

# Teaching Pack No.1

## Early Primary

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# Literacy: Introducing Students to Reading and Writing

1. Beginning to read and write
2. Finding print materials all around you
3. Reading signs

**Key question for the teacher:**

How can you support students learning to read and write?

**Keywords:** early literacy; songs; rhymes; assessment; group work; shared reading

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- used songs and rhymes to teach beginners to read;
- used 'environmental print' and grocery packaging to teach reading, writing and design;
- explored ways of supporting learning with group work;
- developed your ability to assess learning.

## Overview

What should a successful reader and writer know and be able to do? As a teacher, you need to be able to answer this question so that you can guide your students. Learning to read and write successfully takes practice. Therefore, it is important to use a variety of approaches and activities that will keep students interested. It is also important to assess students' progress and to ask yourself whether you are meeting their needs. This section of the Teachers' Pack explores these ideas as it looks at early literacy.

# 1 Beginning to read and write

Learning to read and write is hard work! Because you want students to look forward to reading and writing lessons, it is very important that you make your classroom – and the activities that support learning to read and write – as stimulating as possible.

What successful readers and writers need to know explains that students need to learn how to connect sounds and letters, letters and words, words and sentences. Songs and rhymes that students know well – and to which they can perform actions – help them to make these connections. So does shared reading, in which you read a large-print storybook with pictures, to your students. While you are reading, stop to show them each picture and to ask what they think will happen next. When you have finished, use the book for letter and word recognition activities in which you ask individual students to point to and read particular letters and words. Remember to give students plenty of opportunities to talk about the story – the characters, what happened, how they feel about the story, etc.

## **What successful readers and writers need to know**

### **The language in which they are expected to read and write**

If students have to learn to read and write in a language that is not their home language, this makes the task much more difficult. In this situation, teachers need to start with oral work and vocabulary building in this additional language, using actions and pictures. Only when students have some oral understanding of the additional language can they be expected to use it for reading and writing.

### **The written code**

Students need to understand how the letters on the page represent particular sounds and how they combine to communicate meaning in the form of words. This is why it is important for teachers to give some attention to 'phonics' – the letters that represent particular sounds – when working with beginner readers. To take an example from English, as a teacher you could use a picture of a dog, with the separate letters d o g and then the word dog underneath it. First ask students what they see in the picture (a dog), then point to each letter and pronounce it; then pronounce the whole word. Then check students' understanding by pointing to the separate letters and asking them to make each sound. Next, ask them to tell you other words beginning with the d sound. Also give them some examples of your own.

### **The rules of writing**

Students need to understand how words combine to make meaning in sentences, paragraphs and longer texts (e.g. a whole storybook) and how texts are written in different ways for different purposes (e.g. a recipe for cooking a meal is written differently from a story). In the early years, students begin learning about how writing is organised, but this is something that they learn more about all the way through their studies. Students need to work with whole texts so that they can see how words



connect with one another and how a story or an argument develops. This is why phonics work alone is not sufficient.

**How to read drawings, photographs and diagrams and how to make connections between these visual images and written words**

Students need to be taught to notice details in drawings, photographs and diagrams. You can help them by asking questions such as 'What is the old man holding?' 'What does the hippopotamus have on his back?'

**About the world and how it works**

The more that teachers help students to expand their general knowledge of the world and how it works, the easier it is for students to read about what is new and unfamiliar because they can make connections between what they have already experienced or learned and this new information.

Above all, it is important that students enjoy reading and writing – even when they find it challenging.

### Teaching Example 1

Mrs Nomsa Dlamini teaches students to read and write in isiZulu in her Grade 1 class in Nkandla, South Africa. Nomsa reads storybooks to them, including some that she has written and illustrated herself because there are few books available in isiZulu.

At the beginning of the year, she makes sure that all students understand how a book works – cover, title, illustrations, development of the story – because she knows that some of them have never held a book before starting school. She has found that prediction activities, in which students suggest what will happen next in the story, are useful and stimulating for her students.

Nomsa realises that students need a lot of practice to give them confidence in reading. She makes big print copies of Zulu rhymes or songs that they know well and also ones that she knows are particularly useful for teaching letter-sound recognition. Students say or sing them and perform actions to them. Most importantly, she asks individual students to point out and read letters and words. Some students find this difficult so she notes their names and the letters or words they have trouble with. She prepares cards with pictures, letters and words to use in different ways with these students, either individually or in small groups, while the rest of the class are doing other activities. Nomsa is pleased to find that this helps the confidence and progress of these students.

## Activity 1

Ask students to:

- choose a favourite song/rhyme;
- sing/say it;
- watch carefully, while you say the words as you write them on your chalkboard (or a big piece of paper/cardboard so you can use it again);
- read the song/rhyme with you (do this several times);
- point out (individually) particular letters or words or punctuation (capital letters, full stops, question marks);
- decide on actions to do while singing the song/saying the rhyme;
- perform these actions while singing the song/saying the rhyme again;
- sit in groups of four and take turns reading the song/rhyme to each other.

Move round the class, noting students who find reading difficult.

End by asking the whole class to sing the song/say the rhyme, with actions, again.

**Here are some examples of songs and rhymes:**

### Example of a Luganda song with an English translation

This is a lullaby – a song sung to help children to stop crying. Notice the frequent repetition of the same letters and sounds – particularly in the Luganda version.

Luganda	English
Mwana wa nnyabo, weesirikire Kye nnaalyako nja kuterekera	My dear mother's child, keep quiet I will keep for you whatever I will happen to eat

**Mwana wa nnyabo**

Traditional Ugandan

Voice

Mwa-na wa nnya - bo, wee-si - ri - ki - re; Kye-nnaa - lya - ko -

nja ku-te-re-ke - ra; Baa baa, a-ka - li - ga, kaa-nywa taa - ba; Baa,

baa, a - ka - li - ga, kaa - nywa taa - ba.

Source: A traditional lullaby from Buganda – central Uganda – as collected by music teacher Robinah Nazziwa

**A rhyme in English that is fun to say quickly****Yellow butter by Mary Ann Hoberman**

Yellow butter purple jelly red jam black bread  
 Spread it thick  
 Say it quick  
 Yellow butter purple jelly red jam black bread  
 Spread it thicker  
 Say it quicker  
 Yellow butter purple jelly red jam black bread  
 Now repeat it  
 While you eat it  
 Yellow butter purple jelly red jam black bread  
 Don't talk with your mouth full!

**An action rhyme**

I'm a little teapot, short and stout  
 Here is my handle, here is my spout  
 When I get my steam up  
 Then I shout  
 Tip me over  
 Pour me out.

**Song of the animal world – a song from the Congo**

Note: This song is about movement and the sounds of the chorus represent the movement of the creatures.

NARRATOR: The fish goes

CHORUS: Hip!

NARRATOR: The bird goes

CHORUS: Viss!

NARRATOR: The monkey goes

CHORUS: Gnan!

FISH: I start to left,

I twist to the right.

I am the fish

That slips through the water,

That slides,

That twists,

That leaps!

NARRATOR: Everything lives,



Everything dances,  
Everything sings.  
CHORUS: Hip!  
Viss!  
Gnan!

BIRD: The bird flies away,  
Flies, flies, flies,  
Goes, returns, passes,  
Climbs, floats, swoops.  
I am the bird!

NARRATOR: Everything lives,  
Everything dances,  
Everything sings.  
CHORUS: Hip!  
Viss!  
Gnan!

MONKEY: The monkey! From branch  
to branch  
Runs, hops, jumps,  
With his wife and baby,  
Mouth stuffed full, tail in air,  
Here's the monkey!  
Here's the monkey!

NARRATOR: Everything lives,  
Everything dances,  
Everything sings.  
CHORUS: Hip!  
Viss!  
Gnan!

*Original sources:*

*Yellow butter – Traditional rhymes/songs; New Successful English, Grade 6, Reading Book, Oxford University Press*

*Song of the animal world – Traditional song from the Congo, African Poetry for Schools, Longman*

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## 2 Finding Print Materials All Around you

Some students grow up in homes that are rich in print and visual images: grocery boxes, packets and tins, books for children and adults, newspapers, magazines and even computers. Others have few of these items in their homes. Your challenge as a teacher is to provide a print-rich environment in your classroom. One way of doing this is to collect free materials wherever possible. Packaging materials (cardboard boxes, packets and tins) often have a great deal of writing on them and even very young students often recognise key words for widely used grocery items. For more experienced readers, magazines and newspapers that community members have finished with can be used for many classroom activities.

This part explores ways to use such print to support learning to read.

### Teaching Example 2

Mrs Bakoru teaches English to 54 Primary 4 students in Koboko, Arua District. They are not very familiar with English but they recognise letters and some English words on grocery packaging.

Mrs Bakoru asked her neighbours for empty boxes, packets and tins. She brought these to school to use for reading and writing activities.

The packets you collect for your students could be in a local language - what ever language is being used to teach the students.

Her students' favourite game is 'word detective'. Mrs Bakoru organised the class into nine groups of five and gave each group the same box, packet or tin. She asked students to write down numbers from 1 to 5 and then asked five questions. Students compared individual answers and decided on a group answer. Mrs Bakoru discussed the answers with the whole class. The 'winner' was the group that finished first with most correct answers.

Sometimes Mrs Bakoru invited each group to ask a word detective question.

To encourage students to think critically, she sometimes asked questions about the design of the packaging and the messages in the advertising.

Mrs Bakoru noticed that some students didn't participate, so the next time they played, she asked every student to write down four words from the grocery 'container' before they returned to their usual seats. Back at their seats she asked each one to read their list to a partner. She discovered six students who needed extra help and worked with them after school for an hour, using the same grocery items and giving time to practise identifying letters and words.

Mrs Bakoru realised becoming familiar with letters and words on packages helps students to identify these letters and words in other texts they read, such as stories. By copying words from packages, students also learn to write letters and words more confidently and accurately.



## Activity 2

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Bring to class enough tins, packets or boxes for each group of four or five students to have one item to work with or ask your class to help you collect these items.

Write questions on the chalkboard about the words and images on the packet, tin or box. Either ask your students to read them or do it for them. Here are some examples:

1. What is in this tin/packet/box?
2. How do you know this?
3. Which word or words are in the biggest letters?
4. Why do you think this word or these words are in the biggest letters?
5. How many words begin with capital letters?
6. Which words are written more than once on the package?
7. Which word is used the most?
8. What is the weight of this product (grammes/kilogrammes)?
9. What do all the words and pictures tell you about this product?

Either play the word detective game in groups (see **Teaching Example 2**) or ask students to write individual answers, which you assess. Arrange to give extra practice time and support to students who could not manage this activity.

In the next lesson, ask students to work in the same groups to design the print and visual information for the packaging of a real or imaginary grocery item.

Ask each group to display and talk about their design to the rest of the class.

**What have students learned by reading the packages of grocery items and by designing and displaying their own? Compare your ideas with the following suggestions.**

### **What students could learn from working with grocery packaging**

1. Beginner readers could use the words on the grocery package to gain confidence and skill in recognising the shape of upper and lower case (capital and small) letters of the alphabet and in linking the letter shapes to sounds.
2. By copying letters and words from the packaging, beginner writers could gain confidence and skill in writing these letters and words accurately.
3. More advanced readers could read the 'messages' on the packaging and think about what these mean. They could begin to become critical readers.
4. By working in groups to design some grocery packaging, students could benefit from each other's ideas, learn what is involved in package design, use their imaginations and practise some writing and reading.
5. Some students find it difficult to speak to the class because they don't know what to talk about. Having a design for a package to explain to the class gives students a subject to speak about.
6. Each group's design gives the rest of the class some additional material to read.



7. You could make reading cards with letters/words that some students found difficult to read. Put a helpful picture on each card. Use these for individual or small group reading practice with these students at a suitable time.
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### 3 Reading Signs

Reading and writing can be very exciting and stimulating, but some students develop a negative attitude to these activities. This might be because they find reading and writing very difficult, perhaps because they are bored by reading and writing tasks that always follow the same pattern, or perhaps they don't see much value in reading and writing. One of your challenges as a teacher is to stimulate students' interest in reading and writing and keep them interested.

**Teaching Example 3** suggests activities that may help students to become more interested and confident in reading and writing.

#### Teaching Example 3

Mr Sam Kawanga teaches English to a Primary 5 class in St John Primary School, Kampala. The area around Kampala is a densely populated area with many examples of environmental print outside the school – mainly in English but also in several local languages.

To generate income, people have set up 'backyard businesses' such as grocery shops, barber shops, panel beaters and phone booths. These all have homemade signs and some also have commercial advertisements for various products. There are schools, clinics, places of worship and halls, most of which have signs and noticeboards. On the main road, there are signs to many places, including the respected Makerere University.

Mr Kawanga planned a route around Kampala that would give students opportunities to read and make notes and drawings about different examples of print and visual images. He also prepared a list of questions to guide their observations.

Mr Kawanga has 58 students in his class, including ten who have recently arrived from Tanzania. He decided to ask two retired multilingual friends to assist him with this activity. One speaks Kiswahili, the language of the Tanzanian students. The class went out in three groups.

Mr Kawanga's friends participated in the classroom discussion and the writing and drawing activity that followed. By the end of the week, the three men agreed that students had become more aware of how information can be presented in different ways and in different languages and some seemed more interested in reading and writing than before.



### Activity 3

Before the lesson, read the following to plan the walk and prepare your questions. Write the questions on the chalkboard.

#### Preparing for a community walk

**Step 1:** If your class is very large, you could ask some adults from the community to help you in walking with groups of students. If you do this, meet with these adults before the walk to explain what you would like them to do. They should know what questions you will be asking students and what examples of environmental print you want students to notice. They may also have some suggestions to give you.

**Step 2:** Plan the activity by walking through the area around your school. For some of you this may be a village, for others part of a busy city. (Note: If your school is in a very isolated place, you may need to work with community members to arrange transport for students to a place where they can see a range of environmental print.) Notice every example of environmental print you can draw students' attention to and plan a route for you and the students to walk. The kinds of print and visual images will, of course, vary greatly from one neighbourhood to another but may include names (e.g. school, clinic, mosque, church, community hall, shop, river, street); signs (e.g. a STOP sign); advertisements on billboards or the walls of shops; community notices (e.g. election posters or notices about meetings or social or sports events).

**Step 3:** Prepare a list of questions for students to answer. These could include:

- What does this sign or name tell us?
- Why do you think it has been placed here?
- What language is it written in?
- Why do you think it has been written in this language?
- What information do you get from the drawings or photographs that you see?
- Which signs are easy to read? Why?
- Which signs do you like? Why?
- How could you improve some of the signs?
- What other names, signs, advertisements, posters, notices would you like to have in this neighbourhood? Why would you like to have these?

**To begin the lesson, tell students about the walk and, if they are able, ask them to copy the questions from your chalkboard. If not, have the list of questions ready for each group leader to ask on the walk.**

Take them for the planned walk through your local community.

While walking, they must give or write answers to the questions and draw examples of the print and visual images they see.



Afterwards, ask students in groups to share what they saw, wrote and drew. Ask the whole class to report back and record key points on the chalkboard.

Ask each group to design, write and draw a name, sign, notice or advertisement they think would be helpful to have in their community. Help them with any difficult words. The children may need to work in small groups with an adult to help them.

Ask each group to show their design to the whole class and explain the choice of language, visual images and information.

Display these designs in the classroom for all students to read.

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# Numeracy: Learning Through Games

- 1 Playing number games
- 2 Helping number recognition
- 3 Cultural games

**Key question for the teacher:**

How can games help students learn basic number skills?

**Keywords:** games; group work; investigation; number skills

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- developed ways to use games to raise interest in mathematics;
- used a range of games to help enhance mathematical understanding and number skills.

## Overview

Using games in your classroom can enhance your students' mathematical understanding and skills. These games can range from mental arithmetic games played with the whole class to more complex board games.

This section explores how games provide a cooperative way to stimulate interest and thinking about numbers.

By using local cultural games you help relate mathematics to students' everyday lives.



# 1 Playing Number Games

Using games to motivate all students, even those who are sometimes reluctant in mathematics lessons, can have very positive effects.

Children are able to practise mental calculations and other skills while enjoying playing games.

You should always practise each game yourself before introducing it to students. This will ensure you understand it and can explain it clearly; it will also help you to identify the mathematical thinking needed to play the game. You can make the games yourself or with your class and they can be used again and again.

## Teaching Example 1

Miss Isah, a Primary 2 teacher in Nigeria, found that her students enjoyed playing number games at break time. The boys rolled balls through numbered arches on a table and the girls tossed beanbags onto a target. In each game the winner was the first student to score 20 points, and Miss Isah noticed how some of her students were better than others at adding scores together.

She decided to introduce similar games into her teaching to find out if all her students could add up. She used the same game each day with one group at a time for a week. The rest of the class worked on practice exercises and she divided her time between supporting those playing and the rest of the class. See Using group work in the classroom in the Teaching Pack Additional Resources.

She found that there was a small group of students who were less sure of adding numbers mentally and she gave these students extra opportunities to play and planned other mental arithmetic sessions for them.

Miss Isah also found that her students were more eager to come to class and she decided to use more games in her class in future.

## Activity 1

You should play any games yourself first, so you know the rules and can explain them clearly to your class.

This game enables your students to practise their simple number bonds and use their observational and memory skills. If you have older students you could adapt this game using other numbers and sums. See the following example of a number adding game for how to play, and ways to adapt the game.



### Number bond games

Here are the instructions for the question and answer match game. Below are some examples of questions and answers. You could either copy these or ask your students to draw the squares themselves.

1. Cut up each square separately.
2. 2–6 players can play this game at any one time.
3. Place all the cards face down on the table. Keep the answers and questions separate to help the players.
4. Decide who goes first. Each player takes it in turn to turn over two cards – one from the sums first and then one from the answers. If the answer is right for the sum the player calls the first 'match'. If they get a match, they can have another go. If not, the next player has their turn and does the same. Carry on in this way until all the sums are answered. The winner is the one who has most matches.
5. You could make this more challenging for older students by using more difficult sums, which include subtraction, multiplication or division. You will have to adapt the 'answers'

Examples of Questions				Examples of Answers			
1+0=	0+2=	1+1=	2+0=	1	2	2	2
1+2=	2+1=	0+4=	1+3=	3	3	4	4
3+1=	2+2=	0+5=	4+1=	4	4	5	5
1+4=	2+3=	3+2=	0+6=	5	5	5	6
1+5=	5+1=	2+4=	4+2=	6	6	6	6
3+3=	0+7=	1+6=	2+5=	6	7	7	7
5+2=	3+4=	4+3=	8+0=	7	7	7	8
1+7=	2+6=	6+2=	3+5=	8	8	8	8
4+4=	0+9=	8+1=	2+7=	8	9	9	9
3+6=	4+6=	7+3=	9+1=	1	2	2	2

You will need to make several copies of the game or you could involve students to help you make their own copies.

- Organise your students into groups of five or six, and provide each group with a game.
- Encourage groups to talk to one another about the game and the rules.
- Each group selects a leader who makes sure the game is played fairly.
- As the students are playing, go around the class observing anyone having problems so you can plan ways to help later.

Ask yourself:

- What number skills are students practising as they play these games?

Questions you may wish to consider or discuss with a colleague:



- Did the students enjoy the games? How do you know they enjoyed them? Look for other examples in other subject areas.
- Did all the students participate? If not, how could you ensure everyone takes part?
- Did you feel that you were in control of the whole class?
- How could you improve this lesson? Would smaller groups be better?
- Did you give the students enough time for their tasks?

## 2 Helping Number Recognition

Games can be played in small groups or as a class. Playing with the whole class needs preparation and adequate resources. Allowing games to be played at times other than class time will encourage more learning and help to consolidate ideas. Setting up a games club in your school may also encourage more students to play.

### Teaching Example 2

Lucy played Bingo with her Grade 2 class because she thought it was a great game to help students recognise two-digit numbers.

She played the game with the whole class first. She gave each student a card and some buttons. A student drew cards, numbered 10 to 50, from a box and read them to the class. If a student found the number read out on their card, they placed a button over it. The first student who had buttons covering a row, column, or diagonal correctly won the game. As the students played the game, Lucy went around the class helping. The successful completion of a row, column, or diagonal is evidence of the ability to recognise two-digit numbers correctly.

Next, she divided the class into groups of eight and they played the game at their own pace, taking it in turns to be the caller.

Lucy also allowed students to play Bingo at break and she was surprised how many students played, especially on a wet day. She also noticed how much more confident they became in mathematics classes. She extended the game by putting more cards into the game using numbers 51–99 for her more able students.

### Activity 2

In this activity, ask your students to play one of four games described below and identify any mathematics they think they are learning. You may need to help them identify the mathematics

- Organise your students into groups of four or five.
- Provide each group with one of the four number games.





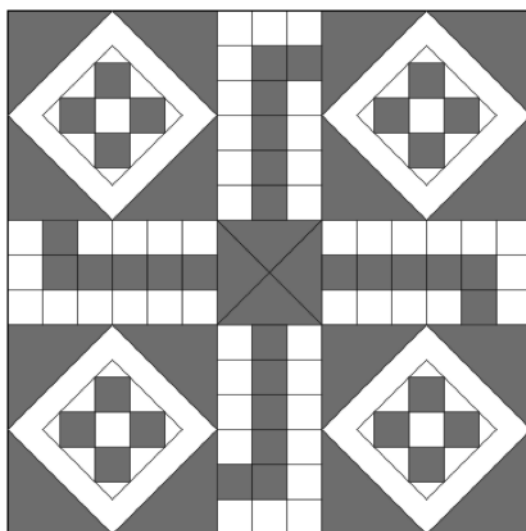
- Ask each group to discuss the game, checking they understand the rules before playing.
- After playing each game for a set time, ask groups to list what mathematics they think they have practised using the following table.

### Games to practise numeracy skills

#### Ludo

A simple children's board game for two to four players, in which the players race their four tokens from start to finish according to the way the dice falls.

Players take it in turns to throw the dice and move their tokens round the board. When a player throws a 6 they have the option to start to move another token around the board. If a player's token lands on a space that is already occupied by another player's token, that player has to remove their token from the board and wait until they have thrown a 6 to start again. The winner is the first player to get their four tokens to the centre of the board landing on their matching coloured area.



### Bingo

This is a game of chance where randomly selected numbers are drawn on a bingo card which includes blank squares. One example is below:

5				49		63	75	80
		28	34		52	66	77	
6	11				59	69		82

One person, 'the caller', writes the numbers 1–100 usually on small balls (but you could use cards). The caller then selects these one by one without looking and calls the numbers out. If the player can match that number they cover the number on their card with a counter, or cross it off. It is important that the caller remembers to keep the numbers that have already been called separate, as they will need them later for checking. The caller selects and then calls until one person has covered all the numbers on their card and shouts out '**BINGO!**'. The caller needs to check their card is correct and declares the person the winner.

### A loop card game

'Loop card' games keep students 'on their toes' and listening, as all are involved and they do not know when their card will come up.

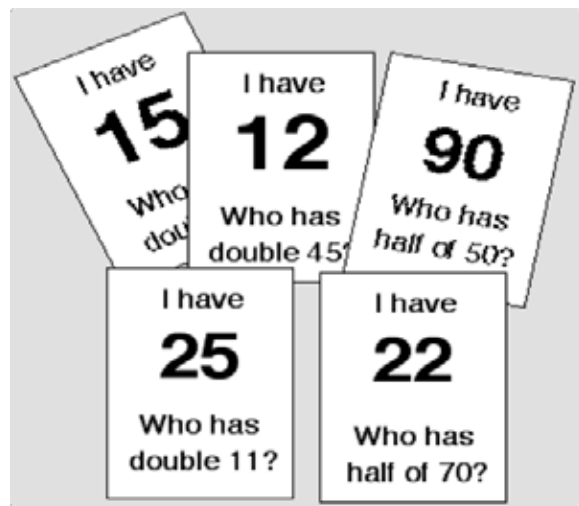
### Instructions

Each card has a number such as 12 (or any other number) and a question. The question can simply be about adding or multiplying numbers, or could involve all four rules of number depending on what you want the students to practise. You can therefore make different sets of these cards, easy and hard, to use at different times. For example, some cards could help students who have particular problems with larger numbers. The examples in the picture below are about halving and doubling.

You need enough cards for each student to have one card. You could also make cards using money, distance etc. as a topic.

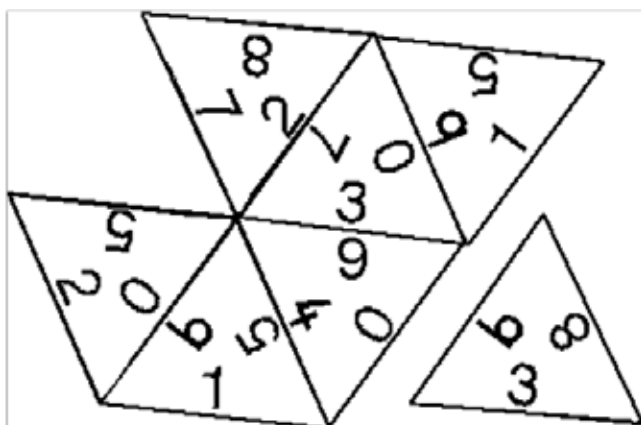
To play the game, the students could sit at their desks or you could organise them into a big circle. Give out a card to each student. Choose one student to start by reading out their question. The child who has the correct answer stands up and says the answer. If they are correct, they read their question. The child with the correct answer to this new question stands up and reads out their question and so it goes on until all the students are standing (or sitting if they all start standing up).

Do not have more than one card with the same number as this will confuse the students. You can use this game often as your students will get different cards each time. It is a good activity to use at the end of a lesson when all other work is finished, and is good practice for their mental mathematics skills.



## The triangle number game

The triangle number game is the most versatile mathematics game for primary children. The game is played much like dominoes, where numbers are matched to each other to make a pattern. Two sides of the triangles are put together according to a chosen rule. In the example below, the 'rule' is that the two numbers must add up to 9.



For older students, the winner is the one to finish their cards first, but younger children usually play cooperatively. The game is best with 2–4 players, although it can be used by one as a ‘patience’.

Some of these examples have been adapted from <http://homepages.which.net/~jenny.murray/games.htm>

If you can, visit the website to get other ideas and examples.

**Table to record numeracy skills**

Tick the mathematics practised by each game; for example, game 1 helps addition.

	Game 1	Game 2	Game 3	Game 4	Game 5
<b>Number</b>					
<b>Addition</b>	x				
<b>Subtraction</b>					
<b>Multiplication</b>					
<b>Division</b>					
<b>Making Sets</b>					

- You may then want groups to try one of the other games. If you have time, you could continue until each group has played all four games (rotating different activities like this is sometimes called a 'circuit'; using a circuit approach allows one set of equipment, in this case a particular game, to be used by the whole class).
- Pin all the results on the wall so that they can be discussed.

You may have to let them play over more than one lesson or let them play during break times.

### 3 Cultural games

Playing cultural games is another way of motivating students. This helps them see that mathematics is a popular, universal and historical activity. There is a very popular game played all over Africa, which has a variety of names.

There are many versions of this game, described in detail in the next activity. It involves important mathematical skills and can be played by students of different ages.

Understanding how games can be adapted for use by students of different ages is important for a teacher. For example, in its simplest form, this game is suitable for younger students as it encourages counting and understanding the concept of one-to-one correspondence. As you extend the game, students learn about addition and subtraction. If you are teaching students at different levels, see Working with large and/or multigrade classes at the end of **Teachers Pack No. 1**.

#### Teaching Example 3

Mr Mathivha told his class about a game (the game described below) that he had played as a child. He said they would play it in their next mathematics lesson.

He showed the class the board used and demonstrated the game by asking two students to play as he explained the moves. While the class



watched, he encouraged them to ask questions.

He then gave out resources for students to play the game in pairs (four students per game) so they could talk with their partner about the moves. As they finished, he asked them to identify the number skills needed to play the game.

Finally, he gave the students permission to take the games home and play with someone there for the rest of the week.

At the end of the week, Mr Mathivha asked his class what those at home thought about the game. Many said their parents and grandparents had played the game as children.

### Activity 3

Before you start, check you know the rules of the game.

#### The cultural game of Africa

This game has many names, for example:

- Moruba (also maruba) by the Pedi of South Africa
- Kpo by Vai people of Sierra Leone and Liberia
- Ajua by Luo in Kenya
- Omweso by Ganda of Uganda
- Bao by Swahili in East Africa
- Gambatta in Ethiopia
- Ayo by Yoruba in Nigeria
- Oware by Igbo in Nigeria
- Warri by Asante in Ghana

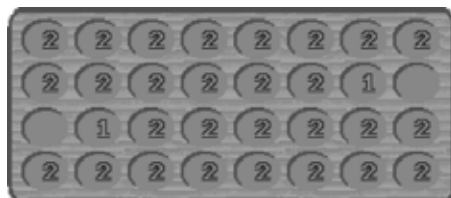


In the past, boards for playing the game have been made from beautifully carved wood, bronze (in the royal court of Benin, Nigeria) or gold (by the Asante Kings in Ghana). Now there are less elaborate versions available and you can make your own using a piece of cardboard and drawing the required number of circles.



### Rules for Playing Moruba

The size of the game board depends on the number of players. Most common is a board which consists of four rows of eight holes (mekoti) each, but there are old photos which show boards that had up to 16 holes per row. The holes are dug into the earth. The counters are usually pebbles called mathlapa ('cattle').



#### Initial position

Each player only uses his/her side of the board, which consists of two rows.

At his/her turn, a player takes the contents of one of his/her holes, which must contain at least two stones, and distributes them, one by one, counterclockwise into consecutive holes on his/her own side.

If the last stone falls into a non-empty hole, its contents are distributed in another lap in the same direction.

The move ends when the last stone is dropped into an empty hole.

If the last stone is put into an empty hole of the inner row and the opposite hole of the opponent contains stones, these enemy stones are 'killed' (tlaba). Additionally, the stones of the outer hole directly behind it are 'captured' (tlola) and the contents of any other enemy hole. The killed or captured stones of the opponent are removed from the board.

When a player has only singletons, he/she is permitted to move them, but only in empty holes.

The player who has still stones at the end of the game is declared the winner, while the other player who has no stones left, has lost. Draws are not possible.

*Original source: <http://www.wikimangala.org/wiki/Moruba>*

- Collect enough boards and 58 seeds/beans for each group.
- Divide the class into groups of four and provide each group with a board and 48 seeds/beans.
- Ask each group to identify two volunteers who will play the game.
- Let two other students help the volunteers play.
- While the game is in progress, move around the class, helping where needed. Listen to what the students are saying and write down any mathematical words they use.

**Discuss with the students what you heard. What mathematical skills were they practising in the game?**

## Science: Plants

1 Simple plants

2 Knowing our plants

3 Local plants

**Key Question for the teacher:**

How can you help students investigate local plants?

**Keywords:** plants; reproduction; flowers; project; nature trail

**Learning Outcomes for the Teacher**

**By the end of this section, you will have:**

- explored how to help students ask questions, observe and make deductions to develop their knowledge of local plants;
- worked with students to develop positive attitudes to how the local habitat is valued and cared for;
- planned and carried out a class project to develop a local nature trail.

## Overview

How many species of plant grow locally? How many can you and your students recognise?

In this section, you work with your students to establish what they know about plants. This is your starting point for introducing new knowledge. The new knowledge will then be more likely to make sense to them and be more meaningful. The emphasis throughout this section is on practical activities, encouraging students to explore, observe carefully and investigate their own environment. This includes planning a nature trail with your students. This work will help them develop a positive attitude to their local environment, valuing and caring for the different species.

# 1 Simple plants

What makes plants so special? Two things. Almost all plants make their own food from water and a common gas in the air – carbon dioxide. The special green pigment, chlorophyll, traps the energy of sunlight, forming energy-rich carbohydrate. At the same time, plants release oxygen. People and animals would not exist if it were not for plants. This is why we should take plants more seriously!

A good starting point for exploring plants is to look at some of the simpler non-flowering plants. Simple plants do not have flowers, pollen or seeds; they reproduce in different ways. This group of plants includes mosses, ferns and lichen.

Do you have examples of these in your local environment?

On your usual walks, try to find examples of these different plants; this will give you ideas for questions to raise with your students. You could collect some to bring into your class.

## Teaching Example 1

Mr Karume and his class in Tanzania walked round the area near their school, hunting for examples of simple plants. They found tiny mosses, green tufts growing on the bark of the shady side of tree trunks and rocks. They looked at lichen, which grew on the bark of the sunny side of tree trunks and rocks and even roofing. They found small ferns growing in cracks in the wall near the rainwater tank. They drew each plant and noted where it was growing.

When they were back in the classroom, Mr Karume asked his students to think about how these plants were able to reproduce. He displayed all their ideas on newsprint round the classroom.

To find out more, the students collected some moss and grew it under the bottom half of a clear plastic bottle. After a time, they noticed that the moss produced green, club-shaped capsules that turned brown and split, releasing tiny spores. They discussed whether these would grow into new moss.

The students then went back to observe the ferns and the lichen. They discovered that all the ferns had patches of scaly brownish spore capsules on the undersides. They kept observing the lichens, but saw no spore production. Mr Karume asked a local high school biology teacher to tell them more about lichen and how it reproduces. He was very pleased with how these activities had increased his students' awareness of these plants.

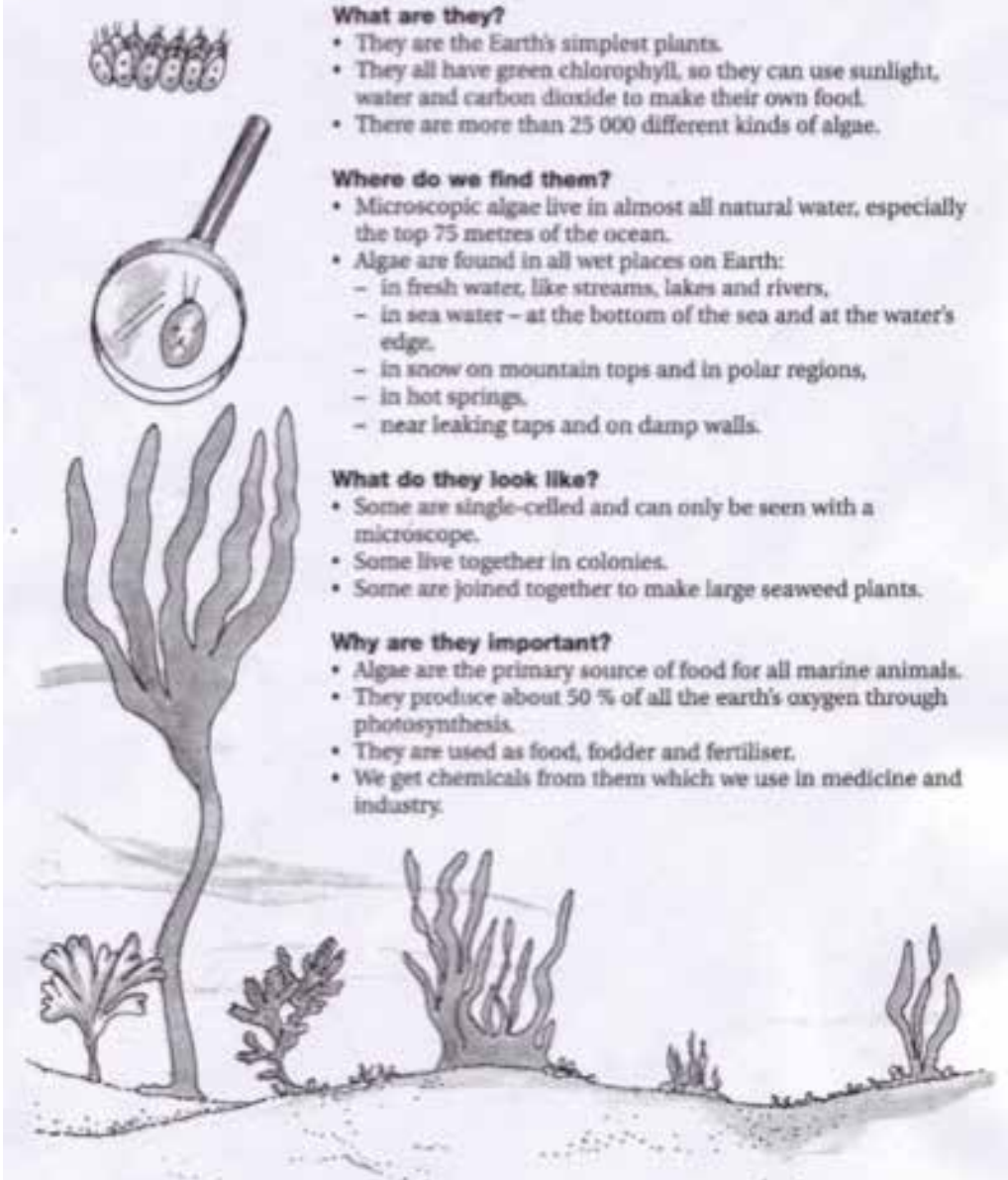


## Activity 1

Here are some examples of simple plants.

# About the plant groups

## Algae



**What are they?**

- They are the Earth's simplest plants.
- They all have green chlorophyll, so they can use sunlight, water and carbon dioxide to make their own food.
- There are more than 25 000 different kinds of algae.

**Where do we find them?**

- Microscopic algae live in almost all natural water, especially the top 75 metres of the ocean.
- Algae are found in all wet places on Earth:
  - in fresh water, like streams, lakes and rivers,
  - in sea water - at the bottom of the sea and at the water's edge.
  - in snow on mountain tops and in polar regions,
  - in hot springs.
  - near leaking taps and on damp walls.

**What do they look like?**

- Some are single-celled and can only be seen with a microscope.
- Some live together in colonies.
- Some are joined together to make large seaweed plants.

**Why are they important?**

- Algae are the primary source of food for all marine animals.
- They produce about 50 % of all the earth's oxygen through photosynthesis.
- They are used as food, fodder and fertiliser.
- We get chemicals from them which we use in medicine and industry.

## Mosses

### What are they?

- Mosses are very small green plants which are about 65 million years old.
- The fossil remains of mosses look very similar to the mosses we find today.
- There are more than 20 000 different kinds of mosses.

### Where do we find them?

- Mosses grow in places that are damp for long periods. We find them:
  - on damp rocks,
  - on forest floors,
  - near drainpipes, drains and gutters,
  - on the ground shaded by other plants.

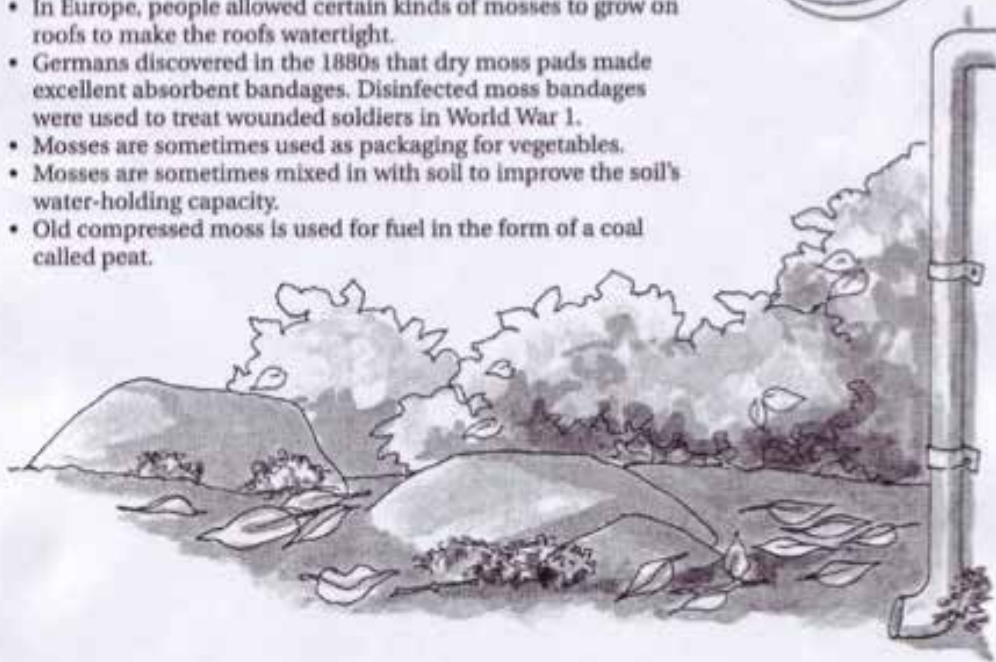
### What do they look like?

- Most mosses are only a few centimetres in size.
- Some mosses look like sheets of cells, with other structures growing out of them which are used for reproduction.
- Some mosses are simply many-branched stems with leaves growing out of them.

### Why are they important?

Mosses have been used for a variety of interesting purposes:

- Native Americans used to grind up dried moss into a paste which they used to treat burns.
- In Europe, people allowed certain kinds of mosses to grow on roofs to make the roofs watertight.
- Germans discovered in the 1880s that dry moss pads made excellent absorbent bandages. Disinfected moss bandages were used to treat wounded soldiers in World War 1.
- Mosses are sometimes used as packaging for vegetables.
- Mosses are sometimes mixed in with soil to improve the soil's water-holding capacity.
- Old compressed moss is used for fuel in the form of a coal called peat.



## Ferns

### What are they?

- Most ferns are small plants growing no more than a metre high.
- There are some ferns that grow as high as a small tree and are woody (tree ferns).
- All ferns have veins and vessels for conducting water, mineral salts and food.
- At one time in Earth's history, ferns were the most dominant type of plant.
- There are more than 10 000 different kinds of ferns.

### Where do we find them?

- Ferns are land plants but they need water for reproduction.
- They grow in cool, moist, shady places, like the floor of tropical rain forests and on the banks of rivers and streams.
- They also grow in places that get lots of water at certain times of the year.

### What do they look like?

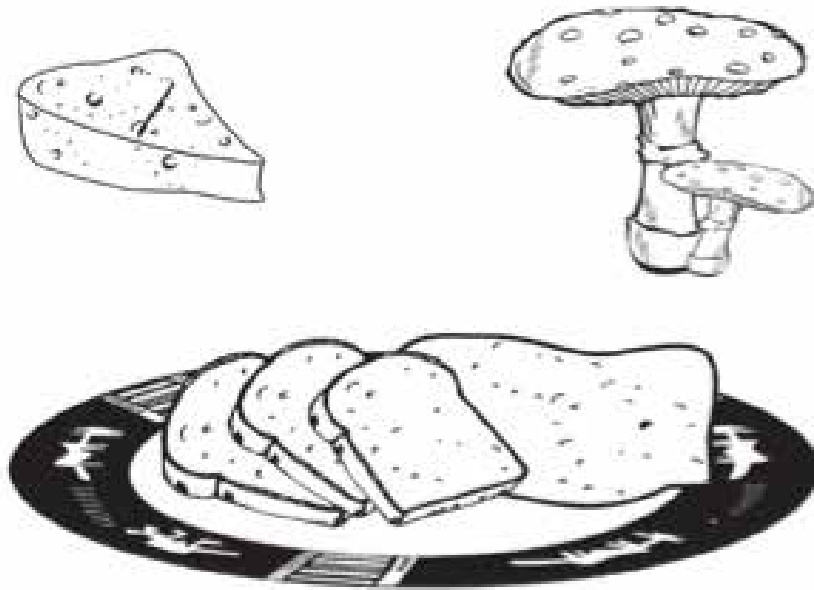
- The individual leaves of a fern together make up fronds.
- On the back of the fronds dots of brown sori are found. Sori contain spores, which are used in reproduction.
- The tip of a frond unrolls like a spring as the frond grows.

### Why are they important?

Ferns were the dominant plants on Earth 300 million years ago. At that time Earth's climate was warm and rainy and the land was covered by shallow seas and swamps. The ferns grew throughout the year, but as they had shallow roots many ferns toppled over into the swamps. Here they rotted slowly. Eventually, over a long period of time, they became covered with rock. Over millions of years they turned into coal and oil, which we use today for fuel and other purposes.



## Fungi



You could use algae or moss or ferns for this activity.

Freshwater algae are plants that make food and give off oxygen. Grow some algae in the classroom by letting some water turn green in a clear open glass (or collect some algae locally).

- Encourage students, working in small groups, to think of questions to ask about the algae. What would they like to know about it? Remind your students of the seven characteristics of living things. Does it need light to grow? Where does it come from? Why is it important? Each group of students should record each question on a piece of paper or newsprint.
- Ask each group in turn to share their questions. Display the questions in suitable clusters on the classroom wall and discuss them. Which questions could you investigate? Which do you need to look up in a book or ask an expert or use the Internet? Which might be very difficult to answer?

## 2 Knowing our plants

An important part of thinking scientifically is looking for patterns and organising observations. You and your students have been looking at simple plants, which reproduce without flowers, pollen or seeds. But most plants today, from the tiniest grass plants (grass has very inconspicuous flowers) to the tallest of woody trees, have flowers that make pollen and produce seeds carried in a closed ovary.

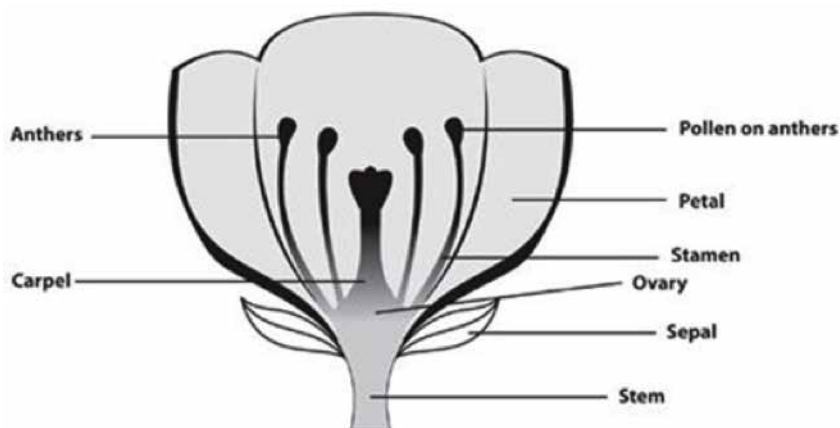
Here is a checklist for your own planning (or for use with older students) You would want to adapt the language for use with younger students.



### Reproduction in flowering plants

Flowers contain the reproductive parts of a plant – they produce the seeds from which a new plant will grow. Flowering plants reproduce by two special sex cells joining together. The male sex cell (pollen) joins with the female sex cell (ovum) to become the first cell of a new organism. This cell then divides to become two, then four, then eight ... and so on until there are millions of cells in the seed. The seed then germinates and grows into a new plant.

The diagram shows the parts of a flower:



- The stamen is the male parts of the flower.
- The anthers, at the top of the stamen, contain thousands of grains of pollen.
- Each pollen grain contains a male sex cell.
- The carpel is the female part of the flower. At the bottom of the carpel is the swollen part – this is the ovary.
- The ovary contains several ovules.
- Each ovule is a female sex cell called an egg cell.
- Ovules are bigger than pollen grains – sometimes you can see them with a hand lens.
- Plants need help to get the pollen grains from the stamens to the top of the carpel of another flower of the same kind: this is cross-pollination. (Self-pollination is when this happens in the same flower.)
- In cross-pollinating plants, the stamens usually ripen to produce pollen before the carpels have fully developed so that self-pollination does not occur.
- Some plants use insects to help them pollinate. The insect, in search of food, is attracted to the flower. The pollen brushes onto the insect's body and sticks. The insect then visits another flower and some of the pollen will rub off onto the carpel of the next flower.

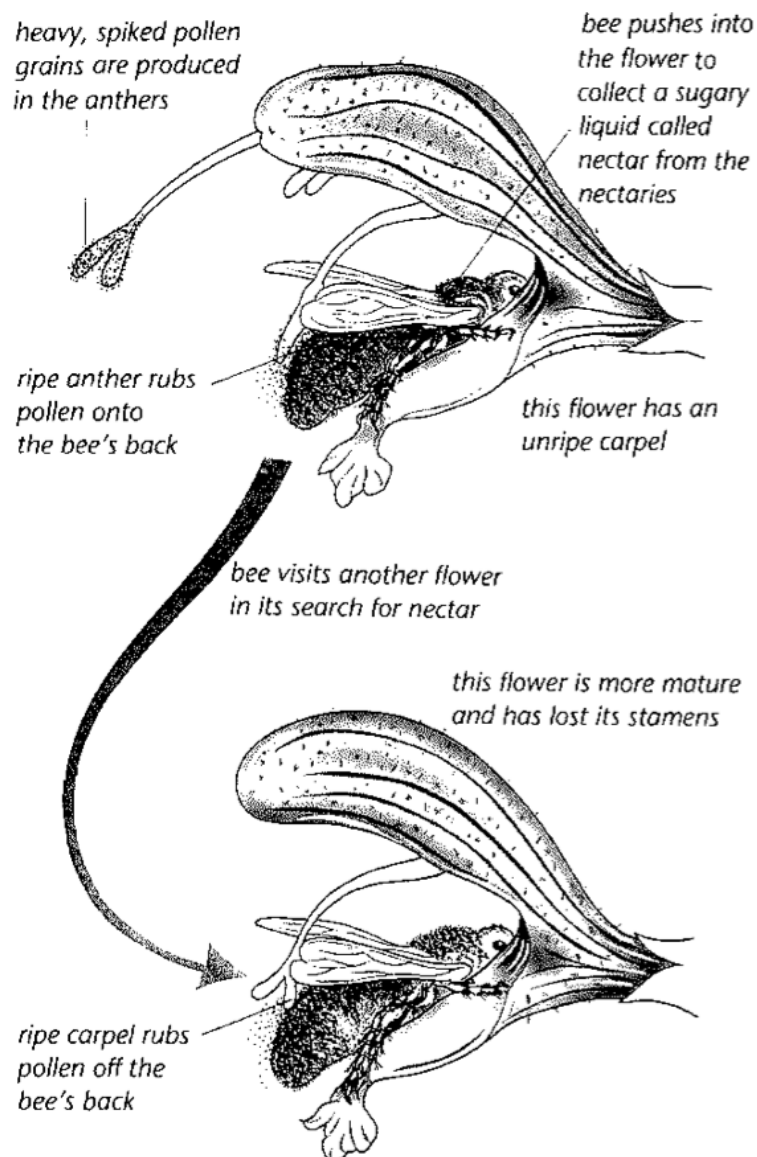




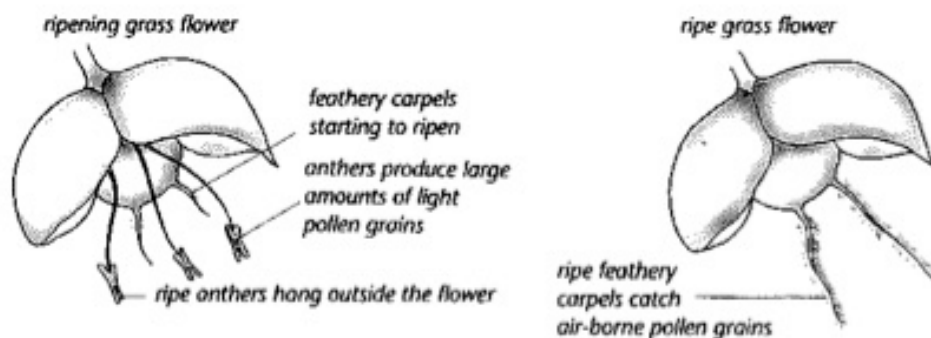
- Flowers that use insects to help them pollinate usually have brightly coloured petals, scents and large sticky pollen grains.
- Some plants use the wind to help them pollinate. These plants usually have male and female parts that hang outside the flower. They are not usually brightly coloured and their pollen grains are small and light. Grasses are pollinated in this way.
- After pollination, a tube grows out of the pollen grain and down to the ovary.
- In the ovary, the nucleus of the male sex cell joins with the nucleus of the female sex cell – this is fertilisation.
- Fertilised ovules develop into seeds and the ovary changes to become a fruit.

### Examples of pollination

#### Insect pollination



### Wind pollinated plants



In **Activity 2** you work with students to find out the common features of flowering plants and try to solve a problem – how does each plant pollinate? In this type of activity your students will be involved in speculating, sharing and reforming their ideas. It is important that you and other students listen carefully to everyone's ideas and do not dismiss what anyone says. The discussion should challenge the ideas, not the person – otherwise students will not be happy to do this kind of activity.

Following the activity, you might want to start a checklist of local flowering plants. You could use scrapbooks to keep the information for future reference, as well as drawings and pressed dried specimens. Other students in the school and parents may enjoy looking at these scrapbooks and adding their own comments.

### Teaching Example 2

Mrs Ollenu set her class an activity for the holidays. She asked them to report back on the number of examples they could find of plants (alive or dead) being used to form a protective barrier in some way. A barrier keeps things in or out of a place. She told them they could also interview older people to discover what happened in the past, or find photographs in old magazines or newspapers.

The next term, students reported back on what they had found out. Mrs Ollenu was delighted with their findings and the class were very surprised at the number of different examples. They didn't just have examples of hedges and wooden fences; they also had windbreaks, creepers grown over structures to provide shade, cane screens and cotton cloth curtains. Mrs Ollenu gathered their ideas on a large poster on the classroom wall. Some students had brought in drawings, so this was a very colourful and informative display.

She used this display as the starting point for a class debate on the advantages and disadvantages of plants as barriers.

## Activity 2

- Organise your class into pairs, or into groups of four if you have a large class. Ask each pair or group to find a flower that grows in your local area.
- Now ask each pair to find out everything they can about the structure and function of their chosen flower.
- Use the following instructions and questions as a guide with your students:
  - Draw the structure of the flower.
  - Label the parts of the flower. (To help them do this, you could put up a large drawing of a flower with the labels you want them to use on the chalkboard.)
  - Describe the function of each part.
  - How is the plant pollinated: Do insects visit the plant? Does the pollen hang on stamens outside the flower? Is it in a windy place?

When each pair or group is ready, they could give an oral presentation to the class covering the points above.

Here is an example of the kind of information you might ask the children to look for:

### The gosenga

Here is an example of a shrub or small tree commonly known as the Gosenga, which is widespread in West Africa.

- Name: Gosenga or *Acacia dudgeoni*.
- Where found: sandy soils in open savanna (location Yendi).
- Appearance of plant, leaves, flower and fruit, or seeds: flaky, reddish coloured bark with curved spines at nodes. Light green leaves. Small flowers and dried pods.
- Uses: a gum, firewood, wood for tools.
- Animals that can be associated with the plant: goats, antelopes and horses eat the leaves and young pods; bees get pollen from the flowers.
- Interesting beliefs: bark extract sometimes used for treating diarrhoea and dysentery in children.

## 3 Local plants

How well do your students know the plants of the local area? Do you or your students know what plants of interest grow in the vicinity of the school? Perhaps the school should develop a list of local plants and collect information about them. This could be an interesting and valuable ongoing project to do with your class or school.

Once your students have increased their knowledge of local plants, you could use this knowledge to plan and design a nature project, which will make it easier





for next year's students to learn about local plants. Projects such as this allow students to transfer learning from one context to another, to make decisions and to work closely with others. This enables students to develop skills that help them to become cooperative members of the community.

Undertaking a project like this can be daunting if you have not done it before. You will need to plan carefully and not worry if it does not go exactly as you planned. The important thing is to think about the experience: What went well? What would you change next time? What did you enjoy? Most importantly, did this activity allow your students to be active learners?

### Teaching Example 3

At Akaa-Buem Roman Catholic Primary the teacher came into the class with samples of local plants collected from around the school. Students struggled to identify most of the plants. Yet the week before, they had brainstormed a list of 52 local plants in 15 minutes. They knew the names, but could not always associate the correct name with a specific plant. There was a problem here.

The teacher suggested that her class could increase their knowledge of local plants and also produce a resource for other students in the school. She explained that the students would be responsible for developing an accurate checklist of all the plants they could name and identify in the local area. Then she helped them draw up a plan of how they would approach this, by giving them these questions:

- Which plants are you going to include?
- What information are you going to give about each plant? (e.g. shape of leaves, where it grows, does it have flowers? how big is it? is it useful? do any animals eat it? are there any stories about it?)
- What do you already know about each plant?
- How will you find out more about each plant?
- How will you present this information?
- How will you organise yourselves to do this task as efficiently as possible?

Her students organised themselves into groups, each with responsibility for one area. They set themselves a timetable.

The students responded well to the challenge of increasing their knowledge of local plants. They presented their work to the school in an assembly and also invited parents to come and see what they had learned. Everyone praised their work and the way they had worked together.

The teacher explained that this is the kind of work done by trained botanists. She told her students that they were thinking and behaving like scientists.



### Activity 3

A nature trail is a path that can be walked and which includes places where interesting trees and other plants can be seen. As well as a map that shows sites of interest, a trail often has an information brochure or pamphlet that gives additional interesting information.

Work with your students to plan a nature trail near your school. Developing a nature trail gives more detailed advice for organising this activity, as well as some of the safety precautions you might need to take account of.

#### Developing a nature trail

Developing a nature trail is not a difficult thing to do. You and your students learn a lot and it helps you all appreciate what the environment has to offer.

#### What is a nature trail?

A trail is a planned walk along a mapped-out path. There are sites, or stations, along the trail where people can stop to observe things of interest. There is usually a pamphlet or guide that explains what is to be seen and gives extra details and background information to support people's observations.

#### The first step – discussion

You need to start off by discussing what you mean by a nature trail. The students need to feel it is something worth doing. You should talk a little about what plants you plan to look out for, and what you want to focus on. It could be something simple like how many different types of tree can we find, and what plants do we find associated with the different kinds of trees. Or perhaps you could focus on looking for signs of resilience in plants. Make sure you make a few notes in this discussion.

#### First exploratory walk

You need at least two clipboards so that people can write easily on the walk. If you don't have clipboards, they can be easily improvised using stiff card and clothes pegs. The first clipboard is for a pair of students who volunteer to map the route you take and note down the points of interest. The second clipboard will be for a pair of students who list the plants as they are found. If you have lots of clipboards, students could work in groups of four with two clipboards for each group.

Before you start the walk, speak to your students about appropriate behaviour and think about any possible dangers. The biggest fear might be of snakes, but when a large crowd walks in the bush, any sensible snake makes sure that it is well out of the way. If a snake is seen, it is best left alone. No one should panic. Give the snake time to move away. Then just walk past calmly, avoiding the place where the creature was last seen. Eating unknown plant parts or berries could be dangerous, and students should watch out for thorns and stinging nettles as well as stinging insects like hornets. Another thing to be avoided is somebody letting a branch swing back into the face of the following person, especially if it has thorns.



As you go round the walk, stop when you see anything interesting. Spend a little time observing. Encourage students to ask questions and to try to find answers to the questions raised. When you come across plants that are not known, ask one pupil to be responsible for finding out its name and any interesting information about it. They might need to break off a small part of a twig with some leaves, flowers or fruit without harming the plant. If you have a camera/cellphone you could take photos of each plant and tree.

A circular path is best, but the way will also depend on the paths available to you.

### **After the walk – discussion**

When you get back to the classroom, discuss what went well. What didn't you see that you were hoping to see? Did you notice any differences between north- and south-facing slopes? Or any differences near streams, lakes or roads?

### **Research**

Give your students a few days to find out about the plants that were not well known. Let them report back and write up what they have found.

### **Second exploratory walk**

Now you want to improve on what happened the first time. You might also want to think of a way of numbering or marking the larger plants that doesn't harm them, but makes identification easier. This is a problem to solve. You need something durable (that lasts) which can be fastened to a plant and can be seen. A few more outings with some of your students may still be needed before a final route is settled and the stations are properly marked on the map.

### **Finalising the nature trail**

Then a pamphlet or booklet can be designed and made. Groups of students could each plan, design and prepare a page for part of the nature trail. Make sure that your students give tasks to different members of the class and that everyone has a chance to contribute to the pamphlet. (If you have access to a computer or laptop, your students could use this to lay out their pamphlet. You might include images from a camera/cellphone or from the Internet).

Your class could now invite other classes or teachers to experience the nature trail that they have designed. It might be interesting to invite some students from a neighbouring school. Another task is to ask some volunteers to design a questionnaire to find out what people think of the trail.

Later, you and your students might want to assess the trail and even think of ways you could improve on your first attempt (perhaps you could survey the opinions of other students who use the nature trail).

# Social Science: Making Local Maps

- 1 Getting to Know the Local Area
- 2 Using Symbols on Maps
- 3 Displaying art from home and school

**Key question for the teacher:**

How can you use the local area to help students understand maps and plans?

**Keywords:** maps; group work; symbols; investigation; game

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- used local resources to develop your skills in teaching about the physical features of your students home and school areas
- used games to extend your students' understanding of maps
- used group work as a teaching and learning strategy to manage large and small classes

## Overview

Most students have some understanding of the area in which they live. They know the quickest way to their friends' houses or the local market. When developing their understanding of place and, in particular, their mapping skills, it is always important to start with what students know before you move on to what they don't know. This gives students confidence, because you are using what they already understand.

Building on what your students know about the physical features of their home and school environments, ensure you move on to more formal mapping of their local surroundings. This provides a meaningful context to explore the symbols used in mapping. The activities in this section will help you encourage your students' skills in observation and help transfer their knowledge into maps and plans.

You will also develop your skills in using group work in your classroom



# 1 Getting to Know the Local Area

Most students know a lot about their local area and may be able to map their understanding of where things are in their own way. First, it is important to develop your students' abilities to observe their local environment and to make these activities meaningful for them. Explain that noticing the features in their surroundings enables them to locate places in relation to each other and to describe places clearly. Having a sense of direction helps students to find

their way around. Once they understand their own environment, and their way around it, your students can begin to explore the wider world.

One way to start observing the local environment is to encourage your students to keep a notebook with them and to draw or write down any interesting things they see as they move around the local area. Another way is to work with your students to produce a class mural or picture on the classroom wall. Each day, a small number of students could add pictures (and words from older students) of things in the local area

## Teaching Example 1

Mrs Kazimoto, a teacher at Dabanga Primary School in Tanzania, wants to develop her Grade 3 students' skills at observing and identifying important features in the local area. She will then progress to drawing maps.

Mrs Kazimoto has a large class and so she divides them into eight groups of ten students. She knows that using group work will help her manage the class and ensure that all students participate. It will also develop their cooperative learning skills. (See 'Using group work in your classroom' at the end of Teacher's Pack 1)

She asks each group to list all the features of the school grounds that they see as they come to school, such as trees, buildings etc. She asks one person in each group to write down all the important information. After a few minutes, she stops the class and asks each group to read out one feature from their list, which she writes on the board. She keeps going round the class until they have read out all the features.

Next, Mrs Kazimoto hands out large pieces of paper to each group and asks them to mark in the middle a square for the school. Each student is then asked to place a feature on the paper in the correct place.

When each group has finished, Mrs Kazimoto sends them outside to see what they had in the right place and what they need to move or add. Their plans are modified and then displayed in the classroom.

Mrs Kazimoto sees that two groups have managed very well. The other groups have had to modify quite a few features and she plans to take these students out in groups to do some more simple mapping of the school



### Activity 1

- Ask your students to observe and record in their notebook or exercise book 6–10 important things they see on their way to school the next day. Younger students might do drawings.
- In class, ask each student to arrange what they saw in the order they saw it.
- Explain to the students what a physical feature is.
- Ask the students to tick the physical features on their list.
- Ask them why some of the things they observed are not physical features. Would they expect to find these on a map? Discuss why this is so e.g. some things such as dogs and cats move, as do cars, so these are not (permanent) physical features.
- Ask the students from which direction they come to get to school i.e. North, South, East and West (N, S, E and W). You may have to explain about this and have a map ready for them to see or remind them about N, S, E and W.
- Based on the directions, form four groups, each comprising students who come from roughly the same direction. If all your students came to school from only one or two directions, we suggest you take your students on a class walk to explore the other directions.
- Ask each group to make one joint list of the physical features found on their route home. Can they put them in the order in which they would see them on their way from school to home?
- Display the lists, according to the direction, on the walls of the classroom.

**What other activities could you do to develop your students' observation skills?**

## 2 Using Symbols on Maps

Observing the features of the local area is a first step to producing a map. To help your students understand a map, you need to introduce them to the idea of **symbols**.

### Teaching Example 2

Miss Yaa Nsiah, a teacher of Class 5 students in Cape Coast, Central Region, wanted to build on students' knowledge of direction and the local environment to introduce the idea of using symbols to represent physical features. She decided to hold a treasure hunt.

Before the lesson, she observed six physical features of the school, including the gates, the large tree and the head teacher's office. She found six pieces of cardboard and drew one symbol on each to represent one feature (e.g. a desk for the head teacher's office). She then numbered the card and added directions to the next symbol on each card. She placed the pieces of card at their specific locations.



In class, the students were divided into 'search parties' and given their first clues. They had to go outside the classroom, and turn in an easterly direction – the teacher helped by telling them this to get started. When they found the card at the feature this gave them the next direction to move in, and another symbol to find, and so on.

The students found this game very exciting. They were very involved in trying to work out what the symbols meant and move in the right direction. Miss Nsiah followed the groups around and was on hand to help any that were struggling with what the symbols meant or which direction to follow.


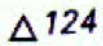

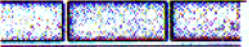




Everyone reached the final card. Miss Nsiah was pleased because she knew they had managed to interpret all the symbols and understand direction better.

## Activity 2























- Begin your lesson with a brief explanation of the use and importance of symbols on maps. Ask students to give you examples of common symbols they know that are used around them (e.g. on roads) and use these to build up a list of standard symbols. (See **Map symbols** at the end of Activity 2 for some examples.) You could build the list up over a week and make a classroom display.
- Ask students to think about why the geological survey department has used these symbols rather than words. This kind of questioning will help them to think of the value and importance of symbols. Now ask each student to think of three physical features they see on their way to school and draw a symbol for each. After a few minutes, ask students to swap their symbols with a partner. Can the partners guess what the symbols mean?
- Ask some students to come and draw their symbols on the board. Can other students work out what they mean?
- Finish the lesson by seeing if the students can decide what makes a good symbol.

List their reasons on the board

### Map Symbols

Road: National freeway		Trigonometrical beacon (the beacon number shows height)	
Road: National route		Urban built-up area	
Road: Arterial route		Building (of significance or isolated)	
Road: Main road		Bridge	



Road: Secondary road		Cultivated land	
Railway (showing a station)		Row of trees (where of significance)	
River: Perennial (has water all year)		Wind pump	
River: Non-perennial		Communication tower	
Dam		Eroded area	
Pan: Perennial		Boundary: International	
Pan: Non-perennial		Boundary: Provincial	
Pan: Dry		Boundary: Cadastral farm (original farm)	
Canal		Boundary: Game reserve	
Powerline (major lines only)		Boundary: State forest	
Spot height (elevation at a point)		Contour	

### 3 Understanding Local Maps

Developing knowledge and understanding of the standard symbols that are used on maps worldwide will help your students explore physical features of any area in the world. It will also help them understand the way maps are constructed and their value in daily life, especially as they grow and travel to new areas.

However, it is important to use ways of working that involve students actively in exploring their surroundings and thinking deeply about the problem they are trying to solve. Using local resources and experts helps students understand more as the context has meaning for them. It may be possible for you to find someone who is knowledgeable about maps to come and speak to the students about how maps of their local area were drawn and explain the meaning of the symbols that depict local physical features.



### Teaching Example 3

Mr Chukwu is a teacher in an urban primary school in Western Region. He wanted his students to be able to study a map and recognise the physical features in any area.

Mr Chukwu decided to use a real map of the city of Takoradi and so, two weeks before he planned to do the work, he visited the geological survey department to obtain a number of topo sheets of the area. He drew up a worksheet for his students to use based on the topo sheets. Because this work would involve symbols, he also drew up a chart of symbols, which he planned to display in the classroom.

As the geological survey department was only able to give him five topo sheets, he divided his class into five groups. Mr Chukwu showed his students the chart that identifies the symbols, and handed out a map and one of his prepared worksheets to each group. He had identified a number of roads, major buildings, some bus stations, a market and a hospital, all of which the groups had to find on the map.

Next, he asked the students to work out the scale. He explained that map scales compare the size of the map with the real size of a place. Mr Chukwu showed his students how to read the information shown on the scale statement and the scale bar.

When the groups had finished analysing the maps and completed the worksheets, they swapped their worksheets with other groups, and checked to see whether they had found the same answers. Where there were inconsistencies, Mr Chukwu asked the groups to confer and agree on an answer.

At the end of the lesson, he went through the symbols with the whole class. Where groups had come up with different answers, they discussed the reasons and agreed on a final answer.

### Activity 3

- Tell the class that you are going to draw a large map together of the different routes they take to school and the physical features around the school.
- Divide the class into four groups according to the direction they take from their homes to school (N, S, E and W).
- Ask each group to list the physical features that they see on the way to school
- Mark four spaces on the ground – or on a large piece of paper or plain cloth – N, S, E and W.
- With your younger students discuss the symbols to use and draw them on the board. Then ask them to use the symbols on their maps.
- Then each group adds to what was not drawn by their fellow students.
- Once the big picture is completed, discuss with the students how they now have a large map of the whole area around the school in front of them.

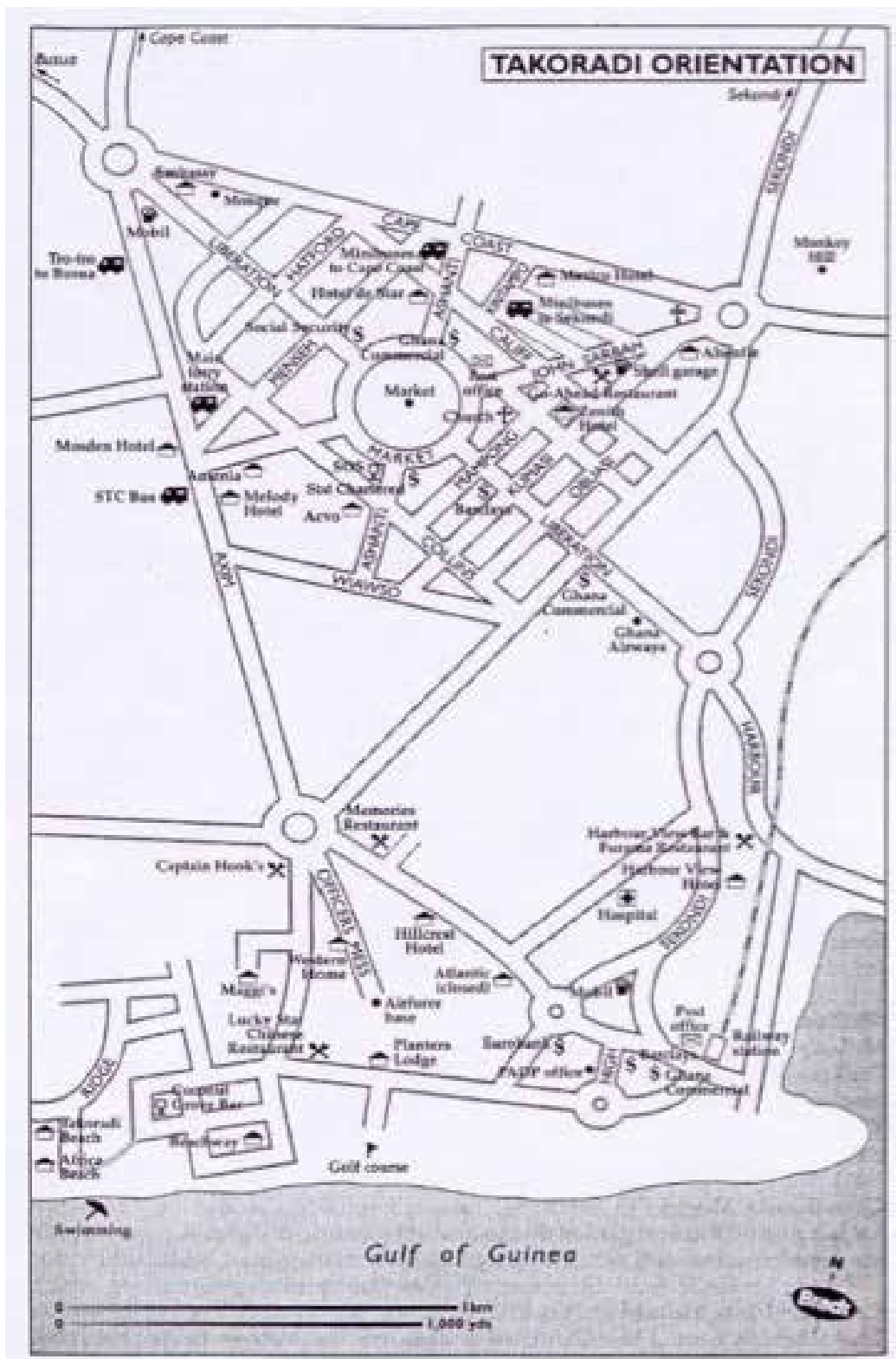


- Ask the students from different groups to look at a map from another route and see if they can identify what the symbols mean.

Finally, ask students to draw their own small maps of the school and its surroundings, using the larger map as a guide.



Here is an example of a map and questions to ask your students about it  
 A Map of Takorada



#### Questions about the map of Takorada

- If you wanted to buy petrol for your car, which three streets might you go to?
- Which sport might you play if you were next to the beach?

- c) Can you name two banks located within the area shown on the map?
  - d) What is next to the railway station?
  - e) Where is Takoradi market located?
  - f) If you wanted to take an STC bus out of Takoradi, which street would you go to?
  - g) If someone asked you for directions to Takoradi hospital, which hotel could you tell them that it's near?
- 



# Life Skills: Ways to Explore who Students Are

- 1 Similarities and Differences
- 2 Feelings and Opinions
- 3 Understanding Your Students Better

## Key Question for the teacher:

How can you help students explore who they are in ways that are sensitive and stimulating?

**Keywords:** class management; questioning; group work; thinking; data gathering; respect; sensitivity

## Learning Outcomes for the Teacher

By the end of this section, you will have:

- developed your skills in organising the class in ways that will help students show respect for each other
- developed your skills in asking questions to encourage thinking
- used different ways to gather data to help students discuss who they are

## Overview

We all learn best when we feel comfortable and safe. As a teacher, one of your key roles is to support your students so that everyone is able to participate fully and feels they are respected and their ideas are listened to.

This section explores how to do this by looking at different ways of organising the class. You will help students learn how to treat each other with respect by:

- helping them understand their similarities and differences
- asking them to share opinions and feelings
- giving them tasks where they can ask each other questions and listen to the answers.



# 1 Similarities and Differences

Young children often find it easier to identify difference rather than similarity. In this part, we show two ways to organise your students that will help them to explore differences and similarities.

They will:

- learn how to share information and contribute to discussions;
- learn about themselves and each other;
- have better self-esteem as they realise their ideas are as valued as those of others.

As a teacher, it is important for you to encourage this – if your students all understand their similarities and celebrate their differences, they will treat each other better. You should act as a role model, treating your students fairly and equally.

Before starting, it is a good idea to reflect on this and think about whether you treat your students respectfully. Do you ever have a ‘bad day’ when you shout at them for no good reason? Do you have favourites who you treat more kindly than others? If you can answer these questions honestly, you can take steps to make sure that all your students are treated fairly and respectfully.

You may find the following useful for your own planning. You could ask yourself questions including: What questions will the students ask each other? What information will they need to find out? Will they work in groups? In pairs? How will you organise this? How will you give them instructions to do the activities?

## Teaching Example 1

Chanda teaches at a rural primary school in Mwenda, Zambia. He is working with his students to develop a positive classroom environment. He is looking at the students’ similarities and differences and asks them to think about the ways in which they are all the same.

First, the whole class practises making sentences, e.g.: ‘We all like food’; ‘We all go to school’. Next, he puts them in groups of five to think of five sentences beginning: ‘We all ...’ with one student in each group writing the sentences on a piece of paper.

After ten minutes, each group reads out one sentence. If the class agrees with the sentence, Chanda writes it on the board.

Using the sentences, he shows the class the different ways in which we are the same:

- e.g. physically – ‘We all have skin’;
- e.g. how we experience the same kind of feelings – ‘We all feel happy’;
- e.g. situation – ‘We all are school students’.

Chanda is pleased with the ideas from his class and plans to use this as a starting point to look at differences



## Activity 1

(see **Types of Similarities and Differences** at the end of Activity 1 for some information and ideas)

- To introduce the idea of 'the same', start by asking easy questions. Hold up two pencils and ask: 'Are they the same? Why?'
- Hold up a pen and a pencil. Ask: 'Are they the same? Why?'
- Repeat this, using different objects.
- Ask two children to step forward. Ask: 'Are they the same?'
- Be careful. If they are girls, the students might say 'Yes!' If it is a boy and a girl, they might say 'No!' But they might give other answers e.g. the children might be the same height or have the same name.
- Split the class into pairs. Ask them to look at each other's features including such things as height, foot size and possibly hair, eyes etc. and list how they are similar.
- Share their ideas, one group giving one idea at a time.

**Did they listen to each other? Did they accept the idea of being the same but different? What evidence do you have for your answer?**

### Types of Similarities and Differences

#### Appearance

The most obvious way in which people are different is in their appearance. Some are tall, some are short. Some are fat, some are thin. If you are working with your students to explain similarities and differences between people, then looking at physical features is an easy place to start. You must also be careful: like adults, children can be sensitive about their appearance, so you should try not to draw attention to something that a student might be embarrassed about. Instead, focus on similarities such as 'We all wear clothes'. You will need to be especially careful if you have children with physical disabilities in your class.

In addition, children sometimes tease or bully other children, and drawing attention to differences in appearance might encourage them to behave like this outside of the class. So, as well as helping students identify their differences in appearance, you should also emphasise how many similarities there are. If students can see the connections between themselves and others, they are more likely to treat others with respect

#### Similarities and differences in personality

While it is easier to see the similarities and differences between people's appearances – the way we look – it is probably more important for students to understand the similarities and differences between people's personalities – the ways we think, feel and behave.



Our opinions and feelings influence the way we behave with other people. They can be summarised as follows:

- 'Opinions' cover what people think about things – whether they like or dislike something, or whether they agree or disagree with something. Differences in opinion can sometimes cause arguments and fights, whether with children or adults. Opinions can be based on clear factual knowledge or hearsay which is not always accurate.
- 'Feelings' cover people's emotions – whether something makes them feel happy, sad, angry or frightened etc. Feelings can sometimes be hard to explain, and if someone has different feelings about something to you, it can be difficult for you to understand it.

As children grow up, it is important for them to be able to understand their feelings and emotions, interact with other people, and recognise the needs of others. It is important for children to learn that not everybody thinks and feels the same way that they do. Each person's ideas, feelings and opinions will have been influenced by their home environment, experiences and carers. This diversity (variety) should not be seen as a problem – except where it goes against legally accepted behaviour. The activities in this module will help students begin to appreciate such diversity as a basis for friendship and working together.

As a teacher, you need to understand the feelings of your pupils and make sure that you consider their feelings and differences as you plan their learning. You must be considerate of the fact that some children will enjoy certain activities – e.g. talking in front of the class – and others will not.

However, you must also be fair and equal with your pupils. If you treat each of your pupils differently in class, the children will see this and begin doing the same, both inside and outside of school.

## 2 Feelings and Opinions

Understanding differences in people's opinions and feelings is important in developing good relationships. This is essential when dealing with a class of young people, from many different contexts, (backgrounds and settings), with different opinions and feelings. Your students need to understand this to help them communicate effectively and sensitively with each other.

However, before we can learn to understand different opinions and feelings, we first need to recognise them.

You can compare your students' opinions by organising a survey. You need to plan how to:

- organise the survey;
- explain it to the students;
- check that they have understood.

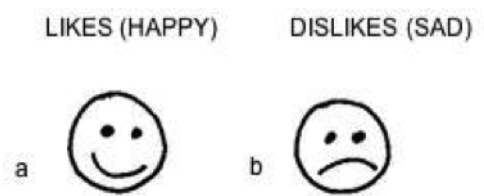




### Teaching Example 2

One week Mr Obeng used a 'Do you like...?' survey with his primary 5 class. He recorded their answers and stuck them on the wall. He often found students reading them and talking together.

The next week, Mr Obeng asked again about likes and dislikes, but this time, he drew two faces on the board:



For each question, they counted the number of 'likes' in the class and wrote the number under face a. They wrote the number of 'dislikes' under face b.

To introduce the idea of feelings, he wrote 'HAPPY' above face a, and 'SAD' above face b. In groups of four or five, the students named things that made them feel happy or sad. Working in small groups helped involve the quieter students.

He repeated the exercise, this time using:



In their groups, the students named things that made them feel angry or frightened. They shared the main ideas together as a class. They looked at whether some things occurred in more than one list and discussed why this might be. Mr Obeng was pleased with how thoughtful they were.

### Activity 2

(See **How to conduct a class survey** at the end of Activity 2 to help you prepare)

- Perhaps start by asking your class easy questions about what they like and dislike, e.g. 'Do you like homework?'
- In pairs, the students think of their own questions about what they like and dislike and record these.



- Draw the chart from **How to conduct a class survey** (at the end of Activity 2) on the board. Ask your students to copy it and choose three of their own questions. With older classes you could put in more questions.
- Explain that they will all ask five students the questions and write down 'Y' or 'N' for the answer under their names.
- Ask the pairs to compare their answers. Ask some students to read out their questions and answers so that the whole class can hear the different responses. Discuss what they have found out from the survey.

Think about what the students learned from the activity and how you know this.

### How to conduct a class survey

#### 1. What is a survey?

A survey is a way of gathering information from many different people on a particular topic. It can explore a range of opinions in a group, and help to find out more about individuals.

To gather the information, a survey usually uses a chart to record the responses. The chart below is one example where the answers could be recorded easily and quickly by using a Y for a yes and N for a no in each box:

Name:	...Faith...	.....	.....	.....	.....
1. Do you like yams?					
2. Do you like...?					
3. Do you like...?					

A survey is an interesting way for pupils to practise finding out information for themselves.

Because a survey has many different stages, it can take a whole lesson to complete – or longer, if pupils have to ask people outside school. Providing time for the data collection to happen is especially important so that everyone is involved and able to see the process in action.

#### 2. Choosing your topic

When deciding to do a survey with your class, you need to think carefully about what the survey will be about – what information will you find out? Clearly, the survey should be linked in some way to the topic in class. For example, if teaching about similarities and differences, a survey about the different foods people like might be an idea. The pupils will be more involved if they suggest ideas themselves.

It is important at this stage to think about the skills that your pupils need to develop and practise. Design a survey that matches your learning objectives

#### 3. Writing the questions

In any survey, it is good for the pupils to think of and write their own questions – each pupil or group of pupils should come up with their own ideas. But you need to think about how you will organise the pupils to do



this. Pair or group work is good if it is the first time that they have done this, as then they can check each other's work. To help pupils do a survey you may need to decide (by yourself or with the pupils):

- how they are to work e.g. individually, in pairs, or in groups;
- how many questions they should write (3–5 is usually enough);
- what types of questions they should ask (provide some examples yourself and ask them for some more examples to check that they understand);
- how much time they will have to write the questions – 10–15 minutes should be enough for 3–5 questions.

It is important to do all the above with the whole class together before they start working. As they work, go round and monitor their work to check that they really have understood the task.

The type of question they will write depends on the kind of information that they want to find out. For example, if the idea of the survey is to gather information about the numbers of pupils who think/like/do something, then they might write 'Yes/No' questions: e.g. 'Do you like football?'

However, if the idea of the survey is to gather information about the range of interests in the class, then they might write 'open-ended' questions: e.g. 'What sports do you like?' They will have to think of ways to record the answers.

#### 4. Asking the questions

Every pupil should practise asking and answering questions on a one-to-one basis. Think carefully about how you would organise this. Here are a few suggestions:

- Pupils do not need to speak to everybody in the class. This would take too much time and also be very repetitive. A sample of five pupils may be enough, and maybe no more than ten pupils – depending on the size of your class.
- If they wrote their questions in pairs or groups, they shouldn't ask each other the questions. Instead, suggest they ask others in the class or school.

Organising pupils into groups to do the survey can be useful if you have a large class. You also need to ensure that all pupils are involved in writing and asking the questions. (See Using **group work in your classroom** at the end of Teacher's Pack 1)

#### 5. Recording the answers

The pupils need to be clear about the responses they are recording and keep these as short as possible.

For example, if they are asking open-ended questions, they can write down one-word answers: Q: What sports do you like? A: football/running/jumping.

If they are asking Yes/No questions, they can write Y or N as an answer.



If they are gathering information on numbers, they could just keep a tally, with one mark representing one person: e.g.

Favourite sports:	Football	Running	Jumping	Catch
Numbers:	IIIII	IIIIII	III	IIII

Again, plan this carefully, and explain it to the pupils before they gather their data. To check they understand, you could ask them to explain it to you, too.

### 6. Comparing answers

After the pupils have asked questions and recorded the information, it is good for them to talk in pairs or groups about their data and compare answers. This data can be used to discuss people's likes and dislikes and they could draw graphs of the results to make it easy to see the differences and discuss what they mean.

Displaying their findings or asking them to write about their findings will help you understand their thinking and give them the opportunity to think more deeply about

## 3 Understanding Your Students Better

Appreciating the similarities and differences among your students will help you become a more effective teacher. You will be able to plan better to match their needs. If your students also understand themselves and others, they will become more confident about participating in class.

As the students realise the ways in which they are different from other people, it is important that they should not start to feel isolated or left out. Part of your role is to help them understand that agreeing with people on one thing and disagreeing on others is acceptable and not a reason for conflict.

When a child is seen to be different because of how they look or behave, other children may bully or tease them. Bullying can make children very unhappy. It damages their schoolwork and stops them from making friends.

Children need to learn how to interact with each other. Your role as teacher is crucial for helping them understand the difference between right and wrong.

How can you encourage this? Below are some other ideas you can use. Try them out. Are they successful? Did you have any problems?

### Teaching Example 3

Mrs Ojo has a boy in her class who is an albino. One day, she had seen some girls laughing at him and calling him names. This made her upset, but she allowed herself to calm down and after school, she asked them: 'Why were you behaving like that?' She asked how they would feel if



somebody teased them, and how they thought it made him feel. With questions like this, she helped them think about their behaviour. Thinking about this afterwards, she decided to help all her students respect each other's differences.

The next day, in class, she used a story about a child with polio to start a discussion about how her students would feel if they had polio. She also used the words and ideas for talking about likes, dislikes and feelings when she needed to talk to the students about their behaviour.

When two boys were fighting, Mrs Ojo talked with them, one at a time, to find out why they were angry with each other and helped them resolve their conflict. When one child was sitting alone, she asked others to find out why and make friends with him. This way, her students began to look after each other. Mrs Ojo was pleased.

### Activity 3

See **Observing your Students** at the end of Activity 3

- Organise your students into groups of five.
- Ask each group to imagine two brothers or sisters whose likes and dislikes are opposite. Ask them to imagine a conflict between them.
- Ask them to role-play the conflict. Two members of the group will be the brothers or sisters. The others could be the mother, father and grandparent.
- First, they should role-play the conflict, and then discuss the conflict all together. Next they should role-play the resolution, which should be a peaceful one.
- Next, the group should discuss their ideas about the causes of the conflict and the resolution.
- Finally, ask each group to act out their role plays to the class, and explain the lesson that they learned. Collect each of these lessons together and display them on the wall to remind everyone.

If you have time, at the end of each role play, allow the rest of the class to ask questions to the group or give further ideas as to how the conflict could be resolved.

#### Observing your students

Observing or watching your pupils at work in the classroom or playing in the playground is a very good way to build up a picture of them as people. It tells you who they mix with and whether any pupils are isolated. Such information can help you plan activities that better match their needs.

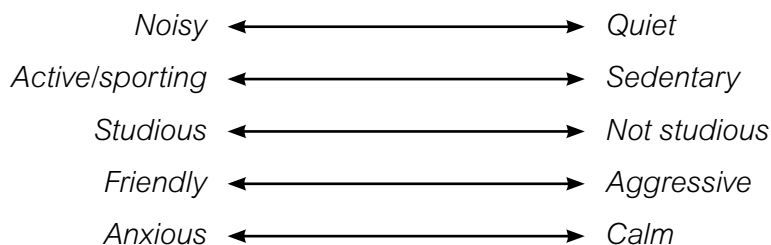
Do they talk more in groups? If so, by using group work more, you may help them think more and therefore learn more. You can observe at two levels by looking at:



- the social groups in your class and how they do or do not interact. What kinds of conflicts are there, if any? How can you use this knowledge to plan group work?
- individuals and their social skills, interests etc. (Finding out and acknowledging what pupils are interested in outside and inside school can be a very powerful way of motivating them to learn.)

### Observing your students

Some aspects you could look out for as you watch your students are in the table below. But remember to keep an open mind and readjust your picture as you get to know your students better.



Below is an example of how to record student observation. A version of this was used in the Literacy Development Across the Curriculum programme in Nigeria.

Tick the appropriate column in terms of the student you are observing.

0 = not at all; 1 = poor; 2 = fair; 3 = good

	Not at all (0)	Poor (1)	Fair (2)	Good (3)
(a) Student participates actively in the lesson				
(b) Student produces something creative				
(c) Student works in groups or pairs				
(d) Student shares ideas/information				
(e) Student shows evidence of understanding lesson				
(f) Student is not afraid to ask questions				
(g) Student shows respect for the ideas of members of the class.				

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No.2

## Early Primary

<b>Section 1</b>	<b>Literacy:</b>	<b>Books from stories, poems and games</b>
<b>Section 2</b>	<b>Numeracy:</b>	<b>Exploring shapes</b>
<b>Section 3</b>	<b>Science:</b>	<b>Investigating and classifying</b>
<b>Section 4</b>	<b>Social Studies:</b>	<b>Investigating family histories</b>
<b>Section 5</b>	<b>Life Skills:</b>	<b>Health and well-being in younger learners</b>

<b>Additional Resources:</b>	<ul style="list-style-type: none"><li>• <b>Group work in your classroom</b></li><li>• <b>Working with large/multigrade classes</b></li></ul>
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## Literacy: Books from stories, poems and games

1. Telling stories
2. Making big books
3. Designing book covers

**Key question for the teacher:**

How can you support students learning to read and write?

**Keywords:** writing; illustrating; designing; book; cover

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- used discussion to help students understand the similarities and differences between oral and written texts;
- developed ways students can turn oral stories, poems, songs or games into written and illustrated forms;
- explored how to produce books of stories, poems, games and songs for a class library.

## Overview

One important aspect of teaching is that your students see a real purpose to the tasks you set them. By helping students to make books for the class library, you will be giving them a reason for taking care with their writing and drawing. This will also encourage them to value their home languages and the classroom lingua franca or additional language. The books can be written in the students' home language(s), a classroom lingua franca or an additional language. More than one language can be used in the same book. The books students make, with your help, will also give you extra materials for reading activities.

# 1 Telling stories

Students who speak a language at home that is different from the language of the classroom need to know that you value their home language. This is important because a home language is part of who a person is. One way of demonstrating this is to encourage your students to tell stories and riddles, recite poems, sing songs and explain games in their home languages and then to write these down, either in their home languages or in another language. In **Activity 1**, you help students explore the similarities and differences between oral and written texts. You will encourage them to think about what is valuable about the oral tradition, why people write things down and which languages are used in speech and writing.

## Teaching Example 1

Mr Okitikpi, a Yoruba-speaking teacher, has recently been transferred to a community in Northern Nigeria that has Hausa as a common language, but a number of students speak three Nigerian languages. A few parents and young adults have agreed to act as teaching 'aides'. They know Hausa and some English and are helping Mr Okitikpi to learn Hausa so he can communicate with his students better. As some of his students can speak three Nigerian languages, Mr Okitikpi has involved these aides in storytelling activities to build students' confidence in speaking and to show that their home languages are valued. He wants students to write some stories down, ideally in their home languages. However, a number of the languages do not have a written form, so he decides they should write the stories in Hausa.

One of his aides discusses with students why people write stories down. Next, they write down their favourite story, in Hausa, so that they can put it into a book for the class library. Mr Okitikpi puts the students into groups for this writing activity, making sure that at least one group member is fairly fluent in Hausa and can support the others. He also asks his aide to help him monitor the writing process.

## Activity 1

First, read the following on how books are made

### How stories are made into books

Making a book for your class alongside their normal reading and writing activities gives students an understanding of the importance of being able to read to access information and new stories. This process might encourage your students to want to read more by making a book for the class using their pictures and their own words as they become more competent writers.

### Stage 1: Books begin with a great idea.

The author writes down a story. Probably, the author will write a few drafts of the story, trying to improve it each time. Authors often do research for their stories to

make sure that they spell words right and get their facts straight. Sometimes it takes many weeks for the author to find the right way to tell the story. When the author is satisfied, she'll type up or write her words into a manuscript, which she will send to her editor at the publishing house.

**Stage 2: Editors are very busy people, and they have to read a LOT!**

Manuscripts come in every day from authors all over the world. Editors have to sort through all of the manuscripts and decide which stories they think should be published. Editors love being able to tell authors that they want to publish the author's story. And, of course, the author is thrilled! The editor also decides who should illustrate the manuscript. It's very odd to think that for some books the author and illustrator never meet each other! Sometimes, the editor helps them communicate back and forth.

**Stage 3: The artist's work begins.**

Before an artist sits down to illustrate a story, she finds out the size the book is to be, and then she plans out the pages. She makes a 'dummy' book, with rough sketches, to show to her editor and the book designer. At this point, the editor might make some changes in the text of the story. Editors are good at helping writers find clearer ways of saying things.

**Stage 4: The book designer gets involved.**

The designer takes a look at the artist's dummy book, and he makes suggestions for the art. He also finds the right typeface to use in the book. The style and size of the letters can make a big difference in how the book looks in the end. The designer can also help the artist decide how the words of the story will fit in with the art. Next, the story is sent to a copyeditor so that spelling, grammar, and punctuation can be checked. Then the author has another chance to change any part of the story. Meanwhile...

**Stage 5: The artist gets busy creating the finished artwork!**

She uses her dummy book as a guide. The pages must be measured exactly so that she draws the art in the right place. She makes marks in the border where the pages will be sewn into the binding, and she marks the trim lines where the pages will be cut. It's not easy! She needs to create the art the way it will look in the printed book. It needs to be wonderful. Lines need to be straight, and there needs to be space for the words of the story. When this is finished, she delivers the art to her editor at the publishing house. There, the art is checked for mistakes, and the production director estimates how much it will cost to make the book. He determines the printing schedule for the book and orders paper.

**Stage 6: The book goes into production!**

The designer shows how the words and art will be placed. Then colour proofs are made, and everyone checks to make sure the printed colours match the colours of the artist's illustrations.

Once everyone is satisfied with how the art looks on the pages, final printing plates are made. The plates will be used on the printing press to print the pages.

**Stage 7: Finally! It's time to print the book!**

After months of preparation, the printing takes only a day. The thin plates (with impressions of the book on them) are wrapped around large cylinders that go

in the printing press. Each cylinder prints one of the four colours of the book – first yellow, then blue, then red, then black. The other colours are made from combinations of these four colours. Special grippers and conveyer belts help move the sheets of paper through the press. It's VERY noisy in a printing plant!

### **Stage 8: Hooray! The moment everyone has been waiting for is here!**

The book is printed, and it looks wonderful! Did you know that all of the pages of a book are printed on one BIG sheet of paper? Half of the pages are printed on one side of the press sheet and the other half are printed on the opposite side. After these sheets are printed, they are folded, cut and then bound into a book.

### **Stage 9: The new books are distributed!**

Bound books are taken to the book warehouse, where they stay until they are sold to libraries and bookshops. How do librarians and booksellers know that a great new book has been published? Other people at the publishing house sell and publicise the book. Sometimes posters and special displays are made. Publicists send out review copies of the book to people in the media. Authors often are interviewed by reporters in the newspaper and on TV. Lots of people work hard to make sure that one day...

### **Stage 10: ...you read the book!**

All of the people you've met are thinking about you and whether or not you will like the book. The author and artist think about you when they create the story and illustrations. The editor and designer think about you, too, when they put the book together. And YOU are the reason the big noisy printing press prints the books for you to read.

Happy reading!

*Adapted from: How a book is made – <http://www.harperchildrens.com>*

*Other websites on this topic include <http://library.thinkquest.org> and <http://www.factmonster.com>*

Now think about the answers to the five questions below for students.

Ask students for the titles of home language stories, poems, songs and games they know. Write these on the chalkboard.

Discuss these questions with students:

- are these home language texts written in books?
- why do people write down stories, poems, songs and games in books?
- would you like your home language stories, poems, songs and games to be written in books? Why, or why not?
- in which language or languages would you write poems, stories and games for a book? Why?
- how do books get written and produced? Tell students they will be making books for a class library.

Ask students to each choose a favourite story and to write the first draft in the language of their choice.

Were you pleased with the discussion?

How did students respond to this activity?

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## 2 Making big books

Some kinds of learning, such as learning to play a musical instrument, use a computer or drive a car, require a great deal of practice. As a teacher, you need to give students opportunities to repeat and practise what they have tried before so that they can improve on their first efforts. Students will learn that writing is a process and that their written stories, poems and instructions for games will give more pleasure to others if they craft them carefully. Writing, illustrating and reading these books may take several lessons, but as these activities provide many opportunities for language work, the time will be well spent. You can use the following checklist to help students assess their work. The following teaching example suggests how teachers can make books with students who are not yet very skilled as writers.

Checklist for stories	Tick
Does the story have a title?	
Will this title make readers interested in the story?	
Will readers be able to follow the sequence of events in the story (what happens first, what happens next...)?	
Have characters and places in the story been carefully described so that readers can picture them?	
Does the story come to a climax/conclusion?	
Checklist for poems or songs	Tick
Does the poem or song have a title?	
Will this title make readers interested in the poem or song?	
Does the poem or song have a rhythm or rhyme (or both) that readers are likely to enjoy?	
Have the words been carefully chosen to describe people, animals, objects, actions or feelings?	

Checklist for games	Tick
Does the game have a name?	
Are the instructions in the correct sequence? (eg first do this... etc)	
Are the instructions clear?	
If objects (such as pebbles or paper) are needed for the game, have they been listed?	

### Teaching Example 2

Regina Banda teaches 60 Grade 1 and 2 students, in a combined class, at a farm school near Lilayi in Lusaka. Regina regularly invites parents into school to tell stories in Chinyanja to their students. Regina asked her students to help her turn a favourite story, which they had helped create, into a book. First she made a big blank book. She wrote out the story, using short phrases and sentences. Then she decided where each phrase or sentence should go in the blank book. She used a black wax crayon to write the story in large neat letters, leaving space for drawings. In class, Regina held the book up for students to see, and read the story with them. She discussed what kind of picture was needed on each page. She gave pieces of paper to each pair of students, and two pairs of students illustrated each of the 15 pages. She asked students to find the right page for each picture, and helped them paste the pictures in.

#### What you will need to make big book

Some large sheets of 'newsprint' (approx 60 cm x 85 cm)

Some fat wax crayons

A pencil

Thick felt tip pens

A fat sewing (or embroidery) needle

Some thin string

A glue stick

Some smaller pieces of plain white paper

A large sheet of card, or poster paper, or a 'chart'

The beginning of the story that you told your students

The rest of the story, which your students have dictated to you

### How to make a Big Book

Making books can really motivate children to want to read and write more for themselves. With younger students, you may want to do more preparation beforehand, limiting the tasks they are involved with to specific aspects (see below). Older students, depending on their experience, will be able to undertake many more of the tasks themselves (as in **Activity 2**) See the following instructions:

1. First of all, read through the whole story carefully and make sure it is complete and properly punctuated.
2. Decide how much text (writing) you want to put on each double page spread. If you have Primary 1s and it is the beginning of the school year, you may want to make sure that there are no more than two or three sentences on a double-page spread. In some parts of the story you may only want to write a phrase. If you are working with older students, you can write more.
3. Think about what illustrations or drawings you need to accompany the text. This will help you to decide how long you think the book will be, and how many pages it will have.
4. Take your sheet of thin card, and fold it in half. This will be the cover of your book. If a book made of newsprint pages has a card cover, it lasts much longer.
5. Write out the whole story on an A4 sheet of lined paper and put the text for each double-page spread on a new line. This will be really helpful when you write out the text on the actual pages.
6. Fold each sheet of newsprint in half. Slip the sheets together and make sure that they are neat, and fit nicely. Don't fasten the sheets together yet.
7. Now decide where you are going to put the text. Will you put it on the left-hand page of each double-page spread? Or will you write on the right-hand pages? Will you write at the top of the pages? Or will you write at the bottom? Will each double-page spread look a little different? Perhaps you will choose to write right across the double-page spread sometimes? You will have to make decisions about this.
8. Now take the folded newsprint pages. Work at a large table. Use the fat black wax crayon and write the title of the story neatly on the outside of the first sheet. Write the title just as it would look on the very first page in a book that you would buy in a shop. You want your book to look professional.
9. Underneath, in smaller letters, write the names of all the students who created the story, or your class. (If this is the whole class, it will be very difficult to fit in 50+ names, so just name the class if you can't fit in all of the names!)
10. Next, open the first sheet of newsprint. This will be your first double-page spread. Write the first sentence(s) or phrase(s) on this double-page spread, using the fat black wax crayon. You must leave enough space for the illustrations or drawings.



11. When you have written the text for this double-page spread, turn over to the next double-page spread, and write the next sentence(s), or phrase(s), with the black wax crayon. Carry on in this way, until you have written out the whole story.
12. Take the 'cover' of your book. You need to decide where you want the title. It's a good idea to leave space for an illustration. Will you write the title at the top, or at the bottom? When you have decided, write the title lightly in pencil. When you are happy with the way it looks, write over the pencilled words with a felt tip pen.
13. Slip the newsprint pages neatly inside the 'cover'.
14. Now sew the pages and cover together. There are several ways that you can do this, but the following way works very well:
15. Open out your book so that the cover is at the bottom, and the middle double-page spread is on top. With a big book, it is a good idea to mark two places on the crease in the middle, where you can sew. Mark one place in the top half of the crease, and mark another one in the bottom half. In each place, make three spots. These spots should be about 4 cm apart.
16. Thread your needle with a piece of thin string about 50 cm long. Push the point of the needle through the middle of one of the sets of three spots, right through all the newsprint pages and the cover. Pull the string through firmly, but leave a piece of string about 7 cm hanging and follow the chart.
17. Cut the string attached to the needle, about 7 cm from where it has come through the pages. Now tie the two 7-cm ends together firmly.
18. Repeat the process at the opposite end of the crease.
19. Make a list of the illustrations that you need. Decide if you are going to ask specific children to make the illustrations, or whether you want your whole class to be involved. Students can work well in pairs to create the pictures. Plan how to organise the drawings.
20. Choosing the pictures. Read through the whole text with your students. Hold the pages open, and read the story aloud. Read the story so that it sounds interesting.
21. Tell your students that you want them to make the pictures. As you read through the text a second time, pause on each double-page spread and discuss the picture that it needs. As you and your class decide what is needed on each page, assign each illustration to a specific student, or pair of students.
22. Give them time to make the pictures carefully. Involve the students in sticking them in the book.
23. Even beginner readers can memorise the story, and have a sense of where each picture goes. Underneath each picture, write the name(s) of the students who made the picture. Continue in this way until all the pictures have been glued in and labelled.





24. When all the illustrations have been glued in, read the book with your students. We are sure that both you and your students will feel very proud of their efforts.

## Activity 2

Put students in groups of four and ask them to read the first drafts of their stories (from **Activity 1**) to each other. Ask them to choose two drafts (from the four) to work on in pairs to improve them. They should use the checklist above to guide their work. Remind them 'real' authors revise their work many times. Next, ask them to show it to the other pair in their group for further improvements. Now collect their work and write on it corrections to spelling, grammar and punctuation. Next lesson, give the groups their blank book (see the instructions above) and ask them to do the following: plan which sentences go on each page and where illustrations will be; decide how to divide the writing and drawing tasks, so that each group member participates. Ask them to show you their plan; discuss this and then ask them to carry out their plan. With younger students, you could write a story together in a big book and then the students can do drawings for each page.

## 3 Designing book covers

Communication is not just about words. Today's newspapers carry far more photographs than in the past and modern textbooks include many more illustrations than older ones. Advertisers use images on billboards, in magazines and on television to sell products. Computer screens combine words and images in exciting ways. Students need to be able to create and read texts that combine the verbal (words) and the visual (pictures). As the teacher, your responsibilities include: keeping up to date with what interests students; including design activities (for example, designing grocery packages, posters, advertisements) in language and literacy lessons. This part focuses on designing a cover for the students' books of stories, poems, songs and games.

### Teaching Example 3

Mr Eddie Mubanga encourages his Grade 6 English students to ask questions in their reading lessons about words and expressions that they hear or read but don't understand. One morning, a student told the class he had heard one character in a TV drama say to another, 'Don't judge a book by its cover.' Mr Mubanga asked his students for ideas about what this expression means and why it might have been used in the drama. After a few minutes of discussion, students understood that the design of a book cover may or may not give a good idea of what a book will be about. In a similar way, how a person looks or what he or she says may not be a reliable guide to what that person is like 'on the inside'.

Mr Mubanga decided to take the discussion further. He asked the class to think about the purpose of book covers and then to look at the cover of a storybook he had brought in. Can they tell from the cover what the story is about? What did they like or not like about the cover? Could it be improved and if so, how? After a lively discussion and reading the story to the students, he asked them to work in groups of four to make a new cover design for this book and gave them loose sheets of paper to work on. When they had finished, one student from each group explained to the class why they had chosen their design. Mr Mubanga displayed the covers on the classroom wall.

### Activity 3

Having finished the writing and drawings for their storybooks, your students are now ready to design their book covers. You could use the backs of posters, cardboard boxes and other 'throwaway' materials, especially if resources are limited in your school. See **Being a resourceful teacher in challenging conditions** for further ideas.

Show students some book covers and ask them what they think are good features

#### Features of a good book cover

- Eye-catching – a potential reader is attracted to the 'look' of the cover.
- The title is carefully positioned on the page and stands out clearly.
- The title encourages readers to open the book.
- The words of the title and the name(s) of the author(s) are easy to read.
- The use of colours attracts the reader.
- The use and position of images (drawings or photographs) on the page attracts the reader and these images are 'connected' with the book.

Ask each group to design a cover for their book. They need to agree on the words, drawings and the position of each and decide who will write or draw each part of the cover.

Move around the groups to discuss their designs with them and provide support and guidance as they make their book cover. Allow time for the groups to assemble their books.

Ask one student from each group to display the book and encourage other groups to read it.

**Put the books into the class library.**

**What do you think your students learned from this activity?**

**Were the books read by other students once they were in the library?**

With young children, you could read the story or poems and ask them to draw a picture for the cover or inside.

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## Numeracy: Exploring shapes

- 1 Studying shape
- 2 Using mathematical words to describe shape
- 3 Playing the feely bag game to practise mathematical words

**Key question for the teacher:**

How can you help students to develop a mathematical vocabulary of shape

**Keywords:** object; shape; geometry; language; classification; open-ended activities

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- used open-ended sorting activities to explore knowledge of shapes;
- explored practical ways to introduce students to the language or 'register' of mathematical terms;
- used practical activities to develop students' understanding and use of mathematical descriptions of basic geometric shapes.

## Overview

Investigating shapes or exploring geometry with your students can be very rewarding. Using a practical approach and objects from the students' environment can help to raise students' motivation and interest. In this section, you use objects from everyday life to help students develop important geometrical skills, such as recognising, visualising, describing, sorting, naming, classifying and comparing.

# 1 Studying Shape

To begin with, you will need to collect a range of resources that you could use for the activities in this section. Feely bags or boxes, which can easily be made by you or your students can be used across the curriculum to help develop your students' observations and language skills. In mathematics, it is a good way to help students explore the properties of shapes and objects. In science, you might explore the textures of materials. It may be helpful to gather and keep a box of such objects as a permanent resource. Your students may enjoy helping you collect the resources, and 'looking out for shapes' in everyday life. (Remember to praise the students who contribute, and to take the opportunity to discuss the shape of any objects they bring.

## Teaching Example 1

Some primary mathematics teachers in Umtata, South Africa, were planning a geometry scheme of work for the term. As part of their in-service development, they wanted to prepare good, hands-on geometry activities for their students

They decided to invite a mathematics education expert from their nearby higher education institution to help them write their scheme. She agreed, and suggested they start with a sorting activity. They needed to collect as many different objects as possible, such as empty cans, cotton reels, toilet roll tubes and pictures of different shapes in the environment e.g. buildings, fabric patterns and so on. In pairs, they planned an activity using these shapes and tried it themselves.

Back in their classes, the teachers asked their students to help them collect similar objects. When they had enough for the students to work in groups of five or six, with each group having ten or more different objects to sort, they tried out the activities.

The tasks were all about putting objects into groups that had similar properties, to record what property they shared, and which items had that property. The teachers were surprised and encouraged by the interest and thinking that the activity produced in their students. At the next in-service meeting, each teacher reported back on what happened.

### Using feely bags

Feely bags or boxes, which can easily be made by you or your students (see below) can be used across the curriculum to help develop your students' observations and language skills. In mathematics, it is good way to help students explore the properties of shapes and objects. In science, you might explore the textures of materials. Using a feely bag or box is a great motivator for students as the involvement in the game, the need to listen carefully and the desire to guess the right answer excites and interests them.



**Suggestions for objects for shapes activities**

You may use a selection of cubes (dice, blocks), rectangular prisms (boxes, wooden blocks), triangular prisms (wooden wedges, fancy chocolate boxes), spheres (balls), pyramids (wooden or plastic), cylinders (toilet rolls, pens, dowel sticks), cones (party hats, ice cream cones). You may also like to include one or two irregular or semi-irregular objects (stones, shells, leaves) to provoke discussion. All of these could be collected locally to help to link mathematics to the local environment.

**Making a feely bag**

For this you could use a paper bag that you cannot see through or you could sew a bag out of fabric about 30 cm by 30 cm with an opening at one end. The top of the bag needs to be able to be closed and opened to put in the objects and to allow the student to put in their hand to feel the object but ensure that no one else sees what is in the bag. You could use an elastic band or a drawstring to keep the top closed.

**Making a feely box**

Any medium-sized cardboard box will do for a feely box. You have to cut a hand-sized opening in one side of the box. This is so that a student can put a hand into the box and pick up something to feel. Some people cut two holes so that a student can put two hands into the box to feel for something. You need to keep the opening away from the rest of the class so they cannot see what is in the box. **How to play the game:**

The idea of the game is to hide some interesting, different things (which are familiar to your students) in the feely bag/box. You could use regular shaped bowls or pots, tools, or even tins of food. A student comes to the front and feels for something in the feely bag/box. He/she doesn't take the object out or show it to the other students. Instead, the student then thinks very carefully of ways to describe the thing, without mentioning its name. He/she uses the sense of touch to list and describe observations. At the same time, the student has to be quite scientific/mathematical. He/she has to consider the properties the object is made of. He/she also has to think carefully about the shape, size and form of the item.

- Each time the student makes an observation, another student in the class is given a chance to try to work out what the object is.
- While this is happening, the teacher can act as a scribe (or secretary) and record the observations and the inferences on the board, or on a large sheet of paper. They list the main points only.
- This carries on until someone actually works out what the item is. Then the item can be pulled out of the box and is shown to the rest of the class.
- It is important that a little time is spent discussing the accuracy of the observations – mathematical language skills, the effectiveness of the descriptions, communication skills and the quality of the inferences.

### Activity 1

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Collect together as many objects of different shapes as you can. You will need at least two objects for every student. You could use pictures of shapes from the environment as well.

- Divide the class into groups of five or six and give each group a selection of objects (see earlier example of the feely bag game).
  - Explain what a 'set' is – a collection of items with some common features, for example, the class is a 'set' of children, who are all taught by you. This 'large set' can be grouped into smaller sets – one example would be a set of boys, and a set of girls. (You may like to physically separate the students into these two sets to illustrate this point.)
  - Explain to the groups that they have a set of different objects. You want them to sort these objects into smaller sets. Ask them the following question: How many different ways can you sort these objects into sets? This makes the task an open task, so do not specify how many sets or any criteria.
  - Ask them to explain their reasons for their sorting each set.
  - As they work, observe them and listen to the discussions they have in their groups, noting carefully what they say. This will help you find out who has clear ideas and who is still exploring the ideas.
  - Ask each group to share the different ways they sorted their objects and note the main features on the board. You may wish to use a double lesson for this activity.
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## 2 Using mathematical words to describe shapes

Having introduced the concept of sorting objects, and asking students to describe the characteristics in 'everyday' language, it is now time to develop a more mathematical way of describing some of the objects' features.

In every area of activity, people develop special words and terms to describe what they are doing. Introducing students to the language of shape will take time and needs to be built into your lessons over time. As your students understand the concepts behind the names, this is the time to introduce the mathematical words. As well as using these words in practice, you might also like to ask your students to begin making a 'mathematical dictionary' to help them remember the meanings of such terms. You may want to put some words on the chalkboard. Here are some words to start you off!

Surface

Edge

Curved surface

Flat surface

Vertex

### Teaching Example 2

Mrs Nsofu asked her students to sort a collection of different shaped objects that she had provided. Some students decided to group the objects according to where they would be used in the home, such as the bedroom, kitchen and bathroom. Other students were looking at whether the objects looked alike. Some groups found it difficult to describe the features of their objects; for example, they said that some shapes were flat, but could only describe the other shapes as 'not flat'.

Drawing the whole class around her, Mrs Nsofu examined some of these problematic 'not flat' objects with the students. Not using the mathematical terms at first, she began pointing out certain features (like curves, edges and corners) and asked students to describe these in their own words. Then, when a few students had described these features, and thought of all the words they could use, Mrs Nsofu began to introduce the correct mathematical terms, and agreed with the class how they would describe such terms in their own words. She explained that they were beginning to learn 'the beautiful language of mathematics'.

Mrs Nsofu made a large sheet for the wall and wrote the new mathematical words on it, and the definitions they had agreed. She asked the students to start to write their own mathematical dictionary at the back of their exercise books, drawing diagrams to show the meanings of these words. They added to this dictionary during subsequent mathematics lessons.

### Activity 2

Introduce and practise using words for shapes through a sorting' activity (see **Activity 1**).

- Use a game to give students more practice. The game should be at the right level of difficulty for your students. Here are examples of games that can easily be adjusted for different ability levels.

#### Games

##### Find the difference

Equipment: Pairs of pictures with different, but similar, objects. Each picture should be folded so that it can't be seen by the other player. Instructions: Without showing their pictures to each other, or using gestures, players describe their pictures and ask each other questions until they identify a given number of differences between them (e.g. three). When they have done this, they reveal their pictures to each other.

##### Draw it

Equipment: Simple pictures mounted inside a piece of folded card. (The pictures should not be visible to the other player.) Paper and pencil. Instructions: Without showing his/her picture to the other player, or using gestures, one player describes his/her picture while the other player tries to draw it. When the drawing is finished, the player with the picture shows it to the other one



- Put the students into pairs (or small groups if you have a large class) and give each pair/group a set of cards. After doing the activity with one set of cards, the sets can be passed around so that everyone has a new set. As the students play the games, go around the room and monitor what they say. Don't interrupt unless they ask for help, but take a note of anything you want to tell the whole class afterwards

### Pictures for Games



### 3 Playing the feely bag game this time to practise mathematical words

One way to assess how well your students have learned to understand and use language to describe shapes is to use 'feely bags' (see Activity 1 for more detail). One student must carefully describe an object hidden inside a bag. The student should use the special words they have learned, and other students must try and guess which object is being described. In this way, students have to visualise the shape in the bag, and correctly use the simple geometric terms they have learned, if they are to 'win' in the feely bag game. How you organise this, so that all students are engaged in the activity, is important because if done well, the learning of more students will be enhanced.

#### Teaching Example 3

Mrs Nsofu made some cloth bags big enough for a student's hand to fit into, and with a drawstring around the top to close the bag up.

She put one of the objects from her collection into each bag, having carefully chosen the objects to give variation. Mrs Nsofu explained the game to her class and chose the student who would feel and describe the shape of the object in the first bag. This student had to describe the object using their newly learned words. The other students had to put their hands up when they thought they knew what the object was.

Being able to feel and describe the object in the next feely bag was the reward for the student who guessed correctly. When doing the activity, Mrs Nsofu made sure all the students were paying attention, only allowing one to speak at a time so that students could think about what each person was saying.

#### Activity 3

First prepare your feely bag or box. You need a bag or box in which you put an object and the student can put a hand in to feel the object but not see it (see making a feely bag above).

You could have one feely bag for the class or, if your class is big, have more than one so that several groups can work at once. This will help more students participate.

Then proceed with the game.

- One student should feel one object in the bag/box and, without taking it out, describe it very carefully to the others. The student must not name the object.
- They should say things like, 'it has all flat surfaces, it has so many corners, it has so many flat surfaces,' etc. This carries on until one student thinks they can name the object.
- If it is the correct answer, the object is pulled out of the bag and the successful student is the next to do the feeling (but allowing only one chance per student).

Encourage your students to use the vocabulary they have learned in the previous activities to describe their objects. Ask them to add them to their mathematical dictionaries.

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## Science: Investigating and classifying

- 1 Finding and naming different types of materials
- 2 Solids, liquids and gases
- 3 Investigating and unknown material

**Key Question for the teacher:**

How can you use games and investigations to help students identify and classify materials?

**Keywords:** properties; solid; liquid; gas; games; investigations

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- used games to assess and develop students' awareness of materials around them;
- explored ways of demonstrating properties of matter to students and helped them to classify materials around them;
- guided students to more independence in setting up their own investigations

## Overview

Most of us take our material world for granted. Thinking scientifically can cause us to pay more careful attention to the matter around us. Have you ever stopped to think how many substances we come into contact with and use? This section looks at how you can help students scientifically identify, sort, and classify the matter around them. Using games, labelling and simple investigations, you will help your students build a 'mental' map of the material world.

# 1 Finding and naming different kinds of materials

What earthly substance are we most in contact with? Soil; plants; water; wood; concrete; cloth...?

Did you think of nitrogen? We live our lives immersed (totally surrounded) in the gas nitrogen (80% of the air).

We start this section by looking at the 'big picture' of the matter and materials that make up our world. Teaching Example 1 and Activity 1 describe games in which students name, describe, sort and group matter and materials.

These fun activities will help you establish what the students already know, a key part of good teaching in any topic.

## Teaching Example 1

Running a teacher development workshop in northern Nigeria, the presenter, Ismaila, thought it was time for useful fun. He suggested a scavenger hunt game.

To play this game, you divide students into groups of four or more. Each group gets the same list of items. They have to find them quickly and resourcefully and bring them back or use a camera to record that they have found the item. The first group to be able to prove they have scavenged (collected) all items is the winner. See the following example of the way the game was played.

Students were given the 'list of items' in the central column. The table then shows how Groups A and D solved the challenge of finding examples of the items.



The scavenger hunt game		
Group A – 12 minutes	List of items	Group D – 9 minutes
Ms Obiri's diamond	<b>The hardest of substances</b>	A steel screw
Milk	<b>From a cow</b>	A shoe and a leather belt
Goat droppings from the road	<b>Something eaten</b>	A leaf eaten by an insect
Ohene cries and laughs	<b>Something changed</b>	A burnt match
Our group – four boys and three girls	<b>A mixture</b>	Air in an empty glass
Salt	<b>Something pure</b>	Sugar
Candle	<b>Something that disappears</b>	Water (evaporates)
Pencil	<b>From a tree</b>	Paper
Glass from sand	<b>Something from something</b>	Same paper
Sand again	From the mountains	The wind and the tap water
The game proved to be an exciting challenge that made the teachers think more carefully about what is around us and where it comes from. They saw the value of the task and enjoyed the next challenge of modifying and adapting the list for their own students		

### Activity 1

This activity is based on the game 'musical statues'.

- Divide your class into groups of 10–12 students.
- Play music. The first group dances in a space in the centre of the classroom. Everyone else is the audience.
- Stop the music.
- The dancers freeze (anyone who moves is out and sits down).
- The teacher calls out the name of some sort of matter, e.g. 'metal!'

The dancers unfreeze and rush to put a finger on something metal.

Anyone who touches a type of metal already touched is OUT!

The last one to find a metal of their own is OUT!

The 'touchers' take turns to tell something interesting about what they are touching.

If they can't tell, or it is a repetition, they are OUT!

Students from the audience can ask questions about the thing touched.

If the 'toucher' can't answer satisfactorily, they are OUT!

The survivors get another turn later.

- The next group comes to the centre, dances, freezes, rushes to touch a new substance (liquid, paper, wood, etc.) and try to survive the telling and the questioning.

**Did this game allow you to assess and, at the same time, grow the students' awareness of their material world?**

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## 2 Solids, Liquids and Gases

As you get to know your class, it is really useful to talk to your students about their personal characteristics; things they can do, their likes and dislikes, and their strengths and weaknesses. A nice way to summarise this sharing talk is to ask them to draw a careful full-length self-portrait and to label their distinguishing features in one colour. They could use other colours to list and record their other different types of characteristics. Now they will be ready to do the same thing when they consider the properties of different common substances (kinds of matter) they know from their environment. **Activity 2** explores one way of doing this, using pictures.

In **Teaching Example 2**, a teacher introduces the idea of properties and the three states of matter (solids, liquids and gases) by starting with a single property –compressibility. Is this different to the way you usually introduce this topic? What other topics could you explore using this approach?

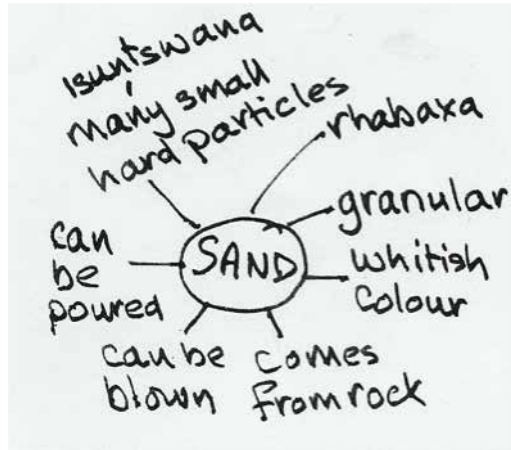
### Teaching Example 2

Miss Yvonne Manu works with Primary 4 students and plans to introduce them to the idea of the three states of matter: solid, liquid and gas. But she doesn't want to just tell them.

She carefully plans a lesson around the idea of compressibility. She shows them a small sponge, a ball of cotton wool, a soft square of cloth (like a yellow flannel duster) some water and a block of hard wood. With each in turn, Yvonne demonstrates how she can squeeze, force or press them down into the small hollow space of a clenched fist. All except the water and the block of wood. She cannot easily change the size or shape of the wood, and although she can change the shape of the water, she can't change its size. She follows this up with a lesson where she uses syringes to demonstrate compressibility in liquids compared to solids (sand) and air. You may find Yvonne's planning useful.

**Lesson plan: Which can be compressed – solid, liquid or gas?**


Yvonne used the activity below as the basis for her lesson. First she got her students to do a quick spider diagram of their observations and knowledge about sand and this is what one of the better groups produced.



Then she decided that with an activity like this she could have given the students more ownership of the whole task. She made a worksheet (see below). She found that this change in approach really made a difference to the motivation, enthusiasm and learning of her students.



## INVESTIGATION




**SAND**

**AIR**

**WATER**

- You have 3 Syringes.
- You have SAND, WATER and AIR in 3 bottles.
 


- Look carefully at the sand, water and air.
- COMPARE THEM.
- Something to think about.....

CAN YOU PRESS SAND INTO A SMALLER SPACE?

CAN YOU PRESS WATER INTO A SMALLER SPACE?

CAN YOU PRESS AIR INTO A SMALLER SPACE?

- Before you try (experiment)  
What do you think will happen? (predict)

SAND	YES/NO	WATER	YES/NO	AIR	YES/NO
------	--------	-------	--------	-----	--------

- Now half fill one syringe with sand, one syringe with water and one with air.
- Put your finger over the end of the syringe and try to push the sand, the water and the air into a smaller space.
- You can compress....

SAND	YES/NO	WATER	YES/NO	AIR	YES/NO
------	--------	-------	--------	-----	--------

### Activity 2

To do this activity with the whole class, you need to find a large poster of a room, showing a range of different substances (for example, a shop, a clinic or a kitchen).

For group work you will need a large picture for each group – use a different picture for each group. (Look for pictures in magazines and catalogues.) Using different pictures gives the students a very real reason for reporting back,

because each group has different information to share.

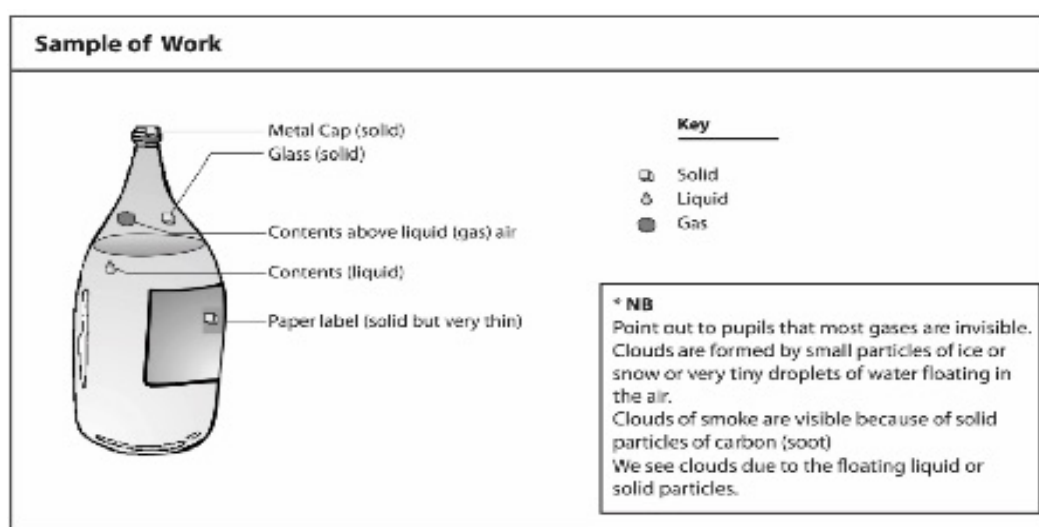
With your students, choose three suitable icons to use in this lesson.

You will need icons to represent a solid (perhaps a picture of a block or cube – brown or black), a liquid (perhaps a droplet – blue) and a gas (perhaps a cloud of dots – grey or pencil).

Students draw these icons on bits of scrap card or cut out the shapes and colour them if possible.

Then they use small bits of sticky tape to mark solids, liquids and gases on their pictures.

**Encourage discussion and feedback from each group. How did they identify liquids? Gases? You may find the following example of students' work useful**



### 3 Investigating an unknown material

Thinking and behaving scientifically is most evident when students investigate something practically.

Investigating is a key skill in science. It involves you and your students in:

- deciding on the question you are trying to answer;
- deciding what equipment to use;
- deciding what measurements and observations to take;
- deciding how to present your results and how they give you an answer to the problem.

**Teaching Example 3** shows how teachers can lead a class investigation of an 'unknown' substance. If the students have experienced a teacher-led investigation, they will be better prepared to do their own independent investigations of other substances. You may find the following lesson plan useful

### Teaching Example 3

A few years ago, some colleagues were running in-service primary science workshops in rural Northern Ghana. In one series of workshops, a science lesson was planned, tested, reflected on and improved collectively. The heart of the lesson was the teacher guiding the step-by-step investigation of the properties of an 'unknown' powder (powdered clay). First, the teacher focused on developing the skills of observation and communication in her students. Then she asked: 'What will happen if we add a few drops of water to the powder?' Students' answers led to more investigation, observation and communication. On reflection, it was clear that the students were thinking and acting scientifically. You may find the following lesson plan useful

#### The plan of the lesson

Before the lesson, you need to find some dry clay and to crush, pound and grind it until it forms a fine dry powder. You don't need much – just enough to give each group a heaped teaspoonful.

#### Step 1a – Investigation by observation, comparing and recording

Give each group a small dish or the flat lid of a jar to hold the powdered clay. Ask them to observe the substance carefully and to note down all their observations in the local language or English on paper or in their books.

(We found that it is important that the teacher doesn't interfere with the groups at the start of the lesson. You need to give them a few minutes on their own to get started.)

Before the end of Step 1, ask these guiding questions to ensure that the observation has been thorough:

- Have you noted the colour of the substance?
- How does it feel?
- List other substances you know that are similar to this substance.

#### Step 1b – Communication

Ask the groups to feed back their observations. Summarise them on the chalkboard. This is a chance to bring languages together. If students answer in the local language, you can negotiate that the answers are written up in English. At this point you can identify the substance as dry clay powder.

#### Step 2a – Prediction and recording

Get the groups to use a different colour or kind of pen/pencil for this step.

Hand out droppers with water, or show the class a small bottle of water.

Here are the questions we prepared for this step:

- What will happen if we add just a few drops of water to this substance?
- Write down what you predict will happen if you add a few drops of water to the dry clay powder.



- How will the water change the clay?
- Write down all the changes that your group thinks will happen.

Then leave them to get on with the work. After about five minutes, you might give them a few prompts. Will the colour change? Will the appearance of the substance change? What will it feel like?

#### **Step 2b – Communication**

Add the students' new work to the chalkboard using a different colour of chalk. Use English to record, and comment on their answers, extending the knowledge where necessary.

#### **Step 3a – Investigation, observation and recording**

Again, change the colour of the groups' writing tools/pens. Now let them add and mix a few drops of water. What changes do they see and feel? Were their predictions correct? Get them to investigate and write down what they notice.

#### **Step 3b – Communication**

For the third time, record the combined work of the groups on the board, using a third colour of chalk if possible.

#### **Step 4 – Discussion**

At this stage, ask the students to talk about and write down the things that damp clay can be used for. Record their suggestions on the chalkboard. Then get them to roll out a small snake from the damp clay in their dish/lid. Let them record or measure its length before they leave it in a safe place to dry. Ask students to record what they think will happen to the clay over the next few days. You should now have a mind map on your board showing observations and predictions about clay.

*Adapted from: Primary Science Programme Cross Curricular Work*

### **Activity 3**

Tell students that each group (three/four students) will be getting a different 'unknown' white powder to investigate. Remind them about properties and the steps and processes of the powdered clay lesson from the case study.

Guide them as they plan the steps of their own investigation for the next day. They must include the equipment they need in their plan and perhaps some predictions. Give them time to share and improve their plans in class.

The next day, hand each group a different 'unknown', BUT safe to use, white powder, such as icing sugar, salt, soap powder, sodium bicarbonate, fruit salts, maize meal, flour.

Support them as they do their investigations and plan how to report on their findings.

**Can they identify the substances?**

**How did you assess their work? What advice would you give to a colleague who is going to do this activity?**

A follow-up language lesson could be reading details on the packaging of substances used.

Use these questions to help your students look at different packages

1. What does the picture tell us?
  2. Does all the writing look the same?
  3. Who makes this product?
  4. What do we get in this packet?
  5. Where does it tell us what is inside?
  6. What do you see first? Why?
  7. What do you see next? Why?
  8. And then what do you see? Why?
-

## Social Studies: Investigating family histories

- 1 Family histories
- 2 Family timeline
- 3 Changing times

### Key Question for the teacher:

Helping students to understand history through studying their families.

**Keywords:** family; history; confidence; investigation; small-group work; discussion

### Learning Outcomes for the Teacher

By the end of this section, you will have:

- structured your activities to help students understand themselves and their relationships with other family members;
- used small-group discussions to build students' self-confidence as they investigate their family histories.

## Overview

Good teaching often starts by encouraging students to explore situations that they are already familiar with. In terms of history, this means using their own lives, and the lives of their immediate families, as a source of investigation. The skills used to explore this familiar history can then be used in the study of broader historical questions. All of us have a history, which starts from the moment we are born. This will include all our experiences and all the people we interact with. In this section, you start by exploring your students' immediate family situations and their roles and responsibilities within the family. You will also look at the wider context of the extended family. As you work in this area, you will have to be sensitive to different backgrounds and family or other structures that your students live in.

# 1 Family histories

When investigating the family, it is useful to first explore students' understanding of what a family is and show them the diversity among families. Celebrating such diversity helps students feel better about themselves when they realise how different families can be.

## Teaching Example 1

Mr Nguzo is a social studies teacher at Muhimu Primary School in Tanzania. He wants his students in Standard 3 to learn about families and the roles of different family members.

He organises groups of not more than six; he puts students together who do not usually work with each other. In the groups, students take it in turns to answer the following questions, which he has written on the board.

What is your name?

1. What is your name?
2. Who are your father and mother? What are their names?
3. Who are your grandfathers and grandmothers? What are their names?

Are they older or younger than you?

During the discussion, Mr Nguzo goes to each group to check that all the students are being given a chance to contribute. After 10 to 15 minutes, he asks the groups to share with the whole class what they have found out about different families.

Then he asks the groups to consider this question

6. What makes someone your sister, your brother, your aunt, etc.?

After 10 minutes, one member of each group presents their answers to question 6 to the class. Mr Nguzo prepares a large, basic kinship chart to help focus the discussion.

A kinship chart shows how each person is related or connected to the others and their family or community. Different cultures have different ways of describing relatives.

Below is a simple kinship chart for Zambia

<b>Me</b>	<b>My Parents</b> Father Mother	<b>My Grandparent</b> Grandfather Grandmother
<b>My brothers and/or sisters</b>		<b>Grandfather</b> Grandmother

Mr Nguzo and the students note that although there are words in their language that express cousin, uncle and aunt, these relations are normally referred to as brother or sister; grandfather, father are usually simply

father; grandmother, mother are similarly simply mother. There is a distinction between the uncles and aunts from the mother's side and those from the father's side. Mr Nguzo realises that teaching students about the relationships within families can be confusing for younger students

### Activity 1

Before the lesson, draw some kinship charts on the board or prepare some paper copies

- Ask the students to work in groups of three or four. One student volunteers to list all the people they know in their family and fill in the details on a kinship chart. (You may wish to select which student is chosen.)
- Students might want to draw pictures of their relatives on the chart.
- Share these charts with the class. Discuss the variation in families and emphasise how good this variety is.
- For the paper copies, display the kinship charts on the wall of the classroom.

## 2 Family Timeline

When studying past events, it is important to help students understand the passage of time and how things change from generation to generation. Developing the ways that young students look at their family histories will help them link events together as well as put them in sequence. They may want to develop a kinship chart bigger than the one above to help them see relationships between family members e.g. their cousin is their mother's or father's sister's or brother's child. See below for some examples of Lunda kinship terms

#### Lunda kinship terms and Lunda term Explanation

**mama** mother, aunt on mother's side

**a-mama** mothers, mother's sisters

(Honorific 'mothers' in general)

**mama wakansi** aunt, a younger 'mother', mother's younger sister

**mama wamukulumpi** aunt, mother's older sister

**tata** father, uncle on father's side

**a-tata** fathers, fathers' brothers

(Honorific 'fathers' in general)

**tata wakansi** uncle, a younger 'father', father's younger brother



**tata wamukulumpi** uncle, father's older brother

**yaya** older brother, sister or cousin

**a-yaya** older relation

Used honorifically as well

**mwanyikami** young brother

### Teaching Example 2

Joyce Phiri plans to teach about family relations over time with her Grade 5 students.

She cuts a series of pictures from magazines of people of different ages, doing different things, e.g. at a wedding, a school prize day, and writes numbers on the back of each picture. She tells her students that the photographs represent different events in one person's life and asks her students, in groups of six, to sequence the photos in terms of the age of the person. She gives them 15 minutes to discuss the order and then asks each group to feed back. She asks why they chose the order they did and lists the clues they found in the pictures to help them order the events. They discuss the key events shown in the pictures and Mrs Phiri tells the students they have made a 'timeline' of life.

### Activity 2

The following example can be a starting point for your class to do their own timeline.

- First, discuss the importance of knowing one's own origins and members of one's family.
- Explain what a timeline is.
- Model (demonstrate) the making of a timeline yourself (you don't have to use your own life – you could do a realistic one based anonymously on someone you know). Modelling is an excellent way of supporting students to learn a new skill/behaviour. Draw this timeline on the board and talk through what you are doing, or have one prepared on a large roll of paper. Remember to use a suitable scale – a year should be represented by a particular length. (When your students come to do their timelines, they could use 5 cm or the length of a hand if they don't have rulers.)
- Ask students to write down key things they remember about their lives and also give them time to ask their parents/carers about when they first walked etc. Ask them to record any other information they want to include on their timeline.
- Support them as they make their timelines. You could encourage them to write in the main events that have happened to them personally, and in a different colour (or in brackets under the line) the main events that happened to their wider family (e.g. older sister went to college, father bought a field etc.).

- Display their timelines in the classroom.
- Students who finish quickly could be asked to imagine and draw a timeline of their future. What will be the main events when they are 20, 25, 40 etc.?

### 3 Changing times

Helping students to develop their understanding of past and present takes time, and involves giving them a range of activities where they have to observe, ask questions and make judgements about what they find out. How can they develop skills to help them think about how things change over time?

#### Teaching Example 3

Mr Kabwe Kato, Mrs Siame Sime and Miss Banda Benda planned their social studies classes together. They did not all do the same topic at the same time, but it helped them to share ideas.

#### Activity 3

See **Using Mind Maps and Brainstorming** at the end of this Teachers Pack 2. Ask them to consider how they could investigate the ways in which life for their families has changed in the village/community over time. What sources could they use to find out about this?

They are likely to come up with ideas such as: using their own observations and memories to think about what has changed in their own lifetime; asking their parents; talking to other older people; talking to people in authority (such as the chief); looking at older maps; using a museum (if there is one); reading from books about the area etc.

**Ask the students to gather stories from their own families about how life has changed for them over the last few generations. What was everyday life like for their grandparents and great grandparents? What are the family stories from previous times? Does the family have any old newspapers, photos, letters, etc. that help show what life used to be like?**

Students could share their stories with each other in class and use them as a basis for presentations – these could include pictures of what they think life was like, role plays about life in the past, written factual accounts based on family stories and other documents, and imaginary stories e.g. ‘describe a day in the life of your grandmother when she was young’.

## Life Skills: Health and well-being in younger learners

1 Growth

2 Games for Growth

3 Healthy development

**Key Question for the teacher:**

How can you plan to develop health and well-being?

**Keywords:** lesson preparation; games; problem solving; whole-school activities; planning; self-esteem)

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- planned lessons that are focused on clear learning outcomes to investigate growth and development;
- explored ways to include games and exercises into your lessons;
- used problem solving in whole-school activities

## Overview

This section focuses on your planning and preparation of lessons. It is important to do this well if your students are to achieve what you want them to achieve. One of your roles is to help your students understand the concepts of physical growth and development. These include both the physical changes that will take place as they get older, and also the different things they need to think about and do in order to stay healthy. As you plan practical activities about physical growth and development, you need to use students' existing knowledge as a base from which to plan and extend their understanding. This section suggests different ways to work in and outside the classroom, which you could also plan to use elsewhere in your teaching.

# 1 Growth

You may want to prepare yourself for your lesson by reading the following:

## **Introduction to physical development. Background information / subject knowledge for teacher**

We are all growing all the time. We are growing physically, but are also extending our ideas and understanding, and often these are happening alongside each other.

During the years that children are at school, they go through many physical changes. You can see this by comparing students in different classes. The older children are taller and stronger, and they can usually also express themselves better. As part of the natural process, children also develop sexually once they reach their teenage years. Children cannot develop and grow on their own. Just like a plant needs water, sun and good health to develop, people need certain things to help them. They include:

- good food;
- exercise;
- protection from illnesses;
- clean surroundings.

Each of these things contributes to the physical development of the child.

- If a child does not eat well, they will not grow as quickly as others. Food contributes to other things, too: the amount of energy that children have, how much they are protected from illness etc.
- If children do not exercise, they will not develop their arm and leg muscles and so will not be as strong. Physical exercise also helps develop their bodily coordination when doing exercises like running, jumping and rope skipping. Coordination helps with other skills, like reading and writing. Physical exercise is also good for well-being and physical growth.
- If children are not protected from illnesses, they will become sick more often, which will affect the way in which they grow. If children are ill, they cannot exercise, and so will not develop their muscles. If they are ill, they also find it hard to study, and so will fall behind in their learning.

You need to think carefully about how you will introduce this topic. Just reading out information and hoping that the students understand is not the best way for most students to learn. You need to plan your lesson carefully, thinking about what will happen at each stage of the lesson and finding out what they already know and think. Each lesson should have a particular learning outcome (intention). In this case, you want the students to be able to identify the four basic things that contribute to improved physical development.

For each stage of the lesson, you need to answer three questions:

How does this activity contribute to the learning outcome?

What will the students be doing to help them learn?

What will I be doing to support them?

Look at the games and activities you could use. Which ones will support your learning outcomes?

### Teaching Example 1

Biduga teaches in a small school in a rural area of Tanzania. This term, her colleague Mary is on maternity leave, so she is teaching a large, multigrade class of 85 students from Grades 3–6. This means that she has to deal with a large number of children at different stages of physical development. Biduga knows she needs to consider this when organising her classroom.

She has noticed that the older children often take responsibility for some of the younger children. So, she organises the class into groups, each with a group name and a Grade 6 'leader'. The leader checks that each child is present, and gets their group settled and ready for study.

She also finds that the younger children enjoy having many different activities in a lesson. She plans lessons with two strands of activities: one for Grades 5–6 and one for Grades 3–4:

- First, she gives Grades 5–6 some group work or longer exercises.
- Then, she spends time with Grades 3–4, using shorter activities, including simple games.

This means preparing lessons with more stages for Grades 3–4. See **Working with Large/ Multi-grade Classes** in the Teaching Pack Additional Resources. In this way, Biduga has recognised the differences in her students' physical development and is using it to help plan her teaching.

### Activity 1

Introduction to physical development above covers the four principles that contribute to physical development. Write a lesson plan to introduce these four principles to your students.

Identify the activities and resources you will use. You could adapt the 'same or different' activity from Teacher Pack 1 if you have it to hand but you don't have to! Look at similarities and differences in physical growth e.g. height, shoe size, hand and arm length.

Plan your lesson like this:

- Introduction to the lesson and intended learning outcomes.
- Introduce the ideas using students' previous knowledge.
- In groups or pairs, the students do a 'same and different' activity or your own activity.
- The students do another similar activity so you can check their understanding.

To cover the four principles of physical development in a lesson plan, think about these questions:

- What is the key thing you want them to learn?
- How will you introduce the topic?
- How will you organise the first activity? What will your instructions be?
- Will the students work in groups or pairs?

- How will you demonstrate the four principles?
- What resources could you use to help explain them? For example, could you use pictures? Could you bring in different kinds of food?
- Where would you get them?
- How will you check the students' understanding?
- What issues do you need to be sensitive to?

Write down your answers to these questions on a piece of paper. Then use these to plan each stage of your lesson. Remember to always be sensitive to the context in which you are working in so as not to embarrass students.

After the lesson, make some notes for yourself about how it went:

**Was it successful?**

**What did your students learn?**

**Did any part not work so well? If so, why was this?**

**What would you do differently next time?**

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## 2 Games for growth

In the first part of this section, you considered ways to plan teaching your students about physical development. We are now going to look at one element of this: the physical exercise students may get while at school or at home.

### Teaching Example 2

You may find the following examples useful

#### Using games and physical exercise

Physical exercise serves many functions. As we know, it helps children build up their strength and fitness. But it can also help students to develop social, creative and leadership skills. It can help students make friends and learn new things, and it contributes to their emotional well-being.

Think about the range of different physical games and exercises there are:

- sports e.g. football, wrestling;
- play e.g. skipping, dancing, running games;
- word and number games e.g. singing, rhymes.

Children will automatically invent and play games with each other and you can exploit this as part of your teaching.

The use of physical games and exercises as part of your teaching can encourage students to enjoy learning, and so develop a greater interest in coming to school.

By using physical games as part of your teaching, you will also encourage students to learn new skills and behaviour patterns.



These can include:

- collaborative learning;
- thinking skills;
- sharing resources and taking turns;
- motivation and involvement in learning.

All of these are attributes you should encourage in the classroom, as they will contribute to more effective learning.

Below you will find some examples of Kenyan games that use physical exercise.

### SHISWECHELI

#### Play instruments:

A piece of broken pottery, a ten-cent coin or a stone. A pattern drawn on the ground.

#### Age group:

5 to 6 years and above

#### Players:

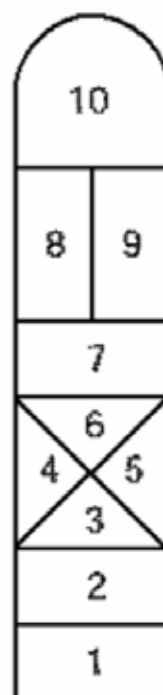
One to four

#### How to play:

The first player throws a piece of pottery, or coin, or stone, into the first segment of the pattern. She jumps on one leg over this compartment into the second compartment as she plays. She then jumps into the other compartments until the last one. At the 4th and 5th compartments, she stands astride with one foot in the 4th compartment and the other in the 5th. The same is repeated at compartments 8 and 9 before she proceeds.

At compartment 10, she turns back the same way she came until she reaches the compartments before the piece of pottery. She bends, picks it up, and jumps over this compartment to the outside with the piece. She then throws the piece into the second compartment and continues the game, jumping over the compartment with the piece to the last compartment, and turns back the same way she came, to the outside. This is repeated with the piece being thrown into each successive compartment until the last one has been covered.

At this juncture she steps into compartment 10, with both feet still facing the front, and throws the piece over her head without looking back. If the piece falls well into one of the compartments, it becomes her territory. If at any point the player aims at a compartment and misses, she loses, and another player takes over the game.



**SHIHULUKHU****Play instruments:**

No equipment required

**Age group:**

3 upwards

**Players:**

Five or more

**How to play:**

One player assumes the position of a lion (Italanyi). He moves/goes ahead of the other players as the others question him:

Players: King Lion, what time is it?

Lion: Seven o'clock.

Players: King Lion, what time is it?

Lion: It is noon.

Players: King Lion, what time is it?

Lion: It is the hour to feed on (eat) sheep! (Here the other players run away as the lion chases after them. The player the lion catches is the next to be the lion.

**TSIBEA NE KIGUMBA****Play instruments:**

Stones, sticks and a piece of cloth

**Age group:**

4 to 6 years

**Players:**

Usually eight children or more

**How to play:**

Players stand in pairs facing each other, forming two lines. The pairs are given numbers. An object is placed in the middle of the two lines. The leader calls out the numbers of two players, and the player from each team who has that number has to run and try to pick up the object first. The player who picks up the object earns a point for that player's group.

When planning to use games in your teaching, you need to think about:

- the content of the game, so that it helps the students reach the learning
- objectives you have set for the lesson;
- the organisation of the game:
- How do you play the game?
- How will you give instructions to the students?
- How will you check they understand how to play?
- Will they play in pairs, groups or as a class?
- Where will they play – inside or outside?



## Activity 2

Mr Oyugi, a teacher in the township of Kiambu, wanted to use students' games in his lessons. So he planned a lesson where they would:

- identify their favourite games;
- describe how to play them;
- use the games to learn about different ideas and topics such as sharing and numbers.

To start the lesson, he used the 'likes and dislikes' survey to find out what games his students knew. To save time, he planned to:

- conduct the survey with the whole class at once;
- record the information on the board himself.

Next, he wanted the students to do something themselves. He decided that, in groups, they would write a description of their favourite game, but they would have to include answers to some key questions that he would provide about how to play the game. He included questions such as: Where do you play it? How many people could play? What equipment is needed? What are the rules? Finally, he built in time for each group to explain their game to the class.

They would vote and play one game each week.

### How Mr Oyugi taught his lesson

Here are the stages Mr Oyugi used in his lesson:

1. Everybody wrote down five games they liked most.
2. Mr Oyugi asked the students to talk, in pairs, about their favourite games and choose one between them. This took ten minutes.
3. To do the survey, he stood at the front of the class asking each pair which game they had chosen.
4. He wrote the game on the board and put one tick next to it. If it was a game someone else had already mentioned, he just added a tick. The list on the board started to look like this:

Football 111111

Skipping 1111111

Clapping 111111

Catch 1111

Marbles 111

5. The survey took 15 minutes to complete. Next, he asked which game was most popular and which least popular.
6. He asked the class to get into seven groups of five. He asked each group to choose one game and write a description for the class of how to play it.

7. He asked them to read their instructions to the class. There were too many games to describe in one lesson so he decided to do one new game during the last lesson of each day.

To help with this, he gave each group the name of a day of the week. Now each group knew when they should give their description. At the beginning of each day, he asked whose turn it was today.

These lessons used the following format:

1. First, the group gave their description of the game and demonstrated it in front of the whole class. This took about ten minutes.
2. Then all the other groups practised playing the game as well. If necessary, Mr Oyugi took them outside. This took 15 minutes.
3. Next, he asked them to think about new ways of playing the game so that it helped them remember what they had learned in class that day.
4. Each group came up with different ideas for adapting the game. This discussion usually lasted about 15 minutes.
5. Finally, they discussed some of the changes and tried them out together until the end of the lesson.

This way, Mr Oyugi started using his students' games to help with teaching different subjects. The best ideas he used again. Also, the students started playing the new learning games in their free time.

### 3 Healthy development

In the first part of this section, we identified key factors needed for healthy physical development. Now we investigate how your school can promote these ideas with the students and local community. Having discussed using exercise and games in your lessons, you now need to promote the importance of a) good food, b) protection from illnesses, and c) clean surroundings, but this will have to be done sensitively.

This can be done by making the school a health-promoting environment.

This will involve discussion with the school staff, about:

- setting the school up as a good example for students and the community.

To resource this, you may need to plan to involve the community and other people to work together, such as local health clinics and NGOs;

- encouraging healthy living practices in your school by having health promotion activities as part of the regular routine;
- having inputs from experts such as HIV/AIDS coordinators and health clinics. Who will be involved, and when?

### Teaching Example 3

Having used games in his lessons, Mr Oyugi thought about other ways he could promote healthy development at school. He decided to hold a school and community Games and Sports Day.

Once a term, the whole school could compete at games and sports. This would involve sports like football and running, but also some of the learning games such as one about the points of the compass that he had been using in lessons.

To plan this, he listed the people he should speak to, such as the head teacher, other teachers, the Parents-Teachers' Association (PTA) and the students. Having gained the support of the head teacher, he planned the competitions with the staff and the PTA. First, they decided the time – it would start at 09.30 and finish at 12.30. Then they chose the different activities.

They organised the games and races according to classes, and wrote a schedule of activities for the day. Then they planned who would help on the day: the PTA, the Board of Governors (BOG), the teachers and some older children. They decided who would make announcements, record the results, give the prizes and so on. This way, they developed a full plan for the first Sports Day.

They planned it over two to three weeks, which meant that it was well organised and a huge success.

#### Mr Oyugi's other ideas for health promotion

As well as Sports Day, Mr Oyugi came up with some other ideas for health promotion at school, such as:

- Students and teachers could clean the playground and classrooms after assembly every morning.
- Using rubbish bins would stop people dropping rubbish just anywhere. (It would also stop dogs and rats coming into the school and reduce the possibility of the children and teachers catching diseases or falling ill.)
- Using the school as a local inoculation centre when the health workers were visiting would ensure that children and teachers would all receive regular inoculations. It would also mean that the children would receive some additional health guidance from doctors and nurses.
- Establishing connections between the school and local and visiting health workers would help the school with health resources.
- Developing a school garden would provide food (such as vegetables to make soup) and exercise, as well as learning about the environment.
- A first aid/rest area or room could be created.
- The school could invite visitors to come and talk about particular problems, e.g. HIV/AIDS, malaria.
- They could run after-school exercise or games clubs.

### Activity 3

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First, discuss the picture with your students and ask them to identify the problems in this school environment.



Organise your students to carry out a survey of your school environment to see if it is health promoting or health demoting. Send the children around the school in pairs or threes to note down anything in the school environment that fits into these categories.

Next, each pair/group presents their findings to the whole class. You make a list of their findings and put them on two posters on the wall – one for health promoting, one for health demoting.

Discuss what needs to be done to make changes for a healthier school environment. Remember to celebrate the positive aspects of your school environment.

Ask your head teacher if you can present your findings to the whole school in assembly. Invite everyone in the school to form teams to tackle all the tasks that need changing to make your school environment fully health promoting.

You may need to ask parents or other community members for help. You will also have to encourage the children to be creative and think of ways to improve the school without spending a lot of money.

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No.3

## Early Primary

<b>Section 1 Literacy:</b>	Ways to collect and perform stories
<b>Section 2 Numeracy:</b>	Patterns in number charts
<b>Section 3 Science:</b>	Everyday forces – investigating movement
<b>Section 4 Social Studies:</b>	Exploring local art
<b>Section 5 Life Skills:</b>	Exploring social networks

<b>Additional Resources:</b>	<ul style="list-style-type: none"><li>• Group work in your classroom</li><li>• Working with large/multigrade classes</li></ul>
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## Literacy: Ways to collect and perform stories

- 1 Key question for the teacher:
- 2 How can you use performance to develop your students' language skills?

**Key Question for the teacher:**

**Keywords:** stories; collect; perform; confidence; competence; pride; cultural heritage

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- worked with your local community to promote language skills and pride in cultural heritage;
- planned and organised opportunities for performance before an audience.

## Overview

Using different kinds of oral activities can develop your students' confidence in speaking and listening and promote pride in their home languages. This will have a positive impact on their self-esteem. Students who feel more confident about who they are will learn more easily.

The activities in this section provide opportunities for your students to collect, rehearse and perform stories in front of an audience. It is suggested that you work with older community members by asking for their help in providing stories and in sharing their storytelling skills. These activities will build competence in the home language, on to which you can later build additional language skills.

## 1 Sharing stories in the home language

Community knowledge of stories is a valuable resource for listening and speaking activities outside and inside the classroom. It is important that your students learn to respect and love the wisdom and heritage of their home language and culture. By strengthening their speaking and listening skills in the home language in an enjoyable way, the students will grow in confidence too.

Because the art of storytelling is no longer so deeply valued in some communities, people may have forgotten some of the richness and detail of stories. A way of building language resources for your class is to uncover older and more authentic versions of stories. You can do this by talking to other people in the community.

### Teaching Example 1

Mr Kimaryo teaches Standard 4 at Makanya Primary School in Tanzania. The school is near a sisal estate, where workers speak many different languages. In his class of 70 students, 10 speak Chaga, 6 speak Chirundi, 3 speak Chinamwanga, and the rest speak Pare. He usually speaks Swahili when he teaches them.

Mr Kimaryo wanted his students to collect stories from their homes and to build their confidence in speaking by telling stories in their home languages. He began his lesson by showing students a picture of an old man and some members of the family seated around the fireplace. He then asked the students in pairs to discuss what the people were doing. The pairs reported their answers to the class. He then asked the students if they also sat around the fireplace to listen to stories, and many said they didn't. He told the students to go home and ask one of the older members of the community to tell them a story.

In the next lesson, he divided the students into groups. He made two groups of Chaga speakers, one group of Chirundi speakers and one of Chinamwanga. He divided the Pare speakers into ten groups. He asked each pupil to tell their story to the rest of the group members, using the home language.

Mr Kimaryo went round and listened as they told their stories. He was pleased at how well they told the stories, especially the ways they used their voices to add interest.



## Activity 1

This activity is for students to share stories they learn at home.

Talk to your students about their experiences of listening to stories, and find out what kinds of stories they enjoy. Ask them whether they listen to stories at home, and who are the storytellers in their community.

Ask them to find someone from the home community to tell them a story. They will need to remember the story because they will have to tell it to their classmates. A good way of learning the story is for them to tell it to a number of people at home. As they do this, they should check that they have all the details of the story right.

In the next lesson, group together students with the same home language (see **Additional Resource Group work in your classroom** at the end of this Teaching Pack). Ask them to tell each other the stories they collected, using their home languages.

**How did your students react to this activity?**

**How could you build up a resource of these stories?**

## 2 Inviting the community in to tell stories

Inviting community members into the classroom will help to motivate students and build their storytelling expertise in the home language. You can also ask your visitors to offer their knowledge of stories, to make sure that the stories the students tell are as complete and authentic as possible. This will mean that these stories become a rich resource for learning.

If you have a large class, this kind of community support is particularly helpful. Asking for support from your head teacher and colleagues may make it easier to get some members of the community involved on a regular basis.

### Teaching Example 2

Four teachers at St Mary's Junior Primary School in Dar Es Salaam were all enrolled in the same NTI distance-learning teacher upgrading programme. One of the modules asked them to explore how resources around them could be used in the classroom. They did some work on collecting boxes, bottles, plants and other resources and using them in science, mathematics and language activities. But the module reminded them that people are the most valuable resource for learning. It suggested that they arrange an Open Day for students and older community members to share their knowledge and skills.



The day the four teachers organised was a great success. Mrs Rwakatare, the School Governing Body chairperson, told the history of the school. Some older community members demonstrated crafts, such as basket weaving, tobacco curing, and beadwork, and women renowned for their cooking gave recipes for traditional dishes. Various grandfathers and grandmothers told itan (traditional tales).

Then it was the turn of the students to demonstrate what they had learned at school. The day ended with the performance of songs and dances by different groups.

As a result of the activities of the day, several community members became regular visitors to the school. They passed on their skills in various crafts and told stories, which were later used in class.

## Activity 2

You will need to plan this activity well in advance and allow a whole morning or afternoon for it.

- Arrange your students into groups of the same home language. Ask each home language group to invite someone from their community to class to help students with their storytelling skills. Give each group a written invitation to take home (see **Sample invitation letter** at the end of this activity).
- On the day, ask the community members to join the group and listen to the students telling stories. Ask the 'experts' to give the students guidance and advice on how to improve the stories and their storytelling.
- Once the 'training' part is over, groups can come together and listen to stories from the experts. Songs, poems and riddles could also be shared.

**What did the community participation add to the learning in your classroom?**

**Were you pleased with the way you organised your activity?**

**What would you do differently next time?**

Dear .....

Our class, Standard..... is learning about local stories and the art of storytelling. We have heard about your expertise and we would like to invite you to come and help us work on how to develop our storytelling skills and to help us learn the stories well.

We would like you to come on ..... Please let us know if this is convenient. .... from our class will meet you at the school gate at 10.00 am.

With many thanks

Standard 5

St Mary's Junior Primary School

### 3 Performing Stories

It is important that every pupil is able to communicate effectively and is given the opportunity to be imaginative. Group story performances can give even quiet students the chance to speak, sing, act, dance, etc. without too much pressure. Each pupil in a story-performing group can play a role: a character in the story, a narrator or part of a chorus. Students with specific talents can create 'props' and 'costumes' with objects such as pieces of cloth or paper or a few twigs from a tree.

In classes where students do not all speak the same home language, working with fellow speakers of the same language in order to prepare a performance in this language can be very positive.

This next part provides you with ways to develop students' confidence and skills in speaking their home language. These ways can also be used to improve skills in a lingua franca or an additional language.

#### Teaching Example 3

Mrs Rebecca Kassam teaches a class of 100 Standard 5 students in a village near Tanga in Eastern Tanzania. She decides to hold an end-of-term story performance day. She organises her students into groups of five and then encourages them not just to tell stories but also to perform them so that both performers and audience will enjoy them. She tells students that if they wish to perform in a language that not everyone knows, they must decide how to help the audience understand the meaning by using actions, facial expressions and different objects ('props').

Mrs Kassam gives her students time to plan and rehearse their chosen stories. As they work, she monitors their progress and sometimes shortens or lengthens the preparation time. She has found that students prefer to prepare and perform their work outdoors.

With 80 students, it would take up too much time if all groups performed for everyone in the class. On the story performance day, Mrs Kassam asks students to form four circles, with four groups in each circle. She numbers the groups in each circle from 1 to 4. Group 1 performs in the circle centre for groups 2, 3 and 4. Then group 2 performs for groups 1, 3 and 4 and so on until all groups have had a turn.

After the performances, Mrs Kassam asks each group to discuss what they have learned. She thinks about what some of the quieter students in her class have shown about their understanding and how she can use this information to plan the next stage of learning.

See **Working with large and/or multigrade classes** at the end of this Teaching Pack.

### Activity 3

Ask students to form themselves into groups of six. Ask them to: think about the stories they have told and listened to;

- decide which story they think would be the best one to perform for the rest of the class, so that everyone can understand and enjoy it – more than one group can choose the same story;
- identify all the characters and decide who will play each part. They may also need a narrator;
- decide on the language(s) to use, sound effects, gestures, clothes and objects that will help bring the story to life and who brings which resources.

Allow time to rehearse and set a time limit for the performance. Monitor each group and help them as necessary by providing ideas or suggesting ways to do things.

Ask the audience to give feedback to each group (see **Assessing group story performances** at the end of this activity).

If you can, tape-record the stories that are performed. Otherwise, take notes for later use.

The stories could be perfected and performed to parents and community leaders in your area to raise funds for buying resources for your class.

### Assessing group story performances

Performance feature	Excellent	Good	Average	Weak
Easy to follow and enjoyable story				
Use of different voices				
Use of sound effects				
Use of movement				
Use of costumes and/or props				

## Numeracy: Patterns in number charts

- 1 Using a number chart
- 2 Investigating numbers
- 3 Using a number chart for multiplying numbers

**Key Question for the teacher:**

How can you use number charts to help pupils find patterns in numbers?

**Keywords:** number chart; number pattern; multiplication; investigation; group work; basic operations

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- helped pupils to find patterns using number charts;
- set up and managed investigations using number charts;
- improved your skills at working with groups.

## Overview

A number chart of 100 is a simple aid for helping students see pattern in number, and can support a wide range of learning activities. Number charts can be used for young students to practice counting, yet can also be used for open-ended investigations with older or more able students.

In this section you will help your students to understand mathematical concepts through investigational and group work.

# 1 Using a Number Chart

It is important that you help students get a sound understanding of number work, in order to lay a solid foundation for their future mathematics education. In this part, you will learn to use guiding questions to lead students to investigate a number chart and increase their skills in the basic operations of numeracy. By asking them to work in groups, you will be helping them learn to cooperate with one another. They will also be making their thinking explicit as they explain their ideas to others.

See **using group work in the classroom** at the end Teaching Pack 3 for ideas.

## Teaching Example 1

Mr Musa in Nigeria planned to help his students investigate number work using 100-square number charts (see the **100-square number chart** at the end of activity 1).

He brought copies of 100-square charts to the class and divided the students into groups of four, giving each group a copy of the chart. He asked them to investigate their chart, noting any patterns they observed. He asked guiding questions (see **Using questioning to promote thinking** at the end of Teaching pack 3).

Going across the rows, what can you say about the numbers? What is the difference between a number and the one to its right? What is the difference between a number and the one below it? Can you identify multiples of 2 and multiples of 5 in the chart?

As his students were working, Mr Musa moved around the class, checking that everyone was participating. When he noted those who were having difficulties he provided support by suggesting strategies or asking questions to guide their thinking. After 20 minutes, he brought the class back together. He asked the students to share the patterns they had observed and try to formulate the rules for the patterns.

## Activity 1

Cover or mark four numbers together in a row or column.

Ask the groups to make up some sums. The answers should be the numbers that are covered.

e.g. if 10, 11, 12, 13 are covered, the sums might be:

$$5+5 =$$

$$13-2 =$$

$$3 \times 4 =$$

$$9+4 =$$

The first group to finish asks the class the sums and chooses a person to answer. If all the sums provide the right answer the group gets a point.

Ask other groups to share their questions with the group next to them. If they are correct they gain a point too.

Continue the game for 10 or 15 minutes to give them practice in making up sums.

Here are some questions for you the teacher to think about after you have finished this activity:

At the end of any teaching session it is always good to pause and think about how the lesson went. By asking yourself a few questions and answering them honestly you will think more deeply about your roles and responsibilities as a teacher.

Below are some questions to help you think about what you did well and what areas you could improve or develop further.

- Did the early work with the number chart lay a good foundation for the further lessons? How did this happen?
- Did the students enjoy this investigation? How do you know they enjoyed it?
- Did all the students participate? If not, how could you ensure everyone takes part next time?
- Did you feel that you were in control of the class?
- How could you improve this lesson?
- Would smaller groups be better? Why?
- Did you give the students enough time for their tasks?
- Did you give all students a chance to discuss what they did?
- What did the students learn?

## 2 Investigating numbers

### Teaching Example 2

Mrs Mudenda wanted to develop her students' confidence in their mathematical thinking. She made many copies of a 100-square number chart, divided her class into pairs and gave a chart to each pair. She then asked the following questions for the pairs to solve using their charts:

**How can you move from 10 to 15?** E.g. move right 5 squares.

**How can you move from 10 to 35?** E.g. move right 5 squares and down 2 squares; or down 2 squares and right 5 squares.

She discussed with the class the possible ways of moving from 10 to 35 on the chart and helped students understand that there are sometimes many ways to answer a question in mathematics.

Mrs Mudenda then asked the students to make up ten similar questions each and take turns with their partner to answer them with the help of the number square. She asked her more able students to try to write the sums down.

## Activity 2

Before the lesson, prepare some number charts.

Also, do the activities yourself and find out how many different ways there are of answering each question.

Ask the students to go into pairs and hand out a chart to each pair. Now ask them to investigate questions such as:

### How many ways can I move from '21' to '34' on the chart?

Go round the class, listening to their reasoning and making notes. Different pairs may give different answers, for example: 'I will go down 1 and along 3' or 'I will go along 3 and down 1'.

Next, ask your students to each make up five similar questions, moving from one square to any other, and ask their partner to solve each of these in at least two ways.

Finally, you could extend this work by asking the students to agree with their partner, 'what is happening to the tens and units with each move?' e.g. moving from 19 to 47 is going down 3 rows, (adding 30), and moving left 2 columns (removing 2). This is the same as adding 28.

## 3 Using a number chart for multiplying numbers

When students are confident in moving around the number chart, they can begin to stretch their ability to 'see' or visualise mathematical patterns. A simple starting point is to colour in (or put counters on) all the squares that meet a certain condition, e.g. multiples of a given number. This is what the teacher in Teaching Example 3 did.

### Teaching Example 3

Mrs Kashina, who teaches a Grade 4 class of 41 students, gave groups of four students a number chart, and 15 small stones. On the board, she wrote down

4, 6, 9, 11

and asked the groups to take one number at a time, and put a seed on all the multiples of that number (e.g. for number 4, multiples are 4, 8, 12, 16). Some of her students coloured or shaded in the multiples instead of putting seeds. Then students had to write down the patterns they could see, as she showed them with 4, before trying the next number. She asked them to look for any patterns in the answers:

4, 8, 12, 16, 20, 24, 28, 32, 36, 40

She asked a different group each time to show their answers and they discussed any patterns on the chart and in their answers.



Here is an example of the work:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90

In a later lesson, Mrs Kashina told a story from a Zambian magazine about a boy who made his own number patterns. She used a mixture of ciTonga and English. (In this way she built on the students' knowledge of their own language to help them understand the new language.) The students became very enthusiastic about number patterns, and Mrs Kashina believed they would enjoy doing similar investigations for multiplication.

### Activity 3

Building on the previous work, give your students an investigation using charts of multiplication facts. Before the lesson, prepare a large chart of number facts for 5, 6, 7, 8 and 9, leaving some squares empty. You are going to ask your students to find the missing numbers using their previous knowledge.

Split your students into groups of four or five and ask each group to copy your chart.

Ask students to discuss together what the missing numbers should be and, if they agree, to fill in their copies and then pin their results on the wall. As they are working, go round the class listening and helping –only where absolutely necessary –by asking questions rather than giving answers.

**What facts do you know?**

**What numbers are missing?**

**Can you see a pattern in the row? In the column?**

Ask a member of each group to explain how they arrived at their answers and have a class discussion to decide the correct solution.

Ask each group to do a neat copy for one multiplication table and mark in the multiples clearly.

Display each chart on the classroom wall in order from 2 times to 10 times so they can look at the patterns easily.

## Science: Everyday forces – investigating movement

- 1 Seeing forces everywhere
- 2 Forces and notions in sports games
- 3 Investigating friction

### Key Question for the teacher:

How can we find out and build on students' ideas about forces?

**Keywords:** force; investigation; brainstorming; floating; games; friction

### Learning Outcomes for the Teacher

By the end of this section, you will have:

- used different methods to find out pupils' ideas about forces around them;
- considered how to record your own and pupils' learning in this topic;
- supported your pupils to do investigations in small groups.

## Overview

The most obvious thing about our world is the amount of movement that is happening almost all the time. What powerful natural forces drive this movement? What is force, and how do we explain its effects? How do we make use of forces to make life easier or better?

Here we look at different ways to find out how students make sense of everyday forces. As their teacher, your challenge is to help them explore and assess possible explanations for how forces cause changes.

# 1 Seeing forces everywhere

How do you, the teacher, find out what your students already know about forces and motion? And how can you extend these ideas and link them to current scientific understanding?

## Teaching Example 1

Eugenia in Abuja, Nigeria, is an experienced teacher who has learned to trust her students. When she did an upgrading course some years back, she realised how following traditional ‘jug and mug’ (where the teacher has the ‘jug’ of knowledge and pours it into the ‘mug’ of the waiting student) teaching had led her to underestimate her students. Now she tells less and challenges them more.

She began the topic of ‘force’ by suggesting to her class that they have a ‘Force Week’, where nearly everything that happens will need to be explained in relation to ideas about force and movement (motion).

First thing on Monday, as they wrote the date in their books, she told them to stop and think if any force was involved in making marks on paper. A lively discussion followed. She encouraged them to investigate by making different marks on scraps of old paper. They came up with ideas that surprised and even challenged Eugenia.

- ‘We pull the pencil across the paper.’
- ‘But I push the pencil!’ exclaimed Danladi, who is left-handed’
- ‘The ballpoint pen slides easier than a pencil.’ – ‘Maybe the ink is like oil for a bicycle.’
- ‘Rough paper scratches more colour off the point of the crayon than shiny paper.’
- ‘Look Ma’ am, you push and you pull when you rub out. Rubbing is a different kind of force.’

How do you turn a page when you read a book? This question led to more discussion about gentle pulls, pushes and lifts, and holding up books against gravity.

Identifying forces in everyday happenings really excited the class.

Soon, students were discussing and trying to explain all sorts of event.

## Activity 1

You will need to collect good pictures from newspapers or magazines depicting force in action and effects of forces. Ask some students to help you cut out paper arrows of two colours (colour-coded for pulls and pushes) and three sizes. (See **Finding forces in pictures** at the end of Activity 1).

Students work in threes to look carefully at a picture for evidence of forces in action.

Mark all the pushes and pulls with arrows that show the direction of force and prepare to discuss and share what they believe. See if they realise that different-sized arrows can be used to compare the size of the different forces they find. Do they notice that you get changes in movement when forces are not balanced?

Ask the groups to join into sixes to explain, check and challenge each other's ideas.

Was asking the groups to assess each other's work successful? Did it lead each group to understand the size, direction and effects of forces better?

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## 2 Forces and motion in sports and games

Forces and motion are part of the games and sports children play.

You can use this to determine what your students already know and to encourage them to challenge their own thinking. By doing this, they will be extending their understanding. Why not use mind mapping or brainstorming to help your students to generate ideas? See **Using mind maps and brainstorming to explore ideas** at the end of Teacher Pack 3.

### Teaching Example 2

Mr Peter Osumba set up a series of games and competitions one Friday. He thought carefully about how these games would show aspects of force. He realised that wrist wrestling would show how forces work in pairs and that, if opposing pushes are balanced, there is no movement. He thought how he could use blow football to illustrate forces acting on a moving object – air blown through the straws would cause movement, change of direction and slow or even stop the table-tennis ball. Tug-of-war would get the students thinking about balance, and being pulled off balance.

Before each game, Mr Peter asked his students to predict what the game would teach them about force. Then, as the game took place, he took the role of commentator, describing what was happening and providing extra information about the effects of forces. In this way, they were thinking about the forces involved as they experienced the effects directly.

The next week, Mr Peter and the students reflected on the 'force Olympics' and made notes and drawings to show what had been learned.



Here are Mr Peters games:

### **The standing one-hand boot throw**

A competitor stands outside in the open with both feet on an agreed line with a large size boot, which they proceed to throw as far as possible, without moving their feet.

- What is the best way to measure/compare distances?
- Is this a push or a pull?
- Discuss other examples, like throwing a 1.5 m stick or heavy stone.  
Explain that these are like sports activities such as javelin throwing and shot put.

### **Wrist wrestling rules**

Opponents face each other on opposite sides of a desk with left hands on laps. Their right elbows are on the table in front of them in line with the opponent's elbow (elbows should not move). They grasp hands and at the instruction 'PUSH!' each tries to push the back of their opponent's hand onto the table to score a point. First to three is the winner who then accepts further challenges. (A variation is to alternate hands.)

This is a good example of balanced forces, but as one weakens, the more powerful force results in a movement.

### **Blow football**

Blow football is played on a large empty table with a ping-pong (table-tennis) ball and two or three players per team. The ball can only be moved by air blown through straws.

A goal is scored when the ball is blown over the far end of the table. A game lasts five minutes each way. If the ball goes off at the side, the opposite team has a free blow-in from the place where the ball left the table. If the ball is touched by a player or a straw, the opponents get a penalty blow and all other straws must be at least two straw lengths away.

This is an example of pushes on the ball from the air.

### **Tug-of-war**

Two opponents stand sideways, foot to foot. They hook little fingers together. At the command pull, they both try to pull the other off balance. The first person to move or lift a foot is the loser.

All these games show the effects of forces clearly and give students a good chance to experience and think more carefully about how forces operate. Many other possible push and pull games exist and new ones are waiting to be invented.

## Activity 2

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Space out the words 'Pulls', 'Pushes' and 'Twists/Turns' on the chalkboard (or on separate sheets of newsprint).

Brainstorm all the force action words the students can think of and form word spiders (word burrs) for each term. (See **example of students brainstorming** at the end of Activity 2) Encourage your students to use all languages they understand and use. Do any words sound like their action? Think of words like 'prod' or 'thump' and even 'stretch' or 'smear'.

Discuss the words and actions with students, using mime to demonstrate (e.g. what are you doing when you 'wring' out a damp cloth to squeeze out the water?). Check if the words represent pushes, pulls or circular movements. Expect some healthy disagreement. Give your students time to discuss conflicting ideas and praise their logical contributions.

Finally, organise your students to display the selected words alongside pictures or objects that illustrate the force action (e.g. 'screw' could show a screw or screwdriver, 'tear' could show torn fabric, 'crumple' could show a crumpled drinks can).

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Here is a summary of forces which you the teacher may find helpful:

- Forces are pushes and pulls.
- A force has two characteristics: size and direction.
- When forces act, they can change the shape of the things they act on. There is a bigger change from a bigger force.
- We can use the change to provide a quantitative measure of forces.
- Forces can be measured using a spring balance or force meter (newtonmeter) in units called newtons.
- An object's weight is the force of gravity acting on it, thus weight is a force.
- The mass of an object is a measure of the amount of matter in it. It is constant and does not change.
- All objects exert a force on each other: the size of the force depends upon their masses.
- Gravity is the force that holds you down to the planet Earth.
- The force of gravity is smaller on the moon than on Earth because there is less matter in the moon (smaller mass) than in the Earth.
- On the Earth, every kilogram is pulled by gravity with a force of around 10 newtons towards the centre of the Earth.
- There is a distinction between mass and weight. Mass is an intrinsic property of an object – no matter where you are, you always have the same mass. Your weight is the gravitational force that acts on you. Your weight acts downwards, towards the centre of the Earth.
- Mass and weight have different units. Mass is measured in grams and kilograms, whereas weight (a force) is measured in newtons

- Friction is a force that resists movement.
- A force is needed to start something moving, speed it up, slow it down or change its direction.
- The bigger the force, the greater the acceleration (or deceleration) on a fixed mass.
- When no overall force is acting on an object, it will remain stationary or continue at a steady speed in a straight line.

*Adapted from: Developing Subject Knowledge – Jane Devereux*

### 3. Investigating Friction

Primary students need to experience a range of practical experiences and have chances to talk and think about what they have been finding out. There are many activities that would extend your students' ideas about forces, for example looking at balls rolling down slopes at different angles and pushing or pulling shoes along different types of surface.

#### Teaching Example 3

Here are Mr Peter's notes on what he feels his students have gained from doing half a term's work on force:

- Confident they know forces are pushes or pulls or combinations of both.
- All students know that forces are involved when things start and stop moving and make turns.
- Some students know that the forces on a stationary object are equal and opposite but many find this difficult, as they can't see any forces acting.
- They have good experience of most forces that require actual contact – but many are not sure about forces exerted over a distance (for example repulsion and attraction of magnets and static electricity).
- The class is pretty clear about effects of gravity and most students have some idea that 'weight' is the force they exert on our planet and that this would change if they were on a different planet.
- Need more work on friction. Some students still puzzled that friction can be both useful and a problem.
- Need to improve our models of force meters, which show how to measure forces accurately.

### Activity 3

Give your students opportunities to work in groups (see **Using group work in your classroom** at the end of this Teaching Pack) to set up their own investigations.

This investigation looks at reducing friction. Write this question on the board: Which substances are better at reducing friction? Some ideas of substances to use are chalk, cooking oil, margarine and soap, but let your students try their own ideas.

Depending on the equipment you have:

Students could use a shoe with weights (heavy stones would be ideal) on a piece of wood. If they tilt the wood the shoe will slide. The more they need to tilt the wood the greater the friction. How does the angle change when they rub different substances on the wood?

Or students could use an elastic band to propel a coin across different surfaces. If the elastic band is pulled back the same amount each time, the coin will get the same pushing force each time. Students can then measure how far the coin travels on different surfaces.

Support their planning of investigations including their predictions – what they think will happen and why. How will they clean the wood in between experiments? How many times will they try each substance? Here are some headings for the students planning their investigation:

*We are trying to find out*

*We think that these substances will reduce friction (3-5 ideas)*

*We predict the substance best at reducing friction is*

*We think this because*

*For our equipment we will need*

*in our investigation we will (do)*

*in our investigation we will measure*

*In each experiment we will change*

*In each experiment we will keep the same*

*We found out that the best substance to reduce friction was*

*Was the prediction correct?*

*Were there any problems in the investigation?*

Give them plenty of time to carry out the experiment. Encourage them to record their results in a table.

At the end of the investigation, ask them to what their results mean. What advice would they give to people who wanted to know how friction could be reduced? They will be behaving, talking and thinking scientifically – which is great.



Think about how your students could present their work: will you ask each group to present to the class? Or make a poster to show their results?

Here are some examples for experiments around forces:

**1. Using springs to measure forces:**

Make a class list of everything the students have seen that includes a spring.

Show how a spring stretches with a pulling force and measure how much it stretches.

Use a spring to measure forces around the classroom – measure how much the spring changes in length. (You can make a spring from a 50 cm length of copper wire or you can use a strong elastic band instead of a spring.) Some forces to measure include door opening, pulling a chair along the floor, pulling a pen or pencil, opening a clothes peg.

**2. Cutting down friction in water – making streamlined shapes:**

Ask students to draw the shapes of fish, boats and diving birds. Which sort of shape is best for going fast through air or water?

Students make different shapes with lumps of clay or plasticine. Drop these shapes through a tall tank of water and time how long it takes each to get to the bottom.

**3. Forces at a distance:**

Use a magnet to pick up steel pins. Ask students to slowly move the magnet towards the pins. What is the distance between them when the pins first start to move?

Rub a plastic pen or ruler on a cloth (e.g. a duster). This gives the pen or ruler an electric charge. Now try to use the pen or ruler to pick up small pieces of scrap paper. How many will it pick up?

Ask students to explain what they think is happening in each of these experiments.

**4. Forces and weight:**

Weight is a special sort of force caused by the Earth attracting everything on it or near it.

Ask students to use a spring or elastic band to make a weighing machine that measures the pull of the Earth on objects. They will need to make a scale for it.

Then talk to students about how the weight of these objects would be different on other planets in the solar system or on the moon. Larger planets exert a larger force on another object and smaller planets or bodies exert a smaller force.

## Social Studies: Exploring the visual arts

- 1 Artworks in the home
- 2 Masks
- 3 Displaying art from home and school

**Key Question for the teacher:**

How do you explore local art with your students?

**Keywords:** art; masks; exhibitions; artefacts; thinking skills; crafts

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- developed your skills in carrying out classroom activities and related discussions in the area of visual arts;
- developed pupils' knowledge of the visual arts that are produced and used in the community;
- undertaken practical artwork with your pupils.

## Overview

Some of the most exciting parts of a society's heritage are its arts and crafts traditions. The way that objects, both ornamental and everyday, are made and decorated, and the music and dancing that is produced, provide insight into the core values and needs of that society.

This section will show you how to introduce your students to visual arts that are around them and ways to use the visual arts to stimulate creative work in your classroom. Your task is to help students understand that artwork makes the environment attractive. In addition, you will want to develop the understanding that art is a means of communication and a way to transmit culture.

# 1 Artworks in the home

The study of art and artefacts and how they are produced can provide students with a window onto their own culture and community history. It also gives you, the teacher, opportunities to design good activity-based lessons, because there are so many exciting objects and artworks that can be brought into the classroom to stimulate interest and provide ideas for students' own art activities.

The symbols contained in art are most often related to the moral and religious values of a particular society. Therefore, it is important to encourage your students to take an interest in the arts – to preserve their own cultural heritage and help them make more meaning of their own contexts. This is why we teach students about art.

## Teaching Example 1

A day before the first lesson on local traditional art, Mrs Kabalimu, from the Tanga Region in Tanzania, asked her students to make a list of artefacts produced in their community, either in the past or in the present. They were to speak to their parents and neighbours in gathering this information. Just to get their thoughts moving, she showed them some examples of artefacts, such as a beautifully woven Makonde basket and a Maasai bead necklace.

The next day, students brought back some extensive lists – Mrs Kabalimu would mark each one and return it. Here is her homework list of artefacts that her students brought in:

Jabali 6B 02.10.2005

### Name of Artefacts

1. Drum	✓
2. Guitar	Is this the guitar that you made?
3. Wooden spoon	✓
4. Bottle	Think about this again. Was the bottle really made in your community?
5. Clay pots	✓ Very good
6. Tingatinga painting	What is this
7. Car toy	Is it one of the toys made in your village?
8. Handwoven mat	✓

Well done Jabali. You have collected a good list of artefacts here. Make sure you understand which of them are made in your community.



She started the lesson by asking students to mention names of artefacts they had learned of, which she wrote on the chalkboard. These included the names of carvings, paintings and different drawings, weapons, household objects and accessories. Mrs Kabalimu divided the class into small groups (see **Using group work in your classroom** at the end of this Teaching Pack) and gave each group the names of two art objects and the following questions:

- Describe the uses of the objects.
- What skills are required to produce the objects?
- Are these skills known to many people?
- How might the objects be stored and preserved for future generations?

After 15 minutes, each group presented its findings to the whole class. Mrs Kabalimu made notes on big sheets of paper and, as she did so, she summarised the students' ideas into different categories. She knew that it was important to group the ideas and to draw attention to the way they were classified.

These sheets were pinned on the classroom noticeboard and left for a week for students to study. Not only were the students learning about artefacts in their own community, but they were also being given an opportunity to develop their thinking skills.

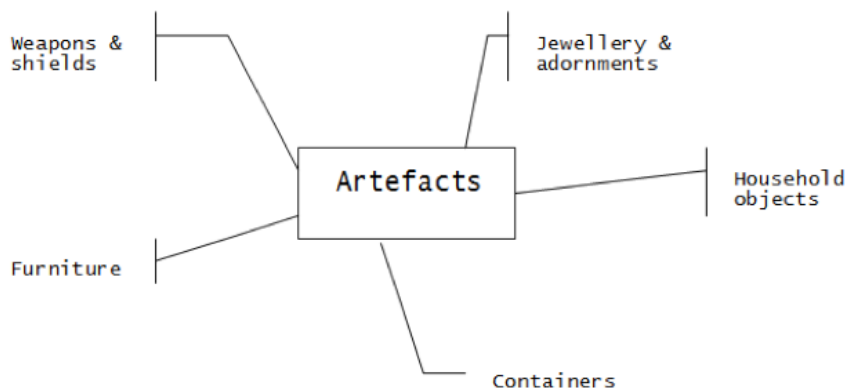
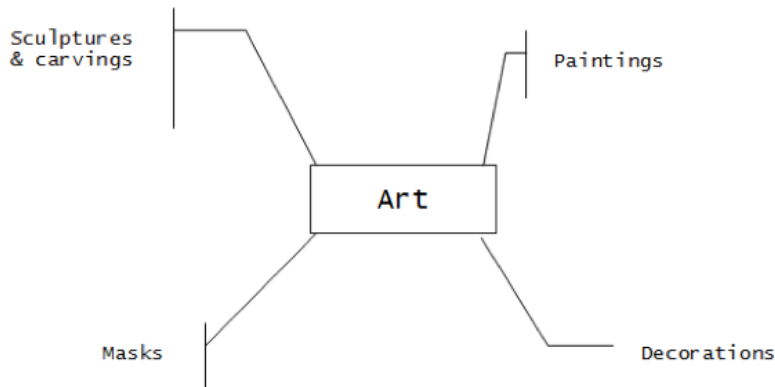
### Activity 1

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You may want to look at the diagram in '**Categories for organising types of artworks and artifacts**' at the end of Activity 1 to assist you with planning this lesson.

- In a classroom discussion, ask students to brainstorm traditional art objects and artefacts they know. Start by giving some examples.
- As students come up with ideas, write them on the board in various categories.
- Examine each object classified as a sculpture or carving and ask the class to discuss the skills required to produce these objects, how and where they are produced and how they are cleaned and preserved.

- Do the same for other categories of objects, covering as many as time allows.
- Finish the lesson by asking students to plan for their next art period, in which they are going to draw pictures of or make some of the objects.
- Find a space where these can be displayed according to categories. They could later become part of a school exhibition.



## 2. Masks

Traditional African masks were considered to be crucial objects because they played the essential role of the spirits in the African belief system. The original intent in creating an African mask was to create it for a particular ceremony or societal ritual. Unlike the West European concept in which a mask is considered to be the means of 'representing' a spirit, traditional masks in Africa were understood to be where a spirit is 'created'. In other words, when a person wears the mask, along with a costume that conceals them from head to foot, the masked person actually 'becomes' the figure the disguise is intended to represent, bringing it to life through their gestures, sounds, activities, and often their possessed state.

**Teaching Example 2**

Mrs Sungi is an art teacher at Ihanja School, Singida. She has decided to explore traditional African masks with three broad outcomes in mind:

- To reflect on shared uses and experiences of artwork across Africa.
- To explore how symbols in a piece of artwork convey particular meanings in a cultural context.
- To help her students make their own masks.

She plans to use about two double-period art lessons to achieve these outcomes.

Mrs Sungi starts by presenting her class with picture books and magazines that contain images of traditional masks from all over Sub-Saharan Africa. Here is an example:

She asks the class, in groups, to explore some of the books together and to draw out common uses of masks in social life across different cultural contexts. Each group prepares a list of ritual and cultural functions of African masks.

Mrs Sungi will go on to introduce specific masks from East Africa, which have many highly stylised features associated with rituals and the symbolism of power. She will draw attention to important symbols in the mask. She will then give her students time to design and make their own symbolic masks.

**Activity 2**

See Lesson plan on East African Masks at the end of Activity 2 for the detail of how to plan this lesson. Before the lesson, gather together a range of picture books and magazines that contain images of traditional African masks from various places and, if possible, some examples of real local masks.

Tell students to look through the resources you have gathered for ideas for their own masks.

As they plan their masks, students need to think what they wish their masks to convey. Remind them that they need to think about:

- facial expressions;
- images or symbols they might use;
- how to capture feelings;
- colour.

Ask them to design their own masks on a small piece of recycled paper/card first, before making either a larger picture of their mask or making a model out of card.

You will have to allow several art periods for this work.

Display the finished masks for all to see and invite other classes to see the masks.



<http://www.masksoftheworld.com/images/African-Makonde-Mask-a.jpg>

There are generally three kinds of mask: face masks, helmet masks (which as the name suggests are worn over the head like a helmet), and body masks, which cover a good part of the dancer's torso and are intended to disguise the dancer's identity from people in close proximity. The body mask sometimes only covers the torso and is worn together with a face or helmet mask.

All masks represent spirits or ancestors, and were most powerfully used in initiation ceremonies as expressions of continuity, fear and morality. They were also used in dances for festive occasions, for instance in harvest celebrations.

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The helmet masks (mapiko; singular lipiko) are notable for their strong, portrait-like features. Many have real human hair applied in shaved patterns, raised or incised facial scarification, open mouths with bared teeth, large ears or lip-plugs. They are used in the mapiko dance and in other dances.

Although both male and female heads can be depicted, female heads are very rare. The dancer breathes and sees through a small opening in the mouth.

Mapiko is not just the name given to a mask (usually helmet mask), but also the name of a dance, the name of the terrifying force that performs in it, and also the name given to one of the stages of male initiation, when the initiate is introduced into the secrets of the Mapiko.

The masks themselves are made in a secret bush location known as the Mpolo, which women are forbidden to approach. When not in use, the masks are kept in the Mpolo, and were traditionally burned when broken or replaced with new masks.

*Adapted from original source: <http://www.bluegecko.org/kenya/tribes/makonde/carving-masks.htm>; accessed 1 July 2007*

**Outcome**

Students will develop an appreciation of a mask's various purposes and will create a mask.

**Materials**

- drawing paper
- card
- pencils
- modelling clay
- paper in various colours
- markers, crayons or coloured pencils
- poster colour
- beads, shells, etc.
- scissors
- glue

1. Collect together some images of masks to share with your students.
2. Discuss the images of the masks and their symbolism.
3. Ask each pupil to create a preliminary drawing of his/her mask.
4. Trace the pattern on card and then draw their design for the mask.  
Tell students that they may change the facial features on their masks.  
The pattern is only a guide for location of eyes and mouth in case they would like to wear their masks.
5. Paint the masks and allow them to dry.
6. Cut the masks out and prepare the materials that will be attached to masks such as hair and a band to secure it on their head.
7. Give students time to decorate their masks.

### 3 Displaying art from home and school

Producing their own artefacts is important for your students and they will want to share their achievements with others. In this part, we suggest creating a school exhibition of community artefacts and objects students have created as a means of fostering and preserving your students' pride in their cultural heritage. Artefacts from the local community that cannot be moved or are otherwise unavailable could be represented by cuttings of pictures from newspapers and other sources.

**Teaching Example 3**

Llemela Community Primary School's Open Day normally takes place towards the end of the school year. Mr Koku, who is teaching art to Standard 4 students, asks the Open Day planning committee to allocate a space in the exhibition room so that his class can display artefacts they have made during class or collected from different sources in the community. The request is granted.





During the preparation period, Mr Koku led his class to plan for the display. He divided the students into four groups. The first group was required to collect and label all drawings, pictures and objects classified as household objects. The second group was assigned the category of musical instruments; the third group was assigned the category of jewellery and the fourth group the category of carvings.

The work of collecting and labelling took up two lessons. In the third lesson, each group nominated one pupil to present its collections to the class the way one would present to visitors. During the Open Day, the class displayed the objects arranged into four categories and four students described the collection to parents and other members of the community who visited the class display table.

At the end of the day, the artefacts table was awarded a trophy for the best table in the exhibition room.

### Activity 3

Ask students to bring into class drawings, artefacts, masks, tools, carvings, pottery and baskets either from home or that were made during their art lessons.

Prepare five cards. On each card, write one of the following words: Picture makers; Weavers; Sculptors; Potters; Carpenters. Divide your class into five groups and assign each group one of the cards.

Ask each group to categorise the objects that they have brought in and display in a separate space those that belong to the category on their card.

Once this is done, ask groups to compare categories in order to arrive at uniform sets. The debate that will go on here is very important in building students' categorisation and thinking skills and will help them identify the key things they want to include on their display labels.

Ask each group to write a name and an information label for each object in their display.

Ask each group, in turn, to arrange their display for public viewing, while other students pretend to be visitors. Ask the 'visitors' to feed back to the groups how they could improve their labels.

Prepare the final draft of the labels and give your class time to set up the displays.

- Devise a rota of students to act as custodians of the display while it is open. It may be open only at break times and lunch time
- After the exhibition, discuss your students what they gained from the experience both in terms of understanding about the artefacts and of being involved in such an event.

## Life Skills: Exploring social networks

- 1 Displaying family networks
- 2 Roleplay for exploring school networks
- 3 Community networks

### Key Question for the teacher:

How can using role play, family trees and local experts help explore family and community networks?

**Keywords:** role play; differences; problem solving; large classes; social networks; family trees

### Learning Outcomes for the Teacher

By the end of this section, you will have:

- set up discussions and used family trees to identify pupils' immediate and extended family;
- used role play and problem solving to explore school networks and relationships;
- worked with local experts to extend pupils' knowledge about community networks.

## Overview

Children have different family, clan, ethnic and other social networks to which they belong and which define who they are. As a teacher, you need to be sensitive to these differences and work to make all your students feel included as they build more networks.

In this section, you will use a variety of teaching methods and resources to help your students identify their own networks and to respect their differences. We start with discussion and drawing family trees to find out about family relationships. You will use role play and problem-solving activities to help students identify their school network. Finally, we propose that you invite a local expert to explore the wider community networks that form part of your students' lives.

# 1 Different Family Networks

We all have very different family networks but there are often many common elements and structures that we can compare.

When discussing family networks, some children in your class are likely to come from very different family set-ups from the others. You will need special skills to help and support these children cope with their differences and ensure that the other class members also respond positively to these differences.

Large classes present particular problems for teachers – especially if they are multigrade classes, see **Working with large classes** at the end of Teacher's Pack 3.

## Teaching Example 1

Miss Ndonga from Namibia has a class of 72 students. The class is working on social networks and she wants to use different methods to help her students identify family types. She knows it is important to help the children to discover things for themselves, rather than just telling them. She talks about family types and asks her students lots of questions about different family types. This tells her what they already know and keeps them interested. She notes that three girls sitting at the back never answer her questions and decides to talk to them at the end of the class. Together, the students identify different family groupings including nuclear and extended families, single-parent and child-headed family groups.

The students are sitting in desk groups of five and Miss Ndonga lets them stay there. Desk groups are not always the best grouping, but sometimes it is the only practical way, especially with very large classes. These groups are mixed age and mixed ability.

Each desk group discusses their own situations and identifies the different family groups they live in. The groups then feed back and Miss Ndonga lists the different family types on the chalkboard. The students copy the list into their notebooks. They do a survey with a show of hands to count the number of each different family type in their class. They have a class discussion about why it is important to respect differences in family types.



In the next lesson, Miss Ndonga asks the same desk groups to talk about why we live in family groups. The groups also talk about the types of houses they live in and what their houses are made of. Finally, they write a short essay on their own family and house and explain how it is different from that of another class member, usually a close friend.

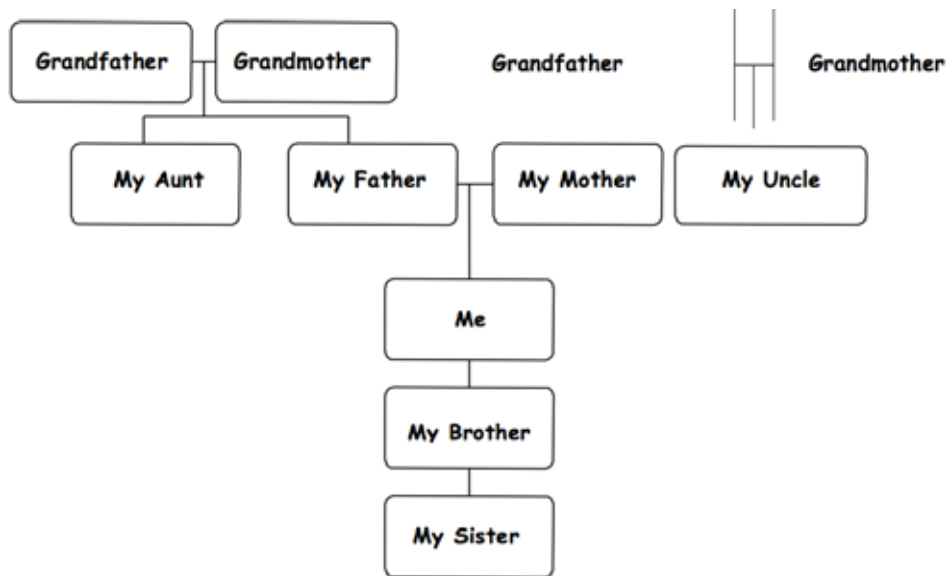
- To protect children.
- To provide food and shelter for children.
- To teach children how to live.
- To teach children the things they need to know, such as honesty and respect for others.
- Because children cannot support themselves.
- For adults to have companionship.
- Because people are social beings and cannot live alone.
- To provide a role model for children.
- To share friendship and love.
- To share the tasks.

### Activity 1

For this activity, you need to plan a lesson on exploring family networks. To do this, you need to consider the following:

- If you have older students or a large class, it would be appropriate to use the same discussion and feedback methods as Miss Ndonga. With younger students, you can still use group or whole-class discussion, but you may find drawing family trees will help young students to understand their family relationships better (see Family network diagram at the end of Activity 1)
- With younger students, you can also use drama, letting group members play the roles of the family members. It might be fun to find out who has the largest family in the class, or the family with the most females. You could link this to survey work in mathematics lessons.
- Be careful if you have child-headed households in your class, as these students may feel they are too different from the others and may feel ashamed or embarrassed. You will need to support these students and help them feel good about themselves. Make sure that other students do not react badly to the difference and make these students feel uncomfortable.
- How you will start the lesson to capture their interest? What activities do you want the students to do to achieve the learning outcomes of the lesson?

When you are happy with your plan, carry out your lesson.



## 2 Role play for exploring school networks

People, especially children, usually feel happy and secure when they are part of a group. This is particularly true outside the family. In school, for example, friendship groups are very important to children. Friendship groups are often a positive experience, but sometimes they can have a negative impact on individual children who are left out or picked on by others. In this part, you are going to use role play and problem solving to help your students explore their friendship groups and the influence these have on their daily lives.

You will need to spend some time preparing appropriate role plays for the age of the children in your class. This will help you start, but you can probably think of other relevant and real situations that you can use. Think carefully about the individuals in your class, consider any problems that have arisen and be careful how you set up the role plays.

With younger students, it is important to help them build up good relationships and friendships so that they find coming to school a positive experience. Using stories about different situations that might arise is one way to stimulate ideas about how to help each other.

### Teaching Example 2

Miss Musonda wanted to help her Grade 5 class discuss the impact of friendship groups. She first prepared some cards with appropriate problems for the age of her students. She spent some time thinking about different problems that her students, who were mostly 11 or 12 years old, may face. She knew this is a difficult age for many children as their bodies are starting to change physically and they start to have hormone surges. She also particularly wanted to tackle a difficult problem she was having with a group of girls who were constantly being nasty to one girl.

Over three lessons, Miss Musonda asked three groups to present role plays to show the problems she had identified on the cards. The class had some interesting discussions after each role play. Sometimes things got a little heated when students had different ideas about solving the problem, but Miss Musonda encouraged them to listen to each other and respect differences.

For homework, she asked the class to work in twos and threes to think of situations that they would like to role-play for the class to discuss. This was quite a high-risk activity, because Miss Musonda did not know what situations they would come up with – so she could not prepare herself. The role plays included bullying, being hungry and having no friends in school. Miss Musonda was pleased with their presentations and glad that there were no problems or surprises.

## Activity 2

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Friendship groups are not the only groups to which children belong in school. Here is a good way to identify different groups when you have a large class. This method involves all the children moving around the class at the same time, so you will need to establish the rules for this if you are to keep control. You may find a whistle is helpful.

Start by asking about the different groups that students belong to in school. Each child writes the name of one group they belong to on a piece of paper and pins it to their clothes at the front. On your signal, they move around the class and find another person in the same group. Give them three minutes. Look out for anyone who is not in a club or group or who cannot find a 'pair' and help.

Then blow the whistle again and each pair must find another pair – again, give them three minutes. Keep going like this until all the groups are formed. Ask the students to count the groups and write them on the chalkboard to establish the group with the most/least members, the most girls/boys etc.

Ask the students to sit back at their desks. Then ask them to write down what they found out, using the information recorded on the chalkboard. You can have a discussion about which groups are the most popular and why. Or which groups have very few members. Perhaps the members of this group can make a short presentation to tell the class about their activity. You could encourage some to join a new group.

With younger students, you may want to work with one group at a time and spread the activity over a week, with you recording their ideas.

**You can read about some examples of school clubs:**

Here is a letter that was sent by two students from Lumezi Primary School in Lundazi, one girl and one boy, to a Zambian magazine:

*'We have many clubs at our school, like Young Farmers, Boy Scouts and Girl Guides. People who did not join these clubs had no club to belong to. So a teacher, Mr Kapanda, started a new club for them: the Good Citizens' Club. It was given this name not because all its members are good, but because Mr Kapanda thought that in the end the members would be good citizens! Now Mr Mtonga is in charge of the club.*

*Members spend a lot of time helping people: we help the old people, cutting firewood, helping people to cross roads, carrying things. One old woman said, "I was coming from the bush to collect firewood, and there were about a dozen boys who were playing with a ball. Two boys came and took my firewood off my head. I was so relieved that I wanted to pay the boys. But they refused, saying that they belong to a club that helps people!"*

*'Our club has been so magnetic that it now has many more members.'*

### 3. Community Networks

Inviting people from the community into school can help keep students motivated to learn and make their lessons more exciting. Handled well, such activities can help you make life skills lessons very relevant for your students. This is a good way to introduce your students to some of the different networks in their community.

However, inviting experts into the classroom may take some time to arrange – you have to identify appropriate people, make arrangements with them and make sure they understand what you want them to do. You also have to prepare resources for your students so that real learning takes place.

Remember to assess what the students have learned after the event. Not only about the topic of the visitor, but also what they have learned about organising such an event.

#### Teaching Example 3

Miss Nkamba talked about community networks with her Grade 6 class. In pairs, students talked about which different community groups they were members of, or which they knew about. They listed all the different groups on the chalkboard:

- Clan/ethnic group
- Religious group
- Boy scouts/girl guides
- Sports clubs
- Dance group
- Choir
- First Aid club

After discussing how many students were members of each different group, the class voted to invite the local Muslim leader to come and talk to them. They did this because only one member of the class was a Muslim and the others wanted to know more about it.

First, Miss Nkamba went to the school library and found a book about different religions. She learned about the Islamic faith herself and prepared a lesson on the basic features of Islam. She did this so the class would have some knowledge on which to base what they learned from the visitor.

The students wrote short essays on the Islamic faith and Miss Nkamba put them all on a special table at the side of the classroom so that everyone could read them. She also asked her students to prepare questions they wanted to ask the visitor and they agreed which were the best questions and who would ask them.

When the visitor came, he was very interested to see the students' work and find out what they already knew about the Islamic faith. He brought interesting artifacts for the children to see and the students were really interested in his answers and asked a lot more questions.

Miss Nkamba was really pleased with the way the visit had motivated her students and decided to follow it up with a visit to the Chibolya mosque. She also decided to invite Mr Patel of the Zambian Hindu Society to give a similar talk.

### Activity 3

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Find out which community groups your students are members of. You can use the same method as Miss Nkamba, or brainstorm with the whole class or use small groups – it will depend on the size of your class and the age of your students.

- Decide, as a class, which community group you would like to find out more about.
  - Prepare yourself – you may need to do some reading.
  - Introduce the subject to your students.
  - Help your students to prepare questions to ask the visitor.
  - Ask for volunteers (or pairs or groups) to carry out the different tasks.
  - Guide your students as they complete their tasks.
  - After the visit, remind the students responsible to write a letter of thank
  - Have a round-up lesson where you explore what the students have learned.
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Teacher Education in Sub-Saharan Africa

# Teaching Pack No. 4

## Early Primary

<b>Section 1 Literacy:</b>	Games for learning language
<b>Section 2 Numeracy:</b>	Introducing measurement
<b>Section 3 Science:</b>	Investigating animal hunters and the hunted
<b>Section 4 Arts:</b>	Practical activities with local crafts
<b>Section 5 Life Skills:</b>	Health and well-being in younger learners

<b>Additional Resources:</b>	<ul style="list-style-type: none"><li>• Group work in your classroom</li><li>• Working with large/multigrade classes</li></ul>
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4

## Literacy: Using local games for learning

- 1 Games for language learning
- 2 Games and chants on reading cards
- 3 Word Games

Key Question for the teacher:

How can you use local games to help language learning?

Keywords: reflection; research; local games; traditional; rhymes; songs; investigating

Learning Outcomes for Teachers:

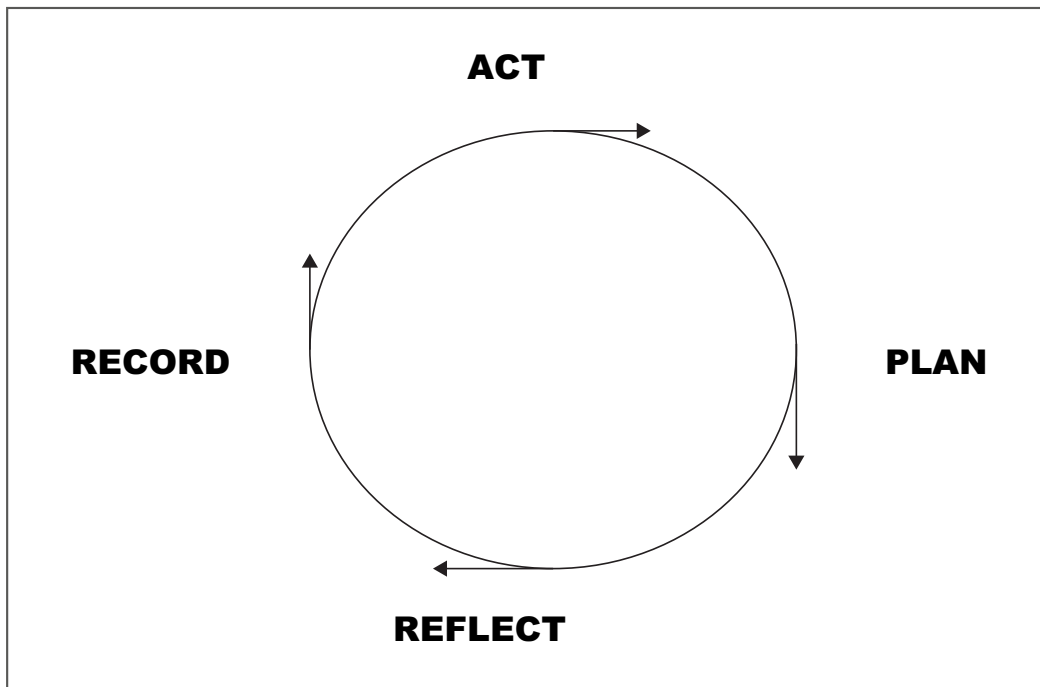
By the end of this section, you will have:

- used traditional and oral games to support learning activities;
- motivated students and built their confidence in using language for games, songs and rhymes;
- extended your own skills in thinking about your role and effectiveness by investigating the value of games for learning

## Overview

Good teachers plan what they do and, once they have done it, record what happened, ask themselves what was successful and what needs improvement. They reflect on (think about) whether the students learned anything and, if they did, what they learned. On the basis of this 'reflection', they plan again for their next activity. This **Action-reflection cycle** shows this process in the form of a diagram.

## Action-reflection cycle



The diagram shows the following steps in the action-reflection cycle:

1. **Plan** an activity.
2. **Act** by putting the plan into practice, and observe how it goes.
3. **Record** what you observe.
4. **Reflect** on what happened.
5. Revise your **plan**, or make a new **plan**.
6. Put the revised or new plan into action, and observe again.
7. **Record** and **reflect** again.
8. And so on, and so on...

Everything you do as a teacher can become part of an action-reflection cycle.

## 1 Games for Learning Language

Children do not only learn in the classroom; they also learn while they are playing. They learn from one another, by watching what others do. They learn by talking, singing, chanting and interacting. By can use play to make your classroom learning more effective and close the gap between what happens in the classroom and outside.

### Teaching Example 1

Six-year-old Maria is at a school where English is the language of the classroom, although it is not her home language.

Every day for a week, Maria could be seen at break time watching other children play with a skipping rope. She did not join in, but stood close enough to watch and to 'listen in' to the rhyme the children were chanting.

On the first day of the second week, Maria took her usual position a few feet away from the game, but now she could be seen 'sounding out' the words of the rhyme.

'Juu-ump, Juuu-ump in and saaay  
One-un, two-ooo, threee,  
Juu-ump in wi-th me.'

She repeated these words over and over, taking delight in saying them louder, softer, and with different stress on parts of a word.

She repeated these words over and over, taking delight in saying them louder, softer, and with different stress on parts of a word. She repeated the rhyme several times and then listened again to the other children. She smiled, and said the rhyme again. Finally she looked for a rope and went to her friend, Miguel. She sang the song, line for line to her friend, teaching him the song. She translated the English words so that he could understand what he was learning. Soon Miguel was able to sing the rhyme with Maria.

### Activity 1

Talk to your students about learning. Do they know that they are always learning: at home, at school, when they are playing?

Ask the class to do an investigation into 'natural' learning.

Their question is: What learning happens when children play?

The students should make notes and drawings about the learning they see in the playground and after school, when other children are playing, and when they play themselves.

In class, ask students to share their findings, in groups. Ask each group to demonstrate how to play one game. Record songs or chants they sing during the game, on tape, or in writing.

Ask each group to discuss what can be learned from these games. Note down their ideas.

**What did you learn from this activity about how games can help learning?**

**Here are two examples of games to try out with your students and then to reflect on yourself**

## 2 Games and chants on reading cards

All sorts of games can be used for learning and you need to think creatively about how to use them in the classroom (see Activity 2). It helps if you can work together with colleagues and friends, and also with your students, creating new ideas that can make the learning in your classroom more fun and effective.

In this part, you and your class extend your research investigations by asking older members of the community about games that they played when they were young.

### Teaching Example 2

The Project for Alternative Education in South Africa (PRAESA) promotes additive multilingualism, i.e. basic learning in the home language, with other languages added (without replacing the home language). PRAESA believes that all languages that children know should become part of the learning environment.

Mr Jacobs helped his Grade 3 students in Cape Town to make 'reading' cards, one for each student in the class. They drew a picture of themselves on one side of a piece of card. On the other side, they wrote songs, games, chants or rhymes, which they brought from home.

Each day, they have a reading period when the children read (and sing!) the cards. Sometimes, a better reader reads a card with a slower reader.

Sometimes, a speaker of one language helps another student to read their language and make the sounds. Sometimes, they act out the rhymes or play the games. Mr Jacobs has noticed how much happier his class is and how they mix much better since doing this.

### Activity 2

Ask your students to ask an older person (parent, grandparent, neighbour, etc.) to teach them a game, song or chant they used to enjoy. They need to know the rules or words and any resources it might need.

Next day, list the games and songs that students brought from home.

Group together students who learned the same game or song. Ask them to prepare to teach this game or song to the class.

Ask them to write out the song or chant or how to play the game on a card.

When the class has learned the game or song, discuss what can be learned from it.

Make notes as you did before.

In future lessons encourage students to read newspapers and magazines to find songs, games, riddles and jokes as a basis for writing their own.

### 3 Word Games

‘Reflection’ is thinking over what happened and seeing how you could do it better next time. After you have tried new activities, it is really helpful to reflect on what was successful and what needs improvement. Make the process of ‘Plan-Act-Record-Reflect’ a part of your daily practice.

Now that you have a good collection of games, you can use them as the basis for learning activities, and as a basis for reflection and growth. (This can, of course, be done with stories as well.)

Here are some word games to try:

#### **Game 1: Bingo**

##### **Make your own version using the squares in the same way**

Read the students a story they enjoy and ask them to choose two words they like.

Ask each student for their words and write the key words on the chalkboard where everyone can see.

Divide the class into groups of six and ask each group to choose 12 words for their group. These can be different for each group.

Each student makes a bingo sheet by drawing a big square divided into nine small squares (see example below).

Tell each student to choose any nine words from their list of 12 and copy these into the bingo sheet, one word in each square. Students’ sheets will be different, because they can only choose nine out of the 12 words.

One student has the master sheet with the 12 words. They call the words out in random order. As a word is called out each student who has the word must cross it out from the bingo sheet. The first to cross out all their words shouts ‘bingo’ and has won.

Let each group play again with each student taking a turn at calling out the words.

If you want to use the bingo sheets more than once, ask the students to cover the words with stones or counters as the words are called out.

Did the students learn new words? How do you know this?

**Sample list of words for bingo:**

Beans  
Cabbage  
Carrots  
Cauliflower  
Corn  
Mangoes  
Maize  
Oranges  
Paw paws  
Peas  
Spinach  
Sweet potatoes

**Two examples of bingo cards:**

Spinach	Paw paw	Beans
Carrots	Cauliflower	Peas
Maize	Mango	Cabbage

Oranges	Maize	Mangoes
Corn	Cabbages	Paw paw
Beans	Sweet potatoes	Peas



**Game 2: Word soup**

Make a list of nine words, e.g. parts of the body, rooms in a house, or vegetables. Put this list on the board (next to pictures illustrating the words if you can).

Give each student a sheet of squared paper. Tell them to enter the key words into the squared paper, one letter per square. Tell them that words can go from left to right, or top to bottom. Tell students to fill the extra squares with any letters of the alphabet. (See example below.)

When every student has done this, collect the sheets and mix them up. Now distribute them randomly, and ask students to circle all the key words they can find. Each student knows there must be nine. The first to finish is the winner.

The students can then choose their own subject or area and a word soup from this to give to a friend to play.

**Example of word soup**

L	I	O	N	A	B	D	E
T	M	O	N	K	E	Y	C
G	I	R	A	F	F	E	C
V	A	D	T	I	G	E	R
I	H	O	R	S	E	R	W
S	N	A	K	E	L	U	M
D	O	P	G	O	A	T	K
R	T	C	A	M	E	L	C

**Words to find in this word soup:**

Goat Camel

Lion Giraffe

Snake Monkey

Tiger Horse

You can make this more interesting by giving ten words and asking them Which word is NOT included in the soup?' You can use this game for lots of different words and in different subjects. A blank template for word soup is below. You can add more squares or make it smaller to make the game harder or easier depending on the age and ability of your students.


**Teaching Example 3**

Ms Mofokeng sang a skipping song when she was a child in Soweto. She decided to use it for teaching her Grade 2 students some words and present-tense phrases in English.

The students first sang it in Sesotho and then she helped them to sing it in English.

She gave each student a piece of paper with a verb (e.g. eat, drink, laugh, cough, jump, run, hop) written on it. She made sure that each child knew what the word meant and how to do the action associated with it.

She allowed each student in turn to mime their action, and the class sang a new verse: 'Antoni, what is she doing? Antoni, she is laughing,' etc.



After the lesson, she thought about:

- what went well;
- what didn't go so well;
- what surprised her;
- what she would change if she repeated the lesson.

What surprised her was how much time it took for the students to learn the English version but also how much the children enjoyed it. She decided that she needed to give more time to the activity, and introduce fewer new words at a time.

The following week, she used the English version of another skipping song in a similar way, making verses with different kinds of foods.

#### MY NAAM IS GALIEMA HOE

My naam is Galiema hoe! My naam is Galiema ha!  
Ek kom van Mosselbaai die laaste Nuwejaar  
Ting tong kalossie, hoe lui die klok vir my  
Die tafel is gedek, met poerring en spanspek

Jy vra 'n stukkie brood, hy het nie botter nie  
Ek vra 'n bietjie tee, hy het nie suiker nie  
Ting tong kalossie, hoe lui die klok vir my  
Die tafel is gedek, met poerring en spanspek

My name is Galiema hoo! My name is Galiema ha!  
I came from Mossel Bay on last New Year's Day  
Ding dong kalossie, the bell is ringing for me  
The table is laid with pudding and sweet melon

You ask for a piece of bread, he hasn't any butter  
I ask for a little tea, he hasn't any sugar  
Ding dong kalossie, the bell is ringing for me  
The table is laid with pudding and sweet melon



### Activity 3

Is there a chant in your class collection that could be changed into the additional language and used to support language learning?

Identify a sentence in the chant where a word (or words) could be replaced by a number of other words in turn. For example, 'She is laughing' could be replaced with 'She is jumping, hopping, running' etc. Each student, or group, can then sing a new verse, with a new word in the sentence.

It will be even more fun if the words or sentences can be linked to actions.

Plan how you will organise your class to sing/chant and act out this 'substitution drill'. (This is a series of sentences, which are the same except for one word/phrase; they are used to practise language patterns.)

If it is not successful, you will need to try a different song, or a different way of organising the activity.

## Numeracy: Introducing measurement

1. What do we know about measurement?

2. Measuring heartbeats

3. Units of measurement

Key question for the teacher:

How to explore what students already know about measurement and plan activities to develop their understanding

Keywords: planning; measurement; mind map; heartbeat; prior knowledge; resources

Learning outcomes for teachers:

By the end of this section, you will have:

- used mind maps to find out what students already know about measurement and measuring;
- used cross- curricular teaching to see how subject areas are interlinked
- planned your lessons to meet your students' needs in developing their understanding of measurement.

## Overview

We measure lots of things in our daily lives, such as our height, the weight of our vegetables, how far we have walked.

What examples of measurement would you expect your students to be familiar with? Without class-sets of measuring instruments, how can your students work with real quantitative data, so that they understand where the numbers come from and what they mean? And how do you help them make sense of prefixes like 'mega-' and 'milli-'? This section will help you explore all of these issues.

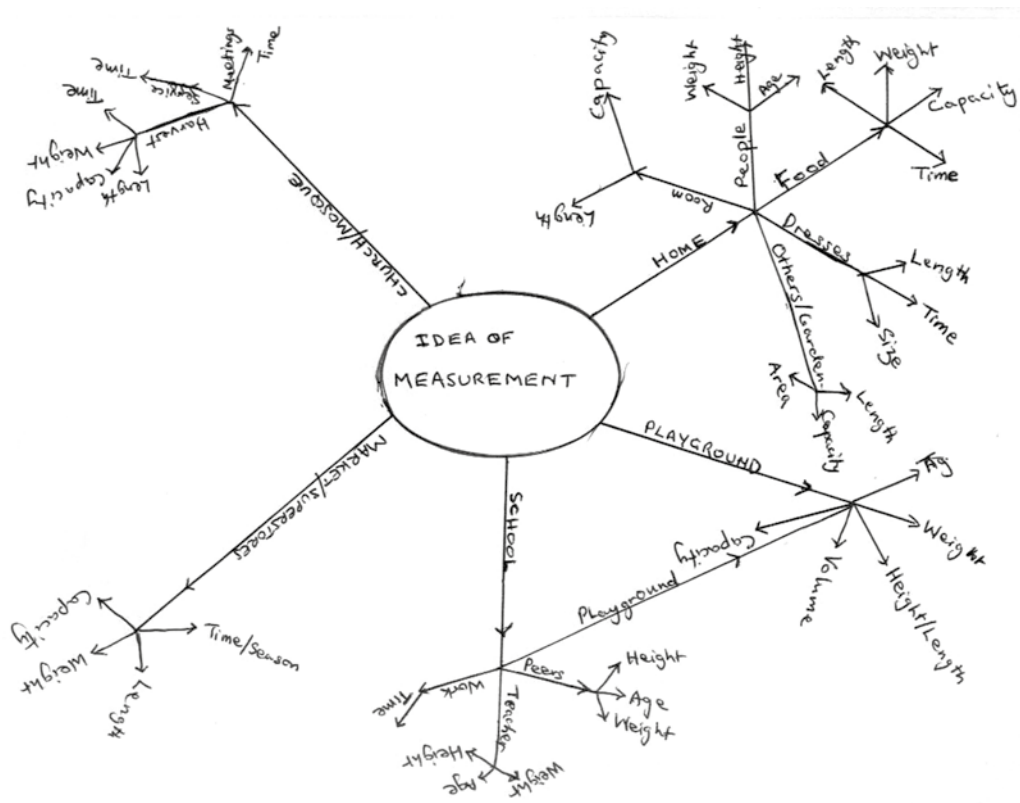
# 1 What do we know about measurement?

Using a mind map will help you find out what your students already know about measurement in everyday life. This information will help you plan activities that will extend their understanding further. See **Using Mind Maps** in the *Teaching Pack Additional Resources*.

## A measurement mind map: Example of students' work

Measurements that are common to the five situations shown in the mind map below are:

- length, surface or solid size;
- weight;
- capacity;
- time.



### Teaching Example 1

Mrs Lekan in Nigeria wanted to find out what her students already knew about measurement in everyday life. She had used mind maps with them before, so the students were familiar with the idea. (See Using mind maps and brainstorming to explore ideas in the Teaching Pack Additional Resources.)

Dividing students into groups of five, she assigned the groups a focus for their mind maps: to some, she said 'time'; to others, 'distance', to others, 'weight'.

She asked each group to complete a mind map showing all that they could think of in relation to their particular focus; she reminded them to think of all the different places they might come across measurement – at home, in school, at the market.

After they had worked on this for about 15 minutes, she asked each group with the same focus topic to display their mind maps together.

She gave the whole class ten minutes to look at the mind maps and then discussed the similarities and differences. She listed the similarities and used these as a basis for planning more work on each area.

### Activity 1

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- Begin your lesson by discussing mind maps and how they work on measurement. Bring them together and display their mind maps or for the first time you could do a class mind map where you write down the ideas your students suggest.
- Discuss with the whole class the similarities and differences between the mind maps. What are the common ideas?
- Ask students to explain any ideas that are not clear and ask them to think of questions they have about measurement. List these and areas they have identified e.g. time, distance. These will help you in planning the next steps.

#### How mind maps can help mathematics teachers and students

Mind maps can help mathematics teachers to:

- plan topics and lessons in a way that is logical and systematic;
- identify and plan activities;
- introduce new concepts to students in interesting ways;
- promote better understanding of concepts;
- focus students' attention on key aspects of a topic;
- help students prepare for tests and examinations;
- organise information that students are able to identify and relate to;
- help find out student's misconceptions;
- assess students' understanding of concepts and topics;
- plan extra support for some students.

Because concept maps can be drawn by students themselves, they are a useful tool for student-centred education.

Mind maps can help students to:

- summarise their knowledge of a topic and give an overview;
  - help order topics according to their importance and relevance;
  - link new ideas with previously learned material;
  - show prior knowledge of a topic;
  - reduce doubt so that the student knows what to study and what to leave out.
- 

## 2 Measuring heartbeats

Consider asking a science teacher to help you show your students how to measure their heartbeats or have a go yourself using to help you. This is an excellent introduction to actual measurement, as it can be done without any instruments other than one watch with a second hand for the teacher or student to use. It can also be integrated with a number of enjoyable exercise and recovery activities, and provide a good basis for cross-curricular work, for example, a 'healthy bodies' week. Practical activities such as this will capture students' attention and involve them.

### Teaching Example 2

Mrs Gwala explained to her students how to measure their heartbeats by holding their left wrist with the middle fingers of their right hand and counting the pulses. She asked them to practise this for a few minutes. Her students were very excited to do this – none of them had felt their pulse before. Mrs Gwala made sure that every student could find the pulse, either at the neck or the wrist. They all measured their pulses whilst sitting and noted this down, or remembered it.

She then asked them to stand up and sit down quickly ten times and then feel their heartbeats again. The students were surprised to see that they had become faster. She asked them to count their heartbeats for 10 seconds and then multiply by 6 to get the rate per minute.

Mrs Gwala asked the students to think why these changes might happen and listed their ideas on the board, e.g. they needed more energy. She was pleased with their thinking and saw them trying this out in the playground during break time.

### Activity 2

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Before the lesson, make sure you can measure your heart rate at your neck and wrist. Practise showing your family and friends how to do this before you try it with your class!

Show your students how to feel the pulse at the neck and wrist, and make sure every student can feel the heartbeat in at least one of these two locations using the middle finger.

Begin the lesson by telling your students that they are going to do an experiment. During the experiment they must sit completely still, and in absolute silence.

Using your watch (or any clock that shows seconds), ask students to find their pulses, and then count how many beats they feel during one minute. Ask them to write down their heart rates but not to talk.

Next, try some moderate exercise (e.g. walking for two minutes) and ask them to take their pulses again.

Wait a minute and ask them to take their pulses again. Record the results.

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### 3 Units of measurement

Understanding the importance of 'units' and the ability to read from scales is central to effective work in measurement. Later sections in this module will deal with length, weight and time: for each, it is important for students to understand the correct unit, and how to read correctly from the scales on measuring instruments. This part explores how you can plan activities to help students develop these skills. By using practical activities related to their everyday lives, students will see a purpose to the work and be more interested.

#### Teaching Example 3

Mrs Gwala had spent some time working on different units of measure with her students. She felt that they were now getting confident in reading from the scale on their rulers, and from the weighing scales she had brought from home. They had talked about centimetres and millimetres and could show these on their rulers, and explain the relationship between them. They knew about local distances between towns, and that these were measured in kilometres. Mrs Gwala was pleased with the progress that had been made, and wanted to make sure the students could now see that 'milli-', 'centi-' and 'kilo-', could be applied to all measurements and units.





Term	Meaning	Weight	Length	Volume
unit	The basic measure	gram (g)	metre (m)	litre (l)
kilo	1,000 times the unit	kilogram (kg)	kilometre (km)	-
centi-	1/100 part of the unit	-	centimetre (cm)	centilitre (cl)
milli-	1/1,000 part of the unit	milligram (mg)	millimetre (mm)	millilitre (ml)

### Units of time

1 minute = 60 seconds

1 hour = 60 minutes

1 day = 24 hours

1 week = 7 days

1 fortnight = 2 weeks

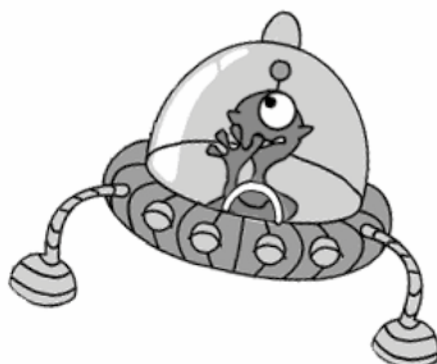
1 year = 12 months = 52 weeks = 365 days

How do you think these traders at a market in Knysna measure their goods?

She decided to do this through 'nonsense' measures – making up playful units, and asking questions about them. After her students had grasped what she was doing, she allowed them to make up their own 'nonsense measure' questions, which they enjoyed greatly. Mrs Gwala was sure at the end of this that they knew well what 'milli-', 'centi-' and 'kilo-' meant, because they were able to explain the differences in their discussion.

Shape, Space and Measures – Measures

## Space and Measure



This report has just arrived from Deep Space, some bits are missing.

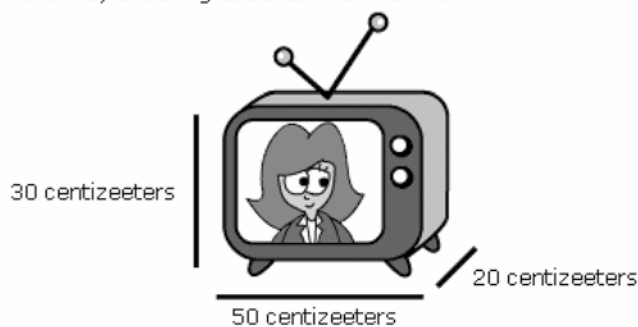
Can you work out what should be written in the spaces?

On my last visit to Earth, I made many measurements. I visited a large city. Its area was 3.5 kilozeeters. That is the same as \_\_\_\_\_ zeeters .

The people there enjoy slurping brown liquid through holes in their faces. They usually slurp 9773 milligurgles, which is the same as \_\_\_\_\_ centigurgles, or \_\_\_\_\_ decigurgles, or \_\_\_\_\_ gurgles.

Everybody is very heavy. Even a little Earthling weighs about 52 kilothudz, which is the same as \_\_\_\_\_ thudz, or \_\_\_\_\_ millithudz. The short Earthlings are about \_\_\_\_\_ decizeeters high, which is the same as 82 centizeeters. The long ones are about 12 decizeeters, or \_\_\_\_\_ centizeeters high.

They spend all day shouting at boxes like this one...



The volume of this box is \_\_\_\_\_

### Activity 3

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Plan this activity with at least one other teacher at your school.

Make a list of all the measuring devices you have access to that could be brought into the school (such as rulers, weighing scales, measuring jugs or spoons, etc.). Devices that have a scale are particularly useful. How do people selling vegetables in the local market measure what the customer wants?.

Think of activities that will allow students to practise using these devices and recording measurements, to develop their confidence and accuracy.

Think about how you will introduce key terms: units, measurement, scale, distance, weight, volume, time, and what your students will do to understand and remember these terms.

Decide how you will organise your students, how much time to allow and the resources you will need to carry out these activities.

Plan your lesson, making sure that, as well as recording the 'number' from the device or scale, students also record the units and what is being measured (e.g. distance, weight, volume, time).

Carry out this lesson. If possible, ask the teacher who helped you plan the activity to observe all or part of the lesson, and discuss it with you afterwards.

**What worked well?**

**What was difficult?**

**Were there any unexpected outcomes?**

**How could you assess your students' understanding of how to measure?**

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## Science: Everyday forces – investigating movement

- 1 Ecosystems
- 2 Hunters and the hunted
- 3 Knowledge of local animals

### Key Question for the teacher:

How can you help students investigate how different living things survive?

**Keywords:** properties; predators, prey, adaptations, observations, projects, animals.

### Learning Outcomes for the Teacher

By the end of this section, you will have:

- used student observations of ecosystems and species to explore animal adaptations and behaviours;
- provided opportunities for students to share their knowledge ways of demonstrating properties of matter to students and helped them to classify materials around them;
- undertaken project work with your students

## Overview

Unlike green plants, which can manufacture their own food, all animals have to find and eat plants or other animals to survive. Hunting animals (predators) are adapted for finding and catching food in many ways. Animals that are hunted (prey) are also adapted to avoid being found, caught and eaten. Students are often fascinated by studying feeding.

In this section, we look at ways of encouraging students to ask 'Why?' questions using animals found locally. We also look at how to structure and record students' observations of ecosystems and species. Students are often fascinated by studying feeding relationships and adaptations.

## 1 Ecosystems

An ecosystem is the pattern of life and interaction between the living things in a specific type of place. This could be a pond, a stream, a hedge, a tree, a forest, a cliff-face or even a field. It could be as small as life under a rotting log or as vast as life in an inland lake.

Thinking about ecosystems doesn't have to be complicated for you and your students. It is sufficient if students spend time observing and investigating different ecosystems. They should get a general idea of 'what eats what', relative numbers of different species and raise some questions about how different animals interact with each other. It is important to give students time to think of the questions they want to ask; often short discussion in small groups will lead to more focused questions.

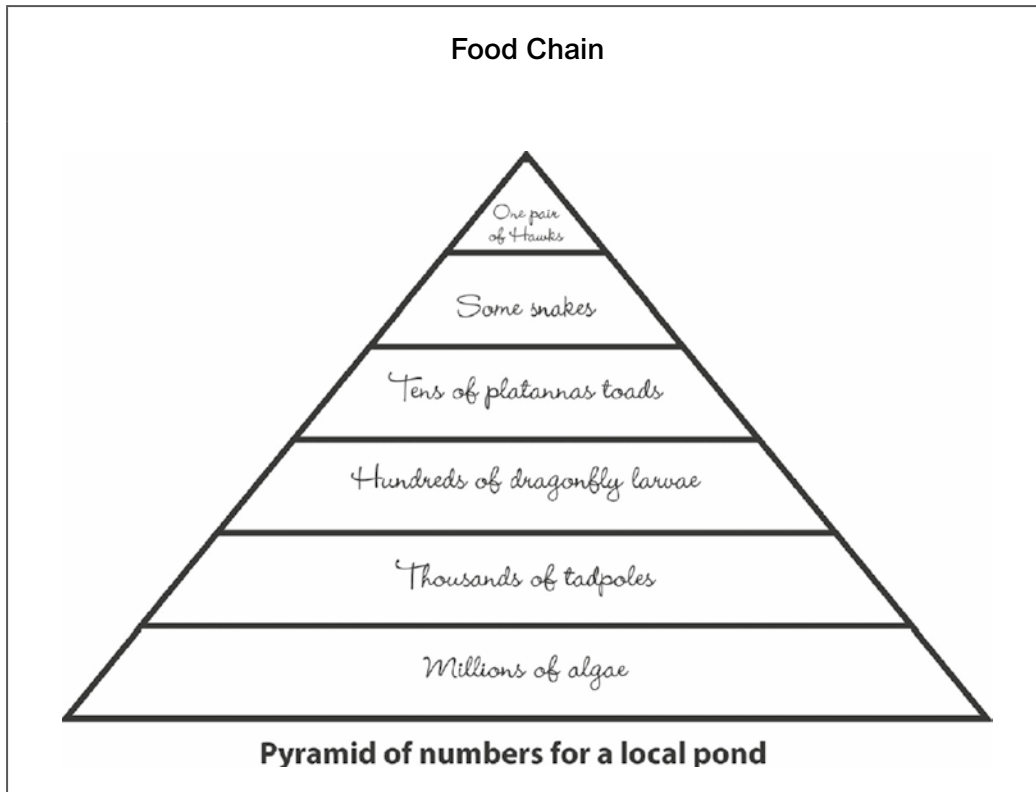
### Teaching Example 1

A primary school in a squatter camp on the outskirts of Nairobi, Kenya, is next to a small natural pond. One of the teachers took her class for a 'look, see, think' slow walk around the pond.

They realised from the greenish colour of the water that there must be millions of minute algae plants and thousands of threads of spirogyra making food in the sunlight. They saw hundreds of tiny tadpoles, which feed on algae. What might eat the tadpoles? Sifiso had noticed about 15 shiny, brittle, larvae skins (exoskeletons) clinging to the stalks of reeds left behind by new adult dragonflies. Perhaps about ten platanna frogs lived in the pond, eating dragonfly larvae and other swimming insects. A few brown water snakes had been seen and these probably ate frogs.

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### Activity 1

Talk to your class about the idea of an ecosystem. Brainstorm a list of probable ecosystems near the school. See likely local ecosystems at the end of this activity

Divide your class into groups and let each one select an ecosystem to adopt and study for the rest of the year. If there is only one suitable ecosystem near your classroom, everyone can study it. Organise students to take turns to record the observations. Encourage them to ask questions about the animals that live there and how they might interact with each other. What types of living things (populations) would they expect to find and in what numbers? What eats what? How might numbers change during the year? Record these questions and predictions for future reference.

Later, make time to visit the sites with students, to check their predictions. This becomes an on-going group project. Make time every few weeks for visits and reports of new information. In this way, the students' knowledge and understanding will grow over time in a relaxed and informal way.

Groups could keep a scrapbook or journal to record their growing understanding of the way things happen in their ecosystem.

As the project progresses, think about your students' involvement – are they motivated by this activity? Do they enjoy this way of learning?

### Likely local ecosystems

Probable ecosystems you and your students might like to consider include the following:

- life under a small rock or fallen tree trunk;
- a nearby tree;
- a hedge;
- the classroom itself (corner, cupboard, etc.);
- the local river, dam or lake;
- a nearby forest;
- a marsh or boggy area;
- a dry barren hillside;
- the household woodpile (watch out for snakes);
- a clump of bushes;
- a compost heap.

Record what students expect to find in their ecosystem in a table, example below:

Species	Approximate number	Feed on	Eaten by	Eggs or?	Activity	Value
Ants	whole colony		Ant Lion	Many eggs and larvae and pupae	different workers soldiers queen	nuisance  clear dead things
Scorpion	Only one	Millipedes Crickets Beetles	Baboon	Live young		sting is poisonous

Write students' suggestions lightly in pencil to be rubbed out when the answers are filled in.

## 2 Hunters and the hunted

Biologists are fascinated by the way the survival of animals depends on adaptation for successful hunting and the avoidance of being eaten. Think of how claws and pincers have been developed to seize and grasp prey or frighten off predators (scorpions, crabs, cats, the praying mantis etc.).

Other animals construct traps. Think of trapdoor spiders, spiders' webs and ant lion pits in soft sand. Topics to discuss with students or ask them to find out about could include mimicry, camouflage, feigning death, prickles and spines, hard shells, speed, bad tastes and even poison.

In this type of work, it is a good idea to start with animals that students can make accurate detailed observations of. Students can then discuss how their observations of behaviour and structure help these species to survive as predators, prey or both.

### Teaching Example 2

Mr Mulele's class kept (and later released) an injured chameleon that the students had rescued from a dog in the school grounds. It recovered from its injury at the back of the classroom on a branch in a vase by the window. The students enjoyed watching the chameleon shooting out its tongue to catch flies.

Mr Mulele asked his class these questions:

- How is the chameleon adapted to be a hunter?
- How is the chameleon adapted to avoid being eaten by other animals (hunted)?

He gave them two days to think about these questions and to watch the chameleon to help them answer the questions. He suggested that they look at how it moved, its eyes and its behaviour when it was threatened. Some of his older students made some notes on their observations.

After two days, he divided his class into groups of five/six students and asked each group to choose a leader. He asked the groups to discuss the questions and to draw up a list of at least two features that help the chameleon hunt other animals and two features that help it avoid being eaten by other animals.

He gave them 30 minutes for this discussion and during this time he went round all the groups encouraging them to use their observations about the chameleon. He also emphasised that the group leader should make sure that each student in the group had a chance to speak.





After half an hour, each group gave one observation to the class. Mr Mulele recorded all their observations on the board as a table.

Hunter	Both	Hunted
long projectile tongue	changes colour to hide from both prey and predators	darkens and puffs up when threatened
swivelling eyes that can be aimed forward to focus on prey	can move slowly – hardly being seen – by using its toes to grip and tail to grasp	hisses and shows bright yellow inside of mouth
	eyes that can swivel independently	swivelling eyes can scan for danger all around

The following month Mr Mulele brought a praying mantis to the classroom. Again, students observed its behaviour and the different ways in which the insect is adapted for survival. This time the students needed less prompting from the teacher to notice significant features.

## Activity 2

Praying mantises are very common in Africa. They can easily be kept safely in the classroom for a short while. See keeping Praying Mantis in the Classroom at the end of this activity. If fed live insects, their hunting adaptations and feeding behaviour can be clearly observed.

Keep an exercise book or large piece of paper near to the container as a journal for everyone to write in. Students can record any interesting observations, descriptions of behaviour, and drawings of adaptations that help the mantis hunt its prey. Over a few days, allow different students in the class to spend time recording their observations. Questions you might give to start the students observing could be: How often does it feed? What does it eat? How does it disguise itself to catch prey? How quickly or slowly does it move?. Also, ask students if they can discover whether they have caught a male or a female praying mantis. How can they tell? How are these features helpful to the male and female?

Encourage students to write questions as well as observations.

Other students may be able to answer the questions. In this way, students can build up collective knowledge about the praying mantis.

You can extend this work by catching a male and female praying mantis and keeping them in the same container.

Some of your students might want to catch their own praying mantis to learn more about it. They should be able to look after it and make further observations. These students could give a presentation to the class about what they have learned.

### **Keeping a praying mantis in the classroom**

Keeping a praying mantis as a temporary guest in the classroom is very easy. The larger ones with bigger abdomens (full of eggs) and shorter feelers are the females. The thinner more delicate ones with longer feelers are the males. They are better adapted to flying in search of females. The females tend to stay on the same plant and wait for males to approach them.

It shouldn't be difficult for students to catch one in a plastic bag. A good cage can be made using wire gauze over a wooden or stiff wire frame. What also works well is to cut off the bottom of a clear plastic 2-litre cool drink bottle. Make a series of holes near the top using a sharp nail to let in air. Put some sand into the lid of a box and stand a leafy twig in a small jar of water (see diagram below). Trap the praying mantis under the bottle and use the screw-on cap to put in a regular supply of small, live insects such as flies, moths and grasshoppers. The students will enjoy watching the mantis trap and eat its prey. If you have a male and a female in the same container they may well mate, but be prepared for a bit of drama. The female will usually lean back and start to cannibalise the male once mating has taken place.

After mating, you might see the female laying her eggs in two neat rows in a frothy substance that soon dries and hardens and is paper-like.

Release the female after a while. Keep the egg case under observation and your students might be lucky enough to witness the hatching of the tiny, blackish praying mantis nymphs. They need to be released, as it isn't easy to feed them in captivity, but notice how the abdomen is curled up over the back in a characteristic way.

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## **3 Knowledge of local animals**

Sadly, much of the local knowledge of the natural world is in danger of being lost in modern times. It is seen to have little or no value. Perhaps local primary schools could take responsibility for reviving interest by researching and recording such knowledge and understanding. You might find the additional resource useful in the Teaching Pack Additional Resources: Researching in the classroom.

Students at a teachers' college discovered that George, the man who worked as the gatekeeper, was a wonderful resource due to his extensive knowledge of the local natural world. But all his knowledge and understanding was in his head and would probably die with him. See the following examples of local knowledge

### Local knowledge

At Kabwe College of Education, teacher training students discovered that George, the man who worked as the gatekeeper, was a wonderful resource about the local natural world – a true naturalist.

If George was shown a pouched squirrel, he would know that it harvested and stored seeds and grain (much like a hamster), and had a specific berom name for it that no student knew. He could tell all sorts of fascinating facts and folklore about the animal. For example, he told how seven years of drought can be predicted when the pouched squirrel is taking the trouble to chew the palm nuts so as to carry them in its cheek pouches to be stored safely.

He also knew that the antelope could see directly up through the spirals of its horns to the exact tip. You can check this if you look down from the top of a mounted set of horns. There is a direct line to the eye socket. We didn't really believe him when he told us that trees communicated directly with the buck, sending them on by saying 'you have taken enough here, now move on'. Years later, telling some nature conservation experts about this odd notion, they laughed, saying that it had recently been discovered that certain local trees do in fact produce bitter-tasting chemicals in response to grazing and that these are even passed on to neighbouring plants, causing the buck to move on to a different clump of plants.

Another example of local knowledge:

#### The story of the old woman who knew her ants

A very famous African entomologist, S H Skaife, tells an interesting story of how, during World War 2, there was a shortage of tea. People decided to try to cultivate the wild rooibos tea plant from the Western Cape Fynbos.

They offered a reward of one pound (a lot of money in those days) for every matchbox full of rooibos seeds. The seeds were very small and the local children soon gave up trying. Only an old woman was successful.

Every week she brought in a matchbox full of seeds and collected her pound. She would tell no one how it was that she managed to do what no one else could.

We need to encourage our own students to become naturalists. We have already explored the value of giving students time to undertake detailed observations of ecosystems and different species. Think about how exciting lessons can be if we value our students' knowledge and allow them to make decisions about their own learning.

### Teaching Example 3

A science education lecturer was disappointed to observe a Grade 5 lesson on birds that really didn't work well. The student teacher followed the curriculum and textbook of the time, but the students seemed bored.

Reflecting on the failure of the lesson to catch the students' imaginations, the teacher and lecturer realised that any three-year-old pre-schooler would already know that birds had wings, feathers and beaks and that they usually made nests and laid eggs.

Later, the lecturer and the student teacher, Mumba, planned a very different lesson where they took in artefacts (such as bits of a broken swallow nest, assorted feathers, the discarded shell of a hatched chick, a dead vulture that had been hit by a car that morning near the school) and pictures of local birds. They put the items on the front bench and left groups of students to choose something and tell their classmates what they knew about that thing. What could they tell us about birds?

What a different lesson! We couldn't stop them talking. They had so much to tell. They told us things we didn't know, like: swallows mate for life, raise a few broods each season, and sometimes, on dead chicks (baby swallows) thrown out of the nest, you find strange bloodsucking tick-like things that can run very fast. Students went on right through lunchtime telling us all the interesting things they knew about local birds and discussing their own unanswered questions. These were recorded for answering later.

### Activity 3

Here, you and your students plan and draw up a large table on a poster to record information that students find out about all kinds of local animals. It could have column headings such as:

Specific name of animal				
Type or kind of animal				
Drawing or picture				
Predator of				
Prey of				
Body adoptions				
Action adoptions				
Beliefs and sayings				
Other interesting facts				

The table is built up and added to over time. Encourage your students to add questions to the table. If possible, use different colours for questions and answers. Blank spaces will indicate where further research is needed. You might ask different students to take responsibility for finding out about particular animals, but encourage teamwork. If you have a multigrade class, older students could assist younger students with the recording. You will need to plan regular times to allow students to add their findings to the table.

At the end of the term or year, the information can be transferred to a large book to be kept as a record for future reference.

## Arts: Practical activities with local crafts

- 1 What do we know about local crafts?
- 2 Craft work
- 3 Making pots

**Key Question for the teacher:**

**How can you help students be creative?**

**Keywords:** Crafts, research, presentations; practical; culture

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

Found out what students already know

- Organised your students into small groups to undertake research activities
- Planned practical activities to help students plan and evaluate their own craft items

## Overview

The range of crafts in your local area may include such things as beadwork, pottery, sculpture, painting and fabrics. The majority of students will already have knowledge about local crafts and some students may even be very skilled at doing some of them. It is important to find out what students already know, and use this as the base for planning activities around local crafts. In this section, you will encourage students to share and develop their understanding of the value and uses of these traditional crafts. One important way is to allow students to make their own craft items; this provides opportunities for them to plan and evaluate their work.

# 1 What do we know about local crafts?

The traditional crafts of the community will have more meaning for your students if you involve them doing some of these crafts. This part explores what your students know about local crafts and the people who do them in a practical context. It gives you an opportunity to develop your questioning skills and shows a way to help your students raise their own questions. You might find the additional resource useful in the Teaching Pack Additional Resources: Using questioning to promote thinking.

Painting is one way that communities can record events that have happened. It is also a medium that uses the imagination and so is a good way for students to express their ideas and feelings.

## Teaching Example 1

Mrs Moyosola from southwest Nigeria was teaching painting. She wanted to encourage her class to paint and draw. She decided to begin by asking her students to look at some pictures by modern Nigerian painters from their region.

She had one copy of each picture that she put on the board. She asked the students to look at these and say what they liked and disliked. She asked if any of them painted or drew and, if so, what and when. Many did not have access to paper and pens but said they did draw pictures in the sand outside their homes. They were sad that these pictures did not last.

Mrs Moyosola asked her class to think about what they would like to paint or draw. She gave them paper and pencils and allowed two art lessons for them to draw and paint. Some painted pictures of their own and others did versions of the modern Nigerian paintings.

Mrs Moyosola displayed these for everyone to share.

## Activity 1

Collect together some examples of local crafts. You could use the same example for all your groups or a different one for each group.

Organise your class into small groups of four/five students.

Ask each group to discuss what they know about one craft. Ask them to start by answering the following questions (write these questions on the board).

- What is it?
- What is it used for?
- What was it used for in the past?
- How is it made?

Give students 10–15 minutes to discuss these questions and to think of one more question to ask about the craft. You could ask older students to draw the craft and record their ideas on the drawing. Then ask them for some of their answers. You might find the additional resources useful in the *Teaching Pack Additional Resources*; **Teaching large/multigrade classes**

## 2 Craft work

Discussing local crafts or traditional weapons or dress is very motivating for most students as they can see the relevance of these to their lives. When students are interested, it will also be easier for you to manage their behaviour. If you also use more interactive ways of working, such as pair and group work, students can achieve more by working together to build new knowledge.

### Teaching Example 2

Ms Dora Edu-Buandoh wanted her students to find out more about tools used traditionally in farming. She decided to give them the opportunity of looking at pictures and artefacts, and writing about what they had seen. But first, she had a surprise for her class. She had asked an older member of the community who had a collection of old tools to bring in some of his collection to the class.

The students really enjoyed the visit and they were able to gather a lot of information about the tools to add to their research project. The old spade that had belonged to the visitor's father's grandfather excited them all most because of its great age.

After the visit, Ms Dora Edu-Buandoh divided her class into small groups and gave each group a picture – some groups had the same picture as she did not have any others she could give. She explained that they needed to discuss the pictures and then write a short story about how the tools in each of the pictures were being used. She explained that they could use the question sheet to start them thinking about what to write about. See the example here. The students used their notes from the visit and also some books that Ms Dora Edu-Buandoh had collected over time. They worked together in their groups to collect the information and write their stories. At the end, each group shared their story with the class.

### Activity 2

Ask students, in pairs, to choose which craft items they want to research more.

- Each pair can choose between looking for the information in books or interviewing a person in their community as their starting point.
- Next, ask the students to think of the kinds of questions they need to ask to guide them to the right information, such as: 'What is the traditional use of this bowl?' Discuss some suggestions and decide together if they help focus on the purpose of the research. Each pair selects their questions.
- Each pair conducts their research using their questions. You will need to provide information books or extracts from books and magazines for those using books as their source of information, and you will need to give the

others time to conduct their interviews. If they have trouble finding information with one method, they may need to use the other as well. Allow time for them to do the research and give them guidance as they work if they are struggling. Ask each pair to make a poster to present their key findings. Assess your students' work using the sheet here.

### Assessment sheet for research presentations

Name of student: \_\_\_\_\_ Date: \_\_\_\_\_

Class: \_\_\_\_\_

#### During the presentation the student:

- Showed a real or drawn or photographic example of the craft item.
- Gave the craft item a name.
- Answered the research question.

Feedback comments:

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Teacher: \_\_\_\_\_

## 3 Making pots

When studying a practical topic like craftwork, it is important that your students have an opportunity to work with the materials themselves or at least see someone doing the craft.

### Teaching Example 3

Mrs Khendi was teaching a lesson on traditional pots. She started by asking students to talk about their experience of traditional pots and utensils. The students had some interesting knowledge about their use in the harvest period and at wedding ceremonies and religious festivals.





Students also spoke about the different pots they knew, such as one to keep bracelets in. While they were talking, Mrs Khendi made a list of the traditional pots on the chalkboard.

Mrs Khendi had brought in a selection of pots that she had collected from people in the community. She told the students to bring in any that they had at home to share to see the shapes etc.

### Activity 3

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Next, she showed them how to make a small pot out of clay that she had collected by the river.

- She gave each pair some clay to shape a pot and decorate it in any way they liked.
- She encouraged them to look at the local designs and, from this, develop their own ideas.
- The students' pots were left to dry at the side of the classroom where everyone could see them

Below is an example of how to make pots in the classroom.

Clay can be made into vessels because of its unique physical properties. The molecular structure of clay means it has a 'plastic' quality, allowing it to be shaped into an infinite variety of forms. Subject these forms to sufficient heat and they are altered into a rock-hard material, making them both functional and durable. Clay is composed of the most common elements found in the Earth's crust and, as a result, is found throughout the world, beneath our feet. Clay was put to use by nearly every culture, often with extraordinary results. Pots can be made with bare hands using clay lubricated with water.

The potter, bearing down on the clay with their hands, then centres the clay. The fingers are used to first form the floor of the pot and then, to pull the walls of the clay up, typically into a cylindrical shape. Then the potter gently shapes the pot into the desired form, using the fingertips, as the wheel continues to spin.

Once fully formed, the pot is cut off the wheel head with a wire and removed. The process is then repeated with the next ball of clay.

### An example using pinch pot construction

With pinching gestures, you can mould clay into objects such as animals or make a bowl, a pot, a cup etc. While this form of pottery seems basic, you can get a feel for the clay you are working with and you will get to know the limits of your clay. (Does it bend easily? Does it dry fast? Etc.)



To make a bowl, a pot or a cup, begin with a ball of clay. Push your thumb into the centre. Then pinch up the walls.



Turn the piece as you pinch.  
This will help you to keep an even thickness in the walls of the piece.



Gently pat the bottom on a flat surface to create  
a flat spot on the bottom of the piece.

Example of traditional pot – an African bracelet bowl



This bowl is traditionally used for storing bracelets.

Adapted from: <http://www.hobokenpottery.com>, <http://www.jhpottery.com> and  
<http://www.jhpottery.com/tutorial/pinch.htm>

- Discuss a presentation of the pots that have been made.
- Agree a date for this and the venue
- Invite other classes in the school or parents
- On the day, the next class or the school or parents are invited to come and see their work. Each pair/group stands with their work and explains it to visitors. The oral presentations are held after people have looked at the displays etc.

## Life Skills: Exploring students ideas about healthy living

- 1 What do we know about eating well?
- 2 Healthy Habits
- 3 Learning from the community about health

**Key Question for the teacher:**

How can you find out what students already know about healthy living and develop it further?

**Keywords:** Group discussion; story telling; writing; traditional healthy practices; prior knowledge

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- used class and group discussion to find out what students already know
- learned how to build on students' prior knowledge;
- used local resource people to motivate students to learn.

## Overview

When introducing the study of healthy living into your curriculum, you will need to be sensitive to the setting in which you teach. This section includes investigating your students' prior knowledge – where they get ideas from and what knowledge they bring to the classroom – and using this to develop their thinking about healthy living. By recognising your students' knowledge and how competent they are, you will build up their self-esteem.

The activities ask you to use group discussion, practical tasks and local people to explore and deepen your students' knowledge about healthy living.

# 1 What do we know about eating well?

Your students need to know what foods are best for them, but just telling them is not enough. Here, we look at more interactive ways to help them learn and understand.

Importantly, they may already have some ideas about the topic. To find out what these are, you could start your lesson by:

- introducing the topic and asking them ‘What can you tell me about ...’ and noting down their ideas;
- organising them into pairs or small groups to talk about the topic and giving them some open-ended questions to guide their discussion;
- asking them to give their responses, and listing the key ideas you want to take further.

Having found out your students’ prior knowledge, your planning – and therefore your teaching – will better match their needs. See questions to promote thinking at the end of this Teaching Pack.

## Teaching Example 1

Mrs Shivute, in Tabora Primary School in Tanzania, found that her class liked talking about food, so she asked them to list all the foods they liked.

She asked them where the foods came from originally – plants or animals. In groups, they cut pictures of food from old magazines that Mrs Shivute had collected and kept in her classroom and sorted them into different food groups. Here is some information on types of food which will be helpful for teaching.

### Types of food

It is important to eat and, if possible, to eat a balanced diet. Foods can be grouped in many different ways and here is one that is commonly used in Africa. It lists four basic food groups, and each one helps us in a different way:

- 1. Grains** – this includes food like bread, rice, maize and fufu. Eating these gives us the energy to do physical work. Grains, which are carbohydrates give us energy.
- 2. Fruits and vegetables** – these are important because they give us the vitamins and minerals we need to be healthy. Eating them helps us stop getting ill.
- 3. Meat, chicken, fish, eggs, beans and nuts** – all these have protein in them. Protein helps build muscles. You need protein to grow big and strong.



**4. Dairy foods** – this includes milk, cheese, and yogurt. These types of food have a lot of calcium. Calcium is important because it helps build strong bones and teeth. Eating a mixture of these foods gives us good nutrition. Eating only one of these things every day can cause health problems. However, some food is better than no food. Many children like to eat sweets and sugar. This is fine in small amounts, as it gives us energy. But too much sugar is bad for the teeth because it can cause tooth decay. Too much sugar can also make us fat.

### Activity 1

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- Ask the students what they like to eat. They can draw pictures or find pictures in old magazines if you have them.
- Ask the students, in small groups, to share their ideas about what types of food are better for them than others.
- Ask each group to share one idea and list these on the board.
- Using their ideas as a starting point, explain the different food groups and how each helps us. Try and find some localised foods to use in this activity or bring some real examples into the classroom.
- Ask students, in their groups, to match pictures to food groups. Ask them to discuss why the different foods are good for them and what they provide.
- Ask each group to write five questions about different food types. Have a class quiz – each group asks their questions in turn and others answer.
- Finally, ask the groups to make food group posters or displays, using their drawings and pictures. You could also use samples or empty food packets. Leave these in the classroom for all to see.

### Cardboard box display

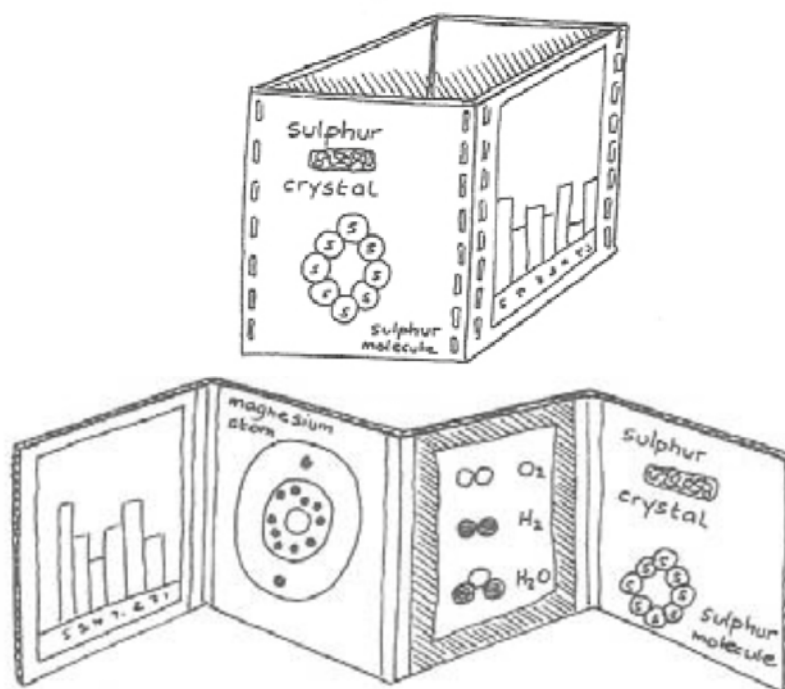
Pin display work on the sides of the box

- Sew or tape cardboard sheets together to make a box.
- A box can show eight sides.

### Cardboard box display

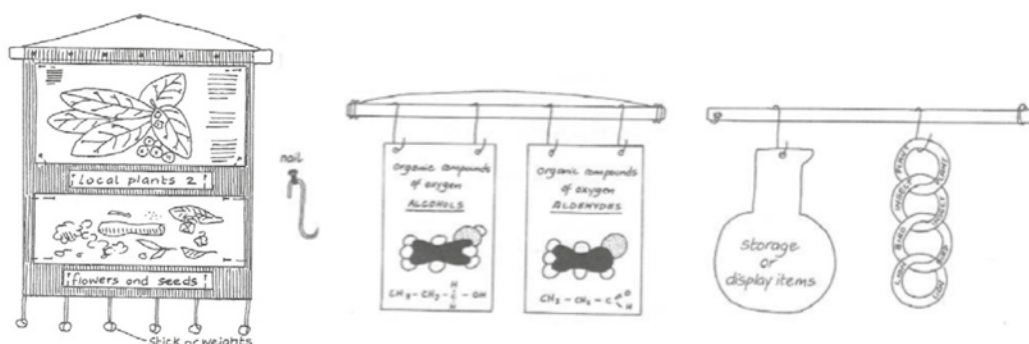
Pin display work on the sides of the box

- Sew or tape cardboard sheets together to make a box.
- A box can show eight sides.



### Display beams and hooks

- Make a beam supported by two nails or loops of wire that can be hung on the wall, or suspended from a fixed beam.
- Hooks or wire allow easy and swift display.



### Display charts

- Display charts can be made from durable cement bags, cloth, cardboard boxes, sleeping mats and blankets.
- To make the chart hang flat, attach a strip of wood to the top and either another strip of wood or weights to the bottom.
- Strips at top and bottom will strengthen the chart and make it last longer.
- Attach items to be displayed to the chart with office pins, cactus needles or sharpened matchsticks.

## 2 Healthy habits

You have introduced your students to some ideas about food and nutrition and given them the opportunity to contribute their own ideas during the activities.

However, in talking about healthy living, you also need to encourage them to develop healthy habits, using what they already know. By using discussion you can encourage them to think about their own daily habits and identify ways to improve them.

Possible discussion topics are:

- exercise;
- eating as balanced a diet as possible;
- keeping food safe;
- keeping clean.

Organising a discussion needs careful planning. Where will the groups work? Who will be in which group? You might want groups where there is a good mix of personalities to help discussions and someone to act as leader.

To encourage students to participate, set the groups three or four questions. One or two can be easy to answer – e.g. Name three healthy habits – and the others should encourage students to explain their ideas – e.g. Which habit do you think is the most important? Why do you say this? It is important that they respect other ideas and listen carefully to each other.

### Teaching Example 3

Mrs Aketch wanted to develop her students' ideas about healthy living. She decided to organise discussions on a different topic, one a week for three weeks.

For each discussion, she introduced the topic using pictures or stories and asked some simple questions to start them thinking. Then she put them into small groups of four or five to discuss a related topic, e.g. why do we need to keep as clean as possible?



As the students were talking, she would go around listening and sometimes joining in and helping to move discussions on.

After five or ten minutes of group discussion, she asked each group to say what they had talked about and explain their ideas.

Finally, with the students, she wrote a list of good practices on the board for them to remember and record. The next day, she asked them to look at the list again and suggest which they thought were most important.

Then, Mrs Aketch gave the students next week's topic and asked them to think about their ideas in advance.

## Activity 2

With your own class of students, how would you organise a group discussion on healthy living? See Keeping Food Safe- Why we clean our surroundings. Good Hygiene exercises at the end of this activity.

- Choose a topic to discuss or make a list for them to choose from. Plan your introduction.
- Think how they will work – in pairs, groups or as a whole class? Design the task – either discussing the answer to a question or ask your students to plan an activity to keep healthy. Prepare your instructions. How will you check that they understand the task?
- How long will they talk for? 10–15 minutes or more? What will you do while they are talking?
- At the end of the discussion, ask them for their ideas. Think of questions you might ask to help them. How many people will you ask? Plan how you will summarise their best ideas, perhaps by drawing a mind map. See Using Mind Maps and Brainstorming in the Teaching Pack Additional Resources.
- Discuss with the students how they will remember and use these ideas. Use these questions to plan your lesson on a healthy living topic. After the lesson, ask yourself how well it went and what you would do differently next time to make it more effective.

### Keeping food safe

To keep food safe, there are a number of things you need to think about. Firstly, foods can go bad or rot. These include most vegetables, fish and meat, but some take longer to go bad than others. They go rotten when they have been left alone too long. When they rot, they start to smell awful, and if you eat them they can make you sick. To stop fresh food from rotting, it is good to keep it as cool and dry as possible. Another way to stop fresh food rotting is to preserve it. This involves drying the meat, fish or vegetable either in the hot sun or over a fire.

Secondly, some food, especially food in cans, can go bad if it is kept too long and not stored properly.

Thirdly, some food, especially meat, can make us sick if it is cooked once and then heated up again but not reheated thoroughly. It is best to only cook what you are going to eat on that day. If you do heat up cooked food, make sure it is thoroughly heated through.

Finally, animals including many insects also like food, but if they touch our food they leave germs that can give us diseases and illnesses. Try and keep your food covered up. If you have a box or container to keep it in, this is best.

### **Why we clean our surroundings**

We clean our surroundings to protect us from dirt and diseases. People can get ill from coming into contact with many different things. These include:

- animals and insects;
- rotting food;
- rubbish;
- animal and human faeces;
- chemicals;
- dirty clothes.

For this reason, it is good to clear these things away from where we live, eat or sleep. You can do this easily by cleaning your surroundings every day and collecting the rubbish and dirt in one place away from where you stay.

### **Good hygiene practices**

There are many kinds of good hygiene practices you can do every day. The reasons for these are to keep us clean and to protect us from picking up illnesses.

Some good practices include:

- washing ourselves every day if possible;
  - cleaning our teeth every day if possible ;
  - washing our hands before eating or cooking;
  - washing our hands after going to the toilet;
  - keeping our house, clothes and surroundings as clean as possible;
  - not going to the toilet near the house or kitchen;
  - not leaving food lying around in the open.
-

### 3. Learning from the community about health

There are many things for children to know about if they are to remain healthy. Some of these they can learn in school, but many things they can learn at home or in the community.

To encourage them to learn more from the community, you can devise ways to help them find out who they can learn from. This will motivate them to want to learn. One way to encourage this is to give the children homework where they ask their parents or grandparents about something. How would you help the children do this? For example, what information will they gather? What questions will they ask? How will they record the information? Another way is to invite people from the local community, who know about local healthy practices, into the classroom.

#### Teaching Example 3

Mr Maina asks Mrs Mueni to visit his class to talk about local food. Mrs Mueni is the wife of the local chief and every year she visits schools to help the children learn about how food is cooked and stored.

She takes cassava flour, maize meal, plantain, dried fish and meat to the school and she tells the students about cooking these foods and drying them in the sun.

They identify all the foods that are available locally. The students are excited about the visit and listen carefully. They enjoy tasting the small sample of fried plantains she cooks for them.

Mrs Mueni talks about the grain harvest and how long the local store will last and the students find out how other local food is grown and stored.

Mr Maina saw how the new learning experience motivated his students as many of them come in the next day telling him how their parents cook and store some foods.

### Activity 3

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This activity is about planning and carrying out a lesson where you invite a local expert into your class. To plan this effectively, you need to think about the following:

- Which local resource people could visit your class? What health topic could they cover? For example:
  - ↘ a farmer to talk about local food;
  - ↘ a traditional healer to talk about beneficial plants and herbs;
  - ↘ a housewife to talk about storing and cooking food;
  - ↘ a nurse who can explain everyday hygienic practices.

You will need to:

- Plan an activity to check the students' prior knowledge of the topic;
- Discuss with the students what questions they will ask the visitor;
- Tell the visitor what to talk about and for how long; plan a students' activity after the visit to explore ideas further.

In the last activity, you could assess how much the students have learned by asking them to write stories or do role plays to share with the class.

Now carry out your lesson as planned above and think about its effectiveness.

You could develop your students' findings into a class presentation for the school assembly.

<http://www.tessafrica.net>

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No. 5

## Early Primary

<b>Section 1 Literacy:</b>	Language Practice
<b>Section 2 Numeracy:</b>	Measuring Time
<b>Section 3 Science:</b>	Exploring Sounds and Music
<b>Section 4 Social Studies:</b>	Investigating the resources we need for living
<b>Section 5 Life Skills:</b>	Exploring Good Citizenship
<b>Additional Resources:</b>	<ul style="list-style-type: none"><li>• Group work in your classroom</li><li>• Working with large/multigrade classes</li></ul>

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## Literacy: Providing natural contexts for language practice

- 1 Classroom Management
- 2 Active Learning
- 3 Writing as a means of instruction

**Key Question for the teacher:**

How can you help students to practise language structures in a natural context?

**Keywords:** classroom management; games; recipes; instructions; processes

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- used classroom management to help students learn an additional language;
- used games and everyday activities to develop students' language skills and vocabulary.

## Overview

All of this requires a great deal of thought, planning and skill. This section will provide some approaches and techniques to help you.

How much natural exposure – through radio, books, magazines, speakers and TV – do your students have to an additional language to that used at home?

The answer might be, 'Very little. They only hear and use it in their daily class at school.' This means that you are responsible for providing the kind of exposure to the language that will help students:

- use and become fluent in new vocabulary and grammatical structures;
- communicate using oral language in social situations;
- develop their reading and writing skills.

# 1 Classroom Management

As a teacher, you will often give instructions of various kinds to your students. You can use these everyday instructions to develop new vocabulary and listening skills in the additional language. Instructions use the imperative form of the verb. If you use the imperative form consistently, in meaningful contexts, students will begin to understand and learn it.

When students learn a new language, listening develops more quickly than speaking. They need lots of opportunities to listen and respond to new language. In the early stages of language learning (and later as well), you can use activities that require them to respond with actions but that do not need them to reply until they feel more confident. (This is often called 'total physical response' – see below)

## Total physical response ideas

This website gives information about total physical response (TPR) as a way of working in language learning: <http://www.tpr-world.com/>. There are also other discussions you might want to explore.

You can introduce your students to many new language structures through game-like activities that involve them responding to instructions with actions (total physical response). Here are some examples of the kinds of instructions that you can give. Focus on one type of instruction at a time, so that the students get used to the way the language works.

### 1. Body movements

Stand up.  
Laugh.  
Cough.  
Cry.  
Kick the table.

### 2. Activities and objects

Point to the door.  
Pick up the pen.  
Close the window.  
Smell the flower.  
Point to the mountain.  
Point to the woman who is baking a cake.

### 3. Add possessives

Give Rose's book to Sibeso.  
Bring Pamela's pen to me.  
Give Songiso his book.  
Give Lufwendo her glasses.



## 4. This and that; here and there

Give this to Sibeso.  
Fetch that from her.  
Take the pen and put it here.  
Fetch the book and put it there.

## 5. Space relations

Put the pen between the two books.  
Put the pen close to the ruler.  
Put the eraser into the box.  
Put the ruler on top of the box.

## 6. Add number, colour and size

Put two pens into the box.  
Take three stones out of the box.  
Pick up the red pen and give it to Rose.  
Put the green book on the table.  
Take the small book and give it to Pamela.  
Put the big book into the box.

## 7. Instructions and descriptions, with some speaking

**Do and listen**

Student does the action. Teacher (or another student) says what they are doing (e.g. 'You are standing.')

**Listen and do**

Teacher (or another student) instructs the student (e.g. 'Stand.')

Student obeys, doing the action.

**True or false**

Student learns to say 'true' and 'false'. Teacher (or another student) does an action, and makes a true or false statement about what he or she is doing (e.g. 'I am sitting.')

Student says, 'true' or 'false'.

Adapted from: <http://www.tpr-world.com/>

**Teaching Example 1**

Mrs Mujawayo teaches a Grade 1 class in Kigali, Rwanda. She uses English for all her classroom management.

In the morning, she greets individuals in their home language, and asks for home news. After assembly, she says to the class (in English), 'Line up, children,' and gestures towards the veranda, where they should line up. 'Walk in,' she says, gesturing again. 'Stand by your desks.'

Teacher and class greet one another in English. 'Sit down,' she says.

She then switches back to the home language to introduce story work, and continues in their home language until she puts them into groups, for different activities.

Each group has a letter. 'A and B raise your hands,' she says in English, raising her hand. 'Take books from the box,' she says, pointing to the book box. 'Sit down, and read to your partner.' If they seem uncertain, she mimes what they have to do.

She later gives further instructions to each group in English, without translation. Two groups are to illustrate their story, and one group will read with her in their home language from a big book.

Mrs Mujawayo finds that her students quickly become familiar with the English instructions, especially when she accompanies her words with gestures, and soon start trying to say the words.

### Activity 1

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In this well-known game, students respond physically to commands. You can use it to extend vocabulary and listening skills in a range of subject areas.

The leader gives the command and carries out the actions at the same time. Students are only to obey commands that come from Simple Simon. (You could change this name to that of a well-known local person.)

The game goes like this:

**Leader:** Simple Simon says, 'Jump!' (Leader jumps.)

The students jump.

**Leader:** Simple Simon says, 'Touch your toes!' (Leader touches her toes.)

The students touch their toes.

**Leader:** 'Scratch your nose!' (Leader scratches her nose.)

Some scratch their noses. Others do not. Those who scratch their noses are out (because the instruction did not come from Simple Simon).

And so on...

Use simple instructions for new language students, more complex ones for more competent students. Start fairly slowly, but build up to a quicker pace. The winner is the last person left in.

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## 2 Active Learning

Providing natural opportunities for developing your students' skills in the additional language is important. Here we suggest ways that you can involve the community and use local skills and wisdom as a resource for classroom activities.

You have seen, in **Teaching Example 1** and **Activity 1**, how everyday instructions can provide a useful natural context for language learning. Students listened and showed understanding through actions. In this part, we suggest you use local recipes and processes as contexts for instructions, giving students the opportunity to speak (and write) as well as listen.

The activities used here will be carried forward to **Activity 3**, where your class begins to compile a book of recipes.

### Teaching Example 2

Some adult learners of ciNyanja were spending a day in the townships as part of their course at the local college. Each learner was accompanied by a language helper who was a ciNyanja speaker. The helpers supported the learners as they tried out the language they had learned; buying vegetables from hawkers on the streets and chatting with the families that were hosting them.

An important part of the day was cooking a meal. The learner was supposed to do the cooking, instructed by the language helper. The cooking had been practised and mimed, and often written down or recorded on tape, in classes the week before. In Zambian tradition, the men were given a list of things to go to the market to buy, while women were asked to stay at home and cook foods like impwa, cikanda, cibwabwa and tomato and onion gravy. They also talked of how they might swap roles around to help them learn the language.

When the meal was over, some Zambian songs were sung, and learners learned traditional Ngoni children's games. Once the dishes were washed up, a happy and exhausted group of language learners boarded taxis to go home.

### Activity 2

Tell your students they are going to find out how certain household tasks are done and explain the steps of the process in the additional language. Ask students to bring the information from home or invite community members to school to demonstrate the skills.

- Divide students into pairs or groups (these could be mixed-ability groups), to work out and, if possible, write down the steps of one of these processes in the additional language. Go round and help them with new vocabulary they may need.

- Give the groups time to memorise and rehearse the steps, in preparation for instructing others. They could collect from home items that are needed for the process.
- The next day, let one student use the additional language to instruct a member of another group, while the class watches e.g. sweeping the house.

**How well did the students respond to this kind of activity?**

**Could you use it with other processes to extend their vocabulary?**

**If so, how would you plan this?**

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### 3 Writing as a means of Instruction

Language is used for communication, and it is important that you create real reasons for students to speak, listen, read and write in the additional language. This is not always easy when your school is in an area where the additional language is not commonly spoken. However, the additional language may well be the language of books and written communication.

Around the world people exchange information on 'how to do' things; for example they give each other recipes or patterns for dressmaking. You have already done this orally; now students can do it in writing. Show your students conventional written formats for recipes, in the additional language. A recipe is often presented as a series of instructions.

When we write a recipe, or describe a process, we are not concerned about who does the action, but are concerned that the action is done.

#### Teaching Example 3

In a school near Kabwe, in Central Zambia, students had been sharing recipes. They wanted to draw their recipes in diagrams and exchange them with their friends. Mrs Malambo, their teacher, thought it would be good for them to know different ways of presenting information. She showed them how to draw flow charts. Once they had drawn and labelled the flow chart, they wrote the process as a description as well (see Resource 2: Recipes for examples).

Mrs Malambo discussed with the students which they found easiest to do, and why. Over two-thirds of the class found the flow charts more fun and easier to do because they were able to break the recipes down into steps and the drawings helped them remember and understand the words.

Mrs Malambo used this idea of flow charts in other lessons, as this seemed to help her students to remember more. For example, in a geography lesson, she used a flow chart to write out directions from one place to another, and the students drew pictures of landmarks to make it easier to remember the words.




### Activity 3

- Ask your students to find out how to make their favourite meals from home and share these with the class.
- Introduce your students to the format for a recipe before they do their own examples.
- Ask your students to write out their recipes neatly, each making one version for themselves, and another to go into a class book of recipes. The second version could use a different format to the first.
- Ask students to exchange and discuss their recipes.

#### Recipes

Here are three different ways of presenting the same recipe.

#### Making Curried Peaches

Peel 4 peaches Slice the peaches  Boil 100 ml vinegar Add the peaches, curry powder and salt Simmer the peaches until tender  Leave them to cool Bottle them Seal the bottles	  
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#### Curried Peaches (process description)

When peaches are curried, 4 peaches are peeled and sliced. 100 ml of vinegar is boiled, and the peaches, curry powder and salt are added. The peaches are simmered until they are tender, then they are left to cool. They are bottled and the bottles are sealed.

**Ginger Beer**

Ingredients:

1 packet ground ginger

1.5 kg brown sugar

1 tin yeast

20 litres water

Method:

Boil 20 litres water.

Add the ginger and sugar.

Cool the mixture.

Add 1 tin of yeast.

Divide the mixture between two containers, to leave room for fermentation.

Leave it to stand for one and a half days.

## Numeracy: Measuring and handling time

- 1 History of time telling
- 2 Teaching time
- 3 Telling the time

**Key Question for the teacher:**

How can you help students to understand and measure time?

**Keywords:** time; clock; sundial; history; mixed-ability; cross-curricular; practical activities

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- used practical activities to enhance your skills in mixed-ability teaching;
- considered the benefits of cross-curricular teaching in measuring time;
- developed your skills in managing an active classroom and resourcing it well.

## Overview

In order for students to understand time, they need to develop an awareness of time – past, present and future. This raises the question: How can students be helped to both tell the time and understand the passing of time through practical ‘hands on’ learning activities?

In this section, we consider a number of ways to do this, working in groups or pairs. As a teacher, you need to think ahead and plan activities. Collecting resources over time, such as card and paper that you can recycle to make models, is a good idea and will help you with the following activities.

# 1 History of time telling

A good introduction to telling the time is to first discuss the many ways people used to tell the time before the invention of clocks. You could ask your students how they think they might be able to tell the time today, without using clocks. Exploring these ideas first and listening to their answers will provide you with evidence of their current understanding. This will help you to judge how much they have learned after undertaking some activities about time.

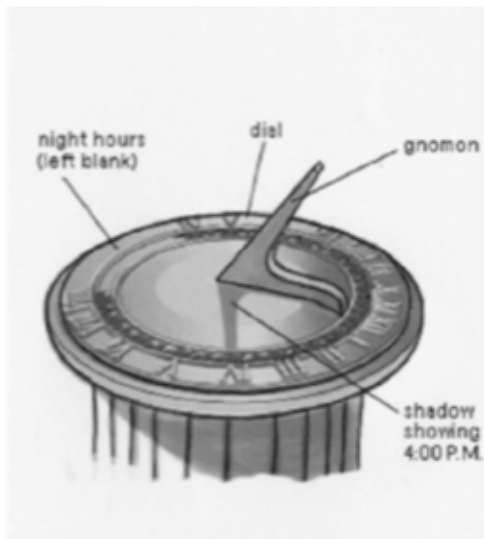
## Teaching Example 1

Mrs Tokunbo is a teacher in a primary school in Nigeria. She planned to teach 'time telling' to her students. She wanted to begin by helping them all to understand the need for a standard way of telling time.

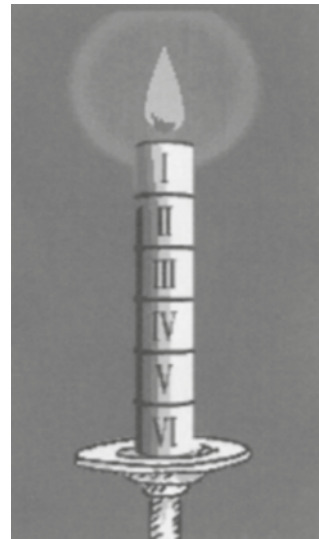
First, she asked them to tell her what they thought about how to tell the time and listed these ideas on the board. She discussed other ways of telling the time long ago, including marked candles, sundials and sandglasses. For each of these methods of time telling, she asked students to think of what it would be like to depend upon such a method, and what problems it might cause. (See below for examples of what Mrs Tokunbo told her students.)

### Ways of measuring time long ago

**Sundail**



**Candle Clock**





### A story about using the crowing of the cock to tell the time

Mr Ali is a village petty trader. He takes his wares to nearby villages on their market days. He normally treks to the villages. To know when to start his journeys, he used to listen to the crow of the cock early in the mornings; that tells him it is morning and he would set off. But one day, the cock crowed too early. Mr Ali thought it was morning and set off. On getting to the road, he found that it was still very dark and for a long time he had to travel alone in the dark. He also got to the market too early and had to wait for a long time before other people arrived. From that day, Mr Ali concluded that depending on cock crows to know when it is morning is not always reliable.

Original source: <http://inventors.about.com>

### Activity 1

Begin your lesson by asking your students to think of ways people tell the time without a clock and write down all their ideas on the board. You may need to suggest some examples, such as the rising and setting of the sun, the opening and closing of flowers like Etinkanika.

Put them into groups of four or five and ask them how they know what time of day it is. Then ask them to discuss how reliable they think each of these methods are. Ask the groups to report back and have a class discussion, writing up relevant comments, of reliable ways to tell the time 'Some people can tell what time it is by looking at the sun. But I have never been able to make out the numbers' (Attributed to a primary student).

## 2 Teaching time

You may find it helpful to work together with the history teacher to explore how time was measured in different cultures throughout history. This could become activity-based – your students will probably enjoy experimenting with some of these ancient methods of time telling, such as making a candle clock or sundial. It will show your students that mathematics is – and has always been – important in many areas of life and study.

Using other experts in your classroom will help you learn more about a subject and will motivate your students. The teacher in Teaching Example 2 takes this approach.

### Teaching Example 2

Mrs Lengasha wanted to teach her students about time. She began by telling them stories of how people in her father's village used to tell the time of day and how they knew when to arrange ceremonies and events. She asked them if they knew how the length of the shadow cast by a pole was used to determine when to do certain activities and the time for observing Muslim prayers.



Mrs Lengasha asked the history teacher to help by explaining how time was measured long ago. The history teacher told them about birds that sing at certain periods of the day or night, like cocks that crow in the morning, and of the relationship between the rainy and dry seasons and clearing-sowing-harvesting times. She told them of how some people used the moon to tell the time over a month.

By working with the history teacher, Mrs Lengasha showed her students that mathematics is not an isolated subject, and she herself learned some new examples and ideas about time that she did not know before.

## Activity 2

Before the lesson, collect some sticks and chalk. You could also read the information below to learn more about sundials.

- Familiarise your students with sundials (or shadow clocks as they are sometimes called) and how they work.
- Ask each group of students to make simple sundials using card, a pencil or stick and some plasticine/mud (or put the stick in the ground).
- Use the plasticine/mud to hold the stick up on the card, and place the sundials outside. Ask students to mark the stick's shadow at certain times of the day – 'School begins', 'Maths class begins', 'Break time', 'Lunch time' and so on, throughout the day.
- At the end of the day, compare the dials. Discuss how the shadow has moved. Can the students explain why?

They could use themselves as sundials by standing in the same position at certain points in the day and observing what happens to their shadows. Ask them to share their results and list the changes they notice about their shadows.

### Sundials

The Egyptians formally divided their day into parts something like ours. Obelisks (slender, tapering, four-sided monuments) were built as early as 3500 BCE. Their moving shadows formed a kind of sundial, enabling people to partition the day into morning and afternoon. Obelisks also showed the year's longest and shortest days when the shadow at noon was the shortest or longest of the year. Later, additional markers around the base of the monument would indicate further subdivisions of time.

Another Egyptian shadow clock or sundial, possibly the first portable timepiece, came into use around 1500 BCE. This device divided a sunlit day into ten parts plus two 'twilight hours' in the morning and evening. When the long stem, with five variably spaced marks, was oriented east and west in the morning, an elevated crossbar on the east end cast a moving shadow over the marks. At noon, the device was turned in the opposite direction to measure the afternoon 'hours'.

In Europe, during most of the Middle Ages (roughly 500 CE to 1500 CE), technological advancement virtually ceased. Sundial styles evolved, but didn't move far from ancient Egyptian principles.

### 3 Telling the time

There are several important facts students need to know about time but one of the most challenging aspects for young children is often being able to 'read' a clock face. The use of practical 'clock hands' activities should help students to be able to read a clock and tell the time.

Once you have a clock or clocks, begin with times that are easier, gradually moving on to the more difficult times:

- 'on the hour' (o'clock);
- quarter past, half-past, quarter to the hour;
- five minute intervals;
- one minute intervals.

**Teaching Example 3** and the **Activity 3** give examples of how you could do this.

#### Teaching Example 3

Mrs Ondieki wanted her students to be able to practise setting and reading different times from a clock face. She decided the best thing to do was to ask her students to make cardboard cut-out clock faces that they could practise with. She asked students to help her collect enough cardboard for every four students to be able to make quite a large clock face, and two hands for it.

When they had enough, she asked her students to cut out circular clock faces and hands from their cardboard; and showed them how to number them on the board, making sure they had the 12, 3, 6 and 9 at the key points. Mrs Ondieki had bought some 'split pins' to hold the hands on the clock faces.

Mrs Ondieki then explained to her students how they should use the clocks, starting first with telling the hours (one o'clock etc.). She showed the students a particular time on her own cut-out clock and they made their clocks say the same time. They worked in small groups, helping each other. (See Additional Resource: Using group work in your classroom)

They used the clocks they had made for several weeks, until Mrs Ondieki was sure that all her students could tell the time confidently. Every day, she also brought to the classroom a little alarm clock. She looked at this with her class at different times of the day to see what time it was.

#### Activity 3

- Collect the materials and make cardboard cut-out 'clock faces' with your students.
- Begin with whole-class teaching to help students see how the hours and minutes work.
- When students have some confidence in this, you may ask pairs or small groups to challenge each other: either saying a time, and asking their peers to show it on the clock face, or making a time on a clock face, and asking their peers to say what time is shown.

- Ask them, in groups, to make a list of the key things they do during the day, including the times they do them. You may have to help younger children. You could do a picture for the time.

At the end of the lesson, or in the next lesson, ask them to draw clock faces in their books, and put in a time and then write down the time in words for each clock. (If you can, have one or two small round objects that students can draw around to save time.)

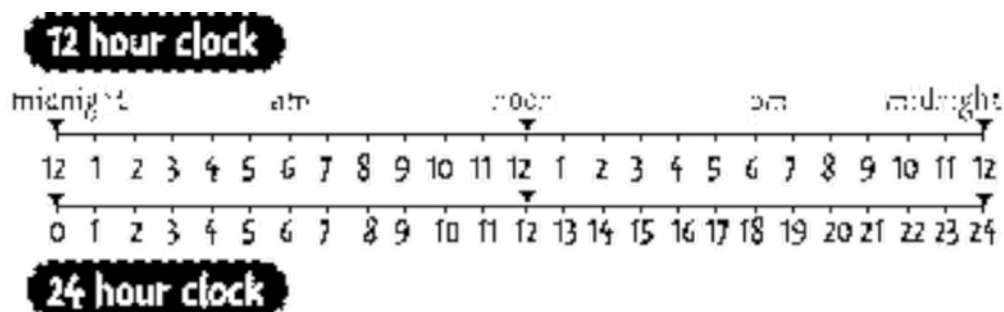
### Units of time

Time

- 1 minute = 60 seconds
- 1 hour = 60 minutes
- 1 day = 24 hours
- 1 week = 7 days
- 1 fortnight = 14 days
- 1 year = 12 months = 52 weeks = 365 days
- leap year = 366 days

Many timetables and digital watches use 24-hour clock time.

Use this scale to change between 12-hour and 24-hour time.



6.15 am → 0615

6.15 pm → 1815

Remember:

- a.m. is morning time (it comes from the Latin ante meridium, meaning 'before midday');
- p.m. is afternoon and evening time (it comes from the Latin post meridium, meaning 'after midday');
- the 24-hour clock always uses four digits.

Original source: <http://www.bbc.co.uk/schools>

## Science: Exploring sounds and music

- 1 Identifying different sounds
- 2 Sound Waves
- 3 Musical Instruments

**Key Question for the teacher:**

**How can you involve your students in assessment?**

**Keywords:** sound; musical instruments; assessment; local resources; game; project

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- used peer assessment with your students;
- used resources from the local community to produce musical instruments with your students;
- used practical activities to develop your students' understanding of how to produce different sounds.

## Overview

From a very early age, we respond to familiar sounds – a baby will respond to its mother's or carer's voice for example – and we learn new sounds very quickly. Your students will have learnt to recognise a large number of different sounds. In this section, you support your students' developing ideas about sounds and how they are produced. The emphasis is on practical activities and active learning. Do you play an instrument yourself? Or know someone who could visit your classroom to play to your students?

This section also explores ways for helping students to assess their own work. Being involved in assessment helps students understand their learning and set goals for future progress. It also builds self-confidence and enthusiasm for learning.

## 1 Identifying different sounds

It is always wise to start by finding out what students already know. Students will recognise many different sounds, but they probably haven't considered different qualities of these sounds like pitch (low notes or high notes) and volume (loud or soft).

In Activity 1, you play a guessing game with your students, where they try to identify sounds and explain how they think the sounds were made. This involves students scoring their own answers, one way of involving them in assessment.

Don't dismiss answers that seem incorrect – encourage students to explain their responses. You can learn much about their understanding from what they say. Afterwards, think about what they said – was there anything that surprised you?

**Teaching Example 1** shows how one teacher used a local story as a starting point for students' questions about sound. Do you know any stories from your own culture that you could use? Or could you ask a member of the local community to visit your school to tell a story? Could one of your students tell a story?

### Teaching Example 1

Ms Sarpong, who teaches in South Africa, but comes from Nigeria, used a Nigerian folktale about a swallowing drum to introduce the topic 'sound' (see Resource 1: Sound story).

When she told the story to her students, she beat three different-sized drums to demonstrate the 'bim', 'bam', 'bom' sounds of the drums in the story.

After the storytelling, they discussed the sounds in the story and how they were made.

Some groups investigated how drums make sound, by using grains of dry rice on the surface of the drums to see the vibrations. They also tried to get different sounds from the same drum.

Other groups investigated what happened when they blew air over the tops of different sizes of empty plastic bottles. They made notes of what they found out, and later they shared what they had thought about and learned.

Finally, they made a list of all the questions they had about sound and displayed it on the classroom wall. Ms Sarpong encouraged them to think of ways they could find out the answers for themselves.

### Activity 1

Gather 10–12 different objects that make interesting noises – include both familiar and unusual sounds. You might include sounds recorded on a cellphone. Before students come to class, you will need to set up a screen to hide from view both the objects and the action that makes the sound.

From behind the screen, make each sound in turn. Students need to write down how they think the sound is made.

At the end, show how each sound was made and students score the sounds they identified.

Finally, ask the students if all the sounds were equally easy to identify? How did they identify the more unfamiliar sounds? What clues helped them to identify the sounds?

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## 2 Sound Waves

Sounds are made by vibrating objects. The vibrating object causes the air particles to move closer together (compress) and then apart in a regular pattern – this is called a sound wave. Thus the air carries the sound to our ear.

### Sound Waves

#### What is sound?

Sound is produced whenever an object vibrates. The object could be a string on a guitar, a flat surface such as a drum skin, the diaphragm in a loudspeaker or even the vocal cords.

Sound transfers energy away from the vibrating object, and it needs something to travel through. Sound cannot travel through a vacuum – in space, no one can hear you scream!

#### Speed of sound

Sound travels at different speeds through different substances. In general, the denser the substance, the faster sound travels through it. Sound travels at 5,100 m/s through steel, 1,480 m/s through water and 330 m/s through air. This is much slower than the speed of light.

Light travels nearly a million times faster through the air than sound does. This is why you hear the thunder clap after you see lightning in a thunderstorm, and why the sound of someone hammering some distance away does not match the hammer blows.

#### Echoes

Sound can reflect from the surface of an object. This is called an echo. Hard surfaces reflect sound better than soft surfaces.

#### Loudness

The loudness of a sound depends upon the size of the vibrations. Big vibrations transfer more energy than small vibrations, so they are louder.

#### Pitch

A sound can range from a high to a low pitch (high to low note). The pitch of a sound depends on how fast the original object is vibrating. If there are lots of vibrations per second, the frequency is high and the sound has a high pitch. If there are few vibrations per second, the frequency is low and the sound has a low pitch.

### Checkpoint

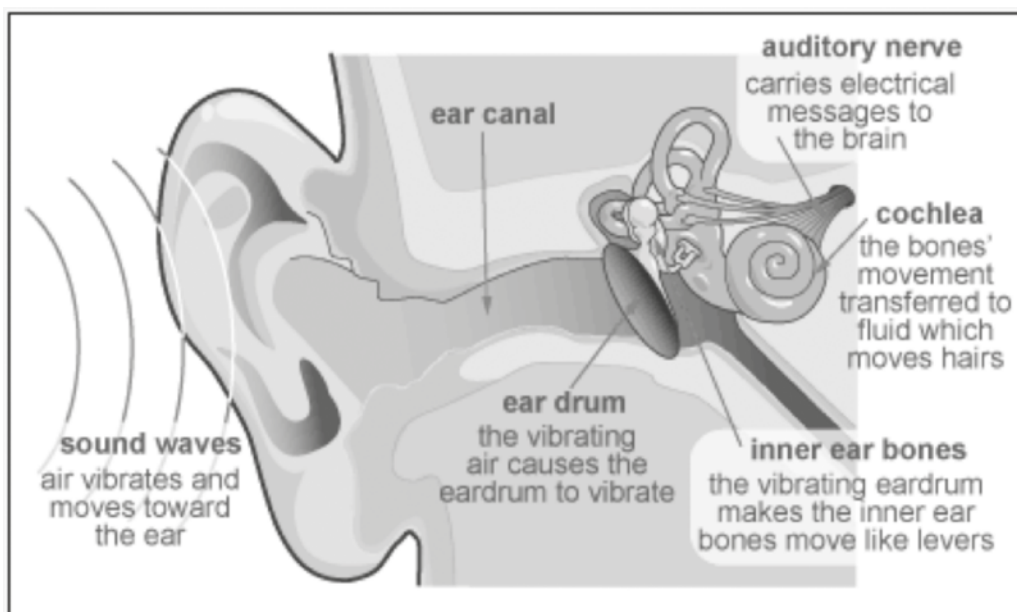
The table summarises some features of sound waves and vibrations.

	Size of the vibrations		Number of vibrations in each second	
	Small	Big	Low	High
Sounds like	Quiet	Loud	Low pitched	High pitched
Example	Whispering	Shouting	Man talking	Child talking

### Hearing

We hear because sound waves enter the ear and cause the eardrum to vibrate. Three small bones in the inner ear carry these vibrations to the cochlea (pronounced 'kok-lee-a'). The cochlea contains tiny hairs, which send messages to the brain when they vibrate.

#### A diagram of the ear



Adapted from: <http://www.bbc.co.uk>

### Hearing damage

Our hearing is easily damaged and as we get older we find it more difficult to hear very low or very high sounds. The three small bones may join together as we age, so they are not so good at passing along the vibrations from the eardrum to the cochlea.

Loud sounds can eventually damage our hearing. If the eardrum is damaged, it may repair itself again, but if the cochlea is damaged, the damage is permanent. People with damaged hearing may find it difficult to follow conversations and may need a hearing aid.



In Activity 2, you ask your students to use everyday objects to make sounds and see how they can change these sounds in different ways. The students should carry out this investigation in small groups. (See the additional resource in the Teaching Pack Additional Resources, Using group work in your classroom.) Spend some time at the end of the investigation talking to your students about how the groups worked; do they have ideas about how they could work together more effectively in the future?

In Teaching Example 2, a teacher uses an interesting set of questions to encourage students to think about their work – another way of involving them in assessment.

### Teaching Example 2

Mrs Antwi organised her multigrade class into groups of six students of different ages. Each group was given some wooden blocks.

She asked them to find out how far the sound of blocks clapped together travelled. Each group organised their own investigation. When they had planned their investigation and decided who would carry out each task, she let them work outside. Groups recorded results on a poster.

After they had completed their investigations, Mrs Antwi gave them the following questions to discuss in their groups:

Did they get an accurate answer to the question (results)?

Were they happy with their data?

What would they do differently next time?

Mrs Antwi knew this was a good way of helping her students to reflect on their learning. The students came up with some excellent ideas, including that the wind varied and affected the results, not everyone's hearing is the same and that other noises were distracting.

### Activity 2

Organise your class into small groups to investigate ways to change the sounds made by a range of objects. Give each group one set of equipment – here are some ideas:

Use different-sized upturned tin cans as drums.

Fill five identical glass containers with different levels of water and tap them with a pencil.

Blow air over bottles of four different sizes.

Use four identical plastic bottles filled with different amounts of sand as shakers.

Students could also choose something for themselves.

Ask your students to think about and then carry out investigations to find out:

- How are you making the sounds?
- How can you make the sound higher? lower? louder?

Each group records their results on a poster, including any patterns that they found. They also discuss:

- how well they have worked together;
- how they might organise themselves next time;
- how happy they are with the group ideas on changing sounds.

Groups could swap equipment if they want to do more experiments, but make sure that they have first recorded their results on the poster or in their book.

You may like to use the information below to help your students with their discussions at the end of the experiment

### **Ideas students may have about working in a group**

Choose one of these methods to help your students talk about how they worked together in a group.

1. Write each of the following words on to a card, or on the board. Give each group of students a set of cards to help them develop three sentences to describe how they worked. They should try to use some of these words in their sentences:

decide, persuade, tell, ask,  
argue, describe, agree, opinion,  
listen, share, organise, lead,

2. Write these statements onto a set of large cards (keep these for different group work activities). Display the statements around the room and ask each group to choose the statements that describe the way they worked.

Encourage your students to add further statements.

- Everyone in the group had a chance to speak.
- Everyone in the group was encouraged to speak.
- Not everyone spoke during the activity.
- We reached agreement in our group.
- We listened carefully to each other.
- Sometimes we found it hard to listen to others without interrupting.
- Not everyone in the group agreed with our way of drawing the poster.
- Not everyone in the group contributed to the poster.
- Everyone in the group was able to add to the poster.

3. Choose one or more of these questions. Read it/them out to your class and ask each group to discuss the question(s) in their group for five minutes. Ask for feedback from some of the groups.
- How did sharing your ideas help you?
  - Did everyone have a chance to speak?
  - Did you encourage each other to share your ideas?
  - Did you listen carefully to each other?

### 3 Musical Instruments

For centuries, people have developed musical instruments using local materials. These all involve plucking, hitting, blowing or rubbing to create vibrations of different pitch and volume. Many instruments also have a box of vibrating air to amplify the sound (make the sound louder). Try to find out about traditional instruments in your community – is there anyone who could come into your classroom and show their instrument?

Teaching Example 3 and Activity 3 involve students exploring musical instruments – either from the community or those students have made themselves. In both cases, students develop criteria to judge the instruments. In the activity, you could also ask your students to develop criteria to judge their presentations.

Inviting local musicians into the school to demonstrate their instruments and to hear the students' instruments would be a wonderful way to end the activity.

#### Teaching Example 3

Mrs Osei involved her class in the choice of a musical instrument for the school choir. She planned a research project where students researched locally available musical instruments, such as the balafon (xylophone), musical bow, drums and trumpets. The class suggested the kinds of questions that would have to be asked, the points to be awarded for each answer and how they would report back. These questions were put together to form a questionnaire. Students worked in small friendship groups for homework to get answers to their questions.

Ideas for judging each instrument

1. These are some questions students could ask about each instrument.

Brainstorm a list of questions with your class.

What is it made of?

How old is it?

How robust (not easily broken) is it?

Does it need to be kept in a special place?

How easy is it to carry around?

How do you make a sound?

How do you make the note higher? lower?

How do you make a quiet sound? loud sound? Is this easy to do? Can you hear the quiet sound?

What is vibrating?

How easy is it to learn to play?

How much does it cost?

2. Decide which of these questions are important when judging the instrument. We suggest that students in your class choose a maximum of five criteria/questions to judge each instrument.
3. For each of the five criteria or questions your class has chosen, develop a scoring scale out of 5. The maximum for each instrument would then be 25.
4. Each group presents their instrument, the class gives them scores for each criterion.
5. These scores could be recorded on the chalkboard or a large sheet of newsprint on the wall.

**Each group should summarise their work by saying:**

The final score for our instrument is:

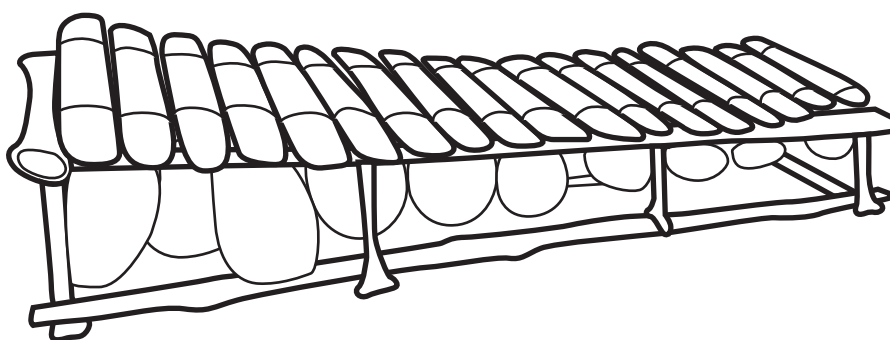
Our instrument is a good choice because ... (strengths)

Our instrument might not be a good choice because ...  
(difficulties and problems with the instrument)

To analyse the scores, Mrs Osei made a table on a large manila sheet (also in Resource 5 for hints). As the different groups brought in their reports, the scores were entered into the table. These points were all totalled up and, based on the instrument with the highest total score, the class decided to buy the small locally made wooden balafon.

**Traditional musical instruments**

The balafon (or 'bala') is a resonated frame xylophone of West Africa. It is a lamellophone with wooden keys. There are many different balafons in Africa. They fall into two main categories: the free-key type, in which the keys are independent of one another and of their supports, and those with fixed keys, in which the keys are permanently strung together and attached to their support. In the free-key balafons, the loose keys are assembled on temporary supports; for example, the player's legs, banana-tree trunks, straw bundles or logs padded with grass. The fixed-key balafons are generally mounted on or suspended from a frame, with or without calabash resonators.



<http://www.africaclub.com/balafogr.jpg>

The keys themselves are suspended over the resonators by means of two lines of twisted leather cord, which pass through two 'vibration knots'. Each key has its own particular length, width and thickness. The keys are struck with two beaters with rounded ends, formed by winding the tips with rubber strips.

#### Playing techniques

There are two main playing techniques for the balafon:

1) The balafon reproduces the timbres and tonalities of the spoken language. A tonal language is one expressing difference of meaning by variation of tone. Thus, the same word pronounced at different pitches will have a different meaning.

If the musician plays and sings:

- the balafon repeats a phrase that has been sung; or
- the singing repeats a phrase that has been played; or
- the same phrase is played and sung simultaneously. In this case, as the balafon playing is faster than speech, the musician performs melodic phrases to fill in. For this, each interpreter develops his own particular formulas. These formulas may sometimes be as simple as the repetition of a single note.

If the musician plays without singing, he expresses himself in a coded manner by transferring his speech to the balafon.

Balafons are played alone or in pairs, with or without accompaniment from other instruments. Some pieces may be played by two, or even three or four players on the same instrument. One or two of the keys of the balafon are sometimes struck rhythmically with the handle of the beater or with wooden sticks.

Adapted from: <http://www.masabo.com/balafon.html>

### Activity 3

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Organise your class into groups of three (or more if you have a very large class).

Tell them that each group will make their own musical instrument, using what they know about changing sounds.

Ask each group to draw a rough diagram, showing their instrument and a list of what they will need to make it.

Ask each group to organise themselves to bring in materials from home.

The next day, give time for each group to make their instrument and prepare a three-minute presentation to:

- show the different sounds the instrument makes (louder/softer, higher/lower);
- try to explain how the instrument makes the different sounds.

Depending on the size of your class, bring groups together or into four larger groups.

With the class (or large group), develop a set of criteria to judge the instruments. Make a list of these criteria on the board. Discuss whether they are all of equal importance.

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## **Social Studies and Arts: Investigating the resources we need for living**

- 1 Importance of natural resources**
- 2 Natural resources and human settlements**
- 3 Shortages of resources**

**Key question for the teacher: What different activities can you use to explore why people settle in particular places?**

**Keywords: resources; Teaching Example; group work; settlements; debate; questions**

**Learning Outcomes for Teachers:**

**By the end of this section, you will have:**

- **used small group work and debate to help students understand the resources needed for living;**
- **used pictures and maps to explore the relationship between the availability of resources and human settlement.**

### **Overview**

Every day of our lives we use resources of all kinds and as the population of the world increases there is great pressure on many of these resources.

As a teacher exploring these ideas with your students, it is important to start by finding out what they already know about the resources in their own environment. It is then possible to plan how to extend their knowledge and engage them in thinking more deeply about the issues. The teaching examples in this section show how some teachers explained these ideas and will help you think about what you will do in the activities.

# 1 Importance of natural resources

On their way to school, your students will see many natural resources that are used in everyday life. In this part, you will ask your students to brainstorm some of these natural resources and the ways people use them. By ranking them according to their importance for the people living in a particular environment, they will see how important these resources are. This will help your students develop their skills of observation and think about their role in using resources wisely. You will need to explore their understanding of the differences between natural resources and resources made by people.

You will also explore ways to use group work to manage your class. Working in this way helps them to share ideas and learn together.

Read Teaching Example 1 before trying Activity 1; these show different ways to find out what your students know. You can try both methods at different times in your classroom.

## Teaching Example 1

Mr Kaizilege is a teacher at Kitahya Primary School, which is near the Ileme village in Tanzania. Most of his students come from the village.

The village is located in an environment that has many natural resources – trees, water, a quarry and cultivated fields. Mr Kaizilege wants to develop his students' abilities in observing and identifying the natural resources surrounding their village. He hopes this will help them understand their roles and responsibilities with respect to these local resources.

At the end of one day, he asks the students to note down all the resources they see in the village on their way home and bring their list to school. The next day, he divides the class into groups of eight and writes the following question on the board:

What resources do we have in our own environment?

One student in each group copies the question onto the middle of a piece of paper and each group shares their findings from the previous day's observation exercise, drawing or writing their findings around the question. Mr Kaizilege displays these on the board, and together they reflect on how similar their brainstorms are. Mr Kaizilege suggests gaps that exist in their charts. For example, no one mentioned the quarry or the sun.

Mr Kaizilege then writes sentences on the board. Each sentence shows the use of one resource found in the village. He asks the groups to match each sentence to a resource. The groups share their ideas and reach agreement on them before copying them into their books.



### Activity 1

- Write 'Local resources' in the middle of the chalkboard. Make sure they are clear about what you mean by 'resources'. Ask your students to spend three minutes talking to one other person about the resources they use in their village or suburb.
- Then ask different pairs of students to give ideas.
- Record their ideas in two lists on the board – 'Natural resources' and 'Resources made by people'.
- Now divide the class into small groups and ask each group to discuss some differences between the natural resources and those made by people.
- Ask each group to feed back to the class. Discuss with the class the key points that they have made.
- Ask each group to rank the list of all the resources available in their village/ suburb, from the most important to the community to the least important.
- Ask each group to present and defend their order to the rest of the class.
- As a class, agree on one ordered list. You might want to organise this as a vote.
- Ask them to think about which resources are readily available and which are more difficult to get hold of or more expensive.

Did the students have a clear sense of the difference between natural resources and those made by people? Does anyone need more help?

## 2 Natural resources and human settlements

People have traditionally settled in places where they can find natural resources such as water, fuel and access to food, perhaps land to grow crops or keep cattle or fish from the sea or a lake.

To help your students understand why people choose certain places to settle, you will use a historical example to explore the issues of water. You can then relate the key ideas to their own lives.

Using group work will increase the interaction and exchange of ideas, which will help students explore their thinking and develop their understanding more.

### Teaching Example 2

Mrs Mpata was teaching her Primary 6 students about the relationship between natural resources and human settlements. She decided to use, as an example, the importance of water as a resource to explain the settlement of people on the shores of Lake Victoria in the Jinja area.

She prepared some notes about life in Uganda in ancient times and wrote these on the board. (See below: Natural resources and human settlement.) She asked the students in pairs to identify the major natural resource that exists in the Jinja area and to discuss why people settled in various places. They were able to identify Lake Victoria as the source of the Nile, and water as the natural resource in determining the settlement of people in the country.

#### **Natural resources and human settlement**

The shores of Lake Victoria

The Lake Victoria Crescent covers the areas directly influenced by the Lake environment. It receives an annual rainfall of 1,500 mm and it is characterised by fertile dark loam soils, favourable for agriculture. The area is gifted with a tropical climate and has tropical forests. The physical natural environment of this region has attracted settlement activities, such as industrialisation subsistence and commercial agriculture, and eco-tourism among others. It is no wonder that this area is highly populated and full of many economic activities, especially around Jinja, Masaka, Kampala, Mukono, Mayuge, Iganga and Mpigi district.

Next, she asked her students to work in groups of eight and share with each other how important water is to the survival of their own village. She asked them to identify where the village gets its water from, and how this affects both the position of the village and the daily lives of the people. The groups shared their findings with the rest of the class, and Mrs Mpata wrote their ideas on the chalkboard. They discussed how important each idea was.

Mrs Mpata was very pleased with her students' informed discussion – this meant that they understood the relationship between natural resources and human settlement.

### **Activity 2**

Divide the class into groups and ask each group to think about the needs of early settlers (e.g. food, water, shelter). Ask one person in each group to list the ideas.

Ask each group to think what would be the best place for a settlement e.g. near a river, but away from flooding.

Ask each group to present its findings to the rest of the class and identify the common factors together.

Next, ask each group to think about and note down activities that might have been carried out by people in these settlements.

Now ask each group to design their own village. Give each group a large blank piece of paper. Ask them to mark these features on the paper:

- a river;
- houses;
- an area of high ground;
- a road or track.

Encourage them to use symbols on their maps and to include as many other features as they want.

Allow time at the end of the lesson for groups to present their village maps to each other and explain where the people in the village get their resources from.

### 3 Shortages of resources

Many resources are scarce and therefore need to be properly managed. Some resources, once used, cannot be replaced. Others are plentiful at the moment, but may not be if people do not look after them or use them wisely.

In Teaching Example 3, the teacher uses a class debate to explore one particular resource issue. If you have older students, you could try this strategy, choosing any topic which is relevant to your community. The success of the debate will depend on giving the students time to plan their speeches well and organising the class so that students are clear about their roles in the debate.

In Activity 3, you are encouraged to use another way to explore a resource issue in your area.

#### Teaching Example 3

Mrs Komuhangi wanted her Primary 6 students to explore the positive and negative effects of managing natural resources. She decided to hold a debate in her class on the issue of bush burning, which had been a problem recently in the local area.

She started the lesson by writing on the chalkboard: 'Bush burning is harmful to the community'.

##### How to debate an issue

A debate is a formal argument or discussion. One side proposes the topic or motion and the other side opposes it. There are three speakers for each side and there is a time limit within which they have to give their point of view.



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### **How to debate an issue**

A debate is a formal argument or discussion. One side proposes the topic or motion and the other side opposes it. There are three speakers for each side and there is a time limit within which they have to give their point of view.

- A chairperson introduces the topic and the six speakers.
- The first speaker from the team that is proposing the motion speaks first. The first speaker introduces the topic. They may speak for a limited time (such as a maximum of three or five minutes each).
- Next, the first speaker from the team that is opposing the motion speaks. This speaker also introduces the topic, but from the opposing point of view.
- They are followed by the second speaker from each side. The role of the second speaker is to enlarge on the argument by giving valid examples and evidence to back up their team's point of view.
- The chairperson then opens the debate to the floor (the rest of the audience), who can question the speakers and challenge their arguments.
- The third speaker from the opposing team then sums up the team's argument.
- The third speaker from the proposing team sums up the team's argument.
- The class votes on the motion, based on the strength of the different arguments.

Mrs Komuhangi then explained how a debate works. She asked for three volunteers to propose – or support – the motion and for three volunteers to argue against the motion. She explained to both teams that they must gather evidence to back up their points of view. To help them find the evidence, she encouraged each team to speak to older people in the community about why the community often burns the grass in their area. She also gave both teams some information that she found on the Internet, which looked at the role of bush burning in traditional communities in Africa, and some ways to manage bush burning.



**Bush burning:****Reasons for bush burning**

A typical example of bush burning is when farmers burn their harvested fields to prepare their farms for the next planting season, or during dry seasons when farmers organise hunting parties for popular game often called 'bush meat'. The bush is deliberately set alight to trap small animals during hunting. Other fires are caused by accidents during the dry season when most bushes and forests have dried up and are very combustible; cigarettes, matches, campfires etc. can spark up small fires that later grow bigger.

**Bush burning management strategies**

Bushfires can be managed by professional staff, such as rangers and park workers, with help from volunteers from rural areas. However, large fires are often of such a size that no conceivable firefighting service could attempt to stop the whole fire directly, and so other techniques are needed.

This might involve controlling the area that the fire can spread to by clearing control lines. Here the land is cleared of any vegetation either by controlled burning or digging a ditch. This takes time and does not happen often. This can interfere with the forest ecosystem.

**Who is affected by bush burning?**

Rural farming communities are rarely threatened directly by bush burning as the fires are usually located in the middle of large areas of cleared, usually grazed, land, where often there is very little grass left. People who live in urban areas that spread into forested areas are more open to threats of fire.

Adapted from: <http://en.wikipedia.org/>

**Bush burning in Uganda**

During every dry season, cattle keepers in Nakasongola district indiscriminately set fires on the vegetation so that it sprouts.

The fires destroy habitats for the animals that live underneath the inselbergs. Those that escape hide in burrows, but birds' nests do not survive the fires.

'Bush burning is the major environmental abuse in the district,' says Joseph Kimeze, a 28-year-old herdsman from Wajjala, Nakasongola. He adds that the prolonged dry periods are always accompanied by indiscriminate bush burning.

'We do not all burn the bushes for fun, but we want fresh grass for our animals,' Kimeze says. 'Once we burn the old vegetation, the pastures regenerate ... [and] are good for grazing.'

Kimeze and others do not realise that by burning bush, they are exposing the already harsh terrain to more destruction.

Nakasongola has about 20 inselbergs scattered in Wajjala, Sasira and Kasozi parishes. They stand out at around 1,097 metres above sea level.

An inselberg is a German word meaning a rocky mountain. It is a unique rocky outcrop formed as a result of wind erosion. In Uganda, inselbergs are also found in Karamoja. They are usually endowed with peculiar ecological diversity.

Kunobera says during the 2003 World Environment Day, the National Environmental Management Authority (NEMA) gave Nakasongola enough pine seedlings for two acres.

Other semi-arid areas of Uganda found in the cattle corridor of Kumi, Soroti, Katakwi, Moroto and Nakapiripirit districts also experience extensive bush burning and wind erosion during the dry season.

In response to the effects of drought, the district and development partners are promoting sustainable agricultural practices.

Water is being made available in the form of valley dams, in addition to promoting rainwater harvesting.

Different community and non-governmental based organisations are working hand-in-hand with the local government to promote tree-planting programmes.

Adapted from: The New Vision <http://www.dip.go.ug/english/news>

Mrs Komuhangi gave the teams a week to prepare for the debate, including time in one lesson for all the class to think about the positive and negative aspects of bush burning. The rest of the class also tried to find out what they could from the local community and share this with both teams as appropriate. On the day of the debate, Mrs Komuhangi reminded the class of the rules of debating, and how important it was for them to ask questions if they did not understand.

At the end of the debate, a vote was taken and the motion was carried by a large majority. Mrs Komuhangi reminded the class that it was important to respect each other's viewpoints and not to gloat as 'winners'. She was pleased that both teams put forward interesting ideas to support or oppose the motion.

In the next lesson, Mrs Komuhangi asked her students to brainstorm ideas of how to develop community awareness of the negative effects of bush burning and provide alternative methods of managing the land in their community. She wrote their ideas on the chalkboard and encouraged the students to discuss the ideas with their families.

### Activity 3

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Choose an image of a different environment and pin it up in your classroom. If you have photographs from a visit to a different part of Nigeria or have access to images in a textbook or magazine you could use these. Try to choose a place that is very different to the environment of the school.

- Explain to your students where the photograph is of.
  - Organise them into groups of three/four and ask them to think of between four and six words to describe the place.
  - After five minutes, ask each group to give you one word. Write these as a word bank on the board or on a sheet of newsprint.
  - Next, ask your students to work in their groups and to list the features of this place that are similar and different to their own environment.
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## Life Skills: Exploring good citizenship

- 1 Family rights and duties
- 2 Community responsibilities
- 3 Discussing citizenship

**Key question for the teacher:** How can you use different ways of organising students to develop their understanding of citizenship?

**Keywords:** resources; Teaching Example; group work; settlements; debate; questions

**Learning Outcomes for Teachers:**

**By the end of this section, you will have:**

- developed your skills to help you relate students' previous knowledge to new knowledge about citizenship;
- found different ways to help students find out about community responsibilities;
- organised a school assembly.

## Overview

Every day of our lives we use resources of all kinds and as the population of the Large classes present special problems for teachers – particularly if they are multigrade classes (see **additional resources: Working with large and/or multigrade classes**). In this section, we make suggestions about using different types of classroom management for developing students' understanding of citizenship.

Just telling students about their roles and responsibilities as citizens has much less impact than involving them in active experiences. This section helps you think about different ways to find out what they know and use this to extend their understanding

All citizens, including children, have rights and duties (responsibilities), but these vary from person to person. In order for students to understand this, they need to explore what rights and responsibilities mean for them, share their findings with other students and consider the differences. To do this, they need to talk either as a whole class or in pairs or groups.



# 1 Family rights and duties

Citizenship is a difficult idea for young students and they may not understand it at first. It is a good idea, therefore, to relate it to something they know – such as the kinds of tasks that are carried out at home. With older students, you will be able to explore the topic more deeply and extend their understanding by thinking about their roles and responsibilities within the wider community.

## Teaching Example 1

Mrs Nqwinda is a teacher in Malbena Primary School in Mndantsane in the Eastern Cape of South Africa. She has a Grade 4 class of 62 students who sit in groups of five around each desk. It is not easy to move the children or the desks, so she used desk groups to discuss the duties students have to carry out at home. She chooses the group work method because she wants to make sure that all the students have a chance to share their ideas.

As they discuss their duties for ten minutes, she moves around the classroom making sure that no one is dominating the discussion and reminding each group to think about the three duties they are to feed back on.

The students find this an easy task. As the groups feed back their answers, Mrs Nqwinda writes each new duty on the chalkboard. She is interested to find that most of the girls help their mothers with tasks around the house, like cleaning and cooking and looking after smaller children. Most of the boys help their fathers and uncles with fetching wood and water, and some of them work in the fields and gardens. They have an interesting talk about gender roles in the household.

Mrs Nqwinda then asks if they could say what things they were free to do in their family. The students find this task more difficult, so she encourages them to discuss in their groups before giving feedback. Mrs Nqwinda writes their answers on the chalkboard and explains that these things they are free to do are their 'rights'. She checks they understand the difference between duties and rights.

See **Resource 1: Rights and duties of children** for the list of her students' rights and duties in the home.

### Rights and duties of children – Mrs Nqwinda's class list

#### Our duties are:

- Cleaning the house
- Fetching wood/water
- Looking after younger children
- Cooking
- Working on the land

#### Our rights are:

- Somewhere to live – shelter
- Food to eat
- Protection from harm
- Care from adults
- Medical care when sick

## Activity 1

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- Discuss the word 'duties' with your class and make sure they understand what it means.
- Ask the students, in pairs, to discuss and list the duties they have to carry out at home.
- After ten minutes, ask each pair in turn to give a different duty and list these on the chalkboard (many will have the same duties). Make sure they all understand these are their duties. Ask each student to record their own list of duties in their book.
- Next, ask the pairs to discuss the things they are free to do in their homes (such as read books, go to worship, go to school, play inside or outside).
- List their ideas on the chalkboard and explore their understanding about how these are their 'rights'.
- Ask them to list and draw the things they like doing most – duties or rights.

Did you find working in pairs easy to manage? If so, why? If not, why?

How would you change this activity to improve it next time?

Did the students' knowledge and ideas surprise you?

We all live in a group or family, and our family is part of a group, such as a village or a community. Within our community we have rights and duties. This means we must do certain things in the community and the community must do, or provide, certain things for us. The **Rights of the Child** below will help you prepare for this topic.

### Rights of the Child in Uganda

In line with the United Nations Convention on the Rights of the Child passed in 1990, the Ugandan Government passed a law in 1995 known as the Children's Statute. The Rights of the Child are as follows:

A child in Uganda:

1. Should have the same rights as an adult, irrespective of sex, religion, custom, rural or urban background, nationality, tribe, race, marital status of parents or opinion.
2. The right to grow up in a peaceful, caring and secure environment, and to have the basic necessities of life, including food, health care, clothing and shelter.
3. The right to a name and a nationality.
4. The right to know who his or her parents are and to enjoy family life with them and/or their extended family. Where a child has no family or is unable to live with them, he or she should have the right to be given the best substitute care available.
5. The right to have his or her best interests given priority in any decisions made concerning the child.
6. The right to express an opinion and to be listened to, and, to be consulted in accordance with his or her understanding in decisions which affect his or her wellbeing.

7. The right to have his or her health protected through immunisation and appropriate health care, and to be taught how to defend himself/herself against illness. When ill, a child should have a right to receive proper medical care.
8. A child with disability should have the right to be treated with the same dignity as other children and to be given special care, education and training where necessary so as to develop his or her potential and self-reliance.
9. The right to refuse to be subjected to harmful initiation rites and other harmful social and customary practices, and to be protected from those customary practices which are prejudicial to a child's health.
10. The right to be treated fairly and humanely within the legal system.
11. The right to be protected from all forms of abuse and exploitation.
12. The right to basic education.
13. The right to leisure which is not morally harmful, to play and to participate in sports and positive cultural and artistic activities.
14. The right not to be employed or engaged in activities that harm his or her health, education, mental, physical or moral development.
15. A child, if a victim of armed conflict, a refugee, or in a situation of danger or extreme vulnerability, should have the right to be among the first to receive help and protection.

## 2 Community responsibilities

Students need to be able to meet expert people who are willing to talk with them about their ideas on this topic. This will help students to understand their responsibilities in the community and motivate them to learn. Before a visitor comes to your classroom, you may need to think about moving the furniture to make the atmosphere more welcoming. This will make the visitor feel comfortable and help the students' learning because they can see and hear better.

### Teaching Example 3

Mr Mabikke wanted his 48 Primary 4 students to discuss their community responsibilities. He decided that the layout of the classroom was not helpful for group discussion work so he made a plan for a new organisation of the desks. He discussed it with his head teacher, who approved the change. With a fellow teacher to help him, he reorganised the classroom into eight groups, each with three desks arranged to seat six students. The next day, the children were excited that the classroom was different. Mr Mabikke explained that the arrangement would mean they could do more group discussion.

He asked the students to discuss, in their groups, what the community provides for them – the rights of the people living in the community. But first he talked with them about taking turns to speak in their groups and listening to each other with respect. Each group was to make a poster showing the different things the community provides as their rights as members of the community.

His students knew that they also had duties along with rights so, in their groups, they discussed what their duties in the community were and then they marked these on their poster in a different colour and provided a key.

All the posters were displayed on the wall so the groups could see everyone's ideas before they had a final discussion about which were most important rights and duties.

## Activity 2

- Discuss with your students their duties in the community.
- Guide their talk towards care for the environment, respecting people and property, taking care of each other. Organise the class into groups and ask the groups to make a poster, write a poem or a story, or draw a picture to show their ideas.
- Discuss their rights in the community – help them understand they have a right to education, to medical care, to be safe in the streets and their homes, and to speak their opinions.
- Talk about community leaders and other important people in your community. Make a list of all the people who serve the community.
- Decide who they would like to visit the school to tell them about their work in the community. It could be a village elder, a community leader, a political leader, a nurse, a librarian, a police officer or a religious leader.
- Arrange the visit and prepare questions with your class to ask the visitor.

After the visit, discuss with the students what they found out about the work of the visitor.

## 3 Discussing citizenship

To qualify as a citizen of any country you have to meet certain criteria. These are usually laid down in the Constitution. Try to get a copy of the Constitution of your country and see what it says. **Excerpt from the Constitution below** lists criteria for qualification as a citizen.

**Excerpt from the Constitution of Uganda, showing those who qualify to be a Ugandan citizen**

### Citizens of Uganda

Every person who, on the commencement of this Constitution is a citizen of Uganda shall continue to be such a citizen.

**Citizenship by birth**

The following persons shall be citizens of Uganda by birth:

- (a) every person born in Uganda one of whose parents or grandparents is or was a member of any of the indigenous communities existing and residing within the borders of Uganda as at the first day of February 1926 and set out in the Third Schedule to this Constitution; and
- (b) every person born in or outside Uganda one of whose parents or grandparents was at the time of birth of that person a citizen of Uganda by birth.

**Foundlings and adopted children**

- (1) A child of not more than five years of age found in Uganda, whose parents are not known, shall be presumed to be a citizen of Uganda by birth.
- (2) A child under the age of 18 years neither of whose parents is a citizen of Uganda, who is adopted by a citizen of Uganda shall, on application, be registered as a citizen of Uganda.

**Citizenship by registration**

- (1) Every person born in Uganda:
  - (a) at the time of whose birth:
    - (i) neither of his or her parents and none of his or her grandparents had diplomatic status in Uganda; and
    - (ii) neither of his or her parents and none of his or her grandparents was a refugee in Uganda; and
  - (b) who has lived continuously in Uganda since the ninth day of October 1962 shall, on application, be entitled to be registered as a citizen of Uganda.
- (2) The following persons shall, upon application be registered as citizens of Uganda:
  - (a) every person married to a Uganda citizen upon proof of a legal and subsisting marriage of three years or such other period prescribed by Parliament;
  - (b) every person who has legally and voluntarily migrated to and has been living in Uganda for at least ten years or such other period prescribed by Parliament;
  - (c) every person who, on the commencement of this Constitution, has lived in Uganda for at least 20 years.
- (3) Paragraph (a) of clause (2) of this article applies also to a person who was married to a citizen of Uganda who, but for his or her death, would have continued to be a citizen of Uganda under this Constitution.
- (4) Where a person has been registered as a citizen of Uganda under paragraph (a) of clause (2) of this article and the marriage by virtue of which that person was registered is:
  - (a) annulled or otherwise declared void by a court or tribunal of competent jurisdiction; or
  - (b) dissolved, that person shall, unless he or she renounces that citizenship, continue to be a citizen of Uganda.

### Citizenship by naturalisation

Parliament shall by law provide for the acquisition and loss of citizenship by naturalisation.

One way to explore your students' ideas on citizenship is given in Teaching Example 3.

School assemblies can bring a topic to a close in a way that will motivate your students. How to prepare for a school assembly is explored in Activity 3.

#### Teaching Example 3

Mrs Makoha, from a small rural school in Uganda, invited the Regional District Commissioner (RDC) to visit her Primary 5 class of 56 students. The RDC brought with him a photograph of the president, the national flag, coat of arms/national emblem, his identity card and passport. He explained to the children about the importance of these things in being a Ugandan. He explained what the different parts of the flag symbolise. They also sang the national anthem and made a list of all the events where they sing the national anthem.

After the visit, Mrs Makoha organised the class in small groups around their desks and asked them to discuss why it is important for them to be a citizen of Uganda. She moved around the class and guided the groups to stay focused on the task and to listen to each other's ideas.

Next, she asked them to work individually and write their own reasons in their books. She collected in their work and was able to assess how much each student had learned about citizenship. There were five students whose reasons were less well developed and Mrs Makoha discussed the reasons with these students during break to assess whether they understood the ideas.

### Activity 3

Ask your head teacher if you can hold a school assembly on 'Being a good citizen'.

Discuss what the content of the assembly might be with your class.

Each group prepares their part and the resources needed. You might want to suggest to your students that the following need to be included:

- Who is a citizen?
- Rights and duties in the home.
- Rights and duties in the community.
- Symbols of national identity – flag, anthem, identity card, coat of arms, passport.
- Why is it important to be a good citizen?

Give groups different tasks and allow them time to prepare their contributions – maybe over several lessons.

Make the task clear, so that each student produces a piece of work that you can use to assess their learning.

Encourage them to write poems or texts for reading, paint flags or find a text they want to read or use.

Agree the order for the presentations and rehearse.

Present your assembly to the school.

Afterwards, discuss with the students what worked well and what could have been improved. How well did they think the rest of the school understood about citizenship?

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No. 6

## Middle Primary

<b>Section 1 Literacy:</b>	Reading and writing stories
<b>Section 2 Numeracy:</b>	Ways to solve number problems
<b>Section 3 Science:</b>	Classifying living things
<b>Section 4 Social Studies:</b>	Investigating how we used to live
<b>Section 5 Life Skills:</b>	Girls and boys

<b>Additional Resources:</b>	<ul style="list-style-type: none"><li>• Group work in your classroom</li><li>• Working with large/multigrade classes</li></ul>
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## Literacy: Reading and writing stories

- 1 Hooked on books
- 2 Creating new beginnings and endings
- 3 Silent reading

**Key Question for the teacher:**

How can you use local games to help language learning?

**Keywords:** shared reading; creative responses; silent reading; beginnings and endings; stimulating interest

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- used shared reading in your reading to support developing readers
- used activities that focus on alternative beginnings and endings to stimulate interest in reading
- explored different ways to support silent reading (SSR) in your classroom

## Overview

Students are more likely to learn how to read successfully if they enjoy reading and read as often as possible. If you asked your friends what they enjoy reading, their answers might vary from newspaper sports pages to recipes, romantic novels, detective stories or biographies – or they might not read much at all! Like your friends, different students may enjoy reading different kinds of texts. They will respond to what they read in different ways. Your task is to motivate all the students in your class to read successfully and to enjoy reading. The focus of Activity 1 is preparing and teaching a shared reading lesson. The aims of this activity are to increase your confidence and skills as a reader and to get students 'hooked on books'.

# 1 Hooked on books

The kinds of stories and story-reading activities that students enjoy are likely to vary according to their age and their knowledge of the language in which the stories are written. Younger students and students who are just beginning to learn an additional language enjoy having a good story read to them several times – particularly if they have opportunities to participate in the reading. By reading a story several times and by encouraging students to read parts of the story with you, you are helping them to become familiar with new words and to gain confidence as readers. See the resource in the *Teaching Pack Additional Resources* on Using Storytelling in the Classroom.

## Teaching Example 1

When Jane Dlomo thought about her childhood in the Eastern Cape of South Africa, she remembered how much she had enjoyed her grandmother's stories. Two things stood out in her memory: firstly, how much she liked hearing the same stories over and over again and secondly, how much she and her brothers and sisters enjoyed joining in with the stories. Sometimes her grandmother asked, 'What do you think happened next?' Sometimes she asked the children to perform actions. Jane decided to make her reading lessons with Grade 4 students more like her grandmother's story performances. She also decided to experiment with activities that would involve students in sharing the reading with her and with one another. When she told her colleague Thandi about her decision, Thandi suggested that they work together to find suitable storybooks, practise reading the stories aloud to each other and think of ways of involving the students in the reading. Both teachers found that sharing the preparation helped them to be more confident in the classroom.

### Preparation for shared reading

Choose a story with characters and events that you think will interest your students.

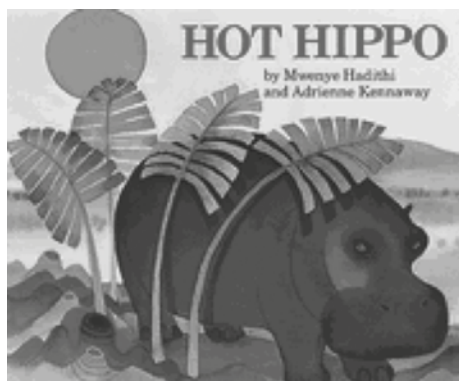
Think about any background knowledge that students will need in order to understand and enjoy the story. Decide how to provide this before you begin the story reading. For example, young students in some parts of Africa would be familiar with a hippopotamus, but in others they may not be, so before reading the story *Hot Hippo* you would need to find out what students know by asking questions like these:

Questions to establish background knowledge:

- What does a hippopotamus look like?
- Would you be frightened of a hippopotamus? Why, or why not?
- Where would you be likely to see one?
- What does a hippopotamus eat?

**First prediction question:**

- This story is called *Hot Hippo*. Look at the drawing on the cover. (The drawing shows a hippopotamus trying to shelter under some palm leaves.) What do you think the story will be about?



Note: While these questions refer to the story *Hot Hippo*, similar questions could be asked about animals, people, places or activities in relation to any story.

**Activity 1**

- Using the guidance on **Shared Reading** above, prepare work on other tasks for some students to do while you do shared reading with a group of 15 to 20. Establish any background knowledge about the topic of the story before reading it. As you read, show students the illustrations and ask questions about them. Use your voice and actions to hold students' attention. Invite students to join in the reading by repeating particular words or sentences that you have written on the chalkboard and by performing actions. At the end, discuss the story with your students.
- How did you feel about your reading of the story?
- Did students enjoy the story? How do you know?
- What can you do to develop your story reading skills?

**Questions to use with book readings – first, second and third readings**

Here are a few questions you could ask before reading a story with students and then examples of questions to ask when the reading has been completed. There are also questions after they have read the book another time or more.

**First Reading Session****Before reading**

1. Does the cover make you want to read this book? Why, or why not? What does the cover make you think the book is going to be about? How does it do this?
2. Tell me about what you see on the first page of the story.

**During reading**

Ask questions about the development of the story and how the words and pictures contribute to this development.

**After reading**

1. What did you like or dislike about this book?
  2. Is there anything that puzzled or surprised you about this book?
  3. Are there any patterns you have noticed?
  4. What is your favourite picture? Could you tell me what you see in this picture?
  5. Do you think the cover was appropriate (the right kind of cover) for what happened in the story?
  6. Do you find the words or the pictures more interesting? Do they tell the same story in different ways? Would the words still be good without the pictures? Would the pictures still be good without the words?
  7. Is the story told through the words, the pictures or both? Is it the same all the way through the book?
- 

## 2 Creating new beginnings and endings

The child psychologist Bruno Bettelheim (1976) believes that if children find 'magic' in stories, they will really want to learn to read. He argues that if a child believes strongly that being able to read will open up a world of wonderful experiences and understanding, they will make a greater effort to learn to read and will keep on reading.

Sharing interesting stories with students is one way for a teacher to make reading a magical experience. Stimulating curiosity and imagination by encouraging them to create alternative endings (and sometimes beginnings) to stories and to share these with their classmates is another.

### Teaching Example 2

Mrs Miriam Muwai teaches English to Standard 6 in a Nairobi school. One day, she asked her students to think about the stories they had read with her and to tell her which story ending they liked best and which they found disappointing or unsatisfactory. She found they had different favourite stories. However, there was one story that most students didn't like because they didn't know what happened to three characters that 'disappeared' from it. Miriam asked them to suggest what could have happened to these characters and wrote their ideas on the chalkboard. Then she asked students to choose one of the three characters and to write an ending to this character's part in the story. She encouraged students to use their own ideas, as well as those from the chalkboard, and to include drawings with their writing. Then she reread the story to remind them of the setting, the characters and the main events.

Although Miriam asked students to write individually, she also encouraged them to help each other with ideas, vocabulary and spelling. She moved around the room while students were writing and drawing, helping where needed. She was very pleased to find that most of her students really liked the idea of being authors and of writing for a real audience (their classmates).

She noticed that they were taking a great deal of care with their work because their classmates would be reading it. In the next lesson, when they read each other's story endings, she observed that most of her 'reluctant readers' were keen to read what their classmates had written and see what they had drawn.

## Activity 2

- Write this short story or one of your own on your chalk board.
- Omit the title and the last two sentences.

### [Run for glory by Mark Northcroft (aged 12 years)] Omit

On and on he ran. His legs felt like churning acid. He could hear his pursuers closing in on him. He felt he could not keep this up much longer but he knew he had to. The footsteps were gaining on him. 'Faster! Faster!' he cried. 'I can't! I can't!' he answered. Somewhere deep inside himself, he found a sudden surge of energy. Now he knew he could do it. Suddenly a man approached him from out of nowhere. 'Now or never,' he thought.

### [He shot – low to the right. What a goal!] Omit

#### Notes

'His legs felt like churning acid' – This simile or comparison is not easy to explain but you could say that the man or boy felt pain in his legs as though he had a mixture of chemicals bubbling up in them. 'pursuers' – people who are following or chasing someone. 'surge' – a sudden, powerful movement. 'energy' – liveliness, capacity for activity.

#### Questions to ask students in preparation for writing an alternative beginning and ending to this story:

1. Who do you think 'he' is?
2. Where do you think he is?
3. What do you think is happening to him?
4. Who is 'a man'?
5. What other people might be part of this story?
6. What might have happened before this part of the story?
7. What might happen next?

Read the story with your students. Discuss any new words. Ask them to answer questions such as those above. Organise the class to work in fours – two to write a beginning to the story and two to write an ending. Each pair does a drawing to illustrate their part of the story. (This may take more than one lesson.)

Ask each group to read their whole story to the class and to display their drawings. Discuss with students what they like about each other's stories.

Finally, read the title and the last two sentences of the original story to your class. (They are likely to be surprised that it's about soccer!)

- Find another story to repeat the exercise.
  - How well did this activity work?
  - How did the students respond to each other's stories?
- 

### 3 Silent reading

Extensive or sustained silent reading (SSR) helps students become used to reading independently and at their own pace (which may be faster or slower than some of their classmates). The focus is on the whole story (or on a whole chapter if the story is a very long one) and on students' personal responses to what they read. SSR can be done with a class reader, with a number of different books that students have chosen from a classroom or school library, or with newspapers and magazines (if students can manage these)

#### Sustained silent reading

Developing sustained silent reading (SSR) in your classroom is important in encouraging your students to want to read and developing their reading skills. For SSR to succeed requires some careful planning ahead. You will need to gather together resources for your class or a group to read. These could be articles from newspapers or magazines, books, etc. You need to be resourceful to gather these and also to store them so they are not lost or damaged. If you have enough resources for your whole class, you could do SSR once a week at the start or end of the day. If you only have a limited number of resources, you could do it with one group each day and also work with your class to make more class books to read.

#### Questions to ask

These are examples of questions that could be asked about many different kinds and levels of storybooks, but you may prefer to ask students for just a brief comment.

1. What happens in the first part (introduction, beginning) of the story?
2. What happens in the middle part (where there are complications or conflicts in the story)?
3. What happens at the end (resolution)?
4. Is there a problem that needs to be solved?
5. What is the goal of the main character or characters?

6. What happens to the characters in the different parts of the story?  
What difficulties do they face?
7. Have similar things ever happened to you?
8. If their first attempt is unsuccessful, do the main characters get another chance to achieve their goal?
9. What happens to the characters at the end?
10. How do you feel about this story? Did it make you think about your own life or anyone else's? If so, in what way(s)?

### **Stimulating interest in reading stories: Keeping a reading record**

As students carry out SSR it is useful for them to keep records of the books they have read and to comment on what they did or did not like about them. It is also a way of seeing what breadth of material they are reading and the kinds of things that interest them. It tells you how much they are reading, especially if you encourage them to also include books, newspapers, magazines, etc. that they read at home or elsewhere. With newspapers and magazines, you may suggest they only add these when they read them regularly and say how often they read them. They may want to include articles from particular magazines.

Keeping a record must not become a bore, as this will put students off reading. Each record should only include the title and author and maybe publisher if you wish to add the book to the class collection (if you have a budget). The student could say if they liked the book and why, and if they'd recommend it to others to read.

The record could be a class one, where the title of each book in the library is on the top of a sheet of paper and every time someone reads this book they sign the list and put in a short comment. Another way is for each student to have a page at the back of an exercise book where they keep a list of the books they have read and every time they finish a book or give up on a book they make a comment next to the title and author. It would be useful if these entries are dated, so you can see how often they are finishing a book etc.

Once you have enough books and magazines for all the students in your class to read individually, you need to think about how to look after these precious materials. If you have, or could make (or get someone else to make), some shelves for one side or the back of your classroom, you could then display the books and magazines in order to attract students' interest. In an exercise book, write down the titles of the books and magazines so that you can keep track of them. At the end of each SSR period, watch carefully to check that students return the books to the shelf.

If you do not have shelves, then pack the books and magazines carefully into boxes. You may like to choose some students to be book monitors to help you distribute books from the boxes at the beginning of the reading period and to pack them away at the end.



### Collecting and displaying materials for SSR

If you need to start your own classroom library, the first requirement is to collect books and magazines. There are organisations that can help schools obtain books. Here are some useful contacts.

#### Africa Book Centre

**website:** <http://www.africabookcentre.com>

Kenya Publishers Association

P O Box 42767

00100 Nairobi

Longhorn Publishers

**website:** <http://www.longhornbooks.co.ke>

#### East African Educational Publishers

**tel:** +254 4451530/1/3

**email:** <http://sales@eastafricanpublishers.com>

**website:** [eastafricanpublishers.com](http://eastafricanpublishers.com)

Macmillan Kenya Publishers Ltd

Kijabe Street

P O Box 30797

00100 Nairobi

**tel:** +254 0 220012

**website:** <http://www.macmillan.com>

#### Kenya Literature Bureau

P O Box 30022

000100 Nairobi

**tel:** +254 244847

**email:** <http://customer@kenyaliteraturebureau.com>

**website:** <http://www.kenyaliteraturebureau.com>

#### Jomo Kenyatta Foundation

P O Box 30533

00100 Nairobi

For more information on SSR, the following website is also useful:

<http://www.trelease-on-reading.com>

Sometimes the embassies of foreign countries or organisations linked to embassies, such as the British Council, are able to make donations of books. Service organisations such as Rotary Clubs also collect and donate books.

If you cannot contact any organisation for assistance, then try asking colleagues and friends to donate books and magazines that their children or other family members have finished with. Some schools ask parents to help teachers to organise fundraising events and then they use the money that is raised to buy books.

### Teaching Example 3

A workshop was held in Naivasha, Kenya, to introduce teachers to sustained silent reading (SSR). It was explained that one of the main aims of SSR is to create a 'culture of reading' among students. Teachers were invited to participate in SSR and then to reflect on their experiences. Each teacher chose a book or magazine and read silently for 20 minutes. After this, they had ten minutes of discussion with three fellow readers about what they had read and how they responded to the text. When they returned their books and magazines, they signed their names in the book register and, next to their names, wrote a brief comment about the text.

These teachers decided that SSR is useful for developing concentration and self-discipline, for learning new vocabulary and new ideas and for providing content for discussions with other students. They thought their students would enjoy this activity and be proud when they finished reading a book. Some teachers decided to try this with a small group at a time and rotate around the class because they only had a few books in the class.

### Activity 3

- Collect interesting books, magazines and stories that are at an appropriate level for your students. Involve students and community in collecting suitable texts or use books your students have made in class
- Set aside 15–20 minutes every day or three times a week for sustained silent reading. Ask students to choose a text to read silently. Read yourself as they read.
- At the end, if they have not finished their books, ask them to use bookmarks so they can easily find their places next time.
- Ask each student to make or contribute to a reading record. Every week, ask students, in small groups, to tell each other about what they have been reading.
- Move round the groups to listen to what students are saying. Check their reading records.
- Do students enjoy this activity and are they making progress with their reading?
- How can you help more?

## Numeracy: Ways to solve number problems

- 1 Listening to student's voices in mathematics
- 2 The essence of the problem
- 3 What makes problems easy or hard?

**Key Question for the teacher:**

How can you develop students' problem-solving skills using number problems?

**Keywords:** metacognition, differentiation, tasks, creativity, thinking about thinking, problem solving, number

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- used strategies to explore students' ways of solving mathematical problems
- distinguished between deep and superficial features of mathematical problems
- used techniques to develop thinking about thinking in your students

## Overview

Problem solving is an interesting way to develop your students' mathematical thinking. Students have to work out what calculations need to be done before they can find the answer. This means sorting the information given to establish what it is they need to find out and how to do it.

This will help them make explicit their mathematical thinking, and understand and recognise the deep features of a mathematical problem. You might find it useful to think of why problem solving is important. There are many different ways of solving mathematical problems.

## Why problem solving is important

### Problem solving:

- adds enjoyment and interest to mathematics lessons
- helps students gain confidence in their mathematical ability
- helps students see the interaction between mathematics and everyday life
- helps students value mathematical learning
- improves communication skills in mathematics
- develops the process of making and testing hypotheses
- develops abstract thinking

### Strategies for solving problems

- Draw a picture or diagram
- Make a table.
- Make a list.
- Look for a pattern.
- Guess and check.
- Say the problem in a different way.
- Look at all possibilities systematically.
- Work backwards.
- Solve a simpler problem with fewer variables.
- Explore the role of each variable in turn by fixing the others.
- Explore any previous similar problems.
- Look for the 'deep' features.

You may be surprised at how many other ways students find, other than the way you may have expected them to use.

## 1 Listening to students' voices in mathematics

'Thinking about thinking', or meta-cognition, is a powerful means for helping students understand and recognise the 'deep' features of particular kinds of problems, and how to solve such problems.

The first step towards such thinking is to give students the opportunity to talk about the problems they are trying to solve and how they are trying to solve them. When students are explaining their thinking, it is important to listen and not dismiss any ideas they have learned after undertaking some activities about time.

**Teaching Example 1**

Nomonde in South Africa reminded her students that, when they go home from school, there isn't only one way to get home: there are many possible ways. Some are shorter, some longer, some safer, some more interesting. She told them it was the same with mathematics problems – there is often more than one way to get to the right answer, and looking at the different ways might be interesting.

Nomonde put the following questions on the board.

1. Sipho has 24 stones. He gives 9 stones to a friend. How many stones does he have left?
2. Thembeke eats 7 sweets every day. She has 42 sweets. For how many days does she have sweets?
3. The teacher buys 25 packets of crayons. There are 12 crayons in each pack. How many crayons does she have?

Next she asked the students to answer the questions using any method they liked. She gave her students ten minutes to answer the questions. She checked their answers and then asked one or two to explain how they worked out each question.

Nomonde listed these methods to find the answers and made a note of which methods were most popular. She reminded her students about the different routes to school.

**Activity 1**

Try this activity yourself first, preferably with two or more colleagues. Then try it with your students.

Ask your students to try to answer Nomonde's three questions by working individually.

Split the class into groups of four or five and ask them to take turns to explain carefully to each other how they worked out their answers.

Next, ask the groups to make a list of the strategies used, then ask these questions:

- Did you all have the same answer?
- Did you all work it out in the same way?

How many different ways can your group find to work out a correct answer for each question?

List these on the board.

Explain how important it is to your students to try different ways to solve problems to help their mathematical thinking.

## 2 The essence of the problem

With any mathematical task or problem you set your students, there are ‘deep’ features – features that define the nature of the task, and strategies that might help solve it.

Almost all mathematics problems have these deep features, overlaid with a particular set of superficial features. As a teacher, you have to help your students understand that once they have recognised the superficial features, changing them does not have any effect on how we solve the problem. The strategies for solving a problem remain the same.

### Ways to help students solve problems

You can help your students become confident problem solvers by helping them to understand the importance of:

- reading the problem carefully to find the important parts;
- identifying the ‘deep’ features of a problem;
- deciding what exactly is involved;
- discussing and sharing different methods to solve the problem;
- testing out ideas;
- working alone and with others;
- being prepared to start again if there is a mistake;
- checking their work;
- asking other students or you for help when needed.

You can also help your students become confident problem solvers by:

- using contexts that are interesting to students when setting problems;
- making the classroom environment supportive so they can share ideas without fear of being laughed at.

### Teaching Example 2

Amma wrote this problem on the board:

In one family, there are two children: Charles is 8 and Osei is 4. What is the mean age of the children?

Some students immediately wanted to answer the question, but Amma told them that before they worked out the answer, she wanted them to look very closely at the question – at what kind of a question it was. Was there anything there she could change that would not alter the sum?

Some students realised that they could change the children’s names without changing the sum. Amma congratulated them.

She drew a simple sum on the board ( $1+1=2$ ) and then said, 'If I change the numbers here,' (writing  $2+5=7$ ) 'it is not the same sum, but it is still the same kind of sum. On our question about the mean, what could we change, but still have the same kind of sum?'

Some students suggested they could change the ages of the students as well as the names.

Then Amma asked, 'Would it be a different kind of sum if we talked about cows instead?'

They kept talking in this way, until they realised that they could change the thing being considered, the number and the property of these things being counted, all without changing the kind of sum being done.

The students then began writing and answering as many different examples of this kind of sum as they could imagine.

## Activity 2

Try this activity yourself first.

- Write the following question on your chalkboard:

Mr Ogunlade is building a cement block wall along one side of his land to keep the goats out. He makes the wall 10 blocks high and 20 blocks long. How many blocks will he need in total?

- Ask your class to solve the problem.
- Check their answer.
- Next, ask your students in groups of four or five to discuss together the answer and what can be changed about the problem, yet still leave it essentially the same so it can be solved in the same way.
- Ask the groups to make up another example, essentially the same, so that the basic task is not changed.
- Swap their problem with another group and work out the answer.
- Do they have to solve this new problem in the same way?

## 3 What makes problems easy or hard?

Problem solving can be adapted so that every pupil can contribute. For example, all students can discuss what makes a problem easy or difficult to solve. It can be the variations in the superficial features – for example, using large numbers, decimals or fractions rather than small integers – that often make a problem harder to solve.

Sometimes, setting a question in a 'context' can make it easier, but sometimes this can distract students from the deep features of the problem, so they may not easily see how they are meant to solve it.

When students begin to see the deep features of a problem, they can also begin to 'see through' the superficial features, so they recognise the underlying task. Students can then confidently tackle any task with the same deep features.

### Teaching Example 3

Agnes was working with her students on the topic of division.

She wrote three division problems on the board:

1. Kofi has 12 oranges, and 3 children. If he shares the oranges equally, how many should each child get?
2. Divide 117 by 3.
3. Amma has 20 Gp for travelling to work. She spends 3 Gp each day on a taxi. One day, she doesn't have enough money for the taxi. How many days has she travelled to work? On the day her money runs out, how much extra does she need for the taxi that day? You might like to use pretend paper coins based on real coins to help with this activity.

As part of this activity, you might like to use paper or real coins to help students work on mathematical problem solving

She asked students in groups of four to try to answer these problems together.

After ten minutes, Agnes asked her students which problems were easier or harder to answer. Together they made two lists on the board – 'things that make the problems hard' and 'things that make the problems easier'.

Agnes asked the groups to find how many different ways they could solve the problems they had been given. She said she would reward the group that found the most ways by displaying a 'maths champions' certificate, with their names on it, on the classroom wall.

### Activity 3

Make a list on the board of 'things that make the problems hard' and 'things that make the problems easier'.

- Ask your students, in groups, to write three questions of their own. They should make one question easy, one harder and one very hard.
- After ten minutes, ask the groups to swap the problems they have written with another group and to solve the questions they have been given by the other group.
- Ask the groups to report back. Were the 'very hard' questions really much harder than the 'easy' questions? What made the questions hard or easy? Revisit your lists on the board – is there anything students want to change or add now about making problems hard or easy?
- Ask them to make up problems for homework related to their local community e.g. about the number of trees, the cost of a taxi.
- Next day, share these in class and ask students to solve them.



## Science: Classifying living things

**1 Collecting evidence of life around us.**

**2 Model making**

**3 Life cycles**

**Key Question for the teacher:**

**How can you help students organise their observations of living things?**

**Keywords:** classify; model; life cycle; animals; plants; research; group work

**Learning Outcomes for Teachers:**

**By the end of this section, you will have:**

- **collected and displayed real items in your classroom in a logical way to support your students learning about grouping living things**
- **use model building as a way of recording what your students know about different living things**
- **organised your students into pairs or small groups to undertake independent research projects on**

## Overview

Students need to grow up respecting and caring for our natural world; ideally, we all need to be naturalists. A naturalist is interested, observant, curious and values nature – someone who is learning about and caring for their world all the time. They have a clear, ‘big’ picture in their mind of how things work in nature. New observations will find a place in their big picture.

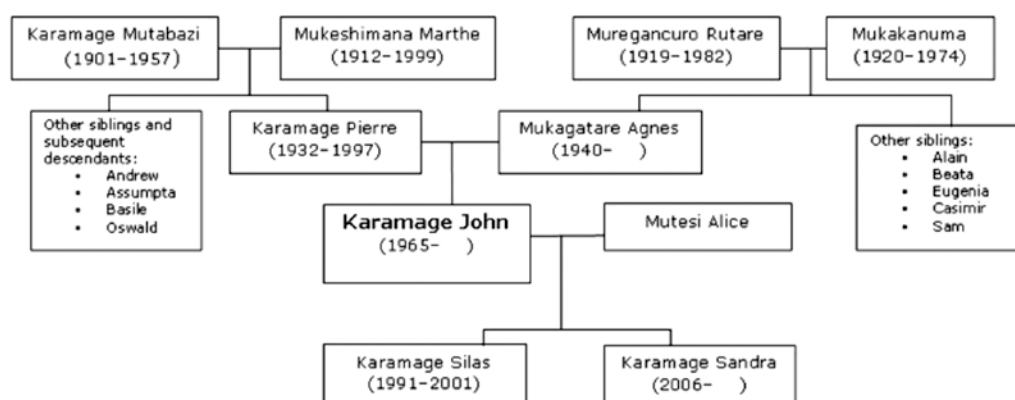
How do teachers help students achieve this big picture of how nature works? This section explores how you can help students organise and extend their knowledge about living things. You will bring real items into your classroom, organise displays, make models and undertake research with your students. When we find out something new, we fit it in amongst all the things we already know. We build up our own big picture (organising system) in our heads. That’s how the human mind works.

# 1 Collecting evidence of life around us

Think about how we organise our ideas of a family. We can represent this in a diagram called a family tree, where you place people where they belong in the big picture. An African family tree shows a typical family tree. You might like to create your own family tree to share with your students, or that of a famous person.

## An African family tree

This resource shows the family tree of the Karamage family.



This is how it is with biology. As a teacher, you need to help your students to build up a useful big picture of living things and how they are related. There is an agreed organising system that scientists have developed over years. The current agreed classification of living things shows how biologists organise living things into kingdoms and some of their subdivisions. A good way to start helping students organise their ideas about living things is to begin with items in your own environment – objects that students are familiar with and can easily investigate.

## Teaching Example 1

Amaka Ukwu's students in Nguru, Nigeria, were surprised to find two new tables in the class. Without saying anything, Ms Ukwu carefully laid out four self-standing cards in specific positions on the tables. 'Non-living' on the table to the left and 'Living', 'Plants' and 'Animals' on the table to the right.

Ms Ukwu gave the class five minutes to go outside and find different examples of non-living things. She talked about what they brought back and helped them to group similar things together on the non-living table.

Ms Ukwu deliberately checked that things like bone, wood, cardboard and paper were on the side nearer to the living tables. Why did she do that? Next, each student was given a small self-standing card and asked to draw any plant or animal on one side and write its name on the back. It must be different from anyone else's. The cards were brought to the front and sorted, displayed and discussed. Ms Ukwu ensured that like was sorted with like. (She had in mind the organising diagram from the Current agreed classification of living things but chose not to confuse her students by telling too much too soon.)

Ms Ukwu completed the lesson by asking the students to look at all the non-living things and divide them into those that were once living and those that were never alive. The students worked in groups and had lively discussions about many of the exhibits.

### Activity 1

- Tell your students that they will be developing a display to show non-living and living things around them. Explain that it would not be right to display real animals and plants. They should not damage or kill anything living. Instead, rather like detectives, they should hunt for clues and evidence of any living thing – for example, feathers, droppings, leaves and seeds. Give students several days to bring in things for the display. Now talk about the groupings you will have (animals, plants and so on), what defines each group and where each item sits in the display. Students could then make labels for the display.
- In the next science lesson, choose six things from the display – three living and three non-living – and display them on another table.
- Gather your students round the table and ask them which of the six things are living and how they know this. By careful questioning and discussion you should be able to draw up a list of the seven characteristics of living things.

### The seven common characteristics of all living things

When asked to think of the characteristics of all living things, most young children relate it to themselves and include things like needing to sleep, needing to keep clean, all die, need air, need to eat, all grow, all can be hurt or damaged, need friends, etc.

Accept and praise all their answers before you explain to them that scientists have come to agreement that the seven things that all living things have in common are the following:

- Nutrition
- Reproduction
- Growth
- Respiration
- Sensitivity
- Movement
- Excretion

We suggest you discuss each characteristic in turn with students. It is useful to clarify that the same basic things happen in plants and in animals but slightly differently. For example, with nutrition, plants manufacture their own food, whereas animals are dependent on eating plants or other animals. A further example is that more plants than animals can reproduce both asexually (without mating) as well as sexually (requiring pollination). It is only some of the more simple animals that can split into two or bud off new offspring; otherwise sperm and eggs are involved. But with both eggs and seeds there is an embryo that develops and germinates/hatches or is born. Let the children's interest and questions guide the discussion about each characteristic.

A good activity is to try to find evidence of these characteristics. For example, a leaf that shows evidence of having been eaten by some insect, or the owl pellets of skin, fur and bone found under a tree where an owl roosts (nutrition). Tracks, trails and ripples in water are evidence of animals moving (movement). Flowers that follow the sun, like sunflowers, or others that close/open at night, is evidence of plant movement. Then, clothes that no longer fit, shed skins of insect larvae and tree roots that crack paving are evidence of growth. Write each characteristic on the chalkboard and let students add notes or drawings to explain evidence they have found.

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## 2 Model making

Mathematics deals with patterns, so does art, and even in language there are patterns and structures. Thinking scientifically also involves looking for basic patterns. Think of your hands and feet. They have the same basic plan. They are joined to a limb by a joint (wrist/ankle), there is a flat part (palm/sole) and there are five jointed digits (fingers/toes) with hard nails on the upper tip.

Scientists group things by similarities and differences in the basic patterns of their structure or form. Students will enjoy looking for basic patterns in the plants and animals they know and find. One way to find out what your students observe about patterns in plants and animals is by asking them to make models. Talking about their models will help them make more detailed observations of the living things.

### Teaching Example 2

A teacher education session, teachers worked to plan more practical, hands-on science lessons that would help them see what children already knew and could do.

They explored the use of model making as a way to assess what children knew about something like the structure of plants. Then, after comparing each other's models and observing real plants more carefully, the students could choose to improve their old models, or make new ones to show new learning.



One of the teachers, Okoro Mohammed, demonstrated how she had used a cardboard box of scrap material (cloth, cardboard, paper, plastic, old tights, elastic bands, used containers etc.) as a resource for children to build models to show what they already knew about plants. She explained how much more detail the children had taught themselves after comparing each other's work and going out to observe plants more carefully. They included bark and buds, and finer details like leaf veins, or specific patterns of branch formation. Improving their models seemed to give the students a real reason to sharpen their observation and extend their understanding of plant structure.

### **Plant models**

Before this activity, ask your students to bring in scrap materials. Collect some yourself. Scrap materials might include: tin; cardboard; string; tape; straws; plastic bottles; fabric; paper; netting; wire.

**Step 1:** Divide your class into small groups of three or four students. Write the following instructions on the chalkboard or give each group an instruction card:

**Talk about what a plant looks like.**

**Then make models of the plants from the scrap materials.**

**Step 3:** Give your students time to plan and build their models.

**Step 4:** Ask each group to come to the front in turn and explain their model to the class.

### **How the lesson went for Okoro**

The plant models that the students made showed that they knew the basic structure of a plant, but they were not too sure of the details, like bark, side branches and where the leaves are on branches. She decided to let them look at plants outside and then return to their models and change or add to them. Her students had some knowledge of the terminology but not enough in English or their mother tongue, so they used a mixture of both. There were some plant parts they did not know the names of in either language.

To help students, she developed a lexicon (a small dictionary) to show which words the students knew to describe the parts of plants that they were familiar with: eg stem, leaf, bud, bark etc

(You might find it helpful to put up these words round your classroom and encourage the students to use them when talking about their models).

## Activity 2

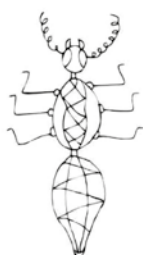
- In many parts of Nigeria, entrepreneurs make a living by selling lifelike models of animals. We feel that all students are entitled to the chance to extend this natural desire to make models to help with their study of different animals. By asking children to make models, you will also be integrating science with technology and art. You can add to the classroom displays set up in Activity 1 by getting children to work at making models of different types of local animals like chickens, dogs or cows using appropriate materials.
- We suggest you organise the students to work in groups, three or four students in each group usually works well.
- You could organise your groups by mixing lower and higher achievers.
- Encourage students to bring in materials for their models. As they are building the models, move around the classroom, talking to the groups; with younger students ask them to name the parts of the animal they are modelling – paws, tails, ears and so on. With older students, ask questions about the shapes and functions of the different parts of the animals – how do they help the animal move? eat? keep warm? cool down? sense that predators are near?
- Think about how you could encourage your students to reflect on their work. Could you ask different groups to comment on the other group's models? Make sure you allow time for students to talk about their work and to improve it.
- Did this activity work well?
- Were you surprised by the detail of the students' models? Is the detail of the students' models accurate?
- What could be improved?
- Did it help students to see similarities and differences between animals?

### Pupil's Models of Animals from scrap



#### Lizard

From wire and beads - shows they know long flattened body - S-shaped posture - legs out to side wide mouth, nostrils, large eyes to side of head, no ears



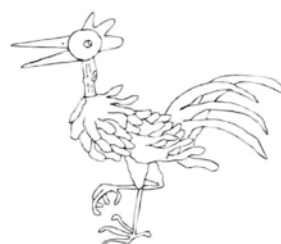
#### Insect - Ant

Made from scrap wire  
3 body parts - head, thorax, abdomen  
3 pairs jointed legs, mandibles, large compound eyes  
characteristic elbow shape to feelers  
Waist between thorax and abdomen



#### Frog

modeled from river clay, short, squat body, no tail, powerful back legs, webbed back feet, short front legs, no webs, wide mouth, nostrils, large protuberant eyes, smooth skin



#### Bird

Made out of clay, wire, cardboard wings with paper feathers and drawn eyes and nostrils, wooden stick for a neck.  
Most basic features of a typical bird shown.  
**NB:** Claw to back for gripping.

### 3 Life cycles

In this section we have been exploring patterns in living things. There is a basic pattern to the life cycle of all living things. There is fertilisation and development of an embryo in a seed/egg/womb. Then there is a process of birth/hatching/germination. Next comes feeding and growth through a number of stages. At maturity, the final stage of reproduction can take place and the cycle begins again.

#### Teaching Example 3

Mrs Aderinto gathered her class round her, held up a green bean pod and told the story of the life cycle of the bean. She used the words seedling, germination, growing and adult plant so that her students learned the correct words.

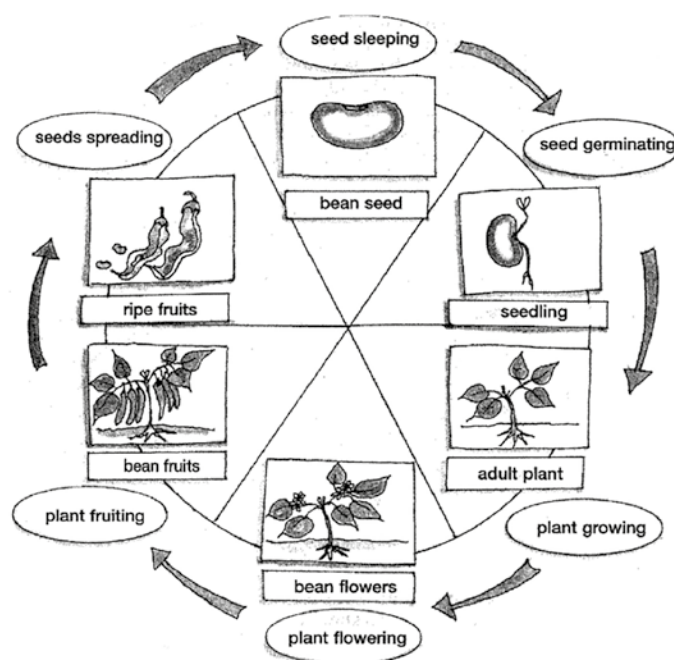
Then she divided her class into four groups: Groups 1 and 2 each had three pictures showing one of the stages in the bean's life cycle, Group 3 had the rectangular labels (describing the pictures) and Group 4 had the round labels (describing the steps in the life cycle story. The story wheel of a bean shows these labels and pictures.

Mrs Aderinto then drew a large circle on the board and divided it into six equal parts. She asked the group with the first picture to come and put it in the story wheel. She then asked what came next and asked the students to put in the next picture. When each part of the wheel contained a picture, she asked Group 3 to add their labels. Finally, Group 4 placed their labels in sequence on the story wheel and explained the steps to the class. She

finished by asking students to copy the story wheel and explain in their own words the story of the bean's life cycle – they could start anywhere on the cycle. Mrs Aderinto found this lesson worked really well with her students and they wanted to do story wheels for other plants and animals.



Story wheel of the life cycle of the bean



The story wheel is a useful tool because it:

- shows the stages in the life cycle of plants;
- helps the students work from the known to the unknown, that is, from the children's stories to the pictures to the labels;
- provides the students with an organising diagram summarising the life cycle of any plant;
- shows the logical sequence of the stages in the life cycle.

It also shows the students that they can start the story at any place in the wheel and follow it through all the stages.

### Activity 3

- Organise your class into groups of three or four. With your students, make a long list of animals that can be found in your local environment. Write this list on the board or on a large piece of paper stuck to the wall.
- Ask each group to choose an animal from the list; try to ensure that no two groups choose the same animal. Suggestions include: grasshopper, butterfly, frog, turtle, mosquito, beetle, elephant, bird and fish.



- Give the class some basic guidelines for the work on life cycles; how long they have, what you expect from them and how they should display their work. For younger students, you would expect them to give you three/four pictures in the story wheel shape and to put some basic labels on the pictures such as egg, chick, adult, baby and to have the pictures in the correct order. Older students should be able to discover something about each of these five stages:



- They should draw detailed diagrams with clear labels and notes.
  - They should include the number of babies born together, the time for each stage and how the animal gets its food at each stage.
  - You will need to guide them so that they can work fairly independently with confidence. One way to help the students is to have a list of useful words on the classroom wall; they can then feel confident about spelling these words.
  - Encourage each group to start by recording what they already know about their animal. Then they should find out more by investigation, research and observation. Students might want to ask people in the community or to use books or the Internet if you have access to these.
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## Social Studies and Arts: Investigating how we used to live

- 1 Oral History
- 2 Written Records
- 3 Examining historical evidence

**Key question for the teacher:** How can you develop your students' thinking skills in history, using oral and written stories?

**Keywords:** evidence; history; thinking skills; interviews; questions; investigations

**Learning Outcomes for Teachers:**

**By the end of this section, you will have:**

- used oral history and documents to develop students' thinking
- planned and gathered out activities that help students gather and use oral evidence to find out about past events

## Overview

When we study history as part of social studies, we place a great deal of importance on the sources of evidence that can tell us something about the past.

There are two important ways of gathering evidence about the past – finding and analysing documents that record what happened and using oral history. Oral history is the gathering of people's stories about particular events. We can also look at objects, pictures and buildings from the past to find out more.

You can encourage your students to investigate documents and conduct oral interviews in order to help build their understanding of their own past. It is important to encourage students to ask questions and listen to each other's ideas, so they develop skills in assessing evidence and drawing conclusions.

# 1 Oral History

Teaching history does not only involve facts about historical events, but also the development of students' historical skills. As a teacher, you need give your students the opportunity to develop and practise these skills. The kinds of events you explore with your students will depend on their ages. With younger children, you will also take more of a lead in helping them find out and understand what happened. In this part, students will conduct oral interviews with an older family member or another member of the community. The aim of the interview is to find out how different their own lifestyles and interests are, compared with those of people in the past. By showing students how to conduct an oral interview, you can help develop important skills – being able to see the value of oral history and being able to listen.

We all have stories to tell, stories about our lives and special events that have taken place. We give our experiences an order and organise such memories into stories. These stories could, if collected together with other people's memories of the same event, allow us to build up a clearer picture of what actually happened. Your local community will be a rich source for exploring what happened at a particular event or what it was like to live there 20 years ago. Your students could investigate the Ugandan Civil War or some other more local event.

## What is oral history?

Oral history is not folklore, gossip, hearsay or rumour, but the real history of people told from their perspectives, as they remember it. It involves the systematic collection of living people's stories of their own experiences. These everyday memories have historical importance.

They help us understand what life is like. If we do not collect and preserve those memories, then one day they will disappear forever.

Your stories and the stories of the people around you are unique and can provide valuable information. Because we only live for so many years we can only go back one lifetime. This makes many historians anxious that they may lose valuable data and perspectives on events. Gathering these stories helps your students develop a sense of their own identities and how they fit into the story of their home area.

## How do you collect people's stories?

When you have decided what event or activity you want to find out about, you need to find people who were involved and ask if they are willing to tell you their stories. Contact them to arrange a time of day and tell them what you want to talk about and what you will do. You need to record what your interviewee says. You can do this by taking notes by hand or possibly by tape recording or video recording.

Having collected your information or evidence, it is important to compare and contrast different people's views of the same event, so that you can identify the facts from the interpretations that different people put on the same event. You could ask your students, in groups, to interview different people and then to write a summary of their findings to share with the rest of the class. These could be made into a book about your class's investigation into a particular event.

### Teaching Example 1

Every person has a history. Mrs Eunice Shikongo, a Grade 5 teacher at Sheetheni School on the outskirts of Windhoek in Namibia, wants her students to explore their own family histories by interviewing one family member. First, she discusses what oral evidence is, by encouraging students to share things they have learned from their grandparents. She asks them: 'Has what you have learned been written down?' Most agree that things learned in this way are not written, but passed on by word of mouth. Mrs Shikongo then explains that, by conducting an interview, students will collect oral evidence about what the past was like and will find out what a valuable source of evidence this can be. She helps them compile a list of interesting questions to use to interview their family members

#### Possible interview questions

Below are some questions to use with a visitor to find out about an event in the past or how they used to do things in the past. Areas you could explore include:

- growing food;
- traditional dress;
- traditional healing;
- building houses;
- education.

These three sets of starter questions will help you support your students in thinking of their own questions.

#### (1) Historical events

- What historical events took place when you were young?
- What did you wear when you went to a party or a wedding?
- Which event do you remember most?
- What do you remember about it?
- What happened? Tell me the story as you remember it.
- Who else was with you?
- Could I speak to them about this still?



### (2) Games

- What games did you play when you were a child?
- How did you play these games?
- Who taught you to play these games?
- When did you play them? • Where did you play them?
- What other activities did you enjoy?

### (3) Growing food

- What vegetables and fruit did you grow?
- How did you grow them?
- Where did you grow them?
- What tools did you use?
- What did vegetables cost at the time?
- Where did you buy them? Which ones did you buy?
- What else did you eat that you liked?
- Do you still eat these foods?

The students then add their own questions to the list before carrying out these interviews at home. The next day, they share their findings with the rest of their class. Mrs Shikongo summarises their findings on the board under the heading. Next, she asks them to answer the same questions about their own lives, and summarises this information under the heading 'Now'. She asks them to think about how their lives are different from the lives of their family members in the past. She then asks the students, in pairs, to compare 'Then' and 'Now'. Younger students write two/three sentences using words from the board. Older students write a short paragraph

Discuss with the whole class how life has changed since their parents and/or grandparents or other older people were children. Pose questions that encourage them to reflect on why such changes have taken place.

### Activity 1: Oral interviews about childhood

- First organise your students into pairs. Then tell them to think of some questions they can ask an older person about his/her childhood. Give the students time to think up their questions and tell them how long they have to do this task – maybe two or three days. If you have younger students, you could work together to make up three or four questions they could remember and ask at home.
- When they have asked the questions at home, ask the students to share their information with their partners.
- Then ask each pair of students to join with another pair and share what they have found out.
- Now ask each group of four to complete a table to show how life has changed.

Older Person	Me
I would travel to market by donkey	I travel to market by bus

- Discuss with the whole class how life has changed since their parents and/or grandparents or other older people were children. Pose questions that encourage them to reflect on why such changes have taken place. (Key Resource: Using questioning to promote thinking can help you think of the kinds of questions you need to ask to stimulate students. You could note some of these down before the lesson to remind you at this stage.)
- Make a list of the key changes on the board.

## 2 Written records

As well as using oral histories to find out about life in the past, you can use written records with your students.

### Teaching Example 2

Mr Kaguri is a teacher of a Primary 6 class in Kanungu district, Uganda. The anniversary of Ugandan independence is coming up and he wants his students to think about the events that led up to it and some of the things that it led to.

He sends his class to the library where they read up on the events. A daily newspaper, *The Monitor*, has just published supplements about the granting of independence on 9 October 1962. Mr Kaguri reads from these to his students to stimulate their interest. These articles contain profiles of the lives of some of the people who were involved. He divides his class into groups and asks each group to take one of these people and to research and then write a profile of that person on a poster, for display in the school hall. The poster must include how they were involved and what has happened to them since. Mr Kaguri's students then plan to present their findings to the whole school. Their posters are displayed around the hall and some of the students speak at the assembly.

**Ugandan independence: Background information / subject knowledge for teacher**

The first Europeans to visit Uganda were the British explorers John Hanning Speke and James Grant when they were searching for the source of the Nile in 1862. They were followed by Samuel White Baker and Charles George Gordon commanding Egyptian troops.

The Anglo-American explorer Henry Morton Stanley, welcomed by Kabaka Mutesa I (reigned 1852–1884), reported the king's eagerness to understand Christianity. Soon both Protestant and Roman Catholic missionaries were working in Buganda. Within a decade the factions they created caused a civil war.

Once isolated, the region became, by 1890, a major object of the European nations' scramble for African territory. Britain, after securing German recognition of its rights, moved to secure Buganda. Frederick Lugard, working for the British East Africa Company, ended the civil disturbances, and his successors used the Bugandan army to help conquer the other kingdoms and tribes. By 1896, a British protectorate administration had extended its authority over most of the region, and the name Uganda was adopted.

Final details concerning the administration of Uganda were settled by a series of agreements in 1900, the most comprehensive of which guaranteed special status to Buganda, including the continuation of its social and political system. Britain's almost 70 years of rule in Uganda was thus a centralised European bureaucracy superimposed on a federation of kingdoms and tribes. This worked well until the independence movements of the 1950s, when Buganda demanded separation from Uganda. Only after Kabaka Mutesa II was exiled for two years in 1953 was it possible to proceed with developing a united government.

After much experimenting, a federal constitution was promulgated in April 1962. The Uganda People's Congress won the elections, and Milton Obote became prime minister. Independence was granted in October 1962.



**Events after independence**

Dissension continued, however, and in May 1966 Obote sent the army into Buganda and drove the Kabaka into exile. He then proclaimed a new republican constitution, which formally abolished the kingships, and became Uganda's first president of a unitary government. Bugandan recalcitrance, a fall-off in the economy, and charges of corruption led to an army coup in January 1971. Power devolved upon the army commander, Idi Amin, who began eight years of misrule. He increased the size of the army, eliminated his political opponents, and began a reign of terror directed at the people of Buganda, Obote's Lango people, and their neighbours the Acholi.

He also expelled approximately 70,000 Asians from the country. By 1978, Uganda was bankrupt, and the government was dependent on massive loans from Arab states friendly to Amin. Uganda went to war with neighbouring Tanzania in late 1978, and Tanzanian forces allied with Ugandan rebels drove Amin from the country early the following year.

Three provisional presidents served before elections under a new constitution were held in December 1980. Obote's party was successful, and he became president once again of a changed Uganda. Once thriving, the nation had become an economic disaster, with an inflation rate of more than 200%, no consumer goods, few jobs, rampant thievery, famine in the north, and no effective government in the countryside. In 1982, after Tanzanian troops had been withdrawn, anti-government guerrillas became active, and thousands of young men were arrested, suspected of being guerrillas. Thereafter, more than 100,000 Ugandans were killed or starved to death.

The constitutional government was overthrown in July 1985 in a coup by Acholi army officers; Obote fled the country and settled in Zambia. The new Acholi-dominated regime had little popular support, and quickly fell apart. After four days of fighting in Kampala in January 1986, National Resistance Army leader Yoweri Museveni took over the government.

Since Museveni's ascension to power, Uganda's economy has prospered. Foreign investment has increased and many Asian Ugandans have returned to open businesses. Museveni forbade the creation and activity of political parties, believing that parties would form along ethnic lines and further divide the nation.

The early 1990s saw an upsurge in terrorism in northern Uganda, the home of Museveni's political enemies. In the mid-1990s hundreds of Ugandan soldiers and civilians were killed in attacks by the Lord's Resistance Army, a Christian fundamentalist rebel faction led by a former faith healer. A new constitution was adopted in 1995 that established a democratic, though non-party, system of government.



## Activity 2

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- This activity is built on a visit to a museum, in this case the Uganda Museum, Kampala, but you could use a more local site or contact the education officer at the Uganda Museum as there may be materials available to schools where museum visits are not possible. (If it is not possible for you to visit a museum, you could also collect together some newspaper articles, pictures and books to help your students find out for themselves about an event.)
- Decide on a particular historical event that you wish your students to investigate during the visit to the museum (or in class if you have the resources) For example; here is a news report on the exile of Ugandan Asians in 1972.

### 1972: Asians given 90 days to leave Uganda

The Ugandan leader, Idi Amin, has set a deadline for the expulsion of most of the country's Asians. General Amin said all Asians who are not Ugandan citizens – around 60,000 – must leave Uganda within 90 days.

The military ruler's latest statement amended his original expulsion order two days ago when he said all the country's 80,000 Asians had to go. Asians, who are the backbone of the Ugandan economy, have been living in the country for more than a century. But resentment against them has been building up within Uganda's black majority.

### Expulsion surprises Britain

General Amin has called the Asians 'bloodsuckers' and accused them of milking the economy of its wealth. Up to 50,000 Asians in the former UK colony are British passport holders. In a broadcast, General Amin said he would be summoning the British High Commissioner in Kampala to ask him to arrange for their removal. The expulsion order has taken Britain by surprise. General Amin overthrew Uganda's elected leader in a military-backed coup last year but the British authorities had regarded him as a man they could work with.

Some British MPs have warned that letting more Ugandan Asians into the UK could raise racial tensions. They are urging the government not to take them in. MP Ronald Bell said Uganda's Asians had no real links to Britain. Mr Bell said: 'They were either born in India or have retained close connection with India. They have no connection with Britain either by blood or residence.'

Adapted from original source: <http://www.bbc.co.uk>

It is important that you focus the attention of your students on a particular event, especially if they are visiting a museum covering many years of the past.

Divide the class into groups, giving each a different issue or aspect of the historical event to focus upon.

Discuss what kinds of questions they might need to find the answers to as they read and look at the exhibitions (if at museum) or materials (if in school).

Back in class, ask the students in their groups to write up their findings on large posters. Display these in the classroom or school hall for all to see.

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### 3 Examining historical evidence

You can encourage your students to think critically about the validity and reliability of such evidence, and to compare oral testimonies of a historical event with written evidence of the same event. Investigating the similarities and differences in the two types of evidence provides an exciting learning opportunity for students.

#### Teaching Example 3

Mrs Kasigwa teaches social studies to Primary 6 at a small school in the Jinja district. Many of the families have older members who remember or were affected by the expulsion of Ugandan Asians in 1972.

Mrs Kasigwa has invited two Asians, who have returned to the country, to speak about their experiences. They will come on consecutive days as they have businesses and have to arrange for other people to look after them.

Mrs Kasigwa warns her class that these two people were children, one a teenager and one younger, when they left – their memories will be different from those of their parents and from each other. Before the guests arrive, the students prepare some questions that they want to ask. Over two days, the visitors come and tell their stories. The students listen carefully and ask them questions. In the next lesson, Mrs Kasigwa and the class discuss the similarities and differences between the two accounts. They think about why the two visitors have different views on the events.

Mrs Kasigwa lists the key points that came out of their stories and also stresses that, when they were young, the journey to another part of the world might have been more exciting and less worrying than it would have been to their parents. She explains that while these oral histories may give students some understanding of the exile, they may not always be accurate, and the stories that different people tell may vary considerably. Mrs Kasigwa believes her class learned a valuable lesson in the uses and problems of gathering oral evidence of history.

#### Activity 3

- With your students, identify an important historical event (such as a local feud or uprising) that took place in your area in the past. If you can, find a short written text about it. You could use the news report in Activity 2 above.
- In preparing this activity, you need to gain an understanding for yourself (as a teacher) about what people in your community know about the uprising or event in question. These 'memories' are the oral stories that have been passed down from person to person. Identify some key people who your students could talk to at home or could come into school.
- Send your students out in groups to interview these older people. Ask the students to record ten key points made by each interviewee. (Make sure that students only go in groups and that they are safe at all times.)
- Back in class, ask your students to feed back their key findings.

- Ask each group to design a poster of the event, including the key events and using some of the visitor's comments to give a feeling of what it was like to be there.
- Display these in class.
- Discuss with your students whether they think they have enough clear evidence about what happened from the people they spoke to. If not, how could they find out more?

## Life Skills: Girls and boys

### 1 Investigating gender roles

### 2 Role plays

### 3 Discussing citizenship

**Key question for the teacher:** How can you use interactive strategies to discuss gender issues?

**Keywords:** gender; roleplaying; single sex groups; questionnaire; local experts

**Learning Outcomes for Teachers:**

**By the end of this section, you will have:**

- explored attitudes to gender through single-sex group work
- used reverse role play to highlight gender stereotyping
- used local experts and drama presentations to share ideas on gender issues

## Overview

There are certain behaviours in society that are often seen to be appropriate for either boys or girls, not for everyone. Some of these behaviours may negatively affect girls' and boys' self-esteem and aspirations, and not serve them well when it comes to learning in the classroom. Researchers note that girls are often shy of speaking up in class and sometimes fail to give answers even when they know them.

### Gender issues

- Gender describes those characteristics of men and women that are socially determined rather than biologically determined.
- Many of the students' reactions come from the way they have been socialised, which leads to an unconscious gender stereotyping.
- In the family, men are generally considered the heads, and decision-making is largely dominated by them.
- There are gender disparities in access to education, economic opportunities and health care.
- There is bias in favour of education for boys, coupled with issues of early pregnancy resulting in the high drop-out rate of girls from school.
- There are imbalances in employment by sector and sex. Within the agriculture sector, women are the major food producers.
- People are born male or female, but learn to be girls or boys who grow into women or men.

- People are taught what the appropriate behaviour and attitudes, roles and activities are for them, and how they should relate to other people. This learned behaviour is what makes up gender identity and determines gender roles.

### Issues in gender teaching

- Gender issues are sensitive and therefore rules should be strictly observed in order to ensure that discussion does not become just a fight between the girls and the boys.
  - You need to help both sexes appreciate the dilemmas and choices of the opposite sex.
  - It is important for students to understand how gender stereotypes are reinforced by behaviour in the family, in the school and in society.
  - You need to help your students develop strategies and skills to challenge unfair gender situations.
- 

## 1 Investigating gender roles

### Teaching Example 1

The teacher found the list of family rules from a previous lesson. She thought about how to explore the issues around the different treatment of boys and girls in the family and decided that drama would be a good method.

She organised the class into 'family' groups of different sizes, with students playing different family members. One group was only four people, one group was 11. She asked the groups to make up a play about a family to show how boys and girls are treated. She gave them the whole lesson to do this and went around each group to help and support them. She asked questions like 'So what would happen next?' 'How could you...?'

She asked them to bring in some items to help identify different people in the family and to rehearse their plays during break times. Over the next few lessons, each group in turn performed their play and afterwards the whole class discussed what they had seen. After watching all the plays and discussing them, they realised that girls had less freedom to choose than boys. They had a vote to decide whether this was fair, and the class agreed that boys and girls should be given equal opportunities and not be denied access to activities and work because of their gender.

## Activity 1

To help your students explore and explain their feelings concerning gender roles, this activity uses single-sex groups. Hand out the questionnaire here:

### Gender – what do you think?

You have ten minutes to complete the questionnaire.

Read each statement and draw a ring around the score to show how much you agree or disagree with the statement.

- 5 means you fully agree.
- 1 means that you completely disagree.
- If you really do not know, you can circle 3.

a	Boys are stronger than girls	1	2	3	4	5
b	Cooking is a girl's job	1	2	3	4	5
c	Girls don't have time to study because of their chores	1	2	3	4	5
d	Girls wake up before boys	1	2	3	4	5
e	At school, girls do more work than boys	1	2	3	4	5
f	Boys are more intelligent than girls	1	2	3	4	5
g	Education is more important for boys as they must support a family when they are older	1	2	3	4	5

- Each student shows their answers to their neighbour and they discuss.
- Organise the class into single-sex groups of between five and seven students.
- Each group prepares a list of all the different activities they do:
  - on schooldays;
  - at weekends;
  - during holidays.
- Groups present their list of activities – which you write on the board – making a list for girls and one for boys.
- Discuss the lists with the class. Ask about fairness. Ask why they think the activities are different.
- Ask the students to write an essay called 'How and why are girls and boys different from each other?' Ask them to include their own views. Younger children can draw pictures of activities they do and compare them with each other.

## 2 Role plays

Role playing can be a very powerful teaching and learning method – especially when dealing with sensitive topics in life skills or citizenship lessons. It is particularly useful when exploring issues of gender with your students. It can help students to speak more freely because they are talking about the behaviour of other people rather than their own behaviour.

It is important to explore where gender stereotypes come from. Students need to recognise when stereotypical behaviour is reinforced. Much of this happens in the family, but you may want to look at your own behaviour. Do you reinforce gender stereotypes in your classroom? Were gender stereotypes reinforced in your own family?

### Teaching Example 2

In this activity, we want you to prepare some role plays where the 'normal' roles are reversed.

#### Reverse role play: Mrs Seidu is late

Mr Seidu is busy cleaning the house. He is carrying the baby on his back because she will not stop crying. Annie, the five-year-old, is pulling at his legs because she wants something. Mr Seidu is obviously tired, but dinner is cooking on the small fire. He shouts at some older children outside to go and fetch more wood for the fire. He talks about his problems as he works. He is worried that there may not be enough food when his wife comes home from work at the council. Mrs Seidu arrives home.

She is a little drunk and she is angry that the dinner is not ready and the house is not clean. She shouts at Mr Seidu and they have an argument, then Mrs Seidu hits Mr Seidu and storms out of the house saying she is going to get her dinner somewhere else.

- Explain to your class about the activities and their purpose and about not laughing at people, but to think about the issues raised as they watch.
- After each role play, ask students to discuss, in mixed-gender groups, the following questions:
- What do you think about this situation?
- How did you feel when you were watching the role play, and why?
- What do our feelings show about how we see the roles of men and women in society?
- If the role play were the other way around, would you have felt differently?
- If you have younger students, you will need to make your role plays quite simple. Also, you may feel you need to guide their discussion afterwards, rather than asking them to discuss the questions in groups.

### 3 Sensitive work on gender violence

There are many forms of abusive behaviour and it is girls and women who are more often the victims. This does not mean that boys cannot also be abused; just that girls and women have tended to have had a more passive role in society, while males have been more dominant. If you are going to explore this area with your class, you will need to prepare very carefully and be able to support your students as some ideas may be very uncomfortable and challenging for them. You may also find that you uncover some incidences of abuse, and you must be prepared to support your students, sensitively and discreetly.

#### Gender violence

Studies from around the world show that gender violence is a major feature of school life for many adolescent students, especially girls. For girls in Sub-Saharan Africa, particular aspects of this violence include sexual abuse and harassment by older male students and male teachers, and, in the vicinity of the school, by 'sugar daddies' who seek sex in exchange for money or gifts. Boys as well as girls are exposed to regular verbal abuse and insults from both teachers and other students, and excessive corporal punishment from both male and female teachers. Boys too may be victims of sexual abuse.

Violent schools are breeding grounds for potentially damaging gendered practices, which remain with the students into adult life. Some may themselves become abusers. When school authorities fail to clamp down on gender violence, they send the message to students that it is a 'normal' feature of life. Failure by those in authority to investigate allegations and report offenders, lack of prosecution of teachers and others guilty of sexual misconduct, and lack of information for parents and students about their rights and available channels for complaints, allow such behaviour to continue unchecked.

Gender violence is a sensitive area to research because it involves sexual abuse, which is a taboo topic, one that we would prefer to ignore. Abuse of schoolchildren remains largely hidden because victims are reluctant to talk about their experiences to teachers and parents, and those in authority may find easy excuses for a lack of action. In Ghana, as elsewhere, people prefer to talk about abuse as being something experienced by others.

#### Girls are particularly at risk of violence and abuse because:

- women and girls occupy a subordinate status in society and are expected to be obedient and submissive – this makes it difficult for them to resist or complain;
- boys learn that masculine behaviour involves being aggressive towards females;
- girls who make allegations of sexual abuse by teachers and other men are often not believed;
- teachers often fail to take action against boys who use aggressive and intimidating behaviour towards girls;
- girls have fewer opportunities to earn casual income than boys, so poverty pushes some girls into having sex as a means of paying school fees or meeting living expenses. Engaging in transactional sex or sex with multiple partners increases the risk of HIV and AIDS.



**Gender violence includes:**

- sexual harassment and abuse;
- bullying, intimidation and threats;
- verbal abuse, taunts and insults;
- physical violence and assault, including corporal punishment and other physical punishments;
- emotional abuse (e.g. tempting someone into a sexual relationship
- under false pretences such as promises of marriage);
- psychological abuse (e.g. threatening to beat up a student or fail them in an exam).

The government of Ghana has made a concerted effort to increase enrolments at primary and JSS levels, especially among girls. The establishment of a Girls' Education Unit in the Ghana Education Service and the appointment of Girls' Education Officers at the regional and district levels to oversee improvements in girls' participation are significant developments. Despite these efforts, girls continue to be enrolled in fewer numbers than boys, and to have higher dropout rates and lower achievement. It may be that abusive and intimidating behaviour in schools undermines efforts to improve girls' participation.

There is an urgent need for a more coordinated, proactive and system-wide response to combat the problem of school-based abuse. The study revealed weaknesses in terms of linkages between the district education office and the national level response to violence and abuse in the school environment. A holistic approach is required, working with all categories of stakeholders, e.g. teachers, parents, students, government officials in education, health and social welfare, the police, child protection agencies and NGOs working with woman and children. The example of one head teacher's misconduct is informative, as it shows how difficult it still is for communities to gain redress, despite efforts to delegate powers of educational decision-making to regional and local bodies and to give political voice to the people through district assemblies and bodies such as school management committees.

**1. Schools should:**

- develop specialised curriculum inputs on abuse within a human rights framework, and provide gender-based training courses, workshops and materials for all teachers;
- provide students with gender awareness training to eliminate negative perceptions about girls and make boys aware of the negative impact of aggressive behaviour, e.g. through clubs;
- ensure that students receive information on child abuse, children's rights and protection through the life skills curriculum and other materials; ensure that they know how to report cases of abusive actions, whether to parents, teachers or adult relatives;
- teach life skills and Geography and Citizenship through methods that engage students in discussion and reflection on their own experiences. Skilled facilitators are needed;
- engage peer educators to visit schools to talk about sexual violence and other issues that concern students.

## 2. Head teachers and teachers

School head teachers are crucial in ensuring that students learn in a supportive environment. Less authoritarian schools are not necessarily ones with poor discipline. Strong leadership is key. Studies show that schools with high attendance and achievement are those where expectations of both teacher and student behaviour are high, where the school culture is supportive of both (and includes teacher professional development) and where regulations are enforced fairly and firmly.

### School head teachers can work with teachers to:

- create a student-friendly environment that is conducive for learning, by working with students, especially girls, supporting their personal development and protecting their rights;
- attach importance to gender equity in a whole-school approach;
- take effective action against cases of abuse and bullying in the school, confront the issues and deal with them as serious disciplinary matters;
- consider setting up a Student Council with student representation and involvement in decision-making;
- foster more trusting relationships between students and teachers. The research shows that students distrust their teachers and rarely confide in them;
- strengthen G&C teaching so that it engages students with the issues and develops understanding. A traditional didactic approach is not suitable. Allow space for reflection, analysis and open discussion of taboo topics. Life skills should promote consent, negotiation and consultation in adolescent relationships rather than power domination and control.

## 3. Parents

### Parents and carers should be encouraged to:

- listen to what children tell them and refrain from blaming girls when they make allegations;
- provide their children, especially girls, with basic school items;
- refrain from using abusive language towards children;
- show interest in their children's progress in school, monitor their attendance and discuss their education with teachers;
- refrain from entering into negotiations for compensation with teachers who have made their daughters pregnant.

Adapted from: *Gender Violence in Schools: Ghana 3 Newsletter March 2004*

### Teaching Example 3

- Mrs Yarboi's Primary 5 class had been working for some weeks on gender stereotypes and how they can negatively affect girls' progress in the classroom and in life. It had been a difficult time for Mrs Yarboi because the boys felt that they liked the status quo and did not see that it needed to be changed. She decided to get in some expert help and contacted a local NGO working in rural development projects in their town. She had met a lady called Amina who was their gender specialist.
- Amina came to the school and talked to the class about abuse. They identified that abuse can be mental as well as physical and sexual. Amina told the class of some stories of young people who had been abused by their parents, by other family members and even by people from their religious group. She also talked of ways in which these students had been helped and what organisations there are to help people. It made some of the students very upset that people can behave that way. During the talk, Mrs Yarboi noticed that two girls started crying. After the visit from Amina, Mrs Yarboi asked the two girls if they would like to go and talk to Amina and she made appointments for them. In the next lesson, Mrs Yarboi asked her students to write about abuse and explain their feelings about it. From this, she was able to see how much each student had understood and was able to see how they had reacted to the stories Amina told.

### Activity 3

- Having explored some issues about gender with your class, suggest to them that they share what they have found out with the rest of the school.
- Ask them how they could do this. Could they:  
Produce a play?  
Do an assembly?  
Write an information book?  
Write a poem?

You could do more than one if you have a large class. Students could choose which group they join.

- Once they have decided what they want to do, ask them to plan what to say and the best way to say it. Remind them to be sensitive to their audience and careful how they present their ideas.
- Give them time to draft or practise what they are doing. When ready, allow them to present their play, book, poem or assembly to the class for constructive feedback, so that they can make any changes before they do the real performance or presentation to the school.
- After the event, allow your students the opportunity to assess the impact of their actions.
- Think how you can support your students and build on this task.

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No. 7

## Middle Primary

<b>Section 1 Literacy:</b>	Understanding different kinds of information
<b>Section 2 Numeracy:</b>	Working with data sets
<b>Section 3 Science:</b>	Exploring solids
<b>Section 4 Social Studies:</b>	Using dance for learning
<b>Section 5 Life Skills:</b>	Investigating our place in the community

- Additional Resources:**
- Group work in your classroom
  - Working with large/multigrade classes

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## Literacy: Understanding different kinds of information

1 Understanding what you read

2 Developing visual literacy

3 Summarising what you read

**Key Question for the teacher:**

How can you develop your questioning skills to help students use information texts effectively?

**Keywords:** information texts; comprehension; summary; questions; assessment

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- developed your ability to create questions and tasks that encourage close reading of texts and personal responses
- explored ways to teach students how to read and write about information presented in different forms
- helped your students develop the skills needed to summarise texts
- used these strategies to assess learning

## Overview

In the 'information age' we all need to be able to read and respond to information presented in many different forms. Reading information from a chart or diagram requires different skills from reading a story.

As a teacher, your role is to help students understand what they read, summarise the main ideas in a text and respond with their own ideas. While it is important for students to be able to write answers to questions on what they have read, some will produce better work if they have opportunities to demonstrate what they understand through other activities, e.g. making posters or pie charts.

This section suggests ways to help students develop their comprehension and summarising skills.

# 1 Understanding what you read

Comprehension exercises are very common, but how well do they extend students' reading skills?

Teaching Example 1 demonstrates that you need to think very carefully about whether the 'reading comprehension' questions in textbooks really help you to know what students have understood from their reading. You need to create questions or activities that require students to read information texts carefully. Activity 1 gives you some examples to try out and use as models when designing your own questions and activities. The additional resource Using questioning to promote thinking gives further ideas.

## Teaching Example 1

At a workshop in Lusaka, Zambia, teachers of English as an additional language read a nonsense text and answered questions on it. The first sentence in this text was: 'Some glibbericks were ogging blops onto a mung' and the first 'comprehension' question was 'Who were ogging blops onto a mung?' Every teacher knew that the answer was 'some glibbericks'. In their discussion, they realised they could give the 'correct' answer because they knew that in English, 'some glibbericks' was the subject of this sentence. They didn't need to know who or what a glibberick was, in order to give the answer!

After the discussion, they worked in small groups to design questions and tasks that would show them whether or not students had understood the texts on which these questions and tasks were based. They learned that questions should not allow students to just copy information from one sentence in the text. They designed tasks in which students had to complete a table, design a poster or make notes to use in a debate as ways of showing what they had learned from reading a text.

They reflected that the questions they asked and the tasks they set meant they could better assess their students' understanding.

## Activity 1

Read '**Text on litter**'. Make copies of the article and tasks or write the paragraphs and tasks on your chalkboard.

- Cover them over.
- Before students read the article, ask some introductory questions. Your questions should help students to connect what they already know to the new information in the article. If your students are young or you need to read the text to them, you could write their answers on the board.
- Next, uncover the article and tasks, and ask students to read the article in silence and write answers to the tasks. When they have finished, collect their books and assess their answers.
- Return the books and/or give the whole class oral feedback on what they did well and discuss any difficulties they experienced.

**Text on litter****Litter**

Litter is any kind of 'left-over' or waste product that people do not put in its proper place, such as a rubbish bin. People who simply drop waste such as fruit peel or empty cans on the ground are guilty of littering. We sometimes call these people litter bugs.

**Litter does not just happen**

People are responsible for litter. An item of waste, such as the wrapping from a bar of chocolate, is not litter if it has been placed in a rubbish bin. It becomes litter when someone drops it on the ground, leaves it lying on the ground where he or she has been sitting or throws it out of a window.

**Litter can be dangerous to people**

Broken glass and sharp rusty cans that are left in places where people walk – and especially where young children play – can cut them. These cuts can lead to serious infections. Fruit and vegetable waste is sometimes slippery and if people step on it they may fall and break an arm or a leg. Litter can be a cause of road accidents when drivers try to move their cars or trucks out of the way of sharp objects that could cut their tyres. Plastic bags and pieces of cardboard sometimes blow onto the windscreens of vehicles and stop drivers from seeing clearly.

**Litter can be dangerous to animals and birds**

Glass and cans may also cut the feet or mouths of domestic or wild animals while they are grazing. Nylon fishing line that is thrown on the ground or into water can get wrapped around the beaks or legs of birds and cause them to die because they can no longer move or eat. Sea creatures, such as seals and sharks, may get caught up in old fishing nets. If they cannot free themselves they will also die.

**The dangers of plastic**

Plastic litter causes problems for fish, birds and people. In rivers and the sea it can be harmful to fish because they can get caught up in it and not break free. Plastic bags on beaches have led to the deaths of many seagulls. Even loosely woven bags, which vegetables and fruit are sometimes packaged in, can be harmful to birds. They get inside these and cannot find a way out, as the material is very tough. Pieces of plastic or plastic bags can get caught in the outboard motors of boats and can cause the motor to stop working.

If we want to keep our country clean and beautiful and to protect our people and our wildlife, we must not throw litter. It is not difficult to throw a can, bottle, plastic bag or piece of paper into a bin rather than on to the ground.

Notice that the answers to questions 1 to 5 require students to read the text carefully whereas questions 6 and 7 require them to use their own ideas.

Adapted from Taitz, L. et al, New Successful English, Learner's Book, Oxford University Press



**Writing tasks based on Litter**

**1. List seven kinds of litter that are mentioned in the article.** (To answer this question successfully students need to find information in several different paragraphs, so they have to read carefully.)

**Answer:** Fruit and vegetable peel, glass, cans, plastic, fishing line, paper, cardboard.

**2. Explain what the word litter means.** (Students could copy an answer from the first paragraph of the text without really understanding what the word means but the next question can help you to check their understanding because you are asking them to use a word or words from other languages that they know – for many students their home language.)

**Answer:** Litter is waste material that people do not put in its proper place (such as a rubbish bin.)

**3. What is the word (or words) for litter in any other languages that you know?**

**Answer:** Words from languages used in your class.

**4. List three kinds of litter that are harmful to birds.** (Birds are mentioned several times in the passage, not just in the paragraph with the heading that includes birds. Students need to find each reference to birds and then link this to different types of litter and the problems these cause.)

**Answer:** Nylon fishing line, plastic bags, woven fruit and vegetable bags.



**5. In your own words, describe three of the ways in which people can be harmed by litter.** (Students should use the sub-heading to guide them and then try to express the content of the paragraph in their own words rather than just copying from the paragraph. This will help you to see if they have understood what they have read.)

**Answer:** People can cut themselves on broken glass or sharp cans. People can slip on fruit or vegetable waste and break an arm or leg. People can be involved in road accidents when drivers try to avoid litter in the road or when they can't see because of litter blown onto the windscreen. People on water in motorboats may not be able to safely reach land if the motor of the boat is damaged by plastic. (Four ways are mentioned here.)

**6. Do you agree with the writer that it is not difficult to throw waste into a rubbish bin?** Give a reason for your answer. (This is a personal response question that encourages students to think critically and express their own ideas.)

**Answer:** This is a question to which students should be encouraged to give a variety of responses. For example, it is not possible to put waste in a rubbish bin if there are no bins in the school grounds or in the streets.

**7. Suggest what else can be done with waste products such as glass, paper, plastic, fruit and vegetable peels.** (This is also a personal response question and encourages class discussion about the environmental topic of recycling.)

**Answer:** This task gives you and the students an opportunity to discuss various forms of recycling. For example, vegetable and fruit peels can be put into a compost heap or dug straight into garden soil in order to enrich the soil. Plastic strips can be woven into useful mats for the floor. In some towns and cities, glass, cans and paper or cardboard can be taken to recycling facilities and people can even be paid for what they collect and bring to these places.

## 2 Developing visual literacy

Think about all the kinds of information texts that you read. Whether these are in the pages of textbooks, in advertising leaflets or on computer screens, they frequently include diagrams, charts, graphs, drawings, photographs or maps. To be successful as readers, you and your students need to understand how words, figures and visual images (such as photographs or drawings) work together to present information. Many writers on education now stress the importance of visual literacy. Learning how to read and respond to photographs and drawings is one part of becoming visually literate. Reading and responding to charts, graphs and diagrams is another. Bar and pie charts are some of the easier charts to understand and to make in order to summarise information.

### Teaching Example 2

Miss Maria Bako likes to make each student in her Primary 6 class of 60 students feel special. In her classroom she has a large sheet of paper with the month and day of each student's birthday. On each birthday, the students sing Happy Birthday to their classmate. One day, a student commented that in some months they sing the birthday song much more often than others. Maria decided to use this comment to do some numeracy and some visual literacy work on pie charts.

First, she wrote the names of the months on her chalkboard and then she asked students to tell her how many of them had birthdays in each month. She wrote the number next to the month (e.g. January 5; February 3, and so on).

Then she drew a large circle on the board and told students to imagine that this was a pie and that as there were 60 in the class there would be 60 sections in the pie, one for each student. The sections would join to make slices. There would be 12 slices, because there are 12 months in a year. Each slice would represent the number of students who had their birthday in a particular month, but each slice would be a different size. She began with the month with most birthdays – September. In September, 12 students had birthdays.

Students quickly got the idea of making 12 slices of different sizes within the circle to represent the number of birthdays in each month as a percentage of the class. They copied the birthday pie chart into their books and made each slice a different colour.

The class talked about other information they could put into a pie chart and decided to explore how many students played different sports, how many supported each team in the national soccer league and how many students spoke the different languages used in their area.

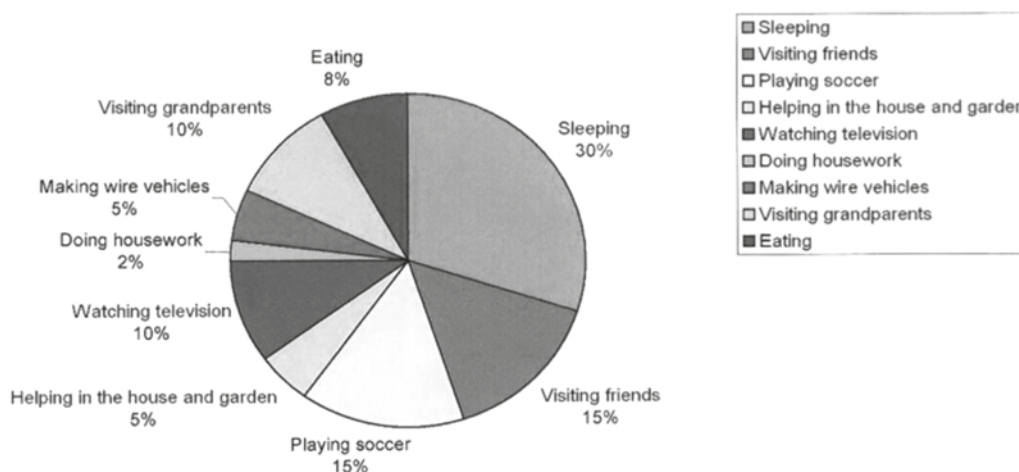
### Activity 2

- Copy the pie chart onto your chalkboard.
- Ask students to suggest why this is called a pie chart.
- Write out the questions (part b) about the pie chart on your chalkboard and ask students to work in pairs to answer them.

- Discuss the answers with the class.
- Use your chalkboard to show students how to turn these answers into a paragraph about Iredia's weekend. Ask students to draw the pie chart.
- For homework, ask students to draw their own pie charts to show how they usually spend their time at weekends.
- After checking the homework, ask students to exchange their chart with a partner and to write a paragraph about their partner's weekend.
- What have you learned from these activities?
- What relevant activity could you do next?

### A pie chart

#### a) A pie chart: How Iredia spends his time at weekends



#### Basic information

30% sleeping;  
 15% visiting friends;  
 15% playing soccer;  
 5% helping in the house and garden;  
 10% watching television;  
 2% doing homework;  
 5% making wire vehicles;  
 10% visiting grandparents;  
 8% eating.

#### b) Questions on the pie chart

1. What does the pie chart tell us? (How Iredia spends his time at weekends.)
2. What does Iredia spend the most time doing? (Sleeping.)
3. What does he spend the least time doing? (Homework.)
4. What does he do for the same amount of time as he watches television? (Visits grandparents.)
5. What does he do for the same amount of time as helping in the house and garden? (Making wire vehicles.)

6. When he is awake, what two things does Iredia spend the most time doing? (Visiting friends and playing soccer.)
7. If you made a pie chart to show how you spend your weekend, would it be similar to Iredia's or different? (Many possible answers.)

You could help students write about their partner's weekend by designing a writing frame with them, or by agreeing an example paragraph together. Here are examples for use to use or adapt.

#### **Writing frame for describing a partner's weekend**

X's weekends  
 X likes/doesn't like weekends...  
 He/she spends the greatest part of the weekend...  
 He/she usually... and sometimes...  
 On Saturday mornings...  
 On Saturday afternoons...  
 On Saturday evenings...  
 On Sunday mornings...  
 On Sunday afternoons...  
 On Sunday evenings...

#### **c) Paragraph about Iredia's weekends**

Iredia loves weekends. He enjoys staying in his warm bed much later than on school mornings and taking his time over meals with the family. He spends the biggest part of his weekend visiting friends and playing soccer. He usually watches television with his family in the evenings and sometimes stays up very late to do this. On Saturday mornings he and his sisters help their parents with cleaning the house or working in the garden. After they have finished, his sisters like to go to the shops but Iredia either goes to his friends or spends some time making wire cars and trucks that he and his friends can race. Sometimes he takes his cars and trucks to show his grandparents when he visits them on Sundays. Usually he needs to find some time on Sunday evening to do his homework for Monday.

*Some of the information in this paragraph cannot be gleaned from the chart. The author has made up bits based on their experience and the data given. You may wish to explore this with your students. Ask them what they can say from the chart and which parts are made up.*

#### **d) What you and your students can learn from these activities**

- To read information on a pie chart.
- To compare one item of information on the chart with another.
- To make a pie chart in order to summarise information.
- To understand that the same information can be presented in different ways.
- To use information from a pie chart to write a paragraph.
- To learn 'time expressions' (e.g. 'usually', 'sometimes').

### e) Ideas for further activities

To consolidate students' learning about pie charts, they could make another one – perhaps about class birthdays or about sports teams they support or languages they speak. You could also decide to show them other ways of representing information such as a bar graph or a table if you have information about these. Your colleagues may be able to assist you here.

## 3 Summarising what you read

Learning to find and summarise the main ideas in the chapters of textbooks and other study materials becomes increasingly important as students move up through the school. These skills take practice to acquire.

The **Activity 3** and '**Text on the baobab**' give examples of ways to help students learn how to summarise information texts. You will need to do such activities many times. For older students, you could ask colleagues to show you what the students you teach are required to read in other subjects such as social studies or science. You could then use passages from social studies or science textbooks for summary work in the language classroom by following the steps in the **Activity 3**.

### Teaching Example 3

The students in Mal Adamu Jibo's Primary 6 class were anxious about the forthcoming examinations. They told him they didn't really understand what their teachers meant when they told the students to 'revise' the chapters in their textbooks. Adamu decided to use an information text from their English textbook to give his class some ideas about how to find and write down the main points in a text.

He asked his students to tell him the purpose of the table of contents, chapter headings and sub-headings in their textbooks. It was clear from their silence that many students had not thought about this. A few were able to say that these give readers clues about the main topics in the book. Adamu told the students that in order to revise a chapter; they should write the sub-headings on paper, leaving several lines between each one. Then they should read what was written in the textbook under one sub-heading, close their books and try to write down the key points of what they had just read.

Next, they should check their written notes against the book and make changes to their notes by adding anything important they had left out or crossing out anything they had written incorrectly. Adamu said that some students prefer to make notes in the form of a mind map in which there are connections between important points. He showed them how to do this.

Finally, he reminded them to ask their teachers to explain anything they had not understood. Adamu also told them how he made notes of what he found out about his students and their learning to help him plan more lessons.

### Activity 3

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Before the lesson, copy the text on the baobab tree or write it on your chalkboard. Try out the activities yourself first.

- Showing students some newspaper and magazine pages, ask why the articles have headlines and what they tell the reader. Ask them to suggest why their textbooks have headings and sub-headings.
- Ask students to read the information text about the baobab tree and to work in pairs to decide which paragraphs are on the same topic.
- Ask them to write a heading that summarises the paragraph(s) on each topic.
- Ask some students to read out their headings and write these on the chalkboard.
- Agree which are the best headings for each set of paragraphs on the same topic.
- Leave the 'best' headings on the board with some space under each one. Ask students to suggest key points from the paragraphs and record these.
- Show students how to link headings and key points in a mind map to help them remember about baobab trees.

#### Text on the baobab

The baobab is a very unusual tree. Some people think it is ugly because it is fat and for much of the year it has no leaves. It does not even seem to grow the right way up. In fact, some people who live in the land of the baobab say that it grows upside down with its branches in the earth and its roots in the air.

The baobab does things differently from other trees. Most trees use bees and birds to carry pollen grains from one tree to another so that the trees can be fertilised and make new flowers, fruit or nuts. The baobab uses bats. In early summer this tree produces big flowers with white petals. The flowers only open at night when the bats appear. The bats suck the nectar and transport the pollen from one tree to another on their wings and bodies.

Baobabs live for a very long time. Some of the largest baobabs may be over 3,000 years old.

The tree has many uses. In the past, some of the Khoi and San people of southern Africa used baobabs for their homes. They set fire to the soft insides of the trunk, making a hole big enough to live in. Even with this big hole in the trunk, the tree continued to live.

The bark of the tree has a number of uses. It can be used for making soft floor mats, paper and thread. The fibres of the bark make very strong rope.

Other parts of the tree also have their uses. If the roots are mashed, they make a soft porridge. The soft insides of the tree provide moisture for thirsty animals during the dry season. If the seeds are soaked in water for a few days, they produce a medicine that is very good for fevers. If the seeds are dried and ground up, they make a good but rather bitter coffee. If the leaves are boiled they become like cabbage and can be eaten.

There are many stories about the baobab. The people in Venda in southern Africa say that the trees were once the hiding place for evil spirits. Then a kind god came and tore the trees out of the ground and replanted them upside down. As a result, the evil spirits could no longer hide in the trees.

Other people believe that if you suck the seeds you will be safe from crocodiles, and if you drink a drink made from the bark you will grow to be big and powerful.

The baobab is a truly amazing tree. It is one of the marvels of Africa.

### **Suggested sub-headings for *The Baobab* text**

Paragraph 1: What a baobab looks like

Paragraph 2: How pollen is transported between baobab trees

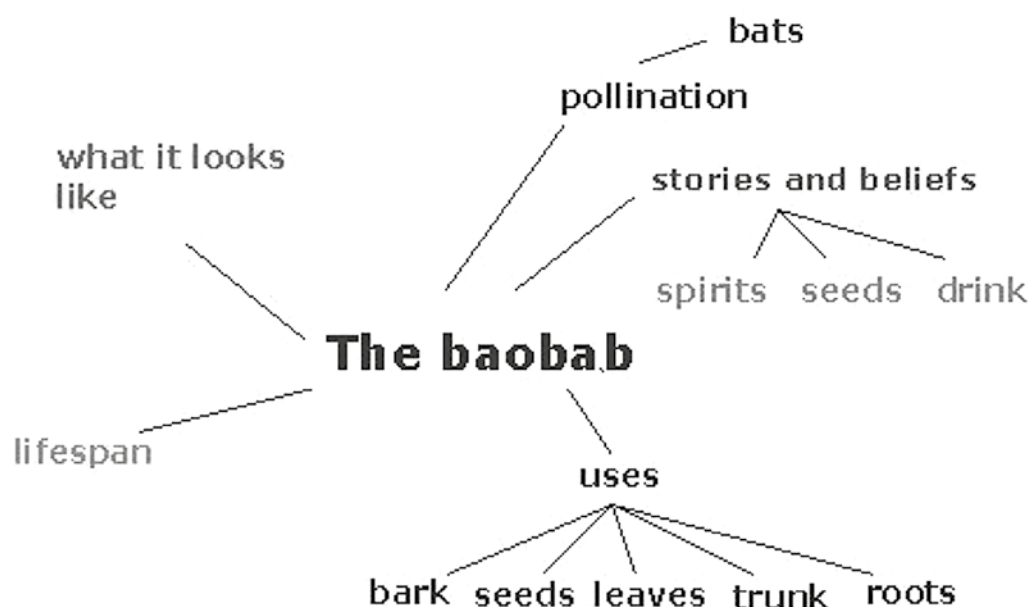
Paragraph 3: Lifespan

Paragraphs 4, 5, 6: Uses of the baobab

Paragraphs 7, 8: Stories and beliefs about baobabs

Note: There is no new information in the final paragraph. It provides a comment from the author, giving his or her opinion of this tree.

### **A mind map summary of *The Baobab***



Adapted from: Ellis, R. & Murray, S. Let's Use English, Learners' Book 5



## Numeracy: Working with data sets

- 1 Collecting data
- 2 Interpreting and creating charts
- 3 Understanding data

**Key Question for the teacher:**

**How can students collect, collate and understand data?**

**Keywords:** survey; data collection; data analysis; interpretation; pie chart; bar chart; pictogram; histogram; line graph; scatter graph

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- be familiar with a range of different data sets that students can usefully collect for analysis
- have developed your knowledge of graphically representing data
- have developed and used a structured question approach to assess your students' understanding

## Overview

There are three core aspects of working with data: collecting data (using what students can do already and new methods to count things); recording data; analysing and presenting data. In all these activities, students themselves must play the major role.

The focus in this section is practical: students will collect data themselves, decide how best to represent it and analyse it. Through whole-class discussion, decisions are made by the students themselves, with guidance from you.

This section will help you plan and carry out these activities with your students, working with real 'first hand' data gathered in the classroom.

# 1 Collecting data

Students are often more interested in working with data that they have collected themselves – they know what the numbers are describing, and where the numbers came from. Surveys help students to understand the concept of data collection and students are encouraged to continue collecting interesting data outside school. Organising your class into groups so that everyone is able to contribute is important. Whole-class discussion can be used to share the data the different groups have collected.

## Teaching Example 1

Mrs Kazulu in Uganda decided to have a completely practical lesson and divided her class into three groups (if you have a big class you may need more groups) – Her students were going to undertake small classroom surveys to collect data. She chose surveys that were relevant to the students themselves, asking one group to find out the number of siblings in their families, another to find out the number of letters in their names and the third to find the number of students from different districts in their class.

Mrs Kazulu drew a template like the one shown below on the board. She gave her students time to copy her chart into their exercise books. She then asked them to work, one group at a time, going round the class and asking their survey questions in pairs.

Later, all groups shared their data and were asked to display it in some way in the classroom. Mrs Kazulu would use the data collected in future lessons.

## Activity 1

Before you begin, show your class how to do a tally. Ask them why they think this might be a useful technique.

Explain to your class that they are going to do a survey about birthdays. Ask them to suggest the best way to organise the list of the different months of the year. Then go round the class, asking each student to call out the month of their birth and let each student record the information as it is being called out.

Next, ask one student for each month to count up the birthdays and put in the total.

You could extend this work by setting an individual homework task, such as to survey the favourite sport or drink of family or friends. In the next lesson, discuss what the data tells you. Ask your class to think of other data they could collect like this and let them have another go at practising these skills.

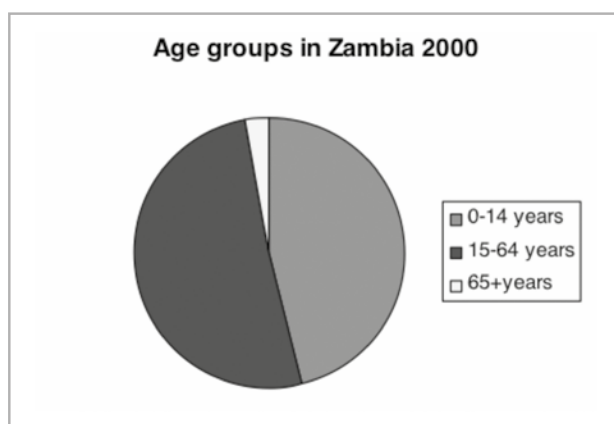
What other ways could you organise your students to collect such data?

### Tally chart

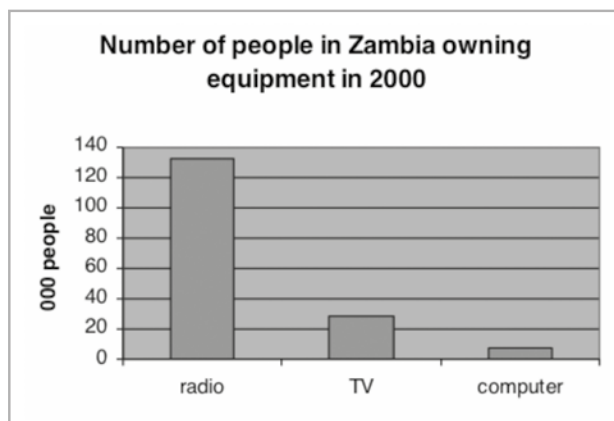
Making tally marks is a useful way to quickly count things in different categories. It involves making a mark or placing a store for each item counted in the particular group. The chart below shows a chart started for siblings in a class of 56 Primary 4 students. Each bundle of marks IIII represents five children.

Name	Brothers	Sisters
Mukasa	II	III
Dembe	IIII	I

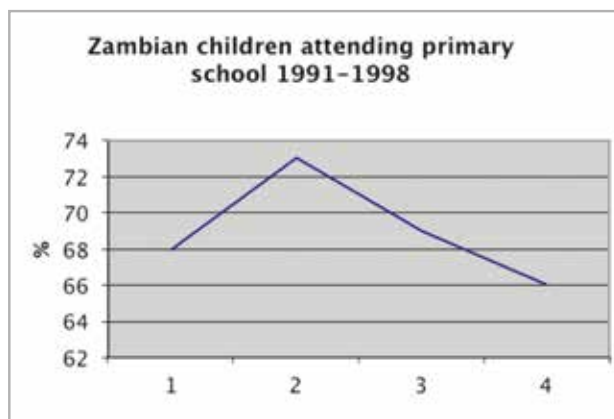
### Pie Chart



### Bar Chart



### Line Graph



## 2 Interpreting and creating charts

Collecting data is only part of some investigations, as it may need to be analysed and displayed to understand it better or to share the information with others. Students can show their data by using pictographs, pie charts, bar graphs, histograms or line graphs. It is important that students know which chart or graph is appropriate for which set of data, and so your examples should be clear.

Again, you will use data from the students' own experiences but it is also a good idea to bring examples to class from newspapers, magazines and government publications.

Helping students understand the different kinds of chart takes time and you will need to plan several activities on each method to develop their understanding.

### Teaching Example 2

Mrs Kunda teaches at a school in Mbale. She wanted to make sure her students could interpret simple charts before going on to produce charts of their own. She brought to schools some examples of pie charts, bar charts and line graphs.

First, she showed the class one of each type and, using some questions she had prepared beforehand, she checked that the students were able to understand the information that each one presented.

She then put the class into groups and gave out other charts. She wrote a few simple statements on the board, and told the groups to decide whether each one was true or false, according to the information in the charts. As the groups did the activity, Mrs Kunda walked around and listened.

When they had finished, Mrs Kunda checked the answers with the whole class, and explained one or two things that they had found difficult. In doing this, she introduced the idea that different types of chart are suitable for different types of information. Then she praised the class for their good work.

### Activity 2

- Write the words 'pie chart', 'bar chart' and 'line graph' on the chalkboard and remind students what each type looks like.
- Copy the data found below on the board, and get students to suggest which type of chart (pie chart, bar chart or line graph) would be most suitable in each case for presenting it. Use questioning to indicate the main features and uses of each type of chart.
- For each set of data, construct a chart on the board with the help of the students. (Draw the main outline and ask students to come out in turn and add to the chart. Ask the class for feedback each time.)

In the next lesson, give out similar data and ask students to make charts individually.

**Data sets****Set 1**

Proportion of Zambian men employed in 2005: 86%

Proportion of Zambian women employed in 2005: 74%

People in rural areas of Zambia who can get safe water: 28%

**Set 2**

Main language groups in Zambia, 2000

Bemba 30.1%

Nyanja 10.7%

Tonga 10.6%

Lozi 5.7%

Chewa 4.9%

Nsenga 3.4%

Tumbuka 2.5%

Numbers of people in main towns 2000

Lusaka 1,085,000

Ndola 374,000

Kiywe 364,000

Chingola 147,000

Mufulira 122,000

**Set 3**

Students attending secondary school 1991–1998

1991: 20%; 1993: 23%; 1996: 20%; 1998: 23%.

Visitors to Zambia 1990–2001

1990: 141,000; 1995: 235,000; 2001: 492,000

### 3 Understanding Data

This final part is on analysis and interpretation of data once it has been displayed. It will enable you to assess the success of your teaching (for more information, see the additional resource **Assessing learning**).

Using information from the science teacher or another subject teacher shows that data collection and analysis is important across the curriculum; it also allows you to work with other teachers and gain support. **Teaching Example 3** and **Activity 3** show how your students can use new data and how you can use this to assess their understanding.

You may decide to use a structured question approach for your assessment, so that you can find out exactly how much each of your students has learned.

#### Teaching Example 3

Mr Kaluba wanted to make sure his students were confident at handling and interpreting data. He also wanted to show them what information they could get from their charts.

He asked the head teacher to provide numbers of students in each class in the school and asked his students to use this to draw a chart that showed the data well. He asked students to work in pairs to help each other with this task. Each pair had to agree on the best kind of chart to use.

Mr Kaluba asked them to note the title, the units used, the scales, what the axes represent, the highest and lowest points and any patterns in the chart, and to write a few sentences to explain what the chart showed them.

Mr Kaluba was pleased with their response and felt that his lesson had been successful. He displayed the students' charts on the classroom wall.

#### Activity 3

To assess how well your students analyse and interpret data, you can use a structured question approach with questions that gradually get harder. This means starting with easy ones that all students can answer, moving on to less easy ones that can be answered by the majority of the students and including a last one which can be answered only by the more able students.

- Write the data on the board or on a piece of manilla paper.
- Write the questions on a separate sheet of paper.
- Show the chart and questions to the class. Explain they are to work on their own, drawing a chart using the data and then answering as many questions as they can.
- Give the class one lesson to do the activity.
- Collect in and mark their work.

Next lesson, give feedback to the class about what they did well and where they need support and say how you will do this.

**Structured questions**

A structured question is one that has three parts.

- Part 1 is easy and can be answered by all students.
- Part 2 is a bit more difficult but can be answered by the majority of students.
- Part 3 is more difficult and tests the more able students.

Here is an example.

Alice and Mary are having an argument. Alice says that it is hotter this week than it was last week. Mary thinks it was hotter last week. Here are the temperatures for the two weeks.

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Week 1	22 °C	21 °C	19.5 °C	23 °C	23 °C	23.5 °C	22 °C
Week 2	18 °C	19 °C	23.5 °C	25 °C	26 °C	24 °C	22 °C

- Draw the temperature for both weeks on the same line graph, using different colours for each week. (Part 1)
- Which week showed the highest temperature? (Part 2)
- Which week showed the lowest temperature? (Part 2)
- Find the mean temperature for each week. (Part 2)
- Find the range of temperatures for each week. (Part 2)
- In some ways Alice is right and in some ways Mary is right. Explain. (Part 3)

*Original source: The New Uganda Primary Mathematics Student's Book 7*

## Science: Exploring solids

**1 Solids - Where do they come from?**

**2 What do metals do?**

**3 Making irreversible changes**

**Key Question for the teacher:**

**How can you encourage student inquiry to explore properties and changes in solids?**

**Keywords: solids; inquiry; properties; investigation; rust; discussion**

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- **supported students as they carry out their own science investigations (inquiry-based learning)**
- **explored different ways to present the results of their investigations**
- **used informal discussion with your students to share ideas and develop interesting areas of inquiry**

## Overview

The emphasis in this section is on one state of matter – solids. We consider how to encourage students to inquire into the origin of the solids they encounter daily. You will help them learn about these solids and communicate what they learn to each other.

To do this we use an approach sometimes known as inquiry-based learning – learning by finding something out for yourself. This is very different from being told something, because the students have to wrestle with their own ideas and explain their thinking.

For solids we can ask: ‘Where does this come from?’ Or: ‘What are its properties?’ And: ‘Can it be changed?’ (This often involves much more active learning than simply listening and hoping to remember. And if we don’t know – or can’t find out yet – there is always the possibility that one day, we will be thrilled to come across the missing information.)

Some solid substances are found naturally; others are manufactured. For example sand is a natural material and glass is a manufactured material. In fact, glass is manufactured from sand. Do you know what the actual process involves? Try to find out, and you are doing inquiry-based science.

Similarly, wood is a natural material obtained from trees, and paper is made from wood. Certain wasps chew wood into pulp to process it into ‘paper’ that they



use to build the cells of their nest. People have discovered how to do the same thing. You could extend your inquiry and experiment with making your own paper from pulped wood.

Good starting points for this approach are informal discussions where students share ideas, raise questions and develop threads of inquiry that interest them. **Teaching Example 1** shows how one teacher encouraged inquiry in her students. In **Activity 1**, you take this further with a class display and accompanying books made by your students.

## 1 Solids - Where do they come from?

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### Teaching Example 1

Whenever Jessica in Kampala, Uganda, had a little spare time in the school day, she played 'the wondering game' with her class (or the children left behind while others went to choir practice). One student would have a turn to pick up something – anything – and ask, 'I wonder where this came from?' Then everyone would put their heads together and share what they knew and thought, agreeing and disagreeing and building ideas as they talked. It was very informal. But it always amazed Jessica that students would come back some days later with more information from home or having noticed something in a book or magazine.

The wondering game seemed to act like a key, opening the door to students' curiosity. She wondered if there was a way to make this part of formal science lessons.

## Activity 1

Interesting materials gathered by students can be displayed in a classroom 'science museum'. Agreed facts for each material are written on cards to support the display, just like in a real museum. The display grows throughout the term.

When you have enough different materials, ask pairs of students to make little information books to add to the display.

Make sure that you give your students time and help to write drafts and plan the layout of the books they make, so that they can be really proud of their work. This also gives you a chance to ensure that the scientific information is accurate. Try to encourage titles like: The story of glass; How cement is made; From trees to books; Where does salt come from? How to make your own glue.

Older students could make the books for younger students to read.

What differences did you notice between the first drafts and the finished books? Did you ask students to comment on each other's books?

## 2 What do metals do?

Why is it that some solid objects feel cold to the touch and others don't? Think of a wooden spoon and a metal spoon. When we first pick them up off the table, they must be at the same room temperature – yet the metal spoon feels colder.

Some materials carry, or conduct, heat better than others. Metals have the property of being good thermal conductors. The metal spoon conducts heat away from our hand and hence feels colder. The wooden spoon is a poor thermal conductor – it is a good thermal insulator.

### Teaching Example 2

On a Monday, Mrs Kapere brings from home a range of different metal items and displays them on her table at the front of the class. They include a gold ring, old silver and copper coins, iron, steel and brass nails and screws, and wires of different sorts.

While the rest of the class is busy with other work, she gathers the group that will inquire into and investigate the properties of metals around her. They handle and discuss what is displayed. They argue about whether metals bounce. They start to raise questions: Are all metals shiny? Which is the hardest/strongest metal? Is tarnishing and rusting a property?

Mrs Kapere also suggests some questions: Do all metals conduct electricity? What about magnetism? What are alloys? They realise that there are many properties to be investigated, but some at a later stage.

She supports them for the week as they prepare to present the results of their inquiry. Next week, another group will be supported when they do their work on a different set of substances such as plastics or wood.

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Object	Label
Piece of copper wire	Pick up the wire. Can you bend it? Where have you seen it being used? What is able to pass through it?
Woven basket	How does the basket feel? Can you easily pull it apart?
Metal spoon	Pick up the spoon and think of three words to describe how it feels. What happens to the spoon if you put one end in a cup of very hot water?
Pottery cup	Can you change the shape of the pottery? Would it break if you dropped it? (DO NOT TRY THIS.)
Piece of glass	Can you see through the glass? What would happen if you dropped it? (DO NOT TRY THIS.)
Plastic bag	What happens if you drop water onto the plastic bag? Does it go through into the bag? Can you easily fold up the bag?
Wooden spoon	Can you bend the spoon? What happens to the spoon if you put one end in a cup of very hot water?
Piece of cotton fabric	Hold the material up to your face. Can you see through it? What does it feel like?
Small magnet and pins	Move the magnet over the pins. What happens? Where have you seen a magnet being used?

## Activity 2

- Start by discussing what happens when you add something soluble like sugar to your tea. How can you tell something has dissolved? Perhaps with older students you will use this as a chance to introduce terms like solvent (the hot liquid tea), solute (the sugar) and solution (the resulting sweet liquid).
- Give groups five different named substances and containers of water. Which of these substances are soluble in water? Ask them to make predictions and to record the results of their investigation in the form of a table using words like 'slightly soluble' and 'readily soluble'
- Finally, ask each group to plan their own investigation of a different variable (something that can change) that might affect solubility of sugar in water. Think of things like temperature of liquid (solvent); granular size of sugar (solute), stirring or shaking the container. You might want to suggest students think how to present their results as a graph.

## 3 Making irreversible changes

Here, we build on the first two activities by now considering ways in which matter can be changed. In science there are two types of changes students should consider:

- reversible changes – called physical changes;
- irreversible changes (changes that cannot easily be reversed) – called chemical changes.

Wax melting with heat and then solidifying again is a physical change. Dissolved sugar can be regained if the liquid is evaporated, so this is also a physical change. But glass cannot be easily turned back into sand – so this is a chemical change.

Teaching Example 3 shows one way that students can be challenged to think about chemical changes through a series of guided demonstrations.

When iron and steel rust (a chemical change) the metal loses its shape and strength. In Teaching Example 3 you use a competition to get your students thinking about how they could slow down this chemical change.

### Teaching Example 3

Sam is an unqualified teacher volunteering in his rural village school. He believes that learning should be a combination of fun and seriousness. When the time comes to look at irreversible changes he sets up a series of activities.

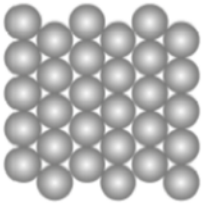
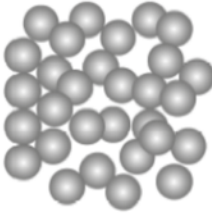
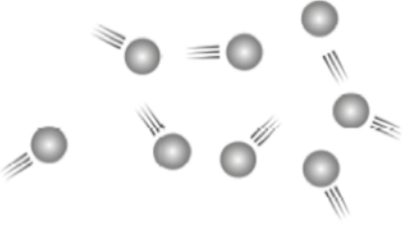
First, he demonstrates what happens when a small cube of bread on the end of a wire pushed into a cork handle is toasted to a cinder over a flame. He asks his students to observe carefully. Eventually the bread gets dry enough to catch light and burn with a flame. He then asks: 'When did it stop being bread?' 'What do you think has happened?' 'What solid substance are we left with if we grind the remains to a powder?'



Some of the students have heard of carbon and Sam explains this is what is left. He burns a small piece of wood and shows this, too, leaves carbon. He listens carefully to their answers and encourages questions based on their observations. In this way, he is able to assess their learning and thinking.

Next, he shows them a more obviously chemical change. He mixes tartaric acid powder and baking powder (sodium bicarbonate) and shows that no change happens. But then he adds water and asks them to observe. This gave rise to lots of questions. Why all the fizzing and bubbling? What is in the bubbles? What gas is given off? Have the substances changed? If we evaporated the water what would we get? He talks about how new substances have been made.

Sam finishes the lesson by asking his students to each find three examples of chemical changes for tomorrow's lesson. He is very pleased with the examples they give – some of the students even bring in materials to show how they have changed.

Molecules and Atoms Teacher Information	A Particle Model for Solids, Liquids and Gases
<p><b>SOLID</b></p> <p><b>Particles</b> Closely packed Arranged in a regular pattern Vibrate about a fixed point, no other movement Strongly bonded to neighbouring particles.</p> <p><b>Properties of Solids</b> Not easily compressed Fixed shape Fixed volume Can be heavy or light</p>	 <p><b>SOLID (EXAMPLE: ICE)</b></p>
<p><b>LIQUID</b></p> <p><b>Particles</b> Fairly closely packed Not arranged in a regular pattern Free to slide over one another Weakly bonded to neighbouring particles</p> <p><b>Properties of Liquids</b> Not easily compressed No fixed shape Fixed volume Can be heavy or light.</p>	 <p><b>LIQUID (EXAMPLE: WATER)</b></p>
<p><b>GAS</b></p> <p><b>Particles</b> Widely spread out Not arranged in a regular pattern Free to move in all directions Not bonded to neighbouring particles</p> <p><b>Properties of Gases</b> Can be compressed No fixed shape Variable volume Very light</p>	 <p><b>GAS (EXAMPLE: WATER VAPOUR)</b></p>

### Activity 3

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Show your class some metal articles that have rusted. Ask them: Where have they seen rust? What makes the iron or steel rust? What sort of change is this? Then tell them their challenge is to find out how to stop iron rusting.

Divide your class into groups. Give each group two iron nails (or other small pieces of iron) and tell them to clean the nails with sandpaper.

Then ask them to think how they will protect the iron from rusting. They should plan their investigation; what they will do, the equipment they will need and make predictions. Why do they think they have been given two nails?

The next day, ask the groups to set up their experiments. You will need to plan time for them to make observations over the next few weeks. After a few weeks, ask each group to report back on their investigation. Was their method successful? Where might it be used?

*Original source: Stories into Books – D Dyer and A & V Kenyon (UCT 1990)*

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## Social Studies: Using dance for learning

- 1 Dance tells a story
- 2 Making our own dances
- 3 Getting ready for a performance

**Key question for the teacher:** How can you use dance to enhance learning and physical well-being?

**Keywords:** dance; choreography; culture; domba; tradition; change

**Learning Outcomes for Teachers:**

**By the end of this section, you will have:**

- explored ways to show how African dance traditions can express society's needs and values
- helped your students understand the changing nature of tradition through practical dance
- drawn on dance traditions to improve learning and assessment, and develop students' physical well-being

## Overview

The arts in general are an integral part of the culture of a people and dance is a very strong and vibrant dimension of many cultures. Dance is part of every aspect of African life. Many forms of dance originating in Africa, although rooted in the past, have changed or have been lost, so encouraging an interest in dance will protect those still in use.

### 1 Dance tells a story

This section will help you develop ways of using dance in the classroom. It explores the cultural traditions of dance in Africa, as well as new ways you can use dance across the curriculum

Helping your students appreciate the value of studying traditional African dance is an important part of teaching the arts. Learning about the arts is often rooted in stories from the past.

Also, the arts enable people to express meaning in their everyday lives and help them to develop their sense of identity and self-worth.

Teaching Example 1 and Activity 1 will help you consider with your students how traditions change and disappear, and debate whether this is a good or bad thing.

### Teaching Example 1

Ms Sylvia Msane teaches at a primary school in Sebokeng, a township south of the Johannesburg city centre in South Africa.

Sylvia is married to a man of Zulu origins and they speak English and Isizulu at home. However, her mother's ancestors are from Venda. Sylvia is concerned that her students, like many other young people in South Africa, know very little about their cultural origins. Sylvia thinks of a saying that has been passed down to her: 'Umuntu ngu muntu nga bantu' – 'A person is a person because of other people'.

She decides to tell her students a story that her grandmother told her when she was a child about the Venda people. After telling them how the Venda people came to live in the northern parts of South Africa, she shows them some traditional Venda clothes and pictures of young women dancing the domba. One student asks what the women are doing. Sylvia explains that these women have almost completed their initiation and are dancing in the form of a python. She tells them another story to explain the significance of this snake and they discover how the domba dance celebrates the fertility of young women. Another student asks her if she was initiated in this way and she explains that she wasn't. People's lives and priorities have changed and many traditions from the past have died out. They debate whether it is a good or bad thing that this has happened.

#### Stories of the Venda drum

Long, long ago, the ancestor god called Mwari gave the Venda people a sacred drum called the Ngoma Lungundu. In these ancient days, the ancestors of the Venda lived in Zimbabwe. One day, they received a divine message that they should pick up their sacred drum, the Ngoma Lungundu, and move south.

This magic drum was large and heavy and had to be carried by many men. In order to preserve the power of the drum, it could never touch the ground. When struck by the chief it could cause fog, hail, rain, thunder or lightening. At times, the great god Mwari would play the drum himself. At these times the drum would appear to be playing itself. Enemies fled in terror, fainted or died when they heard its powerful rhythms.

These powers helped to protect the ancestors of the Venda people during this journey and eventually they arrived where they live today in the northern parts of South Africa. Here, there is a lake called Fundudzi that is sacred to the Venda people. Many years ago, a great hero of the Venda people, called Thoyo ya Ndou, disappeared into this lake, taking with him the magical drum. Most people think that it has never been seen since, but some believe it lies guarded and hidden in a cave. Thoyo ya Ndou, or Head of the Elephant, was greatly admired because he united the Venda people and there was peace and prosperity. Ever since he disappeared, many say there has been disagreement and strife between the royal Venda families.







*Original source: Catalogue: Ten Years of Collecting (1979–89), Standard Bank Foundation Collection of African Art, Editors: Hammond-Tooke & Nettleton, 1989*

### Activity 1

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Find out from your class, colleagues or members of the community if there are any traditional dancers in the area.

Ask the head teacher if you can invite the person in.

Contact the person and ask them to come and talk to your class about local dances and to demonstrate one or two dances. Ask them to bring the clothes they wear.

Prepare your class for the visit. Think about questions the students may want to ask.

On the day, prepare the classroom so there is a space for the visitor to sit and dance and so all the students can see.

Welcome and introduce the visitor. The visitor talks and dances for perhaps half an hour.

Encourage your students to ask the visitor questions.

After the visit, discuss with your students what they have learned about dance. Who liked it? Who would like to do more? Think what you can do next. Maybe the visitor could return to teach them some dances?

## 2 Making our own dances

Dance in the classroom lends itself to cross-curricular work, as you explore the ideas behind dances, the significance of the costumes and learn how to do the dances.

Dance is a physical activity and can be done as part of the physical education curriculum or it could be used to explore ideas in other subject areas such as literature and science, for example.

In Teaching Example 2 and Activity 2 dance is used to help students show what they know about a topic or tell a story.

### Teaching Example 2

Mrs Agholor has been working with her class on how the brain sends messages around the body. She decides to use this topic in her PE lessons where she is doing a series of lessons on dance.

Mrs Agholor tells her students that she is going to divide them into groups of between six and ten. Each group has to think of ways to show how a message goes from the brain to a part of the body to tell it to move and other messages come back to the brain to develop or stop the move. She gives them some time to think about this and goes around supporting them as they talk.

After 15 minutes, she suggests they think about how to do the dance and start practising. She reminds them that they have to convey their ideas through movement with no words.

When they have had time to practise, each group shows what they have done. After each performance, the rest of the class has to guess what is happening and can ask questions.

She decides to give them time to develop their ideas and show them to the class the following week, one group at the end of each day.

Mrs Agholor notes that everyone has had fun and thinks her students now also appreciate the importance of dance as a means of expression and as a way to communicate.

### Activity 2

Ask each student to research a dance that a parent or older relative used to perform or still does. It does not have to be a 'traditional' dance. They should find out:

- Where the dance comes from
- Why the dance was performed and what purpose it served
- Where it was performed
- How it was performed

Give them time to do this and write out how to do the dance.

Next, using one of your local traditional dances as a base, ask your students to list what it is meant to show.

Now ask your students to make up their own dance using any techniques they like, to show similar ideas. These could be about:

- reaching adulthood
- the birth of a baby
- a good harvest

Give them time to practise and then share their dances.

Remind your students that they should show their emotions – such as happiness, anxiety, horror, sadness – with their bodies and faces as they dance.

Discuss these emotions and give them time to practise again. Share their performances again and discuss how they improved.

Encourage your students to ask the visitor questions.

After the visit, discuss with your students what they have learned about dance. Who liked it? Who would like to do more? Think what you can do next. Maybe the visitor could return to teach them some dances?

### 3 Getting ready for a performance

Dance can be very personal but it also lends itself to group performance and allows your students to grow in confidence and self-esteem. This is very important as it can enhance their attitude to learning and their achievements.

As a teacher, it is important in a practical situation to be aware of the individuals in a group and their achievements, as well as the collective achievement of the group.

Teaching Example 3 and the Activity 3 suggest ways of providing feedback to your students that will help them prepare to perform in front of an audience. You will also explore how peers can assess and feed back to each other in order to develop their understanding and improve their work

Mrs Agholor hears from one of her colleagues that the school is going to have an Open Day at the end of the term. Parents and people from the community will be invited to attend.

#### Teaching Example 3

Mrs Agholor has been impressed by the enthusiasm of her students for the dance work they have been doing and decides to help them develop the dances they have created in class into a performance for the Open Day. She encourages them to practise at lunchtime and allocates some time during physical education lessons. A week before the Open Day, they perform for each other and give feedback on the strengths of the dances and ways they could be improved. She uses a series of questions to help them think about and improve their performances. They rehearse and perfect their dances. At the Open Day, everybody is amazed at how Mrs Agholor's students have communicated their ideas about how the brain works through their dances.



Finally, Mrs Agholor asks her students to reflect on the experience; this gives her valuable feedback about the learning process and helps her students to think about what they have gained.

### **Refining our dance**

Use the following questions to guide a discussion about each group's dance. Note that you do not have to follow these questions in any particular order.

#### **Creativity**

- Could you create more variation in your dance to communicate your ideas?
- Could you, for example, swap partners, change directions, use different parts of the space, use different parts of the body or vary the space between the dancers?

#### **Working with each other**

There are lots of different ways of working together in a group dance. Consider some of the following variations:

- working in groups within the large group, e.g. in twos
- swapping partners
- facing each other, dancing alongside, back-to-back or leaning against each other
- varying the distance between dancers
- creating a focus on one or more dancers at a particular time
- allowing one dancer to take the lead and the rest following

#### **Performance space**

- Do you need to adjust your dance to suit the performance space?
- How will you position yourselves in the space to start?
- How will you be positioned in the space when you finish?
- How will you move around the space during your performance?

#### **Awareness of the audience**

- Is it easy for the audience to see all the dancers in your group?
- Could you adjust your dance so that the audience can see it better?

#### **Other things to think about...**

- Does anybody in your group need extra support or help?
- Could you enhance your presentation by wearing similar hats, scarves, particular colours etc.?



### Thinking back about dance

You can use the questions here to help your students reflect back on their experiences. Ask them to read and think about these questions carefully and to answer them in an honest and detailed way.

1. Write down three or more words to describe how you felt during each of the following stages:
  - a – presenting your dance to the class
  - b – watching the other dances
  - c – performing your dance in front of the audience
2. What did you enjoy most about these lessons? Why?
3. What did you find most challenging about these lessons? Why?
4. What do you think is the most successful thing about your dance? Why?
5. Do you think there are any ways you could improve your dance? If so, how?
6. Which other performances did you like? Why?
7. Have you learned anything new about yourself?
8. What have you learned from the other performances?

- Explain to your students that they are going to perform at the next parents' evening and that the head teacher is inviting the community to come too.
- Before you begin, make sure that your students are aware of the need to work sensibly. Give them details of how you will stop them while working and remind them that they need to be aware of where their classmates are.
- Organise the class into groups. Ask each group to plan a dance based around a topic you have been studying. (You could decide this or allow your students to vote for one from a list.)
- Give the groups time to practise.
- Next, allow each group to perform in front of the class. Encourage your students to give each other constructive feedback that will help them improve their performances.
- Support groups as they think about how to improve and refine their dances so that they are ready for performance in front of an audience.
- Discuss any props or costumes and prepare these.
- Make a programme.
- Do the performance.

Discuss how it went together. What they have learned about dance? What have they learned about the topic?

## Life Skills: Investigating our place in the community

- 1 What makes a community?
- 2 What works well in a community?
- 3 Living together with different beliefs in a community

**Key question for the teacher:** How can you use storytelling and local knowledge and culture to enhance learning?

**Keywords:** cultures; community; role play; discovery; behaviour; storytelling

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- found out more about the local community through discovery learning
- used role play to identify acceptable behaviour in different situations
- used storytelling to develop students' awareness of different cultures

## Overview

Discovery learning, stories and role play are active ways to explore the different communities in which students live. They allow students to find out things for themselves – which is much better than you just telling them how things are.

The purpose of using stories and role play is to stimulate discussion and help students to look at their own attitudes and behaviour in a non-threatening way. Because these scenarios are more removed from the students' real situations they may find it easier to talk more freely.

It is important that life skills lessons do not preach, but help students to find out for themselves and think about their own lives and ambitions. You need to be aware that different children will 'discover' different things about themselves, others and their lives.

# 1 What makes a community?

Discussing and writing stories helps students to say what they think about different situations. Stories can be very helpful when you want students to think about difficult subjects. But it does take time to prepare them well; you need to think about the communities your students are part of and prepare your story carefully.

In Teaching Example 1, we learn about Mrs Otto who teaches Primary 6 in a large primary school in Kampala. She wanted her students to think about community relationships in their own town situation and then find out more about a rural community. If you work in a rural setting, you may want your students to explore an urban or town situation.

Activity 1 uses discovery learning to help your students 'discover' more about their own communities

## Teaching Example 1

As Mrs Otto came from a village more than 200 km from Kampala, she knows quite a lot about village life. From her own experience, she was able to prepare stories about her life there to use with her students. Using her own experience was important for Mrs Otto in teaching as it meant she was more confident about her subject knowledge.

Mrs Otto asked two students from her Primary 6 class to read out a story she had prepared about a village community in Uganda and then another two students to read one about a small urban community she knew. She had chosen these stories because they had many similarities.

After each story, she asked her students to discuss in their desk groups:

- the different activities the people carry out to make a living
- the people who help others in the community
- the problems of each community – which were the same?  
Which were different?
- the leaders of the community.

Mrs Otto asked the groups to feed back their ideas and she wrote the key points on the board. As a class, they discussed the successes and the problems of the different communities and how the problems might be solved.

For homework, she asked them to think about their own community. Next lesson, after having done some research each group of four wrote their own description of their community. Some students read these out to the whole class.

### Activity 1

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- Ask your class to brainstorm some of the main groups in the local community. These might include NGOs, religious groups, friends, family, community leaders etc.
- Organise your class into suitable sized groups. (This may be according to age or ability or another grouping.)
- Explain that they are going to find out about one of these groups.
- Allow each group to select a community group. More than one group can investigate the same organisation, as they will have different interests and views.
- You may need to do some research yourself or your students could do it to find out more about each organisation. You or they could perhaps collect some documents to help with their investigations. Each group could also devise a questionnaire and interview people from the organisation. Give them time to do the discovering, or research.
- Next lesson, ask each group to prepare a presentation on their organisation – the presentation could be written, a poster, a picture or any other display method.

For younger students, you could investigate one group only and invite someone from the organisation to talk to the class and together make a poster. You could repeat this at intervals so that your students find out about different organisations.

#### **Suggestions for explaining the idea of a community to students**

A community is a group of people who interact and share certain things in common. Members of the community may live in the same area and may have common values and beliefs. They could share some common possessions.

If you are trying to explain the idea of community to your students, you might start by using examples they are familiar with. A good starting point is to ask them to describe their families, including the wider family of aunts, uncles and cousins. Help them to realise that their homes and families consist of individuals, a collection of people, living in a particular place – a small community.

Building on this, you can ask them to add in other groups that they interact with and who form part of the wider community:

- their neighbours, who live in the same street
- their friends, who they see every day
- their parents' friends, who visit them



It is this collection of different groups of people that makes up a community, and it is how students interact with these groups that contribute towards who they are and how they see themselves within the community. Identifying the different things that help define a community will help them understand the part they play in different groups. You might ask them to describe:

- the location – where people live
- the language – how people speak
- the culture – what clothes people wear, the food they eat, their religion
- the history – important events that have happened to a group of people

- **What is the name of your group?**
- **What is the purpose of your organisation?**
- **Which members of the community do you help?**
- **How do you provide that help?**
- **Who are the members of the organisation?**
- **Who can be a member of your group?**
- **How do you become a member of the group?**
- **Do you meet regularly? If so, when and where?**

## 2 What works well in a community?

Respecting others and behaving in appropriate ways between different generations is important in holding communities together. In your classroom, how your students speak and interact with each other can affect their interest in school and learning. Role play can be used to explore how to behave in different situations.

You will need to spend some time preparing appropriate role plays. Remember, the purpose is to help your students explore their own beliefs, knowledge and attitudes, and role play is a non-threatening way to do this.

Teaching Example 2 shows how one teacher used role play with younger students to explore the rules of behaviour in their families. Activity 2 uses role play to investigate community relationships.

### Teaching Example 2

Mrs Mjoli teaches Grade 3 in Cancele School in Eastern Cape. She asked her students to talk to their grandparents or other older family members and ask them about the rules of behaviour that are used in their families.

The next day, in class, they shared the rules from their different families and found that many were the same. One or two children had rules the others did not have, and they talked about why some families need different rules. They found that most of the rules were for children!



Mrs Mjoli chose small groups of students to perform a role play about one of the rules. This helped the class to discuss the behaviours shown and when the rules are used.

They found that there were sometimes different rules for boys and girls. They talked about this and found that there were specific tasks to be carried out by boys and different ones for girls. They felt that, mostly, the girls were not treated as well as the boys. In the end, the whole class agreed it was not fair and that the rules should be the same for everyone.

At the end, Mrs Mjoli explained why the rules are important. She also made a note in her book to plan a lesson on gender issues to further explore and possibly challenge the differences in the treatment of girls and boys.

**Family Rules example**

*Children do as they are told.*

*Girls help their mothers with the household duties.*

*Boys help their fathers and uncles on the land.*

*Children are quiet and respectful around old people.*

*Children leave the room when a visitor comes.*

*Children cannot play outside the home on Sunday.*

*Older children look after younger children.*

*Never tell lies.*

**Activity 2**

Prepare some role plays set in different community situations:

- Thabo meets the chief
- Mr Ntshona the storekeeper
- Danisile and his grandfather

Ask your students to act out each role play and have a class or small group discussion after each one. Identify the good or bad behaviour. Ask the class how the people in the story should behave.

Ask the students, in groups, to think up their own story to role play. Guide them to make sure they think of relevant situations. Allow each group to present their role play, and repeat the class or small group discussions to think about ways to resolve the situations.

### 3 Living together with different beliefs in a community

It is very important that as your students grow up, you help them learn to respect people's different opinions and beliefs. Stories are a good way of introducing ideas about cultural interactions and good and bad behaviour. Stories can help students understand the principles behind different kinds of behaviour.

To use stories well, you should include characters who behave in different ways. A lot of discussion can come from a well-chosen story, but you also need to think about questions you can ask.

The same is also true of role plays. By inventing characters and acting as them, students can explore the kinds of cultural conflicts that might occur in real life, but without suffering any of the consequences. Stories and role plays can help your students develop their understanding of difference in a non-threatening way.

#### **Intercultural communities**

As you help your students define their communities, be it their family, village or school, it is very important that they also learn to respect people's different opinions and beliefs.

Remind students that they are all individuals from different homes and families. For example, they might not all speak the same home language or mother tongue. Their parents may have different occupations: some may be labourers; others farmers; a few may be traders, nurses etc.

But also highlight the fact that they are all members of the same community, with a common interest. Because of this, they should respect the views of other people in that community.

The first stage of respecting other people is to listen to their views and recognise their value. When students learn about different people's backgrounds and beliefs, they will be able to respect each other more. They will not be fearful of cultural differences. They will also have a greater understanding of who they are.

Cultural differences can sometimes be a cause for conflict within a community. It is important for students to understand the reasons for conflict, such as arguments over property and land, behaviour, money and relationships. An important part of life skills education is finding ways to try and avoid conflict at school and in the community.

### Teaching Example 3

Mr Cole decided to teach his class about the importance of people respecting different members of the community and the roles they play, and the dangers that come from conflict. He used the story of the fight among different ethnic groups in Thokoza township east of Johannesburg to discuss these issues.

Before he told the story, Mr Cole asked his students to listen carefully and try to identify the original reason for the conflict. After hearing the story, they shared their ideas and he listed these on the board.

Next, he asked them, in groups, to describe to each other how the events had developed stage-by-stage. After ten minutes, they talked as a class and compiled the different stages on the board.

Mr Cole then asked them to discuss how they would have stopped the trouble by looking at each of the different stages and describing how they could have controlled each one.

Finally, he asked them to list the ways in which the three different groups contributed to the community and also interacted with each other positively. This helped them understand how each group was important and couldn't operate without the help of the other groups.

The students found this lesson interesting, and Mr Cole saw how they began to treat the issues seriously.

In the next lesson, the students worked in groups again to think of any areas of conflict in their own community and some possible solutions. They used the problem-solving skills they had developed when working on the story.

### Activity 3

Organise your class into three groups: each will represent one of the communities from the stories in the boxes below. Tell them that they will be acting out the conflict and then negotiating the peace, so they need to think through how they will do this. They will need to think about their community's concerns, and how to present these in their role play.

After 15 minutes of preparation, ask a group of six (two people from each 'community') to enact the conflict, as they see it, in front of the class.

Next, ask them to sit down and negotiate the peace while the class watches. Tell them to listen carefully to each other's points, and address these points in any agreement.

With the whole class, identify and discuss:

- the different concerns that each community had
- the different solutions that were reached

Ask them to identify the ideas they could use in everyday life. Which do you think were the best ideas?

Finally, ask them to write the story in their own words and add how the situation was resolved.

**Role Play Examples****Thabo meets the chief**

Thabo had a problem with his neighbour who kept letting his goats into Thabo's garden where they would eat all his vegetables. It had happened many times. Thabo tried to talk to his neighbour but he would not listen. His neighbour used to be very friendly, but lately he was often in the beer parlour and did not care much about his house or his friends.

Thabo decided to go to the chief to ask for some advice. ...

**Mr Ntshona the storekeeper**

Mr Ntshona has a small store that sells food and household items. His store is a great help to the women in the village as it saves them walking so far to the next town. Mr Ntshona is the proud owner of a refrigerator and a generator. Now he can also sell cold things, like cool drinks and milk – even meat. The young people like to come to his shop to buy cola. One day, Mr Ntshona found that while he had been busy serving one boy with some sweets, two other boys opened his fridge and stole two bottles of cola. He was very upset and he decided to ....

**Danisile and his grandfather**

Danisile's grandfather is very old – he is 92! He lives with Danisile and his three sisters and his mother and his aunt and her baby. Most of the time grandfather stays in his room or on his special chair outside the front door under the shade of the mango tree. He is often grumpy and complains about the noise the children make. Danisile's mother tells him they must look after grandfather as he is the head of their household. He has his old age pension from the government, which helps to buy their food. Danisile is quite scared of him and prefers to let his sisters look after grandfather.

One day, his sisters are all out fetching water and mother tells Danisile he must take grandfather his evening meal. Danisile is very worried. He takes the food and then ....

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No. 8

## Middle Primary

<b>Section 1 Literacy:</b>	Creating opportunities for communication
<b>Section 2 Numeracy:</b>	What's in a box?
<b>Section 3 Science:</b>	Plants and animals adapting to survive
<b>Section 4 Social Studies:</b>	Investigating weather
<b>Section 5 Life Skills:</b>	Ways of taking responsibility

<b>Additional Resources:</b>	<ul style="list-style-type: none"><li>• Group work in your classroom</li><li>• Working with large/multigrade classes</li></ul>
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## Literacy: Creating opportunities for communication

1 Information gaps in communication

2 Visual information

3 Making meaning

Key Question for the teacher:

How can you create activities to promote communication in the additional language?

Keywords: information gap; interaction; meaningful; creating activities; groups

Learning Outcomes for Teachers:

By the end of this section, you will have:

- created activities for real communication in your additional language class
- explored ways to teach students how to read and write about information presented in different forms
- developed a 'library' of resources to stimulate natural communication
- used group and pair work to develop interaction in the additional language

## Overview

As a teacher, you need to make use of research findings related to what you are doing. Recent research indicates that people acquire language through participating in meaningful interaction in the language, in natural contexts. What does this mean?

- 'Participating': Each student should participate – or be actively involved.
- 'Meaningful': The activity should be relevant and have meaning for students.
- 'Interaction': Communication should be two-way (or three- or four-way).
- 'Natural contexts': The language used should be everyday language.

In this section, we look at how to stimulate this kind of interaction in your classroom, largely through the use of pictures. We suggest that you develop a selection of resources.

Interactive classroom work usually takes place in small groups. This is the approach in the **Teaching Examples** and **Activities** that follow.



# 1 Information gaps in communication

Motivating students to communicate with each other involves setting up activities they can carry out together that are 'real'. Groups are supportive and allow students to try out new language.

'Real' communication involves an 'information gap'; in other words, students find out something from one another that they don't know already. In the past, students may have been instructed to ask a classmate, whose name they knew well, 'What is your name?' There is no information gap here, so communication is not 'real'.

**Teaching Example 1** and **Activity 1** show how finding missing information can be used in order to form groups or pairs.

## Teaching Example 1

Liz Botha in East London, South Africa, wanted to divide a group of 40 teachers into groups of four, in a way that would help them communicate with one another.

She found a set of 16 pictures all on one page in a textbook. She made four copies of the page and cut ten pictures from each page so that she had ten sets of four pictures: shoes; flags, etc. She shuffled the pictures.

As the teachers arrived, she handed each one a picture, and told them not to show it to anyone. She then instructed them to move around the room, asking questions of the kind:

Question: Do you have a picture of a(n) .... ?

Answer: No, I don't./Yes, I do.

They continued with this until they had gathered a group of four people with similar pictures.

Once groups were formed, members had to talk about themselves to one another, and find, through discussion, one thing that they had in common: perhaps all four had younger sisters, or liked or disliked a particular kind of food or music, etc.

They enjoyed the activity enormously, and ended up knowing one another well.

How can you do something similar in your classroom?

## Activity 1

- Write up a list of words related to a recent lesson.
- Give each pair of students one word from the list and two small pieces of paper. Ask them to split their word into half and to write one half on each of the small pieces of paper.
- Collect and mix up all the pieces of paper. Now give each student a half-word.

- Ask students to find the student who has the other half of their word, and stand with him/her.
- Pairs read their words to the class.
- Each pair then writes the meaning of their word on another piece of paper. Collect the meanings and the half-words.
- Give out the half-words again and repeat the matching process.
- Next, call out each meaning in turn and ask the pair to sit down when they hear their meaning. No one should comment on whether they have sat down correctly or not. The meanings eventually become clarified.
- Try the game again and see if they can play it more quickly and accurately.

**Did this activity help your students to understand the meaning of the words? How do you know this?**

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## 2 Visual information

As a teacher, you should always be looking out for activities that develop the skill of listening with understanding.

Here, **Activity 2** involves listening and drawing, or converting language information into visual information. It has a similar advantage to total physical response (TPR), as students do not have to produce language to show their understanding. However, it requires the one who is describing to be very clear and accurate – otherwise the consequences can be seen in the partner's picture.

### Teaching Example 2

Lulu was always getting 'junk mail' pushed through her letter box: advertisements from different shops showing pictures of their wares. One day she decided to keep them, instead of throwing them in the bin.

She cut out the different household products: packets of Indomie, sugar and flour; boxes of washing powder and cereal, etc. She had many duplicates.

She drew six pictures of kitchen shelves, and stuck the household products onto three of them. Each of the three pictures was different. She then cut out duplicates of all the products on the kitchen shelves. She also had three empty kitchen shelves.

In her Grade 4 class the next day, three groups of six or seven students were given pictures of full shelves. The empty shelves went to the other three groups, and different students in these groups got the duplicate products.



She paired the groups, letting Group 1 (with the complete picture) sit near Group 2 (with the empty shelf and separate products). The members of Group 1 described how the products were arranged on the shelf, and the members of the other group arranged them on the empty shelf. They asked questions when they were not sure. This gave them practice in using words about positions in a 'realistic' situation.

The lesson went well. Lulu decided that next time she would extend her students' vocabulary by asking them to sort and describe images of – or, if possible, actual – drums and artefacts from the local community.

## Activity 2

This activity is carried out in pairs or groups. One member describes and the other(s) draw(s). In a multigrade class, the older students might describe, while the younger draw.

- Find some very simple pictures or diagrams or draw your own, e.g. line drawing of a house or tree. You will need one picture per pair, or group, of students. The pictures can be the same, or all different.
- Introduce students to the vocabulary and sentence types that they will need to use, e.g. 'Draw a square in the middle of the page.' 'Draw two chickens beside the house.'
- Hand out one picture per pair (or group), instructing 'describers' not to let their partners see them. The student with the picture describes it to the other student(s), who tries to draw what is described. They must not say what the picture is.
- At the end the describer and the drawer(s) compare their pictures. Start a whole class discussion: 'Asanda's circle is much smaller than the one in the picture.' 'Thabo's chickens have big heads, but the ones in the picture have small heads.' With practice, they will get better at this kind of activity.

## 3 Making meaning

As a teacher, you need to remember that human beings (including your students) always try to find meaning in what they do. Every activity you give your students should give them an opportunity to search for meaning.

Teaching Example 3 and the Activity 3 explore ways to search for the meaning in passages and texts. Students practise some of the crucial skills involved in reading: prediction and anticipation (guessing what might happen next). They also have to interact with one another in order to solve a problem. Each person has a part to play in order to solve the 'puzzle' and find the meaning.

### Teaching Example 3

Mrs Ndaba's Grade 6 class had brought stories from home and illustrated them. On each page, they had written a sentence and drawn a picture to match it. The pages had been inserted into plastic sleeves in files to make books.

Her colleague, Ms Mdlalose, who taught the Grade 3s, had seen the illustrated stories, and asked to borrow them for a reading activity with her students. Mrs Ndaba came and watched.

Ms Mdlalose divided her class into five groups. She gave each group a story but she took the pages out of the file, and put the file in the middle of the table. She then gave each student in the group one page of the story, making sure that she mixed the order of the pages. Each student had to read the sentence on their page to the group. Through discussion, the group decided which sentence came first in the story, put all the sentences in order and put the pages back into the file in the correct order.

Mrs Mdlalose asked one student from each group to read their group's story to the class and they commented about the order. As a class, they selected their favourite story and a five-minute drama was organised to perform this story.

### Activity 3

You can use this kind of activity at any level.

- Select a short, well-written story or passage that your students can understand and relate to. You could use a story, a picture story or paragraph(s) or a more complex passage in any language or subject area. Each group could have the same or a different story to work on.
- Cut it up into six or seven pieces. These could be paragraphs, sentences or groups of sentences depending on the age and competence of your students. Mount each piece on card.
- Give each group a set of the cut-up parts of the passage.
- Each member has a piece of the passage, and reads their piece to the others. As a group, they put the passage together in its correct order.
- With more experienced or able students, ask them to explain how they worked out the correct order.
- Read the passages or stories to the class.

### More information gap activities

#### What is common?

Choose sets of six or eight pictures. Each set of pictures should have something in common. For instance, you might have six pictures which all have something in them that is made of glass or a set of six where someone is eating in every picture. Maybe you have six pictures that all show a baby, or show poverty, or kindness.

Divide your class into groups so that each group can have a set of pictures. Make sure that you have some spare sets, for any groups that finish quickly.

Once a group has finished, you can collect their set of pictures and hand them to another group that has finished.

The members of the group should not show one another their pictures. They should ask the following kind of questions of the other people in the group:

Is there (a) .... in your picture?

Are there .... in your picture?

Does your picture show .... ?

The other members answer:

No, there isn't/aren't. or Yes, there is/are.

No, it doesn't. or Yes, it does.

The person who identifies the common element is the winner.

The game is easier or more difficult depending on how abstract the common element is.

### What do they do for a living?

Write a list of occupations, like the one below, on the board.

Doctor	Dentist	Teacher
Shopkeeper	Nurse	Manager
Clerk	Pilot	Engineer
Gardener	Bookkeeper	Police officer
Farmer	Fishmonger	Computer operator
Air hostess	Pharmacist	Food vendor
Florist	Scientist	Musician
Computer technician	Shop assistant	Garage mechanic

- Ask the students to say what they would like to do when they finish their studies. They might want to add occupations to those listed.
- Give out cards to pairs of students and let them write the name of an occupation on their card. On another card, they should write the meaning of the occupation.
- Ask one member from each pair to report to the class on the type of occupation they had, and its definition. The other students should comment on whether they think the definition is correct.
- Collect the occupation and definition cards, and distribute them randomly. Ask students to go round the class and find a partner with the appropriate definition or word.
- When the partners have found each other, they should stand together until everybody has finished the activity.

## Numeracy: What's in a box?

- 1 Investigating nets
- 2 Designing and identifying nets
- 3 Drawing nets for different shapes

**Key Question for the teacher:**

How can you help students 'see' and mentally transform geometric shapes?

**Keywords:** nets; geometry; visualisation; transformation; boxes; dice; investigations

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- explored practical ways to use the local environment and simple nets to help students understand 3D objects
- used investigation and problem solving to extend your students' thinking about the different nets to make cubes
- used dice to encourage mental visualisation and transformation of cubic nets

## Overview

Imagine you have to draw a shape on a piece of paper, which can be cut out and folded into a cube. On the paper you will draw the six squares that will fold up to make the six sides of the cube. Can you imagine the shape you would draw on the paper to make the cube?

It is not easy to do, as this imaginary exercise requires two important mathematical skills – mental visualisation (being able to 'see' with your mind's eye a two-dimensional [2D] or three-dimensional [3D] mathematical image) and mental transformation (being able to 'manipulate' or change that image in some way).

This section explores practical ways to develop these skills in your students as they make nets. (A net is a 2D representation of a 3D shape, with dotted lines to represent folds, and solid lines to represent cuts.) Manipulating a real object will help your students visualise the transformations of this object and relate their understanding of shape to their own life.

# 1 Investigating nets

As your students work it is important that they feel that they are doing the investigation, that they are solving the problem. As a teacher, you need to be able to stand back and watch your students taking over the central stage. At first, this is often difficult to do, but if you can find a way to set up your classroom that gives students the space to think, talk and explore, many of them will surprise you with their imagination and understanding. This is the approach in the Teaching Examples and Activities that follow.

Activity 1 and Teaching Example 1 explore ways of allowing students to discover the nets for different shapes themselves.

## Teaching Example 1

Mrs Sawula in South Africa was doing work on shape. First, she took her class out into the local environment to look at all the different shapes they could find.

The next day, she wanted to start her lesson on nets by having her students discover a simple net for themselves.

Mrs Sawula asked them to think how they could make a paper plan of some of the shapes they had seen. She listened to some of these ideas. Then, having asked her students to bring in a tin (she collected a few herself for those who forgot or couldn't bring one in), she asked them this question to discuss in pairs: 'Your tin can was made from a flat piece of tin. Imagine your piece of paper is a piece of tin to be made into a can – what shape would have to be cut from the paper? Can you use the can to help you draw this shape on your paper?'

She gave the students time to try and solve this puzzle. Mrs Sawula enjoyed watching her students working and did not interfere unless she saw they were stuck.

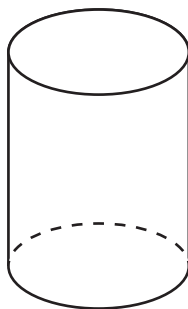
She was pleased at how many were able to produce the net.

A net is a flat or 2D shape that can be folded to make a 3D object. Below is the net of a tin, known as a cylinder.



A 2D net

The 3D object below (a cylinder) is what the 2D net looks like when it has been folded.

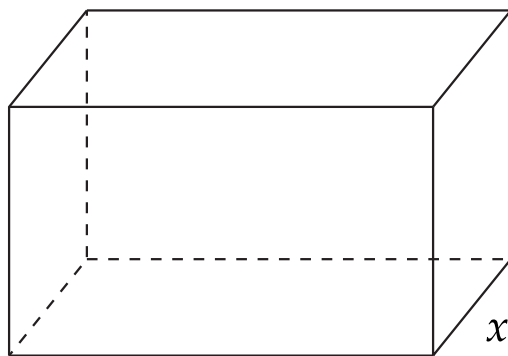


**A 3D object (a cylinder)**

### Activity 1

For this activity ask each student to bring in an empty box. You should collect some too.

- Give each group of four some glue or sticky tape and four sheets of A4 paper.
- Tell students that together they are going to explore how to make a box the same shape as the box (a rectangular prism – see below), using one A4 sheet and by drawing, folding and sticking.



- Ask them to work together and discuss how to do it before they start. Once they are happy with what they are doing, ask them to use one piece of paper to test their ideas.
- If some groups are stuck, give them a clue about how to start by suggesting they undo the box to make it flat.
- Walk around silently; only help if a group is stuck or asks for support.
- Ask each group to show their work to the class.
- In the next lesson, ask students to decorate their boxes and hang them from the ceiling.

Finally, ask them to draw their plans or nets for the box they made and display these too.



## 2 Designing and identifying nets

In this part, you will help students extend their understanding by moving from open to closed boxes. This means adding a lid to the box and explaining what changes need to be made to the net.

Using the same groups working together, means that students can build on their collective ideas. Putting your students into new groups, in this case, would mean they would have to revisit earlier ideas first, which would slow down the development of new ideas.

In this part, you show your students how there is not just one correct answer, but many possible answers. By not telling them too much, but asking questions to guide their thinking, you are giving them the satisfaction of discovering things for themselves. This will build their confidence and give them courage to try new ideas.

### Teaching Example 2

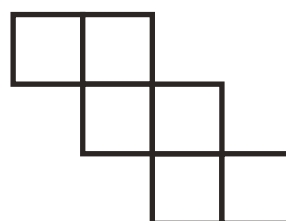
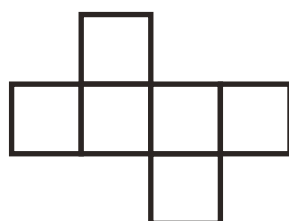
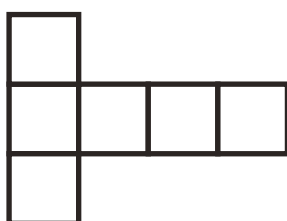
Mr Chishimba was pleased with the progress of his students in Activity 1. He explained that, in mathematics, some words have special meanings. In mathematics, for example, the word 'net' is sometimes used to mean a plane shape (a flat, 2D shape), which can be folded to form a solid 3D object. He asked his students to add this term to their mathematical dictionary and put in a definition. As they had made a net of an open box previously, he asked them to make a net of a closed box. He suggested they looked at the nets they had drawn last time and think how they could add a lid. Using the same groups, Mr Chishimba asked them to discuss together how to add a lid and draw the new net. He gave the groups ten minutes and then asked each group to draw what they found on the board.

Then he asked each group to look at the different nets and agree whether they all worked.

### Activity 2

Make sure students understand what a cube is, then ask pairs of students to find as many different nets for a cube as they can. They should first draw each net, then cut it out and check that it makes a cube, before trying to draw a different net.

(You may want to show one or more examples such as those below to get them started.)

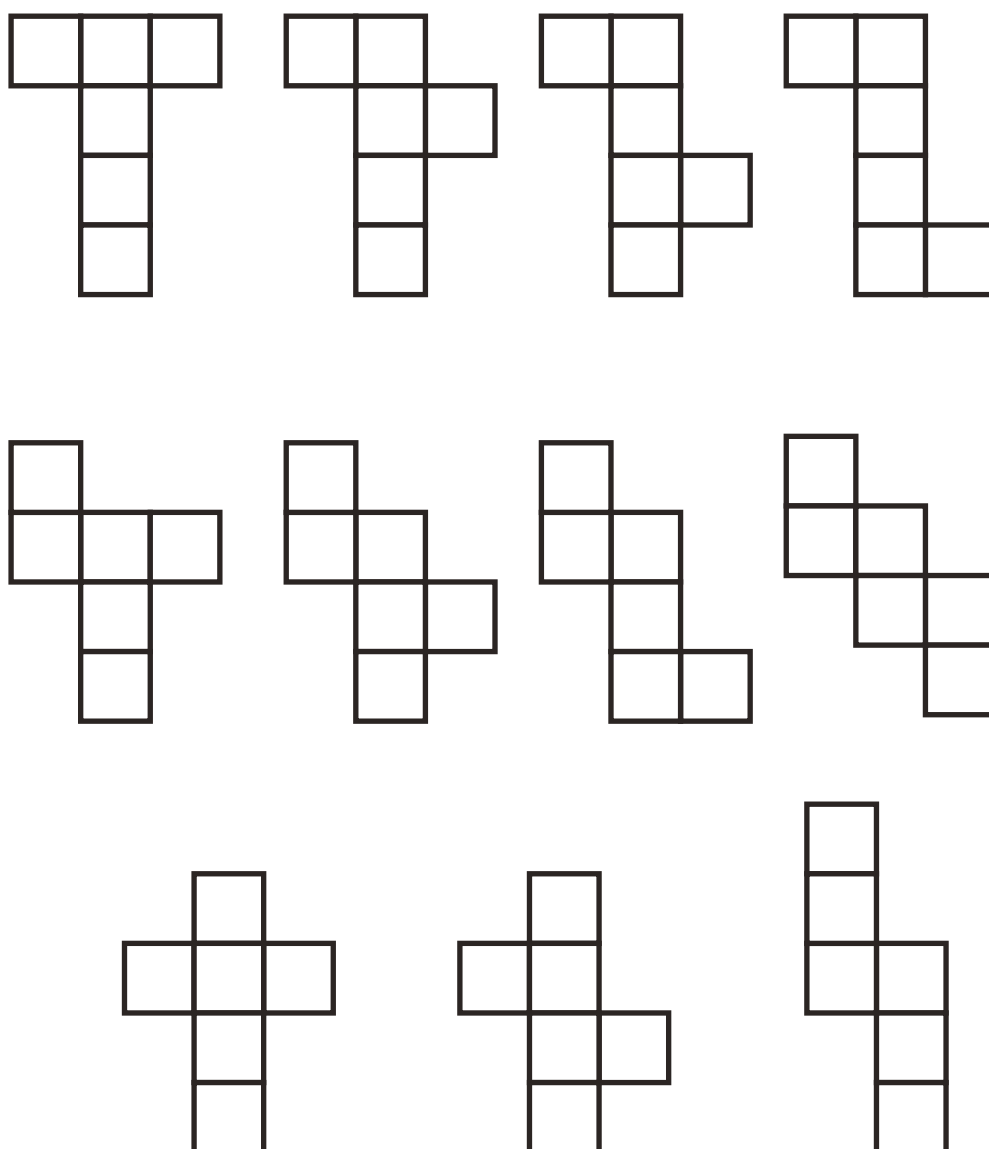


You might like to set this up as a competition, with a reward for the group that can make the most nets for cubes, (see below).

Again, do not interfere or talk too much during this lesson; make space for the students to talk through their ideas and to enjoy the activity. Listen carefully to them and identify how they are able to solve their own problems.

Display the finished cubes and, if there is time, allow them to decorate them to celebrate what they have achieved.

Discuss how many different nets they have found. Ask them to make a wall chart of the 11 possibilities of a net for a cube.



### 3 Drawing nets for different shapes

Having established familiarity with nets, and making cuboid shapes from them, you now move on to ways of helping your students to visualise and transform these nets mentally. One way to do this is by using a dice. Another way is to look at shapes in the environment.

A dice is a special kind of cube, where each surface has a unique number between 1 and 6, and where the numbers on opposite surfaces add up to 7.

In order to correctly number the squares on a cubic net, before it is folded into a cube, the student must be able to visualise the transformation from 2D to 3D in their mind's eye. Teaching Example 3 and the Activity 3 explore these ideas in different ways.

#### Teaching Example 3

Mrs Moyo wanted to develop her students' awareness of mathematics around them in everyday life and so she went to the nearby ZCBC supermarket and took some pictures of various containers with her mobile phone. She printed the pictures and took them to her class.

She asked her students to make neat drawings of what they thought the nets for these containers would be, and label them with the product names. When they had drawn the nets, they cut them out and made them into 3D objects so Mrs Moyo could hang them in the classroom. The students were very pleased with what they produced and so she asked them to invite their parents to come and see their work. Mrs Moyo knows that it is important to have good parent cooperation, as this enhances teaching.

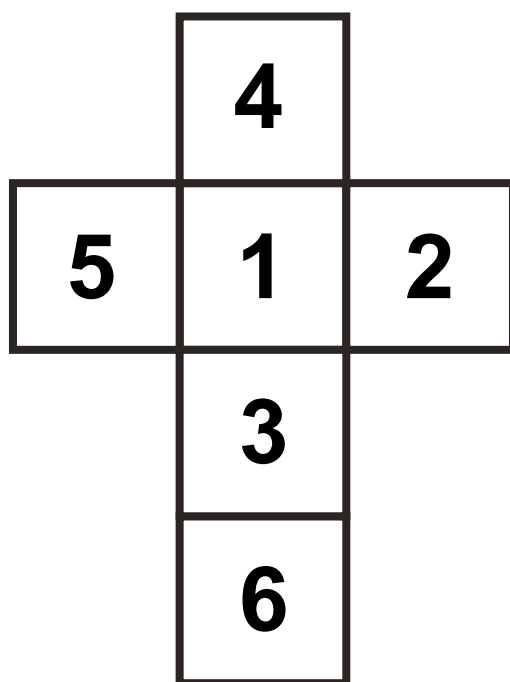
### Activity 3

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Before the lesson, collect up or make several dice to show your class.

- Ask students in pairs to look at a dice, and look carefully at the numbers – they should be able to identify that each side has a number between 1 and 6; you may have to prompt them to see that opposite sides add to 7. Allow them time to check if this rule is followed on all their dice.
- Now give each pair two sets of empty 5 x 5 square grid papers. Ask them to design different nets for a dice: a cube net with numbers written on the squares so that they obey the rules above. When they think they have solved the problem, they may cut out the nets and check that they have ‘correct’ dice.
- After the pairs have solved this problem, they could mark dice numbers on some of the other 11 cube nets that they identified.
- Ask each pair to make a poster to display the different numbering patterns for each net.
- You could extend this activity by asking your class to make a board game about shape and use their own dice to play it.

You may wish to use a double lesson for this activity.



## Science: Plants and animals adapting to survive

**1 Teaching students to think for themselves**

**2 Observation**

**3 Project work**

**Key Question for the teacher:**

**How can you encourage students to make deductions from their detailed observations?**

**Keywords:** plants; animals; observations; adaptation; mind maps; brainstorming; project

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- **encouraged students to make deductions from their observations of living things (thinking and behaving scientifically)**
- **used mind maps to record observations**
- **undertaken collaborative open-ended activities**

## Overview

One important way in which scientists work is to make logical deductions based on careful observations and data.

Too often, teachers prevent this by giving students ready-made facts to memorise (and which students often forget). So we need to support students as they work things out for themselves. This section looks at encouraging students to interrogate (ask questions about) their observations in order to make reasonable deductions for themselves.

To tackle this, we focus on how animals adapt for survival and movement.

Ponds and pools of water support a complex balanced system of life. Observations of such an ecosystem can be organised on a mind map. Students can then add their ideas in a different colour.

In Activity 1 we encourage you to start an open-ended project – making a temporary pond at school. This can be populated by plants and animals borrowed from a local source. It is best if you involve your class in discussions about how you will collect pond life and safely keep it in the temporary 'pond'. Students make accurate observations of life in the pond over a few weeks. By temporarily bringing nature close to the classroom, you have a resource for extending initial observations into deeper science thinking.

# 1 Teaching students to think for themselves

Teachers often feel insecure when doing more open-ended work like this. But it is more 'learner centred'; it builds on students' ideas and interests. You will probably be surprised by your students' enthusiasm and the high quality of work produced. Remember that there are no 'right answers' to open-ended work like this. There is accurate observation and there is good, clear thinking that builds deductions that make sense.

**Teaching Example 1** describes how a specific local environmental problem can be the basis for similar work. Do you have any similar problems in your area? This is a good opportunity to ask a local expert to visit your classroom to talk about the problem; remember to spend time preparing questions with your students before the visit.

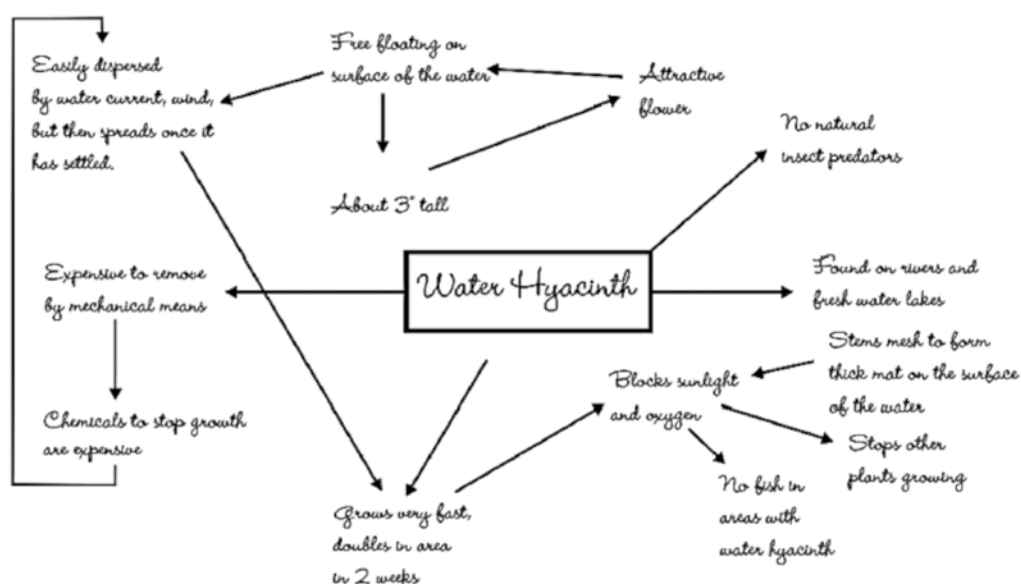
## Teaching Example 1

Bongile Mpuntsha teaches in the rural Nxarhuni valley (South Africa) where there are weirs (barriers) to retain river water for farming. But there is a huge problem on the water. An alien plant – water hyacinth – is growing rampantly out of control and clogging the water.

Bongile uses the problem as a basis for science work. He starts with the observation of actual samples (specimens) of the plant. These initial observations are recorded on a collective class mind map. The students discuss the mind map, which leads to further observations. Then, from what they have observed, students work to answer the core question: What factors and adaptations make this plant such a successful invader?

It is clear that the students are able to think scientifically, given the opportunity. Bongile is surprised and pleased with their deductions. These are discussed and written up on the mind map in a second colour.

### Observations on the water hyacinth – an example from the class



### Background information on the water hyacinth

Water hyacinth, *Eichhornia crassipes*, is a free-floating perennial herb. The plants grow about 3 feet tall as they float on the water's surface, with stems intertwining to form dense mats.

Out of its enemies' reach (mechanical/chemical removal or strong water flow/wind), the water hyacinth has become one of the most troublesome floating aquatic weeds in many tropical and subtropical parts of the Americas, Asia, Australia, and Africa. In Africa, it infests every major river and nearly every major freshwater lake.

Water hyacinth damages water quality by blocking sunlight and oxygen and slowing the water's flow. Capable of doubling within a couple of weeks, it can grow faster than any other plant. By choking out other vegetation, it makes an area unusable by plants and animals that live in or depend on the water. Fish spawning areas may vanish.

Uncontrolled, water hyacinth robs water from potential drinking and irrigation supplies. The mats can block boat travel. Chunks of mat can break free to clog downstream pump stations supplying water for drinking, irrigation and hydropower.

Chemicals and mechanical removal, the primary weapons against the weed, are costly and often ineffective.

### Lake Victoria's water hyacinth problem

No one's sure how the South America water hyacinth invaded Africa's Lake Victoria but there's little doubt as to the damage it has caused. In 1989, the weed was spotted in the lake and seven years later, it had clogged 80% of Uganda's shoreline. Freed from its natural insect enemies, it continued to spread. Getting to fishing grounds became a terrible struggle. A reduced catch and lowered income threatened to trigger widespread famine. Rotting vegetation, under the suffocating blanket of weeds, began to foul drinking water – which comes straight from the lake. Meanwhile, along the edges of the floating weeds, water snails harbouring the deadly schistosomiasis parasite found a new place to breed.

### James Ogwang – decided to spoil the party

Ogwang, a scientist from Uganda, imported another invasive species – a voracious South American weevil and natural enemy of the water hyacinth. Ogwang tested to see if his new tiny imports would solely attack the water hyacinth and not any local crops. Satisfied with their specificity, he released his tiny army and they got to work.

*Adapted from: 'Watch out Water Hyacinths New Jungle Enemies are Coming'*

## Activity 1

Build and establish the pond. It is really best if the ideas come from the students themselves. Remember that we all learn a great deal from our mistakes – especially scientists, who often have to change their ideas as projects progress.

With your students, think of ways to record information about animals and plants in your pond. Perhaps you need a checklist or table for noting the names of

all the plants and animals found? How will the work of observing be divided and shared among students? How will recording happen? Will you keep a scrapbook near the pond?

When you have a good range of observations, try to make a mind map of them. How will it be organised? You could use a large piece of newsprint/paper, the wall or the chalkboard. You might find the Additional Resource useful: **Using mind maps and brainstorming to explore ideas**

Next, ask your students, in pairs or small groups, to think of deductions that can then be added to the mind map in a separate colour. You could write students' initials next to their deductions to acknowledge their work.

## 2 Observation

Plants and animals adapt to a wide range of conditions on land. This makes a fascinating topic to study.

You can work out much from pictures or specimens of plants or animals about how or where they live. Clues are:

- the overall body shape
- the type of outer covering
- the proportions of the body parts
- any unusual structures or arrangements of parts

We do this by processes of deduction. Activity 2 suggests how you can encourage the development of this skill by observing small animals that are found around the school. If you have suitable books, you might extend this work using pictures of other animals or by thinking about humans.

In Teaching Example 2, a teacher helps his students to extend their science thinking based on one student's observation. Read this before doing the activity with your class.

You might ask your class to think about how plants adapt to your own environment.

### Teaching Example 2

Alias Morindat grew up and teaches in the dry Dodoma region. Every few years, he asks his multigrade, farm-school class to list different ways local plants are suited to survival in dry conditions. He is always impressed with just how much knowledge they produce, recording observations and conclusions in a collective mind map. To assess their work, they enjoy comparing it with work from a few years back (including that of their older brothers and sisters).

Here is one example of how this work can encourage students to make deductions from their observations.





One year, a student made this observation: 'Here in Dodoma region, more plants have thorns or spines than those near Tanga (at the coast).' What could be deduced from this observation? Are thorns and spines an important adaptation for dry area plants – and why?

Alias asked groups to consider this. Most agreed that it is an advantage to have thorns because plants in dry places cannot easily replace green parts eaten by animals. One child observed how people in wetter areas encourage fresh growth by cutting off branches. Others noted that some plants also combined thorns with bitter tasting or irritating juices. This stops them being eaten.

They deduced that it must be very important for the survival of xerophytes (organisms which live, or even thrive, in areas with very little moisture) not to have to replace lost parts.

## Activity 2

This activity requires small clear polythene bags. Give one bag to each group (three/four students). Then ask each group to go outside (with your supervision) and catch one single different small animal – not something with a poisonous bite or sting – a grasshopper, for example. Back in class, groups study their mini-beast, which is easily visible and safely contained with enough air to survive until released.

They record all their observations in the form of a mind map. 'Where it was found' and 'What it was doing there' is recorded top right. Its features are carefully recorded bottom right. Bottom left they list what they already know about the creature and the top left is used for questions they raise.

In a multigrade class, you might ask older students to work with younger students to help them record their observations and questions.

Groups share their observations and questions, and add information from other students to their mind maps. Then they think carefully of something more they can add in another colour for each observation or question they have written. This helps them deepen their thinking.

## 3 Project work

All land-living things need air for life processes such as respiration and photosynthesis. But many living things have adapted to moving in air (flight), or to using air in some effective way for survival.

Teaching Example 3 describes a teacher guiding the further investigation of a single group of students in a focused, but still open-ended, project. Activity 3 is much broader and involves students taking more responsibility for their own learning as they work together to meet a challenge. It builds on the skills of observation and deduction from the previous activities.

If there is access to the Internet in your community, your students could use it to find out more for their projects.

### Teaching Example 3

Justin Chidawale's class had spent a term on a 'moving through air' project (see Activity 3), finding out about natural things flying, gliding, parachuting, floating and spiralling through air. They had also discovered that the importance of air carrying smells and odours.

Two boys and a girl came back from the holidays with a question: 'How does a kingfisher bird stay in one place in the air before diving? It doesn't have rotors like a helicopter!'

Justin did two things. First, he gave them time and encouraged them to find out what other living things hovered (dragonflies, hawks, bees, hoverflies and certain moths). Then he encouraged them to spend time observing these creatures in action. Sharifa's deduction was that they could move their wings round and round in a figure of eight pattern. She thought this might be true because that is how she used her arms to stay up in one place when swimming.

Then, Justin arranged for them to use the science textbooks in the nearby high school; one of the teachers helped them. The wonderful thing is that they submitted their project to the Young Scientists competition and won a flight to the national finals in Dodoma.

### Activity 3

Take students into the open air to breathe and appreciate our 'ocean of air'. Notice clouds, quality of light, dusty haze in the distance and evidence of pollution. Ask: What living things and parts of living things move in the air? Challenge students to find out all they can – this is a project to do over several weeks. Back in the classroom start by brainstorming the question with students – perhaps display this as a list on the classroom wall:

Feathers: What are they made for? How do they grow? How many feathers does a bird have? What is the structure of a feather?

Structure of a bird: How do a bird's body shape and other features help it to fly?

What kind of animals can parachute, glide or fly?

What parts of flowers and plants can move through air?

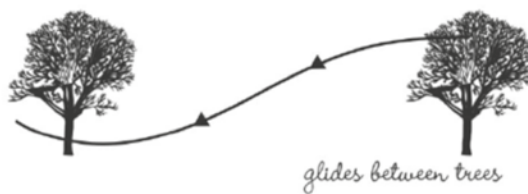
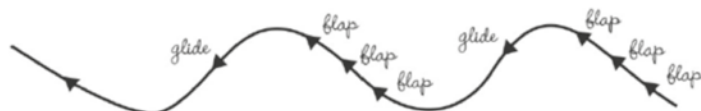
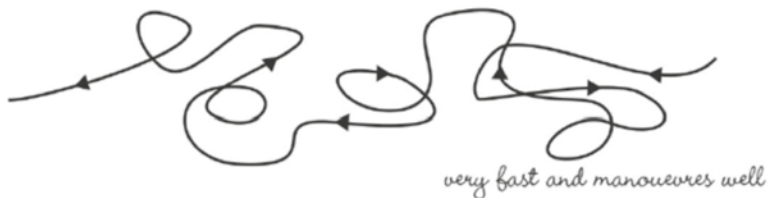
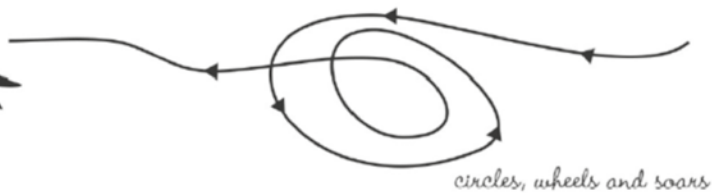
Organise your students into groups of between four and eight. Each group should observe and anticipate one area. You need to plan regular report-back sessions through the project. Keep students motivated with interested support, ask questions and give feedback.

Groups looking at animals could do drawings of different flight patterns (for example gliding, parachuting) and this could lead to drawings of comparative wing shapes.

At the end of the project, each group gives a presentation to the class – think about what criteria you will use to assess their work. Could they assess their own work? You might find the Additional Resource: Assessing learning

Did you and your students enjoy this activity? Could you use this approach for other topics and other subjects?

## Movement through air



## Social Studies: Investigating weather

- 1 Weather observation
- 2 Meteorology
- 3 The impact of weather

**Key question for the teacher:** How can you make the study of the weather more open-ended and activity based?

**Keywords:** problem solving; weather; group work; patterns; observations; brainstorming

**Learning Outcomes for Teachers:**

**By the end of this section, you will have:**

- developed students' skills of observation, data collection and interpretation of weather patterns in order to predict and forecast the weather
- used group work to encourage cooperative learning as students design and construct weather instruments

## Overview

In this section, you will use group work to develop students' cooperative and thinking skills. You will plan practical activities to encourage interaction between students.

For many people, watching the weather is an important part of everyday life. For example, farmers need to be able to judge the best time to sow their crops and fishermen need to know when to set out to sea. The weather patterns are different across Sub-Saharan Africa and rainy seasons and sunny periods will vary. Encouraging your students to observe the changes and patterns – however small – will help them understand the link between the weather, people and their environment.

# 1 Weather observation

There are many beliefs, poems and rhymes about the weather in different parts of the world, including Africa. Using these as a starting point to explore weather will stimulate your students' interest in observing the local weather and encourage them to be more sensitive and responsive to the changes in their natural environment. For example, in Nigeria, the Yoruba people are said to have believed that lightning was a storm spirit who carried powerful magic. That spirit scolded them with fiery bolts of light shot from his mouth. Teaching Example 1 shows one way of using local sayings with your students.

When teaching about the weather, you have a rich resource outside the classroom. By asking your students to collect weather data and look for patterns in the data in **Activity 1**, you will be encouraging them to develop their skills of observation.

## Teaching Example 1

Mrs Ogun from Abeokuta in Nigeria wanted to teach her students about the weather and decided to begin by asking them to tell her what they already knew. The day before she started the topic, she asked her students to ask their families and carers for any rhymes and poems they knew about the weather and bring them to school.

The next day, she asked two or three students to recite or sing the rhymes they had found. She also wrote on the chalkboard a few folklores about the weather from other parts of Africa and discussed the meaning of them, but not the scientific explanation.

Next, she asked why they thought there were so many different folklores about the weather. Her students suggested that people long ago did not understand why the weather changed and so created folklores to explain them;

Mrs Ogun asked the class why they thought it was necessary to understand weather patterns. They suggested the following ideas, which she wrote on the board:

- To know what clothes to wear.
- For farmers to know weather patterns, so they could plant their seeds, and harvest at the right times of the year.
- To plan for any disasters that might occur as a result of bad weather.

She asked the class to work in groups of six and, using any one of the ideas on the chalkboard, to create a little story or folklore about the weather. Some students wrote their stories and others decided to act them for the rest of the class



Country or region and type of weather	Myth	Scientific Explanation
Lightning	<u>Folklore:</u> People hit by lightning were thought by many ancient Africans to have incurred the anger of the gods. Lightning bolts were considered bolts of justice.	<u>Science:</u> Lightning occurs when electricity travels between areas of opposite electrical charge within a cloud, between clouds, or between a cloud and the ground. Lightning bolts between cloud and ground ('bolts of justice') start with electrons (negatively charged particles) zigzagging downwards from the cloud, drawing a streamer of positively charged ions up from the ground. When they meet, an intense wave of positive charge travels upwards at about 96,000 km (about 60,000 miles) per second! This process may repeat several times in less than half a second, making the lightning seem to flicker.
Wind	<u>Folklore:</u> Many people believed evil spirits dwelt in whirlwinds, so they would chase the wind with knives.	<u>Science:</u> The wind is caused by a complex collection of forces. Warming and cooling of the air causes changes in density, or pressure. Air tends to move from areas of high pressure to areas of low pressure. Even very small differences in pressure from one area to another can cause very strong winds. Friction from obstacles like trees, mountains and buildings affect winds, slowing them down, or creating updrafts, bottlenecks and so on. Also, Earth's rotation creates what is called the Coriolis effect, causing winds north of the equator to tend to curve to the right and winds south of the equator to curve to the left.
Sun	<u>Folklore:</u> Ancient Egyptians, boating on the Nile, believed that the sun sailed across the sky in a shallow boat.	<u>Science:</u> While the sun may seem to be sailing across the sky, it is we who are moving on Earth's surface as Earth rotates on its axis and orbits the sun. One rotation takes 23 hours 56 minutes, or one day, and one orbit takes 365.26 days, or one calendar year.
Thunder	<u>Folklore:</u> The god of thunder, Mkunga Mburu, is believed by some to travel the heavens on a huge black bull with a spear in each hand, ready to hurl them at the clouds to make the loud noises.	<u>Science:</u> The noise we call 'thunder' – a distinct crack, loud clap, or gentle rumbling – is caused when air that has been heated to more than 43,000 °F along a lightning stroke expands and then suddenly cools and contracts when the lightning stops.
Rainbows	<u>Folklore:</u> Many of the ancient Zulus thought of rainbows as snakes that drank from pools of water on the ground. According to legend, a rainbow would inhabit whatever pool it was drinking from and devour anyone who happened to be bathing there.	<u>Science:</u> Rainbows are by-products of rain. Raindrops act as tiny prisms when lit by the sun, bending light and separating it into its different colours. A rainbow's arch appears to dip down from the sky to meet Earth's surface. To see a rainbow, you must be standing with the sun behind you, looking at rain falling in another part of the sky. A rainbow may mean the rain is nearly over, since the sun must be peeping through the clouds to make the rainbow appear.

### Activity 1

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- Ask each student to record daily (twice a day) weather observations for five consecutive days for temperature, sky conditions, rainfall and wind speed. Students will need to spend between five and ten minutes at the same time each day outside making these observations on their charts. With younger students, you may want to give them some words to help them describe the weather e.g. strong wind, breeze, calm.
  - Show your students how to read a thermometer to record temperature. (If you do not have a thermometer, ask them to estimate the weather, e.g. very hot, warm, etc.)
  - At the end of the week, ask them to work in groups of six and compare the data collected. How much do they agree? Are there any variations? If so, why do they think this is?
  - Next, ask them to predict the weather for the following week and record their predictions for display in the classroom. Ask them to include reasons for their predictions.
  - Record the next week's weather as before.
  - At the end of the week, review the actual weather against their predictions. Discuss with them how accurate they were and how they could make their predictions more accurate.
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## 2 Meteorology

The science of studying weather is called meteorology. Meteorologists measure temperature, rainfall, air pressure, wind, humidity, and so on. By looking at the data and patterns they find, they make predictions and forecasts about what the weather will do in the future. This is important for giving people advance notice of severe weather such as floods and hurricanes and is extremely helpful to many other people – farmers, for example.

This part explores how using local experts can stimulate students' interest and show ways of – and the relevance of – studying the weather. Activity 2 uses problem solving as a strategy to help students think more deeply about weather.

If you live in an area with regular rainfall, you could also ask students to develop a device to measure the rainfall each day in a two-week period.

**Teaching Example 2**

Mrs Mweemba was fortunate in that there was a local weather station a few kilometres away from the school and she was able to organise a field trip. A few weeks before the trip, having obtained permission from the head teacher and informed the parents, she phoned the weather station to arrange a date and explain what she would like to happen. The deputy in charge agreed to guide the class around the station, to show them the instruments and explain what they were used for. Mrs Mweemba explained that the class had just started learning about weather and had very little prior knowledge of weather instruments.

Before the visit, Mrs Mweemba told her students what they were expected to do, what they needed to take with them and what they would need to do to ensure their safety throughout the visit.

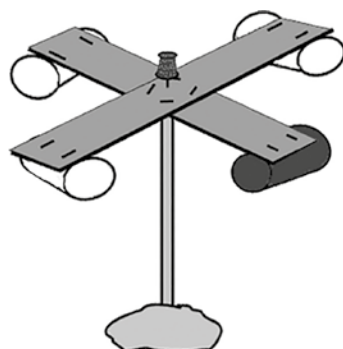
At the station, students saw various weather instruments, including a barometer, a rain gauge and wind scale tools. Mrs Mweemba encouraged her students to ask many questions. With the help of the station officer, they tried using some of the instruments. They were also able to look at some of the records and could begin to see patterns in the weather. The deputy gave Mrs Mweemba a copy of some data to use with her class.

Back in the classroom, Mrs Mweemba asked each group of six students to think about how they could set up their own smaller weather station and how they could organise taking observations regularly. The groups fed back and then the class drew up an action plan.

The lesson ended with a promise from the class to involve their community in the establishment of their weather station.

**Activity 2**

In advance make a wind vane and an anemometer. This can be done with simple materials and you could ask for help from someone in the community who is good with their hands. It is worthwhile spending some time on this as these teaching aids could be used by other teachers and in the years to come.

**Making an anemometer to measure the speed of the wind**

An anemometer is a device that tells you how fast the wind is blowing. A real one will be able to measure this accurately. Your model can give you an idea of how fast the wind is blowing, but will not be as accurate as a manufactured anemometer.



**You will need:**

- scissors
- four small paper cups (e.g. drinking cups)
- a marking pen
- two strips of stiff, corrugated cardboard – the same length
- drawing pin
- a stick
- some clay
- a watch that shows seconds

**Do this:**

1. Cut the rolled edges off the paper cups to make them lighter.
2. Colour the outside of one cup with the marking pen so you can see it each time it spins around.
3. Cross the cardboard strips so they make a plus (+) sign. Stick them together and mark the middle.
4. Stick or pin the cross to the top of your stick through the middle point.
5. Blow on the cups to make sure the cardboard spins around freely on the pin.
6. Place the modelling clay on a surface outside, such as a wooden fence, a wall or a rock. Stick the sharpened end of the pencil into the clay so it stands up straight.

**To measure wind speed:**

Using the watch, count the number of times the coloured cup spins around in one minute. You are measuring the wind speed in revolutions (turns) per minute. Weather forecasters' anemometers convert this speed into miles per hour (or kilometres per hour).

- Pose a problem for your students to solve. Ask them: 'Do you think that the wind is the same everywhere around the school grounds? How could you find out?'
- Let them talk in their groups about ways to investigate this.
- Go around and listen to their ideas, asking questions where appropriate. Use questions like: 'Where could you stand to feel the maximum wind?' 'Where would you stand to feel the minimum wind?'
- Make sure each group prepares a plan. This should include the use of different sites around the school.
- When each group plan is ready, let them carry out the investigation. You could send them out one group at a time. They should record their observations in a chart.

Week 1: Actuals						
Time of Day	Measurement	Day 1	Day 2	Day 3	Day 4	Day 5
Morning	Temperature Sky conditions Rainfall Wind speed					
Afternoon	Temperature Sky conditions Rainfall Wind speed					

- Discuss the results with the whole class:
- Which parts of the school do they think are most windy?
- Which part of the school is least windy?
- Why are there differences between these places?

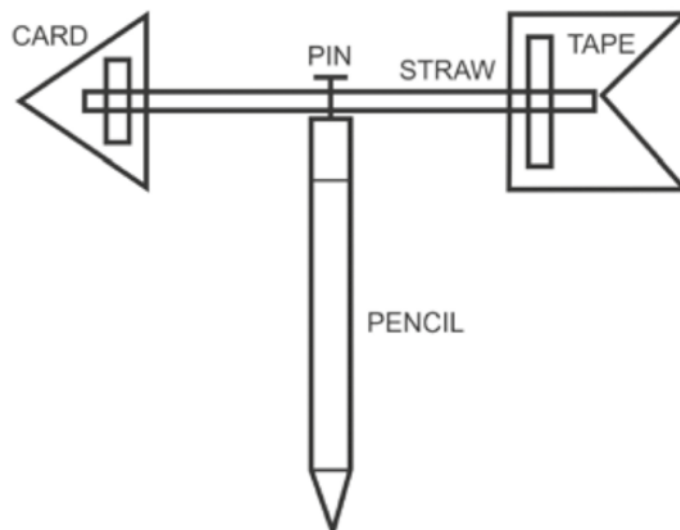
Ask your students how they could see if this is true all year round.

**Making a wind vane to measure the direction of the wind****You will need:**

- a straight pin
- a piece of card
- a straw
- scissors
- pencil (with eraser)
- tape

**Do this:**

1. Cut the point and tail of an arrow out of a piece of card.
2. Tape them onto the ends of the straw.
3. Push the pin through the middle of the straw.
4. Stick the pin into the eraser of the pencil. Make sure the straw can turn freely.



### 3 The impact of weather

While it is possible to collect weather data in the classroom for a certain period of time, it is less easy to explore the effects of weather over a longer period. 'Climate' describes the weather patterns at a place over a period of years.

One way to help students explore the longer-term effects of weather could be to use stories, as Teaching Example 3 does. Here, students are able to think about the wider issues. What would happen if certain weather situations persisted? The Activity 3 uses another approach. Students are encouraged to think about the problems weather can bring.

#### Teaching Example 3

Mrs Mweemba was keen to explore with her Grade 5 students how weather could affect people and resources in different ways. She began by telling them a story about drought.

Having read out the story to her students, Mrs Mweemba organised them into their discussion groups. She then gave them a series of questions.

- What were the different types of weather experienced by Mr Mubita's family?
- How many times did the weather change in the story?
- How did the farmer, Mr Mubita, feel about the sudden outbreak of rain?
- What impact did the rain have on Mr Mubita's crops?
- What impact do you think a lack of rain in his area would have on Mr Mubita and his family?
- How would you feel if you experienced each of the weather types stated in this story?

Mrs Mweemba asked one student in each group to write down the main points from their discussion and another to feed back their ideas to the whole class at the end of the discussion time

- Brainstorm with your students examples of extreme weather, e.g. hurricanes, droughts, floods, freezing temperatures, high winds, heat waves.
- Discuss with the class what happens in each case. Some students may know a lot about some of the examples.
- Divide your class into groups. Ask each group to take one example of extreme weather.
- They should then try to think about all the problems this weather situation would bring and write a short story to show how life would be affected.

Give your students plenty of time and encouragement to devise the story. Ask questions such as 'What would happen to the water supply?' 'Would you have fuel? Food?'



**How weather affected Mr Mubita and his family**

Mr Mubita is a farmer in Choma. He has a wife and six children.

One day, Mr Mubita's family woke up to bright and sunny weather. On their way to the farm, the youngest child was complaining about the biting sun, and had to remove his shirt because of the heat.

In the afternoon, when everybody was working on the farm, rain started to fall. Everybody was soaked in the rainwater and had to stop work until the rain stopped about one hour later. Meanwhile, the youngest child was enjoying the change in the weather and running around the farmland playing with the water on the leaves of plants.

After the rain, the children suddenly realised that the weather had become cool. The cool weather encouraged the family to work for another two hours before they finally left for home.

Mr Mubita was not expecting rain that day and so was not happy that the rain disorganised some of his plans for the day on the farm, but thanked God that the rain would make his crops do well.

That night, the weather became very cold and the family had to make a huge fire and sit round it in order to keep warm before they went to bed.

## Life Skills: Ways of taking responsibility

- 1 Good behaviour
- 2 Responsibility in the classroom
- 3 Developing rules

**Key question for the teacher:** How can you link home and school knowledge to help school achievement?

**Keywords:** group work; discussion; taking responsibility; achievement; home links

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- used linking activities at home and at school
- used group work and discussion to identify how beliefs and values relate to classroom behaviour
- helped students make their own rules for classroom

## Overview

Helping your students to want to take responsibility for their own learning is an important task.

Part of this means involving students in managing the classroom and its resources. In this section, you work with your students to make the classroom a more effective place, by explaining and then giving out particular responsibilities.

You will also encourage students to develop their own classroom rules, by showing how their beliefs can apply to their behaviour in the classroom. Having these rules will benefit both you and them. Showing respect and trust in your students will have a positive influence on their attitudes as people and learners.

# 1 Good behaviour

Every community has different beliefs and values, guided by the customs of the local society. These beliefs and values help to determine what behaviours are acceptable in that community.

Students will first learn these standards at home, and this can be useful to you. You can draw on their families' expectations to help identify the ways students and staff are expected to behave at school:

- in the classroom
- in the playground
- towards the teacher
- towards each other

Developing the principles of good behaviour with your students will assist their concentration during class. They are more likely to listen to what is being said and treat each other respectfully.

In addition, by finding out ideas from your students, they will feel that they have agreed to any expectations of behaviour. They are more likely to respect these expectations than if you had just told them they must behave in a certain way.

Doing this successfully involves some careful planning and can take some time to develop. At each step, you should listen carefully to your students' ideas.

## Teaching Example 1

Mrs Aber is a Grade 4 teacher in Uganda. She has 63 students. During orientation week, at the beginning of term, she asked her students about the behaviour expected of them at home. As she has a large class, she put the students into desk groups of eight, to compare their families' expectations. She asked them to list four rules common to all of them.

The class gave many examples of behaviour their families expected – many of which were the same for different children. Mrs Aber wrote some of these up on the board.

She then asked if there should be the same rules for behaviour in the classroom as at home.

In groups, they chose which home rules could be used in the classroom, and why they wanted to use them.



They then shared their ideas as a class. Mrs Aber was pleased, and used these ideas to establish some principles for behaviour at school, covering:

- how we treat each other
- how we behave during lessons
- how we behave during playtime
- how we treat our things

They voted on six rules that they wanted to adopt.

### **The benefits of classroom principles**

There are many benefits to having well-established principles in your classroom.

A clear set of guidelines about what is good and unacceptable behaviour in the classroom helps you manage the class better. By capturing these as rules, you are able to refer to them if it's needed. However, for rules to be effective in a positive way, the students also need to understand why a particular rule exists.

These guidelines help the students understand what is expected of them. They know what appropriate behaviour is during lessons and during break time. They also have some idea of how to interact with each other and why.

A set of rules for behaviour makes it easier for you to organise the students when doing activities in the classroom. They will know when to listen, when to talk, how to respond to questions, and so on.

Having guidelines on behaviour means that the students will get into the habit of treating each other well. This makes for a peaceful and cooperative classroom.

By allowing the students to write their own rules and take responsibility for classroom activities, you will be encouraging them to take pride in their schooling. They are also more likely to follow those rules they have written themselves.

The above will all contribute towards a positive learning environment in your classroom. You will be able to spend more time on teaching and less time on controlling and organising the class. The students will listen better in class and concentrate on their activities. They will also learn to help each other and support themselves in their studies, which should result in higher achievement. They will feel better about themselves as people as they make progress in their learning and you will enjoy teaching them more.



### Activity 1

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This activity can help explain why we have particular rules, and how they benefit everyone.

Organise your students into groups. Ask them to identify five rules at home and five rules at school.

Get one example of a home rule and one example of a school rule from each group. Write them on the board.

Ask the groups to discuss:

- why they think we have each rule
- how each of the rules helps them

Discuss their ideas as a class. Prepare to ask questions that will help them think more about their answers.

Draw out the different principles behind rules, by questioning the class: e.g. safety; respect; helping others; helping ourselves. Ask them to link each rule with one principle.

Ask students to each write a paragraph about why we have rules. Make a display of these.

How suitable were their suggestions?

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## 2 Responsibility in the classroom

It is important for your students to understand that, like their teacher, they have responsibilities within the classroom.

Firstly, you must be a good role model. Show respect for your duties: be punctual; plan and attend lessons; mark homework etc. If you do not fulfil your responsibilities, you cannot expect the students to do so.

Secondly, involve them in maintaining standards in the classroom. This includes them:

- cleaning the chalkboard
- keeping the classroom clean and tidy
- looking after books and furniture, and so on

If they look after the classroom themselves, they will start to take pride in it.

Thirdly, involve them in organising their own learning through the activities that you give them. This includes them:

- demonstrating the difference between work time and play time
- organising group work and study sessions
- checking each other's work, and so on

The usual way to start doing this is by appointing students as monitors and group leaders, responsible for looking after different tasks. But they also need to understand what is needed for each task.

### Teaching Example 2

Mr Sambawa is a senior teacher with a large multigrade class. He has a group of monitors from the top grades who do small tasks around the classroom and also help the younger students. The monitors check their groups are ready at the beginning of each lesson, they look after the textbooks and they clean the chalkboard each day. They are very useful indeed.

On Friday, the class clean-up day, Mr Sambawa asks his monitors to work with their groups from the lower grades to list which areas need action. Each group makes one suggestion, which is written on the board.

Each group volunteers to take one activity and, supervised by the monitor, work on it each Friday break time until the end of term.

At the end of the week, each group explains to the class what they have done and where they have put things. They also give the class suggestions for next week to make the tasks easier or help solve problems.

At the end of term, they review each group's progress and vote as a class for the best achievement.

### Activity 2

Plan how you will introduce monitors to help in class.

- Introduce the idea of monitors to the whole class. Explain how a system of monitors will work, and how it will benefit everyone.
- With your class, discuss and write a list of all the classroom tasks that need to be done at the beginning, middle and end of each day.
- Identify which tasks have to be done by you, and which could be done by the students.
- As a class, decide how many monitors are needed and then think of a way to select the monitors. You could change monitors every week so that everyone gets a turn and develops responsibility for others.
- Appoint the first set of monitors and explain their tasks. At the end of the first week, review their work with them and with the class.
- Ask them to suggest new tasks they could do.

Once the monitor system has been running for a little while, take some time to think about how it is working:

**What impact does having monitors have on the behaviour and work of your class?**

**Do the students like the system?**

**Does it need to be reviewed – and perhaps modified – by the class?**

**Using monitors**

As a teacher, you can use students to help you with the day-to-day management of your classroom. There are numerous simple tasks that you can ask them to perform on your behalf, and this serves two benefits.

- It allows you to spend more time preparing and delivering good teaching, rather than managing and tidying up the classroom.
- It gives the students small areas of responsibility, which encourages them to take pride in their schooling.

There are a few issues you need to think about when selecting monitors. You want students who will do their tasks well, and who will be willing to help you and others.

You also want students who are responsible and interact well with others. Sometimes, students might see being a monitor as a position of power over others, and they might misuse it. It is important to help them understand that they have to carry out the role responsibly, and you will be a role model in this. All students should be given a chance to take on such roles. If you only choose the same students each time, others will feel less valued. You will need to provide guidance and support to the monitors. Some will need more support than others in the early stages.

You will need to think clearly about each of the jobs before you give them out. If there is not a regular daily task to do, the students will get bored and neglect it. There needs to be a clear purpose for the task as well, rather than something to fill time. Finally, you will also need to provide clear instructions.

It is important to share the jobs around and give each student a turn. If some students are not involved, they will stop taking an interest and may even start disrupting classes to get the attention that is going to the monitors.

If possible, let students choose the jobs they could do to help. You can also hold regular classroom meetings where students can suggest different tasks.

Finally, you will also need to monitor and support them. Give praise where you can and give guidance where it is necessary.

### 3 Developing rules

In this section, you will use students' ideas about good principles of behaviour to help them develop their own classroom rules.

Helping students make a set of rules for the classroom is one way to strengthen participation and responsibility, especially if they write the rules themselves. Establishing their own rules will help them understand what is expected.

There are two sets of rules to think about. The first are social rules. These cover the ways people interact with each other and behave towards each other.

The second are study rules. These cover how students behave during lesson time and what they can do to help everyone study and learn. By organising students to work in groups, you will allow them to share ideas and gain respect for each other more.

It is important that the rules apply to the teacher as well as the students. You need to be a good example for your students. If you respect them in the classroom, they will learn to respect you.

#### Teaching Example 3

Ms Okon asked her Primary 3 class to think about the principles of behaviour they had identified earlier and how these might help them develop their own classroom rules.

She asked students to think about their different responsibilities. What things could they do to help each other fulfil those responsibilities?

They first talked together in pairs, and then as a class. Finally, in small groups, she asked them to write sentences using: 'We should ...'

She went around each group and asked them to read one sentence and explain why they had written it. For example: 'We should be quiet in class because it helps us listen better'.

If students suggested negatives, for example 'Don't talk in class', together they changed it to something positive: 'We should try to listen carefully to each other'.

She was very pleased with their responses, and collected their sentences in. The next day, they reviewed them all again and chose eight. Ms Okon then wrote these on the chalkboard and the students copied them into their books for reference.

#### Activity 3

- Discuss with your class why we need class rules for behaviour and for study. Discuss why they – and not you – will write the rules.
- Let the students, in groups, discuss their suggestions for social rules and study rules. Ask them to write five rules for each, using positive sentences.
- Collect each group's suggestions on social rules and write them on the board. Ask them to explain to the class why they are important.

- Organise a vote: ask each student to choose six to eight rules from the board. Too many is unnecessary if you have good rules. Read out each rule, and count the number of hands up for each rule. Write the numbers down and identify the most popular.
- Do the same for study rules.
- Organise the class to make a poster of the written rules. Display it by the door of the classroom to remind everyone as they come in.

Monitor how they work over a term and review the rules if necessary. How would you and they modify them?

### Asking children to agree rules

I would like to share some stories that happened in my classroom. In the first few days of school, one of our activities is to get together and talk about the classroom and playground rules. In the beginning, I told the children the rules and we talked about them. I wondered if they are too small (4–5 years old), to come up with the rules but last year I decided to let them generate the rules. To my surprise, it went OK, and my children were even stricter than me, and generated more rules. My class really enjoyed this activity and they follow the rules they have generated themselves voluntarily.

Using the children's misbehaviour/mistakes to teach them how to behave well is a good theory. When a child misbehaves in our classroom or during outdoor activities I frequently try to make use of the opportunity to talk about it with the children during class meeting later that day. We talk about what happened and I ask the children to find a solution, not a punishment for the problem. It's true that sometimes my children do suggest silly ideas, but gradually, more often than not, my kids find a good solution to the conflict.

As expected, it takes time and persistence from the teacher, especially with little ones, to show the way and make the kids understand that they have the power to decide how to solve conflict on their own peacefully, but it is extremely rewarding in the end.

Thank you,  
Zsuzsanna  
Nigeria

Adapted from <http://posdis.org>

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No.9

## Middle Primary

<b>Section 1</b>	<b>Literacy:</b>	Using story and poetry
<b>Section 2</b>	<b>Numeracy:</b>	Seeing patterns in multiplication
<b>Section 3</b>	<b>Science:</b>	Looking at liquids
<b>Section 4</b>	<b>Social Studies:</b>	Looking at different kinds of evidence in history
<b>Section 5</b>	<b>Life Skills:</b>	Looking at the world of work

- Additional Resources:**
- Group work in your classroom
  - Working with large/multigrade classes

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## Literacy: Using stories and poetry

1. Name poems
2. Reading and writing from students' interests
3. Crafting students' writing

**Key question for the teacher:**

How can you use poetry and stories to stimulate students to write?

**Keywords:** name; praise; poems; stories; biographies; writing

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- used name or praise poems or stories to stimulate students' ideas for writing
- used resources such as magazine or newspaper articles to stimulate ideas for writing life stories (biographies)
- explored 'drafting' and 'crafting' when writing

## Overview

Throughout Africa, we have a rich oral and written literature about people who are, or who were in the past, important to their families, their communities and their countries. They are celebrated in praise songs and poems and in life stories (biographies). Using this rich cultural history in your teaching can provide reading materials for the language classroom and stimulate students' interest in writing.



# 1 Name poems

If students listen to and read poems or stories that they enjoy, they are more likely to be interested in developing their own reading and writing skills in their home language or in the language of the classroom.

In order to become successful writers, students need several 'tools'. Firstly, they need something to write about. In **Activity 1**, you will use examples of name or praise poems or stories to give students ideas. Then you will guide them in writing the first draft of a name or praise poem or story. It is important for students to understand that writers 'craft' their poems and stories. This means writing several draft versions, to which they make improvements, until they are satisfied that their poem or story is the best they can make it.

## Teaching Example 1

At a four-day workshop in Johannesburg in South Africa, some teachers of English read poems and stories about names. In these, the writers described how they came to have their names, what they liked or did not like about them and what words or images they associated with them. The teachers really enjoyed what they read and asked if they could write their own name poems or stories during the workshop.

On the second day, each teacher read his or her first draft to a partner. They gave each other feedback on what they liked and what they thought could be improved, for example by adding details and choosing different vocabulary or punctuation.

On the fourth day, having worked on their drafts the day before, they each read their completed poem or story to the whole group. There was laughter, there were some tears and there was much applause.

When they were asked to reflect on their experience, they said:

- no one had been 'stuck' for something to write about;
- while most wrote in English, they enjoyed using occasional words or phrases in an African language to express a particular idea;
- they benefited from the feedback on their first draft;
- they felt proud of the final version;
- they enjoyed listening to the other stories/poems;
- many of the poems were similar to traditional praise poems and songs.

The teachers decided they would read their own and other name poems or stories to their students and help them to write about their names.

## Activity 1

Using the name poem or story choose either name poems/stories or praise poems/stories.

- Ask students to suggest what a name poem/story or a praise poem/story would be about.
- Ask them to listen while you read aloud the poem(s)/story(ies) you prepared.
- Ask them questions about what you have read to them.
- Ask students to discuss with a partner either what they know about their name or that of a family member and how they feel about this name, or what they know about the person, animal or object they wish to praise.
- Next, ask some students to report to the class on their discussion.
- Ask students to write the first draft of a poem or story about their own or family member's name or in praise of their chosen person, animal or object.
- Collect the drafts in preparation for **Activity 3**.

**Did writing name or praise poems/stories give your students ideas for writing?**

**Were you pleased with the way you organised the lesson? What changes would you make next time?**

With younger children, you might write a name poem together, sharing ideas and using familiar words in the classroom language. You might find the additional resources useful on **Working with large/multigrade classes**.

Some of the first stories children hear are likely to be stories about the life experiences of family or community members. The life stories (biographies) of famous people are frequently published in magazines and newspapers and even in comic form, so, whether from listening or from reading, many students are likely to be familiar with life stories. This is a good starting point to stimulate interest in reading and writing.

#### **Preparing lessons on name or praise poems**

Decide whether you wish to choose name or praise poems/stories to work on with your students.

1. Choose one or more examples from the examples that follow OR from other resources that you have OR write your own poem or story.
2. Write the poem(s)/story(ies) on large sheets of paper or cardboard so that when you use them in class students will be able to read the large print with you and then refer to the poems and stories when they are writing their own. If you don't have large sheets of paper, write on your chalkboard.
3. Prepare some questions to ask students about the poem(s)/story(ies). Obviously, the kind of question will depend on what you have chosen.

For example, if you chose Tade's or Thabo's poem, you could begin with:

'What do you notice about the way this poem is written?'

(Answer: Each line begins with one letter in Tade's or Thabo's name).

If you chose Hugh Lewin's praise story about Jafta's mother, you could ask:

'Would you like to have a mother like Jafta's? Give me a reason for your answer.'

When you have completed this preparation, you are ready to teach lessons about name and praise poems and stories. When students begin writing, move around the class to help anyone who finds it difficult to get started.

Some may need help with ideas, others with vocabulary.

### **A name poem written by a teacher in South Africa**

#### **Marumo – My Praise Name by Marumo Magdalene Mafokoane**

The pride of the family –

Who brought this name?

How did it come to me?

No one in the family deserved it – except me!

My late aunt Mankwana's name.

My parents did not choose it – the spirits did,

Long before I was conceived.

Marumo – the name that gives hope.

Marumo – my special name.

The spirits told my mother in a vision

You will conceive and give birth to twins.

Name the girl child after her late aunt Makwana Marumo.

She will survive the storms of life.

Give the boy child a name of your choice.

We will take him to ourselves at an early age.

(I still grieve for you, Maile.)

Marumo – meaning weapons.

Our forefathers used them to defend themselves.

So do I.

I am a fighter. I stand up for my rights.

I have fought many battles.

I have won many battles.

I am Marumo.

If I am about to drown, I think of my name.

Marumo. I gain courage and strength to move on.

Marumo.

My parents chose my other name – Magdalene.

A biblical name for a Sunday baby.

Both names are special, but Marumo is my strength.

Marumo is my pride.

### A name story written by a teacher in South Africa

#### A naming story that was told to me by Mbhevula Ntuli

A long time ago, in the middle of summer, my grandfather, then named Mavuvu, went to the river to fulfil some ritual ceremonies. There he came across a full-grown buffalo that had come to drink. The animal charged him and they fought. He killed the massive beast and immediately ran home to tell his father about his amazing feat. His father, Muraai, sent a message round the village and people rushed to the river. It was true – there lay the dead buffalo!

From that day Mavuvu received great respect from whoever knew what he had done. Men and women, young and old, honoured him. Some people started to give him the nickname 'Mbhevula'. The whispered name reached the ears of his father Muraai who decided to call the tribe together for a name-changing ceremony. Officially, Mavuvu became Mbhevula, meaning 'buffalo' in the Ndebele language.

When I was born, in the middle of the 20th century, I was named after my grandfather. It is a name that I associate with the courage and strength of my ancestor and I am proud of it.

#### A traditional Zulu praise poem – in isiZulu and in English translation, with some explanatory notes

Jama	Jama
Ujama kaNdaba!	Jama son of Ndaba!
UJama kaluthwana kangakanani,	Jama is not deceived to the slightest extent,
Nasenhlamvini yomkhont'angenela,	Even on the point of a spear he can be at ease,
Nasemagatshen' angaphathetela.	Even on branches he can hold tight.
Obengumqingo wang'itshe laseZihlalo,	He who was solid like a rock of Zihlalo,
Ebilingalayezwa ngabaphath' izinhlela,	Which could be commanded by those who carry barbed spears,

Thina bamaklwa singathath'ichoba sophule,	While we of the broad-bladed spears could save ourselves by using a sandstone,
UMabopha wakithi kwaZwangendaba,	Inspirer of our place at Zwangendaba,
Ongibophe zaluk' inhlazane nemfuduluko,	Who inspired me as the cattle went out to graze at midday,
Obabis' ihlaba elikuMahogo,	Who made bitter the aloe of Mahogo,
Othabis' idukumbane elikuNgcingci	Who made glad the trifle of Ngcingci.

This is a poem in praise of Jama who was an early Zulu chief. Hlaba (aloe) and Dukumbane (trifle) were the names of regiments of young soldiers who were made 'sharp' (bitter) or pleased (glad) by Jama.

### A praise poem written by a South African student

#### Praise poem for Sekhukunene by Nathaniel Seleka

He was born to rule,

A pure leader.

He had leadership blood in him,

The blood of great ancestors;

No one could take it from him.

He ruled equally,

Land was for everyone,

Land was not sold,

No one was a slave;

He loved everyone who came in peace

Without checking their colour.

He was a great man;

He showed Mama Africa how to live;

Many people don't know him,

But he ruled his own land.

*Original source(s):*

*A praise poem written by a South African student. Praise poem for Sekhukunene by Nathaniel Selka, taken from: English Matters, Grad 7 Anthology, compiled by Lloyd, G. & Montgomery, K. (1999), p.67. Cape Town: Cambridge University Press) ISBN: 0 521 66747X*

## 2 Reading and writing from students' interests

In the classroom, students need support from their teacher and from one another when they are learning to speak, read and write – particularly if this is in an additional language. **Teaching Example 2** and **Activity 2** show how you can give students opportunities to read, talk, work together in small groups and write the first drafts of the life stories of people they are interested in. Students need examples to guide their development as writers. The articles they read can help them organise their writing and help with sentence structure and vocabulary. Younger students will need you to work with them, guiding their writing and gradually extending their vocabulary.

### Teaching Example 2

Mr Simon Ramphela noticed that, in the playground, some Grade 6 boys – who showed no interest in reading and writing during English lessons – often sat together to read the soccer newspaper, *Laduma*. They told him they enjoyed finding out about the lives of their favourite players.

This gave Simon an idea. He asked the whole class whether they ever read newspapers or magazines and, if they did, what they enjoyed reading. Many said they tried to read stories about people who interested them, even though they couldn't understand all the words. Simon organised a collection of newspapers and magazines for the classroom. Then he asked students who they were most interested in reading about. The favourites were sports stars (mainly soccer, but some basketball, athletics and boxing), musicians, film and TV stars, followed by fashion models, politicians, community leaders and successful business people.

Simon grouped students according to their interests. There were several groups for sports stars and musicians! He gave magazines and newspapers to each group and asked them to find articles/pictures about one person who interested them. Then, as a group, they helped each other to write one or two short sentences about the person's life. They used their own words as well as vocabulary from the articles. They wrote their own title.

Simon was pleased to find that most students were involved in reading and, while some did more of the writing than others, everyone participated. Each group enjoyed reading their biography to another group.

### Activity 2

Use **Preparing lessons on life stories** to prepare for this activity.

- Ask students to read together the story you have copied on to the chalkboard or paper. Or read it to them and explain what it is.
- Discuss the features of life stories (biographies). Ask students to tell you what categories of people (e.g. national footballers, local musicians) they are interested in, and why.

- Give each same-interest group several newspapers and magazines that contain articles about the category that interests them.
- Ask them to find articles about a person from their chosen category and use the information to write two important facts about the person.
- Collect the drafts for use in the **Activity 3**.

If your class is very large, you could do this activity with half the class or smaller groups in turn. You could also group students according to their ability – mixing more able and less able to help each other. With younger students, you might do this as a whole-class exercise where you help by writing their ideas down and sharing their words.

### Preparing lessons on life stories

1. Collect the resources that you will need. This may take some time, but the newspapers, magazines and comics that you collect could be used for many different kinds of language lessons in addition to those on reading and writing life stories. Some students may be able to bring newspapers and magazines from home, so ask them to ask their families for permission to do so. Ask your colleagues and friends to contribute newspapers and magazines that they have finished with. In some countries, newspaper and magazine publishers may be prepared to donate copies to your school. Some NGOs also have excellent publications. For example, in South Africa, comics about Nelson Mandela's life are available from the Nelson Mandela Foundation and the NGOs 'Soul City' and 'Love Life' also have useful magazine materials.
2. Before you begin these lessons you must have enough reading material about a range of well-known people for each group of students to work with.
3. Copy on to large sheets of paper or cardboard or on to your chalkboard the life story of Hugh Masekela (biography overleaf) OR another life story of your choice that is written in fairly simple language.
4. Make a list of common features of life stories to discuss with your students. These include:
  - (i) usually telling the story in a time sequence from early years to later years in the person's life;
  - (ii) highlighting the special achievements of the person's life;
  - (iii) details of something particularly interesting or amusing about the person's life.

You are now ready to begin the lesson!

### Guiding students while they write life stories

While students are working in their groups, move round the room to check that they understand the task and are able to find articles to use. You could write a 'checklist' on the chalkboard to guide students in their writing. For example:

- name(s) of the person
- place of birth
- family details
- 'history' – school days, first achievements, later achievements

- interesting/sad/amusing things that have happened in the person's life

Encourage students to think about the order in which to write the information about the person and to use some of their own words. They should not just copy from the articles.

### Hugh Masekela's life story (biography)

#### 'The magic blower – Hugh Masekela'

Hugh Masekela's love for music started when he was a naughty boy at school. At school Hugh had problems. He was not very interested in his studies. He spent his time playing soccer and dreaming about music.

One day there was an important soccer match at his school. Thanks to the goals scored by Hugh, his school won. His team was so pleased that they rewarded him with some 'squo' (sorghum beer). He was very sick from drinking too much 'squo'. His teacher, who liked Hugh very much, became worried about his behaviour and spoke to the local priest, Father Trevor Huddleston.

They asked Hugh what he wanted most in the world. 'A trumpet,' Hugh answered. Father Huddleston organised a trumpet for Hugh. Shortly afterwards, Hugh and some other musicians formed the Huddleston Jazz Band. From that time he never looked back.

Hugh left South Africa in 1960 with the musical show King Kong. He did not return because the racist laws made it very difficult for black musicians to earn a living. Although he was overseas Hugh did not forget his mother country. He continued to write songs about South Africa and the problems of its people. He was very well known as a jazz musician overseas.

Now, Hugh is back home in South Africa, welcomed by all. As well as performing music, he is involved in educating children and adults about the dangers of drug and alcohol abuse and in raising money to help people who have drug or alcohol problems.

*Original source:*

*Hugh Masekela's life story (biography) The magic blower – Hugh Masekela.*

*Adapted from New Successful English, Learner's Book, Grade 5 (2001), p.19 (Cape Town: Oxford University Press). ISBN: 0 19 57433 4*

## 3 Crafting students' writing

When we write something, it is important to make it clear what we are trying to say. We need to plan. Next, we start writing and then stop and read what we've written. We may decide to change the order of some words, to add or take away some information or change it around. Finally, we check for incorrect spelling, punctuation or grammar. The final piece of writing may look quite different from our first draft. We have 'crafted' our writing.

In the classroom, one piece of writing would be completed (i.e. crafted) before another one is begun. **Teaching Example 3** and the **Activity 3** below show you how to prepare for lessons in which students are to craft their writing.



### Teaching Example 3

Mrs Dorcas Mazibuko and Mrs Beauty Mntambo teach English to Grade 6 classes in Daveyton. They give students detailed feedback on their writing, so sometimes stay after school and work together on their marking.

One afternoon, while drinking tea before they began marking, they agreed that they were feeling frustrated. Most students seemed to ignore the comments and corrections in their books. The friends thought this was strange, because they found the comments they gave each other on first drafts helped them to improve the final versions of the assignments for their professional development courses. Then Dorcas realised something important! Her students didn't get a chance to do more work on the same piece of writing. Instead, there was a new topic in each writing lesson. When she said this to Beauty, her friend agreed that the same happened in her class. That's how they'd been taught when they were at school!

They decided to try a new approach. They would use several lessons to work on drafting and crafting the same piece of writing. They would give students ideas to guide their writing and rewriting. At first, students didn't like rewriting, but when they saw how their work improved, they started to take much more pride in it.

### Activity 3

- Before the lesson, read students' first drafts and decide on some general questions to ask them all to improve their work. Write these on the chalkboard.
- Return the drafts, with some general comments on what you like about students' writing. Explain that they are now going to craft their writing.
- Ask them to reread their first draft and to use the questions on the board to write an improved second draft.
- Ask them to exchange their second draft with a partner and give each other suggestions for improvements.
- Ask them to use these suggestions to write the final version. Go round the class and help where necessary. Encourage them to include drawings with their writing.
- If there isn't time to complete this activity within the class period, ask students to complete the activity at home and report back the next day.
- Ask them how the process of drafting helped.
- Were there any improvements in students' writing as a result of the drafting and crafting process? How can you build on these?
- With younger students or those less competent in the classroom language, you could work with them to draft and redraft a simple piece over two lessons – giving them space between lessons to think about what they really wanted to say.

**Questions for students – to think about how to improve (craft) what they have written in their first draft**

1. Does your poem/story have a title? If no, what would be a good title? If yes, is the title likely to interest readers? Is the title a 'good match' with what you've written about?

1. Will a reader be able to follow your ideas or the sequence of events in your poem or story?

3. If you have written a description, have you included plenty of details?

4. Now that you've read your poem or story again, what would you like to add or to take out?

## Numeracy: Seeing patterns in multiplication

- 1 Square numbers
- 2 Rectangular numbers
- 3 Patterns in sequences

**Key question for the teacher:**

How can you help students to see patterns in numbers?

**Keywords:** visualisation; multiplication; shape; imagination; sequence; planning; group work

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- explored multiplication with your students through visual means
- used rectangular shapes to help students understand factors
- used investigations to explore patterns in number series

## Overview

The ability to 'see' or visualise mathematical patterns is a basic skill for developing further understanding. It can also be an exciting process of discovery as students learn to see numbers and shapes in new ways.

This section shows you ways to help your students to 'see' actual shapes and patterns in numbers.

# 1 Square numbers

The concept of 'square numbers' can be very abstract. Drawing squares, or making squares with counters can help students begin to gain a visual understanding. What numbers of counters do we need to make square shapes (i.e. those with equal numbers of counters in each row, and as many rows as columns)?

You need to plan your lessons to ensure that all students are participating. In **Activity 1** on the next page you will ask your students to work in pairs.

## Teaching Example 1

Mrs Baale in South Africa wanted her students to do some investigations in pairs with only some guidance from her. She was keen to see if the students could investigate square numbers for themselves.

She began the lesson by asking students to work in pairs. She drew a square on the board; then she drew a larger square, made up of four smaller squares. She asked the students to draw as many other squares like these as they could in five minutes. She told the class that these numbers were called 'square numbers'.

Mrs Baale asked the class if they could make more square numbers, and to note the number of little squares needed to make each big square.

By allowing the students to work mainly unaided, Mrs Baale felt they would gain confidence and find enjoyment in the lesson. She found that most pairs worked well together.

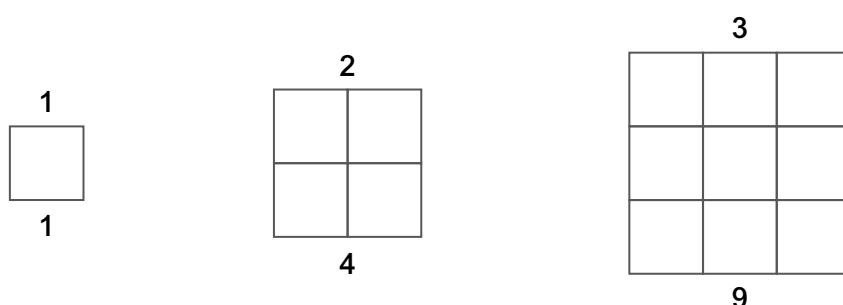
## Activity 1

Look at the square numbers task below. Read it through carefully and try the task yourself before doing it with your class.

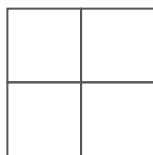
Encourage each student to participate by asking the pairs to choose first one member to be the scribe (the one to draw) and the other the recorder, and then to swap these tasks. In this way, you can make sure each student is participating.

You could also give your students objects (seeds or small stones) as counters. Ask pairs of students to find 'square numbers' (those with equal numbers of counters in each row, and as many rows as columns).

### Square numbers

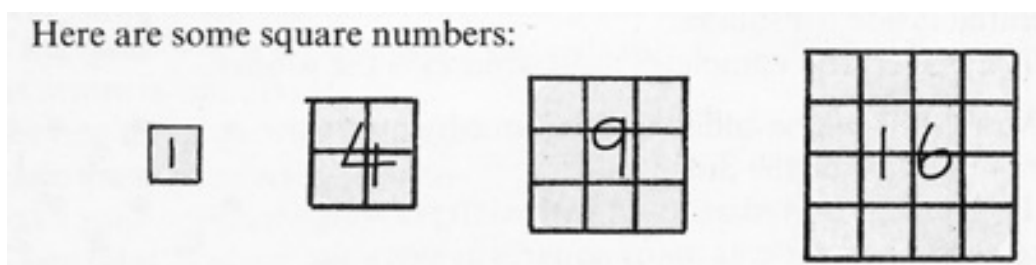


- First draw a square on the chalkboard labelling the sides 2 cm and divide it as shown into 1 cm squares.



- The first recorder has to count the 1 cm squares and write down the number.
- The first scribe has to draw a 3 cm square and divide it similarly into 1 cm squares and the recorder will count and record these small squares.
- This activity continues with a 4 cm square, a 5 cm square, a 6 cm square.

### Examples



Ask the pairs to draw other square numbers to a hundred. The pairs take turns to draw and count/record the numbers.

## 2 Rectangular numbers

From square numbers we move to rectangular numbers. The only requirement now is that there must be at least 2 rows and 2 columns. Each row must have the same number of crosses, e.g.

Number	Rectangular Patterns
1	x
2	x
3	x
4	2 x 2
5	x
6	2 x 3, 3 x 2
7	x

This allows for 'rectangular' numbers. Would you expect there to be more or fewer 'rectangular' numbers than 'square numbers', and can you explain why?

Looking at the numbers that form rectangular shapes is one way for students to explore multiplication (or division) through seeing and doing, as well as carrying out mental and written sums.

Trying out the investigations yourself to see where students may find difficulties and planning how you can help those who do will help you be more effective in supporting their learning.

### Teaching Example 2

Mrs Ali planned to ask her students to find different rectangular numbers by using multiplication facts.

She decided to have a class competition. She divided the class into two teams and asked each team to choose a scorekeeper. The game was that she would write a number on the board and the first student who gave her two correct factors for that number scored a point for their team. Mrs Ali explained that there would be more than one correct answer – sometimes many. She then showed the class an example by writing 6 and saying that she would have given a point to anyone who said ‘2 times 3’ or ‘3 times 2’ or ‘1 times 6’ or ‘6 times 1’. The class enjoyed the game and became quite excited. Mrs Ali was very happy, as she had planned ahead that this game would help her students with their next activity.

In later tasks, she often played this game with her students when she had five minutes left at the end of the day.

### Activity 2

You will need 20 counters, bottle tops, beans or stones, for each group of four/ five students.

- Begin by dividing the class into their groups and handing out the counters.
- Copy or draw the table of multiplications (below) on the board for each student to copy to record their findings.
- Ask the groups to take 6 counters and arrange them in rows of equal numbers, exploring all the possible arrangements they can make.
- After five minutes, let the groups share the possible arrangements they found for the number 6. Check that at least one group included an arrangement with only one row. Ask them to fill in their table for 6.
- Next, let them try number 12 but, before they make the arrangements, they must predict the number of possible arrangements, and then check if their predictions are true.

Repeat with all the numbers on the table.

Table of multiplications

The number	The possible arrangements	Number of arrangements
3		
4		
6	(1 × 6) (2 × 3) (3 × 2) (6 × 1)	4
8		
9		
10		
12		
14		
15		
16		
18		
20		

### 3 Patterns in sequences

In this part, we look at another way of seeing patterns in multiplication, which is not based upon shapes and counters, but still looks for patterns in rows and columns. Helping students explore patterns through practical activities will develop their deeper thinking.

Imagine two columns, one for 'tens' another for 'units'. If we think, for example, of the 8 times table, the first four numbers are 8, 16, 24, 32.

What happens to the tens and the units as you look down the two columns? You should notice that the tens increase by 1 each time, while the units decrease by 2. Using this observation, what would be the next three numbers?

Such observations and questions can be used to help students learn about both multiplication and pattern recognition.

#### Tens and units

Ask your students to fill in the next three sets of numbers in this table:

Tens	Units
0	8
1	6
2	4
3	2
?	?
?	?



### Teaching Example 3

Mr Lutengano wanted to do an activity exploring number. He wrote the following number sequences on the board, then asked the students to help him find the missing number. Students had to put their hand up and say what they thought the missing number was, and why.

- 4, 6, 8, [ ], 12, 14
- 3, 6, [ ], 12, 15
- 16, 25, [ ], 49, 64
- 1, 11, 111, [ ], 11111
- 1, 1, 2, 3, [ ], 8, 13

When the students had finished, he asked them to make up their own patterns and leave a number out. They then swapped their pattern with their partners and tried to fill in the missing numbers.

They were very excited and enjoyed the activity. Mr Inekwe asked if they could see a pattern? Could they predict the last number and each answer? He was pleased some could.

Mr Lutengano used pair work often, as it allowed all students to talk and helped their thinking.

### Activity 3

- Stand by the chalkboard and ask students to be totally silent. Ask them to watch carefully.
- Write the first five multiples of 9 on the blackboard.
- Pause. Ask them to look at what is happening to the numbers.
- Ask a student to complete the pattern to  $10 \times 9$ , under the heading 'tens' and 'units'.
- Ask the class to share anything they notice, recording and accepting everything without commenting.
- Carry on, but stop after  $13 \times 9$ , skip some and then write  $17 \times 9 = ?$  Now, watch carefully while they try to make sense of what is going on. You may have to prompt them to see the pattern in tens and units.
- Finally ask pairs of students to investigate other multiples (it is best to start with single digit numbers, 1–9). Can they work out together the pattern for tens and units?

### Multiplication games

The games below come from <http://www.multiplication.com/>

They are great fun for your students. If you have any other ideas for multiplication games and can access the Internet, why not send your ideas in to the TESSA website?





### 1. Times tables card game

This game is played by two players with a deck of cards with the jokers and face cards removed. Players shuffle the deck and deal them all out face down. Each player flips over a card from his or her pile. The first player to call out the correct answer gets to collect two flipped over cards. If a player calls out the wrong answer the other player gets the cards. Players continue until all the cards have been flipped over. The winner is the player with the most cards at the end.

### 2. Buzz

This game is used to practise multiples of a particular number. It can be played in a small group or with the entire class. The leader chooses a number between 2 and 9. The leader says 1, the next player says the 2, and so on. When a multiple of the number chosen is reached, the player says 'buzz' instead of the number. If a player forgets to say 'buzz', or says it at the wrong time, he or she is out. Play continues until the group reaches the last multiple of the number times 9.

### 3. Around the world

Large group flash cards are great for 'Around the world'. Players sit in a circle. One student starts by standing behind the next student in the circle. The teacher holds up a flash card. The first student to say the answer stands behind the next person in the circle. If a sitting student says the answer first, the standing student sits down in the winner's chair. This process continues until at least one student makes it completely around the circle. The cards have multiplication sums on them. You can make these and use them over and over. You can use different tables e.g. 3, 6 and 8.

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## Science: Looking at liquids

1 Liquids and their properties

2 The value of water

3 Experimenting with water

**Key Question for the teacher:**

How can you use different activities to investigate liquids?

**Keywords:** assessment; mind maps; demonstrations; investigation; surface tension; liquids

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- used 'big picture' mind maps to see what students already know when starting a new topic
- undertaken practical classroom demonstrations to challenge students' thinking
- planned different sorts of activities including investigations and drama to develop students' understanding of the role of water

## Overview

Whatever age you work with, it is always valuable to start a new topic with a thoughtful session where you build up a good picture of what the students already know. This can be recorded in the form of a mind map. Encourage students to share any questions and concerns they have. Knowing your students' learning needs will really help you plan in a meaningful way. What sort of things must be planned?

# 1 Liquids and their properties

In this section we guide you through using a mind map and planning a series of activities around liquids and their properties.

Because water is so important on earth, we make it the emphasis when students learn about liquids. **Teaching Example 1** tells how one teacher recorded students' ideas about water on a mind map that would be added to throughout the topic. Could you use mind maps as a starting point for this topic? After making a mind map, or using another way to find out students' understanding, practical demonstrations are important. These reinforce ideas and show how things work or happen.

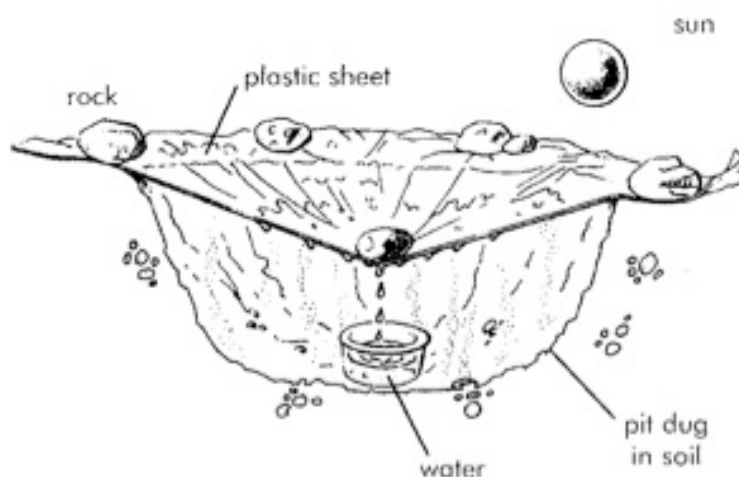
In **Activity 1** you undertake just one of the many possible teacher demonstrations that can be useful to show the properties of water – a waterwheel.

From ancient times people realised the power of flowing water. If water could be channelled to flow over or under the blades of a wheel, it makes the wheel spin. This can be used to drive other machines that do work like grinding meal or even generating electricity.

If you do not have access to sufficient water for this demonstration, we suggest you try another demonstration such as 'How would you show there is water vapour in the air in the desert?' See surviving in the desert below.

## Surviving in the desert

Even if you are stranded in the desert with no water, you can collect water from the soil to drink if you have a clear piece of plastic sheeting and an empty jar or container. The diagram shows how you can do this:



Can you explain how this works?

- The heat from the sun causes water in the soil to evaporate.
- The water vapour rises in the air.
- When it meets the cooler sheet it condenses and turns back to water.
- The water runs down the inside of the sheeting and collects in the jar.

Could you try this with your students?

### Teaching Example 1

Afua in Winneba, Ghana, always starts a new topic in a relaxed way, by gathering her Grade 4 students around her. She sits on a low stool, with a large blank paper on an improvised trestle behind her. She discusses the topic informally – in this case ‘water’.

Afua asks students what they know about water. She encourages them to listen carefully to each other and add to each other’s comments. She does not treat any idea as ‘wrong’ but asks the class to think about it before adding the idea to the mind map, and discussing where it will go.

She ensures there is a sense of logic to the mind map. When Dora mentions ‘floods’, all agree water can be dangerous, and the word gets written with other examples of dangers. When pollution and dissolved poisons get discussed, these too are linked to ‘dangers’.

Later, they copy into their science notebooks the improved neater version Afua has made. While they do this they think about any gaps in their knowledge. Any questions are added to the mind map in a different colour.

#### Sample mind map

Students work in small groups, talking and thinking about different aspects of water, and creating a mind map of one particular aspect. The aspects set out include:

- properties of water
- where water is found
- pollutants
- uses of water
- sources
- dangers
- cultural beliefs

This is a very valuable activity. Instead of testing what the students don’t know, they have an opportunity to share what they do know. They are encouraged to help one another, not to compete against one another. This is a good way to assess what the students know and how well they work as a group.

The following page shows a mind map of all the information teachers thought of at a workshop:

### Activity 1

This demonstration shows the power of flowing water to students in a dramatic, but simple way. Instructions for making a waterwheel are below, they show you how modelling clay/prestik wrapped around a tube can hold blades of cardboard to represent a simple waterwheel. If the tube is free to revolve around a rod (axle) and a weighted string is fastened to the tube, then water poured over the blades will wind the string around the spinning tube and lift the weight.

We suggest you try this out before showing it to your students. Plan the questions you will ask them. These might include:

- Where have you seen this?
- What is the waterwheel doing?
- Where might this be useful?

You could extend the demonstration by finding out if altering the axle or the angle of the blades makes the wheel turn faster.

This demonstration integrates science and technology. When you stop pouring the water, there is a problem. The string will unwind. For technology, students might enjoy designing something to prevent the unwinding or using this device to do a job of work.

### Instructions for making a waterwheel

- You will need a knitting needle, glass or plastic tube e.g. pen case (which the knitting needle can pass through), string (about 1.5 m), modelling clay/prestik and stiff cardboard.
  - Cut out the eight blades for the waterwheel from cardboard – they should be rectangles about 6 cm by 4 cm.
  - Thread the knitting needle through the glass tube.
  - Tie the end of the string round the glass tube and cover the end with lump of prestik.
  - Then put a larger piece of prestik over this and stick the blades of your wheel into the prestik at regular intervals.
  - Tie a weight to the other end of your string.
  - Then try out your wheel. Hold the knitting needle and pour water over the blades on one side.
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## 2 The Value of water

Some people are predicting that future wars will be fought over water – an alarming thought. Water is our most precious resource. How do we ensure that students appreciate water and value using it wisely?

The amount of water found on Earth is about 1,400 million million litres. Most of it is found in three places:

- oceans and seas (97%)
- frozen, as ice (2%)
- underground (1%)

There is also some water in lakes and rivers, in the atmosphere and in living things.

**Teaching Example 2** shows an interesting way of combining science and language in a drama activity about water supply. It is important to use a range of different types of activity in science as each student will have a preferred

learning style – some will learn best through doing, some through seeing and some students will be happiest listening.

In **Activity 2**, you plan and carry out a demonstration that shows how to extract clean drinking water from salt water or dirty water. As with all demonstrations, we suggest you try this out before the lesson and think carefully about the questions you will ask the students during the demonstration.

### Teaching Example 2

Kholiswa Somyo integrates her students' learning whenever possible. With 'water' she linked science to language by making a 'big book' with her class. She prepared everything carefully beforehand so that the combined lesson ran smoothly.

She started by involving one of the shyer students and developed a little classroom drama. She got Sipho to come to the front and said to him: 'Nantsi ikomityi yamanzi.' (Here is a cup of water for you.) Of course, the polite boy said: 'eNkosi M'am, for the drink of water.' To which, she surprisingly replied: 'Don't thank me! I only gave you the water. Thank the ...' (and she pointed to the ikomityi).

So Sipho thanked the cup. 'Don't thank me,' said the cup, 'I only held the water. Thank the ...' ('Tap!' a few children in the class said). 'That's right,' said Kholiswa and got Thembinkosi to come and be the tap.

So Sipho went to thank the tap. 'Don't thank me,' said the tap (Thembinkosi), 'I only poured the water. Thank the ...' ('Pipes!' called out many students).

And so the lesson went on, building up the story of the local water supply, but in reverse; pipes, reservoir, pump-house, and so on.

#### Making a big book

##### Reasons for making a big book

- If the books are interesting, then students learn that reading is interesting.
- If the books are boring and carry little relevant meaning, students see reading as a chore that has little to do with them and their interests.
- If students get the chance to actually make a book, they can see themselves as authors, and this is a very powerful thing.
- If students never find themselves and their lives in the books that they read, then they learn that books have little to do with them and they are less likely to want to have much to do with books.
- In other parts of the world, many students are encouraged to make their own books at school (together or on their own). These students love reading and read well.
- There is also a trend to use very large books for the early stages of reading so that learning what reading is about can be a shared activity. With a large book, a teacher can help the whole class to become readers.

**Thank you for a drink of water**

This book tells the story in reverse of how a child gets a drink of water. It traces the story back to the original provider – the sun. You could adapt this story to your own setting such as a village camp or town and make your own book with your students. Make sure all your students are involved. Plan out each page and then organise different groups to complete each page. Your students could show their book to other students in the school.

**Activity 2**

It is possible to make clean drinking water from dirty or salt water. Ask your students: How can we do this? Listen to everyone's ideas and note them down on the wall or chalkboard.

Show your students how you can make salty dirty water drinkable. Heat a small quantity of water in a suitable container. Above the container place a piece of glass at an angle leading to another container. When the water boils it will turn to steam. The steam will condense on the piece of glass and drip into the second container. Explain these steps to your students. You will need to do this several times and put the important words on the board.

Ask the class to look at the new water and describe it. What is left in the first container? This process is called distillation.

Now ask your students to work in groups to do a design for a large-scale version of this experiment. How could they get enough clean water for their home? Ask them to present their ideas and discuss the different proposals as a class.

## 3 Experimenting with water

For the final part of this section, we build on the ideas in the first two sections to ask students to solve the problem in the **Activity 3** (read this now). This activity uses investigative skills – predicting, planning, recording and presenting findings. Does this kind of activity keep your students interested? Can you think of other topics in the science curriculum where you could use this? Share your ideas with your colleagues. Perhaps you could start a journal of investigations in your school.

Often, in science, the unexpected happens. In **Teaching Example 2** above, one teacher uses a demonstration to challenge his students' thinking – he shows that a metal needle floats. How is that explained? This type of activity gives you an opportunity to assess students' understanding and to add to your original class mind map.

### Teaching Example 3

Barnabas Ngcume had always been delighted by surprises as a child. In his science teaching he enjoyed finding unexpected ways to demonstrate the facts found in textbooks. This short demonstration certainly surprised his students and made them think carefully about the nature of water.

He gathered together an open glass bowl, two-thirds full of water, a few ordinary steel sewing needles, scissors and a double-ply sheet of toilet paper/tissue.

First, he asked the students to predict what would happen if you placed a needle on the surface of the water. They were all confident that it would sink. Barnabas let one of them try it – their prediction was right.

Next, he took another needle and cut a small rectangle of tissue slightly longer than the needle and about 2 cm wide. He peeled apart the two layers and rested the needle on one of the rectangles. Carefully he lay both on the water. 'See! It floats,' he told his class. They all said he was cheating. But then, as they watched, the tissue became waterlogged and sank, leaving the needle floating on the thin skin of the surface.

Barnabas didn't give any explanation. He asked his students to discuss their thinking and questions in small groups. Then he asked them to suggest explanations for what they had observed and he shared some ideas about surface tension.

At the end of the lesson, some of his students added the new information to their original mind map about water.

#### Surface tension

If you had never seen a steel needle floating on the 'thin skin' of the surface of water, you might have been as surprised as your students are likely to be when you demonstrate this. But what is the explanation?

Think it out for yourself. Try to imagine the actual particles of water. In your mind's eye, see them free to flow and move past and between each other. But they are always being held together by weak forces of attraction. This is happening in all directions. At any one moment in time, any one particle will have neighbours on all four sides (left, right, front and back). There will also be neighbours above and below. Do you get the picture?

Now think of a particle at the surface. It has no particles above it. That leaves the particles at the surface with extra attractive force to spare, so the particles at the surface will hold together more strongly. This creates a tough, fairly strong, temporary skin across the surface. Scientists call this extra pull between surface particles of certain liquids surface tension.

Water has a much higher surface tension than most other liquids. You might like to try the experiment with other liquids to show this.

Can your students think of other examples of surface tension?

Other examples include the shape of water droplets and insects walking on water.



### Activity 3

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Organise your students into groups of four.

- Give each group a piece of cloth or paper towel to wet and then cut up. Now ask them to think of the best way to dry the pieces of cloth. Should the cloth be crumpled up? Folded up? Spread out? In the sun? In the shade? In a draught?
- Each group should make a prediction and plan their experiment. What equipment will they need? What will they measure? How will they present their results?
- Discuss with your students the need to keep everything the same except the one thing they are investigating – here, this is their method of drying. So they will need to make sure that each piece of cloth is the same size and have the same amount of water on it at the start.
- When groups have their plan and their equipment, let them try their investigation.

Each group should present their findings to the class; they should include the best way to dry the cloth and things that went wrong in their investigation.

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## Social Studies: Looking at different kinds of evidence in history

1 Using maps to investigate settlements

2 History of farming

3 Exploring local history

**Key Question for the teacher:**

How can you use mind mapping and fieldwork to develop historical skills?

**Keywords:** historical skills; mind mapping; fieldwork; investigations; history; maps

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- used pictorial maps to help students see the importance of the natural environment in human settlement patterns (see also Module 1, Section 2)
- used small-group investigations, including fieldwork, to develop students' understanding of early African societies

## Overview

In addition to looking at oral and written evidence, your students can also learn about the past from other sources, for example maps.

In this section, you will structure lessons and activities that will help students understand the factors that led to the emergence of strong African kingdoms in the past. It provides you with insight into the kinds of evidence and resources you can use.

It covers:

- using maps and other documents to examine factors in the natural environment that influenced the nature of the settlement and the kingdom
- exploring the role of pastoral and agricultural practices in shaping African lifestyles and culture
- exposing students to the material evidence that remains in and around settlements, which will help them examine how the past is reconstructed.

# 1 Using maps to investigate settlements

By looking at the local environment and the physical layout of the land, it is possible to think about why a community settled in a certain place.

Great Zimbabwe provides a good example. It is important that as a social studies teacher you understand a case like this, as it gives you the skills to relate these ideas to a number of different ancient African kingdoms and to your local setting. Using fieldwork, such as actual trips to a site, allows students to see for themselves why one place was chosen for settlement and why some developments survived longer than others.

Most settlements are where they are because the environment provides some kind of resource, such as water or trees, and/or the site provides protection from the elements and, in earlier times, from enemies. Villages and towns are often found near a stream or wood to provide water and wood for shelter and to burn for heat and cooking. By looking closely at your school's local environment or your students' home environment, whichever is easier, you can help them to begin to understand how settlements developed.

Maps from earlier times will show how a site has changed over time.

## Teaching Example 1

Ms Sekai Chiwamdamera teaches a Grade 6 class at a primary school in Musvingo in Zimbabwe. Her school is near the heritage site of Great Zimbabwe. She knows that many of her students pass by this magnificent site of stone-walled enclosures on their way to school. But she wonders whether they know why it is there. Sekai wants to help her students realise that the landscape and its natural resources played an important part in people's decision to settle in Great Zimbabwe.

She begins her lesson by explaining how Great Zimbabwe was a powerful African kingdom that existed between 1300 and 1450. She asks the students to consider why the rulers of this kingdom chose to settle in the Zimbabwe Plateau rather than anywhere else in Africa. A map is her key resource for this discussion. One by one, she points out the presence of gold, ivory, tsetse fly, water supply and access to trade routes on the map; she asks her students to suggest how each of these led people to establish the settlement where they did. As her students suggest answers, Sekai draws a mind map on the board.

Sekai is pleased at the level of discussion and thinking that has taken place.

### Great Zimbabwe

Great Zimbabwe, or 'houses of stone', is the name given to hundreds of great stone ruins spread out over a 500 sq km (200 sq mi) area within the modern-day country of Zimbabwe, which itself is named after the ruins.

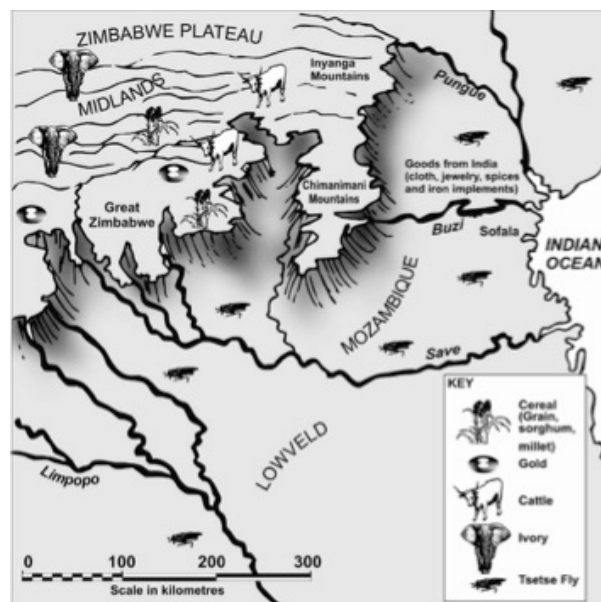
The ruins can be broken down into three distinct architectural groups. They are known as the Hill Complex, the Valley Complex and the famous Great Enclosure. Over 300 structures have been located so far in the

Great Enclosure. The types of stone structures found on the site give an indication of the status of the citizenry. Structures that were more elaborate were built for the kings and situated further away from the centre of the city. It is thought that this was done in order to escape sleeping sickness.

What little evidence exists suggests that Great Zimbabwe also became a centre for trading, with artefacts suggesting that the city formed part of a trade network extending as far as China. Chinese pottery shards, coins from Arabia, glass beads and other non-local items have been excavated at Zimbabwe.

Nobody knows for sure why the site was eventually abandoned. Perhaps it was due to drought, perhaps due to disease or it simply could be that the decline in the gold trade forced the people who inhabited Great Zimbabwe to look elsewhere.

The ruins of Great Zimbabwe have been a UNESCO World Heritage Site since 1986.



1. Find Great Zimbabwe.
2. Find the Zimbabwe Plateau. Why do you think the founders of Great Zimbabwe decided to build the settlement on a plateau?
3. What natural resources were found in and around the region of Great Zimbabwe?
4. Why were these resources important?
5. What other environmental factors may have contributed to the people's decision to settle on the Zimbabwe Plateau?

Adapted from original source: [http://en.wikipedia.org/wiki/Great\\_Zimbabwe](http://en.wikipedia.org/wiki/Great_Zimbabwe)

Original source: Dyer, C., Nisbet, J., Friedman, M., Johannesson, B., Jacobs, M., Roberts, B. & Seleti, Y. (2005). *Looking into the Past: Source-based History for Grade 10*. Cape Town: Maskew Miller Longman. ISBN 0 636 06045 4.

### Activity 1

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Before the lesson, copy the map and questions about Great Zimbabwe onto the chalkboard or have copies ready for each group.

- First, explain what a key represents on a map. Then divide the class into groups and ask each group to analyse the key relating to the map of Great Zimbabwe. Agree what each item on the key represents.
- Ask your students why they think the people first settled here. You could use the questions to help them start their discussion.
- As they work, go around the groups and support where necessary by asking helpful questions.
- After 15 minutes, ask each group to list their ideas.
- Next, ask them to rank their ideas in order of importance.
- Write down their ideas on the chalkboard.
- Finally, ask students to vote on which they think are the three most important factors.

With younger children, you could look at local features and ask them to think why people settled here.

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## 2 History of farming

In the past, cattle were always viewed as an important resource, and many farmers and communities still view cattle this way.

The purpose of **Activity 2** is for students to investigate the traditional role of cattle in African societies using the local community as a source of information. They will then determine how much African farming societies have changed.

**Teaching Example 2** and **Activity 2** use mind mapping and a template to help students think about the task as they work together in groups to share ideas.

### Teaching Example 2

There are many farmers living in the Birnin Kebbi area and many of the students in the school are children of farmers. Bilkisu wants to investigate with her class how important cattle were to the lifestyle and culture of the early African farmers who settled in Nigeria. She also wants her students to think about the extent to which African farming societies have changed. She plans to use the local community as a resource of information.

Bilkisu begins her lesson by explaining the important role of cattle in early African societies. She draws a mind map on the chalkboard that highlights the importance of cattle, and what cattle were used for. The class discuss these ideas.

In the next lesson, in small groups with a responsible adult, the students go out to interview local farmers. Bilkisu has talked with them beforehand to

see who is willing to talk with her students.

The students had two simple questions to ask local farmers:

1. Why are cattle important to you?
2. What are the main uses of cattle?

Back in class, they share their findings and Bilkisu lists their answers on the chalkboard. They discuss what has changed over the years.

## Activity 2

Before the lesson, read the story that follows, **Cattle in traditional life – the Fulani**.

- Explain to students why cattle were important to the people who live in northern Nigeria.
- Ask them, in groups, to list reasons why people used to keep cattle.
- For homework, ask them to find out from older members of the community how keeping cattle has changed.
- In the next lesson, ask the groups to copy and then fill out the template in the role of cattle – past and present to record their ideas.

Share each group's answers with the whole class and display the templates on the wall for several days so students can revisit the ideas.

### Cattle in traditional life – the Fulani

The Fula or Fulani are an ethnic group of people spread over many countries in West Africa, including Nigeria. The ancient origins of the Fula people have been the subject of speculation over the years, but several centuries ago they appear to have begun moving from the area of present-day Senegal eastward.

The Fulani are traditionally a nomadic, pastoralist people, herding cattle, goats and sheep across the vast dry hinterlands (remote areas) of their domain, keeping somewhat separate from the local agricultural populations.

A Fulani family needs at least 100 heads of cattle in order to live completely off their livestock. When the number of livestock drops, the family must start farming to survive.

### The Sokoto Fulani of Nigeria

The Sokoto Fulani are a sub-group of this much larger Fulani group and live in northern Nigeria alongside the Hausa people. The Sokoto region houses some of the ruling class of the Fulani, known as the Toroobe.

The area they occupy is open grassland with narrow forested zones. Camels, hyenas, lions, and giraffes inhabit this region. Though the temperatures are extremely hot during the day, they are much cooler at night.

### What are their lives like?

The semi-nomadic Sokoto Fulani engage in some supplementary farming, along with animal breeding. Millet and other grains are their main crops. Milk, drunk

fresh and as buttermilk, is their staple food, and meat is consumed only during ceremonial occasions. The cattle are herded by the men, although the women help with milking the cows. The women also make butter and cheese and do the trading at the markets. Among the Fulani, wealth is measured by the size of a family's herds.

The semi-nomadic Sokoto Fulani live in temporary settlements. During the harvest, the families live together in small huts that make up village compounds. During the dry season, the men leave their wives, children, the sick and the elderly at home while they take their herds to better grazing grounds. Each village has a chief or headman to handle village affairs.

*Adapted from original source: <http://en.wikipedia.org>*

The role of cattle in the past Cattle were important for:	The role of cattle today Cattle are important for:

### 3 Exploring local history

One way to reconstruct how societies in the past lived is to analyse buildings, artefacts, sculptures and symbols found on sites from a long time ago.

In this part, students go on a field trip to a place of historical interest. If this is not realistic for your class, it is possible to do a similar kind of task in the classroom by using a range of documents, photographs and artefacts. Students can start to understand how to investigate these and fill in some of the gaps for themselves about what used to happen.

#### Teaching Example 3

Aisha has already explored with her Primary 5 students that Sokoto Caliphate was a powerful political empire with a strong ruler. Now she wants them to think about how we know this. As her school is near Sokoto, she organises a field trip. She wants the students to explore the buildings and artefacts, and think about how historians used this evidence to construct the empire's history.

At the site, the students take notes about what the buildings look like. They also describe and draw some of the artefacts and symbols that can be found in and around each of these buildings.

Back at school, they discuss all the things they saw and list these on the chalkboard. Aisha asks them to organise their findings under headings for the different types of building they have seen. The students then discuss what they think the different buildings were used for, based on what they

looked like and the artefacts and sculptures that were found there. Aisha helps fill in the gaps by explaining aspects of Fulani culture and the meaning of some of the sculptures and artefacts. The ideas are displayed and other classes are invited to see the work.

### Activity 3

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Before you start this activity, gather together as much information as you can about the local community as it used to be. You may have newspaper articles, notes of talks with older members of the community, names of people who would be happy to talk to your students.

- Organise your class into groups. Explain that they are going to find out about the history of the village using a range of resources. Each group could focus on one small aspect, for example the local shop, or church, or school.
- Look at the resources you have, if any, before going to talk to people.
- Give the groups time to prepare their questions and then arrange a day for them to go out to ask about their area.
- On return to school, each group decides how to present their findings to the class.
- Share the findings.

You could make their work into a book about the history of your local area.

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## Life Skills: Looking at the world of work

- 1 Exploring work activities in the classroom
- 2 What kind of work would you like?
- 3 How to gain an income

### Key Question for the teacher:

How can different ways of grouping students develop understanding of work and employment?

**Keywords:** group work; collaboration; debate; local contexts; work; employment

### Learning Outcomes for the Teacher

By the end of this section, you will have:

- used 'think-pair-share' to help your students realise the importance of work in the home and community
- prepared collaborative (joint) activities and assessed individual learning
- used local contexts and resources to motivate students to understand about work and employment

## Overview

The way you group students for discussion can make a big difference to their learning experience. Sometimes you will want to group them according to ability; sometimes you will want to mix quicker and slower students. If you have a large and/or multigrade class, you may need to group them according to age or grade. In this section, you will use different forms of grouping for both individual and collaborative working to help students discuss and reflect on their understanding of work and employment.

You can also use local contexts and resources to motivate students so that they use their own initiative to make useful and saleable items from local materials.

# 1 Exploring work activities in the classroom

Young people and adults do different activities as work and employment. In this section, we suggest you use a ‘think-pair-share’ approach to help your students explore the meaning of work and employment and its importance. This is explained in **Activity 1** to follow.

Exploring where the money comes from to provide things at home is a good starting place for this topic.

In **Activity 1** you ask your students to think about the different kinds of work in your community and discuss the difference between work and employment.

**Teaching Example 1** shows some students’ ideas about different types of employment.

## Teaching Example 1

Mr Petrus’ Grade 5 class in South Africa had been working on different forms of employment in the country. He now wanted them to focus on the local community.

Mr Petrus split the class into two. He asked one half to identify all the local employers and prepare an argument saying why it is better to be employed. He asked the other half of the class to identify different informal ways to make money and prepare an argument saying why it is better to earn money this way. After 20 minutes of preparation time, each group gave in their list and Mr Petrus wrote it on the board – making sure he didn’t duplicate ideas see ways of earning money for their list below. They discussed the lists and realised that the work is the same in some cases, whether formal or informal, paid or unpaid.

In the next lesson, they held a debate, with each group nominating a speaker to present their argument. At the end, they held a vote on whether formal or informal employment is better. Even after the vote, the students continued to discuss the ideas, which pleased Mr Petrus.

### Ways of earning money – Mr Petrus’ class list

#### Formal ways to earn money

- |                                    |                    |
|------------------------------------|--------------------|
| • Work for the government          | • Work at a clinic |
| • Work for a company               | • Be a teacher     |
| • Work for a small-business person | • Build furniture  |
| • Run own business                 | • Work in a garage |
| • Make things                      | • Be a plumber     |
| • Work for an NGO                  |                    |

**Informal ways to earn money**

- Sell things
- Grow things
- Sell hot food to workers
- Sew
- Fix cars
- Street trading
- Be a local guide
- Be a domestic worker
- Be a gardener

**Activity 1**

Use the '*think-pair-share*' approach for students to identify different ways to make money and explore students' employment opportunities.

- Ask your students to each think of the different ways there are to earn money. Give each student five minutes.
- Next, pair them with their neighbour and ask them to share their ideas. (If your students sit in desk groups of three, you could use threes instead of pairs.) They combine their ideas to make one list for each pair or three. Allow ten minutes.
- Ask each pair or three to give their ideas and list them on the board.
- Discuss the distinction between work and employment. Make sure they understand that people must work in their homes and on the land, and this is different from the work they do as employment for which they get paid.

Ask the students to share how they would like to be employed in the future.

## 2 What kind of work would you like?

Hearing from others how they do their different activities can help your students understand what variety of jobs there are and what they would like to do themselves. Inviting a guest to talk to them about what they do can help students understand how a particular kind of work is done. Taking students outside school will excite and motivate them and give real weight to how they see many jobs.

**Teaching Example 2**

To help her students develop the concepts of work and employment, and understand the importance of work, Standard 5 teacher Aisha talked to her students about work and the future. She found that most of her class wanted to go to university so that they could get good jobs and earn lots of money. Most of them wanted to move to the city.

To show her students real-life experiences, Aisha invited a local shopkeeper to come to the school and tell the students how he started his business. They learned that starting a shop and running it involves hard work. It also needs money; he got a loan from the government to start his business. He had paid back nearly all of his loan and would soon own his business.

Aisha also invited a friend of hers, Anyango, who used to live in their village but had gone to university and now worked in a bank in the city. Anyango explained that she had always wanted to work in a bank and she had studied hard to become an accountant.

After the visits, the class held a debate on whether it is better to stay in your village and run your own business or to go to university and get a job. The class had learned much about how work and employment were related to their efforts at school and in the wider community.

## Activity 2

Take your class (or in smaller groups, in turns) to a local market and let them see what happens there. Pair the students carefully to make sure they stay focused on the task and do not get distracted while out of school. Prepare for the activity by arranging with some of the market traders to answer some questions from the students about their business. You will need to prepare a worksheet/questionnaire for your students; see the worksheet below. If you do not have the resources to make a worksheet, then in the previous lesson write some questions on the board and ask the students to copy them into their books – leaving spaces for the answers they will get at the market. Also, ask the students what they want to find out and add these questions to the list.

If you think it is more appropriate, you could take the class to a local bank or other place of employment, but you will still need to plan this and have some questions or tasks for them to do or ask when there. After the visit, the students can write up and/or discuss what they learned about work. Summarise these thoughts on the board.

### Worksheet for the visit to the market

1.	How many market stalls are there in the market?
2.	What different goods are sold there?

3.	Who owns/is in charge of the market?
4.	What are the opening hours?
5.	Where is the next nearest market?

For one market trader, students could ask:

1.	How did you start your business?
2.	Where do the goods come from that you sell?
3.	How do you calculate your selling prices?
4.	How do you calculate your profits?

5.	What form of transport do you use to come to market?
6.	How far from the market do you live?
7.	What is the biggest problem for the market traders?

### 3 How to gain an income

In the previous activities, your students have found out more about work and employment through group work and have also heard life experiences of people who are employed or earn a living.

In the **Activity 3** below, you give students the opportunity to be involved in a task that will extend their skills and which they might be able to use to gain an income.

**Teaching Example 3** shows how one teacher set up a mini-enterprise to give her students experience of work and employment.

#### Teaching Example 3

Mrs Maingi is a vocational skills teacher in a primary school in a small town in Kenya. Near the school there are three tailoring shops. The area around the tailoring shops was littered with small pieces of cloth that the tailors had thrown away. Mrs Maingi and her class thought that they could use the pieces of cloth to make useful items during their needlework lessons. She asked the tailors to collect all the pieces of cloth for her instead of throwing them away.

Mrs Maingi used the cloth to teach the students how to sew. They cut, neatly hemmed and stitched them to make handkerchiefs, scarves and small tablecloths. Since most of the students did not have a handkerchief or scarf, each student was given one. The rest of the handkerchiefs and The rest of the handkerchiefs and the small tablecloths were sold at very reasonable prices in school and the village.

One boy and one girl were chosen to record how much money they were paid. They also had to pay for the needles and threads they used. The profit was used to buy sugar to put into their porridge. The students were very happy because there was no more littering from the tailors and they could now take porridge with sugar.

### Activity 3

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It is now time to put all your students' knowledge about work and employment to the test by doing an activity that will benefit the school or home. The text below about Barrina Primary School, Kenya, school garden gives an example of a school in Kenya making a garden to provide food and sell surplus as part of a project.

- Discuss and identify activities that they can do as projects to help them develop skills, while at the same time being beneficial to the school/home. Decide together which are the two best ideas to carry out. Examples could be: making baskets, mats, ropes or brooms, or collecting plastic bags and bottles for recycling. The kind of activity will depend on the context of the school.
- Students choose to work on one of the two selected projects. You will need to help them in planning their project and collecting the resources. Local experts and other community members could help and advise you on what to do.
- Discuss with the students what they can do with the products they get from their project (whether they can be used in school, at home or possibly sold to make money).
- Discuss with the students the usefulness of their projects and the skills they have developed.
- You might want to plan a day to sell some of your goods and use the profits to buy things that would benefit the whole class.

Point out to the students that the activities they do both at home and in school as work can help them develop skills that they can use to gain employment in the future.

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No.10

## Middle Primary

**Section 1 Literacy:** Ways to build on home language

**Section 2 Numeracy:** Exploring 3D shapes

**Section 3 Science:** Investigating air

**Section 4 Arts:** Using music in the classroom

**Section 5 Life Skills:** Emotional wellbeing

**Additional Resources:**

- Group work in your classroom
- Working with large/multigrade classes

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## Literacy: Ways to build on home language

1. Importance of the home language
2. Discussing ideas in the home language
3. Transfer from home language to additional language

**Key question for the teacher:**

How can you build on knowledge of the home language to develop competence in the additional language?

**Keywords:** building; vocabulary; concepts; additive bilingualism

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- used the home language to maximise creativity, understanding and development of ideas
- understood the importance of interplay between the home language and the additional language

## Overview

As a teacher, you want to maximise learning and skills in the additional language and so you need to make decisions about when and how to use the home language. Your choice of language should be based on what is best for your students' learning, rather than on what is easiest for you.

In many schools, the home languages of the students are used at home, and then only in the first few years of school. This often leads to a view that the home language is not worth much. Teachers and parents forget that it is important to build on the students' existing language knowledge and skills and use both languages.

# 1 Importance of the home language

This section shows how using the home language can maximise creativity, understanding and development of ideas, as well as development of the additional language.

Your students come to school with a rich background of human interaction and experience of the world. They also have a language to describe their world. When they use their home language they can draw on this experience to fill their speech and writing with detailed description and imagery. As a teacher, you need to encourage this, and draw out the knowledge that they have.

When it comes to speaking or writing in the additional language, students will often not realise that they can still draw on this knowledge. Teachers, too, may forget that their task is to help students transfer their knowledge in and of their home language into the additional language, rather than building from scratch.

In this part, we suggest that you help your students to express what they know and imagine in their own language, and then to think of ways to carry a similar meaning across into the additional language.

## Teaching Example 1

Mrs Nonhlanhla Dlamini teaches English to 64 Grade 6 isiZulu-speaking students in the Nongoma district of KwaZulu-Natal, South Africa.

One day, she read and discussed examples of praise poems and stories with her students and suggested that they write their own. They were quite excited, but their initial attempts in English were very disappointing so she decided to try a different approach.

Mrs Dlamini asked her students to work in pairs to tell each other what they wanted to write and help each other to write their story or poem in isiZulu. Next, they worked in their pairs to write English versions. She reminded them not to do word-for-word translations because the grammar and vocabulary of the two languages is built up in different ways.

The second attempts at writing in English were much more interesting than their first attempts, though still not as rich in detail and interest as the Zulu versions.

Mrs Dlamini did some vocabulary building work with students to extend their range of verbs and adverbs in the additional language, as she noticed that this was an area of weakness. Next, she then asked students to rework their own writing, using a greater range of verbs and adverbs.

After signing their writing, students placed their poems and stories on a table at the back of the classroom. They enjoyed reading each other's stories.

Mrs Dlamini noticed how many more verbs and adverbs became part of her students' regular vocabulary as a result.

## Activity 1

Write on the board the 'insults' poem 'You' found below.

- Read it with students and discuss each comparison, e.g. 'head is like a hollow drum' makes one think it is big and empty, etc.
- Ask them to write a 'compliments' poem, as a class, about a well-known person they admire.
- Decide with them which aspects of the person they will describe. If the person is athletic, they might choose physical attributes: legs, figure, walk, etc.
- Now distribute these attributes to groups, or individuals, and ask them to think of comparisons in the home language.
- When they feed back their comparisons, decide, as a class, on the best comparison for each attribute, and write them up, in the home language.
- Now discuss how they would say something similar in the additional language. Direct translation will not work, but try to create a similar impression.
- In this way, build up the poem with your class in the additional language.
- Ask them to make up a poem of their own – 'insults' or 'compliments'. Students should make sure they cause no real offence!

**How well did this approach help the students develop their vocabulary in the additional language?**

You!  
 Your head is like a hollow drum.  
 You!  
 Your eyes are like balls of flame.  
 You!  
 Your ears are like fans for blowing fire.  
 You!  
 Your nostril is like a mouse's hole.  
 You!  
 Your mouth is like a lump of mud.  
 You!  
 Your hands are like drumsticks.  
 You!  
 Your belly is like a pot of bad water.  
 You!  
 Your legs are like wooden posts.  
 You!  
 Your backside is like a mountain-top.

*Igbo*

### Teacher notes relating to poem

The above poem is a series of similes. (In this case, the series of similes is also a series of insults!) A simile is a comparison, used to highlight certain qualities in a person or thing that is being described. When you read or hear a simile, you picture the 'mouse's hole' (for instance), and that helps you understand

something about the nostril. In analysing the simile further, you say to yourself, 'What is a mouse's hole like? It is quite big (compared to a nostril). It is dark inside. It is full of messy nests and it is dirty.' Then we can see more clearly what the poet thinks about the person's nose!

A simile is an explicit comparison. In other words, the writer or speaker is open about the fact that this is a comparison. A simile, in English, always uses the words 'like', or 'as', e.g. 'Your nostril is like a mouse's hole' or 'In the tunnel, it was as black as night.'

If the poet had written 'Your nostril is a mouse's hole' this would have a similar impact, but this kind of comparison is called a metaphor. Here, the comparison is implicit. We are not told that a comparison is being made. The nostril is described as if it is a mouse's hole.

*Original source: Machin, N. African Poetry for Schools: Book 1*

## 2 Discussing ideas in the home language

People often feel that a teacher should use only the additional language in class in order that students become as fluent as possible in it. This is not an unreasonable view and it does work well in certain situations. However, the reality in many African classrooms is that:

- there are no native or very competent speakers of the additional language (students or teachers) in the school
- students have little exposure to the additional language outside of the classroom
- most teachers do a lot of code-switching (i.e. alternating languages while they are talking)
- if only the additional language is used, students are lost most of the time, especially in the early years of learning the new language

When students have learned the additional language for a few years only, and do not have much exposure to it outside the classroom, they can only understand and make sentences relating to everyday realities. They are often not yet able to use it to discuss ideas and concepts. In order to extend learning to discuss ideas, it can be useful to take a bilingual approach.

### Teaching Example 2

In Kibaha, Zawadi Nyangasa led her Standard 7 English class in a lesson based on a story about a king and a shoemaker. She wanted them to think about the nature of true 'wisdom' and 'cleverness', and the purpose of education.

She read the story aloud to the class, stopping from time to time to ask questions to check understanding. Most of the questions and answers

were in English, but there were times when she used the mother tongue to clarify a concept or to relate the story to the students' life.

After reading the story, she asked the students to discuss the following questions, in small groups of four to six. She encouraged them to use their mother tongue.

- Do you think the shoemaker was an educated person? Was he wise? Clever? Happy? What are your reasons for saying so?
- What are the important things that we learn at school? Why are they important?

They reported back in their mother tongue, and had a general discussion on the questions. She made notes on the board, also in the mother tongue.

## Activity 2

Read the box below and think about aspects of the reading that may cause difficulties for your class.

Safety starts with the spirit of Ubuntu by Buyi Mbambo.

When I was growing up I felt safe. I could walk everywhere by myself; I could go to the forest to collect wood; I could go to the river, even if I was the only one on the long, winding footpath. The only things I was afraid of were imaginary ghosts, wild rats, and maybe the cattle I would cross paths with.

The sight of a human being, an adult, was a welcome one, because whatever came from them was filled with love and concern. Yes, adults would be angry that I was on my own late in the afternoon; they would wait for me and help me put the bucket on my head. They would make sure I took the safest route home; sometimes they would shout for people to meet me half way. On the way to and from school, there would always be an adult curious about where we were going, concerned about how late we were, or about our appearance.

In my mind, as a child, adults were nosey. They did not hesitate to go home and tell my parents they had seen me doing something wrong; by the time I reached home I would have been 'talked to' seriously by all adults, whether they knew me or not. Nosey or not, I had a privileged childhood, as did many of today's adults.

A lot has changed for today's children. Families have been broken up by a number of factors; the culture and spirit of concern and high regard for children, and for one another, has been destroyed. Children and families live more and more in isolation and there is a general hesitancy about becoming 'involved' in the affairs of your neighbour, even if your involvement could save a life.

*Extract taken from: Children First*

Read the passage with your students, discussing any unfamiliar words or concepts.

Ask them how the adults in their world behave:

- do they behave like the ones described in the first three paragraphs of the passage, or like those described in the fourth paragraph?
- is the behaviour of adults helpful to them as young people? Why, or why not?

Have this discussion in the home language. If it would encourage deeper discussion, let students discuss in small groups, and report back after 15 minutes or so.

Ask them to choose an adult they know whom they admire and write a description of this person, using a language of their choice. Read 'Who is my father?' They could work in pairs or groups of three or four.

### **Who is my father**

#### **My brother**

My brother's name is Ipyana Mwakipesile. He is 18 years old and he is like a father to me. My father died a long time ago. He plays a major role in our lives though he is a very young boy doing Standard I at Azania High School. He is responsible. He takes good care of us. He cooks food and cleans the house. He looks after baby because my mother passed away a few months ago. Every afternoon he closes the gate so that we are safe inside. He supports us in every way. We don't feel that our mother is also no longer there for us. My brother always gives us that love we used to get from our parents. Every Saturday, he bakes cakes, does shopping as my mother used to do. My brother is like a father to us. We trust him, we love him.

#### **My father**

My dad was born and raised in Mbeya [from] where he later moved to Dar. He attended Minaki Secondary School and within those two years, his mother died. His father left him and his two younger sisters. He lived with his grandparents and then his aunt before being moved to an orphanage.

During his years in the orphanage, he had to face many adversaries and learned many lessons. He was exposed to bullies and often had to protect his sisters. Although it seemed that he had a hard time, he appreciated all that he had at the orphanage. The hardest thing for him was not having his own family.

As a result of his upbringing in the orphanage, he learned to fend for himself. In matric, he was made head boy at his high school. He also was very popular and took part in various cultural activities as well as sport.

After school he did his national service and saw many parts of Tanzania. He often shares stories and events that he experienced during his time in the army. His experiences in the orphanage helped him cope with life in the army and he was placed in the leader group, and became an instructor. My dad has always had very good and special friends and has always been in some or other leadership role. Here he discovered that he had a special

talent for teaching. After doing his national service, he went to study to become a teacher.

At college he met a girl who became a very special person in his life. After his studies he became engaged to her. It did not work out and it was at this time that my mother came to work on the same staff as my father. They became friends and were later married.

In 1990 I was born and ever since, I have been close to him.

My father has played an important role in my life, and I someday wish to pass on this gift he has given to me. He has been my teacher, my sports coach, my mentor and most of all, my closest friend.

*Adapted from 'Children First' Nov/Dec 2004/ Vol 8 No 58, pages 5, 6, and 7*

Collect their work and give feedback. They may have shared deep feelings, so respond in a human way to the content, rather than focusing on the grammatical errors, etc.

### 3 Transfer from home language to additional language

Once skills and understanding are established in a well-known language, it is easier to transfer them to an additional language. Many academics also believe that if a person can look at a subject through the perspectives of two languages, their thinking skills are improved. It is important that you make sure your students see themselves as richer – rather than poorer – because they have two or more languages.

When your students have discussed ideas in the home language or lingua franca, it is valuable for them to find and learn ways of expressing these in the additional language. You need to continually think of ways to help them do this. This part offers you some ideas.

#### Teaching Example 3

Zawadi made sure that the Kiswahili notes from the lesson on the king and the shoemaker were not rubbed off the board.

In the next Standard 7 lesson, she started discussing with the students how they could answer, in English, the questions she had asked.

They talked about some of the key Kiswahili words or phrases they had used, terms like *tabia*, *maumbile*. What kind of person, or quality, did each term refer to? Did they know people with these qualities?

They also discussed, in the same way, some of the key English words in the questions: educated; wise; clever; happy; learned. She reminded them that there are not always direct translations for words from English



into Kiswahili, or from Kiswahili into English. However, they found ways of expressing the ideas that were on the board in English. In the process, they learned new language structures and some new vocabulary.

Zawadi put these on the board and asked them to work in groups and write English answers to her two questions. The group could create the answers together, but students had to write their answers individually.

Zawadi found that this code-switching helped her students develop their English much more.

### Activity 3

Ask some of your students to share their descriptions of adults they admire with the class. Ask the class to identify one or two adults they admire in the community, and see if these adults would talk with the students.

Decide on a few questions to ask, e.g.:

- what is most important for you, in life?
- what life experiences have made you stronger?
- who had the greatest influence on you as you grew up?

Agree who is going to ask the questions, and how to record what the person says. Students and adults will probably use the home language.

After the visit, discuss what the students learned.

**Ask your students: What qualities and values would you like to develop as you become adults?**

Work out home language and additional language terms for these, and write them up.

Ask them to write out their own 'vision' and/or 'mission statement' in the additional language.

#### **Vision and mission statements – some examples**

A vision statement is usually short. It is focused on the future and what you aim to become in the future.

A mission statement is often a bit longer, and gives more detail of what has to be done to achieve the vision.

Here are two examples:

#### **Vision statement for the School of St Jude, Northern Tanzania**

To be an exemplary, modern and self-sustainable institution that effects a paradigm shift on the educational system in Tanzania by enabling Tanzanians to run successful and moral schools, thereby alleviating poverty and breaking the cycle of dependency on external aid.

**Mission statement of an anonymous man**

To be the person my children look to with pride when they say, 'This is my dad.'

To be the one my children come to for love, comfort and understanding.

To be the friend known as caring and always willing to listen empathically to their concerns.

To be a person not willing to win at the cost of another's spirit.

To be a person who can feel pain and not want to hurt another.

To be the person that speaks for the one that cannot, to listen for the one that cannot hear, see for the one without sight, and have the ability to say, 'You did that, not I.'

To have my deeds always match my words through the grace of God.

*Original source: Covey, S. et al. First Things First*

## Numeracy: Exploring 3D shapes

- 1 2D shapes and 3D objects
- 2 Pyramids
- 3 Observing and making 3D objects

**Key question for the teacher:**

How can you use practical tasks to investigate the relationship of 2D to 3D shapes?

**Keywords:** polyhedra; investigation; patterns; surfaces; edges; vertices; polygons; subject knowledge

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- developed your own subject knowledge of regular polygons (2D shapes) and polyhedra (3D objects)
- explored practical activities to help students investigate the relationship between polygons and polyhedra

## Overview

The process of building real geometric solids provides an informal and practical way for students to get to know and understand geometric objects.

Because students are able to touch the shapes and objects being studied, they feel more confident about thinking in a more abstract way. If these shapes are linked to objects in everyday life, this helps students' thinking and visualisation.

## 1 2D shapes and 3D objects

To explore and investigate polyhedra, it is important to have examples in your classroom. There are several commercial plastic building sets to make 3D objects that can be bought to use in the classroom, but it is as easy to make your own from recyclable materials such as plastic, card and thick paper. Making their own shapes helps students understand the properties of shapes better.

Plastic drinking straws can be used with thread and wire to build 'skeletons' of 3D models. As a teacher, make it a habit to keep objects that may be useful in the classroom – for example, always keep a straw whenever you buy a cool drink. Ready-made nets of various solids that fold up for storage can be used to help students explore the difference between 2D shapes and 3D objects.

### Teaching Example 1

Mrs Yomba, a primary teacher in Lindi, Tanzania, wanted her students to be aware of the difference between 3D objects and 2D shapes. She knew this was sometimes a difficult concept for them.

She described 3D objects as those 'one can pick up, like books, pens, desks, etc.'. She said that 2D shapes are things you can see but that you cannot pick up: an image of a horse on a photograph, or a painting of a person, even a square drawn on paper. She said, although one can pick up the photograph or the painting, one cannot pick the horse out of the photograph or the person out of the painting.

She then invited them to suggest other things that could be regarded as either 2D or 3D in the classroom. Some students were quite excited about the distinction, but others really struggled to believe that a piece of paper or a window are 3D objects because they were 'too thin'.

Mrs Yomba decided then to give her students homework. She asked them to go home and tell their parents about what they had learned, and that their homework task was to bring a list of at least ten things from home or the local environment that are 3D. She believed that by doing this they would consolidate the work they had done in class.

### Activity 1

Before you teach this lesson, you need to collect or make some 3D objects and keep these in a box

- Triangle
- Square
- Pentagon
- Hexagon
- Septagon
- Octagon

Organise your class into groups of between six and eight. Ask your students to look carefully at the shapes and objects in the box. Ask your students what shapes, like squares and rectangles, they can see in the objects.

Tell them the names of the objects:

- Prism e.g. cube, cuboid, cylinder
- Pyramid e.g. cone, sphere

**Ask them if they know other objects that look like these shapes around the school and near their homes.**

**Explain that all the solids, except the cylinder and sphere, are also called polyhedra. Ask them: 'Why do you think cylinders and spheres are not considered polyhedra?'**

Tell them that the word polyhedron is from a Greek word for 'a seat'. Prisms and pyramids have many flat surfaces like seats but a cylinder is not a polyhedron as it has a curved 'surface'.

Finish the activity by asking each group to count the surfaces on each object. Ask them to record their answers in their books. Share each group's answers as a class.

For homework, ask them if they can see any of these shapes on their way home – or at home – and report back the next day.

## 2 Pyramids

Pyramids interest students. Here we explore how to visualise different pyramids. The teacher in **Teaching Example 2**, by doing some cross-curricular work, showed his students that mathematics has connection to other subjects and to real life. **Activity 2** looks at the mathematics of pyramids by asking students to make their own, using nets.

### Teaching Example 2

When Mr Ahmadu planned his lesson, he wanted to involve other teachers and to give his students more than just a mathematical experience. He spoke to his colleagues in social studies and they gave him a picture of groundnut pyramids in Maiduguri, Nigeria.

He displayed the picture where all his students could see it and asked them to tell him what they knew about the picture. Mr Ahmadu made a mind map of what they knew about how the pyramids were built.

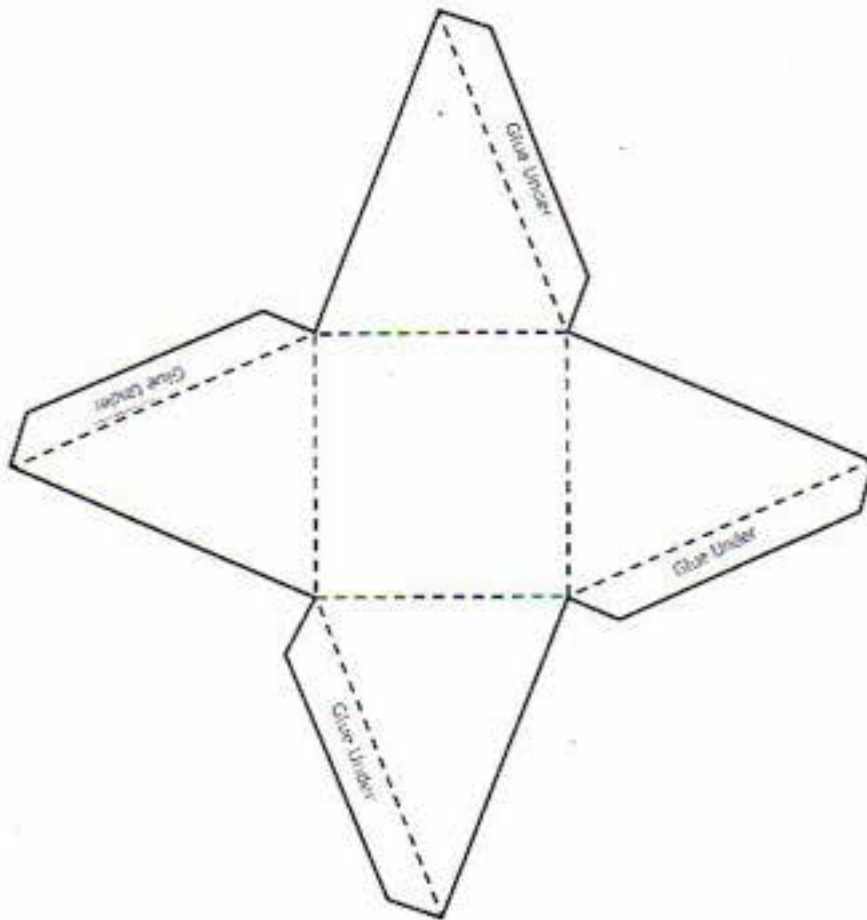
Next, he organised them into small groups to discuss the pyramids and list any questions they had about them. He collected all their questions together and sorted out those that were about the structure of the pyramids and their shape.

He gave each group a pyramid that he had made from cards. He asked the groups to think about the shape and structure and any common features – i.e. sides, edges and surfaces on each.

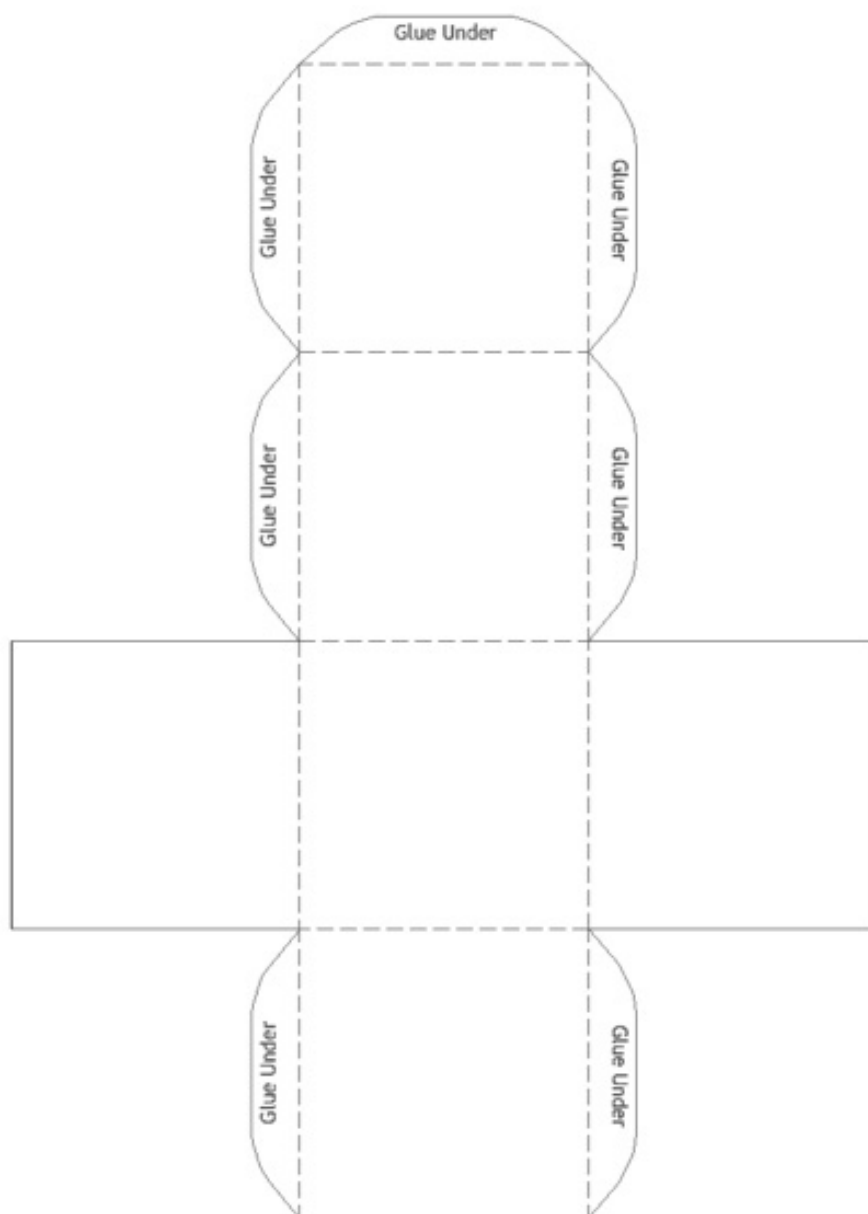
Below are templates for different 3D objects that your students can make.

**Tetrahedron template**

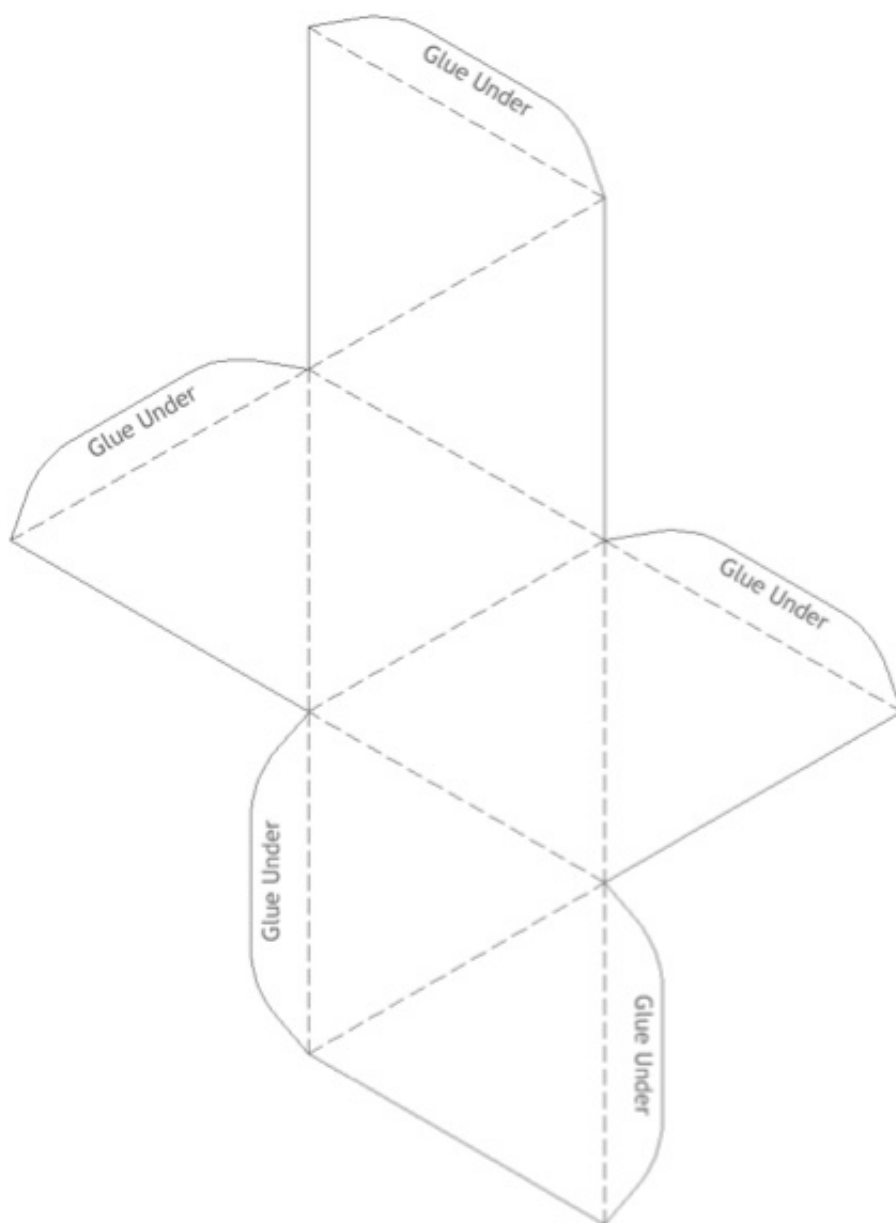
**Net square based pyramid**



Cube template

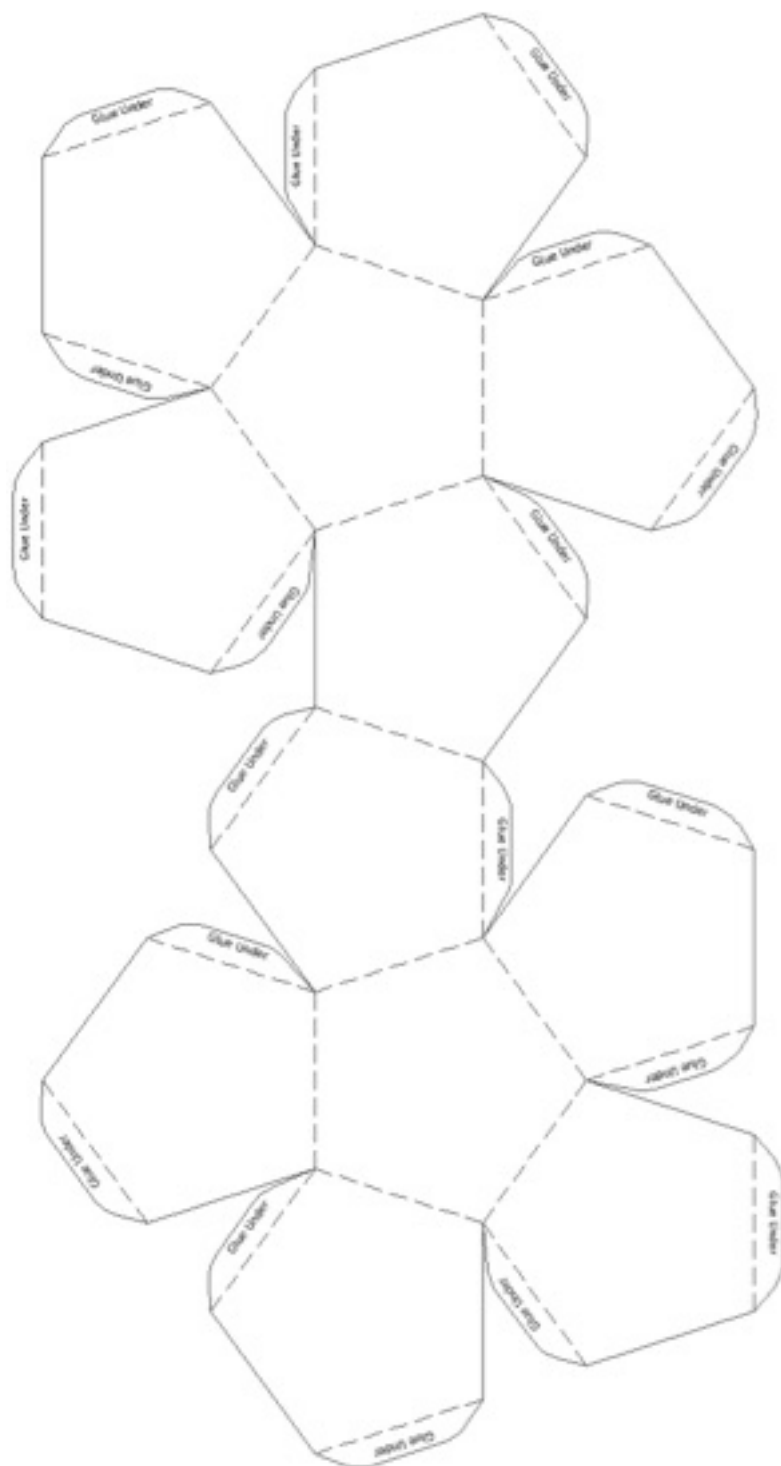


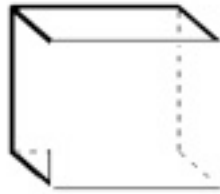
Octahedron template



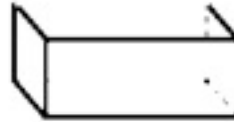


Dodecahedron template

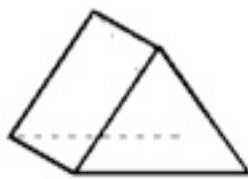




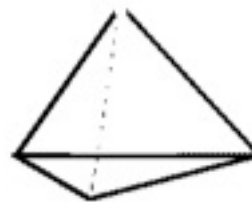
Cube



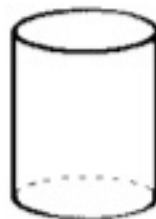
Cuboid



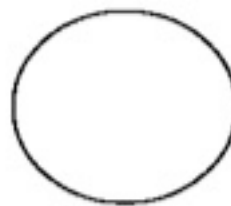
Triangular prism

Triangular based  
pyramidSquare based  
pyramid

Cone



Cylinder



Sphere

Next, he asked them to think how people were able to build such large structures as the pyramids in Maiduguri. He showed them more pictures of how pyramids were built and this really interested his class. As a result they asked their social studies teacher to tell them more about the pyramids.

Mr Ahmadu felt that this mixing of mathematics and social studies helped his students' motivation as they began their mathematics work.

## Activity 2

You will need copies of the nets, paper, scissors and sticky tape or glue. If you only have enough materials for one group to work at a time you can spread this activity over a week.

- Explain to your students that pyramids can have bases of any number of sides – the simplest have equilateral triangles on all four surfaces, but pyramids can be made with any regular polygon as a base: the groundnut pyramids are made of triangular sides, but have square bases.
- Give out the nets of triangular and square-based pyramids, and ask students to cut, fold and glue these to make paper pyramids. Mount a display of them.
- Next, place some straws or matches on each group's desk and ask if they can, using string or sticky tape, make a pyramid out of these materials. Go around and support the groups while they work. Let them share what they did to make their pyramids.

## 3 Observing and making 3D objects

In this part, we move to a more formal exploration of different shapes through using activities that involve students making careful observations before making some different 3D objects themselves.

### Teaching Example 3

Mrs Bako wanted to extend her Primary 5 class' understanding by building some polyhedra to make a new set of mobiles to hang in her classroom. She asked her students to group themselves into teams of six to eight and gave each group scissors, card and glue. She asked each group to make 32 equilateral triangles, 6 squares and 12 pentagons. She wrote the dimensions for each shape on the board.

She asked them to investigate how many different polyhedra they could make with their polygons by following these rules:

- Use one type of polygon at a time to make the polyhedron.
- The polyhedron must be a closed shape. All the edges must join up.

The students really enjoyed the task.

Next, she gave them nets of regular polyhedra and asked them to cut them out neatly, fold them and paste them to make polyhedra. They found that the shapes they built were the same as the polyhedra they had discovered.

She discussed whether it was easier to make the nets into polyhedra or easier having the shapes loose. Most students agreed the nets were quicker.

### Activity 3

---

*First, consolidate students' learning from earlier activities. For this, you will need your box of shapes and objects and charts to record results (see table for recording results) or ask your students to draw the two charts in their books.*

Organise your students into pairs or small groups. Give them one of the items from your shapes box, and ask them to carefully look at the shape and complete the chart as best they can.

Suggest they complete a row at a time. Ask them to return their shape to the box and take another one until they have looked at every shape.

After an appropriate time, ask one pair or group to give their answers to the class for one shape. Go round the class until all the shapes' features have been shared and each pair has been able to check their answers against everyone else's.

**Ask them if they noticed any patterns in their observations. Which shapes and objects are related?**

Display their charts.

## Recording results

Shape, Space and Measures – Shape

## Shape Up!

Complete this 2-D shape table...

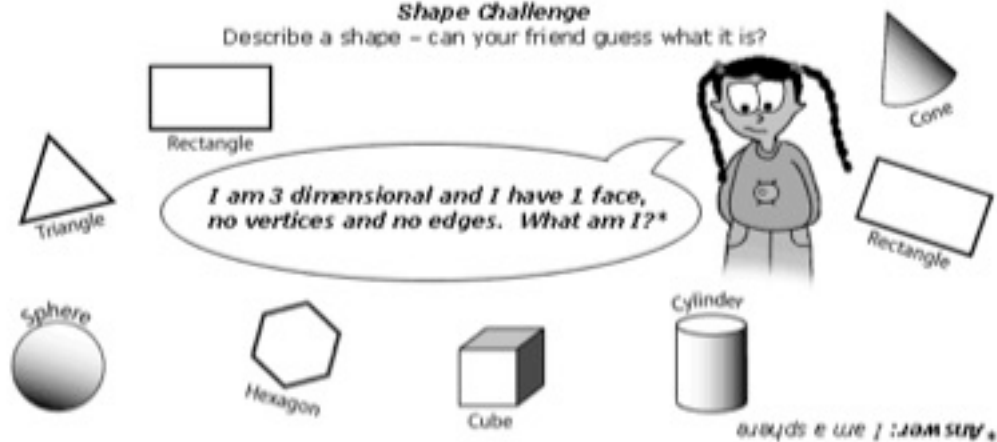
Name of Shape	Number of Sides	Equal Sides?	Parallel Sides?	Number of Angles	Equal Angles?

Now finish this table for 3-D shapes...

Name of Shape	Faces	Vertices	Edges

## Shape Challenge

Describe a shape – can your friend guess what it is?

Original Source: <http://www.bbc.co.uk>

## Science: Investigating air

1 An introduction to air

2 Marvels of air

3 Air is all around us

**Key Question for the teacher:**

How can you use models, experiments and discussions to help students build a picture of air?

**Keywords:** gases; air; particles; assessment; model; investigation

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- considered how to support language learning in science
- explored ideas about air and particles with your students
- used different ways to assess your students

## Overview

This section has two main purposes:

to increase your own awareness of how language supports students as they think and behave scientifically;

to do this as you help students understand the nature of air and how it behaves.

Classroom teachers often resort to teaching science with talk in the mother tongue and writing and testing in the target language, such as Arabic, Kiswahili, English or French. Yet much valuable language learning can take place in science lessons because the language to be learned is 'linked to action'.

# 1 An introduction to air

This is the focus of **Teaching Example 1**. Even the action of ‘pointing out’ something in a short demonstration can help you assess students’ learning. What students say, as they point out something, reveals what they know. You follow this up in Activity 1 with a series of investigations in which the emphasis is on careful observations and deductions – what do students’ observations tell them about the nature of air? Encourage the use of lots of different descriptive words; this is an ideal time to reinforce language learning.

## Teaching Example 1

Many teachers of younger students do not believe you can teach a whole science lesson through the medium of English. ‘The children will be lost,’ they say. At a recent workshop in South Africa, the co-presenter, Lawrence Manzezulu, challenged them to try.

We planned a lesson together (see below) with many opportunities where talk and thought could be linked to action. Nervously, a teacher volunteered to do the teaching, starting by explaining that she would only be speaking English – but students would be free to talk in whatever language they needed at the time.

She ended the lesson by asking what they had learned, and one student said (supporting his use of English with gesture) ‘We have learned, M’am, that air is up, down, in, out, all about.’ (That was an unforgettable teaching moment.) And the teacher said her first Xhosa word – ‘ndiyakumsha!’ (‘I have mastered it!’ in English).

### An introductory ‘air’ lesson

Begin by giving one student a bucket and asking them to go outside to fetch you half a bucket of water. Then give another student a large clear plastic bag and ask them (you might want to pick a student who can take a joke) to go outside to fetch you half a plastic bag of air. This will surely cause a brief moment of puzzlement as it is of course a bit of a joke – but it proves a point – ‘air is all around us’. Insist that the air is fetched from outside. Then hand out three or four more clear plastic bags with which to catch air from:

- under a desk
- in the far corner
- by the window
- from one student’s own lungs

Emphasise to your students that air is all around us.

Divide the class into eight groups. Each group should choose a leader. Explain that when they come back after the break, they will take turns to work for ten minutes at each of four workstations to find out some more about air. This is called rotating group work.

During break time, set out the workstations with the necessary equipment, and a copy of the work card for each station.



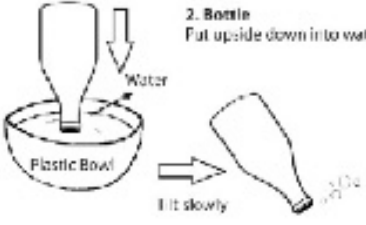

You could get the eight group leaders to help you do this so that they have been prepared for leadership roles in what is to come.

Then it is over to the groups to do the work. At the end of the lesson, ask students to summarise what they had to think about and what they feel they learned at each workstation.

## Activity 1

Take a soccer ball (or other ball) and tell your students it represents the Earth. Hold it out in your left hand and move your right pointing finger slowly towards it from a distance as if it were a spaceship coming back to Earth. Tell students to raise their hands when they think the spaceship has reached the air. (Note when the hands go up.) Stop when you are a few millimeters from the surface of the ball. Tell them, 'Here! Here is where the air starts.' **Did any students think or know that?**

Now ask pairs of students to work through the small experiments in the box below to find out more about the air around them.

Station 1: Where do we find Air?		Equipment: Plastic syringe, plastic basin of water, two pill bottles, bits of sponge, tissue, small bits of dry brick or sandstone
 <p><b>1. Soil:</b> Half fill a plastic syringe with soil or sand. Suck up water to the level of the top of the soil. Observe carefully what happens as you do so. What happens? Why?</p>	 <p><b>3. Crumpled tissue</b> in bottom of the dry pill bottle. * Immerse (push under) the surface of the water. * Don't tilt. * Remove the bottle. Why isn't the tissue wet?</p>	
 <p><b>2. Bottle:</b> Put upside down into water. Tilt slowly. What comes out of the "empty" pill bottle?</p>	 <p><b>4. Sponge:</b> Push a piece of dry sponge under water and squeeze! What happens? Why?</p>	
	<p><b>5. Brick:</b> Drop a small piece of porous stone into the water. Do you see bubbles? There must be space in the solid with air. The water replaces (takes the space) of air and the displaced (lost its space) air bubbles away.</p>	

Ask students to record what they have found out about air:

- what it is like;
- how they know it is there;
- how it is different from water.



**Are you surprised by their ideas? Listening to their ideas and observations gives you an opportunity to assess their understanding of what air is and how it behaves.**

You could start by observing and comparing non-living things, for example sheets of paper, parachutes, kites and airplanes. It can be useful to observe and compare things dropping, or falling through air. It begins to give students the idea that air must consist of small particles that are free to move, but nevertheless get in the way and push against things as they drop.

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## 2 Marvels of air

In Teaching Example 2, we read how a teacher uses a student's question to get the class talking and thinking about how airplanes stay up. **Activity 2** starts by getting the children observing using different languages, and then moves to a practical challenge where students' thinking is revealed by what they do to solve a problem.

### Teaching Example 2

When Paulina Kiyonga at Kamonkoli Primary School gave her students the chance to raise their own questions about air, Mutumba wanted to know what kept an airplane up in the air. Paulina got some advice from a colleague at nearby Kamonkoli High School. Read his advice in 'What lifts an airplane?' below.

Some of the demonstrations and activities he suggested really puzzled the students, especially the one where the table tennis ball could not be blown out of the funnel, no matter how hard David tried. Yet tiny Jimmy could hit the roof by blowing through a tube of cardboard. What impressed Paulina most was that her students even suggested some changes to the 'blowing under the paper bridge' activity. What would happen if the bridge were the other way up? She praised them and let them test this out as well.

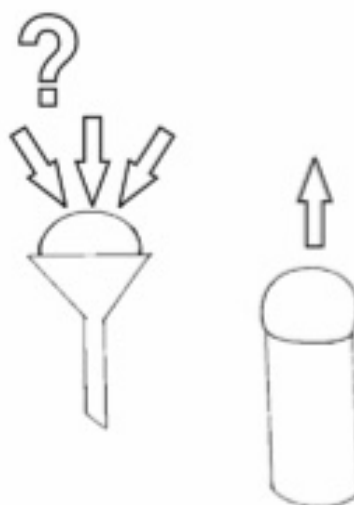
At the end of the lesson, they gave a short presentation to the head teacher about this question:

### 'What lifts an airplane?' Practical activities to carry out with your class

One of the questions that children ask is 'What keeps something heavy like an airplane up in the air?' This is a really good question. Their teacher explained that there were a number of practical things that could be done to hint at how an airplane was lifted. But it does take quite careful explaining.



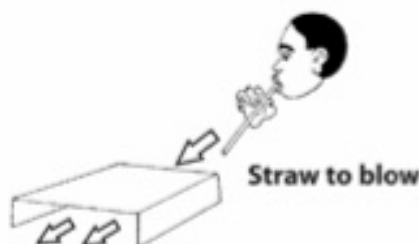
One way to get people thinking is to compare blowing ping-pong balls with two different tools. You need the cardboard tube of a used toilet roll and a plastic funnel. You want to blow the ping-pong ball against the ceiling. Ask the class to predict which tool will be the best ping-pong ball blower – the toilet-roll tube or the plastic funnel. Then let them try.



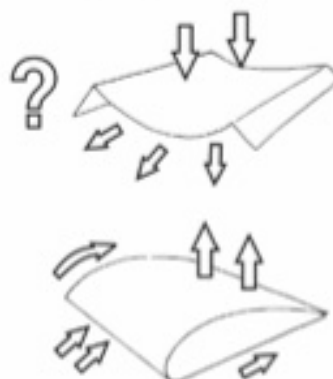
Now this is something to think about because the result is quite unexpected!!!

What is happening in the funnel that holds the ball down so strongly? It can only be the air!

Another teacher gives us another practical activity to try. Make a little bridge of paper by folding down two sides. Use a straw to flow air under the 'bridge'.



What do you predict will happen? What does happen? Why does the bridge collapse inwards and not bulge outwards?



A third thing to try is to fold a sheet of A4 paper slightly off-centre, and then to glue down the two ends to form a model of the wing of a plane or a bird. Blow straight against the front edge and see what happens. The paper model lifts up. Why?

**Clues**

Think of a group or cluster of people walking along a road. They hear something dangerous behind them and start to run away. What happens to the arrangement of people?

*Yes. They tend to spread out as their speed increases.*

Now, try the same thing with a handful of marbles. First roll them slowly across a smooth surface and they tend to stay clumped together. Then roll them more speedily and they tend to spread out.

When air is forced to move more quickly over a curved surface or through a narrow space, the particles spread out. This means that there is less pressure. So you can get a strong force or lift from the air on the other side.

*It can be useful to observe and compare things dropping or falling through air. First we tried paper races. We compared the way two identical bits of paper, labeled A and B, fall through air. Why does a crumpled sheet fall more quickly? Trying to find the best words to describe the observed movement of the flat sheet and the crumpled ball makes for an excellent multilingual language activity.*

**Paper A (flat)**

Floats

Wobbles

Twists

Dives

Zigzags, like a leaf or a feather

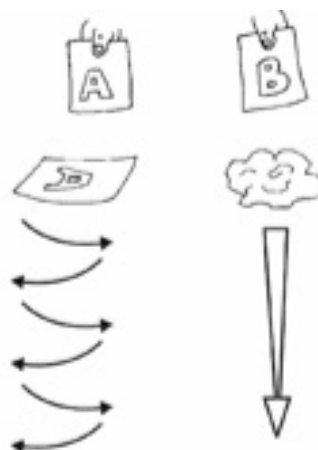
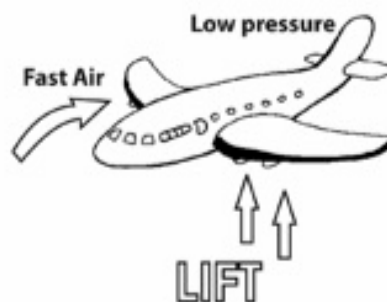
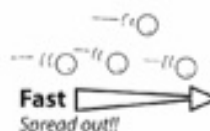
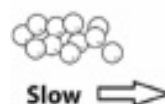
**Paper B (crumpled)**

Drops

Straight

Fast

Falls, like a stone



## Activity 2

First, demonstrate the 'fast paper race'. Stand on your chair or table and hold high two identical sheets of A4 paper, labelled A and B.

- Ask students to guess which one will reach the ground first. Just before you drop them, crumple paper B into a tight ball. Repeat the action a few times asking the students to observe and compare carefully.
- Draw a two-column table on the board to record their observations and descriptions of how each paper fell. Students use the languages they know to describe the movement of the papers. This makes an excellent multilingual activity and gives you a chance to assess your students as they think and talk.
- Finish with the 'slow paper race'. Give pairs of students identical long strips of paper about 30 cm x 5 cm. Their challenge is to modify (change in some way) the paper, so that it falls very slowly through the air. Which design falls slowest?

*Adapted from: Primary Science Programme Grade 4 Air Workshop Report*

### The slow paper race

You can cut, tear, fold, glue....  
anything you like except  
discard any paper.

**Problem - You have a trip of paper the size of a ruler. You want to design a way to make the paper fall as slowly as possible through the air.**

In nature plants have this same problem when they want to disperse their seeds. How can they delay the actual falling of the seed so that the moving air can spread the seed away from the mother plant.

- So think carefully before you do anything to the paper. Try to visualise in your mind's eye- how you will change the paper strip. Tell the person next to you what you plan to do and why. Decide finally exactly what you want to do. Do it.
- Then work out a way to find out who in your group has designed the best way to make the paper fall SLOWLY!!

### 3 Air is all around us

The activities in this section will have begun to give the students some sense of what is called 'the particulate nature of matter'. If you watch the way a sheet of paper cuts its way through the air as it falls, you can almost imagine the invisible particles getting in its way. Paulina mentioned particles when explaining the low pressure above the wing of an airplane.

It's difficult to show students the particles in air – they are far too small to see even with a microscope, so we need to use models to help our students build a picture of what air is like. In Activity 3 you use the students to be particles in the air. Many students enjoy learning by touching and doing, they enjoy being active and find it easier to remember what they have actually experienced.

In Teaching Example 3, one teacher builds a model to show how air is made up of a mixture of different particles and follows this up with investigations around breathing. Both types of approach give you the opportunity to assess your students' learning.

#### Teaching Example 3

Mabel Amooti really enjoyed science at high school, and she was enthusiastic about her students learning science in an active way.

Her class had been looking at air and talking about how it was made up of different gases and how people breathe in oxygen and breathe out carbon dioxide. Mabel wanted to show that this isn't right. You breathe in a mixture of gases and breathe out a mixture. It's just that there is more oxygen in the air you breathe in and more carbon dioxide in the air you breathe out. How could she show this? The particles of each gas are invisible. To make it clearer, Mabel demonstrated with a model.

She used everyday granular solids (salt, pepper, sugar, sand) to represent the separate parts of air and then very clearly mixed them together. She was then able to show that it wasn't possible to just inhale oxygen. Rather, all the gases go into our lungs but only the oxygen moves into the bloodstream.

She followed this with two questions to her students:

- How many times do you breathe out in a minute?
- How much air do you breathe out in a normal breath?

She was delighted with their results. The class produced a lot of data. Together, they looked at the data and tried to answer questions such as: Who breathes faster, boys or girls? Older or younger students? and so on. They displayed their findings in charts on the wall using large sheets of newsprint.

### Activity 3

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First, squirt a small amount of an air freshener into the air in one corner of your classroom. Tell students to put up their hands when they can smell it.

Ask: How has it got to your nose? Guide their discussion to ideas of particles; air is made up of very small particles, which are moving round all the time.

- Now tell your class that they will be air particles.
- Take them outside to a suitable space.
- Tell them they must freeze when you call 'stop'.
- Ask them to run around.
- After a minute call 'stop'.
- Ask: Where are you all? How are you arranged?
- Select five students to stand near you and give them each a hat.
- Now ask everyone to resume running.
- Call 'stop' after a minute.
- Ask: Where are the students with the hats? Have they spread out?

**Gather your students round you and talk about this model. Who were the students with the hats? How will they move if the gas is hotter? Colder?**

Take your class inside and ask them to use these ideas to work in groups to draw a poster to show how cooking smells spread through a house.

### Finding out more about air: Lesson Plan

## 1. Brainstorm What do we know about air?

We suggest that you start with a brainstorm and spend about 10 minutes recording what is known about air in the form of a mind-map

Finish off by asking what pupils think of the statement

**We breath in OXYGEN and  
we breath out CARBON DIOXIDE.**

Tell them that there is a big problem with such a statement. Ask if anyone can think why.

Point out to the class that air is a mixture of gases and not just one single substance.

Explain that they are going to make a 'model' to represent the mixture of gases that form the Air.

## 2. What do we mean by a model?

Pupils probably need to know that a model is a tool to help build a clear understanding of what we think something is like.

One way to do this is to compare a real child with a doll, as in the table below. We think this really helps the pupils make sense of the next part of the lesson.

A child	+	A doll
Can talk	Both	Plastic
Walk	head	No heart
Eat	arms	small
Breathe	legs	can't see
Play	eyes	
	ears	
	nose	
	mouth	
	fingers	
	e.t.c.	
↓		↓
<b>Real</b>		<b>Model</b>

### Making Air Easier to See and Feel

If we catch a bagful of air in a clear plastic bag we can see that it is there and we can easily feel it. But we still can't see what makes up the air. We can't see the parts like we can for a person or a doll. We need to make a model to help us understand that Air is a mixture.

Now let them work in groups and give them careful step by step instructions so that they prepare a blank A4 sheet like the drawing on the right.

Have a teaspoon for each group as well as some clean sand, some sugar, some salt and some pepper.

Explain that sand represents nitrogen, sugar represents oxygen, and salt represents other rare gases.

Tell them to measure out 4 teaspoons of sand into the Nitrogen circle.

Tell them to measure out 1 teaspoon of sugar into the oxygen circle.

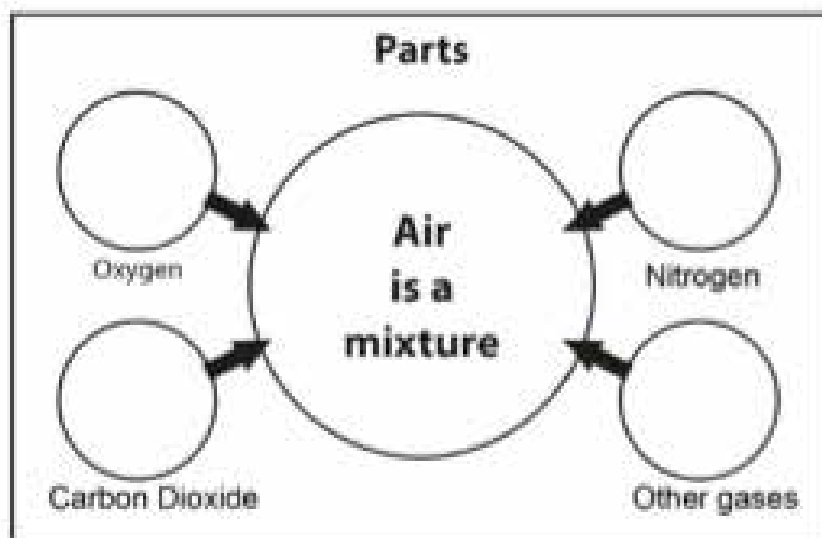
Now let them put one small pinch of salt into the carbondioxide circle.

Finally, let them put just a few grains of pepper into the other rare gases circle.

Remind them what each substance stands for and then tell them to mix everything together into the central circle.

Finish by spending a little time talking about the model they have made.

Can they see why it is impossible to breath in only oxygen and to breath out only carbon dioxide?



You can make self standing labels

with  on one side and

 on the other.

 Sugar

 Sand

 Salt

 Pepper



## Arts: Using music in the classroom

- 1 Exploring sound
- 2 Praise songs
- 3 Group music making

### Key Question for the teacher:

What different approaches are there to making music in the classroom

**Keywords:** music; sounds walk; praise song; group work; community instruments; culture

### Learning Outcomes for the Teacher

By the end of this section, you will have:

- used the environment and community as resources for learning
- planned practical music activities
- involved students in making their own music, using different musical cultures and forms.

## Overview

Music is an important part of most people's lives and cultures. Understanding the place of music and how making music can help students' self-esteem and confidence is important.

The emphasis in this section is on exploring different sounds and working together. Throughout these activities you encourage your students to listen carefully, ask questions and experiment.

# 1 Exploring sound

The environment is a valuable resource for exploring sounds and how different natural materials can produce sound.

The aim of this part is to broaden your students' understanding and experience of different types of sound, and to see themselves and their immediate environment as music resources. Teaching Example 1 and Activity 1 show how sounds in everyday life are a good starting point for this topic. These activities could be extended to ask students to make their own instruments from everyday materials (tin cans, bottles and so on) or you may be fortunate enough to have students who can play an instrument or sing. Organise for them to demonstrate their skills to the class.

Begin with investigating the science of sound with students. Explore these questions with your students by making different sounds, in different ways, using the objects around you as sound makers: a desk, the floor, a pen, a bottle, chalkboard or window. Remember, talking about sound must always relate to our aural and physical experiences of sound.

- What is sound?
- What has to happen for us to hear a sound?
- How does sound travel to us?
- What makes something a musical instrument?
- Can we use our own body as a musical instrument?
- Why do you think people use instruments to make music? What purpose does it serve?
- Which musical instruments do you know about? Can you classify them into groups?
- What criteria did you use to classify your instruments?

## The science connection – how sound travels

Have you ever seen a 'Mexican wave' at a big sports event? Sound travels in a similar way to the movement of a Mexican wave: the air molecules, like people in the crowd, move backwards and forwards, combining to make a wave. The individual molecules do not actually travel from one place to another: molecules vibrate, each about its own position, when something makes the molecules next to them move. These vibrating molecules then attract other molecules, so that they move out of their positions.

Sound can travel through the air or through anything made up of molecules, like water, steel or wood. Sound travels at different speeds depending on the substance it is moving through.

### Teaching Example 1

In her primary class in Soweto, South Africa, Ms Simelane notices two boys tapping the desk. She listens carefully as they create a rhythmic conversation using the desk as a drum. Then they tap their pencil cases. Ms Simelane draws attention to their music, asking the class to close their eyes and listen. 'Are they making music? How?' 'What different sounds can you hear?' The students become interested in using their desks, pens and pencil cases to make sound. She lets them explore the different sounds they can make at their desks, using the objects around them. They listen to each other's sounds and comment on the ways they are made.

### Activity 1

- Before the lesson, read below **Listening to sounds in everyday life**.
- Ask your students to be very quiet and listen to the sounds they can hear in the classroom.
- In groups, or with the whole class grouped around you, brainstorm all the sounds they could hear on a large piece of paper or the chalkboard. (See **Using mind maps and brainstorming to explore ideas** in the *Teaching Pack Additional Resources*.)
- Next, organise small groups of students (four/five) to go out at intervals and walk around the school grounds. They should stop in four places and listen very carefully to what they can hear. They should take pens or pencils and their books or paper or a clipboard for this.
- Each group should note down every new sound they hear and where they hear it, and try to identify what is making the sound and how it is made.
- On their return to class, ask each group to draw their own mind map of their 'sound walk'.

When these are finished, display them for all to see and discuss their ideas about how sounds are made.

#### Making a sound wave

Make a line of ten students next to each other, standing shoulder to shoulder. At one end, ask one student to play a loud instrument like a gong or cymbal and another to hold up a big sign saying SOUND. At the other end, ask a student to hold up a big picture of an EAR and a sign saying HEAR. The other students in the line have signs saying AIR.

The student with the gong or cymbal strikes it. The first student wiggles back and forth using their body (with the feet planted on the ground); then the next student wiggles when they feel the first student (not before!), and so on down the line. The last student holds up the HEAR sign as they feel the wiggle of the student next to them.

**Listening to sounds in everyday life**

This activity encourages students to pay attention to the sounds around them. You can use it as a classroom project or a 'sound search' project at home.

**Sound scavenger hunt**

Ask students to work in pairs to identify and record the following sounds using words, symbols or drawings. The hunt can be done at home, in the street or at school.

The aim is to use their ears, not their eyes!

Ask them to identify:

- a musical sound
- a chaotic sound
- the loudest sound they can
- a short, sharp sound
- a sound that makes them feel calm and relaxed
- a continuous sound (one that goes on and on)
- a sound with a definite pattern
- a sound which makes them want to move or dance
- a scary sound
- a tiny sound
- a sound that is very far away
- a sound that is close by
- a rhythmic sound
- a tinkly sound
- a rough sound
- a long sound
- a deep sound

Use just a few of these with your students to start with, selecting the easier ones (like a deep or long sound) and then extend the list as they understand the task. Let them make up their own descriptions for sounds and try to make the sound that matches their description.

## 2 Praise songs

Praise poetry and singing is an important African practice, past and present. African names carry stories of who you are and where you come from. They tell people about your experiences, your joys and struggles, and what you are like, so that others can know you. People create their own praise songs. Praise poets perform at ceremonies, rituals and festivities to praise a person or group. Praise singing and poetry has become a sophisticated art form, practised in many cultures through music, dance and chanting.

You will help students research and create their own praise poems or songs, focusing on the communication of identity and family heritage. This will enable your students to make connections between themselves and musical practices.

### Teaching Example 2

Mr Ekadu is a musician and arts and culture teacher who grew up in Soroti district in eastern Uganda. He teaches in an urban primary school, where his students represent many cultures, religions and languages.

He is playing an old Iteso song on his guitar as he thinks about his music lessons for the coming month. How will he develop the theme of identity using music? As he sings, the music takes him back to his childhood, his home, parents and grandparents. He remembers hearing naming songs and praises as a child. He remembers his own naming song that tells of his birth and ancestry. His memories form the beginning of an idea for his class.

Mr Ekadu collects some praise poems and songs and devises questions about them. He listens to the songs' call-and-response structure and links this to a familiar naming game his students play in the playground. He plans to do a lesson on praise poems beginning with a familiar song. Next he encourages his class to produce and perform their own praise poems and songs about their friends.

### Activity 2

- Sing a praise song you know to your class or ask a student to sing to the class. Explain to them how the structure of the song works and get them to join in the responses.
- Sing the song again while students keep the beat by clapping, tapping or using their instruments.
- Talk with them about the idea of a praise song, who sings them and why.
- Say a praise poem together, paying attention to the rhythm of the words and communicating the feeling of the poem with your voice. Add instrumental sounds that enhance the poem's mood if possible.

- Next, divide the class into groups of six. Ask each group to work in threes and write their own praise poem. Each three should perform their poem to the other three and then explain the meaning of and feelings in the poem. Together, the whole group chooses a response line to chant in between the individual lines and they practise their two poems. They can add other sounds if they like.

Over the next few days, ask each group to perform their praise poem to the rest of the class.

### **Gracie – A praise song**

Say this poem and ask your students to devise a response that supports the call. Choose instrumental or voice sounds that match the words: high, rooted, calls, soars, guides and moon.

#### **Call:**

Gracie  
High desert dweller  
Rooted in peace  
Calls upon the monkey and the lion spirit  
Soars with the dragonfly  
Guides the pen  
Moon drawn

**Line 1. Gracie** (My name).

**Line 2. High desert dweller** (I was born and raised here in Bend, which is a high desert).

**Line 3. Rooted in peace** (My ancestor Chief Joseph of the Nez Perce Tribe was known for his peaceful nature).

**Line 4. Calls upon the monkey and the lion spirit** (My totem animals are a monkey and a lion. The monkey shows my playful/childlike nature and the lion shows strength, loyalty and ferocity).

**Line 5. Soars with the dragonfly** (The dragonfly symbolises my imagination, love for fantasy, and also dreamland).

**Line 6. Guides the pen** (I love to draw and that is my passion).

**Line 7. Moon drawn** (At night is when I find comfort, the stars give me hope and the moon is who I can trust with my problems).

### **Creating a praise poem or song (student instructions)**

- Start with your name.
- Refer to something about where or how you were born.
- Say something about your family heritage: where your family is from originally.
- Mention an object, animal, something in nature that is meaningful or special to you.
- Say something about yourself: what you are like, what you want, your dreams.

Create a poem of between five and eight lines. The poem is short, so each word is symbolic, i.e. each word has a lot of meaning, telling us many things.

Choose your words carefully. Use your instrument to enhance the feeling and meaning of your poem. Choose when and how you are going to make a sound. Think carefully about how you are going to use your voice expressively.

### 3 Group music making

Making music is a form of communication: instruments and voices ‘talk’, communicating feelings, thoughts and ideas. Music reflects and creates culture, and it is always dynamic – changing and developing. In Africa, music is important in creating social cohesion (unity) and can be important in the classroom.

In this part, you will build on the previous activities to organise a whole-class performance. The way you set up the activity can contribute to students’ cooperative and listening skills.

#### Teaching Example 3

Sam’s passion is making music in a group. The feeling he gets playing the ngoma, or singing in the choir is a special one of togetherness. He wants to share this feeling with his students; to experience what it’s like to make music together when everyone is listening sensitively to each other.

Sam travels from Kampala to Mbale and visits a small primary school away from the city to visit the arts and culture teacher. As he arrives, he comes across a festival. Groups of young boys try out their flutes and drums in preparation. In the dusty playground, Sam listens and watches as a group of 50 children move and make music together – each one contributing, each one watching and listening as they tell the story of the dance.

Inspired by the flautists and the dance, he decides that his own students back in Kampala need to experience what it’s like to ‘become one’ through music. After talking to the teachers and learning more about the cultural significance of the music and dance, he returns home to plan a lesson where his students make music together.

#### Making and playing your own pipes

Pipe ensembles are special music groups because each person plays only one note. However, put together, often in very complicated ways, this creates wonderful music.

Pipes can be made from reeds (in rural areas) or metal (in urban areas). Pipe length can vary from 20 cm to over 1 m, producing a range of high and low notes.

You can make your own pipes by using plastic piping such as electrical conduit, cutting plastic fax-paper pipes, or irrigation piping (12–15 mm diameter). Make pipes of different lengths so that you have different notes.



To play the pipes:

1. Place the open side of the instrument level, against the lower lip.
2. Hold the pipe between your fingers, the index and thumb.
3. Relax your other fingers around the middle of the instrument.
4. Begin to blow softly across the hole until a note is produced.
5. Experiment with closing the bottom of the pipe with your hand.

You could also use different sized bottles and blow across the tops to produce sounds.

### Activity 3

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- Ask your students if any of them play an instrument. If they do, ask them to bring them to school.
- The next day, ask the students who have brought instruments to show them and play them to the class.
- Ask your students if they know any songs or praise poems. If they do, ask them tell you the words. You write these on the board.
- Ask the student to sing the poem/song and then ask the class to join in as you sing it again.
- Repeat until the class are comfortable singing.
- Now, ask those who play instruments to join in as well.

Practise the whole song until everyone is happy and then perform it to another class or at an Open Day.

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## Life Skills: Emotional well-being

### 1 Sharing

### 2 Self-esteem

### 3 Reflecting on behaviour

#### Key Question for the teacher:

How can you set up activities to support students' emotional well-being?

**Keywords:** active learning; building self-esteem; reflective practice; emotional well-being

#### Learning Outcomes for the Teacher

By the end of this section, you will have:

- organised different activities to develop and support emotional well-being in your classroom
- worked in a positive and affirmative manner
- reflected on your own behaviour in developing your students' emotional well-being

## Overview

Learning is easier and much more fun if we feel secure and confident in ourselves. By respecting and supporting your students in the classroom and planning activities that make them feel included you will support their emotional wellbeing.

Games are practical activities that students can participate in, for fun and for learning. They can also teach students how to interact with each other to share ideas and objects. Sharing is important at school because:

- many schools have few resources, and students need to use resources in groups
- students have different skills, and sharing encourages them to help each other
- encouraging sharing and group work means that everyone is learning even if you can't speak to all of your students individually
- sharing is part of life and we all need to cooperate every day
- by sharing, people learn how to give support to others and ask for it in return
- sharing is one way people make friends with each other and it encourages good social interaction.

# 1 Sharing

Here, we are going to look at ideas for sharing activities and how you can encourage sharing as part of your everyday teaching.

## Teaching Example 1

Kembabasi is a teacher in a Grade 4 class at a primary school in northern Uganda. She has many children in her class and very few textbooks, exercise books and pencils. So for each reading or writing activity, she organises the students into groups to share the resources together.

She plans the activities like this:

- Each group has one textbook or storybook, one exercise book and one pen.
- In the group, one student has the textbook and reads it to the others, or they take it in turns and read a bit each.
- One student has the exercise book and writes down the answers.
- The other students all discuss the questions and answers.
- They all check what has been written down.
- They swap resources after every different kind of activity.

Before the class starts a reading and writing activity, Kembabasi asks each group who is reading and who is writing. This way, she checks that each student practises their reading, writing and discussion skills every day, if possible.

The students learn how to listen to each other and share ideas. They gain knowledge from each other and learn how to be friends.

Kembabasi changes the groups regularly, so students develop new skills and make new friends.

You can find further ideas in Key Resource: Teaching in challenging environments.

## Activity 1

This is a game that practises language and sharing.

- Organise your class into three groups.
- Give each person in Group 1 a piece of card with a pronoun written on it (i.e. I, you, he, she, we, they).
- Give each person in Group 2 a piece of card with a verb written on it (e.g. like/likes, go/goes, eat/eats etc.).
- Give each person in Group 3 a piece of card with a noun written on it (e.g. football, home, mango etc.).

- Tell each student that they must make a sentence by finding other students and sharing their words (e.g. 'She likes football').
- Then ask the groups to check if each other's sentences are correct.

**How can you adapt this exercise to teach other topics and subjects, e.g. maths or science?**

This flexible, sharing approach can be used with many different topics.

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## 2 Self-esteem

As a teacher, one of your most important roles is to encourage and support your students as learners and people.

An educational psychologist called Abraham Maslow has identified some emotional needs that are important in order to learn well. These include feelings of:

- safety and security
- love and belonging
- self-esteem

Every student has the desire for high achievement, which can be measured by self-esteem. Students show this in the classroom by being keen to answer questions. If they feel stupid, it damages their self-esteem and discourages them.

However, if you show them their answers might be right or are interesting, it boosts students' self-esteem and encourages participation and high achievement.

You can encourage this in the classroom by being a positive and affirmative teacher. This means:

- being positive and respectful so students feel confident enough to contribute
- making sure that nobody is made to feel stupid or embarrassed when contributing their ideas
- making sure that everybody understands the lesson's most important focus

To do this, you need to develop teaching strategies that do not reject any answer that is given, but you use the students' responses to guide them to think more deeply. By doing this, you will be building students' self-esteem.

### Teaching Example 2

William had been able to encourage students in his Grade 5 class to contribute to most lessons through the sharing activities he uses as part of his everyday lessons. The students began by making contributions in small groups, and soon were confident enough to start making contributions in front of the whole class.



To make sure he didn't damage the students' self-esteem, he planned how he would handle their contributions.

- He would ask the class a question. If students wanted to answer, they put their hands up and he would choose someone.
- If they gave the correct answer straight away, he would praise them with phrases like: 'Well done!', 'Very good!', 'Excellent!'
- If the student gave an answer that wasn't quite right, he was careful not to say 'No' or 'Wrong'. Instead, he would say something neutral like: 'Almost', 'Nearly', or 'Not quite'. He might ask the student to 'Try again' and give them a clue or prompt to help them think a little harder.
- If the student was stuck, William moved on quickly, saying: 'Can anyone else help us?'

Over time he noticed how much more confident they became.

## Activity 2

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One way to build self-esteem is to help your students recognise their own skills.

- Ask your students to describe different kinds of things they enjoy doing, both at home and in school.
- Now ask them to think about which activities they are particularly good at.
- Organise them into groups. Then ask each student to identify three special skills they have and share these with the group.
- Ask them individually to write about these skills and draw pictures of themselves doing each activity. Display them on the wall.

In the next lesson, extend this by asking your students to discuss what they would like to be or do when they grow up.

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## 3 Reflecting on behaviour

We have talked about how to help students identify and explain their feelings. As emotions are strong reflections of who we are as individuals, they can also make us react in ways that we can't always control.

Our feelings and behaviour are linked to two things:

- the particular situations we are in
- our emotional reactions to situations, and our understanding of what is the socially acceptable way to show our feelings

For example, one of your students might be over-excited. Your immediate reaction may be to feel annoyed. But to show this might spoil the good classroom atmosphere. So, to diffuse the situation, you ask her to sit down quietly, or give her a task like giving out books to distract her.

Younger students take time to fully understand their emotions and the social rules that say how we should behave. When young, we often experience emotional situations for the first time and don't know how to react. As we grow older, we learn to understand our emotions better, and to control how we react in different situations.

Here, we are going to look at ways you can encourage this in your classroom

### Teaching Example 3

Mrs Kwei started to work with her Grade 2 students to help them understand more about their feelings and behaviour – what made them happy, sad, angry and frightened.

After this, she planned work with her students to develop a list of things they could all do to make each other happy and not sad, angry or frightened.

Using group and whole class discussions, they made a chart of rules for interacting with each other at school. They included things like: 'We will all say good morning to each other every day' and 'We will not call each other bad names'. They linked each rule with a feeling by drawing a happy or sad face next to it.

With this chart, every time there was some problem of behaviour in the class, Mrs Kwei could refer to the rules of behaviour. She always linked the behaviour with the different feelings it produced.

This way, her students could see the link between their behaviour and people's feelings. They became more caring of each other as a result.

### Activity 3

In this activity, you are asked to think about your own behaviour and plan how to make it more affirmative and supportive in the classroom.

#### Reflecting on your behaviour

Using the questions below, think about your own behaviour as a teacher. Be honest in your answers. Are there examples from your classroom activities that support your ideas?

- Are you a positive or a negative teacher in the way you treat your students? How could you be more positive?
- Do you try to encourage them or discourage them? How? How can you encourage them more?
- Do you make them happy when they are learning? How?
- Do you ever make them sad, angry or scared? How?
- What aspect of your teaching behaviour do you want to change? How can you do this?
- What aspect of your students' social behaviour would you like to change? How could you help them achieve this?

- First, ask yourself the questions listed in the box above.
- Write down your answers.
- Look at the case studies we have featured in this section. Choose one piece of good practice from each, which you can apply to your own teaching situation.
- Write a description of how you will apply it in your own classroom.
- Finally, write a plan for 'affirmative action'. Write five sentences stating what positive behaviour you will use each day; e.g. 'I will say good morning to all my students when I see them in the playground'.
- Extend this to your interaction with colleagues. Perhaps talk to them about your ideas and plan to do these actions together.

Read below to see the approach one teacher took in her

### Mrs Chosane's reflections on her approach

Mrs Chosane was on an in-service course on developing positive self-esteem in her classroom with teachers from the local district. As part of the course, they had been asked to keep a diary for two days in the next week and record as often as was possible all the times they praised their students and times when they told them off or ignored their behaviour.

They used a chart like that in the table below and put a tick in for each time they did one of these things. Sometimes it was not possible to fill it in during the lesson as it was so busy, but Mrs Chosane kept the chart in the book of her lesson plans so she could do it when she had a moment, or as soon as the lesson finished.

Day 1	Lesson	Praise 1 student	Praise several students	Ignored 1 student	Ignored several students	Told off 1 student	Told off several students
	Maths	x	x				
	English		x				
	Science			x		x	x
	Social Studies					x	
	Art	x					x
	Physical Education		x	x			

Day 2	Maths		x				
	English	x					x
	Science					x	x
	Social Studies		x				
	Art			x		x	
	Physical Education		x				

When they went to the next course session, they were asked to examine the data and identify which they did most. Did they do more telling off in classes? If so, could they think why?

Through group discussion, the tutor, Mrs Mbatha, asked them to think what they could do to increase the positive atmosphere in their classes. Each group had to list six things they could do to develop the positive classroom atmosphere.

Mrs Chosane saw from her data that she was more negative with her students in science lessons than in other lessons, and wondered why. Maybe it was because she felt less confident of her own knowledge and had not liked science herself. She often felt less organised and more nervous in case the students asked her questions.

She made a list of things she could do to help her class and her own interaction with her students:

1. Have well-prepared lessons.
2. Check my own subject knowledge.
3. Think about what questions to ask the students and what answers to expect.
4. Think of ways to accept their answers, for example:
  - a) 'That's an interesting idea, but can you think a little more about...' and then ask the first question again in a different way.
  - b) 'I hadn't thought of that idea – how could we link it to my first question?'  
 With each of these, the student is encouraged to think more and participate more and is not told that they are stupid or wrong.
5. Give my students the chance to raise their own questions about a topic if they don't understand. Allow other students to give answers to these rather than just me.

Gradually, over the next few weeks, she became more confident and found that because she was better prepared, she didn't get as anxious and therefore she shouted less. Her students began to enjoy their science lessons more and more.

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No.11

## Middle Primary

<b>Section 1</b>	<b>Literacy:</b>	<b>Working together to improve writing</b>
<b>Section 2</b>	<b>Numeracy:</b>	<b>Practical work with fractions</b>
<b>Section 3</b>	<b>Science:</b>	<b>Investigating electricity</b>
<b>Section 4</b>	<b>Arts:</b>	<b>The art of storytelling</b>
<b>Section 5</b>	<b>Life Skills:</b>	<b>Taking responsibility for our environment</b>

<b>Additional Resources:</b>	<ul style="list-style-type: none"><li>• <b>Group work in your classroom</b></li><li>• <b>Working with large/multigrade classes</b></li></ul>
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11

## Literacy: Ways together to improve writing

1. Repetition and language teaching
2. Meaning of language
3. Self and peer editing to improve writing

**Key question for the teacher:**

How can you help students gain confidence in using specific language structures?

**Keywords:** verbs; adverbs; drills; poems; songs; edits

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- guided your students towards control of the structures of the additional language;
- used drills, songs, poems and stories to teach language structures;
- helped your students to monitor their own work as they look for meaning and correct use of verbs.

## Overview

As a teacher of the additional language, you need to be always looking for new ways to give your students experience of that language. If they are given opportunities to practise it, their use of the language will become more fluent and accurate.

This section introduces you to useful exercises that focus on particular tenses or structures.

Remember that the activities you choose need to have meaning for the students, either within the activity, or within their lives (preferably both).

# 1 Repetition and language teaching

Providing your students with opportunities to use specific language structures over and over again, in order that they absorb them, needs to be enjoyable.

There is a theory that people learn language through imitation and repetition. In the past, many language courses made extensive use of drilling (repeating exercises). It is now thought that activities that involve students in 'real' communication are more helpful than meaningless drilling. However, drills can still be very useful if students can attach real meaning to the sentences. It also helps if they are set to music.

Try the ideas in **Teaching Example 1** and **Activity 1** to test these theories.

## Teaching Example 1

Mr Gasana teaches English to Grade 4 in Butare, Rwanda. A murder had taken place in their city, at 8 o'clock, two nights before. He showed his students a newspaper report of the murder. He talked with his students (in the home language) about how detectives question people when they are trying to find a criminal. Then he put up a question and answer pattern on the board, in English:

Q: What were you doing at eight o'clock on Tuesday night, Kigeri?

A: I was watching television.

He asked a few students the question, making sure they gave their own answer in the right form. Then he put students into groups of six. Each student was to ask the question to the other five group members, who would provide their own answers. Mr Gasana encouraged the students to correct one another, and walked around, listening to and monitoring the groups.

He asked each student to write a 'detective's report' about their group. Each of the six sentences was to be in the following form:

Muteteli was playing with her brother at 8 p.m.

Erisa was dishing out food at 8 p.m.

## Activity 1

Find or make a sale advertisement or a price list of local vegetables, showing price reductions. Before the lesson, make a big copy of the advertisement or price list on the board, or prepare one advertisement or price list per group in your class.

Write the following question and answer sequences on the board.

Q: How much is that .... ?

A: It was .... before, but now it's only ....

Q: How much are those .... ?

A: They were .... before, but now they're only ....

During the lesson, point to a few of the items, asking the appropriate question, and ask a few students to answer. Then put them in groups, to question and answer one another in the same format.

Let each group make up and perform a song, with verses in the form:

That .... was .... before, but now it's only ....

**What did your students learn from these activities? How do you know?**

**Will you use this kind of exercise again? Why, or why not?**

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## 2 Meaning of language

It is important in language teaching to focus on the meaning of the language, stressing the importance of communication, but at the same time working to develop students' competence in grammar. **Activity 2** gives an example of how to use a praise poem written in English to do some work with students on verbs and adverbs. This kind of work can be done with a wide range of texts, focusing on a wide range of structures. Make sure that you also focus on the meaning of the piece of writing, and don't simply use it as a device for teaching grammar. With younger children, the focus will be on the meaning and enjoyment.

Stories usually use the past tense, while descriptions are usually in the present tense. These are good contexts in which to give your students practice in tenses.

If you do not teach English, think about what students find difficult about the grammar of the language that you do teach, and adapt **Activity 2** to suit this language.

### Teaching Example 2

At a workshop in Kampala, teachers had a lively discussion about grammar. Henry Woneka said he had read that grammar is the bones or skeleton of a language and other words are the flesh. Both bones and flesh contribute to meaning. The teachers agreed that students need to develop understanding of how the structures of a language work, but they also complained about students' lack of interest in grammar lessons.

Ruth Kagaba teaches in a rural area and lessons for her students had been in the local language for their first four years of school but they are now in English. She tries to include activities that focus on language structures when her Primary 6 students are reading interesting stories or poems. For example, after reviewing the main verb tenses in English, she asked students to suggest why the writer of the story or poem had used past, present or future tense. Then she asked them to decide which verb tense or tenses they needed to use to write their own story or poem to make it more interesting for their readers.

To help with their English grammar, Ruth makes big charts on the backs of old calendars. These give students information about the present, past and future tenses of different verbs. (See below). She encourages students to consult these charts when they are writing.

Present	Past	Future
I walk	I walked	I will walk
I bite	I bit	I will bite
I choose	I chose	I will choose
I dig	I dug	I will dig
I draw	I drew	I will draw
I eat	I ate	I will eat
I forget	I forgot	I will forget
I know	I knew	I will know
I see	I saw	I will see
I sleep	I slept	I will sleep

## Activity 2

- Make copies of 'My Drum'. Where photocopiers are not available, copy it on the chalkboard or the back of an old calendar.
- Once students have read the poem and understood it, let them work in groups to find all the verbs in the poem. Remind them that most verbs are 'doing' words. Let each group report back on the verbs in one verse. (If you need any help with the vocabulary in the poem you can refer to the verbs and adverbs box below the poem.)
- Ask them which tense the verbs are in. In verses 1 and 2, verbs are in the present tense; some in verse 3 are in the future and some in verse 4 in the past tense. With more advanced students, discuss why these tenses were used. Ask them what difference does the use of different tenses make to the meaning and effect of the poem?

You can use other poems and stories in similar ways.

### ***My Drum* by Francis Faller**

It beats  
patiently  
like water  
dripping  
on  
a gutter  
pipe  
or proudly  
as the pounding of the sea.

My drum. My drum.  
It summons love.  
It hammers anger out.  
It calls for freedom.  
It never stops  
even when nobody  
hears my drum  
but me.

My drum greets  
everything  
that passes by:  
the rising sun  
the rain battering  
the wind that blows  
a family of cranes  
home across the sky.

It greets the cricket  
chirping out its glee.  
It greets the workers  
whose drills and picks  
are digging holes  
monotonously

I follow it  
into laughter  
I lead it through  
throbbing pain.  
It's a sparrow pecking seed  
it's a stick along the fence  
it's a rapid fire gun.

My drum. My drum.  
Nervously it beats  
a welcome  
just for you.  
Will you hear it  
with delight?  
Will you run away in fright?  
A drum is only  
skin and wood  
so will you come?  
You should.  
You should.

My little drum  
was yesterday so weak.  
Today it's beating  
Strong.  
Surely it wasn't stretched  
across this world  
to play for nothing.

Though it never  
gets reply  
I think  
I could not live  
if the song  
of my drum  
should die.

Original source: *My Drum* – Meyerowitz, B., Copans, J. & Welch, T. (compilers)

<p>It <u>beats</u> <b>patiently</b> like water <b>dripping</b> on a gutter pipe or <b>proudly</b> as the pounding of the sea My drum. My drum. It <u>summons</u> love. It <u>hammers</u> anger out. It <u>calls</u> for freedom. It <b>never</b> <u>stops</u> even when nobody <u>hears</u> my drum but me.</p> <p>My drum <u>greet</u>s everything that <u>passes</u> by: the rising sun the rain <u>battering</u> the wind that <u>blows</u> a family of cranes home across the sky. It <u>greet</u>s the cricket chirping out its glee.</p>	<p>Note1: <b>patiently</b> is an adverb of manner, which describes how the drum beats: calmly, over and over again without getting upset or angry.</p> <p>Note 2: <b>dripping</b> is part of the full verb 'is dripping': like water [that is] dripping – the poet decided to leave out 'that is'.</p> <p>Note 3: <b>proudly</b> is also an adverb that describes how the drum beats: with pride, as though it is very pleased with itself.</p> <p>Note 4: <b>never</b> is an adverb of time that adds information to the verb 'stops': the drum does not ever stop.</p> <p>Note 5: <b>battering</b> is part of the full verb 'is battering': the rain [that is] battering.</p>
--	---

It greets the workers  
whose drills and picks  
are digging holes

**monotonously.**

I follow it  
into laughter  
I lead it through  
throbbing pain.  
It's a sparrow pecking seed  
it's a stick along the fence  
it's a rapid fire gun.

My drum. My drum.

**Nervously** it beats

a welcome

just for you.

Will you hear it

with delight?

Will you run away in fright?

A drum is only

skin and wood

so will you come?

You should.

You should.

My little drum

**was** yesterday so weak.

Today it's beating

**Strong.**

Surely it wasn't stretched

across this world

to play for nothing.

Though it **never**

gets reply

I think

Note 6: **monotonously** is an adverb of manner which describes how the digging goes on and on in a boring, repeated way.

Note 7: **It's** is the short form of **It is** and **'is'** is a verb, though not an action verb.

Note 8: **Nervously** is an adverb of manner that describes how the drum beats: as though the drum is anxious or a little afraid.

Note 9: **'will come'** is in the **future tense** but it is in the question form 'will you come?'

**You should** is a shortened form of **You should come** – also action in the **future**.

Note 10: **was** is the past tense of 'is'.

Note 11: **Strong** would usually be written 'strongly': it is an adverb which describes how the drum is beating.

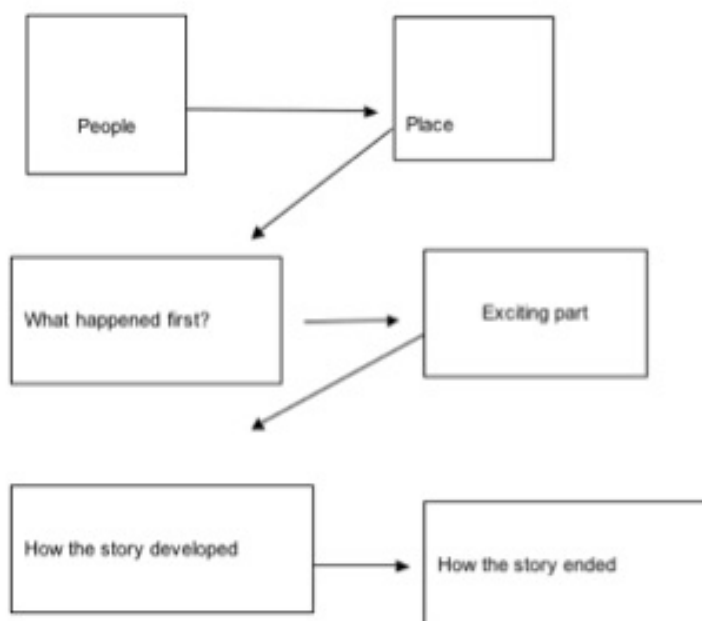
Note 12: **wasn't stretched** is a verb in the **past tense**.

Note 13: **never** is an adverb of time (see Note 4).



<p>I <u>could not live</u> if the song of my drum <u>should die</u>.</p>	<p>Note 14: <b>could not live</b> and <b>should die</b> are verbs that refer to the <b>future</b> because the suggestion is that the poet would not be able to live in the future without the drum.</p> <p>Note 15: Students may be puzzled by words ending in 'ing'. Sometimes these words are part of a verb: I am singing. Sometimes they are nouns: The singing of the choir was excellent. Sometimes they are adjectives that describe nouns: The singing canaries flew to the top of their cage. In this poem <b>dripping, battering, chirping, digging, pecking, beating</b> are parts of verbs. The <b>pounding</b> is a noun. <b>Throbbing</b> is an adjective describing pain. <b>Everything</b> is a pronoun that stands in place of the nouns that follow it in verse 2. <b>For nothing</b> is an expression that means 'without payment' or 'for no reason'.</p>
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Title
Words I might use



### 3 Self and peer editing to improve writing

You will probably have found that it is difficult, at times, to mark students' written work, because there are so many language errors in it. You do not want to discourage your students by making too many corrections. But you also don't want them to get into bad habits. How can we solve this problem?

One way is to connect meaning with language structures. Set a writing task that has meaning for the students. Encourage them to edit their work before they hand it in. You could ask them to write in pairs so that they support each other. They can then receive their work back without having lots of marks on it.

When you do mark their work, focus on meaning and interest. As a secondary focus, concentrate on one aspect of language structure – spelling or perhaps verb tenses or prepositions. In this way, the feedback is limited and focused, and the students are more likely to take notice of it.

#### Teaching Example 3

A group of teachers on an in-service course in Kampala were trying to improve their own writing. Tutors encouraged them to form 'Writers' Circles', where they read one another's writing and gave feedback. They wrote about their own experiences – early childhood memories, memorable characters and places, unforgettable experiences.

Tutors guided them in giving feedback, using different criteria depending on what had been written. Here are examples:

- Does the writer make it clear what they are saying? Are there parts that need to be clarified?
- Which parts are interesting? What makes them interesting? Which parts are dull? How could these be improved?
- Does each paragraph have a main idea? Do some need to be more fully developed? Do paragraphs need to be reordered?
- Are sentences complete? Are they too long or too short? Are they correctly punctuated? Are words spelled correctly?
- In what tense is the piece written? Check that every verb is in the relevant tense or that there is a good reason for using another tense.

A book was compiled of the writing of these teachers that was shared with family and friends. The teachers decided that some of these ideas could be used in class, adapted for the age and ability of their students.

#### Activity 3

Ask your students to write something based on their own experiences. Discuss ideas to stimulate their imaginations. For example, they could describe something they own or an interesting person they know. (As these pieces are descriptive they would probably use the present tense.) They could tell the story of a frightening or exciting experience, or a community event. (As these

pieces are stories or narratives, they would probably use the past tense.) Some students may find it more helpful to work in pairs.

Next, ask them to work in small groups, to read their pieces to one another. Ask them to use one or both of the following sets of questions to provide feedback to each other:

- Which parts are interesting?
- What makes them interesting?
- Which parts are dull?
- How could these be improved?
- In what tense is the piece written?

Check that every verb is in the relevant tense OR make sure there is a good reason for using another tense.

Having received group feedback, each rewrites their piece. Take the pieces in, and use the same criteria to mark them.

**How successful was this approach? Will you repeat it?**

**Did the quality of students' writing improve? How do you know this?**

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## Numeracy: Practical work with fractions

- 1 Exploring fractions
- 2 Fraction strips
- 3 Equivalent fractions

**Key question for the teacher:**

How can you help students to understand fractions?

**Keywords:** fraction strips; fraction discs; simple operations; group work; problem solving; definition; numerator

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- developed students' understanding of fractions using simple resources;
- used group work and problem solving to increase students' confidence in dealing with fractions.

## Overview

Allowing students to divide things into 'parts of a whole' using real objects helps them move more easily onto abstract ideas, such as fractions, division, ratio and proportion. This section will help you use simple physical objects and practical activities to develop your students' understanding of these concepts.

# 1 Exploring fractions

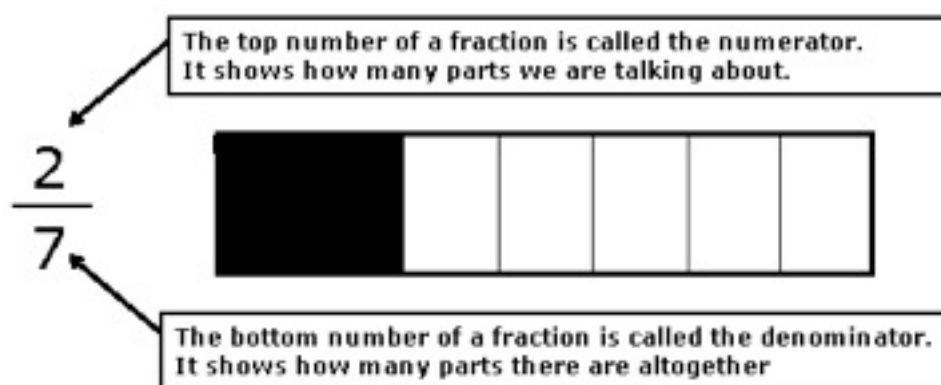
In this section you will introduce the concept of fractions. By trying tasks with groups of different sizes, you will be able to consider what is most suitable for your situation and for each practical task.

**Teaching Example 1** and **Activity 1** use simple resources – a fruit, paper and fraction strips – to help students understand the concept of fractions more easily. Also, by using groups and asking the students to discuss their conclusions, you will be exposing them to different fractions. Understanding fractions provides a foundation for thinking about division ('share by' equal parts is the first grasp of understanding division), ratio, proportion and decimals.

You may first want to refresh your own understanding of fractions:

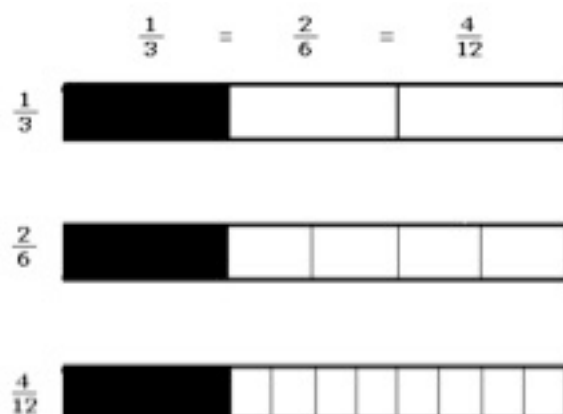
What is a fraction?

A fraction is a part of a whole. There are two numbers to every fraction:

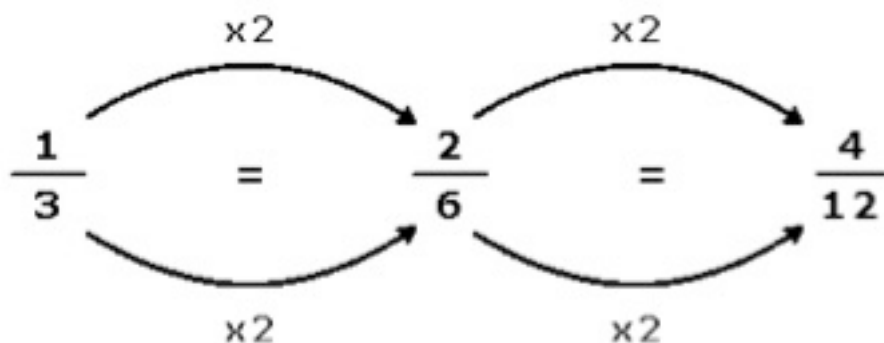


Equivalent fractions

Equivalent fractions are fractions that look different but show exactly the same amount:



You can make equivalent fractions by multiplying or dividing the numerator and denominator by the same number:



### Teaching Example 1

Mr Umaru in Nigeria began his lesson with his Primary 5 class on fractions by cutting an orange into two equal parts and then into four equal parts, asking the students to name the parts – halves and then quarters. He introduced more simple fractions, showing each by folding rectangular pieces of paper. He emphasised that two halves make a whole, etc.

He then discussed with the students how things are shared in real life. As his class was large, he divided it into small groups of three. He drew a circle, a rectangle and a square on the chalkboard and asked each student to choose one shape and to draw it six times. He asked them to shade their drawings to show

- a half
- two halves
- a quarter
- two quarters
- three quarters
- four quarters

Each student in the group showed the others what they had done. He asked them if they could see any patterns in their pictures and some students pointed out that two quarters is the same as one half etc. They shared this with the other members of their group and with the class.

Even though his class was large, Mr Kofi found that his approach of working in groups meant that all the students got an initial understanding of equivalent fractions from their drawings and interaction with each other. He also felt they were well prepared for the next lesson he had planned.

Fractions may be easier to understand when related to everyday objects that students recognise.

Show your students an object (or picture of an object) that can easily be divided into fractions.

Set students a series of questions relating to the object. For example:

- If there are 6 cheese triangles in one packet and Kofi eats half of them, how many are left for his brother Kwame?
- Can you express one cheese triangle as a fraction?
- How many cheese triangles will be left after Abina eats two-thirds of them?

### Activity 1

Arrange students into groups of four. Give each group four strips of paper of equal length (see example below). In each group, ask one student to fold a strip into 2 equal parts; another into 4, and another into 8. One person in the group should not fold their strip.

1															
1/2								1/2							
1/4				1/4				1/4				1/4			
1/8		1/8		1/8		1/8		1/8		1/8		1/8		1/8	
1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
1/10		1/10		1/10		1/10		1/10		1/10		1/10		1/10	
1/5				1/5				1/5				1/5			
1/3						1/3						1/3			
1/6		1/6		1/6		1/6		1/6		1/6		1/6			
1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	

Using the strips, can the groups agree:

- How many halves ( $1/2$ ) make a whole?
- How many quarters ( $1/4$ ) make a half ( $1/2$ )?
- How many eighths ( $1/8$ ) make a quarter ( $1/4$ )?
- Then you could ask them to try some more difficult equivalent fractions, e.g.
- How many eighths ( $1/8$ ) are there in a half ( $1/2$ )?
- How many eighths ( $1/8$ ) are there in three-quarters ( $3/4$ )?

While the students are working, go around to help them. Share some of their answers with the class to show how fractions work.

## 2 Fraction strips

In this part, we build on the previous work with fraction strips to add and subtract simple fractions.

As you work, ask yourself these questions:

Are you having to help your students a lot? If so, why do you think this is?

Are you and the students enjoying the practical activities?

Do you think the students learn more this way than if you had just told them?  
How do you know this?

### Teaching Example 2

Mr Agbe brought to his lesson a large fraction strip of tenths that he had made to show to the class and asked each student to make a similar one using the resources he provided. After 15 minutes, he helped students use their fraction strips to find answers to these questions:

By how much is  $8/10$  bigger than  $5/10$ ?

What is the difference between  $8/10$  and  $5/10$ ?

What is  $8/10 - 5/10$ ?

He wrote on the chalkboard the sum  $8/10 - 5/10 = 3/10$  and asked the students to copy this in their exercise books.

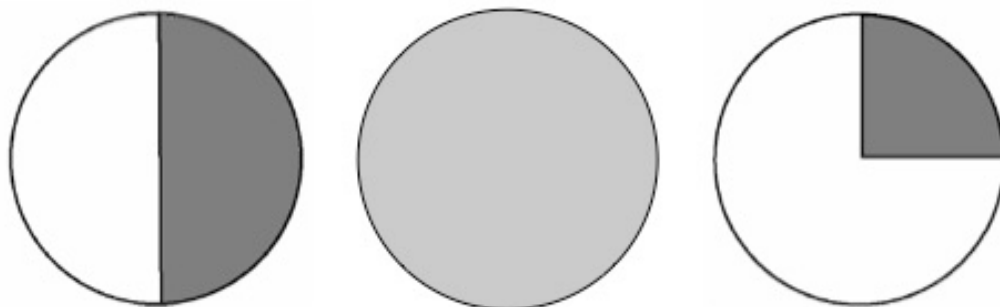
He then asked his students to work in pairs and do some addition sums with tenths using their fraction strips. He made up some sums for them, and then asked those who were working well to make up some sums for each other.

Mr Agbe was amazed at what the students were able to do, but also realised that he needed to give some students more practice and time to talk about their ideas as they worked.

### Activity 2

Before the lesson, prepare three discs – a complete disc, a quarter disc and a half disc, each with all the quarters shown as shown below.

These are made by drawing a circle and dividing it into halves, quarters, etc. by folding.





Hold up the quarter disc and the half disc and ask your students what would be the total if you added these two discs. Give them time to answer, and when you get the right one, write the sum on the board:  $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$

Next, hold up all three discs and ask what would be the total if they were all added together.

Again, wait for the right answer and then write the sum on the board:  $1 + \frac{1}{4} + \frac{2}{4} = 1 \frac{3}{4}$

<b>1</b>	<b><math>\frac{1}{2}</math></b>	<b><math>\frac{1}{4}</math></b>
whole	half	quarter

Now pair your students, and ask them to draw similar discs with thirds. Ask them to make up addition sums to give to their partner and to write down the complete sum and answer in each case.

As they are working, go around the class and help where needed. If necessary, let them try other fractions to see if they really understand the idea.

Display some of the different fractions on the wall.

You may want to do this activity over two lessons to consolidate students' learning.

### 3 Equivalent fractions

How can students compare fractions that have different denominators (e.g.  $\frac{3}{5} + \frac{1}{4}$ )?

They could make fraction strips to compare the different fractions, but although this supports comparison, it doesn't help them add or subtract such fractions. To do this, they must understand common denominators.

*To compare fractions, you must first change them so they have the same denominator.*

To compare  $\frac{2}{3}$  and  $\frac{3}{5}$ :

- First look at the denominators (the bottom numbers).
- Decide which number they both go into. They both go into 15.
- Change both numbers into 15ths.

$$\frac{2}{3} \overset{\times 5}{\curvearrowright} \frac{10}{15} = \frac{2}{3} \underset{\times 5}{\curvearrowleft} \frac{10}{15}$$

$$\frac{3}{5} \overset{\times 3}{\curvearrowright} \frac{9}{15} = \frac{3}{5} \underset{\times 3}{\curvearrowleft} \frac{9}{15}$$

$\frac{10}{15}$  is bigger than  $\frac{9}{15}$   
 so  $\frac{2}{3}$  is bigger than  $\frac{3}{5}$

Original source: <http://www.bbc.co.uk/schools>

### Teaching Example 3

Mrs Dokono decided to use the part-whole model to introduce equivalent fractions to her class and to develop her skills of using group work and practical work.

She knew that using everyday objects helps students' understanding, and took to her class some biscuits to help her explain equivalent fractions. First, she divided the class into groups of eight and told them they were going to explain how 20 biscuits could be shared equally among a number of children.

Next, she assigned each group a different number of biscuits. She gave one group 2 biscuits and asked them to share these biscuits among 4 students. They saw that 2 divided by 4 gave each student  $\frac{1}{2}$  a biscuit. She wrote on the board 2 divided by 4 =  $\frac{2}{4}$  =  $\frac{1}{2}$ .

She repeated this problem with other groups and 3 biscuits among 6 of the students.

Then she gave 4 biscuits among 8 students, each getting half a biscuit.

Each time she wrote the fractions on the board  $\frac{2}{4}$ ,  $\frac{3}{6}$ ,  $\frac{4}{8}$  with each equal to  $\frac{1}{2}$ .

She told the students that these are called equivalent fractions.

Mrs Dokono was pleased with the class response to her mathematics lesson using the biscuits to explain equivalent fractions.

### Activity 3

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Using halves, thirds and quarters, write down five additions, e.g.

$$\begin{array}{ll} (1/2 + 1/4) & (2/4 + 1/3), \\ (1/3 + 1/2), & (2/3 + 1/4). \\ (3/4 + 2/3), & \end{array}$$

Show how to work out the common denominator of the first sum. Ask pairs of students to calculate the remaining common denominators.

Show students how to convert the numerator for the first two sums; ask students to complete the next three sums.

Show how to find the answer to the first two sums; ask students to complete the last three sums.

Ask each pair of students to make up and solve as many similar problems as they can in ten minutes.

After the lesson, look at 'Questions for self-evaluation' and ask yourself questions on your use of practical activities and resources.

#### Questions for self-evaluation

When answering these questions, it is very important that you answer the questions honestly so that you can reflect on your practice better in order to develop as a more effective teacher

- Do I feel more confident in using group work?
- Did using different group sizes and types improve my lessons and make it easier for students to understand?
- Do I feel practical work helps students' understanding, and am I confident in using it?
- Did my students enjoy doing these practical mathematical activities?
- Did I give my students enough time to do their practical tasks?
- How can I improve my teaching of this topic?
- What would I change next time?

#### Questions about the use of practical activities and simple resources

- Did the activities help me meet my learning objectives?
  - Were the activities appropriate for my class?
  - Did the activities stimulate the students' interest?
  - Did the resources help me meet my learning objectives?
  - Were the resources appropriate for my class?
  - Did the resources stimulate the students' interest?
  - How enjoyable were the lessons?
-

## Science: Investigating electricity

### 1 Student-led investigation

### 2 Rotating group work

### 3 Electromagnetism

#### Key Question for the teacher:

What sorts of practical activities with electricity can you do in your classroom?

**Keywords:** circuit; electromagnets; models; investigation; group work.

#### Learning Outcomes for the Teacher

By the end of this section, you will have:

- gained confidence to do practical activities in your classroom involving electricity and improved your understanding of the dangers associated with electricity;
- used rotating group work;
- supported your students in undertaking investigations in small groups.

## Overview

This section deals with electricity. This topic often frightens teachers – you may think it is complicated, difficult or even dangerous. But there are straightforward, practical activities that help students make sense of an important aspect of modern life.

We suggest you use small group demonstrations and investigations to help students understand two key ideas:

- Energy cannot be created or destroyed, only changed from one form to another. What can we change electrical energy into?
- An electric device will only work when there is a complete circular path for the electric current.

# 1 Student-led investigations

It is very important that students are given opportunities to think and behave scientifically. This can only happen with practical, hands-on activities. Students will be challenged and enjoy working in groups to discuss and discover things for themselves. It often helps their thinking if they use models as well as real items.

**Activity 1** uses cut-out shapes to help students understand the need for a complete circuit in an electrical device. **Teaching Example 1** shows how one teacher extended this activity and supported her students in their own investigations about electric circuits. This type of encouragement and recognition is very important to students.

The information below shows you how you can extend this work and lead students to a clearer understanding that electricity travels in a complete circuit inside a torch bulb.

First make your teaching aid – a model torch bulb, and read this information about a torch bulb.

With younger students, we suggest that you draw in features of a face to explain what we mean by features.

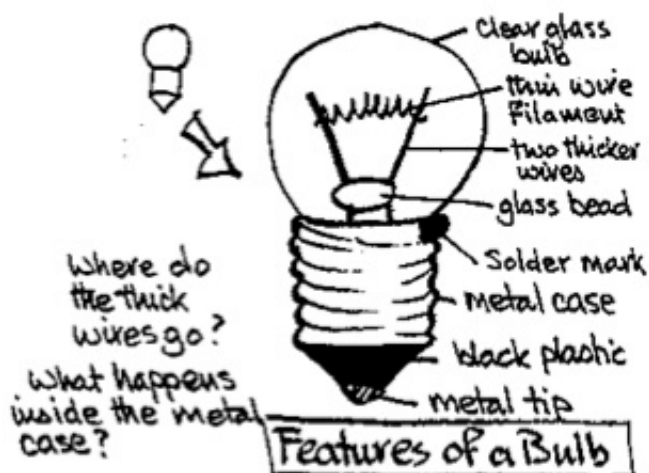


Now tell them that the class will do the same thing with the torch bulb.

Organise your class into groups of three/four:

Give each group of students a torch bulb and ask them to look at it carefully.

- What are the 'features' or parts of a bulb?
- Give them a few minutes to observe carefully.
- While they do this, draw the outline of a torch bulb on the board. (Or you can have a ready prepared drawing, which you put up at this point. You can also have labels, written on cards, ready for when they tell you what they observe.)
- When they seem ready, ask them to tell you what they see. You can be open to any suggestions and fill in the picture in a random way. Or you can decide to be systematic and guide their reporting by pointing to a place on the drawing and asking a specific question. As they answer, draw in and label the part – the notes below show you how to do this.



Recording observations in an ordered way

- Point to the round glass part. What do we see here?

Answer: Glass ball

- What do we see inside the glass ball?

Answer: Two thick wires

- What do we see between the two thick wires?

Answer: a thin wire, like a curly hair, called a filament.

- What do we see between the two thick wires near the base/at the bottom?

Answer: A small glass bead

- What is below the glass bulb?

Answer: A metal drum/case/cylinder

- What can we observe on one side of the metal case, near the top?

Answer: A little lump of metal

- What do we observe right at the bottom of the torch bulb?

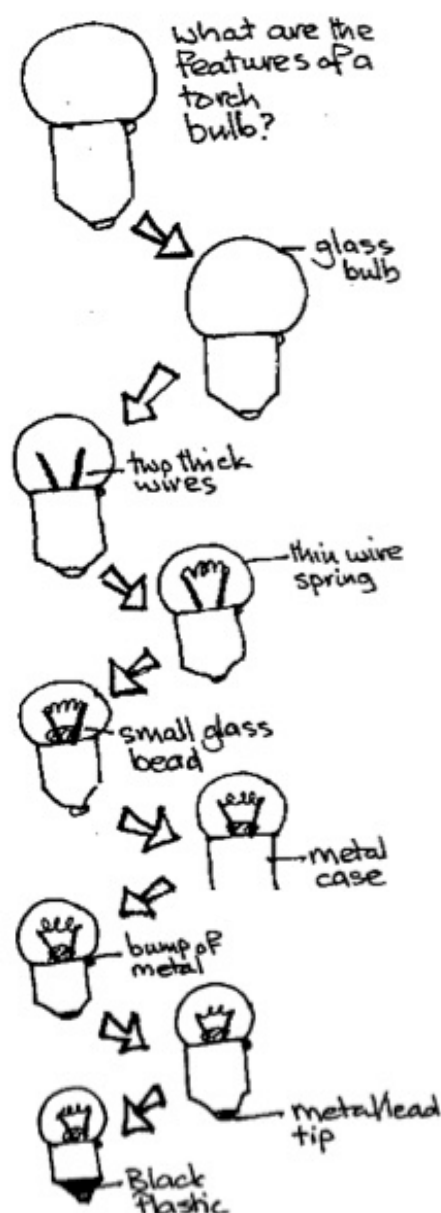
Answer: A metal/lead tip

- What do we observe between the metal case and the metal tip?

Answer: Black plastic

- Is there anything else you have observed?

Answer: Some may notice writing on the metal case.



### Making a teaching aid

You also need to make a large 2-D (flat) model of a torch bulb for the part of the Activity where students observe a bulb carefully. You will use this model again when you conclude the Activity.

1. Cut out the large bulb shape.
2. Cut out the shape for the metal case of the bulb.
3. Glue the bottom of the bulb to the right side rectangle so that it fits over the shaded triangle.
4. Use a large black crayon or koki-pen to draw the thick wires, as shown.
5. Cut out a small oval bead shape from a coloured picture in a magazine and paste it over the black lines you have drawn (this represents the glass bead that prevents the two thick wires from touching).
6. Make the filament from a coil of thin wire, and fasten it across the ends of the thick black lines. One way is to stick the ends of the coil of wire through the cardboard and to use sticky tape on the wrong side (back) to fasten them down.
7. Fold the left-hand side of the base of the bulb over the right-hand side. Now your model of a torch bulb is nearly complete.
8. Use blobs of Prestic to represent the metal solder mark on the side of the case, and the bottom metal tip of the torch bulb.
9. Finally, shade the trapezium shape between the metal case and the metal tip of the torch cell. This shows the layer of black plastic that separates the metal cylinder from the metal tip.



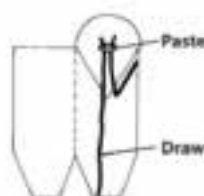
Bulb



Metal case



Glue

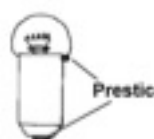


Paste

Draw



Fold Over



Prestic



Shade

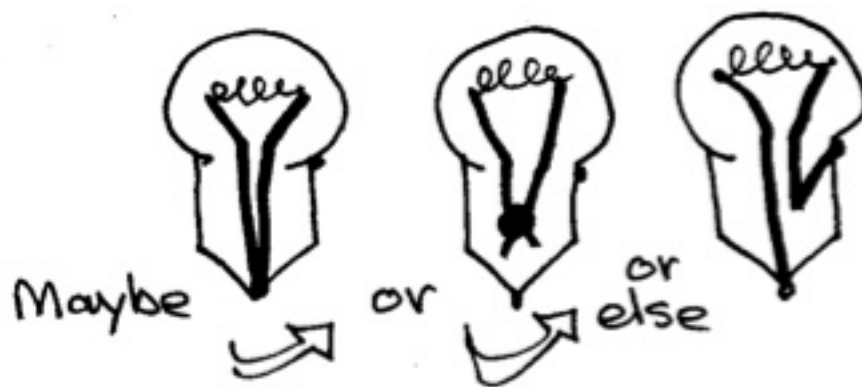


This model is specially designed so that you can demonstrate the arrangement of the inner parts of the bulb. What happens inside a light bulb will always be a strange mystery to students unless they have thought about what might be the case, and then had the chance to find out. It is possible to use a hack-saw blade to carefully cut open the metal case of an old screw-in bulb. Then the arrangement and direction of the wires is clear.

### A model light bulb

Now show them the model you have made of the torch bulb. Ask: What do they think they would find, if they could open up the metal case? What would be inside? Where do the two wires go? Give them some time to think.

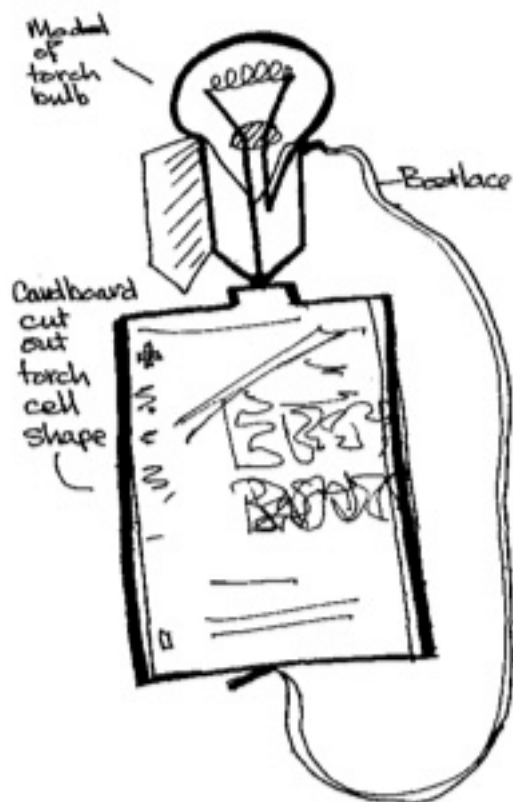
What do they predict will be the arrangement of wires that are hidden by the metal case?



After a while, you can open up your model and show them how one wire is joined by solder to the metal case, and how the other goes to the metal tip at the bottom of the torch bulb.

Now use your model to demonstrate that there is a complete pathway, or circuit, for the electricity when the bulb lights. The electricity is free to travel in a complete pathway. It travels from the cell, through the wire to the metal case, and then to the one thick wire. From there, it goes through the thin wire filament. It causes the filament to light up, and goes back down the other thick wire to the torch cell again.





*All illustrations above adapted from: Umthamo 3, University of Fort Hare Distance Education Project*

Two teachers discuss the dangers and safety of electricity with a science advisor and they explain why they are nervous about dealing with electricity in the classroom.

She assures them that the 1.5V batteries and light bulbs that we find in a simple torch are quite safe.

One teacher asks: 'When is electricity dangerous?' The science adviser explains that the electricity supplied to homes is 220 volts, so it is hundreds of times more powerful than a battery. The high-tension wires that carry electricity across the country are thousands of times more powerful.

So the teachers realised that they could safely conduct electricity experiments in the classroom.

The science advisor advised them to make sure that they warned the children of the true dangers of electricity, and she left them some examples of safety pamphlets that are available locally.

The two teachers decided they would also look in the local newspapers for articles about electricity-related accidents and get their students to discuss both the causes and the consequences of these tragedies.

Here is one example they found:

### Eight feared electrocuted in Imo

from Charles Ogugbuaja, Owerri

About eight persons are feared dead in a massive electrocution that occurred yesterday in Orji, near Owerri, the Imo State capital.

According to an eyewitness, the accident happened when a small truck carrying a metal kiosk suddenly ran into a high-tension wire. When the kiosk touched the high-tension wire, the many men in the vehicle were electrocuted.

One of them, who was thrown out of the vehicle by the electrocution, died instantly. It is believed that the other men died while receiving treatment.

The public affairs manager of the Power Holding Company Nigeria (PHCN), Owerri district, Mr Osita Ugwuafor, confirmed to The Guardian yesterday that though he was unable to visit the hospital to check the story, he had heard about the deaths of two victims.

'We are yet to get full details, but [an] unconfirmed source told us that two died earlier. I don't know the state of others because the authorities were yet to allow people to see them,' he said.

*Adapted from: The Guardian, <http://www.guardiannewsngr.com/news/article17/230107> (Accessed 19/06/07)*

### Teaching Example 1

When teacher Florence in Uganda tried Activity 1 with her class, she found that some students took the investigation further. They noticed that the metal tip of a ballpoint pen will also allow the bulb to light when it is placed between the top of the battery and the bottom of the bulb. She watched as they investigated other materials; a wooden pencil did not light the bulb, nor did a piece of cardboard, but the end of a metal spoon worked.

Florence gave them the chance to report on their own investigations and encouraged them to repeat and do further investigations. Later, she took the activity further to explore circuits and switches.

She asked her students to use their bulbs and cells (and other bits of scrap materials) to design a circuit so that when a visitor presses a switch a light comes on. Her students used paperclips, small pieces of wood, card and metal from cans to make really imaginative switches.

Then, some of the older students made model rooms from cardboard boxes and scraps of material and put two or even three lights in the room with a switch. One group even managed to add a warning light, which came on when a thief opened the door of the model room. Florence displayed all these models in her classroom and encouraged other teachers to come and look at them while her students explained how they worked. Her colleagues were very impressed at what the students had achieved and everyone enjoyed the afternoon.

### Activity 1

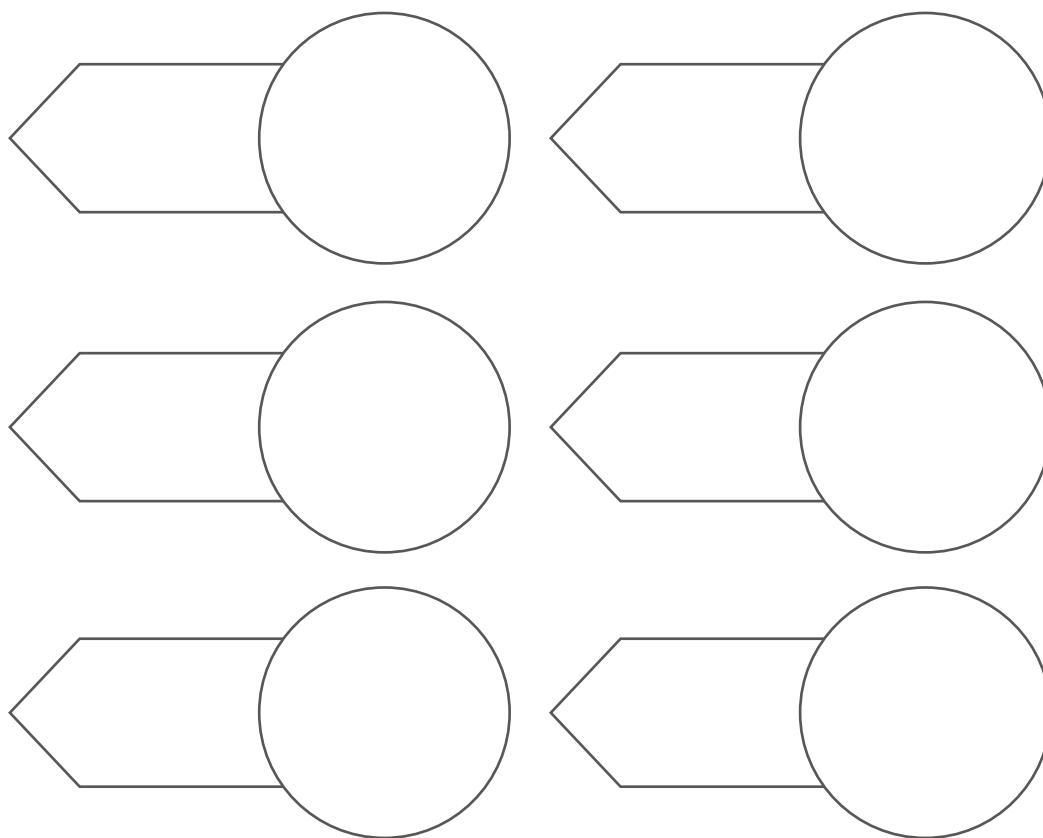
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Each group of students needs one live torch cell, one working torch bulb, two 15-cm lengths of plastic-coated thin copper wire, at least five life-size cut-out shapes of a torch cell and five cut-out shapes of a live bulb. (See the templates below – it is quite time consuming to cut out the shapes; you could ask older students to do this for you before the lesson.) They also need a blank sheet of card or paper and a small amount of glue. (Make sure all cells and bulbs are working before the lesson.)

- Hand out a bulb and a cell to each group. Ask: 'What do we get from these?' Can they show this? What else do they need?
- Hand out the cut-out shapes and the wire. Ask students to investigate different arrangements to see if they can light the bulb. Successful arrangements are recorded by gluing the shapes down and drawing in the position of the wire.
- Tell them: 'There is more than one arrangement that will light the bulb.' Encourage them to find five possible different arrangements.

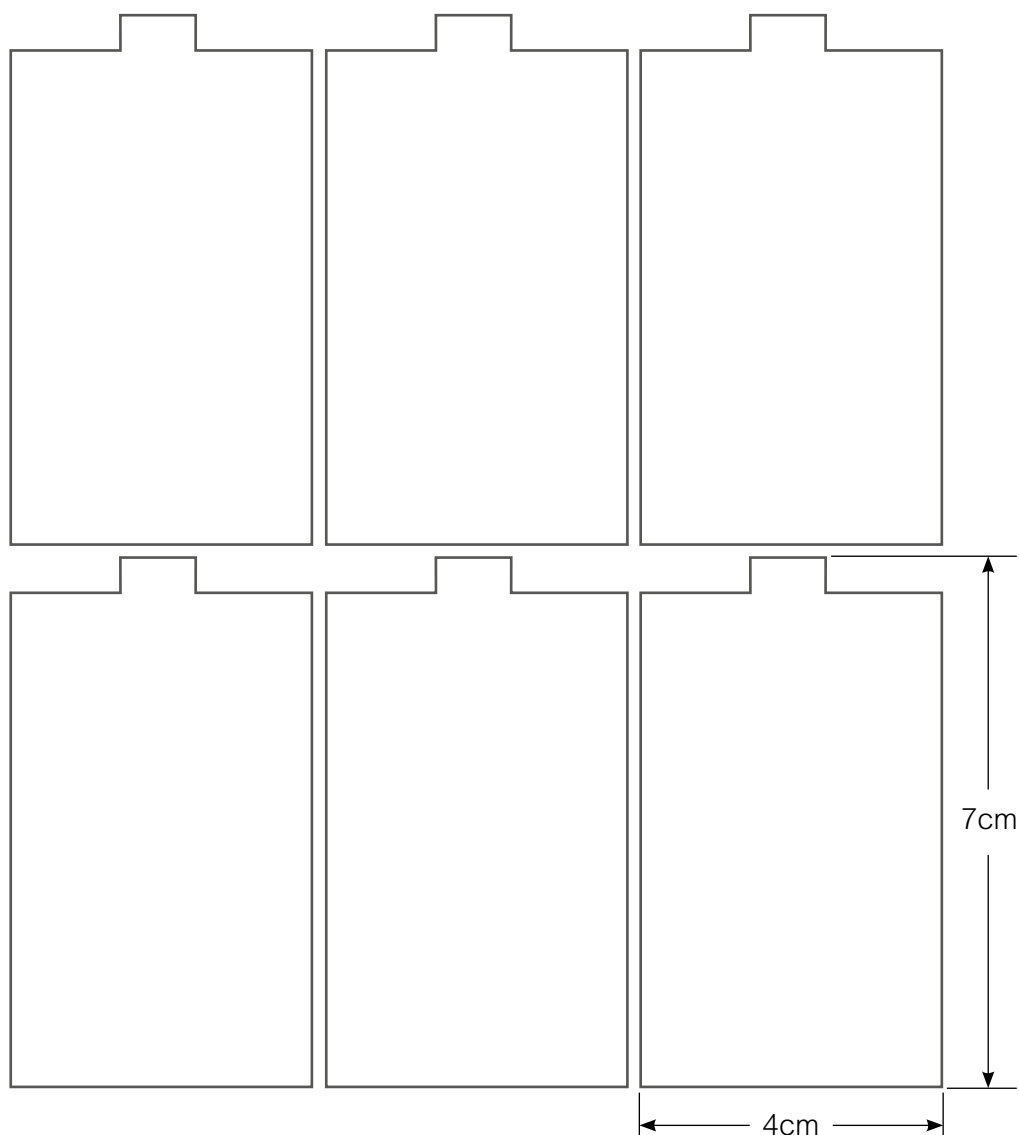
The groups report back at the end.

#### Templates of bulb – for cutting out



### Templates of batteries for cutting out

#### Torch cell



#### Discussion notes for Activity 1

Be patient. Let your students struggle. Remember that 'easy come' knowledge, becomes 'easy go' knowledge. Don't interfere. They will be determined and persist. They may eventually work it out by trial and error. Then they will try to make sense of this and ask: 'What's going on here?'

You will see that most young children first think it will light if they just touch the bottom of the torch bulb to the top of the torch cell, metal to metal. They look quite puzzled when it doesn't work.

They think, 'No! But it needs some wires! Or a wire!' Then they link a piece of connecting wire from the base of the cell to the top of the cell. It still doesn't work.

Watch to see what strategies your students adopt.

The bottom of the torch bulb must contact the top of the torch cell, and the wire connects the bottom of the cell to the metal side of the bulb.



The five arrangements

They will probably get these on their own, by trial and error. Give them time and keep encouraging them.

One or two groups may realise that it will still work if the bulb is laid on its side.



*Adapted from: Umthamo 3, University of Fort Hare Distance Education Project*

## 2 Rotating group work

Electricity provides more than light. Think of the modern electrical appliances we use. We get heat from electricity (stoves, irons, etc.). We get movement (mower, fan etc.). Radios and TVs give us sound. Some students may even know that magnetism is also involved in some way with electricity.

You need to think about how you can show these electrical effects to students. One way would be to get students to be investigators in their local community; they draw up lists of all the effects and uses of electricity that they see around them. Or they could cut out pictures of appliances from adverts in old magazines and newspapers to make a display. Can you think of other ways to make students aware of different uses for electricity?

In **Activity 2**, your students move round a number of workstations in your classroom to find out about the effects of electricity; this is an example of rotating group work. You will need to think about how you ask the students to record what they have learned in this activity – will they create a poster in each group? Will you ask each group to present their ideas about one workstation? Read **Teaching Example 2** to see how one teacher carried out this activity.

After the activity, ask yourself if your students enjoyed this way of working. How could you improve it next time?

### Teaching Example 2

Mrs Yargawa, an experienced primary science teacher, decided to try rotating group work using a double period and ten groups of five students. She planned ten workstations to show the effects of electricity: two for the 'heat' activity, two for 'movement', two for 'sound', two for 'magnetism' and two for 'light'.

The day before the lesson, she made ten workcards, which can be seen below and packed the apparatus for each workstation in a shoebox. She appointed a group leader for each group and arranged a meeting with the leaders before the lesson so they were well prepared.

Reflecting on the lesson, Mrs Yargawa was very pleased with the way it went. The groups moved from station to station every ten minutes, and the leaders ensured that everyone took part. She had asked the students to write their own notes on what they had learned from the lesson and to comment on their experience of rotating group work. She was impressed with how much the students gained, but she was even more impressed with the mature way they talked about the approach she had used.

### Activity 2

Read the workcards, which give details of workstations, each to demonstrate one effect of electricity. Look at the equipment needed, and decide how many workstations you will have for each card. Prepare the equipment and label it clearly.

- Divide your class into groups to match the total number of workstations. (If you have a large class and only one workstation for each effect, you may need to do the activity with half your class and then repeat it with the other half).
- Explain to your class how to set up each workstation and read through the workcard for each workstation with the students.
- In each group choose a leader. Gather the leaders round you and tell them they are responsible for making sure that their group works in an orderly way at each workstation and that everyone in the group joins in. When you call 'stop' the leaders will move their group to the next workstation until they have completed all five.
- Tell the leaders to return to their groups and to start working.
- After ten minutes call 'stop'. Each group puts the equipment back neatly and moves to another workstation. Do this again after another ten minutes, and so on, until everyone has looked at all five workstations.
- Make sure that each group records their observations at each workstation.

At the end, ask each group to present their observations and ideas from one of the workstations.

**WORKCARD 1: HEAT**

What you have:

- a torch cell/a torch bulb
- a 10 cm length of very very thin, bare wire (unravelled from wire flex from an old broken tape recorder) or fuse wire
- a 10 cm length of ordinary bare copper wire

What you do:

- Hold the 10 cm wire with the two ends on the top and bottom of the torch cell.
- Touch the arc of the wire to the back of someone's hand. Do they feel anything?
- Repeat using the length of very very thin wire/or fuse wire. Do they feel anything now?
- What form of energy do you sense here?
- Discuss what you have felt. Try to think of an explanation of your own. Experiment using the different wires to light the bulb. Compare the brightness. What do you think?

**WORKCARD 3: MOVEMENT**

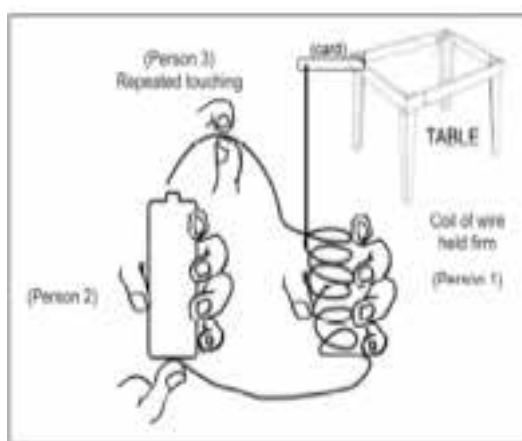
What you have:

- a torch cell
- 25 cm length of insulated copper wire
- a steel needle or pin that has been magnetised (made into a magnet) by being placed alongside a strong magnet for a time
- a 15 cm strip of thin, flexible card
- a small electric motor from an old broken toy or tape recorder
- a drawing pin



What you do:

- Make a tight coil by wrapping the wire around a pencil.
- Fasten the strip of card to the edge of the table/desk so that it is like a swimming pool diving board.
- Push the magnetised needle so that it hangs vertically from the end of the strip.
- Hold the coil steady with the magnetised needle dangling into the centre of the coil.
- Hold the torch cell with one bare end of the wire from the coil in contact with the base.
- Another person repeatedly touches the other end of the wire to the top of the cell.
- Discuss what you have seen happen. What form of energy do you find? What is your group's explanation for what you have seen?
- Now turn the torch cell upside down and repeat the activity. But first PREDICT what you think you will see.
- Finally – use the torch cell to work the small electric motor. What direction is it spinning? Can you reverse the direction?
- Do you think an electric motor might have something to do with coils of insulated wire and magnets?



#### WORKCARD 4: SOUND

What you have:

- a torch cell
- small speakers from old broken electrical equipment
- grains of coarse sand/bits of wire flex



What you do:

- Experiment to see if you can get sounds from the speakers by attaching the torch cell to the speaker terminals (why are there always two?).
- You should be able to get a crackling sound.
- What do you have to do to repeat the sound?
- Sprinkle grains of coarse dry sand onto the open cone of the speaker. What do you notice as you make repeated crackling sounds?
- Look carefully at the speakers. Can you see any arrangement of magnets and coils or spirals of wire?
- Discuss your own ideas of how a speaker works.
- Can you link your ideas to Workcard 3: Movement?

#### WORKCARD 5: LIGHT

What you have:

- three torch cells
- four torch bulbs
- assorted lengths of flex wire

You have already seen how we get a bulb to light and you have already investigated the structure of a light bulb.

What you do:

- Investigate different arrangements for getting different numbers of torch cells to light up different numbers of bulbs.
- Record the different arrangements that work. Draw pictures to show these.
- Which were the brightest bulbs?
- Can you think of ways to explain what you see?

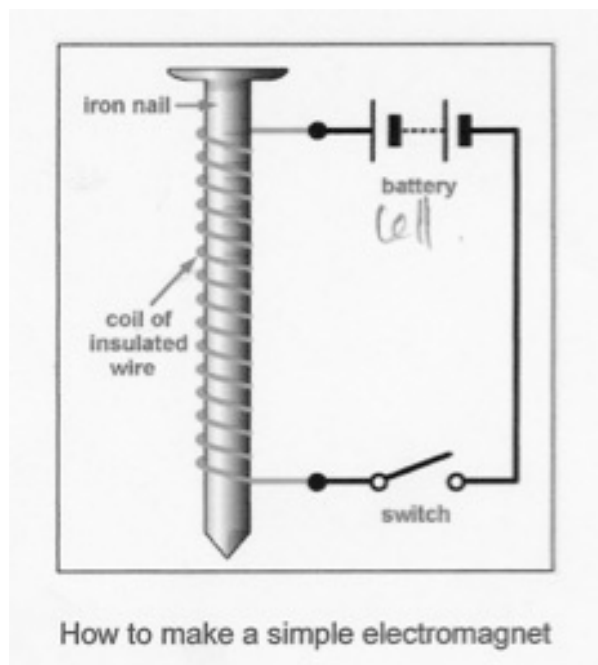
## 3 Electromagnetism

The Activity 3 builds on the ideas of energy change and the need for complete circuits. In it, students work in small groups to explore one effect of electricity – electromagnetism. This type of activity encourages students to think about different scientific processes – planning, observing and recording. After the activity, students could think of uses for their electromagnets.

#### Electromagnets: Teacher notes

A magnetic field is produced when an electric current flows through a coil of wire. This is the basis of the electromagnet. We can make an electromagnet stronger by:

- wrapping the coil around an iron core;
- adding more turns to the coil;
- increasing the current flowing through the coil.



The magnetic field around an electromagnet is just the same as the one around a bar magnet. It can, however, be reversed by turning the battery around. Unlike bar magnets, which are permanent, the magnetism of electromagnets can be turned on and off just by closing or opening the switch.

### Using electromagnets

Many objects around you contain electromagnets. They are found in electric motors and loudspeakers. Very large and powerful electromagnets are used as lifting magnets in scrapyards to pick up, then drop, old cars and other scrap iron and steel.

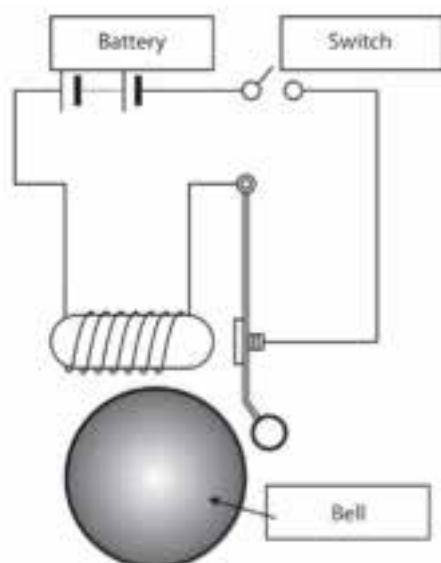
### Electric bell

Electric bells also contain an electromagnet.

- When the current flows through the circuit, the electromagnet makes a magnetic field.
- The electromagnet attracts the springy metal arm.
- The arm hits the gong, which makes a sound and the circuit is broken.
- The electromagnet is turned off and the springy metal arm moves back.
- The circuit is complete again.
- The cycle repeats as long as the switch is closed.

**Electric Bell**

This shows how an electric bell works



Original source: <http://www.bbc.co.uk/science/>

**Teaching Example 3** shows how a teacher with very limited resources encouraged her students to think through the processes involved in an investigation like this.

### Teaching Example 3

Mrs Popoola works in a rural school with little equipment. She likes doing practical demonstrations with her students and is always searching through broken devices in the village to find equipment to use with them.

One day, she took apart an old buzzer to use as an example of an electromagnet. She set it up on her table and gathered her students around her. She showed them that she was using electricity to make a magnet. She then asked them each to discuss with their partner ideas for how she could make the magnet stronger – what could she change? How could they measure the strength of the magnet?

After a few minutes, Mrs Popoola asked students to share their ideas and she recorded the different suggestions on the chalkboard. Some students thought that if she used more torch cell batteries the magnet would get stronger. Others suggested using a different material in the core. Other ideas included longer wire, more coils round the core and using two strands of wire. Mrs Popoola then asked pairs of students to come out and try one of the ideas. They recorded the results in a table on the board. The next pair tried a different idea, and so on, until they had tried all the ideas. Her students copied down the table with the results and then, working with their partner, tried to write a sentence to summarise what they had found out.

Mrs Popoola was very pleased with the way her class listened to each other but she realised that next time she needed to make sure that equal numbers of boys and girls came out to do the experimenting.

### Activity 3

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Gather your class around you and brainstorm the concept of 'magnetism'. You can find further ideas in the additional resource on **Using mind maps and brainstorming to explore ideas**. Where have they seen magnets being used? What sorts of substances are magnetic? Can we make magnets from electricity? This is called an 'electromagnet'. Record their thoughts on the chalkboard or on large newsprint on the wall.

- Organise your class into small groups of between four and six students. Give each group: a steel pin; a working 1.5V torch cell; some small pins or paperclips; and 50 cm of thin insulated copper wire.

Tell the groups you are setting them a problem. They have to use the equipment to make an electromagnet that will pick up as many pins as possible. (You can find further ideas in the additional resource on Using investigations in the classroom).

- Encourage students to investigate how to make an electromagnet with the equipment.

When they have solved the problem, ask students to draw a diagram to show their solution.

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## Arts: The art of storytelling

1 Cultural significance of stories

2 Traditional tales

3 How to write a good story

**Key Question for the teacher:**

How can you help students appreciate stories and develop their storytelling skills?

**Keywords:** stories; community; storytelling; writing; culture; group work

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- planned and managed classroom activities to develop an appreciation of stories and storytelling;
- used local contacts and resources to develop your knowledge about the culture of storytelling;
- devised and used strategies to help students write their own stories

## Overview

Stories have been part of human history for centuries. In the past, stories often delivered important messages. The listeners would laugh, cry and sometimes sing along with the storyteller.

It is the ability to carry messages that makes stories so valuable for you, as a teacher. The activities, case studies and resources in this section are intended to help you use this rich heritage to develop your students' skills in the art of writing, telling and reciting stories. This will develop their sense of belonging and give them insight into their cultural heritage.

A story may be told, written, read or recited. It may be a true story or fiction. Often stories have messages in them about the values of the community, how to live our lives and how to care for others.

You and your students will probably have told and listened to stories before. You may even have written some. This part will help you develop your students' understanding of the art of storytelling and also that storytelling is embedded in the culture of your society.

# 1 Cultural significance of stories

You may be fortunate and know someone in your community who is skilled at telling stories and could come and tell a story to your class. Or, as in **Teaching Example 1**, you may be able to visit the storyteller and record them on a tape and use this in your class. **Activity 1** suggests ways to organise students to share their own favourite stories.

## Teaching Example 1

Mrs Biyela teaches at Furaha Primary School, Tanzania. She is preparing for her next teaching topic, which is 'Story'. She consults books and website resources on storytelling, writing and reciting. She learns that storytelling has deep cultural significance, and wants to find some way of conveying this to her students.

She has heard of an old lady, Bibi Koku, who lives nearby and is famous as a storyteller. One afternoon, she visits Ma'Koku and asks if she would be willing to tell a story to Mrs Biyela's Standard 4 students. The old lady agrees, but, she says, 'Only during the evening.' She insists that people who tell stories during daytime invite famine into their community and she is not willing to do that.

Immediately, this becomes an interesting issue for Mrs Biyela – she is sure it would grab her students' attention and give them insights into a cultural aspect of storytelling. Therefore, she arranges to bring a tape-recorder and record Ma'Koku telling a story, as well as talking about the taboo on daytime storytelling. She is concerned to try to make sure that the old lady talks about this in a way her students can understand. As it turns out, Ma'Koku solves the problem for her by telling the story about what happens to people who tell stories during the day!

On the day of the lesson, Mrs Biyela checks the tape-recorder to make sure everything is fine. She introduces the lesson, asking students if they have ever listened to any stories told by old people. The students are curious – they listen to Ma'Koku telling her story.

Next, Mrs Biyela conducts an animated discussion about why Ma'Koku could not come to tell the story at school that morning. She is excited by the fact that so many of the students are aware of the custom of not telling stories during the day. By the end of the lesson, they have built up a rich understanding of the tradition and the taboos associated with it.

## Activity 1

Prior to the lesson, ask each student to decide on a favourite short story to share in class.

- Organise the class into small groups of between four and six students. Ask each student to tell their story to the members of their group. Before they start, emphasise that everyone is to have a turn and they must each listen to each other's stories.

- Next, ask each group to choose between them one story from their group. They will present these to the class. If you become aware that any group is finding it hard to agree, step in to help the group decide on a story.
- Give the groups time to prepare. If possible, provide a range of props – clothing, tools, toys, musical instruments, etc. – or ask students to bring these in, to enhance their stories and help convey the meanings.
- Each group in turn tells their story to the whole class and explains why they like it.
- Finally, discuss with your class the important parts of a story; the beginning, the body, episodes, setting, characters and the ending.

**Were you surprised at the stories your students chose?**

**How well did your students work together in the small groups? Do you need to plan different groupings for the next activity?**

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## 2 Traditional tales

Many traditions and beliefs are passed on through story. In this part, we suggest how to develop students' understanding of the importance of story in passing on such traditions and providing messages about how people should live.

It is very exciting for students to hear expert storytellers telling their stories. In **Teaching Example 2**, a teacher organises a visit to a storyteller. In **Activity 2**, you use brainstorming to investigate your students' knowledge of traditional tales and explore ways to gather these stories together.

### Teaching Example 2

Mr Mncube is an arts and culture teacher at a school in KwaZulu-Natal. Mr Mncube visited his village leader, Inkosiu Shandu, and asked him if he could bring the Grade 6 students to his kraal. He also asked the village leader if he would tell a traditional tale to the students. This was agreed.

A day before the appointment, Mr Mncube told the class that he would be taking them out on a visit to the village leader's home to listen to the traditional tales of the amaZulu. In order to prepare his students, he conducted a brief discussion about their experiences of story and what they thought they might encounter the next day and made a mind map of their ideas on the chalkboard.

The tale that the village leader narrated is set out in 'The snake chief' below. It had an important message and lessons to be learned. Mr Mncube, as he listened to the story, was already preparing questions that he would ask the class about the story in order to bring out these lessons. Because the village leader was an old, respected man, he was also able to impress on the children the rich sense of ancestry attached to the story in Nguni tradition – it had been handed down over time, with its meanings reinforced

from generation to generation. Mr Mncube realised that he had made a wise choice in actually bringing his students to the storyteller's home, rather than simply telling them the story himself.

### **The snake chief**

#### **This is a Zulu folk tale.**

Nandi was very poor. Her husband was dead and she had no sons to herd cattle and only one daughter to help in the fields.

In Summer, when the umdoni trees were full of creamy flowers, she and her daughter dug for amadumbe to eat with their maize porridge. But in Autumn, she collected the umdoni berries, purple and sweet, and gave them to her neighbours in return for strips of dried goat meat or calabashes of thick creamy sour milk.

One hot day, Nandi went to the river as usual to gather the purple berries, but she found nothing.

Just then she heard a loud hissing. Looking up, she saw a great green-grey snake wound around the dark red trunk of the tree, his head swaying among the branches. He was eating all the berries.

'You are stealing my berries,' she called. 'Oh snake, you are stealing all my berries. What will I have to exchange for meat if you take all the fruit?'

'What will you give me in exchange for the umdoni berries?' he hissed. 'If I fill your basket, will you give me your daughter?'

'Yes,' cried Nandi, 'I'll give you my daughter this very night. Only let me fill my basket with the purple fruit.'

But once her basket was full, she began to tremble at what she had promised. How could she give her daughter to such an ugly creature? She must make sure that snake did not find out where she lived. She must not go straight home lest he were watching.

At last she reached her hut and cried out to her daughter, 'My child, I have promised you to snake in return for this basket of purple fruit.' And she burst into tears.

Meanwhile, snake had followed Nandi to her hut. Just as she burst into tears, snake hissed at the entrance to her hut.

'No! No!' cried Nandi. 'I did not mean my promise.' The young girl looked up fearlessly and said, 'A promise is a promise, Mother.' She put out her hand and stroked his grey-green head. She gave snake food and made a bed for her snake master. During the night, Nandi heard voices, one deep and strong. She silently crept from her skin blankets and she saw a handsome young man, tall, brown and strong sitting with her daughter. Surely he was a chief's son or a chief himself. Her daughter was making a bead necklace, weaving a wedding pattern with the multicoloured beads. The young man was talking gently and lovingly to her as she worked.

Nandi looked at the folded blanket where snake had slept and on it lay a long coiled green-grey skin. She snatched the skin and threw it into the fire that still burned low in the middle of the hut.



'Now the spell is broken,' spoke the snake chief. 'For a virtuous girl took pity on me and a foolish old woman has burned my skin.' But in spite of his harsh words he smiled gently at Nandi.

*Adapted from: Pitcher D. in Gordon M Ed, Madiba Magic: Nelson Mandela's Favourite Stories for Children, Tafelberg 2002, page 26*

## Activity 2

Before the lesson, gather as many written or oral versions of local traditional stories as you can find. There are some examples below.

### Stories and fables from across Africa

#### Thunder and Lightning

A long time ago, both thunder and lightning lived on this Earth, among the people. Thunder was a mother sheep and Lightning was her son, a ram. Neither animal was very popular with the people, for when somebody offended Lightning, he would fly into a furious rage and begin burning whatever he came across. This often included huts and corn bins, and even large trees. Sometimes he damaged crops on the farms with his fire and occasionally he killed people who got in his way. As soon as Thunder knew he was behaving this way, she would raise her voice and shout at him as loudly as she could, and that was very loud indeed. Naturally the neighbours were very upset, first at the damage caused by Lightning and then by the unbearable noise from his mother that always followed his outbursts. The villagers complained to the king on many occasions, until at last he sent the two of them to live at the very edge of the village, and said that they must not come and mix with the people any more. However, this did no good, since Lightning could still see people as they walked about the village streets and so found it only too easy to continue picking quarrels with them.

At last the king sent for them again. 'I have given you many chances to live a better life,' he said, 'but I can see that it is useless. From now on, you must go away from our village and live in the wild bush. We do not want to see your faces here again.' Thunder and Lightning had to obey the king and agree to abide by his ruling; so they left the village, angry at its inhabitants. But still there was plenty of trouble in store for the villagers, since Lightning was so angry at being banished that he now set fire to the whole bush, and since it was the dry season this was extremely unfortunate. The flames spread to the little farms of the people, and sometimes to their houses as well, so that they were in despair again. They often heard the mother ram's mighty voice calling her son to order, but, since it was always after the fact, it made very little difference. The king called all his counsellors together and asked them to advise him and, after much debate, they hit on a plan. Why not banish Thunder and Lightning completely away from the Earth, and send them to live in the sky?

And so the king proclaimed. Thunder and Lightning were sent away into the sky, where the people hoped they would not be able to do any more damage. Things did not work out quite as well as they had hoped, however, for Lightning still loses his temper from time to time and cannot resist sending fire down to the

Earth when he is angry. Then you can hear his mother rebuking him in her loud rumbling voice.

*Adapted from original source: <http://www.gateway-africa.com>*

Ask students to brainstorm as many traditional tales as they can remember hearing.

Next, divide the class into groups of four. Ask each group to identify a story that was identified in the brainstorm and to write up and illustrate a fuller version of the story.

Provide guidelines, such as:

- What is the name of the traditional tale?
- To which society/community/clan does the tale belong?
- What message(s) does the tale provide?
- What lesson(s) can be learned from the tale?
- Who normally tells the story?
- Who is the intended audience and why is this audience targeted?
- What time of the year is the tale normally told? Why?
- What time of the day is the tale normally told? Why?

The stories that are produced can be bound together as readers for use in the school. It may even be possible to publish them in the community or beyond.

Having a good understanding of local traditional tales is a good base for your students to devise their own stories. Listening to stories told with animation and which use words to gain effect will give them confidence to take risks in their writing and produce more creative tales.

### 3 How to write a good story

The purpose of this part is to use local resources to develop your students' skills in writing their own stories and poems. You will also develop your skills in planning learning activities that allow students to participate fully. In **Teaching Example 3**, a teacher uses a radio programme to stimulate interest about writing stories and **Activity 3** uses pictures as the stimulus. With younger students, you might want to encourage them to draw pictures for their story; it is important that all students feel able to tell a story, rather than struggle with spellings and handwriting.

#### Teaching Example 3

While listening to the radio, Miss Sala, a social studies teacher, heard that on the coming Friday there would be a programme in which a renowned local storyteller and writer would be interviewed.

Fortunately, the programme was at a convenient time during the school day, so Miss Sala came to school with her radio. She also prepared to tape-record the radio programme.

Before the programme started, she discussed with her students what they knew of the writer, and what they expected she would be talking about when she was interviewed.

During the programme, the writer explained about the structure of a story, the theme/main idea, the characters and setting. She gave some advice on the process of writing. She also spoke about what inspired her and where she got her ideas from.

When the programme was over, Miss Sala asked the following kinds of questions to promote discussion among her students:

- What can you learn from this writer that could help you become a better writer yourself?
- What inspires her? Are there things in your life or community that you want to write about?
- What is the structure and content of a good piece of writing?

She asked the last question at the end because she wanted it to be inspired by the bigger issues.

At the end of the lesson, she said that with their next piece of creative writing, she would like students to try some of the techniques suggested by the storyteller. She would then mark it by looking for evidence they had considered these issues and give careful feedback.

### Activity 3

- Present students with a stimulus to draw out ideas about life, community or broader society.
- Using 'Using pictures as a stimulus for story writing' to guide you, discuss the picture your class has chosen.
- Ask each student to write their own version of the story. Encourage them to add in their own ideas and scenarios as they write. For example: What happened before that led to the picture and what happens next?
- The next day, students read their stories to each other in small groups and each group chooses one to read to the whole class. Remind them of how important it is to use their voices and props if possible to help them.

You might want to put all the stories into a class book.

#### Using pictures as a stimulus for story writing

Pictures or photographs can be a very good stimulus for creative writing for your students. Discussion focused around a picture can stimulate ideas before students write their own stories or poetry.

You can discuss a chosen picture or photograph with the whole class or have

more copies of the same or different images so that they can discuss them in groups. If you have a large class, you may need to have many more images or work with half the class at a time while the other half of the class is working on another task.

The following questions can be used with any picture to stimulate ideas and imagination. You can write the questions on the chalkboard and discuss them as a class or give each group a set of the questions and ask them to report back after a few minutes. Some of these questions will not be useful with every picture. You will have to select those that fit your purpose best and maybe add your own questions to the list or ask your students to raise questions about the picture.

1. What do you think is happening in this picture?
2. What do you think it is called?
3. What catches your interest in this picture? Why?
4. What do you like in this picture?
5. What do you not like in this picture?
6. What is the story around this picture?
7. What led up to this picture being painted / photograph being taken?
8. What do you think will happen next?

Record students' answers on the chalkboard so that they can look at these as you set them the task of writing a story, but encourage them to be creative and use their own ideas.

Encourage them to think what happened before the picture and maybe start their story there.

Practise the whole song until everyone is happy and then perform it to another class or at an Open Day.

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## Life Skills: Taking responsibility for our environment

- 1 Local water use
- 2 Using stories to understand environmental issues
- 3 Taking action on environmental issues

### Key Question for the teacher:

How can you gather data to develop students' learning about the environment?

**Keywords:** environment; data gathering; assessment; diaries; real-life stories

### Learning Outcomes for the Teacher

By the end of this section, you will have:

- used real-life stories, data gathering and diaries to develop understanding of environmental issues;
- planned, carried out and reflected on an action on a local environmental issue;
- assessed the learning of the class and the success of the project.

## Overview

LA major issue across the world is the impact that people have on their environment. If we use up or misuse resources and pollute the environment we have a negative effect on wildlife and crops, and we run the risk of damaging the world for future generations.

As a teacher, and a responsible citizen, you need to be aware of environmental matters and act as a role model for your students as well as helping them to understand the issues. You can do this best by giving them activities that involve gathering information about the environment, both locally and more widely, and using what they find out to think about the consequences of different actions.

There are many ways to do this. This first part of the section focuses on gathering information from your students' own experiences to explore the concepts and their own responsibilities and rights.

# 1 Local water use

Learning about some of the complex concepts about the environment needs you as the teacher to break down the ideas into smaller parts and build up the picture in a logical way. Students find this easier if you take think about the ideas they already have and you use the local environment to show them how these ideas relate to their situation.

## Teaching Example 1

Mrs Namhlane in Nigeria was starting a topic on the local environment with her large Primary 2 class, looking at the importance of water in everyone's life.

To stimulate her students' interest in the topic, she decided to set up a class research project. First, she asked them to get into groups of six to eight people who lived in the same part of the community and told them that there were three people coming into school next day – one from each part of the community – to talk about how they got and used water. She asked them to think about and write down questions to ask. These area groups shared their questions together so that each area group could check they had thought about all aspects.

The next day each visitor talked, either in the classroom or outside under a tree, with students from their area. The groups asked their questions in different ways – in one group different students asked one question each, in another group a girl and a boy asked all the questions and the others took notes.

After the visit, students were asked to list three important things they had found out and report to the whole class. Mrs Namhlane asked each group in turn to tell what they had found out but not to repeat any answer already recorded on the board.

They then discussed the problems that there were about water and thought of possible solutions.

- Long distances to travel to obtain water.
- Leaving younger children behind to get water.
- Students out of school to collect water.
- Is the water clean and safe?
- Size of containers to carry water and weight of water to carry over long distances.
- Time taken to obtain water stops people doing other things.
- The water collected may be contaminated by poor sanitation and animals' use.
- Open to infection by water-borne diseases.
- Drought can restrict access to clean water.

- Lack of infrastructure e.g. pipes and storage containers to capture rainwater etc.
- Lack of systems to purify water.
- Lack of education about ways to use and keep safe natural water resources.
- No sustained access to water.

### Activity 1

Ask your students to keep a 'water diary' for one week. They will record (perhaps on a wall chart) how much water they use and what they use it for.

After a week, ask them to work in groups and to list all the uses in their group and then put them in the order of which activities use most water and which use least. Display each list on the wall and allow them to read each other's lists before having a final session together discussing the issues about water in their area.

**You may want to consider questions like: Where does our water come from? Does everyone have access to water? Is our water clean and safe? How could our water services be improved? How can we help?**

You could also link this activity to number work (by looking at the data – the amount of water used), to science (why water is essential to life) and to social studies (the problems of providing water in some parts of Africa).

## 2 Using stories to understand environmental issues

Drawing is a useful way to explore students' ideas about any topic. It allows them to show their ideas without having to speak aloud or be able to write. It is especially useful with young students and provides a way for them to talk about their ideas. The drawings do not have to be of a high standard but have to tell a story or show an idea.

Using stories is another way of encouraging students to think more deeply about a problem. It removes the focus from the individual and allows students to talk more openly. Stories can also provide a wider perspective for students and give them inspiration. Teaching **Example 2** and **Activity 2** show how you could use both techniques in your classroom.

### Teaching Example 2

Mr Ngede read the story below to his class to stimulate their ideas about the Earth and its resources.

**The story of the selfish farmer**

There was once a young farmer, who had a wife and two children, who lived in a small village. The farmer had inherited his farm from his hardworking grandfather whom he loved. While being sad at the death of his grandfather, the farmer was pleased to be his own boss and own all the land.

He was a hardworking young man and he maintained the farm as well, if not better, than his grandfather. He had learned a lot from his grandfather but also had learned well at school and read all about different ways to preserve water and tend the ground, which increased his crops. However, he was not like his grandfather in that he would not share his ideas or extra produce with other farmers and growers in the village.

The villagers were surprised when they went to ask for some seeds or advice to be told to get off his land. His wife was not happy about this but respected his views. The villagers watched what he did and some tried to copy the things he did but without as much success. Others just laughed or moaned about what he was doing.

One very dry season, the crops in the village did not do well. There was little water as the stream had dried up and there was a long walk of over six kilometres to the next source of water, which meant that only water for drinking was brought back.

The selfish farmer, however, had plenty of water and food, but did not help villagers who came to seek help. His wife begged him but he did not change his mind. He had put up guttering and sheets to catch the rainwater and stored this in big drums that he had collected so when the drought came he was able to water his plants, which grew as well as ever.

As it got hotter and hotter and drier and drier, people's crops began to fail and many were hungry. The wife tried to persuade her husband to help the villagers. The children tried to persuade their father, but he would not listen. He said he had worked hard and it was his and the others were lazy or had not planned ahead.

However, one day, a very thin and ragged man came to the farm to ask for food for his ill wife. The farmer shouted at him to go away but his wife stopped him and said: 'Don't you recognise your cousin?' The farmer was shocked at how thin and old his cousin looked. The cousin explained how he'd tried to save water but failed, and so his crops failed.

The farmer told him what he could do next time. But his wife said he is too weak to do this unless you give him and his wife food. The farmer relented and gave the cousin food. The cousin returned a week later saying his wife was getting better and could he have more food. The farmer was going to say no but his wife told him that they were so hungry it would not be enough to give just one lot of food. The farmer gave the food and over

the next few days he slowly changed his ideas as he thought about how selfish and thoughtless he had been to his grandfather's memory and to his neighbours. So he asked the villagers to his farm and shared his food with them and promised to help them prepare better for the next crops.





1.	How many different ways can we use the land? Make a list.
2.	Why is it important to look after the land?
3.	Why are some people more selfish than others? Why should we share our land?
4.	How can we encourage people to share? Should we share everything?
5.	Do we look after our land well?
6.	Who else do we share our land with?
7.	How can we look after the land better?
8.	What can we, as a class, do to look after the school land?

He then gave his students a small piece of paper and asked them to draw a picture of 'why the farmer was selfish'.

He explained the idea carefully and encouraged them not to copy, but think of their own ideas. As the students finished, they stuck their pictures on the wall. Mr Ngede asked some students to say what their drawings were about and he tried to guess what some were. The students enjoyed this very much.

Next, he led a discussion about how important it was for everyone to look after the land. They listed together on the board how people in the local community used the land and looked after it.

He then asked them some questions, which they discussed in groups. For example:

- How did the people use the land?
- Did they look after it?
- In what ways could the farmer have looked after his land?
- Who did the work?
- Was the land productive? If so, why? If not, why not?
- How could they improve the way they looked after the land?

As a class, they thought about the questions and shared some ideas.

At the end of the day, Mr Ngede asked the students to look on their way home at all the different ways the land was being used and to come back the next day with any that could be added to their list.

## Activity 2

This activity looks more widely at the importance of looking after our environment. Sebastian Chuwa tells the story of a Tanzanian man who has inspired communities to come together to solve environmental problems. Read this before you plan your lesson.

Tell your class this story. On the wall have a number of words spelled out clearly, for example 'conservation'.

After you have read the story, discuss these words and their meanings.

Ask your students, in pairs, to imagine themselves as someone like Sebastian Chuwa. What particular environmental issue would they like to do something about? How would they do this? Move around the class and ask pairs with good ideas to explain their ideas to the rest of the class.

Ask them to look closely at their local environment as they go home and see if there are other issues they had not noticed before and share these the next day. Make a list of their five favourite issues

Sebastian Chuwa is a man with a vision for his country, his people and the future generations who will inherit their legacy. For 30 years he has been actively studying environmental problems in his east African homeland of Tanzania, and the solutions he has found offer results that benefit not only the land, but all the populations that depend on it for life and sustenance. His methods are based on the two primary objectives of community activism – organising people to address their problems at a local level, and youth education – influencing the teaching of conservation in schools, beginning at the primary level.

He has inspired large groups of community volunteers to come together to solve not only their environmental problems, but problems of poverty alleviation, women's empowerment and youth employment within the area of Kilimanjaro

Region in northern Tanzania. His efforts on behalf of African blackwood have created the first large-scale replanting effort of the species. Because of the establishment of multiple community nurseries and numerous cooperative projects geared towards reforestation over the past decade, in 2004 the ABCP and the youth groups associated with Sebastian's work celebrated the planting of one million trees. The ever-expanding nature of his work has given him and his community a reputation as leaders in the field of Tanzanian conservation.

### **History of the African Blackwood Conservation Project**

In 1996, James Harris, an ornamental turner from Texas, USA, and Sebastian Chuwa founded the African Blackwood Conservation Project (ABCP), to establish educational and replanting efforts for the botanical species *Dalbergia melanoxylon*, known as mpingo in its home range of eastern Africa. The wood of mpingo is widely used by African carvers and by European instrument manufacturers for the production of clarinets, flutes, oboes, bagpipes and piccolos. Because of overharvesting and the lack of any efforts directed towards replanting the species, its continued existence is threatened.

In 1995, James Harris, who uses mpingo in his craft, saw *The Tree of Music* film in the US and determined to do something for the conservation of the species. He made contact with Sebastian by mail and proposed a joint effort: he would launch a fundraising effort among woodworkers, musicians and conservationists of the western world, and send the money to Sebastian to start tree nurseries in Tanzania. The project was enthusiastically endorsed by Mr Chuwa. Since that first contact, the ABCP has become a leading force for mpingo conservation in northern Tanzania, founding nurseries for the production of large numbers of mpingo seedlings and raising awareness about the importance of the species internationally.

### **Conservation at Ngorongoro**

Sebastian Chuwa's childhood home was on the southern slope of Mt Kilimanjaro at 4,900' elevation. He learned to love nature at an early age from his father and mentor, Michael Iwaku Chuwa, who was a herbalist. Together they would take long forays into the forests to collect plants for the remedies his father used in his work. On these expeditions over many years he learned the names of the plants and trees of Kilimanjaro's abundant flora. His love for the natural world continues to this day and is the guiding force behind his work.

After finishing secondary school, he studied at Mweka College of Wildlife Management and after his graduation was hired as a conservator at Ngorongoro Conservation Area. During his 17 years of employment there, he studied and catalogued the plants of the area, discovering four new species (of which two are named in his honour) and assembling a herbarium of 30,000 plants at the visitor's centre for the use of visitors and staff personnel. Because of his considerable knowledge about the flora of the area, he worked with Mary Leakey at nearby Olduvai Gorge, identifying plants in the area of the Leakey early hominid discoveries. At Ngorongoro, he also instituted a successful protection programme for the endangered black rhinoceros, which was duplicated in other African locales.

Ngorongoro Park is a co-management area where the Maasai communities still live with their cattle herds. During his employment at the park, Sebastian worked

closely with the Maasai, studying their medicinal remedies and setting up tree nurseries for their use. He also set up the first youth conservation education programme in Tanzania for Maasai children, focusing on practical activities like establishing tree seedling nurseries and replanting programmes. This club was so successful that it became the blueprint for a nationwide movement, called Malihai Clubs of Tanzania (see below), established in 1985, with offices at Ngorongoro Park headquarters in Arusha and now operating nationwide with about 1,000 clubs.

#### Offices and awards

In 1999, Sebastian was honoured with an appointment as chairman of Kilimanjaro Environmental Conservation Management Trust Fund by the Regional Government Authority of Kilimanjaro Region, Tanzania. This office automatically makes him a member of the Regional Environmental Conservation Committee. His valuable contributions to environmental conservation will be amplified through this position.

*Adapted from: <http://www.blackwoodconservation.org>*

## 3 Taking action on environmental issues

As a teacher, you need to help students understand their responsibility to their environment in ways that stimulate their interest and develop a caring attitude towards it. In Activity 3, a poster campaign is used as a stimulus and in Teaching Example 3, a small-scale project is described that shows how different groups can interact in order to make a difference.

As the students work through such a project, your role is to be well prepared to anticipate some of their needs and provide resources to support their learning. If you have a large class, you will have to think how you can involve all your students and perhaps divide the tasks up between groups. With younger students, you may have to plan to do something on a much smaller scale and involve some members of the community in helping you more.

### Teaching Example 3

A class in Ngombe school in Iringa decided to launch a 'clean-up' campaign. Their teacher Mrs Mboya had been working on a cross-curricular theme with the title 'looking after our land'.

Having spent one morning walking around the school and the area just outside it, Mrs Mboya and her class discussed what they had seen. They listed everything they liked about the area and also those areas or things they would like to change or improve.

They decided they could work on two small areas to clean up the environment – the school playground and the local stream. The class was divided into two groups with two teams working in each area. The teams discussed what they could do and then shared their ideas with their

other team. They agreed who would do which tasks and then each team worked out its own action plan for the week, around school hours.

The class carried out the clean-up over a one-week period. They then made a display in the school hall that showed:

- the amount and type of material collected in the clean-up;
- their plans for keeping the environment attractive and litter-free in the future;
- how to dispose of the litter, including recycling and reusing some of it and burning or burying some.

The assembly went well and many students from other classes were pleased at the work done and helped to keep the school area tidier.

### Activity 3

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This activity builds on your students' raised awareness of litter and waste management and takes a step-by-step approach to learning through action.

**Step 1** – Ask the class (perhaps working in pairs) to identify litter and waste issues in and around the school. Select one issue (probably the one that was mentioned the most).

**Step 2** – Work with the class to design a 'plan of action'. To do this, ask each pair to suggest ways of solving the problem. Make sure that the agreed plan of action you develop is realistic and can be attempted by the class. Give out tasks to groups of students.

Make the plan into a large poster with deadlines that can be displayed on the class walls.

**Step 3** – Take action: this might involve days or months of work but make sure each group keeps a record of what they do, when and in which order.

**Step 4** – As they complete each part of the action plan, ask them to record their progress on the poster.

**Step 5** – On completion, reflect on the success of the action with the class. What went well? What did they learn? What were the problems? What could they do to extend this idea? Is the area staying clean?

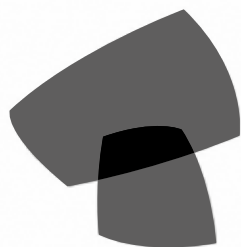
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# TESSA

Teacher Education in Sub-Saharan Africa

## Teaching Pack No.12

### Middle Primary

<b>Section 1</b>	<b>Literacy:</b>	Investigating stories
<b>Section 2</b>	<b>Numeracy:</b>	Exploring Symmetry
<b>Section 3</b>	<b>Science:</b>	Looking at light and shade
<b>Section 4</b>	<b>Social Studies:</b>	Understanding timelines
<b>Section 5</b>	<b>Life Skills:</b>	Investigating self esteem

- Additional Resources:**
- Group work in your classroom
  - Working with large/multigrade classes

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# 12

## Literacy: Investigating stories

1. Storytelling
2. Meaning behind stories
3. Writing a story

**Key question for the teacher:**

How can you use investigations to develop ideas about story?

**Keywords:** research; stories; purpose; questions; investigating; community

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- Used investigation and research methods to develop your classroom practice;
- Investigate students' understanding of stories;
- Explored ways to create original stories

## Overview

Storytelling is an important part of most communities' life and culture. This module explores how to strengthen links between school and community by using the community and its stories as a resource for learning.

This section introduces you to the value of research in teaching and learning. By setting up research activities, you will find answers to questions, try out new ideas and then use them to create an original piece of work.



# 1 Storytelling

We all tell stories, about our daily lives or about the past. There are many traditions around storytelling and many lessons to be learned from stories.

**Activity 1** explores what researching is, how it is done, and how results can be analysed. As you work alongside the class on the task, you will learn what your students are capable of.

## Teaching Example 1

Mrs Rashe and her Grade 3 students in Nqamakwe, in the Eastern Cape of South Africa, tell stories every day.

One day she wrote the question 'Why do people tell stories?' on the chalkboard and then listed students' answers:

- To enjoy
- To make people frightened
- To teach me not to do something

She asked each student to go home and ask an older person the same question and to bring the answers back. She made sure that she reminded students that they needed to approach people very respectfully when asking the question. She also reminded them to explain what the information would be used for.

The next day she added their answers to the list. Where more than one person gave the same answer, she added a tick (see below)

### Why do people tell stories?

- To enjoy ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ 35
- To make people frightened ✓✓✓✓✓ ✓✓ 7
- To teach me not to do something ✓✓✓✓✓ ✓✓✓✓✓ 10
- To teach wisdom about life ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ 14
- To show correct behaviour, ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ ✓✓✓✓✓ ✓✓ 32
- To make our language grow, ✓✓✓✓✓ ✓✓ 7

She asked the students to add up the ticks for each reason. They discussed the following questions:

- Which reasons are the most popular? How do you know?
- Do you agree with the elders' ideas? Why, or why not?

After the discussion, Mrs Rashe asked her students to write what they had found out through their research.

The next day, she asked a few students with different views to read their reports. She was very surprised and pleased with the different ideas that the students came up with.

## Activity 1

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Explain to students about research, using the additional resource on:

**Researching in the classroom** beforehand, to help you plan what you want to say. Explain that they are going to help you investigate storytelling. You may find the additional resources useful on **Explaining and demonstrating in the classroom**.

Write the questions below on the chalkboard.

1. Who are the people who usually tell stories?
2. To whom do they tell them?
3. When and where are the stories told?
4. Why do people tell stories?
5. How do they tell them? (Style of delivery)
6. Are new as well as old stories told? For what reasons are new ones created?

Explain that each student is going to ask these questions of one older person in the community. Remind the students to approach the elder respectfully and to record the answers they are given.

Some days later, divide students into groups of six to eight and let them list (for each question), the answers they got, adding a tick where more than one person gave the same answer.

Now each group reports and you complete a set of data (the information collected by the class) on the chalkboard.

**Discuss the most common ideas. Do the students agree with them?**

Help students to write a simple report on their findings.

### Plan for research report

- Research question
- What we did
- How we analysed data
- What we found out

### Report on story research

The Grade 3 students asked elders a question: 'Why do people tell stories?'

35 elders answered the question.

The students made a list of all the answers, and counted how many people gave each answer.

### Example report

34 people thought that stories are told for the listeners to enjoy them.

32 people thought that stories are told to show correct behaviour.

14 people thought that stories are told to teach wisdom about life.

10 people thought that stories are told to teach people not to do something.

7 people thought that stories are told to make language grow.

7 people thought that stories are told to frighten people.

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## 2 Meanings behind stories

Once you have your research results, they need interpreting so that you can use the information. In this case, this means helping your students use this information to understand stories more. **Activity 2** helps you to explore meanings in stories as a follow-up to the investigation.

**Teaching Example 2** introduces the important idea of getting students to raise their own questions and to try to find answers to them. Being able to raise their own questions in small groups builds independent thought and develops students' ability to think creatively and critically.

### Teaching Example 2

Mrs Masiko from Ibanda did careful research into the details of a good, but not well-known, story.

One day, she gathered her Primary 5 students around her, and told them the first part of the story (the first three paragraphs of *The river that swept away liars and other stories*). Next, she asked them to each think of a question about what would happen in the rest of the story. After two minutes, they gave her their questions, and she wrote them on the chalkboard.

She asked the class to think of answers to the questions, taking each question in turn. The students gave reasons for their answers.

After they had gone back over all the questions and answers, she asked them to help her write an ending for the story. They suggested what might happen next and she wrote their ideas on the board. She did not rush the process, or push her ideas on to the students.

Once the story was complete, they read it together.

The students liked working together on the story. The next day, in pairs, they drew pictures for different parts of the story. These were put together in a book.

Finally, Mrs Masiko read them the original story. The students were pleased at their ending compared to the original and talked a lot about the problems of telling lies.

### Activity 2

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Choose a good story from those that you know. Make sure that you have a complete version of the story.

- Make one copy of the story for each group in your class, or write the story on the chalkboard, where they can all see it.
- Also write up the reasons for storytelling that came out of the class research.
- Ask your students to discuss in groups why they think people would have told this story (i.e. its purpose).
- As groups report back, ask them to explain their reasons.
- Next, discuss the characters in the story and their behaviour.
- Ask the students how they could apply this story to their own lives.
- Ask them, in groups, to discuss the purpose of another story, perhaps one from home and then to draft a paragraph about the story's purpose.

**Did they all understand the purpose of their stories? How do you know this?**

This activity need not be completed in one 30-minute lesson period. It can be spread to other lesson periods if your students have lots of ideas to discuss.

**The river that swept away liars and other stories**

A certain master was on a journey with his servant. It was a long journey on horseback. As they were travelling across the country, the master saw a jackal crossing their path.

The master remarked, 'That jackal is quite big.' The servant replied, 'Oh, Master, this is nothing compared to the one I saw yesterday.' 'Is that so?' responded the master. 'Oh yes. It was very, very big. In fact, it was as big as an ox!' 'As big as an ox?' questioned the master. 'Yes, as big as an ox,' answered the servant. The master answered again, 'You say "as big as an ox"?' 'Yes, really, as big as an ox,' said the servant. The master did not utter a word and they continued on their way, without talking to each other, for about an hour.

The servant noticed that his master was not happy and he didn't know what was worrying him. So he asked the master what the matter was. The master told him that they would have to cross four rivers before they reached their destination. The last river was the biggest and the most dangerous of all the rivers. This river was allergic to liars, and no liar could escape its anger. It swept liars there and then down to the deep blue sea. It never missed a liar, even if they were to invoke 'Ifa' to bring them luck (people invoked Ifa to bring them luck, and to give them power to conquer evil spirits).

When the servant heard this, he was quite shocked because he knew how powerful Ifa was. If this river would not yield to Ifa, then he knew it must be a VERY powerful river. As they travelled, he became more and more uneasy. The master also became sadder and sadder the further they rode. And as his master grew sadder, the servant grew more and more panic-stricken.

As they neared each river, the size of the jackal changed. When they reached the first river, the servant said, 'My Lord, the jackal was not exactly as big as an ox. It was a little bit smaller than an ox.' The master said nothing.

When they reached the second river, the servant said, 'The jackal was not even nearly the size of an ox. It was as big as a calf.' But again, the master said nothing. When they had crossed this second river, the master just explained his concerns about the last dangerous river, and said no more.

As they approached the third river, the servant said to his master, 'The jackal was not even as big as a calf. It was as big as a goat.'

Just before they reached the last river, the jackal was the same size as other jackals, which are common everywhere.

*Adapted from: Umthamo 2, University of Fort Hare Distance Education Project*

### 3 Writing a story

Research suggests that people learn best when what is being taught is relevant to them. As a teacher, you constantly need to make sure that your students are gaining knowledge that will help them make sense of their world.

You and your class have researched why people tell stories, and looked at the meanings of particular stories. Now we look at how you can help your students apply storytelling to real-life situations and difficulties.

#### Teaching Example 3

Mrs Alitwala wanted to help her students in her Primary 5 class in Kampala to write their own stories in pairs. She wrote a list of possible story features (see below) on the chalkboard and discussed with her students how these can determine what kind of story is written.

- Animals representing humans
- Marvellous events, unusual creatures
- Someone getting into difficulties and finding a way out
- Good and evil
- Explanations for the way things are

She also gave them a list of events, good and bad, that had happened in the city recently and suggested they use one of these as the context of their story. Next, she asked them to choose whether the characters in their story would be animals or people. Finally, she asked what theme they might choose, such as the battle between good and evil. Once they had decided, she encouraged each pair to start writing.

Over the next week or two, Mrs Alitwala asked each pair to share their story with the rest of the class who then discussed what the story's purpose was. She was very pleased with the variety of the stories.

### Activity 3

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Ask students to think of problems in their families, school and community that come out of the way people behave towards one another. The problems might range from everyday ones, like laziness, to serious issues, such as HIV/AIDS, step-families, poverty, parents neglecting their roles, drunkenness. You might prompt them by describing familiar situations involving certain kinds of behaviour, but be sensitive to the situations of individual students in your class. You could use old newspapers and magazines to help with ideas for stories.

- Each group should choose one problem to create a story that shows the effects of this kind of behaviour and offers some wisdom about it.
- Discuss some of the features of stories before they write their story or plan how they will tell it (see Teaching Example 3).
- Ask each group to tell their story to the class. Discuss the purpose of each story, list these, and compare them with their research findings from Activity 1.
- Let group members decide for themselves whether their story was successful, and why. (See questions below.)

**How well did they assess themselves?**

**Do you agree with their assessment?**

If you have younger students, you may want to do this as a whole-class activity where you write their ideas on the board or on paper.

#### Questions

1. Did the class enjoy your story?
2. How do you know?
3. Did the class learn something from your story?
4. How do you know?
5. Did your story give its message clearly?
6. How do you know?

## Numeracy: Exploring Symmetry

### 1 Symmetry

### 2 Creating symmetry in the classroom

### 3 Multiple lines of symmetry

#### Key question for the teacher:

How can you use everyday objects to develop students 'abstract' understanding of symmetry?

**Keywords:** lines of symmetry; reflection; rotation; nature; open-ended questions; cross-curricular

#### Learning Outcomes for the Teacher

By the end of this section, you will have:

- Used group work to help develop students' understanding of symmetry, including multiple lines of symmetry and orders of rotational symmetry;
- Developed a range of strategies including using open-ended questions to develop thinking skill around symmetry;
- Worked across curriculum areas to extend ideas about symmetry

## Overview

If you fold a blank page in half and open it out again, each side of the fold looks like a reflection of the other. When folded, the two sides overlap and cover each other perfectly. This is reflection symmetry. The 'mirror' or 'fold' line that gives these two equal reflections is called the line of symmetry.

Many mathematical shapes have lines of symmetry, and many living things are also approximately symmetrical in shape. This section will help you develop your understanding of symmetry, and try a range of strategies for teaching about it.

# 1 Symmetry

Introducing the concept of symmetry and reflection needs careful planning. Understanding that a shape is symmetrical if both sides are the same when a mirror line is drawn is best explored using practical activities. You need to think of ways to organise and group your students so that they can participate fully. One way to introduce this topic is by using drawings, photos and flat items like leaves. To see the line of symmetry you need to try:

- looking at a piece of paper held upright on the line of symmetry – look on one side, then the other;
- putting a piece of paper over an item, along the line of symmetry, then turning the paper over to cover the other half;
- holding small hand mirrors on the line of symmetry.

When looking at natural objects or images, your students need to understand that we are only looking at 'approximate' symmetry. For example, the left side of a person's face is probably not 'exactly' the same as the right side. However, by using real examples from the local environment such as fabric patterns or nature, you will motivate students more.

## Teaching Example 1

Miss Bwalya, a primary teacher from Juba, Southern Sudan, wanted to introduce her students to the concept of symmetry.

She divided her class into groups of four and distributed to each group four pieces of paper that she had cut into the following shapes – rectangle, square, isosceles and equilateral triangles. She asked one student from each group to take the rectangle and fold it so that the two parts fitted exactly. The rest of the group could offer advice and support. She noticed that some groups found only one way to fold the rectangle while others found two. Miss Bwalya asked each group to show what they did.

Next, she asked another member of each group to take the square and repeat the exercise. The class agreed that there were four ways for a square. She told the class: 'These lines are called lines of symmetry. The rectangle has two, while the square has four.'

She drew a table on the chalkboard drawing the shapes and asked them to enter the number of lines of symmetry.

Next, she asked them to explain the meaning of 'symmetrical' and 'line of symmetry' in words that everyone in the class understood. They then added these terms to their mathematics dictionaries.

For homework, she asked them to collect objects from home or from their journey home that they thought had lines of symmetry to explore in the next lesson.



### Activity 1

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Before the lesson, collect some natural objects that have approximate symmetry: these could include leaves, flowers or vegetables. You could even use local animals (but you must ensure they are well treated) or you could use photos of them (you might ask your students to help you). There are some useful photos below and you may want to collect more from magazines and newspapers, or some samples of local fabrics.



*Original source: <http://creative.gettyimages>*

- Divide the class into small groups of five or six and ask each group to consider the objects or images and try to identify all the lines of symmetry. Share their answers as a class (see **Key Resource: Using group work in the classroom** to plan how to do this).
  - Ask your groups to think of other objects from everyday life that are symmetrical. Suggest that on the way home they try to find other examples and either note these down or bring a sample in if possible.
  - In the next lesson, ask each group to make a poster of six different objects that they have found that have lines of symmetry and draw the line(s) of symmetry on them. They could draw or perhaps stick on some objects.
  - Display the posters for the whole class to see and discuss their ideas after a day or so to remind them.
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## 2 Creating symmetry in the classroom

As well as encouraging students to see symmetry in the world around them, this topic allows students to be creative and make symmetrical patterns and objects. It is a good opportunity to enjoy cross-curricular work with art. These activities can be done with very young students, and yet be so open-ended that even the oldest students can still stretch themselves.

### Teaching Example 2

Mrs Ngugi wanted to use art to help students explore symmetry and had decided to spend a lesson making butterfly pictures with her students. She had found two pictures of butterflies, which she showed to her class. She explained how the butterfly has four wings, and how varied the size, shape and colour of these wings can be, but that the wings and their patterns are always symmetrical.

Folding a piece of paper, Mrs Ngugi showed the class how she could cut out a butterfly wing shape, open the page, and have a pair of butterfly wings. She also showed them how they could make butterfly patterns by folding paper with wet paint inside. She invited the class to make their own butterflies, imagining different shapes for the wings and different patterns. The younger students used paint blots to colour their butterflies, while the older students drew intricate symmetrical patterns.

When the butterflies were finished, Mrs Ngugi hung them from the class ceiling with string. Her students were excited by the display and talked about the patterns a lot.

### Activity 2

You will need enough paper and pencils or paints for each student to make a colourful mask, string or elastic to tie the masks on, and pieces of cardboard big enough to make the masks with. You may have to spend some time collecting these resources before you can do the activity but your students may be able to help you gather materials together (see **Being a resourceful teacher in challenging conditions** in the Teaching Pack Additional Resources).

Explain to the students that they are going to make masks, but that both the shape of the mask and any drawing or painting on it should be symmetrical. Suggest that they do a rough design before they start working. You could show them some local masks. Perhaps they could gather resources and do a rough design in one lesson, and make the mask in the next lesson or two.

Suggest they make masks of people, leaves, animals, wings, imaginary creatures, or tribal masks. This could be a decision you leave to each student, or one you decide for the whole class.

**Think about what resources might help the students design their masks. What other creative activities could students do to consolidate their understanding of symmetry?**

## 3 Multiple lines of symmetry




So far we have mostly looked at one or two lines of symmetry, but some objects have several lines of symmetry – a square has four: one vertical, one horizontal and two diagonally. The square also has rotational symmetry, meaning if we rotate it (turn it around) we can get the same pattern again: a square can be

rotated to make the same pattern four times – it has a rotational symmetry of four. This is sometimes called having rotational symmetry of order 4.

This next part explores the idea of multiple lines of symmetry further by using objects in everyday life and searching for patterns in the shapes. Some of your students may be able to predict the pattern if you set up the activity so that they can work at their own pace and discuss their ideas with others.

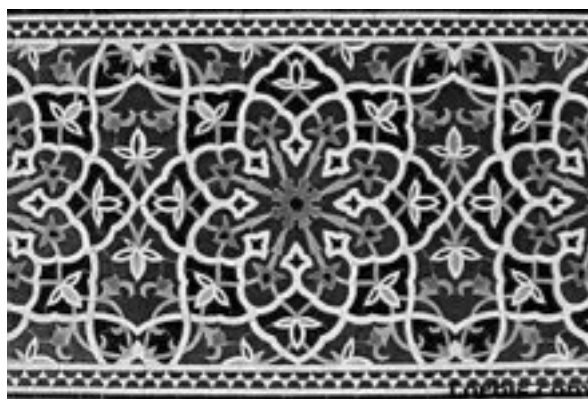
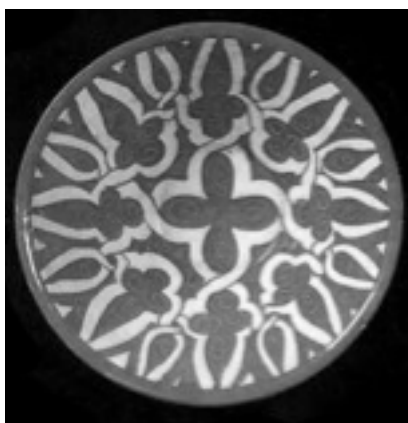
Teaching Example 3

Mr Namisi thought his students had become confident at working with one line of symmetry and he wanted to stretch them further by looking at different kinds of symmetry. He had drawn and cut out four different religious symbols (see below), making each one as large as he could on a piece of A4 paper.

Religious symbol	Lines of symmetry	Order of rotational symmetry
<div><p>Star of David</p></div>	12	6
<div><p>Cross (Christian)</p></div>	1	0
<div><p>Mosque (Islamic)</p></div>	1	0

Mr Namisi held these shapes up and asked if students knew what each one was called. First, he asked his students to look for lines of symmetry. On the Cross and the Mosque, they easily found the line. With a little encouragement, they were then able to see that there were many possible lines of symmetry on the Star of David and the Dharma Wheel; the older students were able to count these.

Mr Namisi then put a thumbtack in the centre of the Cross, and showed that if he turned it round, it only looked the same in one position – where it started. He said this meant it had no rotational symmetry. He showed the students the other shapes and they tried the same rotation with each. They counted a rotational symmetry of six for the Star of David and eight for the Dharma Wheel. His class were eager to look for other shapes in real life that had multiple lines of symmetry, which pleased him.



*Original sources:*

*<http://www.islamicarchitecture.org/art/images/>*

*<http://blog.vcu.edu/arts/images/>*

### Activity 3

You will need a page of polygon shapes for each small group of students.

You will need to use the following 2D polygons:

- Pentagon
- Octagon
- Square
- Septagon
- Triangle
- Hexagon

First, ask students to write in their books three column headings: 'polygon sides' 'lines of symmetry' 'rotational symmetry'. Then ask them to look at the shapes and, for each polygon, count and record:

- How many sides it has.
- How many lines of symmetry they can find.
- How many orders of rotational symmetry they can find.

After the first few shapes, some students may begin to spot a pattern and be able to complete their table without counting; others may not see the pattern. If this happens, ask the students who have seen a pattern to explain how it works to those who have not.

Use questions like: 'How many lines of symmetry would a polygon of [n] sides have? And how many orders of rotational symmetry?' ([n] could be any whole number.)

Ask each group to complete the chart you have drawn out on a sheet of newsprint and display their charts in the classroom).

Object	Lines of symmetry	Order of rotational symmetry

## Science: Looking at light and shade

**1 Investigating light and shadow**

**2 Reflection**

**3 Applying science to real life**

**Key Question for the teacher:**

How can we integrate science with other areas of the curriculum?

**Keywords:** light; shadow; reflections; patterns; evaluate; prediction; investigation

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- Supported students in carrying out their own investigations;
- Encouraged your students to develop the science skill of prediction;
- Developed your own skills and confidence in integrating different areas of the curriculum

## Overview

As a teacher of science, you need to help your students look carefully at things often taken for granted. Light, dark, shade, shadow, colour and reflection are very much part of our daily lives, but we often pay little attention to the science involved.

This section looks at how light behaves on different surfaces and objects. It suggests using active learning to help students understand how light is used for different purposes and develop their skills at prediction. It also builds on the links between science and the arts and technology. This should help students develop an understanding of applications of science.

## Safety advice for teachers

### Not looking at the sun

It is really important that you warn children to NEVER look at the sun directly. Tell them our eyes have built-in lenses that act like magnifying glasses and will focus the HEAT as well as the light energy from the sun onto the tender back of the eyeball, the retina, which helps us see. This heat can burn and destroy forever the cells of the retina, just like a magnifying glass can burn and destroy paper. (Using things like binoculars would be even more dangerous.) Tell them that nobody should ever take chances with something as precious as their sight.

### Don't get burnt

Most other direct light sources also involve quite intense heat. Only insects like fireflies and glow-worms seem able to produce light without heat. Supervise children carefully when flames are involved. Also, make sure that matches are kept safe and used properly.

### Electric shocks

All the usual necessary precautions need to be taken when electrical appliances are being used in the classroom as sources of light. (No damaged cables, no faulty connections, plugs properly wired, and no water near electricity.)

Finally, it is not nice to think of any student getting hurt, burnt or injured, but make sure that you have thought about the possibility that it might happen to you or a colleague, and be prepared to take the proper first aid action.

## 1 Investigating light and shadow

Start by investigating light and shade for yourself, using pictures from magazines or photographs. Which parts of the picture stand out because they are directly in the light? Where do you see shade or shadows? Can you work out where the light source is coming from? When do we see a silhouette (the dark outline of an object or person)? Try this out for yourself, perhaps with a colleague.

You are now investigating 'cause' and 'effect' with regard to light by considering the evidence you have observed and you are thinking scientifically. You might want to try this investigation with some of your students.

**Teaching Example 1** shows how it is important for students to experience the science they are talking about. In **Activity 1**, you encourage your students to think about effects they observe and to recognise patterns when doing experiments with light.

### Teaching Example 1

Busiku was going to read her class a story about a child losing their shadow. First, she planned for them to notice their own shadows more consciously. Outside in the morning sun they traced their shadows on large sheets of paper. The shadows were shaded in, carefully cut and proudly

displayed and talked about in the class and at a school assembly.

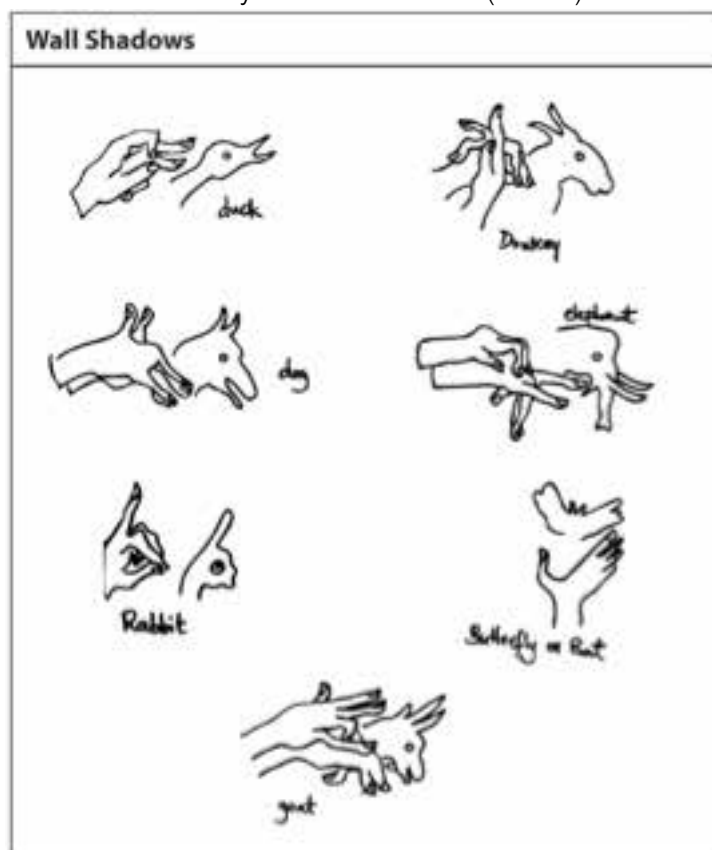
The popular story of the lost shadow was reread many times. In this story, a child loses their shadow, but finds a way to get it back again. By now, the original shadows were getting a little damaged. 'Yes! Yes!' they clamoured when Busiku suggested they repeat the activity. This time she specifically took them out at noon. They, too, were losing their shadows! The students were confused and worried. Wisely, Busiku chose deliberately to leave them like that.

Over the next few weeks, the class talked about this experience, relating it to other observations. They slowly built up their understanding of what had happened to their shadows.

### Activity 1

With your class, discuss the creative game played at night using hands to make shadow images on a wall. Set them a homework task of inventing images that can be made.

They should find out what they must do to make (cause) the shadow picture to



be bigger or smaller (effect).

Students must come back tomorrow ready to demonstrate what they have found out.

Set up a way for students to demonstrate their wall shadows in the classroom.



Help them record what they have found out by:

- listing the different images they demonstrate (students do drawings to show the shape of their hands);
- writing down the 'cause and effect' findings.

**If nobody mentions it, ask them to investigate what causes the effect that some images are blurred while others are clear?**

Finally, use everyday objects (a cup, a comb, scissors, a hammer etc.) to pose problems. The students should only see the image and not the object or how it is held. Hold different objects in a range of positions to cast interesting shadows. Ask your students to work out what the object is and explain why they think this.

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## 2 Reflection

Reflection plays a large role in how we see or perceive light and colour. In fact, without reflection, we would see nothing.

### Sources of light

- The sun – major source of light and heat here on Earth.
- Stars – distant suns. We can just see the light of these but don't feel the heat.
- The moon and planets – reflect the light of the sun.
- Lightning flashes during thunderstorms.
- Fire, flames, sparks, heated metals and glowing embers.
- Electric lights.

### Colour

- When white light is refracted (bent) by certain transparent surfaces, even raindrops, it is split and reveals the seven colours of the rainbow.
- Coloured things absorb all the other colours but reflect their own colour. So a red car reflects only red light, red glass in a car's brake light transmits only red light.

### Light travels

- Nothing travels faster than light.
- Like sound, light travels as waves of energy. We talk of sound waves, but light 'rays' or 'beams' of light.
- Light rays generally travel in straight lines that radiate out from a source.
- We see things because light rays bounce off them (get reflected).
- Darkness is because of an absence of light. If there is no source of light to reflect off things we get blackness and cannot see anything.

### What happens to travelling light?

- It passes straight through transparent things (glass, water, clear plastic, etc.).

- It partly passes through translucent things (wax paper, tissue, tinted or frosted glass, mist and clouds, etc.).
- Light is blocked by opaque things – this causes shade and shadows.
- Light is also reflected by opaque things.
- Very shiny surfaces (mirrors, polished metal etc.) reflect a clear image/picture.
- Dull surfaces scatter the light that they reflect.
- When light is neither transmitted or reflected, it is absorbed.
- When all the light is absorbed by anything we see it as black.

### Mirror images

- When we look into a mirror, the image we see seems to come from behind the mirror.
- A mirror image turns things otherwise (lateral inversion). That is why we can't easily read a page held up to a mirror.
- Try to shake hands with your own image in a mirror – you will see that as you hold out your right hand, the mirror image 'holds out' its apparent left hand.

In this part, we look at ways you can help your students explore what happens when light is reflected off different surfaces. Your aim should not be to provide them with the 'right' answers, but to give them a range of experiences that make them thoughtful and interested in this topic. In Activity 2, you encourage your students to observe carefully examples of reflection around them. Teaching Example 2 shows how one teacher's work on reflection encouraged some students to become better artists

### Teaching Example 2

Mrs Moonga teaches a combined primary class. She had carefully collected and mounted on card good pictures from old magazines for language, literacy and communication work.

When she read the introduction to part one of this section, she realised she could use her pictures again for science. She could see so many different sorts of reflections in the photographs (not only shadows and shade). There was light glistening on the water, reflections in glass windows, the sparkle of shiny objects, as well as the glow on the skin of an apple. She realised that even the glint in someone's eye is in fact a reflection.

First, Mrs Moonga explained to her class some of the facts she knew about light and reflection.

Next, she gave them the pictures to look at and she was surprised at just how much detail they were able to notice. They were much more aware about the effects of light on different surfaces. She was totally amazed when some of the children, more interested than others in drawing, began to experiment with shading and drawing in the reflections on round objects so that their drawings became more realistic.

## Activity 2

### Mirror game

Start with this game. In pairs, children take turns to act as the mirror image of the other. One student carefully leads, and the other copies (mirrors) the slow deliberate movements. Let students do this for a few minutes.

**Discuss the experience. Do they realise that if the leader winks with the left eye, then the follower ('mirror image') winks with the right?**

### Reversals in reflections

Now use lipstick or eyeliner to mark the cheeks and hands of some students. Write 'L' or 'R' in the palm of each hand and the letters 'AB' on the right cheek and 'OB' on the left. Let them observe what they find when they look at themselves in real mirrors. Discuss their observations.

### Are we really two-faced?

Are the two halves of our face exactly the same? Students might enjoy an activity where you look at full-face passport photographs that they or you bring.

Stand a small hand mirror down the midline of the face in the photograph so that the reflected half makes one face with the uncovered half. Now do the same to the opposite side. Isn't it amazing how different the two faces are? That is because our faces are not exactly symmetrical.

### Shaking the wrong hand

Try to shake hands with your own image in a large mirror – when you hold out your right hand, it offers you its apparent left hand.

Repeat this, but this time, arrange two mirrors at right angles. Look into the corner and you will see one image of yourself. Offer to shake hands.

### What hand does the image in the two mirrors offer this time?

### Can you work out why this happens?

### Using reflection

Brainstorm uses of mirrors:

- Which devices contain mirrors?
- Where are they useful?
- How could mirrors be useful in a shop to help security?

### Scary reflections

Experiment with looking at reflections in curved pieces of metal like spoons and kettles.

- What happens to the reflection?
- What patterns can you notice?

### Light and dark

Gather together a collection of different shiny materials and objects. Experiment

with looking at them:

- in normal classroom light;
- in a 'black box' where there is very little light;
- when a torch is shone on them.

**Which objects are the shiniest? Can you put them in order of shininess? What happens when you put them in the box? What happens when you shine a torch on them? Can you see any patterns in your observations?**

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## 3 Applying science to real life

We try to make sense of our world and then we use what we have found out to help us do things. It is the same with science. Results from investigations can sometimes be used to solve problems we face in life. This is linking science and technology and helps students to understand why it is important to study science.

**Activity 3** (read this now) builds on knowledge gained from **Activity 2** to solve a technological problem. How will you assess your students in this activity? After the activity, think about how your students reacted to this way of working – did they work well in groups? Would you do anything differently next time you do this?

In **Teaching Example 3**, a teacher encourages his students to use what they have found out from **Activity 1** to plan and present shadow-puppet plays.

### Teaching Example 3

Mr Mapushi projected shadows of mystery objects on a screen when doing Activity 1. Three students stayed behind to investigate and play with the items used. He watched them as he tidied the classroom.

They realised that the scissors or the pliers seemed to 'speak' if you moved the parts.

'Hello, I am Mr Scissor-mouth. I am a very sharp guy!'

'And I am Mr Heavy Hammer and I am going to beat you to death!'

They soon improvised a plot for a short play where Mr Hammer threatens Mr Scissor-mouth. But Mr Scissor-mouth is rescued by Mr Long-handle Pliers! Mr Mapushi gave them a chance to present their shadow-puppet play to the class.

The class became very interested in shadow puppets. Some students made cut-out puppet characters and discovered how to join parts that could move, using thin wire or dry grass-stalks for rods and supports. The way they used what they had learned in science amazed Mr Mapushi. They made the puppets appear larger and smaller, clearer and more blurred, and they were able to create different shapes with the same puppet by holding it at different angles to the screen.

### Activity 3

Write this question on the board:

'What is the problem if you are a short person standing near the back of a crowd at a soccer match?'

You can't see! Ask your students how might you solve your problem? What about mirrors? Design something to solve the problem of seeing over something higher than you.

In groups of three/four, students design, make, compare and assess their own device to see around corners or over the top of a high obstacle.

Before they start, students need to discuss the following points in their groups:

- How many mirrors will you need?
- What angles will the mirrors need to be placed at?
- How will you hold, fix or support the mirrors safely and securely?
- Draw a plan for the device.

Then, before students start building their devices, discuss with them the criteria you will use to evaluate their devices. Draw up a list and display it during the activity.

#### Periscopes

Start by finding two mirrors.

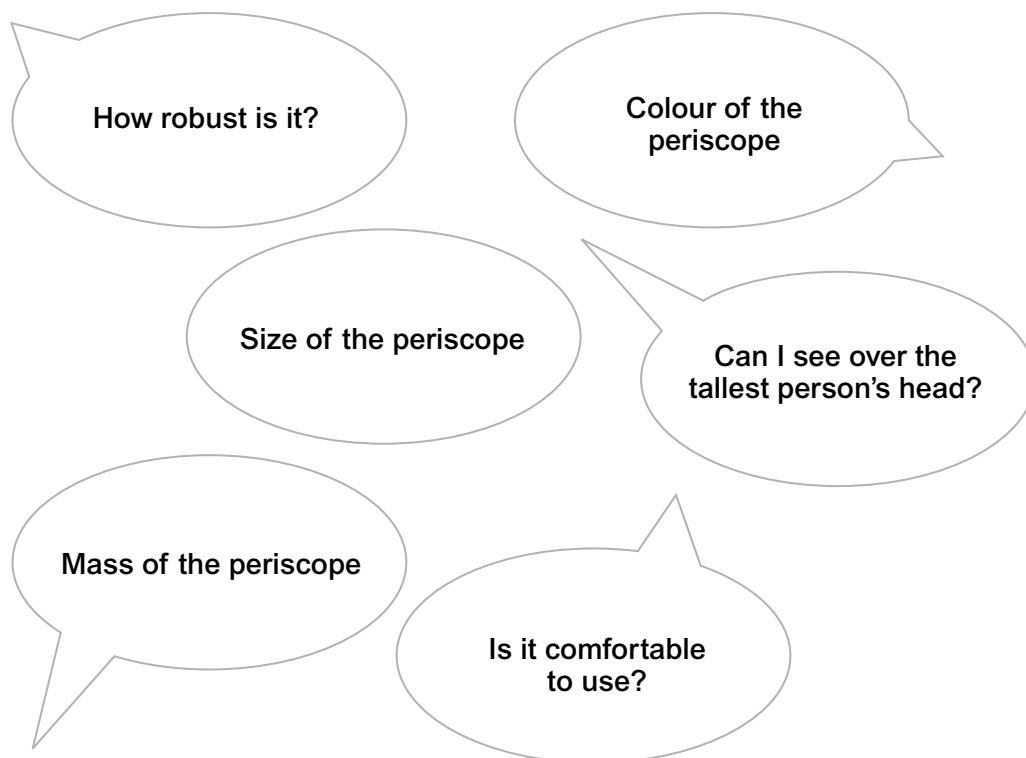
Hold one in each hand and see if you can use them to peer over a wall or see round a corner.



When you have a good image over the wall or round the corner, stop. Look at how the mirrors are arranged – what do you notice about the angles?

Now you can use your observations to build a periscope. The images below give you some ideas of how to do this.

**How will you evaluate your periscope? Are any of these criteria useful? Can you think of anymore?**



Draw up a table of the criteria you choose and use it to record judgements on everyone's periscope.

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## Social Studies: Understanding timelines

1 Dividing time

2 Chronology

3 African timelines

**Key Question for the teacher:**

How can you use timelines and other sources to develop understanding of cause and effect?

**Keywords:** timelines; historical change; chronology; history; historical sources; debate

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- used timelines to represent historical change over time;
- helped students to identify the key events in a particular historical process;
- encouraged students to view history not just as a series of dates to be learned but as a process to be investigated;
- used a variety of sources to help students see that one event may have many causes.

## Overview

When developing an understanding of time past and passing, it is important to be able to sequence events into the order in which they happened.

Students often struggle with the concept of time. In this section, you will first help your students to divide time into periods that are more manageable and then, once they are able to do this, think about the order of events and why this is important. (With young students, this might be as simple as helping them order how they do certain tasks, leading on to more complex activities as their understanding grows.) You will then help your students identify the most important events in a particular passage of time. This can lead, with older students, into an analysis of cause and effect, and the understanding that there is usually more than one cause of an event.

# 1 Dividing time

Investigating a particular period in history, and trying to sequence events in the order in which they happened, will help students begin to see the links between events and some of the possible causes. Understanding the causes of change in our countries and societies may help us to live our lives better.

The purpose of this part is to explore how using timelines in history can be a useful way to divide time into more manageable 'bits', so that we know which 'bit' or period we are dealing with. This is particularly important when we are teaching history, because it is crucial that students understand the idea of change over time.

From an early age, students need help to sort and order events. As they grow and experience life, they can revisit activities like these ones, using more complex sequences and events.

## Teaching Example 1

Ms Tetha Rugenza, who teaches history at a small school in Rwanda, wants to show her Grade 4 class how to divide up time into smaller periods. In order to do this, she plans a lesson where she and her students explore how to construct a timeline and divide it into periods.

Ms Rugenza decides to use the example of Rwanda. She draws a timeline on the board of the history of Rwanda. To help students understand the concept of periods, she divides the history of Rwanda into the pre-colonial, the colonial and the independence period. To give a sense of how long each of these periods is, she draws each period to scale.

She writes a list of important events, together with the date on which they took place, on separate pieces of paper and displays these on a table. Each event, she tells the class, falls into a particular period. She asks her students to work out which events fall into which period and in which order, doing a couple of examples herself. She calls out one event at a time and allows a student to come and stick it next to the appropriate place on the timeline. The rest of the class check that it has been put in the correct place. Through discussion, she helps the students if they are not sure where an event should go. She asks them if they can think of any other national events that should be placed on the timeline and adds them as appropriate.

## Activity 1

Tell the class that they are going to make a timeline of the school year together.

- Start the lesson by asking your students to write down the most important events that have taken place in school during the year.
- Ask them to give each event a date if they can, or to find this out.
- Ask students to order these events from the beginning to the end of the school year.



- Help students to decide on how big they want their timelines to be and to create a scale accordingly.
- Ask students to mark out each month correctly in terms of their chosen scale and to write down the event dates on the left-hand side of the timeline – starting at the bottom of their timeline with the past, and working up to the present at the top.
- On the right-hand side of the timeline, ask students to write a short description of the appropriate event next to each date.
- Display the timelines for all to see.

(If you do not have enough resources for this to be done individually then it can be done in groups of up to five students.)

**Discuss as a whole class whether there are some school events that could happen at any time of the year. Are there some that have to happen at a particular time? Why? (End-of-year exams, for example – why can't they happen at the start of the year?)**

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## 2 Chronology

The study of time and the order in which events took place over time is called chronology. This part explores how you can help students understand this sequencing of events, the relationship between the order events happen and the outcomes. In using these activities with students, you will realise the importance this has on their understanding of the past.

### Teaching Example 2

Mr Ngenda wants to show his Grade 5 students how chronology affects their understanding of events. He writes the following sentences on the chalkboard:

- A body of a man lies on the floor in the room.
- A man is arrested for murder.
- Two men go into the room.
- A man leaves the room.
- A man screams.

He asks the students to rearrange these sentences into an order that makes sense and to provide a reason for why they think the sentences should go in that particular order. Mr Ngenda uses this exercise to show how important it is to place events in a logical order.

However, he also wants students to begin to see the connections between events, and how one event influences another. He tells the class about the events in Rwanda since independence from Belgian rule to the genocide in April 1994. See the historical events listed in more detail below.

Using some of these events, he and his students construct a timeline on the chalkboard. He cuts these events up into strips and asks his students to put them in date order. He asks his students if they can identify the most important events that changed the course of Rwandan history.

Mr Ngenda is pleased that his students are beginning to see chronology as the first step in explaining why things happen

### **Some important historical events since independence**

**1300s** – Tutsis migrate into what is now Rwanda, which was already inhabited by the Twa and Hutu peoples.

**1600s** – Tutsi King Ruganzu Ndori subdues central Rwanda and outlying Hutu areas.

**Late 1800s** – Tutsi King Kigeri Rwabugiri establishes a unified state with a centralised military structure.

**1858** – British explorer Hanning Speke is the first European to visit the area.

**1890** – Rwanda becomes part of German East Africa.

**1916** – Belgian forces occupy Rwanda.

**1923** – Belgium granted League of Nations mandate to govern Ruanda-Urundi, which it ruled indirectly through Tutsi kings.

**1946** – Ruanda-Urundi becomes UN trust territory governed by Belgium.

### **Independence**

**1957** – Hutus issue manifesto calling for a change in Rwanda's power structure to give them a voice commensurate with their numbers; Hutu political parties formed.

**1959** – Tutsi King Kigeri V, together with tens of thousands of Tutsis, forced into exile in Uganda following inter-ethnic violence.

**1961** – Rwanda proclaimed a republic.

**1962** – Rwanda becomes independent with a Hutu, Gregoire Kayibanda, as president; many Tutsis leave the country.

**1963** – Some 20,000 Tutsis killed following an incursion by Tutsi rebels based in Burundi.

**1973** – President Gregoire Kayibanda ousted in military coup led by Juvenal Habyarimana.

**1978** – New constitution ratified; Habyarimana elected president.

**1988** – Some 50,000 Hutu refugees flee to Rwanda from Burundi following ethnic violence there.

**1990** – Forces of the rebel, mainly Tutsi, Rwandan Patriotic Front (RPF) invade Rwanda from Uganda.

**1991** – New multi-party constitution promulgated.

### Genocide

**1993** – President Habyarimana signs a power-sharing agreement with the Tutsis in the Tanzanian town of Arusha, ostensibly signalling the end of civil war; UN mission sent to monitor the peace agreement.

**1994 April** – Habyarimana and the Burundian president are killed after their plane is shot down over Kigali; RPF launches a major offensive; extremist Hutu militia and elements of the Rwandan military begin the systematic massacre of Tutsis. Within 100 days, around 800,000 Tutsis and moderate Hutus are killed; Hutu militias flee to Zaire, taking with them around 2 million Hutu refugees.

*Adapted from: BBC NEWS:*

[http://news.bbc.co.uk/1/hi/world/africa/country\\_profiles/1070329.stm](http://news.bbc.co.uk/1/hi/world/africa/country_profiles/1070329.stm)

Ask students to use the summary of a 'History of Zambia' below to produce a simplified account of 20th-century Zambian history. They should:

- read through the account;
- underline what they think are the important events that took place;
- using the events that they have underlined, create a timeline. Remind them about the importance of listing the events in order;
- mark on their timeline the event they believe is the key event;
- explain below the timeline why they have chosen that particular event as most important. In other words, how did that event cause later events?
- share their answers and, by discussion, agree the key event and then discuss whether or not this key event was the only cause of later events.

### History of Zambia

#### Early history to the 19th century

Some Bantu-speaking peoples (probably including the ancestors of the Tonga) reached the region by c. AD 800, but the ancestors of most of modern Zambia's ethnic groups arrived from present-day Angola and Congo (Kinshasa) between the 16th and 18th centuries. By the late 18th century, traders (including Arabs, Swahili, and other Africans) had penetrated the region from both the Atlantic and Indian Ocean coasts; they exported copper, wax and slaves. In 1835, the Ngoni, a warlike group from South Africa, entered eastern Zambia. At about the same time, the Kololo penetrated western Zambia from the south, and they ruled the Lozi kingdom of Barotseland.

#### The colonial period

The Scottish explorer David Livingstone first came to the area that is now Zambia in 1851; he visited Victoria Falls in 1855, and in 1873 he died near Lake Bangweulu. In 1890, agents of Cecil Rhodes's British South Africa Company signed treaties with several African leaders, including Lewanika, the Lozi king, and proceeded to administer the region. The area was divided into the protectorates of Northwestern and Northeastern Rhodesia until 1911, when the two were joined to form Northern Rhodesia.

The mining of copper and lead began in the early 1900s. By 1909, the central railroad from Livingstone to Ndola had been completed and about 1,500 Europeans had settled in the country. In 1924, the British took over the administration of the protectorate. In the late 1920s extensive copper deposits were discovered in what soon became known as the Copperbelt, and by the late 1930s, about 4,000 European skilled workers and some 20,000 African labourers were engaged there. The Africans protested the discrimination and ill treatment to which they were subjected by staging strikes in 1935, 1940 and 1956. They were not allowed to form unions but did organise self-help groups that brought together persons of diverse ethnic backgrounds.

In 1946, delegates from these groups met in Lusaka and formed the Federation of African Welfare Societies, the first protectorate-wide African movement; in 1948, this organisation was transformed into the Northern Rhodesia African Congress. In the early 1950s, under the leadership of Harry Nkumbula, it fought strenuously, if unsuccessfully, against the establishment of the Federation of Rhodesia and Nyasaland (1953–63), which combined Northern Rhodesia, Southern Rhodesia (now Zimbabwe), and Nyasaland (now Malawi). The booming copper industry had attracted about 72,000 whites to Northern Rhodesia by 1958, and the blacks there experienced increasing white domination.

### **Independence and Kaunda**

Kenneth Kaunda, a militant former schoolteacher, took over the leadership of the Africans from the more moderate Nkumbula and in 1959 formed a new party, the United National Independence Party (UNIP). Following a massive civil disobedience campaign in 1962, Africans were given a larger voice in the affairs of the protectorate.

On 24 October 1964, Northern Rhodesia became independent as the Republic of Zambia, with Kaunda as its first president; he was re-elected in 1968 and 1973. The main problems faced by Kaunda in the first decade of independence were uniting Zambia's diverse peoples, reducing European control of the economy, and coping with white-dominated Southern Rhodesia (which unilaterally declared its independence as Rhodesia in November 1965).

*Adapted from original source: <http://www.onfoplease.com/>*

## **3 African timelines**

Timelines can help us compare the similarities and differences in a series of events for different people, or different groups, or different countries.

For example, if your students drew timelines for themselves, there would be some events the same (starting school) and others different (birth of baby brother or sister for example).

Using timelines to compare the history of a variety of African countries during the time of moving to independence can help your students see common themes but also differences between their experiences.

### Teaching Example 3

Mrs Banda organised her class to work in groups to make a comparative multiple timeline that helped them to learn about the experiences of their own and other countries' journey towards independence.

For each country that she chose she made a long strip of paper (she did this by sticking A4 pieces of paper together, one piece equalling five years). See the African timelines template.

This would enable the groups, when finished, to place one under another to allow for easy comparison.

With her own books, and books and other materials borrowed from a colleague in a secondary school, the groups carried out their own guided research to find out the major events for each chosen country and then wrote each event in at the correct time on the chart. (For younger classes you could provide the events and dates yourself to help them construct the timeline.) The key events in the move to independence found next to the timeline templates provides examples of some key dates and also suggests websites where further information can be found if necessary.

Mrs Banda made the timeline for 'World events' as an example (World War II, independence for India, first flight in space, the Cold War, Vietnam War, the invention of the Internet, Invasion of Iraq etc.).

She made sure that each 'country' wrote 'Independence' in the appropriate time spot in another colour.

When all the groups had finished, she asked them to line up their timelines one under the other neatly. This enabled easy comparison between the countries.

### Activity 3

- Follow the activity carried out in Teaching Example 3.
- When the timelines have been completed, let each group introduce their country and talk through their timeline.
- Prepare a series of questions for the class to answer, for example:
  - What are the major events on the timelines?
  - What similarities can you see between the experiences of different African countries?
  - What are the major differences?
  - Which countries were the first to gain independence and which were the last?
  - Which countries have suffered most from internal wars since independence?
  - What major events are soon to happen (e.g. African countries involvement in the next World Cup)?

(This sort of work can easily be extended. Groups can carry on researching their designated countries to find out more about them: languages spoken; major industries; agriculture; cities and towns etc. They could draw maps of their countries and label them. There are many possibilities.)

#### African timelines template

Nigeria	
Date	1940
	1945
	1950
	1955
	1960
	1965
	1970
	1975
	1980
	1985
	1990
	1995
	2000
	2005
	2010

Ghana	
Date	1940
	1945
	1950
	1955
	1960
	1965
	1970
	1975
	1980
	1985
	1990
	1995
	2000
	2005
	2010

Sudan	
Date	1940
	1945
	1950
	1955
	1960
	1965
	1970
	1975
	1980
	1985
	1990
	1995
	2000
	2005
	2010

Kenya	
Date	1940
	1945
	1950
	1955
	1960
	1965
	1970
	1975
	1980
	1985
	1990
	1995
	2000
	2005
	2010

Rwanda																	
Date	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010		

South Africa																	
Date	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010		

World Events																	
Date	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010		

### Key events in the move to independence

1957	Ghana becomes first independent black state in Africa under Kwame Nkrumah through Gandhi-inspired rallies, boycotts and strikes, forcing the British to transfer power over the former colony of the Gold Coast.
1958	Chinua Achebe (Nigeria): <i>Things Fall Apart</i> , written in 'African English', examines Western civilisation's threat to traditional values and reaches a large, diverse international audience.
1958	All-African People's Conference: Resolution on Imperialism and Colonialism, Accra, 5–13 December 1958
1954 – 1962	French colonies (Francophone Africa) oppose continued French rule despite concessions, though many eager to maintain economic and cultural ties to France – except in Algeria, with a white settler population of 1 million. Bitterly vicious civil war in Algeria ensues until independence is gained in 1962, six years after Morocco and Tunisia had received independence.

1958	White (Dutch-descent) Afrikaners officially gain independence from Great Britain in South Africa.
1964	Nelson Mandela, on trial for sabotage with other ANC leaders before the Pretoria Supreme Court, delivers his eloquent and courageous 'Speech from the Dock' before he is imprisoned for the next 25 years in the notorious South African prison Robben Island.
1960 – 1961	Zaire (formerly Belgian Congo, the richest European colony in Africa) becomes independent from Belgium in 1960. Then, in Elisabethville (now Lubumbashi), 'charismatic nationalist Patrice Lumumba was ... martyred in 1961, with the connivance of the [US] Central Intelligence Agency and a 30-year-old Congolese colonel who would soon become president of the country, Joseph Deséré Mobutu.' (Bill Berkeley, 'Zaire: An African Horror Story', The Atlantic Monthly, August 1993; rpt. Atlantic Online)
1962	Algeria (of Arab and Berber peoples) wins independence from France; over 900,000 white settlers leave the newly independent nation.
1963	Multi-ethnic Kenya (East Africa) declares independence from the British.
1963	Charter of the Organisation of African Unity, 25 May 1963.
mid-60s	Most former European colonies in Africa gain independence and European colonial era effectively ends. However, Western economic and cultural dominance, and African leaders' and parties' corruption intensify the multiple problems facing the new nations.
1965	Rhodesia: Unilateral Declaration of Independence Documents.
1966	Bechuanaland gains independence and becomes Botswana.
1970s	Portugal loses African colonies, including Angola and Mozambique.
1976	Cheikh Anta Diop (Senegal, 1923–1986), one of the great African intellectuals of the 20th century, publishes the influential and controversial book, <i>The African Origin of Civilization</i> , his project to 'identify the distortions [about African history] we have learned and correct them for future generations'.
1980	Zimbabwe (formerly Southern Rhodesia) gains independence from large white settler population after years of hostilities.
1970s – 1980s	Police state of South African white minority rulers hardens to maintain blatantly racist and inequitable system of apartheid, resulting in violence, hostilities, strikes, massacres headlined worldwide.
1986	Nigerian poet/dramatist/writer Wole Soyinka awarded the 1986 Nobel Prize in Literature.
1988	Egyptian novelist and short story writer Nabuib Mahfouz awarded the 1988 Nobel Prize in Literature, the first prizewinning writer with Arabic as his native tongue.
1994	The Hutus massacre up to a million Tutsis in Rwanda; then fearing reprisals from the new Tutsi government, more than a million Hutu refugees fled Rwanda in a panicked mass migration that captured the world's attention.
1996	500,000 of Hutu refugees streamed back into Rwanda to escape fighting in Zaire.



2001	After 38 years in existence, the Organisation for African Unity (OAU: <a href="http://www.oau-oua.org/">http://www.oau-oua.org/</a> ) is replaced by the African Union.
2013	Death of Nelson Rolihlahla Mandela, 5th December 2013

Adapted from original source: <http://www.http://africanhistory.about.com/gi/dynamic/offsite.htm?zi=1/XJ/Ya&sdn=africanhistory&cdn=education&tm>

### Timeline – African countries in order of independence

Country	Colonial name	Colonial power	Independence date	First head of state
Ethiopia	establishment as the Kingdom of Aksum		1st century BC	Menelik I
Liberia	Commonwealth of Liberia	American Colonization Society	26 July 1847	Joseph Jenkins Roberts
Libya	Joseph Jenkins Roberts	Italy	24 December 1951	Idris
Egypt	Joseph Jenkins Roberts	Britain	1922/1936/1953	n/a
Sudan	Joseph Jenkins Roberts	Britain	1 January 1956	Ismail al-Azhari
Tunisia	Joseph Jenkins Roberts	France	20 March 1956	Muhammad VIII al-Amin
Morocco	Joseph Jenkins Roberts	France	7 April 1956	Mohammed V
Ghana	Joseph Jenkins Roberts	Britain	6 March 1957	Kwame Nkrumah
Guinea	Joseph Jenkins Roberts	France	2 October 1958	Sékou Touré
Country	Colonial name	Colonial power	Independence date	First head of state
Cameroon	Cameroun	France, Britain	1 January 1960	Ahmadou Ahidjo
Togo	French Togoland	France	27 April 1960	Sylvanus Olympio
Mali	French West Africa	France	20 June 1960	Modibo Keita
Senegal	French West Africa	France	20 June 1960	Léopold Senghor
Madagascar	Malagasy Protectorate	France	26 June 1960	Philibert Tsiranana
DR Congo	Belgian Congo	Belgium	30 June 1960	Patrice Lumumba
Somalia	Italian Somaliland, British Somaliland	Italy, Britain	1 July 1960	Aden Abdullah Osman Daar
Benin	French West Africa	France	1 August 1960	Hubert Maga
Niger	French West Africa	France	3 August 1960	Hamani Diori

Country	Colonial name	Colonial power	Independence date	First head of state
Burkina Faso	French West Africa	France	5 August 1960	Maurice Yaméogo
Côte d'Ivoire	Côte d'Ivoire	France	7 August 1960	Félix Houphouët-Boigny
Chad	French Equatorial Africa	France	11 August 1960	François Tombalbaye
Central African Republic	French Equatorial Africa	France	13 August 1960	David Dacko
Congo	French Equatorial Africa	France	15 August 1960	Fulbert Youlou
Gabon	French Equatorial Africa	France	17 August 1960	Léon M'ba
Nigeria	Nigeria	Britain	1 October 1960	Nnamdi Azikiwe
Mauritania	French West Africa	France	28 November 1960	Moktar Ould Daddah
Sierra Leone	Sierra Leone	Britain	27 April 1961	Milton Margai
Country	Colonial name	Colonial power	Independence date	First head of state
Tanzania	Tanganyika	Britain	9 December 1961	Julius Nyerere
Rwanda	Ruanda-Urundi	Belgium	1 July 1962	Grégoire Kayibanda
Burundi	Ruanda-Urundi	Belgium	1 July 1962	Mwambutsa IV
Algeria	Algeria	France	3 July 1962	Ahmed Ben Bella
Uganda	British East Africa	Britain	9 October 1962	Milton Obote
Kenya	British East Africa	Britain	12 December 1963	Jomo Kenyatta
Malawi	Nyasaland	Britain	6 July 1964	Hastings Kamuzu Banda
Zambia	Northern Rhodesia	Britain	24 October 1964	Kenneth Kaunda
Gambia	Gambia	Britain	18 February 1965	Dawda Kairaba Jawara
Botswana	Bechuanaland	Britain	30 September 1966	Seretse Khama

Adapted from original source: [http://en.wikipedia.org/wiki/Decolonization\\_of\\_Africa#Timeline](http://en.wikipedia.org/wiki/Decolonization_of_Africa#Timeline)

## Life Skills: Investigating self-esteem

**1 Addressing issues of self**

**2 Child abuse**

**3 Community-based learning**

**Key Question for the teacher:**

How can you use stories and other activities to develop and assess students' self-esteem?

**Keywords:** self-esteem; relationships; group work; community activities; assessment; stories

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- Used different activities and ways of grouping students to develop self-esteem;
- Developed your understanding of factors that can influence self-esteem;
- Planned a community-based activity;
- Used ways of assessing learning.

## Overview

This section looks at how to introduce students to the nature of different relationships and to help them understand that these relationships can either support or undermine self-esteem. The impact of such relationships on students' education can be significant. As a teacher, you have the responsibility to do your best to provide a supportive learning environment.

The 'African Charter on the Rights and Welfare of the Child' (page 2) states that:

'In all actions concerning the child undertaken by any person or authority the best interests of the child shall be the primary consideration...

...Parties to the present Charter shall ensure, to the maximum extent possible, the survival, protection and development of the child'

This section raises, but in no way covers the complexities of the issues surrounding abusive relationships and inappropriate behaviour. It explores how these can affect students' learning and self-esteem and provides you with a small insight into your roles and responsibilities and the need to seek help from other professionals when you are concerned

Finally, we discuss how you can encourage students to work together and help those who are having difficulty.

# 1 Addressing issues of self

Self-esteem is a major key to success in life. If you feel good about who you are, you have more confidence to join in with others, to make new friends and face new situations.

As a teacher, you play a crucial role in developing students' self-esteem through the way you interact with them. You need to be sensitive towards students' feelings and emotions, and you need to be careful about what you say and how you speak to them.

It is important to be positive and encouraging, praising them for their hard work and achievements and using kind words wherever possible. Try to catch them being good, rather than looking out for bad behaviour. This does not mean that you do not have to discipline students, but how you do this is crucial if you wish to maintain a positive working relationship with them.

It is always useful to start off a new topic by finding out what your students already know. Ask them for ideas about self-esteem – you may be surprised at the variety of answers they come up with.

**Teaching Example 1** and **Activity 1** show how you can use a story in different ways to explore an idea such as self-esteem.

## Teaching Example 1

John Nvambo in Nigeria has a good relationship with his 36 Primary 4 students. One day, he noticed that not all of his students were contributing in class anymore. Some were now shy and withdrawn, and didn't ask him questions. He also noticed that this was affecting their grades, so he decided to address the problem.

The next morning, John told the story of three children to help introduce the idea of self-esteem which can be found below.

He then divided the class into three groups, A, B and C, directing each group to list the qualities of a person with either:

- healthy self-esteem;
- low self-esteem; or
- overrated self-esteem.

Next, John organised them into threes, one from each group, to share their ideas before talking together as a class.

They were able to identify the different characteristics, and why they were good or bad for the individuals involved. From this, they were able to talk about how to get a balance of self-esteem by using an activity like the one in **Activity 1**

### A story about self-esteem

There were three children who lived in the same village – two boys and one girl. One day, they all started going to school. Because they were the same age, they all attended the same class, but they reacted in very different ways.

The first boy was clever, and started to do very well at school. He could answer many questions and always got good marks. But because of this, he started to think a lot of himself. He didn't want to listen to other people's views. He became arrogant, and thought he knew everything. He was rude to others, and so he started to lose friends.

The second boy found school difficult, and didn't understand some things. But he was afraid to ask the teacher in case he was punished. He fell further and further behind in his studies. Because of this, he thought poorly of himself. He thought his classmates were making fun of him. He felt unwanted and thought he was looked down upon by the teacher, and so never talked in class.

The girl enjoyed going to school from the beginning. She liked making friends, and realised she could learn a lot from them. She had good learning abilities but liked sharing ideas with others. She was good at listening to others. She had a good sense of humour, but learned not to make too much noise. She could ask questions when it was needed, but knew not to demand attention from everyone.

### Activity 1

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Adapt the story about self-esteem to help you with this activity.

- Divide the class into groups. Call the groups either As or Bs.
- Ask the A groups to help the arrogant boy develop balanced self-esteem.
- Ask the B groups to help the boy with poor self-esteem to develop confidence.
- Monitor group discussions to check that all students are participating.
- After 15 minutes, match each A student with one B student. Ask the pairs to compare ideas and make suggestions for each other.
- After ten minutes, have a class discussion about ideas for helping first the arrogant child and then the timid child.
- Finally, as a class, list the main features of healthy self-esteem and how it helps students to gain from one another.

**Did this activity have an impact on the behaviour of your students towards each other?**

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## 2 Child abuse

Unfortunately, as some of your students grow up they may encounter an abusive relationship. This type of relationship can influence their social, emotional and physical development for the worse, and it takes more time and effort to help them overcome the damage done.

The concept of 'abuse' here should not be confused with offensive and insulting language. 'Abuse' in this sense occurs when individuals use other people in a wrong and improper way. Relationships of this kind leave a lasting psychological, emotional and physical impact on the abused person. There are several types of 'abuse', such as physical and mental abuse. There are examples of these below, which you should read.

### Types of abuse

There are many different forms of abuse – physical, sexual, emotional and psychological. They can take place between adults, between children, or between adults and children.

It is important that your students have some awareness of these forms of abuse, because while they are children they are very vulnerable. They trust adults, and usually do what they say, but they need to know that not everything an adult may do is correct.

**Physical abuse** involves the beating or hitting of someone. It does not have to be hard or violent, but if physical abuse is regular and frequent it can have a bad effect on a relationship.

**Sexual abuse** is the improper use of another person for sexual purposes, generally without consent or under physical or psychological pressure. This happens between adults and adults, adults and children, and also between children entering into adulthood. The trauma and psychological damage can be very severe and students may become very aggressive or withdrawn, nervous around adults or engage in inappropriate behaviour with their fellow students.

**Emotional and psychological abuse** involves treating someone cruelly over a long period, so that it makes them unhappy and depressed. It can involve calling them names or being rude, or just undermining their confidence and belittling their achievements.

There are other examples as well, such as **parental abuse**. This could take the form of a father luring his son into smoking by fixing a cigarette in his mouth and lighting it up for him. Parental abuse could also be in the form of beating a child regularly and violently so as to inflict wounds on them and suppress and control them beyond reason.

There can be **domestic abuse** – poor treatment of wives or housekeepers, no matter how hard they work.

Such abuse causes physical and emotional pain, and can lead to depression and low self-confidence.

As a teacher, your responsibility is to help your students learn. If they are not happy or are being abused, they will not learn. Your role is to protect your students and you may need to involve others who are more expert and can give counselling.

### The role of schoolteachers

Schoolteachers are in a position to identify when children are being abused. They have opportunities to get to know individual children well, and thus to notice changes in a child's behaviour or performance, which could be linked to abuse. Children may also disclose their circumstances as part of life skills lessons or other parts of the curriculum.

If a teacher suspects abuse, a useful process to follow is:

- Start gathering information as soon as you suspect child abuse.
- Continue to do so consistently, and document all information gathered.
- Treat all this information as confidential.
- Discuss your suspicions and the information that you have gathered with the head teacher (unless she or he is possibly implicated).
- Ensure confidentiality by opening a separate file for the particular student. This file must be kept in the strong room or safe.
- The head teacher and the teacher must consult the list of criteria for the identification of different types of abuse to verify the information before making any allegations of child abuse. Include in this process professionals who have experience.
- Remain objective at all times and do not allow personal matters, feelings or preconceptions to cloud your judgement.
- Any information to do with child abuse is confidential and must be handled with great discretion.
- The reporting and investigation of child abuse must be done in such a way that the safety of the student is ensured.
- Justice must not be jeopardised, but at the same time the support needed by the student and their family must not be neglected.

Other important things to remember when talking to students are:

- Do not tell a child who discloses abuse that you do not believe them.
- Affirm the child's bravery in making the disclosure.
- Tell the child what you are going to do about what you have been told, and why.
- If possible, tell the child what will happen next.
- Refer the child for counselling if necessary.
- Be prepared to give evidence in court if there is a trial.

There are many organisations across Africa dedicated to the prevention of child abuse, for example the African Network for the Prevention and Protection against Child Abuse and Neglect (ANPPCAN). See <http://www.anppcan.org/> for more information.

Since 1997, the Nigerian Child Welfare Fund has undertaken a number of activities for the protection of children in Nigeria. You can find out about their work at <http://nigerianchildwelfarefund.virtualactivism.net/> if you can access the internet.

Please note: The World Day for Child Abuse is 19 November every year.

The best way you can help is to explore with your students what they understand about correct and incorrect behaviour in relationships. However, you must do this sensitively and carefully.

### Teaching Example 2

Sara Nduta, a teacher of Standard 5 in Kibera Community School, Nairobi, brought in the local government welfare officer to talk to her class about child abuse.

The welfare officer began by telling the students that using young people to work in trade and on farms had been a common practice in most parts of Africa. It was a way of bringing up the young ones to learn skills and responsibility, and to be self-reliant.

But with the 'UN Rights of the Child' (see Overview), he said that the government disapproved of using children as street hawkers and farmhands where they were exploited and made to work long hours. It was dangerous to their health, sometimes leading to death. It took children from school and education, and sometimes led them into crime.

The welfare officer said that parents sometimes argue that they need their children to bring in food and money for the family. However, he said that the government regards it as unlawful, as all children have the right to free schooling, and that any community needs to tackle the issue.

Following the talk from the welfare officer, the next day, Sara's class did a role play on child abuse. They demonstrated it first for the whole school, and then for the Parents-Teachers' Association (PTA) committee.

### Activity 2

Plan a role play for your class that deals with the issue of child abuse. You need to think carefully about this. It can be a very sensitive issue for young people, so you will need to be careful how you organise such activities.

First, list the different forms of child abuse and their outcomes. Choose which of these you want to focus on in class.

**Think how you will introduce these issues to the class. For the role play, decide on the students' different roles. What are the issues for each role?**

**Plan how many students will be in each group, and how they will prepare and perform their role plays. How will you explain this to them?**

**Finally, how will you summarise the main points with them after they have performed the role plays? Will you have a discussion? How will you manage it?**

## 3 Community-based learning

It is important that students develop ways to reflect upon how different relationships work so that they can make friends and protect themselves from harm.



One way to do this is to help the students work with the community to address a particular issue. Activities like these bring students together with the community to find common solutions to a community problem. Students learn about relationships through working with others, by:

- sharing information with local experts;
- learning how groups work together;
- learning how to accept and fulfil responsibilities;
- learning how to treat each other properly;
- bringing together different ideas to help solve a problem.

Planning and organising an activity where the students work with other people in the community can be difficult. You need to organise a task that the students can realistically contribute to and you need to choose people who are willing to work with children. You also need to plan with them how the interaction will work – it may need to take place over two or three weeks or longer. It is important that everybody involved – adults and children – knows what is expected of them.

Before starting this section, we suggest reading **Key Resource: Using the local community/environment as a resource.**

### Teaching Example 3

Mrs Wanjiku was talking with her Standard 6 students about keeping their surroundings clean. She asked them to think of things in the community that needed cleaning up.

One thing they mentioned was the number of plastic bags in the street. The bags caused problems by blocking water channels. Sometimes, cows and goats would eat them and get sick.

Mrs Wanjiku's class decided to start a community campaign. They spoke to the local environmental officer and he came to help them plan their campaign in class. They also spoke to the market traders' committee and they organised the campaign together.

The environmental officer organised a community event and got some sponsorship from a local NGO working on the environment. The market traders told their customers about it. Having discussed the issues with the environmental officer, Mrs Umar organised her students to:

- design a poster campaign;
- write a drama and a song;
- organise a debate for the event;
- organise a clean-up campaign.

The event was a big success. The market traders displayed the posters on their stalls, explaining the issues to their customers.



One Saturday, the whole school picked up bags in the street and out of the water channels. With help from the market traders and the environmental officer, the village was much cleaner now.

### Activity 3

If you are going to organise a community-based activity for your students, plan how you will assess what they have gained from the relationship. Carry out the activity with your class.

Afterwards, ask them to discuss with each other and then write about their activities, explaining:

- what information they used;
- what activities they did and the skills they developed;
- how they interacted with the other people involved, and who did what;
- how they organised their work.

Once they have done this, you should have evidence of the new skills and knowledge they have developed. Encourage them to think about how effective their event was.

Now, ask them what new things they have learned. Ask them to discuss it in groups and then write a list.

Finally, ask them to describe:

- how they plan to use their new skills in the future;
- who they would like to work with next.

**Did the students find this activity stimulating? How do you know this? How could you use this kind of activity again?**

Guidelines for planning a community-based activity

- Identify a community issue that your students could address. It needs to be relevant to their learning and help the community.
- Identify who from the community they will work with. If possible, these partners will have some experience of working with schoolchildren. They need to be willing to contribute to this activity and to support the students with information and guidance.
- Plan how and when the community members will be involved, and with whom.
- Plan how you will organise the students to do these activities.
- Plan how you will explain the activities to your students.
- Decide how you will observe and guide your students during the different stages.

**Now carry out the activity and then think about how successful it was. If you did this again, what would you change?**

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No.13

## Middle Primary

<b>Section 1</b>	<b>Literacy:</b>	<b>Supporting additional language</b>
<b>Section 2</b>	<b>Numeracy:</b>	<b>Working with weight</b>
<b>Section 3</b>	<b>Science:</b>	<b>Thinking globally: acting locally</b>
<b>Section 4</b>	<b>Arts:</b>	<b>Using artefacts to explore the past</b>
<b>Section 5</b>	<b>Life Skills:</b>	<b>Ways to promote spiritual well being</b>

<b>Additional Resources:</b>	<ul style="list-style-type: none"><li>• <b>Group work in your classroom</b></li><li>• <b>Working with large/multigrade classes</b></li></ul>
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13

## Literacy: Supporting additional language

1. Approach to learning an additional language
2. Writing in an additional language
3. Making a book

**Key question for the teacher:**

How can you build supportive relationships in the additional language?

**Keywords:** pen pals; sharing local information

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- Begun developing relationships between students that support their learning in the additional language and help them reflect on their own learning;
- Provided opportunities for students to communicate with proficient or mother-tongue speakers of the additional language;
- Set up opportunities for communication with students beyond your school

## Overview

Many students in Africa have few opportunities to interact with mother-tongue speakers of the additional language. Often, exposure to the language has to come through reading, listening to the radio or watching the TV.

Nevertheless, there are ways to get your students talking and writing to those who are more fluent in the additional language. You may also be able to help your students communicate, in the additional language, with students in another school.

This section looks at ways to do this.

# 1 Approach to learning an additional language

For people who learn language in a formal classroom, the phrases people use every day to interact with one another are often the last things that they learn.

There are ways to help your students to gain proficiency in phrases and sentences that they can use when they meet proficient speakers of the additional language. Each set of phrases or sentences should:

- be short and easy to learn;
- say something that the students need and want to say;
- be usable with a lot of people;
- allow the students to start a conversation and build a relationship;
- allow the students to learn more about the language from the person they are talking to;
- not provoke long responses from the other person.

## Teaching Example 1

Liz Botha in East London, South Africa, was learning isiZulu as an additional language through a local language project called TALK. The motto of the TALK project was, 'Learn a little, and use it a LOT!'

She started by learning how to greet in isiZulu, and to tell people that she was learning isiZulu. She also learned to ask them to speak to her in isiZulu and help her with her language learning.

She looked for people to whom she could speak isiZulu, and found that there were a number of isiZulu-speaking hawkers selling fruit and vegetables in the streets near her home. She practised her sentences with them, and started to get to know them. She had a friend who taught her new phrases, and she found out, from her, how to ask for the price of something, and buy it. These were the sentences she used the next time she saw her hawker friends.

As time went by, she learned to tell them about herself and her family. Later, she told them short stories about what had happened to her the day before, or at the weekend. One of the hawkers, named Jabu, became a very special friend of hers, and taught her many new words and sentences. He eventually became involved in helping other people to learn isiZulu within the TALK project.

## Activity 1

Ask your students where they hear the additional language spoken. Who do they know who speaks it well? Who could they speak to in the additional language? Consider individuals outside and inside school, and also people that

you could invite to your classroom. Consider a partnership with another school nearby, if it could promote interaction in the additional language.

Now that your students know who they want to speak to, work out what they would like to say to them.

Systematically, as a long-term project, help them to learn vocabulary. Concentrate on clear sounds and pronunciation. Let them practise in pairs.

Ideas for basic things to learn include:

- greetings and leave-taking;
- giving and asking names, and personal/family information;
- explaining that they are learners of the language and want help with learning more;
- buying things;
- talking about the weather;
- saying what happened yesterday;
- apologising, requesting, complimenting, etc.

Encourage them to practise with the people they have chosen to correspond with (above).

Spend some time each week asking about their progress.

**What successes and difficulties have they had?**

**What new language have they learned?**

**What else have they learned?**

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## 2 Writing in an additional language

In this part, we suggest that you motivate your students to write letters in the additional language. This could mean setting up long-distance relationships with speakers of the additional language, or they could write to friends who are closer.

You could introduce a pen-pal scheme with another class. This can be a class in your country or in another country.

If you wish to be put in touch with a school in your own country or another country that is also making use of these materials, please contact National Teachers' Institute at [ntikad@yahoo.com](mailto:ntikad@yahoo.com) or at the following address: National Teachers' Institute, KM 5 Kaduna-Zaria Express Road, Rigachikun, Kaduna, Nigeria.

You can then set up a link between your class and a class of similar age at the other school, and arrange for every one of your students to have a pen-pal. This will give your students the advantage of having a friend to write to, and receive responses from, about matters of interest, using a common additional language or lingua franca. They will gain practice in reading and

writing for a real purpose, and learn a lot about the other person, their family, school, country and lifestyle.

Before you introduce your students to the scheme, make sure that you have sorted out issues such as the provision of, and payment for, envelopes and stamps. You may be able to put all the letters in a large envelope and post this to the teacher.

If students become confident writers and readers of letters while they are at primary school, they are more likely to be successful writers of letters later in life. As they write personal letters to friends, you can also introduce other styles of letter writing. This will equip them for later needs, such as applying for bursaries or jobs, letters to newspapers, letters of congratulation or condolence.

### Teaching Example 2

The students in Mrs Linda Ezenwa's Primary 5 class were upset and couldn't concentrate on their schoolwork. One of their classmates, Oluchi, had been killed in a bus crash. They missed their friend very much. They were also angry because they had heard that the bus had faulty brakes.

Mrs Ezenwa encouraged the students to talk about how they were feeling. She realised that they wanted to do something, so she asked if they would like to write to Oluchi's family. She suggested that they write two letters: one in Igbo for her parents and grandparents and one in English for her brother and sister who had grown up in Onitsha. The students said that they wanted to tell Oluchi's family members that they were thinking about them and also tell them all the good things about Oluchi.

Mrs Ezenwa helped them with an outline for their writing. Each student wrote their own letter in Igbo. In the next lesson, Mrs Ezenwa helped them to write one letter from the whole class in English and then each student signed it.

With Mrs Ezenwa's help, they also wrote a letter in English to the bus company, requesting that all the buses be carefully checked to make sure they were roadworthy.

The class received replies to both the letters they had written. Mrs Ezenwa pinned these letters to the class notice board.

Mrs Ezenwa realised how this had motivated her students and given them important social skills. It had also helped them see the purpose of learning the additional language.

### Activity 2

Set up your partner school by contacting the National Teachers Institute, details given at beginning of this section.

- Give each student in your class the name of a pen-pal with whom they can establish a relationship. (If this is not possible, try to get each student to identify a student in another class or a relative or friend away from home)



they would like to correspond with.) If you already have a partner school, or you set one up, keep in close contact with your partner teacher, to discuss potential problems and find solutions together.

- Discuss with your class the kinds of things they might like to say in their first letter. Over time, they could exchange information about their lives, their families, their friends, their interests, their dreams.
- Agree a format for the letter (see 'Writing letters' below), and let them start writing. Go round helping them with words and phrases that they need.
- Let them revise and edit their letters in pairs (See 'Assessing pen-pal letters'). Take the letters in yourself, and give supportive and constructive feedback.
- Let students write out a final version of their letter, address the envelope and post it.
- With younger students, this could be a whole-class activity and you write what they want to say. They could write to another class in the school.

### **How can you support the development of these correspondence relationships?**

#### **How can you help where needed, while giving space for relationships to develop?**

##### **Writing Letters**

Students are likely to find letter writing more enjoyable (in either their mother tongue or the additional language) if they feel there is a real reason for writing and that someone will be interested in reading their letters. There will be a number of situations where using the additional language would be more appropriate. In every case, you will need to discuss which language to use.

You can arrange with teachers in another school for students in each school to write letters to those in the other. You could also help your students to write a letter to a company to ask for a donation of money, goods or services for the school. If you have taken them to visit a place in your community such as a clinic, an agricultural project or a factory, you could help them to write a letter of thanks. There may be happy or sad occasions where it would be appropriate for them to write someone a letter of congratulations or condolence.

Whatever type of letter you choose, first discuss with students why people write letters and what they want to say in the particular type of letter chosen. Write their ideas on the chalkboard and help them to organise them into paragraphs. You may wish to use some of the following outlines.

When students have completed their letters, send them to the person or organisation to whom they are addressed. You could collect all the students' letters and put them into one large envelope with the appropriate address. If you and the students are lucky, you will receive a reply!

**Outline of a letter to a pen-pal at another school (or country)**

Dear .....

I am very pleased that we are going to be pen-pals. In this letter I am going to introduce myself to you.

My full name is ..... I am .... years old. As I don't have a photograph to send you at present I will describe what I look like.  
[followed by sentences with this description]

I would like to tell you about my family. [followed by sentences about them]  
We live in ..... [followed by sentences about the place]

These are some of my favourite things. My favourite food is .....  
My favourite music is ..... My favourite subject at school is  
.....

At the weekends I like to .....

When I finish school I hope to .....

I am looking forward to hearing from you.

With best wishes

[Name and signature]



**Outline of a letter of thanks after a school visit**

Dear .....

I really enjoyed our visit to .....

What I found most interesting was .....

I thought this was the most interesting because.....

If our school has a chance to make another visit I would like to  
.....

Thank you very much for .....

Yours sincerely

[Name and signature]



**Outline of a letter to a company requesting a donation**

Dear ..... [name of person or Dear Sir or Dear Madam]

I am writing to ask for your help. Our school really needs.....

We need this because .....

I am writing to you because ..... [reasons why this company could help].

I do hope you will be able to assist us.

Yours sincerely

[Name and signature]

**Assessing pen-pal letters**

1. Does the letter create a lively and interesting picture of the writer? What details could be added to make it more interesting?

1. Is the information clearly expressed? Is the letter easy to read?

3. Are different topics dealt with in different paragraphs?

4. Is it in the correct tense? (A description is likely to be in the present tense.) Is each verb in the present tense or, if not, is there a good reason for a different tense? (You can decide what other structure features you want to focus on in this activity.)

### 3 Making a book

Producing books that the students have written and made not only enhances their self-esteem, but also provides you with welcome classroom resources.

This part builds on the idea of a Big Book. It suggests that you motivate your students to bring their writing and drawing to a final stage by putting a book together. This can be shared with others in the class, or with a person, group or school in another place.

You need to think about how to plan and organise an activity like this. You will need to think about the kind of book to make (e.g. folding book), the visuals and layout of the book, and the type of book (e.g. songbook, storybook or non-fiction book).

You will need to think about the resources needed and where to get them. You may have to involve students in collecting some of these before you actually start the work in class. This kind of planning and preparation is vital if your classroom is to be effective in helping students learn. You might find the additional resource useful on **Being a resourceful teacher in challenging conditions**.

#### Teaching Example 3

Mrs Umar, who teaches a class of 44 Primary 5 students in Sokoto, wanted to encourage them as writers and readers and so decided to make books with them in their additional language of English.

She told them that she wished to start a collection of books for the class and it would only grow if they produced some of their own books. They discussed what kinds of books they liked to read and she listed these on the board. The list included stories, poems, and books about sports and clothes. She then asked the class to form small groups of no more than six people interested in a particular kind of book.

Mrs Umar discussed with each group what kind of book they were going to write. One group decided to work in smaller groups of three to produce two sports books, one about football and the other about running. Another group wanted to write a storybook based on a traditional tale. Mrs Umar gave the groups time to plan their outlines before asking them to share their ideas with the rest of the class. The class gave feedback to each group. Over the next week, Mrs Umar gave the groups lesson time as well as homework time to work on their writing.

As each group finished their drafts, Mrs Umar read these through and gave feedback on ways to improve their books. The final drafts were completed over the next week and were put on display for the whole class to read.

#### Activity 3

- Suggest to your class that they make a book for their partner school (or for another purpose), containing songs, recipes and other local information. If

you have a recipe book, show it to them. Some recipe books include pictures, information and stories about places and people related to the recipes.

- Decide which songs or recipes they will include and how they will be presented.
- Decide together what else will be in the book. Think about illustrations, photographs, instructions for local games, stories or poems.
- Plan with your students who will do each piece of work, who will edit the work and when each task should be completed.
- Carry out the plan. If possible, make copies of the book, so that you can keep one and send one to your partner school. Ask your partner school if they can send you a book they have made, too.

Where resources are limited, recycled paper, old calendars, newspapers and magazines are materials you may be able to gather locally for making books. For further ideas, see the additional resource on Being a resourceful teacher in challenging conditions.

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## Numeracy: Working with weight

### 1 Estimating and comparing

### 2 Non-standard units

### 3 Weighing in grams

#### Key question for the teacher:

How can you build supportive relationships in the additional language?

**Keywords:** personal communication; pen pals; sharing local information

#### Learning Outcomes for the Teacher

By the end of this section, you will have:

- Begun developing relationships between students that support their learning in the additional language and help them reflect on their own learning;
- Provided opportunities for students to communicate with proficient or mother-tongue speakers of the additional language;
- Set up opportunities for communication with students beyond your school

## Overview

When exploring weight with students it is important to use a lot of practical hands on activities in the early stages so that they are able to build up mental models which will help their understanding in later stages. In this section you will plan ways to introduce your students to the concept of weight by following three stages:

- comparing weights of two or more objects by holding them at the same time
- estimating and measuring weight of objects using non-standard units such as stones
- measuring and comparing the weight of objects using standard units

Central to this work is the use of simple balances and using standard units that can be made from cheap and readily available materials, to enable practical group work and active learning.

# 1 Estimating and comparing

Estimation is an important skill in both mathematics and science and a useful skill to cultivate for all students. Simple balances can be made with very modest resources that allow students to approach measuring and estimating weight through practical investigation. You may like to make simple balances and plan and carry out these activities jointly with a science teacher in your school. This can be done by helping students to compare and contrast weights in different ways.

## Teaching Example 1

Mrs Nkumu in Nigeria was on a teachers' course at her local district offices and as part of the day's lesson on numeracy the facilitator told the following story to them. Then she asked them what they thought the girls knew and what would they do next with these students if they were in their class.

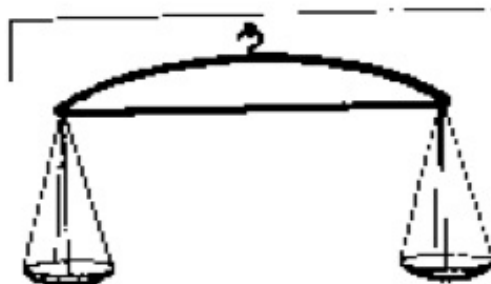
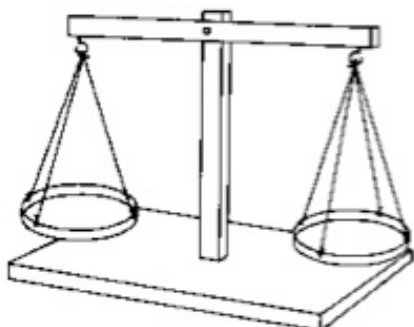
'Two girls, Ranke and Ade, were discussing the quantity of popcorn in two packets, A and B which looked the same shape and size. Ronke picked up the packets one after the other and was surprised that B felt heavier than A. She told Ade that B appeared to be heavier than A. Ade decided to put the two packets in the two pans of a simple balance. She observed that on the scale, packet B went down and so B is heavier than A. Ronke was right.'

The teachers worked in pairs and devised activities that encouraged estimation of heavier/lighter, then using a balance or scales to test their ideas. Each pair tried their lesson out with their class and reported back next session.

Mrs Nkumu found that her class enjoyed the lesson but that she did not have enough different objects for the students to use. Next time she said she would spend more time collecting objects and she would use smaller groups of 4-6 rather than over 10 each.

## Activity 1

You will need 5 simple balances to carry out this activity and 5 sets of common objects e.g. stones, balls, tins, bottle tops etc. that could be used with the balances





Write instructions for your students on the board, see below, and show the class what you want them to do using any two objects.

1. One member of the group picks up and feels the weight of two objects, e.g. a stone and a bean, one after the other. Which feels heavier? Complete the table below.
2. Another member now uses the balance to compare the weights and completes the table
3. Repeat this for all the objects, comparing two objects at a time, allowing each member of the group to participate.
4. Pin your table on the wall and look at each other's results.

Objects	Which feels heavier	Which weighs heavier on balance
a ball and a bean	the ball	the ball
a bean and a stone	the stone	the bean
a bean bag and a stone		

Ask them to estimate which is heavier by giving the objects to 2 students to answer.

Now ask a student to test their idea out by putting them on the pan and let them decide.

Ask them which is the heaviest object and why they think so.

Organise your students into 5 groups, giving each group a set of objects and a balance. Ask students to find which object is heavier by estimating its weight and then by using the balance.

Ask them to fill in a table of their results to share with the class to see if everyone agrees.

You could challenge older or more able students to see if they can order their objects from heaviest to lightest before testing. How could they test their answers using the simple balance?

is lighter than		
a feather	—————→	a comb

## 2 Non-standard units

When developing understanding of the idea of weighing it is better if non-standard units are used to measure first. If students compare and contrast weights against non-standard unit bottle tops or beans they will quickly understand this is not sensible as the weight of different bottle tops and seeds

vary. This is made easier by making sure they have sufficient experience weighing objects against different non-standard units.

Only when students understand the need for a common unit should the introduction of standard units like grams or kilograms begin.

### Teaching Example 2

Lizzy, a Primary school teacher, felt that having taught her students how to use a simple balance to compare weights of objects, they should now compare the weight of any object with that of a given chosen 'standard' object.

She assembled different objects and chose dry beans to be her chosen measure. Using the balance she asked two students to place an object on one pan and put enough beans on the other until it balanced. They counted the beans for each object and recorded their results.

Next she used some longer beans and weighed the same objects and recorded these results. She talked with the class about the difference in numbers between the two kinds of bean and how difficult it was to compare the weight of a stone and wood if one person used one set of beans and the other used a set of larger beans.

### Activity 2

Before doing this activity, read the information provided below and collect together the following resources – enough for your size class.

- simple balances
- collect objects of similar weights to use as measures (e.g. bottle tops and beans)
- objects of different weights to measure (e.g. small bottles, tins or stones).

#### Student instructions for weighing activity

- (1) Put the object to be weighed, say 1 milk tin, in the left scale pan of the balance. Place one bean in the other scale pan. Which is heavier?
- (2) Add more beans one at a time, in the scale pan on the right until the two sides balance. How many beans do you require for this?
- (3) Repeat using bottle tops instead of beans.
- (4) Repeat (1) and (2) for each of the objects to be weighed.
- (5) Record your observations in the form of the table below

Left	Right
Object	No. of beans

Left	Right
Object	No. of bottle tops

- (6) Find out how many bottle tops weigh as much as 10 beans.
- (7) Find out how many beans weigh as much as 10 bottle tops.

You could just collect enough for one group and have each group take turns to do the activity while the others do different work.

Write the instructions for the groups on the board and explain what they have to do.

At the end, ask them to compare how it was different using beans or bottle tops to measure the weight, rather than just comparing pairs of objects. Note their answers on the board. Ask if they think this is a fairer way to measure.

**Ask students to list the objects in order from heaviest to lightest – is this harder or easier than before? Why?**

The previous activities should have shown your students that 'standard units' of weight are needed because without these it is not possible to accurately compare or know how much something weighs. This next part explores how you can introduce terms and develop their understanding of kilogram (kg), and gram (g) (1000 gram = 1 kilogram). You may want to bring bags of sugar and rice to class, to show their weight is recorded in grams or kilograms and for them to feel the actual weights or make some mock ones i.e. plastic bags filled with sand, stones etc. to the correct weight. If you can, borrow a pair of scales to do this.

### 3 Weighing in grams

If you do not have access to calibrated weighing scales or weights at school, it may still be possible to make approximate measurements of weight using your simple balances, and using some everyday objects that have their weight on them to test them against. The second focus in this part is on understanding the terms gram and kilogram and being able to convert one to the other. This kind of activity should only be undertaken when students are confident at weighing in grams and kilograms.

#### Teaching Example 3

Mr. Adu wants his students to estimate, measure and compare weights of 1 object in grams and kilograms. He asked permission from a secondary school science department to use their balances to make bean-bags weighing 100g, 50g and 10g (using different coloured cloth for each weight). He asked some of the parents who work in the local sewing shop to help him sew several sets for his class.

He demonstrated the weighing of objects in grams using the improvised weights and a simple balance, and then asked students to weigh objects to the nearest 10g, and record their results in a table.

Object	Weight
The students were very enthusiastic and weighed nearly everything they could find in the classroom. Mr Adu listened to their talk as they weighed and was pleased to hear them using the correct terms easily.	

### Activity 3

Before the lesson, collect a number of objects that have their weights shown – tinned or packet foods and other goods (you only need the wrapper, not the whole good). Try to have enough to give each group of students at least two or three labels. It would also be good to have some labels for weights in kilograms as well as grams.

Ask groups to write down the name of the product, and its weight – ensure that they include the correct units (grams or kilograms). They could do this by using the actual bags and putting them in order on their table. Students could arrange and re-arrange the packages by weight from highest to lowest or lowest to highest or sort into groups:

- > 500 grams or
- < 500 grams

Then ask students to convert each weight from kilograms to grams or vice versa.

When they have finished ask each group to swap their sheets with another group and they can check each other's answers. Remind them that 1000 gram = 1 kilogram.

Discuss with your students why they might need to be able to convert weights in their everyday lives. This should encourage them to engage with the work more readily.

Display their work on the wall to show each group their achievements.

**What did the groups learn and how do you know this? You could ask them to tell you what they think they have learnt.**

## Science: Thinking globally: acting locally

1 Artefacts of human life

2 Endangered species

3 Taking action

**Key Question for the teacher:**

How can you help students develop values of caring and concern for the environment?

**Keywords:** human footprint; endangered; environment; discussion; research; projects

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- Used discussion to help students become more aware of their values and attitudes towards the environment;
- Used different resources (articles, information books, web sites, photographs, drawing etc.) with your students;
- Helped your students plan, participate in and assess

## Overview

We can feel very proud of Africa and being African. From research, scientists now believe that Africa is the ancient home of all people here on Earth. Southern Africa is seen as the 'cradle of humanity'. Isn't that wonderful?

Although human history is very short compared to the Earth's history, humans have developed the capacity to damage and even destroy vital elements of our natural world.

How can you help students participate in serious discussion about their environment? How can we encourage students to develop values of caring for their world?

# 1 Artefacts of human life

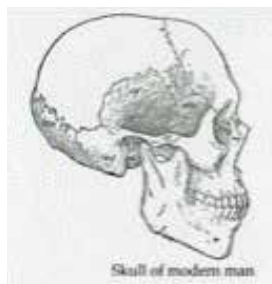
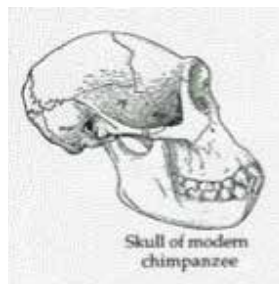
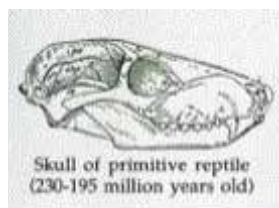
Earlier sections in this module considered how living things are adapted to survive in their environment. The great human adaptive advantage, developed here in Africa, is the ability to think of and make tools to cope with changing environments and to learn new things. For example, the earliest evidence of learning how to make and use fire is found in South Africa. (In **Teaching Example 1**, a teacher uses artefacts of human life from thousands of years ago, found on a local sand dune, to develop attitudes of respect for what early humans could do. This is one way of starting this topic with your students; you could also use some of the background materials in 'Out of Africa'. Make sure you give a purpose to this activity; ask students to find one idea that is new to them or to summarise the main ideas in a way suitable for younger students, perhaps with some pictures.

In **Activity 1**, you lead your students through thoughtful discussion that will encourage them to seek more evidence from a range of different sources.

## The 'Out of Africa' theory of human origins

Most experts believe that the species to which we belong, *Homo sapiens*, evolved in Africa, sometime between 100,000 and 200,000 years ago. By 30,000 years ago, *Homo sapiens* had spread to all parts of the world apart from the Americas; by at least 11,000 years ago, every continent apart from Antarctica was populated.

*Homo sapiens* had more tools than their predecessors, including a wide variety of stone blades and tools made of bone, wood and ivory. They lived in larger settlements and there was more contact between villages and tribes. Communication through the spoken word and through art, engravings, sculpture and music became a vital part of human life. Later human developments – farming, civilisation, huge population growth, industry and control over nature – have occurred in the relatively short period of 10,000 years.



Adapted from: <http://www.harperchildrens.com> and Dorling Kindersley Eyewitness, *Early People*

### Teaching Example 1

Alan is a teacher who grew up spending holidays on the coast of South Africa. Here, when the wind blows away sand in the dunes, it uncovers places long hidden. You can find broken parts of very ancient pottery and marvel at how it was made and decorated. You can find parts of stone that have been chipped and shaped to make tools for cutting, hammering and even grinding. There are also bits of bone that show evidence of having been shaped into awls (pointed tools) for piercing leather, or cut into tubes as beads.

Sometimes Alan takes his students there. When students hold these things and imagine people thousands of years ago, and the time and trouble they took to make these tools, he can see the sense of wonder in their faces.

### Activity 1

First read the information provided below to yourself to give you some ideas about early technologies.

Technology is something that has built up over the ages; it is as old as the human species. And it is at the very centre of most human experience. It always has been and it always will be.

All the latest research shows clearly that human life had its origins in our part of Africa; Southern Africa is now known to be the ancient home of all people – the ‘cradle of humanity’.

As people developed here in Africa and advanced their culture, they found ways to use, adapt and change natural things to make their lives easier. They developed cultural and kinship systems. (Systems themselves are a kind of technology – a way to regulate human life and behaviour.)

Perhaps the first great inventions were bags, or baskets, and knots to tie things. Skins, parts of plants, and fibres were probably used, and knots, weaving and plaiting were invented. (Of course, dried gourds, or calabashes, could also be used as carrying containers.) Bags and baskets were probably invented by women to carry the food that they had gathered, so that they could carry more than a handful back to their homes. Also, they needed to be able to carry their babies safely, while they gathered roots, fruit and plants.

Once human hands were freed by the invention of bags and baskets, people could use their hands for other things. Hunting and other tools were also developed, using hard substances such as bone or stone. Long bones could be twisted or broken and shaped by rubbing them to form bone daggers for cutting or stabbing.

Rocks could be knocked and chipped to make stone hand-axes. The sharp flakes that were chipped off could be used for scraping skins to get leather. These tools could be used to make other tools. And so people evolved

more and more complex technology to make human life easier in one way –and perhaps more complicated in others.

From early on, people probably decorated themselves. They made ornaments like beads, bracelets and necklaces to wear. This required skilful technology.

Before long, people probably discovered that they could get certain colours from plants. They also found, crushed and mixed coloured minerals to make pigments to paint and decorate designs on their bodies. By cutting the skin and rubbing ash into the wounds, beautiful, permanent patterns of scars could be made. At some stage, tattooing was invented.

Of course, they also decorated the objects and tools that they made. We're sure that early people appreciated beautiful, carefully made things.

At some point, the control and use of fire became an important part of human life. This gave people some control over darkness, and a way to process certain foods by cooking or smoking. Control over fire meant that people could now move to live and settle in colder places. Fire could also be used to bake pots made of clay. This process turned the pots into stronger containers that could be used for cooking as well as storing.

Discovering how to find, mine, melt and shape metal was another important series of technological discoveries and inventions.

The taming and domesticating of animals was also a technological advance. This led to a nomadic herding lifestyle. In drier places, people learned to dig wells to provide their animals with water. Domestic animals could be a source and sign of wealth. Complex trading and bartering systems probably developed.

Learning how to grow crops led to the development of agriculture and settled farming. Control of water by irrigation was another technology that was developed.

Settlements turned into villages. Villages, in turn, developed into towns and cities. These towns and cities were complex systems that required many different jobs, which required specialised skills and technologies.

As human life got more complex, many other tools and systems had to be developed. Tools were used to make marks or records on stone or clay that carried messages or information of importance. Writing systems were developed.

Eventually, more complex tools and sets of tools turned into machines that could do the work of many people or animals. They could even do things that people had not been able to do before. When people worked out how to use the wind and water as sources of energy to work the machines, production systems improved. Using steam and coal was another major breakthrough, which led to the industrial revolution.

You can see that technological development leads to all sorts of other changes. Sometimes the changes are good and sometimes the changes can cause problems.





Today we live in a modern world that is dominated by rapid technological change. Do we control technology, or does technology control us? Understanding the uses of technology and being able to live and work as human beings in this modern world is a very important life skill for everyone to learn.

*Original source: University of Fort Hare*

Now, sit your students around you. Ask them to close their eyes and imagine themselves back in the very distant past. They are a family of hunter-gatherers, living off the land, making their own tools and seeing to their own needs for survival. Tell them to keep their eyes shut and to hold the answers in their heads to the questions you ask (later you will talk about the answers).

**Ask them to imagine themselves waking. Where did they wake up? What kept them warm and safe in the night? What are they wearing? Who made it for them and how? What do they eat and drink? How is it prepared and stored? Take them briefly through the probable activities of the day. Focus on the tools, implements and other objects used.**

Record your subsequent discussion in the form of a mind map titled 'The earliest technologies for a good life'.

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## 2 Endangered species

There is strong evidence that all modern humans descended from a single population living in Africa about 150,000 years ago. Until only recently, humans lived in close harmony with nature, advancing the technologies that made their lives easier or better. Today, more modern technologies give us the power to harm or damage our world – and even its climate – in very dramatic ways.

This section looks at how you can explore with your students the impact we make on the world. What harms it, and what heals it? There are many plants and animals that have become extinct over time as part of natural processes, but human activity can also result in a species becoming extinct. Therefore, it is important to help students understand that their behaviour can have long-term effects on the Earth and our environment.

**Teaching Example 2** tells how one teacher worked with his class to raise awareness of the effect of people on one species. In this type of activity, it is important to choose topics that are relevant to your students; **Activity 2** helps you build up a list of these topics. This can act as a starting point for further discussion, research and action. Older students might extend this work to look at how the issues are reported in the media.

Try to do some background research yourself before starting this work with your students. What are the endangered species in your country or local area? If you have access to the internet, it can be a great resource but you can also ask local experts, teachers in the local high school and other community members for help or to come in and talk to students.

### Teaching Example 2

Kioko Mutiso talks to his class about the flightless dodo of Madagascar. This was a large bird (about the size of a turkey) that ate ripe fruit that had fallen to the ground. It built its nests on the ground because there were no natural predators on the island of Madagascar. Then, more sailors started visiting the island, bringing mammals including pigs, monkeys and rats. Over the years, the number of dodos decreased and by around 1680 the last dodo died.

Mr. Mutiso then organised his class into groups of four and gave each group six small cards, each with one of these phases on them:

- Fruit trees cut down to grow other crops
- Climate changed and became too cold for the dodo
- More people hunting the dodo for food
- More people picking the fruit from the trees before it ripens and falls
- More people hunting the dodo for their feathers
- Small mammals ate the dodos' eggs

Mr. Mutiso asked each group to read out the cards to each other and then to put them in order to explain why the dodo became extinct. He gave them 20 minutes for this task and during this time he went round each group asking them questions about their reasoning. At the end, each group shared their ideas on a class table. The most popular idea was eating the eggs and Mr. Mutiso confirmed that this was indeed the most important reason for the dodo becoming extinct.

He then asked his class if they have heard of any other endangered animals. The students mentioned elephants, tigers, dinosaurs and local endangered animals including the black rhino, the African elephant and certain plants.

They decided to research several of these animals to find out the reason why their numbers are going down. They wrote letters to conservation organisations to find out more information about the local animals and make posters of their findings for the classroom walls.

### Activity 2

'What are we doing to the world?' In this activity, you use this question to increase awareness of both global and local issues regarding the environment.

Use the wall at the back of the classroom to make a large score sheet – draw a table with two columns. Head one column 'Harm' and the other column 'Help' or 'Heal'.

Every week, a different group of students collects last week's old newspapers, listens to the radio news or television and finds one story or picture which shows how people are affecting the environment. You might have stories about leaking oil pipelines, burning of forests, dumping rubbish, planting young trees, opening a new road or recycling aluminum cans.

Students should summarise their story using these headings:

- What is the title of the story?
- Which part of the environment is affected? (Air, soil, water)
- How is it affected? Is this a long-term or short-term effect? Who is responsible?

The group presents its story to the class and then adds to the score sheet in the appropriate column.

When the sections are full, the class votes for the most significant choice in each column and these get pasted into a 'What worries us – What we like to see' book for future reference.

Think about how the group oral presentations could contribute to language assessment, you might find the additional resource useful on

### Assessing learning.

## 3 Taking action

It is important that students are encouraged to value their own culture and traditions. Scientists are discovering that indigenous knowledge carries important understanding, but there is a danger that this local knowledge will be lost.

**Teaching Example 3** shows how a teacher uses local news to link local and global issues around pollution, threats to animal populations and increased employment and facilities.

In the **Activity 3**, you build on the earlier discussion and research and take action with your students to improve the local environment. In this type of work, you need to think carefully about how you divide up the work and ensure that everyone has a chance to participate. Encourage students to reflect on what they have contributed to the group, there is some information in the box below about working in a group.

### Ideas students may have about working in a group

Choose one of these methods to help your students to talk about how they worked together in a group.

1. Write each of the following words on to a card or on the board. Give each group a set of cards to help them develop three sentences to describe how they worked. They should try to use some of these words in their sentences:

decide,	persuade,	tell,	ask,
argue,	describe,	agree,	opinion,
listen,	share,	organise,	lead,

2. Write these statements onto a set of large cards (keep these for different group work activities). Display the statements around the room and ask each group to choose the statements that describe the way they worked.

Encourage your students to add further statements.

- Everyone in the group had a chance to speak.
- Everyone in the group was encouraged to speak.
- Not everyone spoke during the activity.
- We reached agreement in our group.
- We listened carefully to each other.
- Sometimes we found it hard to listen to others without interrupting.
- Not everyone in the group agreed with our way of drawing the poster.
- Not everyone in the group contributed to the poster.
- Everyone in the group was able to add to the poster.

3. Choose one or more of these questions below. Read it/them out to your class and ask each group to discuss the question(s) in their group for five minutes. Ask for feedback from some of the groups.

- How did sharing your ideas help you?
- Did everyone have a chance to speak?
- Did we encourage each other to share our ideas?
- Did we listen carefully to each other?

### Teaching Example 3

There is a story in a local newspaper about how a large company plans to build a hotel near to the town on the beach, where many animals live and local people fish. Some local people are very upset about this and think it will bring pollution, and scare away animals and fish. Other local people are excited at the idea that there will be jobs in the hotel, and tourists to guide and buy local crafts. A local teacher, Mrs Rutebuka, sees this as a good opportunity to link language and science.

She asks her students to find as many copies as possible of this edition of the newspaper. She then cuts out the article so that each group (eight students) has a copy of the article. In their groups, the students then read the article and analyse the article under these headings (which Mrs Rutebuka has written on the board);

Person involved	What they want to happen	Why

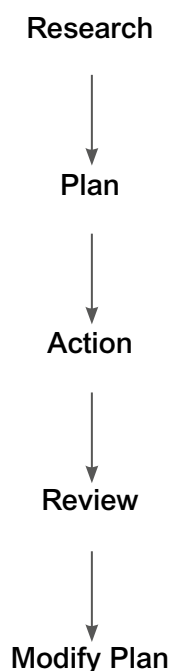
After half an hour, Mrs Rutebuka stops their discussion and asks different groups to send a representative to help complete the table on the board.

She finishes the lesson by working with the students to write a summary of the story from the completed table.

### Activity 3

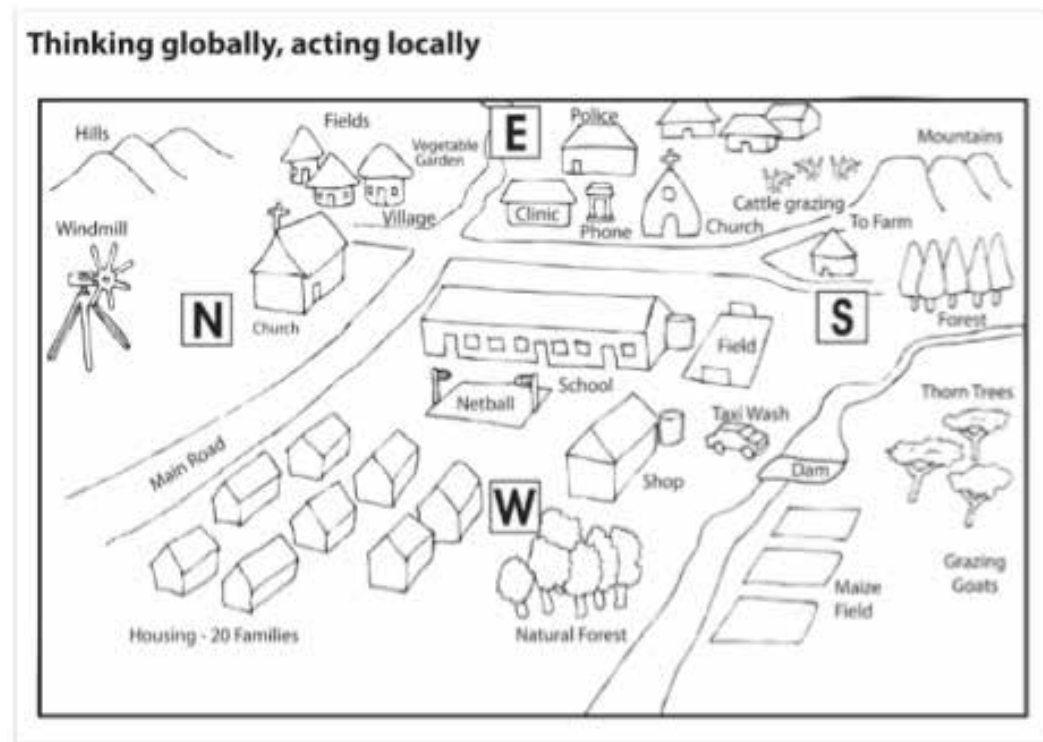
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- Explain to your class that you want them to decide on a project where they take action to do something positive for the natural world.
- Brainstorm the aspects of local life that could be improved. Discuss and rank the ideas in order of importance.
- Next, divide your class into groups. Ask each group to draft a provisional action plan to present to the class. How will you decide which plan is sensible and realistic? Discuss this with the class and decide on 3-4 criteria for judging each plan.
- Ask the class to choose one plan and work out how you will measure the effectiveness of the project.
- Finally, try to put your plan into action. Use an action research pattern of:



### Learning through action: a step-by-step approach

1. Encounter
2. The first draft



*Adapted from: Umthamo 39, University of Fort Hare Distance Education Project*

3. Representing what has been researched
4. Agreeing a plan
5. Designing a plan of action
6. Taking action
7. Assessing outcomes and reporting

## Arts: Using artefacts to explore the past

- 1 Being a history detective
- 2 Traditional local customs
- 3 Developing an understanding about artefacts

### Key Question for the teacher:

How can you use artefacts and other evidence to explore local and national history?

**Keywords:** artefacts; evidence; group working; local history; environment; questioning

### Learning Outcomes for the Teacher

By the end of this section, you will have:

- Used artefacts to help students raise questions about and understand the past;
- Developed lessons that allow students to think about their national history in relation to their own identities;
- Involved local experts and the environment in your lessons to stimulate students interest in local history

## Overview

Understanding who you are and having good self-esteem is enhanced if you have a strong sense of your identity and can see your place in the bigger pattern of life. Studying what happened in the past can contribute to this. Through the activities in this section, you will encourage your students to think about history as it relates to them. Using group work, inviting visitors into the classroom and using practical hands-on activities to investigate artefacts will allow your students to share ideas and develop their historical skills.

Handling artefacts or looking at pictures of them provides a means for you to draw attention to both the factual aspects of history and the interpretation involved. Something that will help you in this work is collecting resources as and when you can. Often it is possible to find old utensils and artefacts from the home and in markets.

# 1 Being a history detective

This part will help you to plan tasks for your students to think about how things that we use in our everyday lives have changed over time. For example, by looking at what we use for cooking now and what we used in the past, we can begin to think about how people used to live. We can compare utensils and, from this, speculate about what it would have been like to live in the past and use such artefacts. This will stimulate students' thinking about themselves and their place in the local community and its history.

## Teaching Example 1

Mr Ndomba, a Standard 5 history teacher in Mbinga township, Tanzania, has decided to use artefacts used in farming in his lesson to stimulate students' interest and encourage them to think historically.

He organises the class into groups, giving each group an actual artefact or a picture of one. He asks the groups to look closely at their object or picture and to write as much as they can about it by just looking at it. His students do well, as they like discussion, and it is clear to Mr Ndomba that they are interested and enjoying speculating about their artefacts.

After a few minutes, he asks each group to swap its picture or artefact with that of the next group and do the same exercise again. When they finish, he asks the two groups to join and share their views of the two pictures or artefacts. What do they think the artefacts are? What are they made of? What are they used for? How are they made? They agree on five key points to write about each artefact with one group doing one and the other group the second. Mr Ndomba puts the artefacts on the table with their five key points and makes a display for all to look at for a few days.

At the end of the week, he asks each group to write what they are certain they can say about the object on one side of a piece of paper and on the other side they write things they are not sure about, including any questions. For him, it is not so important that there is agreement on what the object is, but that there is lively, well-argued debate on what it might be used for and how old it might be.

## Activity 1

Read the information provided below before you start.

### Using artefacts in the classroom

The opportunity to handle actual artefacts is a unique experience. For some reason that no one is quite sure of, the act of touching an object, which obviously has its own history and story, inspires everyone. Students will inevitably be curious about the artefacts and this will naturally lead to good discussion.

### What is the purpose of an artefact handling session?

Artefact handling sessions can be used to:

- motivate students at the start of a new topic;



- attract and hold the attention of students;
- deepen their understanding of a topic they are studying;
- lead to an in-depth study within a broader unit of work;
- act as a bridge between several different subjects or units of study;
- assess students' developing understanding at the end of a lesson.

### **What questions should I ask during an artefact handling session?**

The type of question you ask will depend on what you are using the artefacts for. The questions below should help you get the most out of using the artefacts.

- Questions about the physical characteristics of an object
- Questions about the design and construction of an object
- Questions about the importance and value of an object
- Questions about the function of an object

### **Teaching with objects – some approaches**

Many of the approaches detailed below can also be used when interrogating documents, prints and paintings with students.

#### **Visual stimulus**

Objects can be used to stimulate discussion at the beginning of a lesson. The same objects can be used to recap what students have learned and to see if any of their ideas and understandings have changed in the course of the lesson.

#### **Historical inquiry**

A selection of objects can be used by students for an exercise in historical inquiry – obtaining information from sources. Allow time for students to look at the object carefully before exploring some of the following questions:

- What is it made of?
- What tools or techniques were needed to make it?
- Who might have made it?
- Did making it require specialist skills?
- Is it decorated? How?
- Who might have used it?
- What was it used for?
- Did it have a practical function, or was it used in other ways?
- How large or heavy is it?
- Is it a valuable or rare object?

### **Drawing comparisons and relating objects to each other**

Use two objects or images side by side and ask students to draw comparisons, exploring the similarities and differences. Use groups of objects and talk about the relationships between them.

### Representations and interpretation

Some artefacts may show evidence of a particular viewpoint or bias. Who created the object and for what purpose? Is it an item of propaganda? Does it tell the whole story? What doesn't it tell?

### Other activities using objects include

Prediction activities – show students an object and ask them to work out which period of history it relates to.

**Teaching Example** – students can use a single object or group of objects to build up a Teaching Example, for example, life in West Africa before the slave trade.

**Groupings** – students can group objects into sets that have particular things in common (such as the materials they are made from, the country they originated from, how they were used). Students can consider how to curate a museum display by grouping objects in different ways.

**Caption or label writing** – students can write their own captions or exhibition labels, either from a modern viewpoint or as if they were writing at the time the object was made.

**Emotional intelligence** – students can list adjectives that describe how they feel about an object, demonstrating empathy as well as understanding.

**Creative responses** – students can respond to an object through creative writing, drama or art.

### Which subjects can benefit from using artefacts?

Learning from objects is beneficial to subjects across the curriculum:

- History: sense of chronology, empathy and key skills.
- Science: properties of materials, observation, comparing, classification and questioning skills.
- English: asking and answering questions, contextual materials.
- Drama: stimulus materials, developing empathy.
- Art and Design: stimulus materials, contextual materials, still-life drawing..
- Ask your class to bring in any traditional objects that they have at home. Tell them that you want the object to be as old as possible, perhaps used by their grandparents or before. But remind them they have to look after it carefully so it is not damaged. They should avoid bringing anything very valuable. Have a table ready to display them on when the students bring them in the next day.
- Explain to your students that they are going to be like detectives and piece together as much information and evidence as they can about their objects.
- Ask them, in pairs, to look at all the artefacts and try to name each one and make a list of them in their books. Just by looking and holding, ask them to note what they think each is made of, how it is made and what it might be used for. You could devise a sheet for them to use.

As a whole class, look at each artefact in turn and discuss the different ideas. Agree which idea is most popular and ask the person who brought the object in what they know about it. Or send them home with some questions to ask and bring answers back to share with the class the next day.

## 2 Traditional local customs

One of the purposes of teaching history to your students is to allow them to understand and discover their own and their community's identity. As a social studies teacher, even of primary school children, you should always be looking for interesting ways of helping students understand this past, their history. Considering how local customs, everyday tasks and the objects used for them have changed helps build this identity.

### Teaching Example 2

Mrs Noamasi has asked two older members of the local community to come to class in their traditional dress and talk about what has changed about traditional dress since they were young.

Before the visit, Mrs Noamasi reads the additional resource on Using the community/environment as a resource. - and, with her class, prepares for the visit. Once the date and time have been agreed, the students devise some questions to ask the visitors about what has changed over time.

On the day of the visit, the classroom is organised and the welcome party goes to meet the visitors. The class is excited but shy with the visitors. However, the visitors are so pleased to come and talk that everyone soon relaxes and there is much discussion about the dress they are wearing and the importance of each piece. The visitors also brought some traditional clothes that belonged to their parents for the children to see.

After the visitors have left, Mrs Noamasi asks her students what they had learned that they did not know before, and she is surprised and pleased by what they remembered and liked about the event.

### Activity 2

This activity aims to put in place a frame that you, as a teacher, can use to conduct a classroom discussion about any aspect of social studies or history. In this case, we are looking at local artefacts and their traditional use.

- Arrange for your class to visit a local craftsperson or ask them to come to school to talk with your students about their craft now and how it used to be.
- Before the visit, you will need to organise the date and time and what you want to talk about, so the visitor can prepare what to bring.
- Next, with your class, decide what kinds of things they want to know and what questions they would like to ask about the artefacts that the visitor might show them or they might see on their visit. Maybe the visitor could demonstrate their craft for the class.
- On the day, tell your class to enjoy the visit and to be respectful to the adults.
- In the next lesson, discuss their findings and ask students, in groups of four, to choose one item, draw it and write what they can about it from memory and the notes they took.

- Ask your students to put their work on the wall for all to read and see.

You may be able to organise a craft lesson with the visitor, so your students can try the particular crafts.

### 3 Developing an understanding about artefacts

History is always about balancing subjective claims (peoples' personal accounts and opinions) against objective (independent) evidence. When exploring artefacts, rather than oral or written evidence, the same balancing applies. There are definite things that can be said about a pot for example, i.e. its shape, what it is made of etc. Something like 'what it was used for' can only be speculation, based on what we use such pots for now. By looking at the pot carefully, consulting old drawings and paintings and talking to others, we can build up a more certain picture of how it was used.

This part explores ways of helping students question their thinking and understanding about artefacts

#### Teaching Example 3

Mrs Minka decides to use a book of letters of how children remember the events of the Yaa Asantewaa War against the British in 1979. She plans to use the book *A Story from Ghana: A History for Primary Schools* as the text for the lesson. She chooses to read to the class the speech by Nana Yaa Asantewaa that galvanised the men of Asante to go to war. After studying these accounts carefully, Mrs Minka realises that they are based on subjective evidence, what people say and think what happened. She thinks that it would be a good idea to compare them to more objective historical evidence in the lesson. Therefore, Mrs Minka gathers a range of documents and books written by historians that examine the events leading to the war which give an objective account of it.. She makes a summary of the key ideas to use in class. The students will need to consider what these two terms mean when studying an historical event..

First, she asks each group to read the chosen paragraphs from *A History from Ghana: A History for Primary Schools* and then asks them to look at her chart of key events and thoughts by respected historians. Do they see any similarities or differences in these accounts of the same event? They discuss whether the subjective accounts in the book can be supported by the objective historical evidence put forward by historians. They agree that both give insights. The book is people's perceptions and can vary according to their beliefs, but the chart just has facts.

At the end, Mrs Minka summarises for her class the difference between subjective and objective evidence when looking at the past.

### Activity 3

- Ask your class to bring in any old items they have in their homes, such as traditional dress, old cooking utensils, woodwork, masks, bead and craftwork, pots etc.
- Remember that for your students things that are only 20 or 30 years old will seem very old. The important part of the exercise is for them to gather evidence about the artefact and, by looking at lots of old objects, to develop some idea of how to make sense of life in the past. If you can, make sure you have also collected some items, so that you can give to those who are unable to bring in anything.
- Ask your students, in pairs, to produce a sheet like the one below to display with the artefact.
- When the display is complete, ask other classes to visit your exhibition. You could even ask parents and the local community to come to see the exhibits. You may find out more from your visitors about some of your artefacts.

Student's name: \_\_\_\_\_

My artefact is a:

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This artefact is made from:

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This artefact was used for:

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This is how this artefact was used:

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This is how old the artefact might be:

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## Life Skills: Ways to promote spiritual well-being

- 1 Feeling safe
- 2 Being aware of students' personalities
- 3 Planning a celebration

**Key Question for the teacher:**

How can you promote spiritual well-being in your classroom?

**Keywords:** positive attitudes; storytelling; whole-school activities; spiritual well-being

**Learning Outcomes for the Teacher**

By the end of this section, you will have:

- Explored ways to promote positive attitudes in the classroom;
- Used storytelling and discussion to help students feel safe and secure;
- Identified individual behaviour to support students learning;
- Planned activities to help celebrate life with the whole class and school

## Overview

Developing spiritual well-being in your students means that they can be happy and content in their daily lives, and can be at peace with themselves and others. Spiritual well-being covers all aspects of the students' individual lives, including physical and emotional aspects.

In this section, we look at some factors related to spiritual well-being and how to plan activities that will enhance this. You need to be aware of what upsets or reassures your students, and address these in your lessons. We suggest storytelling and whole-school activities for building spiritual well-being.

Your behaviour in school can have a big impact, both positive and negative, on students' behaviour and motivation to learn. So, too, can the ways students interact with each other.

We have already discussed some ways you can encourage your students to consider each other's feelings. Here, we talk more about helping them feel safe and more secure, because when they do, they will learn better.

# 1 Feeling safe

Everyone strives to be safe and secure. In many places, people build houses with strong walls, windows and doors so that they feel safe inside their property. Other people put guards on their houses and cars. And others even walk around with weapons for security purposes.

But these things only protect us physically. As we have seen, people feel emotionally safe when they are surrounded by people they trust. The best way to do this is to develop a supportive network of friends and partners.

At school, when students feel unsafe, insecure or worried, they cannot learn effectively.

## Teaching Example 1

One day, Thuku, a Standard III teacher in Tanzania, found a worried little boy sitting among the other students and crying. The students were comforting him and asking what was the matter, using the kind of language they had learned for discussing feelings.

After some time, the boy explained that he was walking to school when three older boys with sticks had run after him shouting that they were going to beat him and take his bag and shoes. He ran away to hide in the school.

With the help of the other students, Thuku calmed the boy down by explaining how he was safe now. They told him that he was at school now, and the boys would not come into the school. Also, his teacher was with him, and the teacher would stop any boys from troubling him. He was surrounded by his friends, and they would protect him.

After school, his friends walked home with him and talked with his family and neighbours about what had happened.

The next day, Thuku decided to have another session with his students to discuss feelings of safety and security and how to support each other.

## Activity 1

Organise a discussion on feeling safe and secure. Start by telling a story about the boy in the Teaching Example.

- Ask the students, in small groups, to describe situations at home and at school when they feel a) safe and secure, and b) unsafe.
- With the whole class, identify some general points about when we feel safe and when we don't. List these on the board.
- Ask the groups to discuss what they could do to make everyone feel safe and secure in the classroom and the playground.

Finally, draw up a list of behaviours that make people feel safe in the classroom and the playground and display it on the wall.

## 2 Being aware of students' personalities

What we like and dislike can affect how we learn. Activities that we like and interest us provide motivation, whereas activities we dislike can prevent learning.

Students' feelings and personalities have a big effect on how they respond to different activities. Some children are very shy and will not speak in front of others, whereas some love performing. Some students like working alone, others are better in a group. Some like to learn by reading, others by talking.

You need to find out what types of activities your students like and dislike to help you plan your lessons better. This will fulfil their spiritual well-being, which in turn will help them to learn better.

### Teaching Example 2

Having discussed feeling safe with his students, Mr Adamptey wrote down some different approaches to incorporate into his lessons:

- Most children enjoyed playing with each other. Therefore, group games should appear in lessons regularly.
- Some children liked quiet periods. Therefore, he decided to make time for solitary activities such as reading, writing and drawing.
- All children liked singing and music. Therefore, he decided he could use songs to motivate them and make them happy.
- No child liked to feel scared. Therefore, he should be careful about being angry with them in class. He must also watch out for over-assertive or possibly bullying behaviour from the stronger personalities in the class.

Mr Adamptey thought about the individual students in his class and watched them carefully as they worked. He noticed how each reacted to different activities.

He used this information to plan lessons that included both solitary and sharing activities. He organised groups so that:

- nobody was isolated;
- there was no conflict of personalities;
- everybody was able to contribute;
- everybody enjoyed working with each other.

### Activity 2

Think about the different personalities of students in your class and how they respond to the way you teach. Ask yourself:

- Which students always answer questions?
- Which students don't speak in class?



- How would you describe their personalities?
- Which students work well in a group?
- Who works well on their own?
- Which students behave badly when in a group?
- Who has difficulties working on their own?
- Now think about the activities you use:
- Which are the most popular activities?
- Which are the least popular activities?
- Which activities help the children learn best?

Match the students to the types of activities that best suit them.

### **How could you organise the different activities so each student would benefit?**

Plan a lesson using these ideas. Carry out this lesson and then think:

- Were your ideas correct?
- How did the students respond to the lesson?

### **What would you change next time?**

Read the information about celebrations overleaf.

#### **Celebrations**

Spiritual well-being means being happy with your everyday life. This covers a wide range of things, including:

- having good health;
- being emotionally supported;
- having good relations with those around you;
- being able to enjoy your daily activities, including study, work and play.

One way to help develop this is to identify and celebrate those events in life that make us happy, for example, special occasions like religious festivals, birthdays and special holidays.

Part of the idea behind these celebrations is to spend time with family and friends. During these celebrations, we enjoy their company and feel secure and happy. Celebrations often have particular foods, music, games and gifts that link to the celebration.

It is possible to celebrate life in a similar way at school. The school is like a community, and has many things that everybody enjoys doing together. Special days at school could tie in with, for example:

- Religious festivals like Eid and Christmas;
- National Independence Day;
- World Environment Day;
- World Literacy Day;
- Children's Day;
- Open Day;

- Speech and Prize Giving Day;
- Workers' Day;
- World Communication Day;
- World AIDS Day.

**What sorts of activities could you plan to help celebrate?**

When you provide positive support to your students, you help them celebrate their achievements. This can include:

- recognition of their success and achievements;
- recognition of their skills and talents.

Students respond well to positive support. When you celebrate their achievements you provide them with:

- encouragement;
  - motivation to achieve more;
  - improved self-esteem and confidence.
- 

### 3 Planning a celebration

A celebration does not have to be a big event. Just saying 'Well done!' to a student is a small celebration and provides the positive support described above.

You can also celebrate as a class or school.

This part looks at ways to help celebrate skills and talents. These might not be academic skills and talents but things that the students are very good at or enjoy doing outside of school.

In celebrating these, you are showing that the school:

- recognises the range of abilities that your students have;
- supports the students in other aspects of their lives.

This will encourage your students to feel that school is a place where they are admired and respected in many different ways.

#### Teaching Example 3

Mrs Quartey had noticed that, during break time, many of the children played games that involved singing and dancing. She thought she could use this in her teaching. She asked the head teacher if her class could prepare a performance for assembly. The students were very excited. To plan, she used the following steps:

- She discussed with the class what they wanted the performance to be about.

- In groups, they discussed what different things they would include in the performance in the 15 minutes allocated.
- As a class, they chose to do an assembly about sharing and prepared a presentation, a short play and a song and dance. It was important to choose things that involved as many students as possible.
- Some children did not want to perform but Mrs Quartey was able to involve them in making costumes or acting as prompts.
- As they prepared their activities, Mrs Quartey checked that everybody was clear about their part. Individuals didn't have to speak in public unless they wanted to.

They performed to the whole school. It was very colourful and everybody liked it. The head teacher decided to make this a regular event, with classes taking turns to perform for the school or demonstrate what they had learned. It was a good way to develop students' confidence and self-esteem.

You might find the additional resource useful **on Using role play/dialogue/drama in the classroom.**

### Activity 3

To help your students plan a celebration you need to explore various aspects with them first.

- Ask them, in groups, to name the different occasions they celebrate. Ask them to list different celebration activities. See Resource 2: Ghanaian celebrations for some ideas or to discuss further how they celebrate these events.
- Together with the students, identify an occasion to celebrate at school.
- Ask them to plan for the occasion – activities, plays, songs etc. Make sure everyone is involved in some way, even if they are not actually performing. Help them to rehearse.
- When the class is ready, perform the celebration for another class or the whole school. You could invite parents and the local community.
- The next day, ask the students to write a description of everything they did to prepare for the celebration. Ask them to identify what new skills they learned. Ask them what they would like to celebrate next.

**Was it successful?**

**How do you know this?**

**How did the students respond?**

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**Teacher Education in Sub-Saharan Africa**

# Teaching Pack No.14

## Upper Primary

<b>Section 1</b>	<b>Literacy:</b>	<b>Ways of becoming a critical reader and writer</b>
<b>Section 2</b>	<b>Numeracy:</b>	<b>Teaching transformations</b>
<b>Section 3</b>	<b>Science:</b>	<b>From earth to the stars</b>
<b>Section 4</b>	<b>Social Studies:</b>	<b>Investigating the changing environment</b>
<b>Section 5</b>	<b>Life Skills:</b>	<b>Ways of managing conflict</b>
<b>Additional Resources:</b>		<ul style="list-style-type: none"><li>• <b>Group work in your classroom</b></li><li>• <b>Working with large/multigrade classes</b></li></ul>

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## Literacy: Ways of becoming a critical reader and writer

1. Developing skills to become a critical reader
2. Points of view
3. Reading advertisements critically

**Key question for the teacher:**

How can you develop students' critical thinking skills when reading and writing?

**Keywords:** critical reading; critical writing; point of view; questioning; assessment

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- Used questioning to help your students become critical readers of a range of texts;
- Assisted your students to design and write stories, information texts and letters that 'write back' to the texts they have read critically and so develop thinking skills;
- Used different ways of assessing learning.

## Overview

All writers – whether of political speeches, advertisements, newspaper or magazine articles, school or university textbooks, stories for children, or any other kind of text – write from a particular point of view and for particular reasons. It is important to be able to identify the point of view of a writer and to decide whether or not you agree with it.

Thinking about your own experiences and beliefs, and about what you have learned from your studies, can help you to ask critical questions about anything you read. It will help you as a teacher to remember that your students may have different ideas that are just as valid as yours. If you teach your students to ask questions about what they read and to consider different points of view, you will be helping them to become critically informed citizens. You can start this even when they are very young. As you read stories to them, encourage them to discuss what they agree or disagree with.

The three activities in this section are all examples of ways to help your students become critical readers and writers of texts.

## 1 Developing skills to become a critical reader

When you and your students are reading stories, you can help them to notice who is included in stories and how they are included, and also who is excluded. You can help them to notice how the settings of stories (a school, a village, a town, etc.) are described. You can also help students to understand the attitude or point of view of the writer, to consider whether there could be other points of view and, if so, what these might be.

When you do this with students, you are helping them develop their thinking skills and their skills as critical questioners. You will also learn what students are interested in and what their points of view are. You can use this to plan to meet their needs more.

### Teaching Example 1

Mrs Pinkie Motau in Soweto, South Africa, has three boxes of storybooks in her classroom. Sometimes she reads these books to her Grade 4 class and sometimes they read by themselves. The stories are about children and families, about animals or about imaginary creatures such as dragons.

One day, when she was reading a story about a crocodile, Sizwe said he felt sorry for the crocodile because he was always the 'bad' one in the stories. Mrs Motau asked the class whether they agreed. Most agreed that the crocodile was always 'bad'. Some said this was fine because crocodiles are dangerous, but others said this wasn't fair because crocodiles have to look after themselves just like other animals do. This gave Mrs Motau an idea. She asked the class to suggest how the story could be told from the crocodile's point of view. The students were quite puzzled, so she said, 'Imagine that you are the crocodile in this story. What would you like to tell the other animals about yourself?' This question helped students to make suggestions. After some class discussion, Mrs Motau asked students to work in groups of five to write and draw a story in which the crocodile is a 'good' character. By sharing ideas they wrote and illustrated some very imaginative stories.

While Mrs Motau was reading the stories, she thought about what the words and the drawings told her about her students' abilities to imagine a story from the crocodile's point of view. The next day, she read each group's story aloud and showed the illustrations. After reading each story, she told the whole class what she thought the group had achieved and she also asked students to comment on each other's writing and drawing.

Finally, the stories were made into a book for the class library.

## Activity 1

- Find a story in which the characters, setting and events are written and illustrated from a particular point of view (e.g. the 'good' animals; the parents of a naughty child).
- Read this story to the class, making sure to show students the illustrations.
- Ask some questions that encourage them to think critically about how the story has been written and illustrated.
- Next, help your students work in pairs to write a letter to the author, in which they explain what they like/do not like about the way the story they have just read is written and illustrated. This could include the plot, the ending, the characters or specific scenes. Write an outline of the letter on the chalkboard and discuss.

### Outline of a letter to an author

The author could be a student in your class. If you have shared books with another class, the author could be that class or a student in that class.

Dear .....

We have just read ..... (title of story) in our class. We thought you might like to know what we think about this story.

Firstly, we like ..... (one or two sentences here). We like this because ..... (students write their reason).

We also like ..... (one or two sentences here). We enjoyed this because ..... (students write their reason).

However, we did not like ..... (one or two sentences here). We did not like this because ..... (students write their reason).

When you write another story we hope you will ..... (students make suggestions).

Yours sincerely

(Name of the class)

**What did students achieve in these critical reading and writing lessons?**

**How do you know this? What evidence do you have?**

**Did they do anything that surprised you, pleased you or disappointed you?**

**Is there anything you would do differently if you were teaching these lessons again?**



## 2 Point of view

All stories are told from a particular point of view. Our views as writers and readers may be influenced by whether we are young or old, male or female, belong to a particular political party, practise a particular religion, enjoy particular activities, have good or poor health, are employed or unemployed, etc. It is important for students to learn that stories can be told in different ways to include or exclude different points of view. It is also true in real life that there is more than one way to view an issue and lots of ways to solve problems.

You can help students to learn this by giving them opportunities to tell the same or similar story from different points of view or by modifying the story.

### Teaching Example 2

James, one of the students in Mrs Fortunate Mabuso's Standard 6 class, had been badly injured in a car accident and could only walk with crutches. One day, he told Mrs Mabuso that he felt sad because all the stories about boys in their English textbook described how these boys enjoyed doing things that he couldn't do. Mrs Mabuso felt very upset because she had not thought about this. She asked James what he did when he was at home and found out that he was a skilled musician who played both drums and a tin flute. She asked him if he would play his instruments for the class. He was a bit shy about this but finally said he would.

In their next English lesson, Mrs Mabuso told the class that she wanted to give them some ideas for writing a story. She asked James to play some music for them. The students were surprised and delighted by James's skills. Mrs Mabuso asked them to imagine a story in which James, the musician, was the main character. They shared ideas as a whole class and then worked in pairs to begin writing and/or drawing a story.

During the lesson, some students went to James and his partner to ask advice on details for their stories. In the next lesson, the pairs continued their discussion and wrote and drew their individual stories.

While Mrs Mabuso was reading the stories, she realised that there were other students in the class who probably felt 'left out' of the stories in the textbooks and the class storybooks. She started to plan ways of giving recognition to these students, too.

### Activity 2

- Use the same story as in **Activity 1** or another one you have selected.
- Read it with students and discuss how it could be told in a different way. For example, new characters could be added or some existing characters could behave in different ways. In a family story, a father could stay at home and cook while the mother works at a garage. The family could include a child or adult with a physical or mental disability.

- Ask students to work in small groups to write and/or draw different versions of the story you have just read with them. Move round the class, noticing what students are enjoying. If any group is having problems, give suggestions.
- When the groups have finished, ask one student from each group to read the new story to the class and to show the drawings. Collect the stories for assessment.
- You could 'publish' the stories in a book for the class library or display them in the classroom.

What do the stories tell you about students' ideas and about their stages of writing development?

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### 3 Reading advertisements critically

Advertisements on billboards, radio, television and computer screens, in newspapers and magazines, at the supermarket or in 'junk mail' in our letter boxes, try to get us to act in particular ways – usually to spend money. It is important for you and your students to understand how advertisements try to do this by reading them critically in order to appreciate how clever some advertisements can be.

Students' responses to the **Activity 3** below will show you whether or not they have begun to understand how to read advertisements critically.

#### Teaching Example 3

When Mrs Stella Mapuga participated in a teacher development programme, she was fascinated by the programme's critical literacy activities. She and her colleagues compared advertisements for the same product in magazines for different readerships (younger or older, or from different 'racial' or socio-economic groups). They discovered that the pictures and words used to advertise a product were different in different magazines and that some products were advertised in only one of the magazines. The teachers looked at the language used by the advertisers. They also looked at photographs or drawings in advertisements. A friend of Stella's complained that all the women were young and had perfect figures! Finally, they discussed how the advertisers combined words and pictures on the page and what they (the teachers) noticed first when they looked at the advertisements.

When their lecturer asked what they had learned, the teachers said they would look at advertisements much more critically in future. They had learned that designers of advertisements choose words and pictures to encourage readers to buy the product. These designers also choose different sizes of words and pictures and place them on the page in ways that encourage readers to notice some words or pictures more than others. Some teachers said they looked forward to showing their students how advertisements try to persuade readers to take some action – very often the action of buying – and encouraging them to be selective.

### Activity 3

Prepare for this activity and introduce it to students by following the steps in the box that follows titled: 'Critical reading of advertisements'. You need to collect together advertisements or write out some that you have seen in the local shop or market.

Give the advertisements to the groups and ask them to discuss the following questions:

1. What is being advertised?
2. Who do the advertisers hope will buy this product or service?
3. How do they try to 'sell' the product or service? Refer to the list on the chalkboard for ideas.
4. Who is being left out and being excluded of this advertisement?
5. What questions would you like to ask the advertisers?

After 15 minutes or so, ask a few groups to feed back their answers.

For homework, ask students to find an advertisement, place it in their exercise books and write answers to the same questions (1–5) about it.

After you have assessed their homework, plan and teach another lesson in which students design and make their own advertisements. See the information on designing advertisements for suggestions about how to do the assessment and planning.

#### Critical reading of advertisements

This list below is directed at reading advertisements more critically but can be adapted to be used to read other kinds of texts like poetry, pictures or letters from people with an interest in the school e.g. district education office.

The criteria and questions you ask might be adapted because of this to suit the context more but will still help students read for deeper meaning.

- Collect or write out enough advertisements from magazines, newspapers, supermarket flyers, local markets etc. for each group of four students in your class to have at least one example to work with.
- Before giving these to the groups, ask students to talk to a partner about what it means to advertise something and how they would advertise their school to families who might wish to enrol their children at the school.
- Ask a few students to tell the whole class what they have discussed. Then ask students to suggest what advertisers do to make their product attractive to customers.
- Write their suggestions on the chalkboard.

*Adapted from: Focus on English, Grade 10*

**Designing advertisements****Assessment of students' responses to questions about advertisement**

Use these questions to respond to each student's work:

1. Is there evidence that the student understood the task? For example, the student has/has not chosen an advertisement; the student has/has not attempted to answer the questions.
2. Which question(s) has the student answered most successfully?  
What is the evidence that the answer(s) is/are successful?
3. Which question(s) has the student answered inadequately or incorrectly?  
What is missing from the answer(s) or what is incorrect in the answer(s)?

**The follow-up lesson**

- Return students' homework and make some general comments on what they did well and where they can improve
- Ask students to work in the same groups as in the lesson on answering questions
- Give each group a large sheet of paper and, if possible, some coloured crayons or paint and brushes.
- Ask them to imagine a new product (e.g. a new kind of food, vehicle, household appliance, item of clothing) and to plan how they would draw and write an advertisement for it. They should think about the questions they answered in the previous activity.
- Tell them to design and make an advertisement for this new product.

This activity may take more than one lesson. When the groups have completed their advertisements, display them and have a discussion about what the students think is well done and what could be improved in each one. (When you assess these group advertisements, look for evidence of creativity/imagination, ability to combine words and images in interesting ways and ability to persuade a reader to buy the product).

# Numeracy: Teaching transformations

## 1 Planning a lesson in geometry

## 2 Investigating translations

## 3 Reflections

### Key question for the teacher:

How can you develop confident mental modelling in Geometry?

**Keywords:** congruence; translation; reflection; transformation; multi-grade; differentiation; practical.

### Learning Outcomes for Teachers:

By the end of this section, you will have:

- Introduced students to transformation, congruence; translation and reflection;
- Used cut-out shapes as a means to develop the mental transformation of geometric shapes;
- Considered the challenges of differentiating this work for older and younger students, and tries some different approaches

## Overview

In our daily lives we see many examples of shapes that have been modified (changed) or transformed.

This section will help you develop your own subject knowledge about geometry and transformation, as well as your skills in developing your students' understanding. Most of the resources in this section, therefore, are to support your subject knowledge as a teacher of mathematics.

## 1 Planning a lesson in Geometry

In Geometry, 'transformation' means altering some geometric property of a shape, (such as rotating it or moving its position on the page) while keeping other properties of the shape the same (we say the shapes are 'congruent').

An excellent way for students to model transformation is by using physical objects or looking at shapes in everyday life and how they are transformed e.g. in fabric patterns. While students are doing this, encourage them to talk with you and each other about what they are doing. Talking about how they are trying to manipulate the objects will improve their understanding of Geometry and the language associated with it.

### Teaching Example 1

Mrs Ogola, a teacher in a primary school in Masindi, Uganda, was discussing her experience in teaching Geometry to her students with a senior associate, Mrs Mwanga. She found that students do not like this topic. Her students complained that Geometry is very abstract, requiring much imagination. Apart from that, it bears little or no relation to real life. Therefore, she herself was not always enthusiastic about teaching it.

Mrs Mwanga admitted to similar experiences, but encouraged her to try using a practical investigative approach and to encourage her students to talk about what they were doing. Together they planned a lesson in which students would carry out step-by-step activities using samples of fabrics with patterns that contain translations and variations of shapes. This can lead to students discovering the concepts to be learned themselves.

Mrs Mwanga and Mrs Ogola both taught the lesson to their classes and then met afterwards to discuss how it went. Mrs Ogola was surprised at the level of her students' thinking and how much they wanted to talk about what they were doing. Mrs Mwanga agreed that allowing students to talk about their work not only excited them, but also gave them confidence in their ability to do mathematics.

### Activity 1

To complete this activity, you will need a piece of cardboard and a pencil and ruler for each pair or small group of students, and several pairs of scissors.

- Ask your students to draw three different straight-sided shapes on their card and then cut out their shapes. They should number each of their cardboard shapes 1, 2 or 3.
- Next, on a separate piece of paper, ask your students to draw around each shape; then move the shapes any way they like without overlapping what they have already drawn, and draw round them again. Repeat this until the page is full of shapes, then label inside each outline with a letter (e.g. a, b, c...). (The finished work should be similar to the congruent shapes below.)

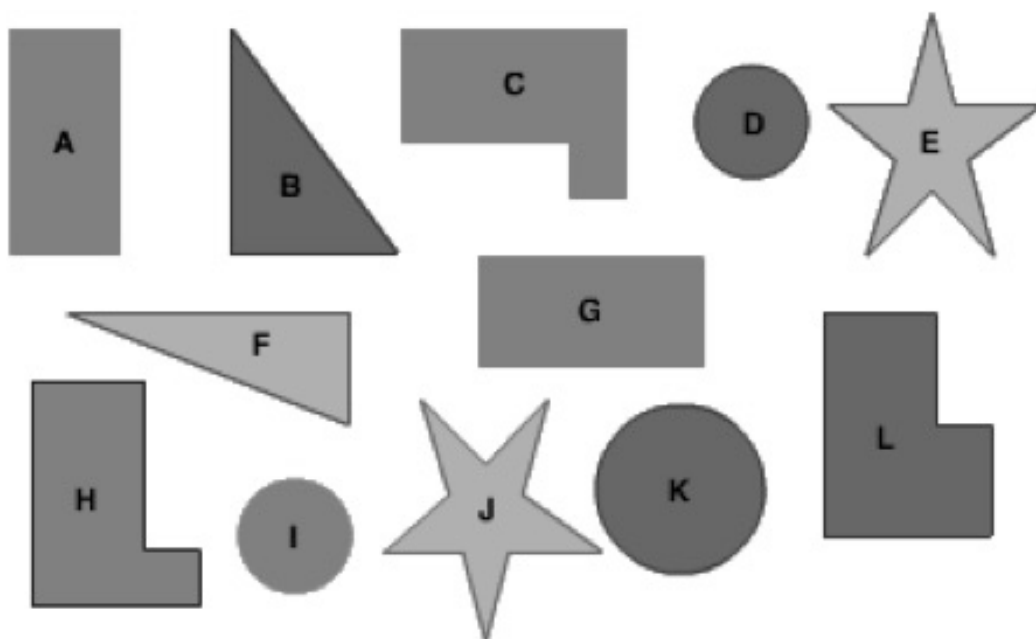
### Examples of congruent shapes

If two shapes are congruent, they are identical in both shape and size.



## Question

Which of the following shapes are congruent?



**Answers:**

- A and G
- D and I
- E and J
- C and H

Remember that shapes can be congruent even if one of them has been rotated (as in A and G) or reflected (as in C and H).

*Original Source: <http://www.bbc.co.uk/schools/>*

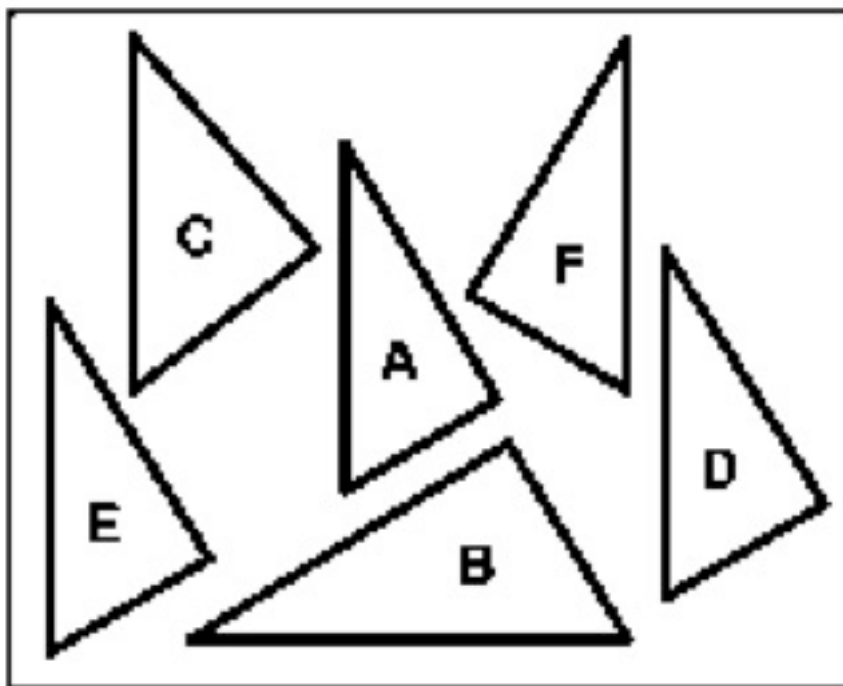
- Ask students to swap their work with another group. Can they find the outlines that were made with the same shape? (Younger children might need to use the cardboard shapes to help them.) Ask them to write down what they think is the answer – e.g. shape 1, outlines a, b, d, g.
- Using the cut-out shape, can they show you what has to happen in moving from one outline to another? Can they describe this in their own words?

Early finishers can colour in their work, using one colour for outlines from the same shape. You could display these on the classroom walls, headed 'Congruent shapes'.

## 2 Investigating translations

One of the simplest transformations is translation. To translate a shape, we simply move its position on the page, up or down, left or right, but do not change the shape in any other way. See the example of translations below.

Which of the following shapes are translations of triangle A?



**Answer: D and E are translations of triangle A.**

*Original Source: <http://www.bbc.co.uk/schools>*

Because translating a shape is simple, even very young students can grasp the idea, especially if they have physical shapes to manipulate. For older students, the activity can be made more challenging by using x-y coordinates and calculation, rather than manipulating physical shapes.

**Teaching Example 2** and **Activity 2** look at translation and how to differentiate tasks according to age and stage.



### Teaching Example 2

Mrs Kiboa teaches a multigrade class in which she has a group of older children who are doing well at mathematics. Feeling their current work had not been stretching them enough, Mrs Kiboa took an opportunity to let them enjoy a real challenge. (For more information on teaching multigrade classes, see the additional resource on **Working with large and/or multigrade classes**.)

Mrs Kiboa had already introduced x-y coordinates to the whole class. One day, while most of the class were working on a triangle translation activity using cut-out shapes, Mrs Kiboa gave these four students extra support.

Drawing a triangle with labelled x-y axes on some grid paper, she asked the students what the coordinates of the three corners (vertices) were – they answered easily, and wrote their answers down. Next, she asked them, ‘What would happen if I were to move the shape six spaces to the right? What would the new x-y coordinates be?’ When they had answered correctly, she went on: ‘And if I moved the shape 3 spaces down?’ Mrs Kiboa went on in this fashion until she felt the students clearly understood what was happening.

Next, she said to them, ‘Now, each of you set one another a problem – give coordinates for a triangle, and a translation to apply to the triangle. Write this down, then draw the triangle you have been set, calculate the translated coordinates, and draw the new position. If you do this correctly, you may then try shapes other than triangles to test each other with.’

The students enjoyed the respect of their teacher, as well as the opportunity to work more freely and to challenge each other mathematically.

### Activity 2

**Make sure students understand how to give x-y coordinates, through whole-class teaching. To differentiate the task for older or younger students, see the notes on differentiation in the ‘Translating and reflecting triangles’ section.**

- Ask students to draw and cut out a triangle, square and rectangle from a piece of squared paper: emphasise that each corner (or vertex) of their shapes should be at one of the ‘crosses’ on their grid paper by drawing an example on the board. No side should be more than 10 squares long.
- On a second piece of grid paper, ask students to draw and label x-y axes at least 20 squares long as shown in ‘Translating and reflecting triangles’.
- Putting one of their cut-out shapes on the paper so that its corners are on the ‘crosses’ of the grid, they should mark the vertices (a, b, c & d as appropriate), then draw the shape and write down the coordinates of each vertex.
- Ask them to move their shape to a new position (keeping it the same way up) and repeat this process.
- Ask your students: ‘What happens to the x coordinates between the two positions? Does the same thing happen to each coordinate? What happens to the y coordinates?’

**What parts of this activity caused difficulty for your students?**

**How will you support them next time?**

Translation is relatively simple, because it affects the coordinates of all vertices in the same way (for example, all x coordinates will increase or decrease by the same amount).

### 3 Reflection

Reflection is more mathematically complex, because you must treat each coordinate separately and in relation to another item – the location of the mirror line. Reflection therefore requires students to hold quite a number of different ideas in their minds at the same time.

Think about what familiar examples of reflection you might be able to use to help your students with this topic – perhaps some work you may have done on symmetry or patterns and designs in art using local traditional ideas. Consider how students could use cut-out shapes as they develop the ability to manipulate such shapes mentally.

In addition, this part suggests you continue to encourage students to discuss their thinking – an important key in unlocking their understanding of mathematics.

#### Teaching Example 3

Mrs Nkony, an experienced teacher in a primary school in Kilimanjaro, has taught the basics of reflection to her class. She now decides to help them discuss their activity and their findings.

She knows that discussion is not merely answering short, closed questions, so she decides to set up a structure to help discussion among her students. She arranges them into pairs. They are asked to look at each other's work, and make three observations about reflection that they will report back. For each observation, they must both be happy that they have found a way to describe or explain it as clearly as they can. When both members of the pair are in agreement that they have three clear observations, they are to put their hands up.

Mrs Nkony then puts the pairs together to make fours, asking each pair to explain their observations to the other. She then asks the fours to decide on the three best or most interesting observations to feed back to the class.

She realises that she could use this way of working in lessons other than mathematics. To find out what your students know and can do see the **additional resource on Assessing Learning**.

#### Activity 3

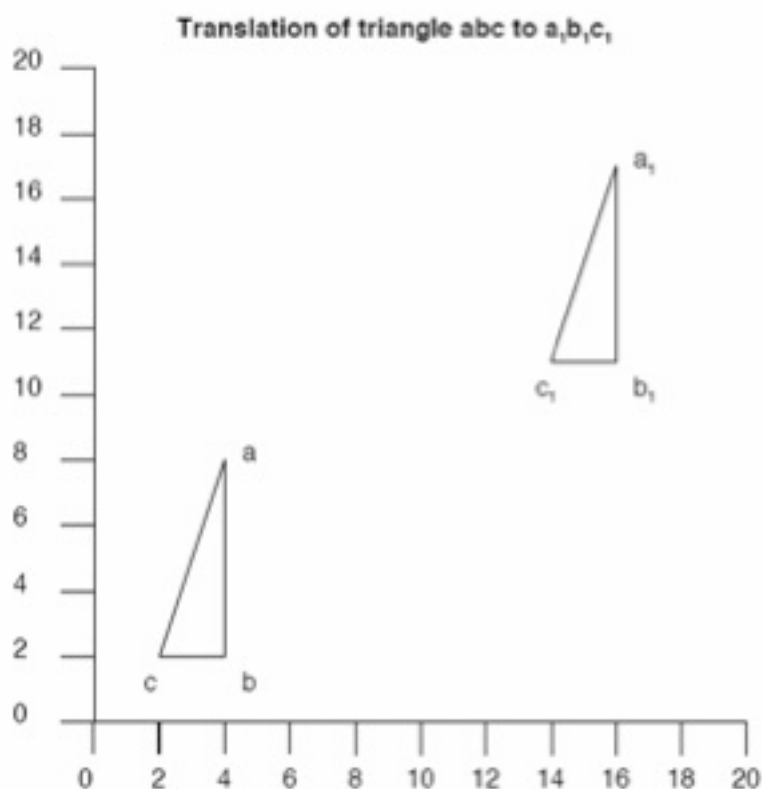
For this activity, your students could reuse the shapes they cut out of grid paper in Activity 2, or make some more if necessary.

- On a second piece of grid paper, ask students to draw and label x-y axes at least 20 squares long, as shown in the graph below.
- Putting one of their cut-out shapes on the paper so that its corners are on the 'crosses' of the grid, they should mark the vertices (a, b, c & d as appropriate) then draw the shape and write down the coordinates of each vertex (corner).
- Ask students to draw a vertical or horizontal mirror line on their grid. They should then draw the reflection of the shape on the other side of the mirror line (remind students that they may use the cut-out shape if it helps them) and write down the coordinates of the reflection.
- Challenge your students to work out the reflection coordinates without using the cut-out shape. Ask them to explain how they did it. Practise using lots of shapes so that students become confident.

**How well did you introduce and explain this work? How do you know this?**

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### Translating and reflecting triangles



x-y coordinates always give the 'x' (horizontal axis) value before the 'y' (vertical axis) value.

So, in the illustration, the x-y coordinates for abc:

a = 4, 8

b = 4, 2

c = 2, 2

The translation to  $a_1b_1c_1$  increases the value of  $x$  by 12, and  $y$  by 9. So:

$$a_1 = 16, 17$$

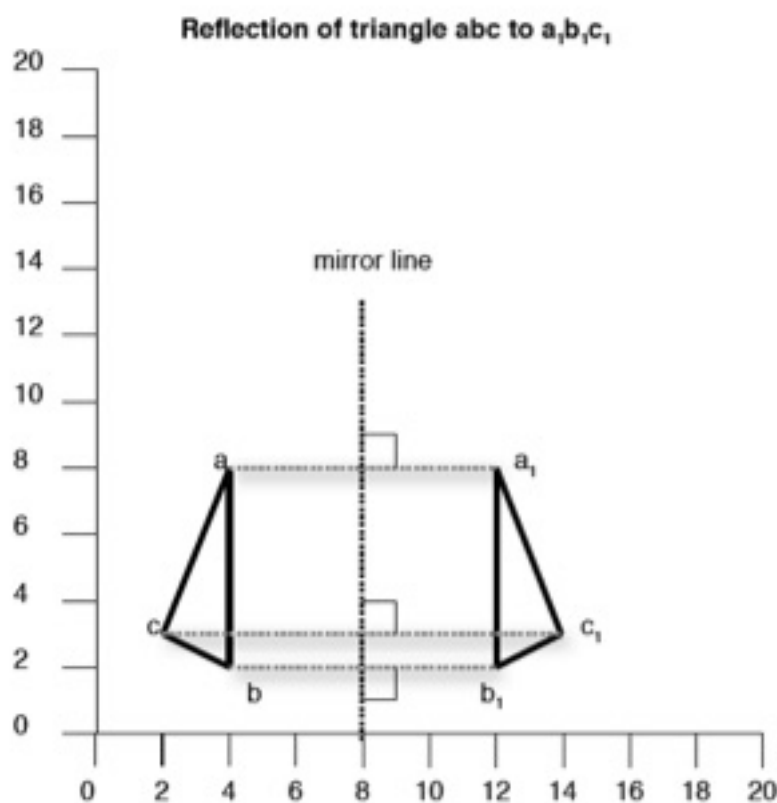
$$b_1 = 16, 11$$

$$c_1 = 14, 11$$

### Differentiation

This can be made simple, by moving a cut-out shape around the grid, drawing around it and recording the new coordinates.

This can be made more challenging by giving coordinates for a shape and asking students to draw the shape. Then say how a translation affects the  $x$ - $y$  values, and ask them to work out the new coordinates and redraw the position of the shape.



In the illustration, the  $x$ - $y$  coordinates for  $abc$  are:

$$a = 4, 8$$

$$b = 4, 2$$

$$c = 2, 3$$

Reflecting  $abc$  in a vertical 'mirror line' ( $x=8$ ) gives an image ( $a_1b_1c_1$ ) at new coordinates:

$$a_1 = 12, 8$$

$$b_1 = 12, 2$$

$$c_1 = 14, 3$$

**Note**

The object and its image are always at the same perpendicular distance (distance measured at right angles) from the mirror line, e.g. if 'a' is 4 squares from the mirror line, 'a<sub>1</sub>' must also be 4 squares from the mirror line.

Compare the x-y coordinates of abc and a<sub>1</sub>b<sub>1</sub>c<sub>1</sub> and observe that a vertical mirror line leaves the y coordinates unchanged.

Similarly, a horizontal mirror line would leave the x coordinates unchanged.

*Original Source: <http://www.bbc.co.uk/schools>*

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## Science: From Earth to the stars

1. Night and Day
2. The Moon
3. Modelling the solar system

### Key question for the teacher:

How can you use models to help students develop their understanding of the universe?

**Keywords:** models; storytelling; stimulation; sun; moon; solar system

### Learning Outcomes for Teachers:

By the end of this section, you will have:

- Used different models to help students develop their understanding of the Earth in space;
- Used brainstorming, observation and model building to explore students own ideas about the universe;
- Explored storytelling as a way of encouraging students in the study of space.

## Overview

What is meant by a year? What shape is the Earth? What do we mean by 'the sun rising'?

Helping students understand how their home, the Earth, fits into the wider environment of our solar system is not easy because hands-on experiences and visits are not possible. But we can use models to help our students understand the key scientific ideas.

This section aims to develop your skills in using models to explore night and day, the phases of the moon and our solar system. These teaching models include physical models (built out of everyday materials), diagrams and computer simulations to help your students understand the relative sizes, positions and movements of bodies in our solar system.

## 1 Night and Day

Students have their own ideas about the difference between night and day based on their experiences. These ideas do not always agree with the scientific understanding. For example, in everyday life, we talk about the sun rising or setting, which implies that it is the sun that moves and not the Earth. However, by using a simple model, it is possible to challenge and extend students' ideas and help them answer the question: 'Why do we have night and day?'

**Activity 1** provides a simple way of modelling night and day and **Teaching Example 1** explores further ideas. You might like to try the activity with your colleagues first, before trying it with students. This will test your understanding and help you decide the best way to use the model in your classroom.

### Teaching Example 1

Mrs Abdul, who works with Grade 6 students in a small rural school in Republic of the Sudan was exploring her students' ideas about night and day. For homework, she asked them to note down the answers they got when they asked friends, carers and other community members the following questions:

- Why does it get dark?
- How does night and day happen?
- How could you show this to others?

The next day, students reported back what they had found out.

Mrs Abdul showed them her way of modelling day and night. She used a candle as the sun and asked several students, in turn, to come up and be the Earth and turn round slowly. As they turned, she asked them when they could see the candle. Next, as they turned a second time, she asked them which was day and night and when was it dawn and sunset.

They talked about their ways of showing night and day and compared these with Mrs Abdul's day and night model and discussed how much their ideas matched.

Mrs Abdul was surprised at the number of questions the students asked about night and day, but also how the model helped them to understand what was happening.

### Activity 1

Working with the whole class, ask them to tell you what they know about how night and day happens. Accept and record each different idea and alongside each suggestion put the name of the person who suggested it. Once all the ideas are listed, ask the rest of the class to show, by raising their hands, which idea they support and put the number by the side.

Using the information below to help you, model day and night for the class.

#### Modelling night and day

Why do we get night and day?

You can use a simple model to help you find out the answer to this question.

#### You will need:

- a large ball to show the Earth
- a torch to show the sun

### Investigate

- Use the ball and torch to investigate why we get night and day – see below.
- Explain how your model shows the difference between night and day.

Ask students to talk with their neighbour about how they would now explain night and day, and record their ideas.

To assess their understanding, use day and night questions found below.

You might read out the questions or ask one student in each pair to read out the questions to their partner. Ask students to record their answers and then share the answers with them at the end.

### What do you think about the statements below?

Score each one according to the following scale. Then discuss your scoring with others.

I know it is true	1
I think it is true	2
I am not sure	3
I think it is wrong	4
I know it is wrong	5

1. At night, the moon blocks out the sun. (False)
2. The sun revolves around the Earth every 24 hours to give day and night. (False)
3. The atmosphere blocks the sun at night. (False)
4. At night, the planets get in the way of the sun. (False)
5. One half of the Earth has day, while the other half has night. (True)
6. The day and night cycle has something to do with the movement of the Earth. (True)
7. The Earth moves around the sun every 24 hours to give day and night. (False)
8. When we are facing the sun it is day and when we are facing away from the sun it is night. (True)
9. It is dark at night because clouds cover the sun. (False)
10. The Earth spins round once every 24 hours to give day and night. (True)
11. The moon is in a part of the sky where it is always night. (False)
12. The Earth turns around an imaginary line from the North to the South Pole once every day. (True)
13. The Earth spins on a line through the equator once every day. (False)
14. At night, the Earth turns to face the moon. (False)



## 2 The Moon

People sometimes refer to the moon when writing or speaking: they use expressions like ‘once in a blue moon’, ‘moonstruck’ and ‘harvest moon’. What expressions do you know that use the word ‘moon’? What expressions do your students know? You might make links with literacy work here.

In **Activity 2**, your students observe in detail the shape of the moon over several weeks. You then build on these observations by using everyday objects to model the changes in the moon shape. This will help students to understand the pattern in the phases of the moon. Try the model part of the activity yourself before using it with the class.

Using traditional tales about the sun and moon is another way to stimulate students’ interest. You could use your own traditional tale instead of the one used in **Teaching Example 2**.

### Teaching Example 2

Mr Lowassa decided to read a story to his Standard 2 class about the sun and moon to stimulate their interest before studying the moon as a science topic. He used the Sun, Moon and Water story, which talks about the sun and moon as being man and wife and living on Earth. His class enjoyed the story, especially as Mr Lowassa read it in a lively way, using different voices for the characters.

#### Sun, Moon and Water

Long ago, before humans first walked on the earth, the Sun and Moon lived together in Africa as man and wife.

The Sun’s greatest friend was Water, and he said to Water one day: “Here I am, visiting you again and yet not once have you ever visited me.”

“Ah” gurgled the Water, “I should love to visit you and to meet your lovely wife the Moon. But I’m afraid your house is too small for me and all those who come with me, as part of me, wherever I flow. You know the shellfish, the starfish and butterfly fish, the mackerel, the sharp-toothed shark and the mighty whale. Build yourself a huge kraal and I will visit you with pleasure, again and again.”

“That’s just what I’ll do,” said the Sun. And he set to work immediately and built a great collection of huts surrounded by a fence, a krall that stretched out in all directions as far as the eye could see.

When the vast krall was completed, the Sun sent his invitation to the Water. Soon he and his wife, the Moon, could see the Water coming. Miles away they could see him flowing in across the plains, making his way amongst the trees and hills until, at least, he swirled in about their ankles. “Here I am, dear Sun, so pleased to be here and to be meeting your wife. What a big and beautiful place you’ve built for me to visit you.”

Even as he spoke the Sun and Moon were knee-deep in the Water sparkling with fishes big and small. “Are you sure you’ve got room for us all?” bubbled the Water. “We’re not all here yet.”

“Certainly”, smiled the Sun. “Without a doubt,” beamed the Moon.

But as they said this Sun and Moon were perched on the highest part of their roof while the flying fishes flashed past them in the air.

“Are you sure you’ve got room for us all? gargled the Water, his voice almost lost as the whales crashed and blew. He could not have heard the Moon as she whispered fearfully, “I believe you’re filling our kraal to overflowing.”

“Nonsense” shouted the Sun, “There’s room for everyone.”

But there wasn’t. The Water was already lapping over the top of the roof and, to escape, the Sun and the Moon had to make a mighty leap high into the sky. Their leap carried them so far, that from the earth, the Sun looked no bigger than a small plum. And as they leapt up, the Moon said to the Sun, “I told you he was filling our kraal to overflowing!” These were the last words the Moon ever spoke on earth.

*Original source: Nevin T (1995), Fire’s Wild Dan*

After discussing the story, Mr Lowassa asked his class to tell him what the moon looks like in the sky. (He reminded the students never to look straight at the sun as it could damage their eyes.)

He drew their ideas and then showed them a model he had made of the phases of the moon to help them understand why the moon has different phases.

## Activity 2

Ask your class, if they can, to look at the moon in the evening when they go home and pay particular attention to its shape. The next day, ask students to draw the shape of the moon. Ask them if the moon is always this shape. If not, why not? If not, what other shapes does it take? Are they always the same? Is there a pattern to the shapes?

Set up a rota of students to look at the moon each night over several weeks and record its shape on the chart you have prepared for this task.

After a month, ask students to discuss and answer the following questions:

- How does the moon’s shape change in a week?
- How would you describe the shape(s) of the moon?
- Why does the shape change?

Next, help the students develop their understanding by modelling the phases of the moon using balls or mud to see how the moon appears to change shape. The background information below gives you further information on the moon.

### Background information for the teacher

The moon is a spherical body that is illuminated by the sun and reflects some of its light. But how is the moon placed in relation to the sun and the Earth, and how does it move?

We know that:

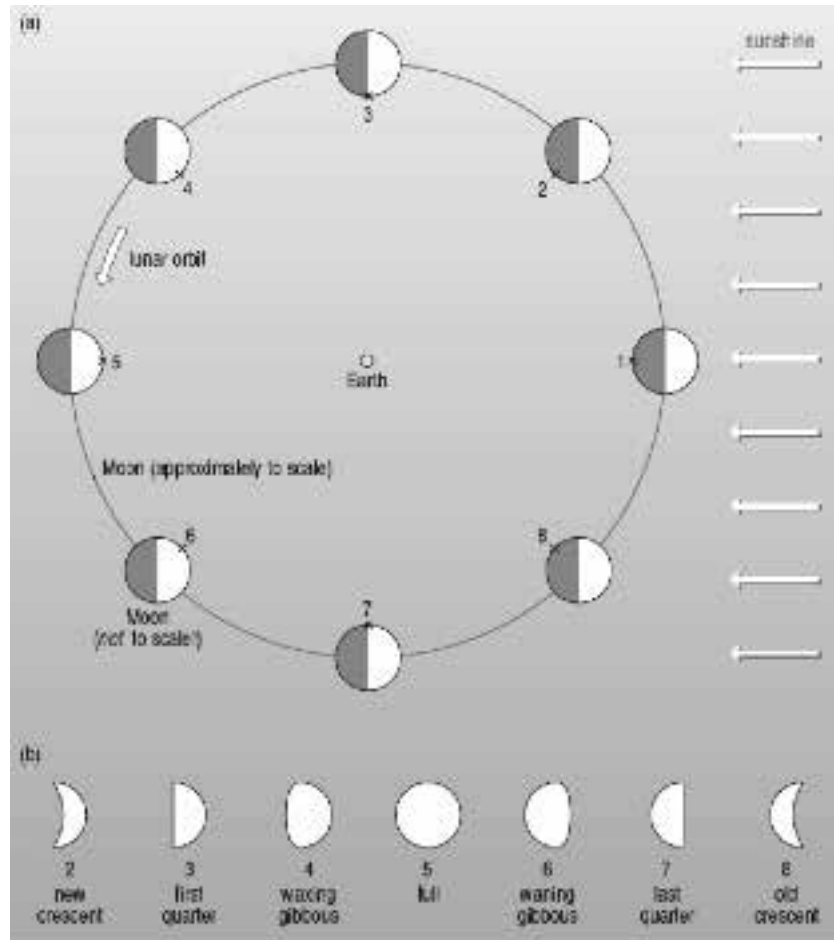
- the moon is visible at different times during the day and/or night;
- the time at which the moon is visible is closely related to the shape and size of its bright part (phases);
- the moon is much less bright than the sun and emits a negligible amount of heat;
- the complete cycle of lunar phases has a period of about 29.5 solar days;
- the moon is visible, albeit at different times, for some part of each solar day (provided that it is not hidden by clouds);
- the moon shows the same face to the Earth at all times;
- the moon is always of the same apparent size;
- the apparent size of the moon is about the same as that of the sun;
- eclipses of the moon occur relatively rarely (no more than twice a year).

### Commentary

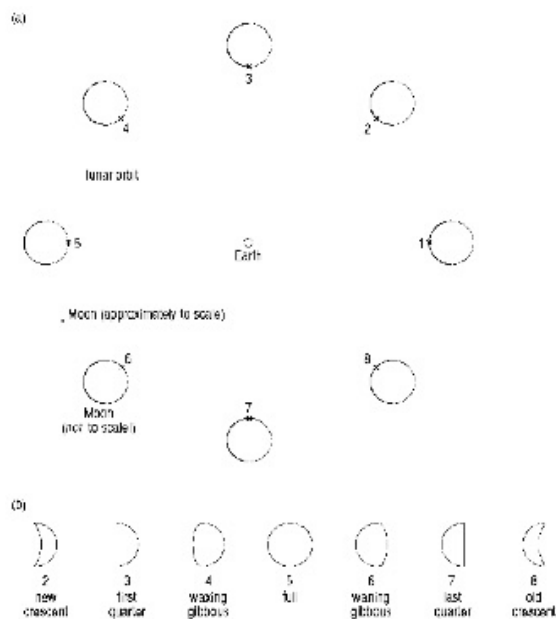
The diagram on the next page will help you to make sense of how the moon moves around the Earth. It shows how we only see different-sized bits of the moon at different stages in its orbit. It shows how the phases of the moon arise from its orbit around the Earth. The time between occurrences of the same phase (e.g. full) is, on average, 29.5 days.

You will see that the moon always presents the same face to the Earth: the moon rotates on its axis in the same time that it orbits the Earth, and in the same direction. Moreover, whenever you see a full moon, everyone else on the same side of the Earth will also see a full moon. This applies to a new moon and to every other phase of the moon as well.

**Please note:** You will need to reverse the sequence in the diagram for the southern hemisphere.



Person on earth sees everything inside the circle  
Moon number 1 = New Moon



Part of the moon illuminated  
by the Sun

Part of the moon in darknes

### 3 Modelling the solar system

People have always been fascinated by space. Most students are interested in space, and the night sky is their first realisation that there is more beyond our world.

Exploring the solar system cannot be done through school visits. But by using books, telescopes, computers, the Internet and models, you can show the vastness and detail of the solar system to your students. The size is something students find hard to grasp, but making a scale model of the solar system will help.

In **Teaching Example 3**, a teacher uses a simulation on the computer, one kind of model, to help develop students' understanding. The Teaching Example shows how the teacher allowed each group of students a turn on the computer and the rest of the class worked on a different but related activity.

In the **Activity 3**, your students use models to show the arrangement of the planets. You could extend the model of the solar system by asking students to find out how long it takes for each planet to orbit the sun and to turn on its axis (day and night).

Afterwards, reflect on the activity. How did your students react to building models? Do you think the models helped them to understand more about the solar system? Could you use models in another topic – what about building models to show particles?

#### Teaching Example 3

Mrs Mucaba was working with her Standard 5 class of 46 students in Usangi Primary School exploring the solar system. She had downloaded from the Internet onto the school computer a simulation model of the orbits of the sun, Earth and moon. She wanted her students to find answers for some of the questions that they had asked about the sun, Earth, moon and other planets. The questions were listed on a sheet by the side of the computer and the groups of four/five students had to try and answer these as they looked at the simulation.

The rest of the class were writing poems about their feelings about being part of the solar system, which they had discussed as a whole class at the beginning of the lesson.

#### Activity 3

Start with a class brainstorm on the solar system. (See the Additional Resource on **Using mind maps and brainstorming to explore ideas.**) Record all their ideas and questions about the planets, sun, moons and so on.

Share with your students the information on the planets. Ask the students to work in pairs to draw a diagram showing each planet in order, giving some indication of the size of each planet. Each pair then shares their diagram with another pair to check their answers.

Ask each group of four students to make a model, using clay and mud, of one planet. If you have access to books and/or the Internet use these to give more information. Try to make sure the models are all to the same scale.



Then, use these model planets to build a model of the solar system. You will need to go outside to place their models in order. The table below contains hints on the sizes and positions of the planets in the model.

Finally, plan an assembly with your class. They should show their model and tell the rest of the school what they have found out about the solar system.

PLANET	REPRESENTED BY	DISTANCE FROM 'SUN'	FOR YOUR MODEL *
MERCURY	1 mm poppy seed	12 metres	12 centimetres
VENUS	3 mm pinhead	23 metres	23 centimetres
EARTH	3 mm pinhead	30 metres	30 centimetres
MARS	1.5 mm mustard seed	50 metres	50 centimetres
JUPITER	30 mm ball	167 metres	1.67 metres
SATURN	30 mm ball	300 metres	3 metres
URANUS	10 mm marble	600 metres	6 metres
NEPTUNE	10 mm marble	900 metres	9 metres
PLUTO	1 mm poppy seed	1.25 kilometres	12.5 metres

## Social Studies: Investigating the changing environment

### 1 Local resources

### 2 Pollution

### 3 Global Warming

#### Key question for the teacher:

How can you raise students' awareness of the issues of resources and pollution in the environment?

**Keywords:** environment; group investigations; fieldwork; resources; global warming; pollution

#### Learning Outcomes for Teachers:

By the end of this section, you will have:

- Used different strategies to raise awareness of pollution and climate change;
- Used an investigative approach to help students understand the effects of pollution;
- Used group work and simple fieldwork to develop young students' understanding of local resources

## Overview

Developing an appreciation in your students of their local environment and the need to preserve and protect it is important if they are to understand their responsibility to care for their environment. This section aims to help you to structure lessons and activities that will link care of the local environment to worldwide problems of pollution and weather change. To support your students, you should read about environmental issues as this will provide ideas for lessons and keep you up to date on key ideas.

By investigating issues such as pollution in real-life situations and by conducting experiments, your students will enjoy learning, as they are actively involved in activities that have meaning for them.

## 1 Local resources

What do your students know about local resources? This part looks at raising your students' awareness of natural resources – particularly plant resources – that are found in their local area.

A good way to do this is to bring in local experts to talk, as in **Teaching Example 1**. Experts bring a specialised knowledge from which both you and your students can learn. Using experts also makes learning exciting because it is different.

In **Activity 1**, you heighten your students' awareness of their local environment through field trips in which they are actively involved in gathering data. (If you are working in an urban area, or it is not safe to let your students walk out near the school, you could change the activity to look at food in the market. Ask students to each name five foods from plants and to try to find out where the food was grown.)

### Teaching Example 1

Mrs Hlungwane teaches in Hoxane Primary School in Limpopo Province in South Africa and wants her students to develop their understanding of their own environment and its natural resources. She has read about local expertise and knowledge regarding medicinal plants, and thinks looking at local plants, including those used for healing, might be a good way to extend the idea of resources from **Section 2**. She decides to contact the seven local plant experts who live near the school and invites them to come and be interviewed by her students. They agree to bring some of the important plants growing in the area to show the students.

Mrs Hlungwane divides the class into groups, each to interview one of the visitors. She discusses with her students the importance of showing respect. Together they draw up a list of questions to ask. She suggests that they find out the following three things about each plant:

- what it is called;
- where it grows around the village;
- its food or medicinal properties.

Afterwards, having thanked their visitors and said farewell to them, each group reports back and Mrs Hlungwane writes this information on the chalkboard in three columns:

- Plants that I find near the school
- Is this plant cultivated?
- Do we use this plant? If yes, how do we use it?





PLANT SURVEY		
Plants that I find near the school	Is this plant cultivated?	Do we use this plant? If yes, how do we use it?
Maize	Yes	Food
Thorn tree	No	A handle for a hoe
Rose	Yes	No
Mango Tree	Yes	Food
Eucalyptus Tree	Yes	Decorating
Nim Tree	No	Medicinal
Acacia	Yes	Firewood and charcoal

Next, they discuss how to protect these plants, as they are an important resource for the community. They decide that learning to identify the plants so that they do not pick them is important. Also, that they should not trample them or damage the locality where they grow.

Finally, Mrs Hlungwane asks the students, in groups, to make posters of the main plants, showing the uses of each plant and where it grows.

### Activity 1

- The table will help students focus on exactly what you want them to do.
- Ask each student to draw a table to record their observations. Draw the table on the board for them to copy.

Plant name	Where does it grow?	Do we use this plant? How?

- Send them out in pairs into the area surrounding the school for say 30 minutes and ask them to fill in at least five lines of the table. Walk around with your students and support them as they work.
- If students don't know the names of plants, encourage them to describe and/or draw them for later identification.
- When they return to class, draw a big version of the table on the board.
- Go around the class and fill in all the students' findings on the big table.

Ask the students what they have discovered from today's lesson about the natural environment and the kinds of resources it provides for the community.

## 2 Pollution

Because our natural environment can provide us with our livelihoods, you need to encourage your students to think about how to preserve the environment so that it continues to provide what we need.

To start your students thinking about the damage that is being done to the environment, you can actually show them the harmful effects of pollution. This is what the teacher in **Teaching Example 2** does with her class. **Activity 2** shows another way – conducting an experiment to show the effects of polluted water or lack of water on the growth of plants. Once your students can see the damage done by pollution, they will be in a better position to develop positive and proactive attitudes towards protecting and caring for the environment.

### Teaching Example 2

*Mamadou Tanle, the Class 6 teacher in the Wa Catholic School, wants to develop her students' awareness of the harmful effects of water pollution. She realises that she can do this by taking them on a field trip to the local river, which is littered with rubbish.*

*At the river, she asks them to make a list of everything they can find that is polluting the water. Once the students have done this, they sit on the riverbank and Mamadou asks them a series of questions to encourage them to think beyond what they see. For example, she asks them: 'How many people rely on this river as a water supply?' 'What would happen to all those people if the water from the river is contaminated?' 'What do they use this water for?'*

Back in class, she asks each group to develop a strategy to help clean up the river and its surroundings. As she moves around, listening and helping, she is excited by the plans that they are coming up with. Ideas include involving the community and the school to combat pollution, not only at the river, but in other areas of the village as well. Mamadou feels she has achieved her aim of developing an awareness of the harmful effects of water pollution, and is pleased that she has encouraged an attitude of community-mindedness in her students as well.

Note: When planning field trips a teacher needs to be conscious of the culture/religion of the immediate environment. Field trips should not be undertaken to sacred places within the community if there is a taboo. In areas where students have to attend the secular schools and Koranic schools, the teacher must ensure that the students come back in good time to enable them to attend the Koranic schools.

### Activity 2

- Try this activity yourself beforehand so you can help your students.
- Ask your students to set up the experiment, which will run over five days, described below.



**Maize seed experiment****Equipment:**

- three saucers, labelled 1, 2, 3
- soil
- three maize seeds
- water
- paraffin

**Method:** On a Monday, set up three numbered saucers, each with its own maize seed buried in some soil.

Put water on saucers 1 and 2, and paraffin on saucer 3.

Each day for a week, put water on 1, do not put anything more on 2, put paraffin on 3.

**Predictions:** What do you believe will happen to the seeds over the next five days?

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- Then ask each student to write down their predictions of what will happen to each seed over the five days.
- Ask them to check the progress of the three maize seeds every day.
- Students should make a formal record of their daily observations. You should also participate by making and recording observations of your own.
- On the fifth day, hold a detailed discussion with students about whether or not their predictions have been fulfilled. What has happened to each maize seed?



**Observations:**

	1	2	3
Day 1:			
Day 2:			
Day 3:			
Day 4:			
Day 5:			

**Conclusions:**

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Discuss the implications of the experiment in terms of pollution. Can you and your students think of other experiments to do around pollution?

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### 3 Global Warming

Most students are interested in what is happening around them and using local resources such as newspapers or radio can help to enhance your lessons.

The purpose of **Activity 3** is to encourage students to think about how global weather changes can affect their local context, and to introduce them to the idea of global warming as a possible explanation of changes in the weather. In **Teaching Example 3**, the teacher used local news items as a starting point for teaching about the water cycle.

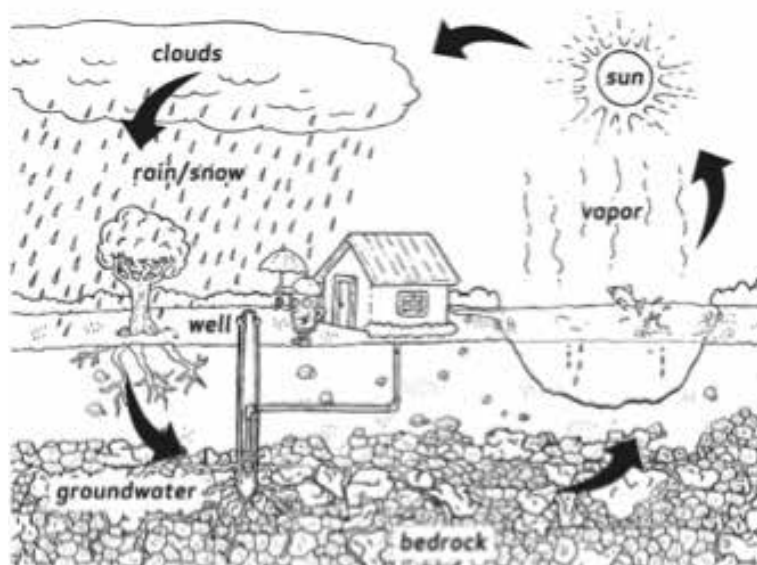
Once students are able to see the links between events, you are beginning to develop their critical thinking skills. Such insights will help them to make sense of the ever-changing world that they live in.

#### Teaching Example 3

There had been lots of discussion about water in the local newspapers over the past week. Water restrictions had been introduced. The Kanji dam was running dry. There was crop failure in the north of the country.

Idrissu Mahama saw the opportunity to discuss issues about water supply with his class. He wrote this question on the board: 'Where does all the rain go when the ground dries?' and he then asked each group of students to talk about this for ten minutes. During this time, he went around the groups and encouraged everyone in each group to contribute their ideas.

Then Idrissu gathered his class round him and asked them to take turns to share their ideas. Together the class build up the understanding of the water cycle which is illustrated below.



Original source: <http://www.epa.gov/safewater>

Idrissu finished by drawing a diagram of the water cycle on the board and asking students to copy the diagram and label it.

### Activity 3

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Read the article below before the lesson.

Divide the class into small groups and then read the articles to the class or give each group a copy to read together.

Ask each group to produce a poster or a short play to answer the following:

- What causes global warming?
- What effects will global warming have on the environment?
- What could we do to slow down global warming?

How will you ask students to evaluate their work?

You may want to share your students' work on global warming with the school in an assembly.

#### Global warming articles

##### Article 1

Global warming is causing a set of changes to the Earth's climate, or long-term weather patterns, that varies from place to place. As the Earth spins each day, the new heat swirls with it, picking up moisture over the oceans, rising here, settling there. It is changing the rhythms of climate that all living things have come to rely upon.

What will we do to slow this warming? How will we cope with the changes we've already set into motion? While we struggle to figure it all out, the face of the Earth as we know it – coasts, forests, farms and snow-capped mountains – hangs in the balance.

##### Greenhouse effect

The 'greenhouse effect' is the warming that happens when certain gases in the Earth's atmosphere trap heat. These gases let in light but, like the glass walls of a greenhouse, keep heat from escaping.

First, sunlight shines onto the Earth's surface, where it is absorbed and then radiates back into the atmosphere as heat. In the atmosphere, greenhouse gases (GHGs) trap some of this heat, and the rest escapes into space. The more GHGs there are in the atmosphere, the more heat gets trapped.

Scientists have known about the greenhouse effect since 1824, and have calculated that the Earth would be much colder if it had no atmosphere. This greenhouse effect is what keeps the Earth's climate habitable. Without it, the Earth's surface would be an average of about 60 °F/ 16C cooler. Humans can enhance the greenhouse effect by making carbon dioxide, a GHG.

Levels of GHGs have gone up and down over the Earth's history, but they have been fairly constant for the past few thousand years. Global average temperatures have stayed fairly constant over that time as well, until recently. Through the burning of fossil fuels and other GHG emissions, humans are enhancing the greenhouse effect and warming Earth.

Scientists often use the term 'climate change' instead of global warming. This is because as the Earth's average temperature climbs, winds and ocean currents move heat around the globe in ways that can cool some areas, warm others, and change the amount of rain and snow falling. As a result, the climate changes differently in different areas.

### **Aren't temperature changes natural?**

The average global temperature and concentrations of carbon dioxide (one of the major GHGs) have fluctuated on a cycle of hundreds of thousands of years as the Earth's position relative to the sun has varied. As a result, ice ages have come and gone.

However, for thousands of years now, emissions of GHGs to the atmosphere have been balanced out by GHGs that are naturally absorbed. As a result, GHG concentrations and temperature have been fairly stable. This stability has allowed human civilisation to develop within a consistent climate.

Occasionally, other factors briefly influence global temperatures. Volcanic eruptions, for example, emit particles that temporarily cool the Earth's surface. But these have no lasting effect beyond a few years.

Now, humans have increased the amount of carbon dioxide in the atmosphere by more than a third since the industrial revolution. Changes this large have historically taken thousands of years, but are now happening over the course of decades.

### **Why is this a concern?**

The rapid rise in GHGs is a problem because it is changing the climate faster than some living things may be able to adapt. Also, a new and more unpredictable climate poses unique challenges to all life.

Historically, Earth's climate has regularly shifted back and forth between temperatures like those we see today and temperatures cold enough that large sheets of ice covered much of North America and Europe. The difference between average global temperatures today and during those ice ages is only about 5 °C (9 °F), and these swings happen slowly, over hundreds of thousands of years.

Now, with concentrations of GHGs rising, Earth's remaining ice sheets (such as Greenland and Antarctica) are starting to melt too. The extra water could potentially raise sea levels significantly.

The climate can change in unexpected ways. In addition to sea levels rising, weather can become more extreme. This means more intense major storms, more rain followed by longer and drier droughts (a challenge for growing crops), changes in the ranges in which plants and animals can live, and loss of water supplies that have historically come from glaciers.

Scientists are already seeing some of these changes occurring more quickly than they had expected. 11 of the 12 hottest years since records became available occurred between 1995 and 2006.

**Article 2** looks at the impact of global warming in Africa.

The African continent is a rich mosaic of ecosystems, ranging from the snow and ice fields of Kilimanjaro to tropical rainforests to the Saharan desert.

Although it has the lowest per capita fossil energy use of any major world region, Africa may be the most vulnerable continent to climate change because widespread poverty limits countries' capabilities to adapt.

Signs of a changing climate in Africa have already emerged: spreading disease and melting glaciers in the mountains, warming temperatures in drought-prone areas, and sea-level rise and coral bleaching along the coastlines.

The following show some related events:

**Cairo, Egypt – Warmest August on record, 1998.**

Temperatures reached 41°C (105.8°F) on August 6, 1998.

**Southern Africa – Warmest and driest decade on record, 1985–1995.**

Average temperature increased almost 0.56°C (1°F) over the past century.

**Senegal – Sea-level rise.**

Sea-level rise is causing the loss of coastal land at Rufisque, on the south coast of Senegal.

**Kenya – Mt Kenya's largest glacier disappearing.**

92% of the Lewis Glacier has melted in the past 100 years.

**World's oceans – Warming water.**

The world's oceans have experienced a net warming of 0.06°C (0.11°F) from the sea surface to a depth of 10,000 feet (3,000 m) over the past 35–45 years. More than half of the increase in heat content has occurred in the upper 1,000 feet (300 m), which has warmed by 0.31°C (0.56°F). Warming is occurring in all ocean basins and at much deeper depths than previously thought.

**Rwenzori Mountains, Uganda – Disappearing glaciers.**

Since the 1990s, glacier area has decreased by about 75%. The continent of Africa warmed by 0.5°C (0.9°F) during the past century, and the five warmest years in Africa have all occurred since 1988.

**Kenya – Deadly malaria outbreak, summer 1997.**

Hundreds of people died from malaria in the Kenyan highlands where the population had previously been unexposed.

**Tanzania – Malaria expands in mountains.**

Higher annual temperatures in the Usamabara Mountains have been linked to expanding malaria transmission.

**Indian Ocean, Persian Gulf, Seychelles Islands – Coral Reef bleaching.**

Includes Seychelles; Kenya; Reunion; Mauritius; Somalia; Madagascar; Maldives; Indonesia; Sri Lanka; Gulf of Thailand [Siam]; Andaman Islands; Malaysia; Oman; India; Cambodia.

**Kenya – Worst drought in 60 years, 2001.**

Over four million people were affected by a severely reduced harvest, weakened livestock and poor sanitary conditions.



**Lake Chad – Disappearing lake.**

The surface area of the lake has decreased from 9,650 sq mi (25,000 km<sup>2</sup>) in 1963 to 521 sq mi (1,350 km<sup>2</sup>) today. Modelling studies indicate the severe reduction results from a combination of reduced rainfall and increased demand for water for agricultural irrigation and other human needs.

**South Africa – Burning shores, January 2000.**

One of the driest Decembers on record and temperatures over 40°C (104°F) fuelled extensive fires along the coast in the Western Cape Province. The intensity of the fires was exacerbated by the presence of invasive vegetation species, some of which give off 300% more heat when burned compared to natural vegetation.

*Adapted from original source: <http://www.climatehotmap.org>*

## Life Skills: Ways of managing conflict

1. Family Conflict
2. Resolving conflict
3. Community conflicts

**Key question for the teacher:**

How can you manage conflict in your classroom and help students to manage disagreements?

**Keywords:** pair work; problem solving; family; managing conflict; community

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- Developed strategies for managing conflict within the classroom;
- Used pair work to identify different causes of conflicts and ways of resolving them;
- Used problem solving to resolve conflicts

## Overview

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Being able to manage differences of opinion and conflict effectively is important for us all. This section introduces the idea of conflict as it might be experienced within:

- the family in the home;
- the school and the classroom;
- the wider community.

We identify some causes of conflict and explore ways to manage it, as well as thinking about ways to avoid conflict in the first place.

As conflict in the class can have a negative effect on learning, you need to develop strategies to reduce conflict in the classroom and maintain an environment that is supportive of all your students.

# 1 Family Conflict

It is possible that your students will come across conflict within their families. They may have had disagreements with their brothers or sisters, or arguments with their parents. They may have witnessed arguments between other members of their family, including between their mother and father, and these may also be more than just arguments and have a physical aspect to them.

They may not be involved directly, but if students encounter conflict within the home, it can affect their schooling in several ways. It can damage their confidence and self-esteem, stop them from concentrating on their work and make them unhappy and depressed.

It is important for you to recognise this and offer support to your students. It might not always be appropriate for you to get involved in a family situation but, as their teacher, there are several things you can do to help the student cope in the classroom.

Firstly, you can make your classroom a conflict-free environment where students feel secure and confident. By establishing rules of behaviour to minimise conflict, students will feel happy and safe.

Secondly, you can provide emotional support to those students who come across conflict at home. This involves you being sensitive to their feelings and making sure they are surrounded by friends.

Thirdly, you can provide students with the skills to avoid conflict with each other, and to negotiate and stop conflicts between others. This can be a challenging task, but it is one that will help them in later life.

## Teaching Example 1

Mr Okitiki in South Africa decided to discuss the issue of family conflict with his students. He told a story similar to the one below.

### A family conflict

In the Kisongo family, the husband provided money for the family's needs each week. One day, Father had to explain to Mother that he did not have enough money to meet her needs. She did not want to listen. She stormed out of the room and slammed the door behind her.

The next morning, the atmosphere at home was tense, as Mother would not listen to Father's explanations. Father kept trying to explain to Mother why he did not have enough money, but she wouldn't listen.

After some time, Father urged the children to talk to Mother. This they did, asking her to be patient. She listened to them and agreed.

Mother listened carefully and came to understand why this week Father had not had enough money – he had needed to lend some to his brother to pay for his children's school fees.

When she heard this, she understood the problem. But in return, she asked that the family's food money be put to one side before anything be lent to others, and topped up a little to meet the rising cost of foodstuffs. Father agreed.

The tense atmosphere at home became relaxed and everyone left home for the day's activities feeling happy. Mother gave Father a hug and kiss. Father returned with a smile. Normal relations returned to the family.

*He asked his students to think about this story and identify what was the cause of the argument. He asked them to discuss, in groups, how the argument was resolved.*

After a few minutes, they talked about it in class. The students said the causes were:

- the habit of lending money being a problem;
- that Father didn't have enough money;
- that Mother wouldn't listen to him;
- that they were not communicating well with each other.

They decided that the solutions were found through:

- the children mediating between the parents;
- Mother listening to Father and hearing his explanations;
- Father listening to Mother and hearing her concerns;
- both hearing and understanding the other point of view.

After this, Mr Okitiki organised the children into groups of three to role-play negotiating in conflict situations. He was pleased with their role plays when each group presented them over the next week. Each role play was discussed by the class, and they learned a lot about ways to resolve conflicts.

## Activity 1

To find out what your students already know about conflict, brainstorm their ideas onto the board or a piece of newsprint. (See the resource on **Using mind maps and brainstorming to explore ideas.**)

Ask them to think of conflict situations they have found themselves in and, with a partner, think about the following questions:

- What do people quarrel about?
- What are the causes of quarrels?
- Do you fight sometimes?
- Who do you fight with?
- What do you fight about? Why?

- How does it make you feel? Why?
- How do you resolve your quarrels?

Encourage them to think about their own situations and behaviour. Ask the pairs to list different things they could do to avoid conflicts with friends or family.

Ask each pair in turn for one of their ideas and write these on the board. Go round each pair until all answers have been recorded.

Ask them: Which are the best ideas? How could they use them to avoid or resolve conflict?

When you have large groups of students together, you are going to have some conflicts between them occasionally. However, you can reduce the likelihood of conflict by working hard to provide a supportive environment for all students. If conflict does occur, it is best to tackle it as soon as possible. This is your responsibility as a teacher. Left unresolved, it can:

- cause a bad atmosphere;
- disrupt the studies of everybody in the room;
- make the classroom an unpleasant place to be.

Most of the time, any conflicts will be between your students, but you should also recognise that there may be a conflict between you and a student. Because of this, you need to make sure that the rules of good behaviour apply to you, too. How you discipline a student must be done with respect for the student as it is the behaviour that is not liked and not the individual student.

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## 2 Resolving Conflict

To reduce the likelihood of conflict, you must establish clear rules of behaviour in the classroom, covering social interaction as well as studying. If the students know to treat each other well, then they are less likely to fight.

You should also recognise the difference between students debating a point and actually quarrelling or fighting.

The easiest way to deal quickly with conflict is by separating those involved to different parts of the room. But you must also get to the bottom of any conflict. Ask the students to explain the reasons to you. Negotiate a solution between them.



### Teaching Example 2

Mrs Kweli has a class of Standard V students. One day, she had organised them into groups of five to do a reading and writing exercise.

She noticed that two children in one group were pushing each other. They did eventually stop, but they also stopped working together. This meant that the others in their group couldn't work properly either, as it was a group task. Also, children in the surrounding groups were distracted by the situation.

Mrs Kweli quickly finished the exercise and checked everybody's answers. Then she asked everybody to stand up, move around the class and make a new group. This way, she separated them without making a big fuss.

At the end of the class, she asked the two students to talk to her about their fight. She discovered that it was a problem over who should read the book. She referred them to the class rules about sharing, and explained why this was important for everybody.

She also said that they had disturbed other students, and that they should be careful. She asked them to make friends again, and to remember why they needed to share.

### Activity 2

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Help your students explore more about conflicts at school.

Ask them, in groups, to list the different types of conflict at school and to give an example of each.

Gather one example from each group and write it up on the board.

Ask each group to talk about one type of conflict, identifying:

- what causes it;
- how it could be avoided;
- how it could be settled.

Ask them to give a presentation of their ideas in front of the class. After each presentation, ask the other groups to add their own suggestions of ways to resolve the conflict.

Finally, ask each group to write down on a card the best way to avoid their type of conflict. Collect these in and make a display.

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### 3 Community conflicts

Developing an awareness of what can cause conflicts and how to avoid them is important for groups and individuals working together.

A school is a central part of any community, and the teachers and children should represent all parts of that community. As such, the school could play an important role in avoiding or negotiating a solution for wider community conflicts.

Schools can also help students become more aware of the causes and issues surrounding conflicts. Some of your students may go on to become important players in helping with community-based conflicts.

To help your students become confident citizens, you need to:

- make sure your classroom is a harmonious environment;
- help your students understand the benefits of this;
- provide them with the skills to resolve conflicts.

Key to this is helping them understand that it is behaviour that is not liked and not the person doing it.

#### Teaching Example 3

Abraham works in a school in North West Tanzania. There was a conflict between two nearby villages, Kitete and Mbulumbulu, over a piece of land.

This sometimes caused problems at school, because students came from both of those villages and would come to school after hearing the people in their villages arguing.

Abraham decided to address the problem with his students.

First, he helped them identify the different things the people of the two villages shared. These included: going to the same school and the same clinic; using the same transport; shopping in the same marketplace.

Then he asked them to identify what was missing from each village. One thing the students identified was a sports ground for football and running.

He asked them if there was any land to develop a football field. The students suggested some ground midway between the villages.

They prepared a presentation saying why they needed a sports ground, and why this place was the best.

They invited the Parents-Teachers' Association (PTA) and village committees to come and, after the students had made their presentation, everybody discussed the issues.

The committees agreed to the suggestion. The villages both gained a sports ground and the two communities began to cooperate over building it.

### Activity 3

For homework, ask your students to each bring in one story about a conflict from the newspaper. The article overleaf is about land conflict in Tanzania, but you could use different examples.

- In groups, students should describe their stories to each other. Ask them to identify the causes of the conflicts.
- Ask them to look again at the stories and suggest what the different solutions might be. Ask them to say who should be responsible for finding the solution.
- Next, ask each group to choose one story and present their ideas for solving the conflict to the class. Ask the students to comment on each other's presentations and say why they think the suggested solution would or wouldn't work.
- Make a list of all the suggestions made, and ask the class to write about which three they are going to remember and use, and why.

**What were the key suggestions that were made?**

**How did you explore them with the students?**

#### **'Cattle clash sparks bitter feud in 2001'**

Over 400 people fled their homes in the eastern Tanzanian region of Morogoro for fear of being attacked by Maasai pastoralists, after a bloody clash there on 8th December between the pastoralists and farmers left 31 people, mostly women and children, dead.

The clashes between Maasai nomads and farmers in Morogoro had been in progress since the end of October, but worsened during four days of fighting last week, the Associated Press (AP) reported on Tuesday.

The 8 December attack was in revenge for the killing of two Maasai tribesmen and the slaughtering of 35 cows by the farmers, AP said. The combination of revenge and sheer anger at the confiscation of their herds compounded a conflict over land use to which there is no clear solution in sight.

The clashes started after farmers in Kilosa confiscated herds which had strayed into their fields and held them pending receipt of compensation. The practice is not uncommon in Morogoro, one of the few regions in Tanzania relatively spared by the drought, where pastoralists and farmers live side by side. The attraction of pasture land was such that, according to recent research, there were 250,000 head of cattle belonging to the Maasai in the region's Kilosa District, the Tanzanian newspaper the Guardian reported on Tuesday.

The conflict had been ongoing for the past ten years, Dr E de Pauw, land use consultant with the Food and Agricultural Organisation (FAO), told Integrated Regional Information Networks (IRIN). 'There is no proper demarcation between agricultural land and pastoral land,' de Pauw said. Herders in possession of excessive stocks of cattle, by virtue of their concentration in Morogoro, grazed them in farmlands, either knowingly or by accident, thereby arousing hostility on the part of the farmers, he said.





President Benjamin Mkapa's government is injecting a new impetus to the livestock sector, according to the Pan African News Agency (PANA). The government had adopted a policy to demarcate pastoralist areas, but its implementation would be difficult, de Pauw said.

The Maasai follow a semi-nomadic lifestyle, moving from place to place, seeking pasture and water. They would 'always seek after the best land [and] no pastoralists will ever move their animals to semi-arid regions,' de Pauw told IRIN. Competition for the best land is harsh, especially in times of drought.

Political factors are also at play, the Tanzanian media has reported. Villagers claimed that the prime minister's office (PMO) had been aware of the conflict between Maasai pastoralists and the farmers as far back as 1997, when farmer representatives sent an appeal to the PMO, but no action was taken, the Guardian reported on Thursday. The villagers then resorted to forming traditional defence groups, called 'sungusungu'.

'However, the sungusungu were not effective, because they did not get police cooperation,' a farmers' representative told the Guardian. Kilosa District Commissioner Edith Tumbo was suspended on Monday by Prime Minister Frederick Sumaye, according to the Guardian.

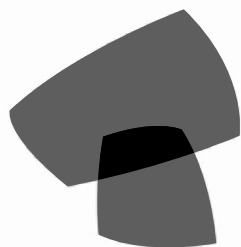
*Original Source: EDC News 2001*

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# TESSA

Teacher Education in Sub-Saharan Africa

## Teaching Pack No.15

### Upper Primary

<b>Section 1</b>	<b>Literacy:</b>	<b>Ways of presenting your point of view</b>
<b>Section 2</b>	<b>Numeracy:</b>	<b>Investigating distance</b>
<b>Section 3</b>	<b>Science:</b>	<b>Wise use and reuse of materials</b>
<b>Section 4</b>	<b>Social Studies:</b>	<b>Investigating people and places</b>
<b>Section 5</b>	<b>Life Skills:</b>	<b>Sensitive ways to talk about HIV and AIDS</b>

<b>Additional Resources:</b>	<ul style="list-style-type: none"><li>• <b>Group work in your classroom</b></li><li>• <b>Working with large/multigrade classes</b></li></ul>
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15

## Literacy: Ways of presenting your point of view

### 1. Expressing ideas and feelings

### 2. Debating

### 3. Letter writing

#### Key question for the teacher:

How can you help students become confident and thoughtful presenters of ideas?

**Keywords:** feelings; viewpoints; debate; letter; newspaper; inclusion

#### Learning Outcomes for Teachers:

#### By the end of this section, you will have:

- Supported students in expressing their points of views in speech and in writing;
- Developed your ability to help students understand other people's situations, feelings and points of view;
- Used discussion to explore inclusion issues.

## Overview

This section focuses on ways we express feelings and present points of view. It is important that teachers and students are able to do this with confidence, both in speech and in writing, in order to participate in decision-making in the family, school and wider community. As a teacher, you have an important role to play. You need to be able to argue your case within the school for such things as resources and ways of working, and also you need to support your students as they develop these skills.

It is important that all students feel included in the classroom and community, regardless of their state of health, home circumstances or any disability.

# 1 Expressing ideas and feelings

This part explores ways of working that will allow students to express their feelings and explore ideas about many things, including their personal lives. It looks at how to manage conflicts and frustrations more effectively.

Often, when starting topics that touch on sensitive issues, it is helpful to let students explore their ideas privately first. Writing thoughts down concerning a particular issue can help to stimulate thinking. This is a technique that can also be applied to other topics to find out what students already know.

## Teaching Example 1

Vivian in Accra, Ghana, discussed with her junior secondary students the kinds of things that make children feel different and/or left out.

She asked them to think about if they had ever felt left out or different from others in the past, or if they were feeling this way at present. She asked them to write about these feelings.

Then they played games that helped them to experience what it was like to have a physical disability like the ones below:

You can help students to understand some of the difficulties that children with physical disabilities face by playing games like those below:

1. Bring to school some old stockings or pieces of rope or wool. Give these to students and ask them to tie behind their back the arm and hand they usually use to write with. Give each student a piece of paper. Explain that the game is to find out who can write the sentence that you are about to read to them in the fastest time, with the neatest handwriting. Read the sentence and then watch what happens! After you have chosen the winner, discuss with students how they felt while playing this game and what it must be like for students who have a disabled or missing arm/hand. If they are not able to write, ask them to draw a tree.
2. Bring to school some pieces of cloth or scarves (or ask students to do so) so that half the students are able to tie cloth over their eyes. Take the class outside. Tell students to work in pairs. The one who has been blindfolded has to walk around a number of obstacles that you have set up – you could use desks and chairs for this – being guided by their partner. Time each pair. If your class is not too large, ask the pairs to swap roles and then time each pair again. The winner is the pair that completes the task in the shortest time, without knocking over any of the obstacles. Afterwards, ask students how it felt to be blindfolded and to have to rely on a partner.
3. Bring to school enough cotton wool for each student to be able to put cotton wool into their ears to prevent them from hearing clearly- warn them not to push it in too far!. Then ask students to listen while you give the class a message to write down. The winner is the first student to complete writing the message without mistakes. Afterwards ask students how they felt when they could not hear clearly and what they could do to help someone with hearing problems.

4. If your school can afford to do this, buy a large number of marshmallow sweets. Give enough to each student so that his or her mouth is full. Tell them not to chew or swallow any of the marshmallows but to tell a partner the message you have written on the chalkboard. This is very difficult to do and they will realise what it is like to have a speech defect that prevents a person from speaking clearly. At the end, they eat the marshmallows!

Afterwards, they talked about how such disabilities may make children feel different and sometimes cause them to be rejected by their classmates. They also talked about children who suffered from HIV/AIDS, or whose parents had died from HIV/AIDS. Vivian asked them to write about their experiences during the games. What did it feel like to have a disability?

After this, before starting a sensitive topic, Vivian often asked her students to write or talk in pairs or small groups to explore their own ideas first.

### Activity 1

When starting a sensitive topic with students it is useful to explore their ideas and feelings first.

Select a picture, poem or story to stimulate their thinking.

Show the picture/read the poem or story and ask them to think about what it means to them.

Ask them to write or talk with their partner about their thoughts and include their feelings as well.

Remind them that no one will mark this or judge what they say to each other. It is for them to think about what they think and feel at that moment.

Next, discuss with the class what they think the messages are in the picture.

## 2 Debating

Learning how to participate in a debate helps students (and adults) to express their points of view, listen to the views of others and think critically. When you choose topics for debate in your classroom, make sure you choose topics that are important to your students so they will really want to express their points of view.

In **Activity 2** you will introduce your students to the rules and procedures for debating and support them as they prepare for a formal debate. In **Teaching Example 2**, the debate is on inclusion in the classroom. With younger children, you could hold very simple discussions or debates about issues such as not hitting each other.

### Teaching Example 2

After Vivian and her students had written about being 'left out', they discussed specific children who were not in school for some reason. Some of these children were disabled, some had no parents and were heading households and some did not come to school because they were too poor to buy uniform.

Vivian introduced the idea of debating to the class, and presented the motion: 'This class moves that all "out-of-school" youngsters, isolated because of barriers to learning, should be brought to school.'

She grouped the 36 students into groups of six, and asked half the groups to discuss points in favour of the motion and half to discuss points against.

Then she gave them a framework for preparing their speeches. Each group drafted a speech, either in favour or against the motion, and chose a speaker from among their number. Vivian looked at the speeches at lunchtime, and gave speakers advice on how to improve them. They did more work on their speeches at home.

The debate was held the next day. Vivian was very pleased with the high level of participation from all class members. The motion was carried, and students started making contact with out-of-school children, and working with their teacher and head teacher to bring them back to school. Vivian realised that the debate had provided an excellent opportunity for students to develop and express their points of view and for addressing an important community issue.

### Activity 2

Explain to students about participating in a debate.

Brainstorm debating topics that interest them and help them to express these in the form of a motion. Decide on the motion for debate and explain the rules and procedures for debating (see 'Explanation of motion' in the box below).

Write the key rules and procedures on your chalkboard so that students can make a copy to refer to in future.

Ask students to prepare the debate speech in groups and choose one speaker to present their arguments.

You may have to help by providing background information for them to use in their speeches. You could also ask them to look for information from home for their speeches.

Check if the groups are ready to start the debate (perhaps later in the week) and then follow the rules and procedures.

Ask students to tell you what they have learned from the experience and use this information to plan future lessons and opportunities to discuss ideas.

With younger students, you could debate topics that relate to school, such as whether they should have class rules. You may have to help them learn to take turns to speak and listen to others' ideas.

### Explanation of a motion

In parliament, or on important committees, when the members are making decisions, someone may introduce a motion to debate. A motion is a statement about something that needs to be done or discussed. A debate explores all sides of the argument. For example, if a member of parliament stands up and says: 'I move that capital punishment be abolished,' this idea is discussed formally and a decision is reached, which results in the desired action being carried out or not.

The following motions are examples of issues you could use in schools. You may have to adapt these depending on the size of your class and the age of your students.

- Parents should not use corporal punishment to discipline children.
- What we learn at home and in the community is more important than what we learn at school.

### a) Supporting the motion

### b) Opposing the motion

*A debate is a contest, or, perhaps, like a game, where two or more speakers present their arguments intent on persuading one another ...*

### Why debate?

By preparing for and participating in debates, students learn to find and use information to support their arguments. They also learn how to present their ideas clearly and persuasively.

Through debating, they learn to understand views that are different from their own because, when debating, they may have to argue a case that they don't fully agree with, and they have to become very familiar with the view of the opposing team.

### Preparation

Good debaters are very well prepared. The debate you conduct in your class may be an informal one, but could build towards a situation where your students debate seriously in competitions.

Before constructing a speech, debaters collect as much information on the topic as possible, from libraries, newspapers, magazines and discussion with people.

They think of all the points in support of the motion, and against the motion. In other words, they become familiar with the opposition's case as well as their own. They prepare themselves for all possible questions that might be asked by the opposition, and all possible challenges they might offer.

Good debaters structure their arguments very persuasively. They listen to other people debating, so that they learn the art and the skill of debating. They join debating societies, and debate as often as possible.





### The process

There are two teams, each consisting of two or three speakers. One team (the affirmative) supports the motion, and the other (the negative) opposes the motion.

There is a chairperson, who controls the proceedings.

The speeches and speaking time are divided equally between the two teams.

Each speaker makes a speech they have prepared to argue their case. The sides speak in turn, starting with the proposer of the motion (affirmative, negative, affirmative, negative). Each speaker has a specified amount of time to speak (e.g. three minutes or five minutes).

Then the debate can be opened to the floor, with speakers standing up to offer points supporting or opposing the motion. Each speaker from the floor is allowed a specified amount of time (e.g. one minute or three minutes).

Each team may then speak in 'rebuttal', after a short period has been allowed for the teams to consult. This means that they have a chance to argue against points raised by the opposition. Each team may have one rebuttal speech each, or more. The first rebuttal speech is made by the negative side and the final rebuttal speech is made by the affirmative.

### Important rules

- The team supporting the motion must not shift its point of view. The same goes for the opposition, who must oppose the motion completely (whatever their private opinions may be).
- If a speaker makes a statement, they must be able to provide evidence or reasons to support the statement.
- Facts presented in a debate must be accurate.
- Speakers may not bring up new points in a rebuttal speech.
- Points of order and points of information

Members of the house (anyone involved in the debate) may interrupt a speaker by raising their hands and indicating that they have a 'point of order'. This means that they wish to point out that one of the rules of debate is being broken (e.g. the speaker is speaking overtime, or does not have evidence to support his or her point).

Members may also raise their hands with a 'point of information' (a question or some information they have to offer). The speaker may choose to allow the member to speak, but does not have to.

### Judging

- The winning team in a debate is usually decided on the basis of the quality of the debating, by a judge, or judges.
- However, it may also be decided by a vote.

*Adapted from: [http://www.triviumpursuit.com/speech\\_debate/what\\_is\\_debate.htm](http://www.triviumpursuit.com/speech_debate/what_is_debate.htm)*

### 3 Letter writing

It is important to learn how to express a point of view clearly, with supporting arguments. This is a useful skill when writing student essays, but also, when older, if debating a community or national issue in a letter, particularly a letter to a newspaper.

A letter to a newspaper can be compared to the first half of a debate. Often another person will respond to a published letter and will present alternative arguments. In the box below there is a letter to a newspaper in which students write about the important issue of including all students in schools.

**Teaching Example 3** and the **Key Activity** offer you guidance for working with students to present arguments in the form of a letter.

#### Teaching Example 3

A few months after Vivian first introduced the idea of inclusion to her students, there were two new students in her class. One was deaf, and the other had only one arm. She and her students were gradually learning to include them in their class, to communicate with them, and to support them without making them feel too 'different'.

She now suggested the students write a letter to the head teacher or a newspaper on the topic of the importance of including all students in school. They could send their letter to the head teacher or to *The Daily Graphic* in Accra. They would have to write in English.

Students liked this idea and brainstormed what they could say. They produced an outline for the letter.

1. Theme: Schools should make efforts to bring in 'out-of-school' youngsters.
2. Reasons.
3. Ways to counter the possible arguments against.
4. Our experience.
5. Successes and challenges.
6. Repeat theme.

Vivian gave students guidance on the kinds of phrases to use, especially for 2 and 3, where they were presenting the argument. They asked a teacher who had access to a computer to type it, and sent copies to the newspapers.



The Editor  
The Daily Graphic  
Graphic Corporation  
Accra

Sir

### **Schools must bring in children who are sitting at home**

In our new Ghana, education is free. It is for all children. But there are still children sitting at home, without education. Some have disabilities, some have HIV positive parents, some are too poor to buy uniform.

Schools must bring these children in, to share education with other children. Why do we say this?

Firstly, it is their democratic right to be educated. The Minister of Education says all children must be included in classes.

Secondly and most importantly, they need to have friends and be part of life.

Some say that teachers do not know how to teach children with disabilities. Some say that parents don't want their children to be friends with 'cripples'. But we don't want our society to be one that chooses. Everyone must be treated the same. Children can help those with disabilities, and make it easier for the teacher.

Our class at Aburi Presbyterian Primary School, found two children sitting alone at home. We persuaded them to come to school. Adwubi has only one arm. We are helping her to learn writing and to play games. She is very clever and learns fast. Asiedu is deaf, but if he looks at your lips, he can hear. He is getting better at it. He is also becoming good at reading. We can write messages to him. We are learning many things from these children, and they are our friends.

It is still difficult for them, and the teacher is giving them extra help after school. The School Management Committee is also helping them to get school uniforms. They don't have uniforms yet.

We are pleased that they have come into our class, and we want to tell other schools to do the same.

Sincerely

Class 5  
Aburi Presbyterian Primary School

### **Activity 3**

- Take a topic your students have debated and introduce the idea of presenting their arguments in a letter to the head teacher or, if you have one locally, to a newspaper.
- Ask them to brainstorm, in groups, what they wish to write.

- Next, write the structure for the letter on the chalkboard using the outline in Teaching Example 3 (although your theme may be different).
- Students may need to write this letter in an additional language (e.g. English) so give them some guidance on phrases to use for introducing and presenting arguments. It may be helpful to share these argument phrases with them.

### Argument phrases

We maintain that ...

Our reasons for saying this are as follows: Firstly, ... Secondly, ... Finally and Most importantly, ...

In the (newspaper name), of (date), (name of person) writes ... OR (name of author), in his book (name of book), says ... This shows that ... OR This proves that ...

Some say that ... But we believe ...

Our experience has shown ...

- Ask the groups to assess their own and each other's letters, using the questions below and decide which is the best one to send to the head teacher or newspaper.

### Assessment questions

- Does the letter start by stating the case, or argument, clearly?
- Does it present arguments supporting this statement?
- Does it include some information that relates it to local circumstances or events and gives it a human touch?
- Does it present the case once more, conclusively, in the last paragraph?
- Is it well structured, divided into paragraphs, each with a main idea?
- Is it accurate, with no grammar, spelling or punctuation errors?
- You may need to do some editing before sending the letter, but try to keep the students' words.

Think what your students have learned from turning debate arguments into a letter.

With younger students or those less confident and competent at writing, you could do this as a class exercise where you write down their ideas. Use the activity to develop their vocabulary in the additional language.

## Numeracy: Investigating distance

### 1 Practical investigation

### 2 Investigating height

### 3 Understanding length in a practical way

#### Key question for the teacher:

What practical and imaginative approaches can you use to develop students' understanding of distance?

**Keywords:** measurement; length; distance; comparison; active; practical; group; pair; investigative; proof

#### Learning Outcomes for Teachers:

By the end of this section, you will have:

- Developed ways of teaching measurement of length in a more student-cantered way;
- Developed your ability to organise, support and assess practical investigations around distance.

## Overview

This section will help you develop students' understanding of estimating, measuring, drawing, experimenting, constructing, interpreting and calculating lengths and distances.

Investigations can be done in class, individually or in groups. They can also be done at home by individual students, and either be presented to the whole class verbally or formally as written work. Investigations are based on having an idea or a phenomenon that you want to find out about. To do this, you undertake various tasks in order to find answers to your questions. Investigations can include practical work, but can also take the form of research as you search books etc. for answers. For further information about investigation see **Key Resource: Using investigations in the classroom.**

## 1 Practical investigation

Any investigation needs to be planned and conducted carefully, otherwise the results might be incorrect or unreliable. In **Activity 1** you will look at a statement that needs to be shown to be right or wrong. Make sure your students have all they need before they start an investigation, and that they understand the task before they begin. Your role is to support them as they work by asking questions to stimulate their thinking and encouraging them to develop their ideas.

### Teaching Example 1

Mrs Mwakapenda in South Africa wanted to give her students a practical investigation on length to find out who was the tallest or shortest in the class.

She prepared some questions for them to ensure that they understood the task properly. She began her lesson by discussing these questions with the whole class.

- What do you understand by the term 'height of a person'?
- How are you going to measure yourself?
- Should you have shoes on or off, while measuring?
- Should you lie down or stand up against the wall?
- What about those with long hair, should they squash it down?
- Where should you measure from?
- What should you measure with?
- How accurate should you be?
- How do you use a ruler or tape measure?
- How should you collect the measurements?

She was aware that the investigation was not just about measuring. It was also about collecting and recording data. She wanted to make sure her students understood exactly what it would involve.

After the investigation, Mrs Mwakapenda was very pleased with what her students had achieved. They had shown that they knew how to organise an investigation. They carried out a fair test and measured the distances well, too.

### Activity 1

Begin by asking your students to consider the following statement and discuss (in groups of four) how they would investigate whether it is true.

'A tall person can jump further than a short person.'

Each group needs access to a tape measure or ruler or some other means of measuring e.g. string or rope. Discuss how they might answer the question and agree on a process. This might be like this:

- take two measurements for each person and measure everyone in the group;
- measure height by standing against a scale on a wall which you made before the lesson;
- the jump must be a 'standing' jump – the person stands on a line, and then jumps as far as they can;
- measure the length of the jump using a tape measure or string etc.

Ask the groups to discuss how they can show their results.

- One way of checking that the statement is true is to make a table with two columns, one for the heights of the students going in order from the tallest down and the other for the lengths of the corresponding jumps. Only if the order is the same is the statement true.
- Another way is to make a mark with a cross on a grid using square paper with the student's height on the horizontal axis and the length of jump on the vertical axis. Only if the result of the crosses is a straight line is the statement true.

Ask them if their measurements agree with the statement. If not, can they rewrite the statement to match their results?

## 2 Investigating height

When exploring a topic such as measuring, it is important not to rush on to new concepts but to give students time to consolidate their learning and practise newly learned skills. This section provides more ways to explore students' understanding and abilities to measure length in different contexts.

Here, you will ask students to make comparisons between measures and think about any links. By using the same groups for a series of activities, you can discover whether they see the similarity between the investigations and are able to use the data and the strategies they used before.

### Teaching Example 2

Mrs Baguna decided to undertake a measuring task with her class but provide less guidance than she had before. She wanted them to be more independent and to use the skills learned from previous tasks. She decided she would listen carefully as they discussed how to proceed and find out who was volunteering to do tasks. She was interested to know who realised they could use the previous knowledge and ways of working for the new task.

She thought carefully about what task to set. The head teacher had talked of moving the school fence and school gate on one side of the grounds to a place he said was nearer, to help save money. Mrs Baguna was not sure it was nearer and she decided this was a real problem to use with her class.

She set the problem in the morning and told her students they could work on it until the end of the day. They also had to do their language work but she said they could choose in which order to work. As she only had two long tape measures borrowed from the education offices, it limited the number of groups that could work with these at any one time. They could use other ways to measure, such as rope or string. She was pleased with how well they organised themselves and, as they worked, she noticed who understood the problem and how to solve it. All the groups agreed that the new site for the path was much nearer. She then asked them to work out how much money would be saved from the path.

They took their investigation to the head teacher who was very pleased with the information.

## Activity 2

Begin by telling your students that you have another investigation for them to do in the same groups as before.

Ask them to find out if this statement is true:

‘Your height is the same as the distance between your fingertips with your arms outstretched.’

Ask them to discuss in their groups:

- How they could check these statements?
- What are they going to be measuring?
- What units of measurement should they use?
- How will they organise the work?
- How will they record their results?

Next, ask them to do the investigation together, or at different times (depending on your resources), and go around and listen to them as they work, supporting them if they are having difficulty. Ask them to show how they worked out the answer. Display their answers.

Discuss with them what you have observed about how they worked as groups.

How can you help them work better in groups? (See **Key Resource: Using group work in your classroom.**)

## 3 Understanding length in a practical way

It is important that students have a real-life ‘feel’ of what different lengths mean and are able to estimate and measure the length or height of an object. This is a very useful skill in real life. For example, will a tree fall on our house if it is chopped or falls down? To assess whether they have this ‘feel’, you can use a question to solve on paper that requires them to use their understanding or give them a final investigation about a real object, such as that in **Activity 3**.

When the task is complete, encourage your students to find out more about the indigenous trees of your country and have a go at measuring a large tree near your school if there is one. Working in this practical way will build their confidence in dealing with length.

### Teaching Example 3

Mrs Juma from Tororo Rock wanted to find out if her students had a real understanding of different lengths, so she designed a paper activity that they had to do individually to assess this. She copied the activity onto the board, see below. She asked her students, who were Primary 6, to work on their own and think carefully about the answers before they filled in the gaps. She collected their books and looked at their answers.



Some students in Primary 3 measured different things in school. These are the measurements they wrote down.

- (a) 4 metres
- (b)  $\frac{1}{2}$  metre
- (c) 19 metres
- (d) 1 and  $\frac{1}{2}$  metres

*Below is a list of the things they measured. Match each length or height against the most likely object.*

Florence, who is in Primary 3  
The length of the school building  
The length of the teacher's table  
The height of the classroom

Mrs Juma realised that many of her students had not got a real feel for length yet and so she decided to do more practical activities. She asked them to measure the school grounds but they had to estimate the length of each side first and record this. Each group took it in turns to do the measuring as she only had one long tape. She had made a large table of the key measurements and each group put in their measurements as they finished. She did not display this until all groups had finished so they would not be influenced by others' results. (She planned to use this data later for a SST lesson to produce a scale map of the school site.)

When all students had completed the measuring, she discussed the variations in their measurements with them and then asked them why this was so. They were able to suggest some good reasons such as starting at different points and not holding the tape straight.

### Activity 3

If possible, take your students outside to where there is a lot of space; otherwise, use a large hall to try out the activities. You will also need about 60 students of average 1 m height and so you may decide to combine with another class. Work with the whole class together and ask guiding questions to help them solve the problem.

Read the following extract about the 'Big Tree' to the class.

- 'In Budongo Forest there are huge old mahogany trees. Some are 60 m high and have a circumference of 6 m or more.'

When you have finished outside, bring your students inside and ask them to answer the questions in the box below to assess their understanding.

Next lesson, ask them to make a display of all their measuring activities and invite other classes to come and see their work.

**The height of the Big Tree**

Remind your students that the height of the tree is 60 m. Ask them:

*'Do you think if all the students here were to balance on each other's heads you would eventually reach to the top of this tree?'*

That would not be easy and so what else can we do? Yes, we could try lying down instead.

Let's do that.'

Ask about ten students to lie down and ask another student to measure and see if that is enough.

Now ask: How many students do you think it will take?

Add more students until how many it takes to make 60 m is reached.

Finally, ask someone to describe how tall the Big Tree is.

**The circumference of the Big Tree**

We are told that the circumference of the tree is 6 m. Ask your students:

*'How many students do you think it would take if you wanted to make a ring around the tree, with fingers touching?'*

Try it by asking one student to measure 6 m. Then form a circle and count the students – this will give you an idea of the circumference of the tree.

**Now try these questions with your group:**

1. Before this activity I thought 60 m was:
  - a. As tall as my school building
  - b. As tall as a mountain
  - c. As high as a tall tree
  - d. As tall as a telephone tower
  - e. Hadn't thought about it
2. It would take the following number of classmates to make a ring around the giant tree in Budongo Forest:
  - a. At least 7
  - b. At least 6
  - c. At least 5
  - d. At least 4
  - e. At least 3
3. 1 m in length is approximately:
  - a. The span from the tip of an average person's nose to their fingers with arms outstretched
  - b. The height of an average person
  - c. The length of a small table
  - d. The height of a cow

## Science: Wise use and reuse of materials

1. Importance of crude oil
2. Local and regional pollution
3. Recycling

**Key question for the teacher:**

How can you develop responsible attitudes to material and use and reuse?

**Keywords:** renewable; recycling; compost; projects; evaluating; values

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- Used different ways to develop responsible attitudes towards the use of material resources;
- Organised practical projects to reuse material
- Worked with your students to develop criteria to evaluate different products and processes

## Overview

Teachers need to be aware of the importance of knowledge, skills and attitudes with regard to learning. Giving students the facts (knowledge) is the most straightforward, skills take more time and practice, but the most uncertain aspect is influencing values and attitudes. Think of a game of soccer. The whole crowd knows the facts (the basic rules of the game). A handful of players have the skill really well. But fairness, honesty, and dignity in defeat are all-important attitudes that are not always easy to come by.

This section introduces you to ways of developing responsible attitudes in your students towards the use and reuse of material resources

## 1 Importance of crude oil

So far in this module we have explored the origins of different materials, considered how they may be classified by their properties and how they may be processed and used in different ways depending on their states.

In this section, we try to make our students aware that we have limited supplies of many materials on the Earth. In **Teaching Example 1**, we read how a teacher introduces this idea by brainstorming a list of materials in terms of 'renewable' and 'non-renewable'. (See **Key Resource: Using mind maps and brainstorming to explore ideas.**)

One very important resource that is in limited supply is crude oil. Do you know how many materials are made from crude oil? Crude oil is a mixture of liquids. It isn't any use until the mixture has been separated at an oil refinery. The crude oil is boiled and each part of the mixture boils at a different temperature. This separation is called distilling and the different parts of the mixture are called fractions. Each fraction is then used to make different products.

In **Activity 1**, you use a diagram to help students appreciate how dependent we are on crude oil. You could follow this up with a display of products based on crude oil in your classroom – students could draw pictures or use images from catalogues or magazines.

### Teaching Example 1

Amani in Khartoum, Sudan, draws a line down the middle of the chalkboard and writes the headings 'Renewable' on the left and 'Non-renewable' on the right. Then she helps her students through a brainstorm where they suggest names of materials and matter that are part of their everyday lives. They decide what family of substances each belongs to and where it fits on the board. (See the table below as an example for a typical result of such a whole class activity). They copy the final diagram and add to it over the next few weeks as they study renewable and non-renewable materials.

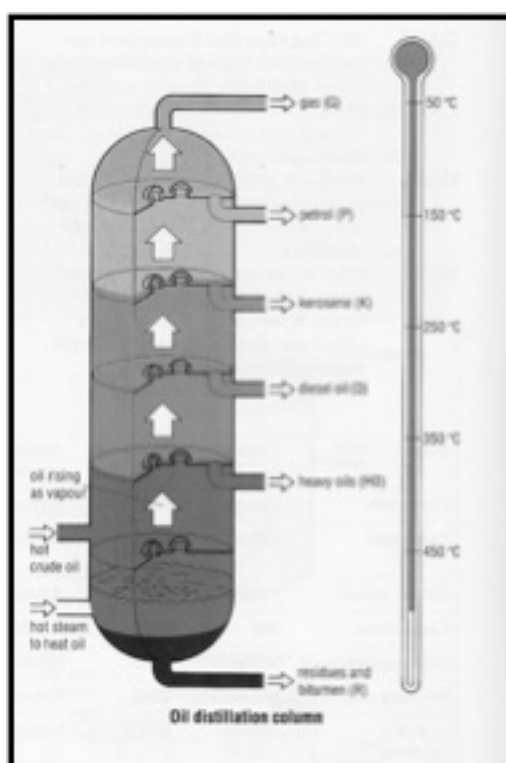
Renewable Sources	Non-Renewable Sources
Wood from planted trees – gum and pine	Wood from wild forest trees
Planted crops	Wild medicine herbs if too much is taken
Meat from farm animals	Threatened wild animals
Water (if we don't pollute it)	Soil that has eroded won't come back
Air	
ENERGY RESOURCES	
Water power (hydroelectricity)	Coal
Wind power	Oil
From the sun – solar energy	Petrol and diesel – from oil
	Paraffin from oil

**Note:** You might see how the teacher has started by accepting most of the suggested items the students present and has tried where possible to use their own words. This gives them confidence to add more. If the teacher rephrases

everything they suggest into textbook-type language many children get discouraged – accepting and working with their actual words is very important.

*You might also have noticed how the teacher has steered the attention to energy aspects – by adding in a sub-heading. Depending on where they live, students might also know of natural gas, which is considered a non-renewable resource.*

### Activity 1



Many sources provide a diagram explaining how crude oil is processed in a petrol refinery. Here is an example.

*Original Source of diagram: Oxford Science Programme Book1, published by Oxford University Press, p. 92 (1990)*

Remind your students about how water evaporates and leaves behind the impurities – Activity 2 in Section 3 – and then help them realise that other substances also evaporate to give gases. When they cool, these gases condense back to a liquid. Think of any cooking area; the walls and ceilings have to be cleaned of greasy deposits, formed when the vapours of hot fat and oils condense.

Explain that crude oil is a mixture of liquids called fractions; each fraction evaporates at a different temperature.

Analyse the diagram with your students – how many different ‘fractions’ are produced? How are the fractions different? What is made from each fraction?

Then divide your class into groups and ask each group to research a different

group of products – they can find out uses, biodegradability (whether or not something rots away), safety. (See the table below for suggestions for this type of work).

Uses of crude oil	
Fraction (or part) of the crude oil	Products from this fraction (sometimes after further treatment)
Gas (G)	Gas fuels, such as calor gas, making other chemicals
Petrol (P)	Fuel for cars, pesticides, drugs, plastics, fertilisers, detergents, solvents, making other chemicals
Kerosene (K)	Paraffin, jet fuel, white spirit
Diesel (D)	Fuel for trucks and buses, central heating oil
Heavy Oils (HO)	Lubricating oils and grease, waxes, polishes, making other chemicals
Residue (R)	Tar for road surfaces, waterproof roofing materials, fuel for power stations

### Teaching ideas

Teaching ideas would include making posters of products and by-products of crude oil using collages of magazine and newspaper adverts (you could show the products or brand names and symbols). Alternatively, you could make a display of empty containers. Products to consider include paraffin, diesel oil, petrol, lip balm, lipsticks, Vaseline, lubricating oils, candles, tar and plastics.

### Nigeria's oil industry

As of September 2004, Nigeria was the largest oil producer in sub-Saharan Africa, the fifth largest petroleum exporting country in the organisation of petroleum exporting countries (OPEC). Nigeria produces 30% of the total oil production in the African region. Oil income has historically provided about 95% of Nigeria's foreign exchange earnings. The source of Nigeria's wealth is the Niger Delta, a wetland of about 70,000 sq km. The Niger Delta is made up of nine oil producing states and has an estimated population of about 20 million people, amounting to about 16.7% of the Nigerian population (120 million).

## 2 Local and regional pollution

From the previous work, students will have begun to realise that we need to think carefully about using non-renewable resources. We need to start thinking how we can act to become part of the solution to this problem and not just part of making the problem worse. It is good to get students involved in positive action that benefits the environment in some way.

In **Teaching Example 2**, a teacher encourages the students to go out into their own community and think about the impact of people on their environment. (If you try the same activity and don't have coloured paper, you could divide the wall into two areas.)

In **Activity 2**, we suggest your class researches, designs and carries out a long-term compost-making project. You can start by introducing the terms 'biodegradable' (rots away) and 'non-biodegradable' (doesn't rot away) and explaining what causes rotting – bacteria. Students will be able to give you many examples of materials in each of these groups – this could be a brainstorm activity.

Later, you might want to go into income-generating production of compost, which would involve systems for safely collecting local compostable waste and its subsequent sale or use in a school vegetable garden.

### Teaching Example 1

Looking at living things around the school has made Reuben Adekola's students care more about the animals and plants in their environment.

Now he tries to do the same thing with awareness of the impact of people on our natural world. He talks to them about the idea of the 'human footprint'. They discuss and list the harmful and helpful things they can think of that are happening in the local area. Then, he sets them a challenge. The whole back wall of the classroom is cleared to make space for a wall 'newspaper'. Students go out into their environment as 'reporters' and come back with information and evidence in the form of notes and drawings. Anything that they feel is harming or not helping the environment is colour-coded on light brown card/paper, and the good things are written up/displayed on green paper. A glance gives an overall impression of the local situation: – mostly brown = BAD; mostly green = GOOD.

The students find so much information that the display spills over onto the side walls. They come with information from the media (press, radio and TV) about their own country and continent as well as across the world. The colour-coded display grows daily and raises discussion, argument and, most importantly, the attitude of concern.

### Activity 2

Read 'Making compost', below which explains one method to do this.

Tell your students they are going to do a project in which they will do something positive with waste – composting. First they need to do some research about composting in their community in groups. What are their ideas? Can they think of anyone in their community who could help them? Could they ask this expert to visit their classroom or could they visit this person? (See the Additional Resource on **Using the local community/environment as a resource.**)

Gather together all the ideas for making compost from students and their research.

**Making compost**

The best and cheapest way to make garden soil better is to make your own compost. It only costs effort and a little bit of time and care.

Choose an out-of-the-way part of the school garden that is quite sunny. Clear away any weeds and rubbish.

When you have an open space, one of the students can mark out a circle with a radius of about 75 cm. If this student stands in the centre of the circle and turns around while holding out a walking stick, a good- good is a bit vague – ‘accurate’? circle will have been drawn.

Take spades and dig up the soil in the circle. Dig to the depth of the blade of the spade. Use a garden fork to make the soil in the circle loose.

Make a small pile of spare soil next to your circle by moving about a third of your loosened soil from the circle.

Stick a central pole or straight branch into the soil in the centre of the circle.

Now you can start the compost-making process. Put a layer of twigs and old leaves you have collected on top of the loose soil. The more you have the better.

Next, put down a layer of stalks and stems from plants and any kitchen waste (potato peelings, old tea bags or tea leaves, eggshells). You can even add shredded scraps of paper.

Then add a dry layer of grass cuttings, dry grass or old dry leaves.

Finish by putting a thin layer of soil on top. Use the loosened soil from the pile next to your compost heap.

Go on adding more layers:

- first stalks, stems, twigs and leaves;
- then kitchen waste and green cuttings;
- then dry grass, old leaves and manure (if you can find it);
- finish each layer with a last layer of soil.

Sprinkle a little water – but don’t make the compost heap too wet.

The height will drop as the matter rots down. Then you can add more layers over time. Always keep a layer of soil on the top – this deters the flies.

Then ask students to think: How will they assess which ideas are best? Give time for each group to develop a list of criteria.

Share criteria from each group and, in a class discussion, decide which are the most important. Students should write these in their books.

Now you are ready to make the compost. Each group could try a different method or you could all try one method. Don’t forget to give students time to plan (listing their equipment) and evaluate against the class criteria.

Did your students enjoy working in this way?



### 3 Recycling

From the previous work, students will have begun to realise that we need to think carefully about using non-renewable resources. We need to start thinking how we can act to become part of the solution to this problem and not just part of making the problem worse. It is good to get students involved in positive action that benefits the environment in some way.

Students can explore other ways to recycle or reuse what would otherwise be waste material. People in poorer communities do this in very creative and imaginative ways out of necessity. Studies of people like the Khoi-san (Bushmen) in South Africa show how, in the past, they wasted almost nothing at all and made a minimal 'human footprint' on their natural world, treating it with enormous respect. How do we compare in modern times? The information provided below is about how to calculate the size of your 'footprint' on the Earth.)

#### Introduction

The ecological footprint is a tool that measures how much land and water area a human population needs to produce the resources it uses and to absorb its waste.

In order to live, we consume what nature offers. Every action has an impact on the Earth's ecosystems. This is of little concern as long as human use of resources does not exceed what the Earth can renew. But are we taking more?

Today, humanity's ecological footprint is over 23% larger than what the Earth can regenerate. In other words, it now takes more than one year and two months for the Earth to renew what we use in a single year. We are surviving by using up the Earth's resource stores. We are both using up non-renewable resources such as minerals, ores and petroleum but also renewable resources such as fish stocks, animals, forests and groundwater – we are using these up faster than the Earth can resupply them. We depend on these ecological assets to survive. Livelihoods disappear, resource conflicts happen, land becomes barren and resources become increasingly costly or unavailable. This is made worse by the growth in human population, as well as by changing lifestyles that place more demand on natural resources.

By measuring the ecological footprint of a population (an individual, a city, a nation, or all of humanity) we can assess how much of the planet we are using, which helps us manage our resources more carefully. Ecological footprints enable people to take personal and collective action so that we live within what the Earth can regenerate.

#### The challenge and the goal: sustainability

Sustainability is a simple idea. It is based on the fact that when resources are used faster than they are produced or renewed, the resource is depleted (reduced in number) and eventually used up.

In a sustainable world, people's demand on nature is in balance with nature's capacity to meet that demand.

*Original source: <http://www.footprintnetwork.org> Calculate your ecological footprint*

### Calculate your ecological footprint

Answer the following questions to see how big your ecological footprint is. Add up your points, indicated at the end of each question (for example [2]) to see if you are making a high, medium or low impact on the environment around you. Remember, the smaller the footprint, the better!

#### 1. How much of the food that you eat is processed, packaged and from far away?

- a) Most of the food I eat is packaged and from far away. [3]
- b) About half the food I eat is packaged. [2]
- c) Very little. Most of the food I eat is unprocessed, unpackaged and locally grown. [1]

#### 2. What is the size of your home?

- a) 30 sq m or smaller [1]      similar size to a large truck
- b) 90–130 sq m [2]      similar size to half a football pitch
- c) 200 sq m or larger [3]      similar size to a full football pitch

#### 3. Do you bicycle, walk, or use animal power to get around?

- a) Most of the time [1]
- b) Sometimes [2]
- c) Rarely [3]

#### 4. On average, how far do you travel on public transportation each week (bus, train, ferry, shared taxi)?

- a) 25–100 km per week [3]
- b) 20 km per week [2]
- c) 0 km per week [1]

#### 5. On average, how far do you go by car each week (as a driver or passenger)?

- a) 0 km per week [1]
- b) 250–500 km per week [2]
- c) 700 km or more per week [3]

#### 6. Compared to people in your neighbourhood, how much waste do you generate?

- a) About the same [2]
- b) Much less [1]
- c) Much more [3]

Now add up your points and refer to the table below.

What kind of recycling is going on in your local community?

<p>If you scored between <b>0–6 points</b>, you currently have a <b>low impact</b> ecological footprint. Well done! See if you can improve your score by using some of the ideas below.</p>	<p>If you scored between <b>7–12 points</b>, you currently have a <b>medium impact</b> ecological footprint. See if you can improve your score by using some of the ideas below.</p>	<p>If you scored between <b>13–18 points</b>, you currently have a <b>HIGH IMPACT</b> ecological footprint. See if you can improve your score by using some of the ideas below.</p>
<ul style="list-style-type: none"> <li>• Set up a group in your area to discuss issues and raise awareness about the impact humans have on the environment.</li> </ul>	<ul style="list-style-type: none"> <li>• See if you can eat more locally produced foods to cut down on fuel used to transport products.</li> <li>• See if you can walk or use public transport, rather than travelling by car.</li> </ul>	<ul style="list-style-type: none"> <li>• Try to walk or use public transport instead of travelling by car.</li> <li>• Try to cut down on the number of packed or transported foods that you eat.</li> <li>• See if you can reuse and recycle any waste materials that your household produces.</li> </ul>

**Teaching Example 3** shows how one teacher and her students survey the local community for evidence of recycling.

In **Activity 3**, we suggest you encourage your students to do an integrated science and technology exercise. They work at designing and making articles from waste and sell these at a special 'entrepreneurial' day to raise funds for the school or class.

### Teaching Example 3

Blossom Ubani involved her class in a tidy-up campaign around the school. She incorporated mathematics. They collected rubbish, sorted and tallied (counted) what they found. This gave them data to analyse. They presented their findings to the school in assembly, showing graphs and suggesting they make a school policy regarding pollution of the environment.

She followed this up with a survey of recycling in the local area. This was again presented in a school assembly. Her students showed the soccer balls that children had made from wrapped plastic, and the beautiful, useful handbags and purses that some local retired people had crocheted from strips of used plastic bags. Students also explained how the local game park had made their fences more visible to buck by attaching old lids of tins to the top strands of wire.



Finally, Blossom set her class a challenge: Devise criteria to test the balls in a competition to 'make the best soccer/netball from waste material'.

### **Finding the best waste material ball**

First, start with a brainstorm where you and your students list the qualities of a 'good' ball. Expect or work towards ideas such as:

A good ball is:

1. properly round and the right size;
2. rolls straight;
3. bounces well;
4. strong;
5. soft enough to catch.

Your students might have some more ideas – make a list on the chalkboard.

Second, you and your students need to discuss how each quality can be measured.

- **Properly round and the right size:** Does the ball fit evenly through a special wire or cardboard hoop of the exact/right diameter no matter which way up it is? Can you hold it comfortably?
- **Rolls straight:** Measure by actually rolling – you need to decide how far to roll it along a line on the ground.
- **Bounces well:** You will need to drop the balls from the same height and measure how high they bounce back to compare them.
- **Strong:** This might have to be tested by actual use. How long before repair or replacement is needed?
- **'Soft enough to catch':** Does it hurt your hands when you catch it?

Finally, you need to set scores for the tests you have established and then try them to see if it works (one example is given below).

You will need to develop this score sheet on the board with your students. You could divide your class into groups – each group to develop the scores for one property.



SCORE for the BALL	5	4	3	2	1
<b>Shape and size</b>	Nearly perfect fit through hoop	Slight, but even gap <1 cm	Uneven gap >1 cm	Uneven fit with big gaps	Totally wrong size
<b>Rolls straight</b>	Perfectly along the straight line	<5 cm off the line	5–10 cm off the line	>10 cm off line	Not on the line at all
<b>Bounce from 1.5 m</b>	About 1 m	More than 50 cm	Between 25–50 cm	Only about 10–25 cm	Hardly any bounce at all
<b>Strong – how long it lasts</b>	Lasts more than 10 minutes	5–10 minutes of use before it is damaged	Lasts for 2–5 minutes before it is damaged	Lasts for 2 minutes before it becomes damaged	Not even 1 minute of use before it needs repair
<b>Soft enough to catch</b>	Catch easily with no hurt	Occasionally causes stinging	Painful after a few catches	Some scratches	Damages your hands – scratches and stings

Give each group time to find materials and make their ball.

Now ask each group to test their ball against the criteria. What is the score for each criteria? What is the overall score?

You may find that you and your students need to change the criteria once they have made their balls. This would show that they are developing critical thinking skills. They may also think of adding qualities, for instance, appearance. That also deserves some praise.

### Activity 3

Here we suggest that students work in friendship groups to think of something that they could make from scrap and waste material. The product should have some value or use and perhaps could be sold at an 'entrepreneurial' day later in the year.

They might want to look at some old things, like corncob dolls, which were so popular in the past. How could these be updated? What about making toy cellphones for younger children? If you can crochet bags from strips of plastic, what about caps or 'beanies'?



How will you get the students to examine the science in this work? As they work you need to move around the classroom talking to each group about what they have learned about matter and materials. They need to give evidence, or be able to tell, how they have thought about the properties and nature of the materials they use, and why have they chosen them. What are their properties? Where do they come from? Are they renewable or non-renewable resources?

At the end, ask each group to present their product to the class. They should explain why they have chosen certain materials and if they are from renewable or non-renewable resources.

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# Social Studies: Investigating people and places

- 1 Diversity
- 2 Similarities and differences
- 3 Local environment

## Key question for the teacher:

How can you help students explore similarities between different people and different places?

**Keywords:** research; cultures; places; environment

## Learning Outcomes for Teachers:

By the end of this section, you will have:

- Explored difference and similarity across different African contexts;
- Used interactive strategies that allow the comparison of communities and practices across contexts;
- Set up a focused classroom research activity using a range of resources.

## Overview

When teaching social studies, you are confronted all the time with questions of human diversity and commonality.

This section looks at how you can help your students compare lifestyle and economic practices across different contexts and cultures. This will help to develop important social studies thinking skills for you and your students.

In primary school, older students are highly capable of working with the idea that objects in two different categories might still have a number of properties or features that make them similar. It is part of your role to help younger students understand this.

## 1 Diversity

In this part, you are encouraged to develop this thinking in your students in relation to the tension between commonality and diversity among human beings.

**Teaching Example 1** and **Activity 1** suggest ways of using group discussions to explore the different lifestyles of people in different places, but also to remind students of the shared humanity of people everywhere.

### Teaching Example 1

Ms Maryogo teaches geography in a remote rural village school in Tanzania. The inhabitants of the village are on the whole very poor. Mrs Maryogo wants to help her students to question the differences between communities and so sets them tasks that encourage them to think critically and discover truths about the world they live in for themselves.

Today, she has considered very carefully what she can expect her 11-year-old students to do and has prepared a series of images that reflect life in different communities.

In discussion in class, Ms Maryogo poses the following questions:

- What similarities are there between these places?
- What similarities are there between the people living in these places?
- What differences are there?
- Why are there these differences?

As students suggest answers to these questions, she encourages them to extend their ideas and think more deeply. She explores sensitively with them the feelings they have about living in their village.

(See also the Additional Resource on **Using questioning to promote thinking.**)

### Activity 1

Here are some examples of how different communities carry out activities – such as swimming and schooling. If you have other photos of activities – e.g. shopping, cooking which show differences, bring them into the classroom. Divide the class into groups of four or more. (If you are able to bring only a small number of illustrations/copies of photographs then the groups will need to be bigger.)





Give each group one scenario from the photographs – schooling, swimming, shopping, cooking etc – to work with. Each group should make a list of the similarities between what people do in each situation, and the differences. Use only the evidence in the pictures.

Ask each group to write sentences which compare the situations, for example:

- In the market, the food goods are laid out in a round tray.
- In the shop, people push things around in trolleys.

They can display these sentences with the pictures and others in class can see what different groups have said about each picture.

Looking at their displays will help you assess how well they have understood the topic. You can use this to plan the next step in their learning.

If you have younger students, you could do this as a class activity, using two contrasting photos and asking questions to help focus their observations.

## 2 Similarities and differences

Providing opportunities for your students to question information about different situations will help students understand differences between communities.

**Teaching Example 2** and **Activity 2** show different ways to organise students and use questioning to allow deeper thinking about similarities and differences.

### Teaching Example 2

Mrs Onuorah has prepared a lesson on exploring differences and similarities between different local areas. She has prepared a brief information sheet on two different locations (see 'A comparison of Owo and Idodo' below). At the beginning of the lesson, she gives the sheet out to the class and asks them to work in their groups. She writes the following questions on the board:

- What are the differences and similarities between the two environments (Owo and Idodo)?
- Are there similar standards of living across the two environments?

While the groups are working, Mrs Onuorah moves around listening to their conversations and supports them in thinking more deeply. She asks questions related to what the students say in order to help their thinking, and picks up on their own ideas and interests.

Mrs Onuorah is always concerned that she is organised so she can focus more on developing her students' understanding.

## Activity 2

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This activity gives students an opportunity to reflect on different social contexts.

- You could use the comparison below or make up your own contrasting environments (perhaps using magazine pictures, illustrations, photographs etc).

### A comparison of Owo and Idodo

#### Owo

Owo village lies about 8 km from the Enugu-Abakaliki expressway in Nkaru West LGA of Enugu state in Nigeria. Besides receiving sufficient and reliable rains throughout the year, the village is well served by natural springs.

The residents of Owo village are mostly mixed farmers. They grow a variety of crops including maize, sweet potatoes, bananas and vegetables like onions, tomatoes, lettuce, etc. They also raise poultry, goats and other small livestock.

In spite of being endowed with abundant natural resources, the residents of Owo have a very low standard of living. They receive low prices for their agricultural products.

#### Idodo

Idodo is a trading post on the Enugu-Abakaliki expressway. Because it is on a main commercial transport route, the residents were able, historically, to develop strong trading contacts with the cities. They have also built networks among truck drivers and other transporters, which enable them to move goods cheaply.

The residents of Idodo are mostly traders. They buy cheap agricultural products, poultry and goats from surrounding rural villages and are able to sell them for a profit in major urban areas like Enugu, Abakaliki and Oitsha.

As a result, the residents of Idodo enjoy higher standards of living compared to people in surrounding villages. Idodo has social amenities, including dispensaries, schools and piped water.

Give each group contrasting photographs or pictures. (See **Additional Resource: Using group work in your classroom**) Ask them to identify the features of each environment in terms of things like physical features, economic activities and what jobs people are doing. They may contrast the pictures with where they live. Ask them to note down important features and ideas about what is different and what is the same.

Put two groups together and ask each group to share their ideas with the other group.

Ask each group to make a presentation of their findings to the rest of the class.

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### 3 Local environment

Having explored differences and similarities between geographical locations with your class, a next step could be to use these ideas by involving your students in thinking of ways to improve their environment. **Teaching Example 3** shows how one teacher developed a school garden as part of her science and social studies lessons and **Activity 3** helps students explore how their local environment can be improved.

#### Teaching Example 3

##### Education for sustainable development (ESD)

##### What is education for sustainable development?

‘Education for sustainable development enables people to develop the knowledge, values and skills to participate in decisions about the way we do things individually and collectively, both locally and globally, that will improve the quality of life now without damaging the planet for the future.’

(Panel for Education for Sustainable Development, 14 September 1998)

Sustainable development is an integral part of citizenship that will enable students to:

- understand that despite physical, material and cultural differences, there is a lot that connects us with the wider world;
- think critically and challenge injustice and inequalities;
- identify, respect and value diversity;
- develop a concern for and commitment to environmental issues and sustainable development;
- be willing to act to make the world a fairer and more sustainable place;
- take responsibility for their actions.

Both citizenship and ESD provide great opportunities for active, student-centred learning styles from which students get a sense of their role as global citizens. Such an approach to learning includes lessons that explore distant localities and environmental issues. Exploring the local community and then communities further afield will help students to expand their thinking about how different communities and cultures can be and how the same problem can be solved in many ways, and provide new ideas to try and test. ESD also explores ways to be more self-sufficient. This means making best use of the resources around you but not using them all up. Thinking about ways you can replenish or replant will ensure continuity. It means using only what you need.

Local resources are not everlasting but have a limit unless we try to share and use these wisely and replace, where possible, what we use.

*Adapted from original source: <http://www.bbc.co.uk/>*



After much discussion, her students decided they would like to make some places to sit in the garden, and also to paint on the playground or make games to play at break times.

She allowed the students to discuss in their groups what this would involve. They needed to think about:

- where to put the seats;
- what they would make them out of;
- gaining permission from the head teacher;
- involving parents and other community members;
- what games they wanted;

Together they made a plan of action, which was displayed on the wall. The head teacher asked to come and listen to their ideas.

### Activity 3

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Ask your students what they like about their community and the school environment and list these on the chalkboard.

Next, ask them to brainstorm ways they could improve their school environment.

Ask them these two questions to start them talking:

- How could you make the school environment more interesting at play time?
- How could you encourage everyone to take pride in the school and protect it?

As each group feeds back their ideas, list the two most popular ones on the board.

When all the groups have fed back, go through each suggestion – summarising what it is.

Now ask your students (individually or in groups) to draw up a plan, that can be displayed in the wall, of the option for improving the environment that they would choose.

## Life Skills: Sensitive ways to talk about HIV and AIDS

1 Preparing to teach lessons on HIV and AIDS

2 Discipline in the classroom

3 Using activities to enhance learning

**Key question for the teacher:**

How can you teach a sensitive topic like HIV and AIDS in a constructive and supportive manner?

**Keywords:** preparation; active learning; sensitivity; quizzes; role play; HIV and AIDS

**Learning Outcomes for Teachers:**

By the end of this section, you will have:

- Prepared yourself for teaching a sensitive subject such as HIV and AIDS, using a variety of resources including the Internet
- Used different methods such as role play and local experts to ensure active learning;
- Created a sensitive learning environment to develop understanding of HIV and AIDS

## Overview

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As a primary teacher, you will be aware of the importance of helping your students deal with the impact of HIV and AIDS on their lives, in terms of knowledge about the facts of HIV and AIDS, the safety of their own health and the health of others.

This is a difficult subject for some teachers and students to cope with and for that reason some teachers prefer to 'leave it to the experts'. However, there are many ways you can provide a sensitive learning environment to help your students explore this topic if you plan carefully. This section will help you to prepare and plan using a variety of resources – colleagues, outside experts, text and the Internet. You will develop skills in using role play in your teaching about HIV and AIDS and create some classroom rules to provide a supportive learning environment. This section does not cover everything to do with HIV and AIDS but does help demonstrate approaches you could use.

# 1 Preparing to teach lessons on HIV and AIDS

You are probably facing two specific challenges when preparing lessons on HIV and AIDS. The first is confidence in your own knowledge and the second is that it is a sensitive subject and potentially difficult to teach. If there are any doubts in your own mind about whether HIV and AIDS education should be taught in school, you should discuss it with your Head Teacher. However, it is important that everyone understands HIV and AIDS.

It is critical that you are well prepared before you bring up this topic with your students. You must know the facts and prepare yourself to answer questions that may be difficult for you. This part will help you to prepare yourself well to teach HIV and AIDS.

You should also think about the students in your class and how each student might respond to this topic. What you cover will depend very much on the age of your students and how much you believe they know about the subject already.

## Teaching Example 1

Mrs Shikongo in Tanzania was preparing herself to teach her Grade 4 class about HIV and AIDS and she was rather nervous. What if the children asked questions she couldn't answer? She knew it was important to be properly prepared and thought about how she could do this. She made some notes of the things she needed to do.

1. Speak to the Grade 5 teacher. He attended an HIV and AIDS workshop in Nairobi. Ask if he has any workshop notes or other resources that could be borrowed.
2. Look in the school library to see if there are any booklets or other information for teachers or students.
3. Ask the Head Teacher if there is an HIV and AIDS advisory teacher in our area and contact them for background material.
4. Find out if there are any NGOs or clinics in town that have information on HIV and AIDS.
5. Collect together the resources, then plan some time to go through them and make notes of important facts. Read the resources with the age of my students in mind and see if I could use them.
6. Think about how to make it easy for my students to learn about this subject and be able to discuss their own views. How can I make sure that their learning is not blocked by embarrassment?
7. Do we need special 'rules' by which we discuss such a sensitive subject?
8. Think about how to assess how much the students have learned.

Having done her planning, Mrs Shikongo taught her first lesson on HIV and AIDS. Her class were nervous at first but as the lesson went on they listened and participated well. Many of them talked about the lesson during break time. Some asked her questions that she said she would answer in the next class.

### Activity 1

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Prepare yourself by researching the facts of HIV and AIDS and thinking about how you will teach it to your students.

Make notes, thinking about the following:

- Check with your head teacher that he or she is happy for you to do this.
- Where will you get information?
- Is there a resource person in your school? Town? District?
- Are there NGOs or medical centres working with HIV and AIDS education?
- How will you collect this information?
- How will you judge what information is appropriate for your students?
- Think about the age of the students and size of the class.
- How will you organise the classroom and your students?
- Would your students benefit from having a local expert come to talk to them to build on your class work? Should they come at the start of this work or later?
- What other resources do you have access to? Is there a computer room in your school where the class can access the Internet or you can gather information?
- Are there any students who may react strongly to this subject? How will you deal with different reactions?

Plan your introductory lesson.

## 2 Discipline in the classroom

Discipline is important in every classroom. However, the topic of HIV and AIDS can cause students to react differently to the way they behave in other lessons. You may find that you need to establish rules to encourage open discussions about HIV and AIDS and sexual activity. It can be a helpful lead in to the topic to discuss with your class why special rules are needed and ask them to suggest the rules themselves.

## Teaching Example 2

Chinyere was very tired – it had been a difficult day. She is a student teacher on practical teaching at Jos Primary School and her mentor had asked her to teach some lessons to Primaries 4, 5 and 6 on HIV and AIDS. She did not feel very confident. They had been given some sessions on this at college which helped her prepare. See the information below about how to deal with different reactions. She had been confident about working with the younger students, but had been very concerned about the Primary 6 class. There are a lot of older boys in that class and Chinyere felt sure they would disrupt the lessons.

Students may react to lessons on HIV and AIDS in different ways. They may:

- ask questions to try to embarrass you;
- remain silent because of their own embarrassment;
- try to shock or amuse by describing sexually explicit behaviour;
- ask personal questions about your private life;
- make comments which open themselves to ridicule or criticism from other students.

To deal with these situations, it is important to set class rules. These must be very clear to students before you start. You can have students discuss and develop their own rules or you can start with a list and discuss if they are fair and why they are important. Your list might include:

- Students are expected to treat each other in a positive way and be considerate of each other's feelings.
- Students are not to discuss personal matters that were raised during the lesson with other people outside the classroom.
- Students should avoid interrupting each other.
- Students should listen to each other and respect each other's opinions.
- Both students and teachers have a 'right-to-pass' if questions are too personal.
- No put-downs – no matter how much you disagree with the person, you do not laugh, make a joke about them or use language that would make that person feel inferior.
- Students will be given the opportunity to put their questions anonymously to the teacher.

Remember that the rules apply to the teacher as well as the students!





She was right; she had just started the first lesson about developing the new classroom rules when Thomas started to ask her questions about her own sex life. She was shocked at first, but she quickly told him not to be personal and carried on. Then, during group work, the class had got very rowdy and noisy with lots of laughter and her mentor had come to see what all the noise was about.

Chinyere split up the noisy boys' group, but when they were giving feedback Thomas and his friends kept describing explicit sexual behaviour to make the class laugh and make her embarrassed. She reminded them of the class rules and said they risked not being able to participate if they could not be responsible. She had dealt with them well, by ignoring most of their comments or turning the comments around to make a factual point. But it had been exhausting and she was glad when the bell went for the end of school. Next time, she would talk to these boys before the lesson about respect and what she would do if they misbehaved. She would try to help them understand the importance of the topic.

## Activity 2

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Part of your preparation for teaching about HIV and AIDS with your class involves preparing the students as well as yourself. You learned earlier about developing classroom rules to help effective learning on sensitive topics. Now you need to do this with your own class.

1. Explain to the class that you are going to be doing some work on HIV and AIDS.
2. Review the existing classroom rules that you have by putting the class into groups to discuss if they are relevant.
3. Ask each group to think of no more than three extra rules they would like to have during this work.
4. Each group suggests their additional rules, which are written on the board.
5. As a class, agree the additional rules you want.
6. Discuss all the rules with the class, including the new ones, and make sure everyone is clear why these rules are needed for this topic.

What will you do if they ignore the rules? Agree with your class what limits or sanctions you will use.

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### 3 Using activities to enhance learning

If students are to learn actively, then they need to be either physically or mentally active – or both! There are many ways you can promote active learning to make sure your students are getting the most out of their lessons. Which methods you use to teach HIV and AIDS will depend very much on the size of your class and the age of your students – and also on what you know about their preferred methods of learning.

You know that role play is a good strategy to use for helping students discuss sensitive topics. In HIV and AIDS lessons, it will allow students to discuss situations that are not their own but to think about how these relate to their own experiences. This is used in the **Activity 3**.

Another effective method is the HIV and AIDS quiz. In **Teaching Example 3**, one teacher uses a quiz activity to find out how much her primary class knows about HIV and AIDS.

#### HIV and AIDS quiz

This quiz is online at <http://www.avert.org/generalquiz.htm> and you can complete it there yourself. If your students have Internet access, you could also use it with them. If not, there is an adapted text version here. Tick what you think is the right answer.

#### 1. Does HIV only affect gay people?

Yes	No	Only Gay Men	Only Gay Women
	<b>a</b>		

#### 2. Approximately how many people are living with HIV worldwide?

38.6 million	25.8 million	3.5 million
<b>a</b>		

#### 3. How can you tell if somebody has HIV or AIDS?

Because of the way they act	They look tired and ill	There is no easy way to tell
		<b>a</b>

#### 4. Can you get AIDS from sharing the cup of an infected person?

Yes	No	Only if you don't wash the cup
	<b>a</b>	

#### 5. When was AIDS first defined?

1997	1987	1982
		<b>a</b>



**6. Which protects you most against HIV infection?**

Condoms	Contraceptive Pills	Spermicide Jelly
<b>a</b>		

**7. What are the specific symptoms of AIDS?**

There are no specific symptoms	A rash from head to toe	You start to look very tired
<b>a</b>		

**8. What is HIV?**

A virus	A bacterium	A fungus
<b>a</b>		

**9. Can insects transmit HIV?**

Only mosquitoes	Yes	No
		<b>a</b>

**10. What does STD stand for?**

Sexually Transmitted Disease	Special Treatment Doctor	Standard Transmission Deficiency
<b>a</b>		

**11. Is there a cure for AIDS?**

Yes	No	Only available on prescription
	<b>a</b>	

**12. When is World AIDS Day held?**

1st January	1st December	1st June
	<b>a</b>	

**13. Worldwide, HIV is most common in which age range?**

0–14 years old	15–24 years old	25–34 years old
	<b>a</b>	

**14. Is there a difference between HIV and AIDS?**

Yes, HIV is the virus that causes AIDS	No, HIV and AIDS are the same thing	Yes, AIDS is the virus that causes HIV
<b>a</b>		

**15. What percentage of those infected with HIV are women?**

Nearly 25%	Nearly 50%	Nearly 75%
	<b>a</b>	

**16. Is it possible to lower the risk of an HIV positive woman infecting her baby?**

Yes, the risk can be made much lower	No, not at all	Only very slightly
<b>a</b>		

**Teaching Example 3**

Maria used the Internet to prepare herself for working on HIV and AIDS with her class. She is lucky that she is upgrading her teaching qualification through distance learning and has access to the computer room at the study centre.

She decided to try out an activity called 'Transmission runaround'.

**Transmission runaround**

You can use this method for any age group by adapting the questions to suit the level of the children. This description is better suited to older primary students.

**Aims**

- To assess levels of awareness of how HIV is transmitted.
- To encourage group members to think about a variety of transmission routes.

**What you will need**

A reasonably spacious room, to allow for free movement. Or you can move outside.

A copy of Transmission Runaround true/false question sheet for yourself and the answer sheet.

Two large sheets of paper clearly marked 'STRONGLY AGREE' and 'STRONGLY DISAGREE'.

Pins.

Time – up to 60 minutes depending on the number of statements used and the size of the group.

**What you do**

- Put up the 'STRONGLY AGREE' and 'STRONGLY DISAGREE' sheets on the wall at opposite ends of the room or on the wall/trees across the playground.
- Explain to the group as a whole that you will read out a series of statements, one at a time. Each person is to think about whether they agree or disagree with it, and move to the appropriate side of the room/space. It is all right to stay in the middle if they are uncertain.
- Read the first statement. Once everyone has moved to their chosen place, ask members to choose one person near them and discuss why they are standing where they are.

- Now ask people to choose one person standing as far away from them as possible, and to discuss the statement with them, explaining why each has chosen to be where they are.
- Repeat the procedure with as many statements as time allows.
- Reassemble as a group and, going round the group, ask each individual to identify one piece of information they are confused or unclear about. Ask members of the group to clarify the issues involved and intervene yourself where necessary.

### Likely outcomes

At the end of the exercise, it will be clear what areas of uncertainty remain. Individuals will have had a chance to think about ways of transmitting HIV, and to discuss these with other group members. It will also be clear that transmission routes for HIV are very specific e.g. it is not 'sex' that transmits the virus, but unprotected sex involving penetration. People can sometimes become quarrelsome during this exercise so you may need to intervene to settle disputes.

### True/false question sheet

		True	False
1.	You can become infected with HIV by sleeping around		
2.	Injecting drugs will give you HIV		
3.	You can get HIV from toilet seats		
4.	If you are fit and healthy you won't become infected with HIV		
5.	Married people don't become infected with HIV		
6.	If you stick with one partner you won't become infected with HIV		
7.	Women are safe from HIV as long as they use a contraceptive		
8.	You can become infected with HIV from sharing toothbrushes		



		True	False
9.	If you have sex with people who look healthy, you won't become infected with HIV		
10.	If you only have sex with people you know, you won't become infected with HIV		
11.	Anal sex between two men is more risky than anal sex between a man and a woman		
12.	You can become infected with HIV from kissing		
13.	A man can become infected with HIV if he has oral sex with a woman		
14.	A man can become infected with HIV if he has oral sex with a woman		
15.	Condoms can stop you becoming infected with HIV		

#### True/false answer sheet

1. Sleeping around is not in itself risky, but having unprotected sex with an infected person is. By using condoms properly and by avoiding sex with penetration, you can substantially reduce the risk of infection.
2. Only if the needle or syringe previously has been contaminated with HIV.
3. There are no known cases of HIV infection via toilet seats.
4. It does not matter how healthy or unhealthy you are, if you engage in risky activities you stand a chance of being infected.
5. This depends on the partners involved, what they did before they met, whether either has unprotected sex outside of the marriage or injects drugs using contaminated equipment. Marriage by itself offers no guarantee of safety.
6. As for No 5.
7. Only condoms offer women protection against HIV, and even condoms cannot offer complete safety. Other forms of contraception do not offer protection from HIV.



8. There is no evidence of transmission via this route, but it is sensible not to share toothbrushes for general health reasons.
9. Most people with HIV will look perfectly healthy. Looks are therefore a useless way of assessing risk.
10. Knowing someone well offers no reliable guide to whether or not they have HIV infection.
11. Anal sex is equally risky regardless of whether it takes place between two men or a man and a woman.
12. There is no evidence of transmission in this way, although kissing when there are sores or cuts in the mouth may pose some risk.
13. HIV is present in cervical and vaginal secretions as well as in (menstrual) blood, so there is the possibility of transmission this way.
14. HIV is present in semen so there is a possibility of transmission in this way.
15. Condoms used properly will help to prevent transmission of HIV from an infected partner to an uninfected partner. Condoms are not 100% safe though. Any lubricant used should be water based, as oil-based lubricants can weaken the condom. When buying condoms check the 'sell by' date.

Maria followed the instructions and found that the method was very helpful in discovering some of the misconceptions her students had about HIV and AIDS. She also found that it took much longer with her big class of 56 students, and it was a bit chaotic the first time she did it.

So, the next time, she split the class into two groups and had one group write about things they knew or thought they did about HIV and AIDS while the others did the activity. In the following lesson, she swapped the groups around. Between lessons she was able to think about what the students already knew or thought they knew about HIV and AIDS and this helped her plan the next lesson.

### Activity 3

Plan some role play lessons on an HIV and AIDS theme, see **Additional Resource: Using role play/dialogue/drama in the classroom** and the role play for HIV/AIDS lessons that are suitable for the age of your students. If they are sexually active, you might focus on prevention. Here are some examples of scenarios to use:

- John says he is in love with Mary. On a date, when they are alone, John tries to pressurise Mary to have sex with him.
- Jennifer, a pretty and clever girl, does not have the beautiful things some of her classmates have. Her uncle introduces her to his friend who likes Jennifer and wants to 'look after' her – but only if she will have sex with him.

You could use these scenarios to discuss the problems first and then ask your students to role play ways to deal with the problem.

With younger students, you could devise role plays which deal with misconceptions such as:

- Precious and Becky are in the washrooms at school. Precious wants to use the toilet but she says she will wait until she gets home or go in the bush because she does not want to catch AIDS.

Make your plan and then carry out the lesson. At the end, ask yourself: How well did it go? What did you do well? How could you improve your approach to help students understand and feel secure?

### **Role play for HIV and AIDS lessons**

When thinking about the problems for role plays, make sure they allow your students to focus on positive reactions or behaviour. Research has indicated that scary and negative messages do not always encourage a positive change in behaviour. In a role play, students act out a situation spontaneously. This means they take on a role and decide what they are going to do and say on the spot. They do not rehearse or use a script. You cannot tell exactly how a role is going to develop. Role plays can:

- help identify attitudes of different people;
- help students to explore group or personal behaviour;
- help students see that other people have similar problems;
- help students develop interpersonal skills;
- provide a way to address sensitive problems;
- help students see things from other people's points of view;
- help students practise assertive behaviour;
- allow students to explore situations that concern them without revealing anything personal about their own knowledge, beliefs, experiences or situation.



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## ADDITIONAL RESOURCES – TEACHING PACKS

- Using group work in your classroom
- Mind maps and brainstorming
- Researching in the classroom
- Using questioning to promote thinking
- Working with large/multi-grade classes
- Using storytelling in the classroom
- Assessing learning
- Using investigations in the classroom
- Explaining and demonstrating in the classroom
- Being a resourceful teacher in challenging conditions
- Using the local community/environment as a resource
- Using role play/dialogue/drama in the classroom

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## Using group work in your classroom

### What group work does

Group work can be a very effective way of motivating students to learn by encouraging them to think, communicate, exchange ideas and thoughts, and make decisions. In groups, students can both teach others and learn from each other in ways that result in a powerful and active form of learning.

### When to do group work

Group work can be used:

- at the start of a lesson or topic, to find out what students already know;
- during a lesson, to encourage understanding or to share views and opinions about a topic;
- at the end of a lesson, to help students think about their learning and be clear about what they know and what they still need to understand.

### Before you start

- Before starting a group session, be clear about what you want to achieve from it. It needs to have a clear purpose or objective. For example: 'By the end of the session we will be able to describe how rain is formed and what it does to our local landscape.'
- Divide the class into manageable groups depending on the size of your class, but don't make them too large – everyone needs to be able to contribute. You may have to move furniture or perhaps have some groups outside.
- Give each individual a job to do in the group. These could include: recorder of what's said; organiser; devil's advocate; peacekeeper; spokesperson; link person with other groups.
- Decide ways in which you will divide students into groups. You could use friendship groups, put similar personalities together, different personalities together, similar ability groups, mixed ability groups – or have no category at all. Which one will work best in the situation you are planning?
- Plan enough time for the students to reach a conclusion as well as time at the end of the session for each group – and you – to summarise the conclusions.

### Introducing the group work

- Once students are in their groups, explain that working together to solve a problem or reach a decision is an important part of their learning and personal development. Tell them what you expect of them in terms of behaviour (e.g. respect for each other, listening, making decisions) and individual roles (e.g. spokesperson, recorder).
- Explain the task clearly and write it on the board as well. Tell the students what they have to do and what the outcome of their group work should look like. This is very important because if they do not understand what they have to do, the session will get off to a bad start. Allow students to ask questions before you start, and be helpful with your answers.

**Managing the group work**

- Check how the groups are doing. Resist the temptation to get involved too soon. Let them struggle with difficulties for a while. If you give them answers too quickly they will come to rely on you rather than on themselves. If necessary, clarify your instructions. It is important to remember that all learning requires us to struggle with difficulty or uncertainty. So expect a lot from your students, telling them how confident you are in them as you go between the groups.

**Ending the group work**

- End with a whole-class session in which you get, for example, one idea from each group until you meet the original objective, or ask each group to tell you about the most interesting thing they learned. Try to make the final session an exchange of ideas rather than you telling them what they have missed.
- Summarise the work of the groups in a way that makes them feel proud of what they have done. Also, ask them to tell you how well they thought they worked in a group. This gives you a clue about their own response to group work.
- Finally, think about how well you did in managing the group session. Recognise the parts you did well and note those areas where you could have done things differently to make the groups more effective. Use this information to develop your techniques for the next time, and note your own improvement and that of your students.

## Using mind maps and brainstorming to explore Ideas

### What is brainstorming?

Brainstorming is a group activity that generates as many ideas as possible on a specific issue or problem then decides which idea(s) offers the best solution. It involves creative thinking by the group to think of new ideas to address the issue or problem they are faced with. Brainstorming helps students to:

- understand a new topic;
- generate different ways to solve a problem;
- be excited by a new concept or idea;
- feel involved in a group activity that reaches agreement.

### How to set up a brainstorming session

- Before starting a session, you need to identify a clear issue or problem. This can range from a simple word like 'energy' and what it means to the group, or something like 'How can we develop our school environment?' To set up a good brainstorm, it is essential to have a word, question or problem that the group is likely to respond to. In very large classes, questions can be different for different groups. Groups themselves should be as varied as possible in terms of gender and ability.
- There needs to be a large sheet of paper that all can see in a group of between six and eight students. The ideas of the group need to be recorded as the session progresses so that everyone knows what has been said and can build on or add to earlier ideas. Every idea must be written down, however unusual.
- Before the session begins, the following rules are made clear:
  1. Everyone in the group must be involved.
  2. No one criticises anyone else's ideas or suggestions.
  3. Unusual and innovative ideas are welcomed.
  4. Lots of different ideas are needed.
  5. Everyone needs to work quickly. Brainstorming is a fast and furious activity.

### Running the session

The teacher's role initially is to encourage discussion, involvement and the recording of ideas. When students begin to struggle for ideas, or time is up, get the group (or groups) to select their best three ideas and say why they have chosen these.

Finally:

- summarise for the class what they have done well;
- ask them what they found useful about their activity. What did they discover in the brainstorming that they didn't realise before?

**What is mind mapping?**

Mind mapping is a way of representing key aspects of a central topic. Mind maps are visual tools to help students structure and organise their own thinking about a concept or topic. A mind map reduces large amounts of information into an easy-to-understand diagram that shows the relationships and patterns between different aspects of the topic.

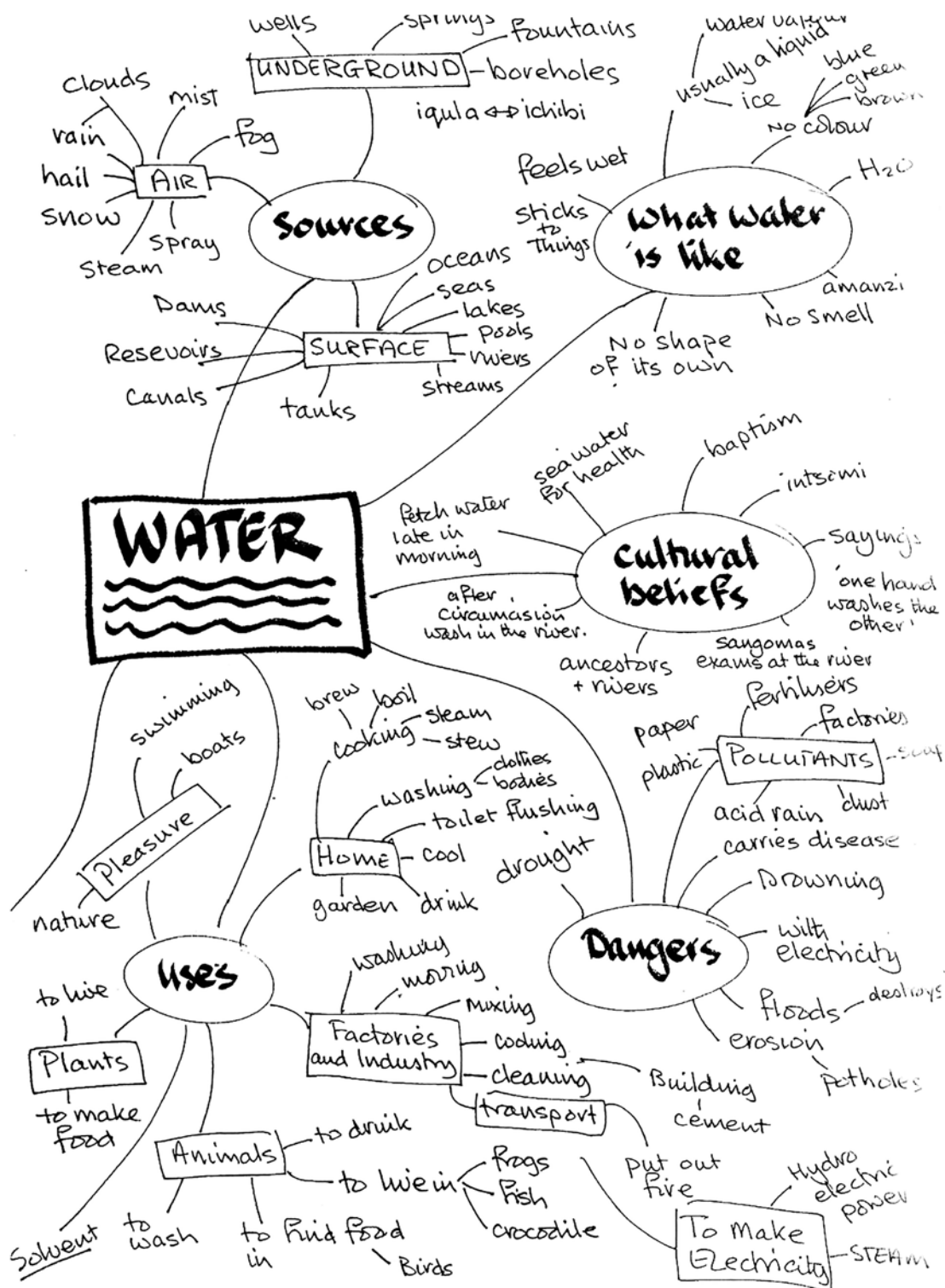
**When to use a mind map**

- A mind map is useful when you want to encourage creativity as its structure encourages free thinking.
- When trying to solve a problem, a mind map helps to highlight the aspects of the problem and how they relate to one another.
- A mind map can help to revise previous work with a class – quickly and in an organised way.
- Use mind maps when you want to encourage discussion, variety, experimentation and thinking in class groups.

**How to make a mind map**

- Begin by drawing a box in the centre of a piece of paper. Write in it the main theme, topic or idea you are going to represent.
- Make branches from the main box that have sub-themes associated with the main theme.
- Be creative with your basic map, adding in ideas around your sub-themes.
- Try a mind map out on your own before trying it with your class. You could use it as a demonstration.

The following page shows a mind map of all the information teachers thought of at a workshop on the topic 'all we know about water':



## Researching in the classroom

Good teachers like to find out as much as they can about their classes and the teaching approaches that work best. This is often a very informal process. For example, it is very common to discuss the best way to teach a certain topic with other teachers. These same discussions might extend to other topics. Why is the attendance of boys in the school much poorer than the attendance of girls? In what ways can parents or guardians be encouraged to come and talk to us about their children's progress?

This can become a more thorough process if you adopt the sorts of approaches and methods that researchers use. You can use what is often termed 'action research' to help improve your teaching and your school generally. The word 'action' is used to signify that you expect to gain information upon which you can 'act' fairly quickly.

Many books and publications now describe the 'action research' approach. Here we set out a very straightforward approach in just four stages.

### Stage 1 – Defining the research question

Take the problem or issues you want to examine and formulate it in terms of a research question. For example, you may have become worried that some girls in the class seem to have problems doing homework. This worry becomes a question:

'Why do some girls have problems doing schoolwork, especially homework, at home?'

### Stage 2 – Deciding on methods to help answer the research question

You then have to think about the methods you use to explore this problem. For example, you could give the girls a short questionnaire asking them about working at home and the reasons why they experience difficulties. This assumes the students have reasonably good written skills. You could carry out individual interviews with the girls. In some situations, you might be able to visit the homes and interview the parents or guardians.



**Stage 3 – Carrying out the research and recording findings**

Find time to carry out interviews, observations or surveys. This is your research. When you have carried out the research, it is a good idea to write up the findings. Sometimes teachers do this as part of a course (an upgrading course for example) and have to write things up in a formal way. Even if you are doing this for your own benefit, it is useful to note down your findings.

**Stage 4 – Make changes**

Interpret and reflect on your findings. Once you have the data, you need to think about what it means and what the implications are. For example, if the interviews with the girls revealed that some of them are expected to take over 'childcare' at home and find doing homework a problem, then you need to think about how you deal with this. Do you talk to the parents or guardians to stress the importance of the girls being able to do their homework? Or do you provide, for example, lunchtime opportunities for the girls to carry out their homework? The research process then carries on as you evaluate the impact of the changes you have made.

Action research can be built into the general strategies for improving teaching and improving schools. It can be done individually but it is also very effective when groups of teachers work cooperatively to try to solve particular problems.

## Using questioning to promote thinking

### Introduction

Good questioning is an important skill for you, the teacher, to acquire. Questioning can be used to find out what your students know and assess their progress, but can also be used to inspire them, help extend their thinking skills and develop enquiring minds. Questions you can ask can be divided into two broad categories:

- Lower level questions, which involve the recall of facts and knowledge previously taught, often involving closed questions (a yes or no answer).
- Higher level questions, which ask the student to use bits of information previously learned to form an answer or to support an answer in a logical manner. Higher level questions are often more open-ended.

There are two issues with both higher and lower level questions. These are:

- encouraging students to respond;
- improving the quality of their responses.

### Encouraging students to respond

Many teachers allow just one second before answering the question themselves or asking another question. This leaves no time for students to think what they might say. By waiting between three and six seconds before saying anything gives students time to think of answers. Research indicates that this has a positive effect on students' achievement. By waiting after posing a question there is an increase in:

- the length of student responses;
- the number of students offering responses;
- the frequency of student questions;
- the number of responses from less capable students;
- positive interactions between students.

The way incorrect responses are handled will determine whether students continue to respond to the teacher's questions. 'That's wrong', 'You are stupid' or other humiliation or punishment often stops students volunteering any more answers from fear of further embarrassment or ridicule. Instead, if you can pick out parts of the answers that are correct and ask them in a supportive way to think a bit more about their answer you may encourage more active participation.

This helps your students to learn from their mistakes in a way that negative behaviour towards them does not. The following phrase shows how you might handle an incorrect answer in a more supportive way:

*'You were right about evaporation forming clouds, but I think we need to explore a bit more about what you said about rain. Can anyone else help us?'*

### Improving the quality of responses

Helping students to think more deeply and improve the quality of their answers is a crucial part of your role. To help students achieve more, you need to be able to:

- prompt;
- probe to seek clarification;
- build on answers by refocusing;
- sequence questions in a way that extends thinking;
- listen very carefully to student answers in order to ask the right question.

**Prompting** is about adding hints that help students develop and improve their answers. Begin by choosing what is right in the answer and offering information, further questions and other clues. ('So what would happen if you added a weight to the end of your paper aeroplane?')

**Probing** is about trying to find out more, helping students clarify what they are trying to say to improve a disorganised answer or one that is partly right. ('So what more can you tell me about how this fits together?')

**Refocusing** is about building on correct answers to link students' knowledge to knowledge they have previously learned. This broadens their understanding ('That is odd. But how does it link with what we were looking at last week in our local environment topic?')

**Sequencing** questions means asking questions in a certain order to extend thinking. Here, your intention is to lead students to summarise, compare, explain or analyse. This means you must have questions ready that stretch students, but not so far that they lose the meaning of the questions. ('Explain how you overcame your earlier problem. What difference did that make? What do you think you need to tackle next?')

**Listening** enables you not just to look for the answer you are expecting, but to alert you to unusual or innovative answers that you may not have expected.

Such answers could highlight misconceptions that need correcting, or they may show a new approach that you had not considered. Your response to these could be very important in maintaining motivation. ('I hadn't thought of that. Tell me more why you think that way.')

**Common mistakes in questioning**

It is often said that 'questions are only as good as the answers they get'.

Common errors in questioning, which discourage students from offering answers or participating, are:

- asking too many questions at once;
- asking a question and answering it yourself;
- asking a difficult question too early;
- always asking the same type of question;
- asking a question in a threatening way;
- not using probing questions;
- not giving students enough time to think;
- ignoring answers;
- not correcting wrong answers;
- failing to see the implications of answers;
- failing to build on answers.

If you do any of these, think about how you might adapt your approach and find ways of doing the opposite. Watch and see the improvement in student performance.

## Working with large classes

### Top 20 ideas for teaching large classes

1. Plan ahead and prepare thoroughly; problems can be magnified in large classes, but they can also be dealt with effectively.
2. Maximise classroom space by removing unnecessary furniture, and use space outside the classroom for learning and activities. Ask your students for suggestions on arranging the classroom in a comfortable way.
3. Do everything possible to get to know your students. A positive relationship with your students means they will be more willing to actively participate in class.
4. Give opportunities for students to individually introduce themselves to the class.
5. Move around the class when talking – this engages students, and it can reduce the physical and social distance between you and your students.
6. Be natural and personal in class and outside of it – be yourself!
7. Tell your students you will be available before and after class to answer any questions they might have.
8. Keep track of frequently asked questions or common mistakes. Use these to develop lessons and help students avoid making mistakes.
9. Be aware of the class. If you notice or even feel that there is something wrong, ask a student what is going on. Invite small groups of students to visit you to discuss important class issues. When necessary, involve students and use positive discipline to deal with misbehaviour.
10. To check the content of your lessons and the knowledge and skills of your students, to identify those students that need your special attention.
11. Recognise the attention span of students is limited: 15 minutes of lecture followed by an activity and then additional lecture if needed is ideal. Determine what information can be delivered in forms other than lecture and develop these methods. For instance, group work, role play, student presentations, reading outside class, and in-class writing can be excellent ways to vary classroom routine and stimulate learning.
12. Develop a formal lesson plan to organise your teaching; this is a way to monitor whether or not your students are understanding what is taught; and a chance for you to think about what to do next and how to improve your teaching. In your plan, identify what topic is to be taught, the learning objectives, teaching methods, classroom arrangement, main activities, resources and assessment methods.
13. Explain to your students exactly how and why you are teaching in a certain way. For example, 'This is why I give quizzes at the end of class (to check on your understanding).'
14. Develop a visual display of the day's topics and learning objectives (such as a list on the chalkboard). This will make following the flow of the class much easier for you and your students. Plan for a clear beginning, middle and end to the class.

15. Use 'prompts' to develop students' question and answer skills, and count to ten after you ask a question to give time for the student(s) to answer.
16. Give assignments that really assess whether or not your students are learning what you are teaching. Can they explain the process they used to solve a problem, and can they apply what they are learning to everyday life? Give clear and thorough instructions for all assignments.
17. Develop a portfolio system or other ways to keep track of student performance – both successes and areas needing improvement – and to identify those students who require extra attention.
18. Develop exams that really tell you if your students have learned and can apply what you have taught them, not just what they remember.
19. Give prompt feedback on assignments and exams. Involve your students in the grading process to give faster feedback.
20. Reflect on your teaching. Discuss with your colleagues and students how your class can be improved. Visit the classes of colleagues who are also teaching many students, and exchange ideas and materials. Above all, view the challenge of teaching a large class as an opportunity, not a problem.

## Working with multigrade classes

### Introduction

What counts in teaching is not the size of the class, nor the age or grade of the students in it, but the quality of the teaching. In this key resource document are some suggestions for teaching classes with students of different grades. You might also find it helpful to see the Key Resource: Working with Large Classes.

### Active learning strategies for multigrade classes

The following teaching strategies are for whole class or mixed-grade groups:

- **Round** Each student has a two- or three-minute opportunity to express his or her point of view on a given topic while others listen. For older students, the topic can be controversial or thought-provoking, such as 'Education is valuable for my daily life.' For younger students, choose a simple topic, such as 'What I like about school.' This activity will provide you with a range of viewpoints to consider when delivering your lessons, as well as building a sense of 'safe participation' and confidence among your students.
- **Brainstorm** Ask students to think individually about an issue or problem – for example 'Why is water becoming scarce?' or 'How can we improve our school?' – and to list its possible causes. Stress that people working together can create more than an individual alone.
- **Simulations and games** Ask students to role-play a situation; for instance, 'What would you do if you were confronted by a bully?' By creating situations that are momentarily real, your students can practise coping with stressful, unfamiliar or complex situations.
- **Peer teaching** Randomly select students to find out about a specific topic and then teach the basics of the material to a partner, group or the entire class.

### Involve your students

- The classroom is for everyone. Students can be very helpful in managing the classroom's physical space, and it helps them to develop a sense of responsibility.
- Involve your students in developing classroom rules! Ask your students to identify what behaviours are acceptable and what behaviours are not acceptable. Make only a few rules that emphasise appropriate behaviour. Remember that penalties should be consistent with the nature of the misbehaviour and based on positive discipline to help your students to learn good behaviour
- Encourage 'experts' from the community to come to class to talk about special skills and knowledge. You can even ask older students in the class to act as peer teachers and to work with different grade-based groups.

### Group exercises and cooperative learning

- In a large class, students working in pairs or larger groups can help each other and learn from each other. Have students from the same grade working together – but also mix up the grades to encourage peer learning
- Group exercises give students an opportunity to meet and work with one another, a good step towards building a sense of community. In the ‘real’ world, working with others is an important skill. Giving your students more opportunities to work together can help them develop this skill and releases you to work with groups of students of different grades.
- Small-group work encourages students who may be reluctant to participate in a large class setting to participate more. Cooperative learning also helps to hold students’ attention – a special concern for large classes – and to increase student thinking.

### Multigrade teaching and group work

- When designing your group exercises (or even individual exercises), the task that the students are to complete should be specific and clear to the group. This does not necessarily mean the group is all of the same grade. Variations of a similar task such as completing some or all of a worksheet, solving a similar problem but of different levels or answering specific questions selected from a range on the chalkboard, will keep your students focused
- *Development exercises.* Place a group of students in a real or simulated situation and ask them to solve a problem. This can be the same problem for all grades but the response might be different. Alternatively, write a question or statement with mistakes in it on chalkboards around the room. These mistakes can be structural (such as grammatical errors) or mistakes in interpretation (such as errors in judgement or in the use of facts) specific to a grade group. In mathematics, for example, you can give different groups of students a ‘story problem’ to solve; in science, you can ask all the groups, whatever the grade, to classify a group of seemingly unrelated objects into categories and justify why they chose these categories.
- *Topic exploration exercises.* Assign each grade group a specific topic to study (research), and give them access to resources they can use to learn about it. These resources can be books, or they can be people in the community who have knowledge about how to do a special activity.
- *Simple exercises.* These exercises focus on developing a particular skill, such as drawing, editing, quick problem solving, etc. In mixed grade groups, the students practise and are given feedback by their fellow group members. At the end of the exercise, volunteers demonstrate their new skills for the class.



### Evaluation of group work

- Require some type of group product for exercises that can be graded. (Remember: grading ten papers or projects is much easier than grading 60.)
- Carefully observe the groups and their members. Praise individual participation as well as the quality of group work.
- Occasionally, require an individual product based on group work, such as a one minute paper about an issue learned from the exercise, a short quiz or an oral presentation by randomly selected group members. This rewards students who were actively involved in group learning and discourages 'freeloading' or the nonparticipation of some group members.
- Sometimes, use self and peer evaluations at the end of an exercise; for instance, give each student in a group a 'score card' and ask him or her to give a grade themselves and for each of his or her group members. This method is especially helpful for judging how well the members of a large class participate, where it can be difficult for you to evaluate all individuals personally.

### Assessment Strategies for multigrade classes

The following assessment strategies help give effective feedback and summative evaluations within a manageable workload for mixed-grade classes:

#### Giving feedback

- To identify which students need more personalised feedback, and to manage the paperwork, use the 'portfolio' method. A portfolio is a file, such as a manila folder, containing samples of a student's assignments, such as essays, stories and reports; illustrations, pictures, maps and diagrams.
- Students' non-curricular activities can also be recorded, such as taking responsibility in a classroom activity.
- The material in a portfolio is organised in chronological order with each item containing a date and the context in which it was produced. It follows the student's successes rather than failures.
- Once the portfolio is organised, you and your students can evaluate their achievements. At least twice every semester or term, review the whole range of work to identify those students who need more individual attention.

#### Create exams that 'look' familiar to students

- Exam questions should be in the same form as those that you used in quizzes, homework assignments, lectures or discussions.

#### Conduct review sessions

- Set aside class time to conduct review sessions, either with the entire class or in groups. One third of the session time can be spent in a short lecture revising the major points of a topic, and then the remaining time for students' questions and/or a short practice exercise.

**Develop exams that demonstrate learning achievement**

Together with, standard multiple-choice exams:

- Add short essay questions; control the length of responses by providing students with a limited amount of space for answers (an 'answer' box).
- Ask students to answer questions using diagrams, flow charts or pictures. These are short and easy to grade, but can be very informative about students' analytical skills.
- For some multiple-choice questions, ask the student to choose the correct answer and then provide a one- or two-line explanation of how they got that answer.
- Give group examinations. The same grade can be assigned to all members of the group, based on the 'group product' they produce. For individuals, ask group members to anonymously grade each other, and then assign the average of the group's grade to each student.
- Ask students to write their own examination questions and answers based on your class lectures and activities. These can be used on actual tests.

**Give prompt feedback on assignments**

- Ask students to do assignments in groups.
- Assign a short in-class assignment for individual students and ask them to bring you their completed assignments when they finish. You can grade these on the spot and give them instant feedback. To avoid a line at your desk, ask your students to take numbered pieces of paper when they have finished their work and to come to your desk for feedback when their number is called.
- Ask older students in upper grades to help you grade your students' assignments.
- Occasionally students can exchange their assignments and they can grade each other's work.
- Give out an answer sheet so students can assess their own work, or set aside class time to go through the answers to the homework with the entire class.

## Using storytelling in the classroom

Stories help us make sense of our lives. There are many traditional stories that have been passed down from generation to generation which were told to us when we were young, that explain some of the rules and values of the society that we were born into. Stories are a very powerful medium, especially if they are well told or written. Stories are entertaining, exciting, stimulating and can transport us out of our everyday life into fantasy worlds, but they can also be challenging. They can provide guidance about how we live our lives; they can stimulate our thinking about new ideas; they can help us explore our feelings and help us to think through problems in a context that is detached from reality and therefore less threatening.

Stories have a strong role to play in the classroom in all curriculum areas and can be used in a number of ways for a range of purposes. The next part explores when and how you might use story in your classroom to develop your students' knowledge and understanding of their world.

### How can you use stories in your classroom?

Stories can be used at the start, middle or end of lessons.

#### Start of the lesson

Most often stories used at this stage are to set the scene for the lesson, to stimulate interest, find out what students know already and to provide a context for the main work of the lesson.

#### Middle of the lesson

Stories used at this stage provide a context for the work the class is doing. They may be analysing or using:

- the values in the story;
- the reactions of the characters;
- the ideas contained in the story;
- the claims made in the story;
- the structure of the story;
- the ideas in the story to broaden and deepen understanding of a subject.

#### End of the lesson

Stories used at this stage are often used to pull learning together, so selecting a story for this stage is much more difficult. They can be used to just relax the students and give them a pleasurable experience before they go home from school. Stories have an immense value in themselves in that they provide comfort, support and entertainment. They help build confidence and self-esteem and help your students learn more about themselves as they relate to the characters in the story, so the telling or reading of stories just for pleasure cannot be overestimated.

Most societies throughout the world have used storytelling as a way of passing on their history and values. This is very true in Africa, which has a wealth of national and local traditional stories.

**Where do we find and how do we select our stories?**

Stories can be found in books, in the local community, and through yourself and your students.

You need to select the story because of its message and the purpose for which you want to use it. For example, you may be investigating the sun and moon in your science lessons and use a traditional tale about how the sun and moon came to be in the sky at the start of the lesson to stimulate interest and to explore the truths of the story.

You may find your story in a book or it may be a local traditional tale that has not been written down, from your childhood or that of your students. You could also invent or write your own story to tell or read to your class or ask them to write the stories. These could be collected and made into a book of local stories or into books of stories about a particular curriculum area. There is no age limit to using story with your students but obviously you would need to select appropriately for those in your class.

Using stories in your lessons is one way to involve the local community, as you can invite a renowned storyteller to come in to tell the tale. You could extend this to set up a storytelling club within the school for those interested in developing their storytelling skills and ensuring that such tales are not lost from the community.

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## Assessing learning

Assessment falls into two categories. One category looks back and makes a judgement on what has been learned already. This is called summative assessment. The second category is when we use assessment as part of the learning process (for example when we use questioning to check whether students have understood something). We call this formative assessment.

Summative assessment – or assessment of learning - can be seen in the form of tests and marks which tell the students how well they have done in a particular subject or piece of work.

Formative assessment is quite different. Formative assessment – or assessment for learning – is based on the idea that students will improve most if:

- they understand what it is they are meant to learn;
- they know where they are now;
- they can see how they can close the gap between these two.

As a teacher, you will get the best out of your students if you aim to use the three points above, which makes assessment as much a responsibility for the student as it is for the teacher. How does this work?

### **Students understanding what they are meant to learn**

When you decide the learning outcomes for a topic or a piece of work you should share it with the students. You need to be clear by distinguishing not just what it is they have to DO, but what it is you are expecting them to LEARN. So to check they have understood, rather than saying 'Have you all understood?' ask a question that gives you the chance to assess whether they have really understood. For example:

- 'Who can explain in their own words what we have to do and what we aim to learn?'
- 'How can you make me sure that you have understood what I have just said?'
- 'So what is it we are going to do today?'

Their answers will enable you to know if they understand what it is they have to learn before they start. Give them time to explore the true meaning of your learning outcomes.

### **Knowing where they are now in their learning process**

In order to help students improve, you and they need to know the current state of their knowledge. It is your role to be sensitive, constructive and enthusiastic in finding out the current state of knowledge of your students. Insensitive comments and behaviour can have a damaging effect on student confidence, motivation and enthusiasm. Think back to those teachers who damaged your own confidence and enthusiasm, and do not follow their behaviour. Instead, when you talk to students about their current learning, make sure that they find your feedback both useful and constructive. Do this by:

- pinpointing students' strengths and suggesting how they might further improve them;
- being clear about weaknesses and positive about how they might be tackled, checking that students understand and are positive about your advice;
- checking with students for examples of your feedback that they found useful.
- Assessment for learning is a two-way process.

### **Closing the learning gap**

You will need to provide opportunities for students to improve their work. This means that by talking to them about their work you may discover misconceptions that mean you have to modify the content and style of what you have been teaching if you want to close the gap between where they are now and where you wish them to be.

Very often, by slowing down with a group of students you can actually speed up, because you have given them time and confidence to think and understand what they need to do to improve. By letting students talk about their work amongst themselves and reflecting on where the gaps are and how they might close them, you are providing them with ways to assess themselves.

Key to all this is you, the teacher, demonstrating a belief in your students, giving constructive guidance on how to improve and providing opportunities for them to take charge of their own learning.

## Using investigations in the classroom

Children are naturally curious. Good teaching exploits this very human characteristic. Over the past few decades increasing attention has been given to using investigative approaches in the classroom. Rather than just telling pupils something, why not make them think about a topic or area of enquiry? At its simplest, this might just be 'asking a question' rather than 'telling'. This promotes a more active approach that is much more effective than passive 'telling' in promoting lasting learning. Increasingly, however, teachers plan to use investigations to promote active learning.

Investigations are already well established in the teaching of science (through experiments) but the same technique can be used in all subjects. Mathematics or numeracy, for example, becomes much more interesting if pupils have to work out real problems. The same is true of other subjects. In geography or social studies, rather than just telling pupils about environmental problems, why not set them a task? You will find a number of examples of topics that can be taught in this way in the TESSA modules.

There are different strategies for approaching investigations. Below is a detailed example when looking at the teaching of science topics, but you can take a similar approach in any area. The following basic steps can be taken.

### Beginning

Use brainstorming to open a topic (see Key Resource: Using mind maps and brainstorming to explore ideas). You can do this with the whole class, or begin with groups and then have a whole-class session. The important things are to make pupils think actively about the issues being raised and to establish their current knowledge of the topic.

### Choosing the focus

A brainstorming session will throw up many different ideas: these will probably have been recorded on the chalkboard or on a chart of some sort. You, as the teacher, now have the opportunity to focus on the key area that is to be investigated. For example, you may wish to teach about the link between human activity (for example farming) and the local environment. In the brainstorm, some pupils talk about local worries about the declining fertility of the soil. You might decide that an investigation into 'whether the local soil is less fertile and if so why' should be the focus.

### Planning your investigative approach

All sorts of methods are available to you. You could carry out detailed interviews with local farmers or discuss with grandparents or older members of the community 'what things used to be like' or 'how crops used to grow'. It is important that pupils think about the methods to be used and why. This helps them develop personal investigative skills.

### Carrying out and reporting the investigation

The pupils then have to carry out the investigation. Before they do this, it is important to establish the way the findings are going to be reported back. The form this takes depends on the nature of the investigation. You can have a fairly informal investigation, for example where pupils ask older family members what the village was like 20 years ago. The report back might then be 'verbal reporting' to the whole class. You might have asked each member of the class to ask the same five questions to at least two older members of the family. The report back then could be in the form of a chart, so that you can show similarities and differences in the findings.

### Interpreting findings

Once the data is reported and recorded, the findings have to be interpreted. This is key and it is very important that you, the teacher, do not dominate discussions initially. Make the pupils voice their own ideas (in verbal or written forms) before beginning to steer them, perhaps through questioning, to the key learning interpretations you are looking for.

The investigative approach should become habit for the good teacher. Set out below is a much more detailed way of using investigations in science.

An investigative approach to science											
A possible approach to teaching investigation											
<b>Step 1</b> - Brainstorming/getting ideas		<b>Step 2</b> - Choosing the variables									
<b>Step 3</b> - Asking a question		<b>Step 4</b> - Planning the experiment									
<b>Step 5</b> - Carrying out the experiment		<b>Step 6</b> - Recording & Presenting									
<b>Step 7</b> - Interpreting & Evaluating											
<b>Step 8</b> - Reporting back											
Step 1 - Brainstorming or getting ideas											
<b>Planning [1]</b> <b>What could we investigate?</b> <table border="1"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table> <b>What could we measure or observe?</b> <table border="1"> <tr><td></td><td></td><td></td></tr> </table>											This table is made available to the children. This may be put up on the wall as a poster or written on the board. The teacher then initiates a class discussion on the investigation topic.



Planning [1] What could we investigate?		
light	temperature	quantity of medium
acid rain	seed type	closeness of seeds
What could we measure or observe?		

Example: Investigation into factors that affect germination and growth.

The teacher may begin by reminding the children about what germination means, then pose the question: What affects germination? The purpose of the investigation is to discover if and how a particular factor affects germination in a particular plant, e.g. cress.

The children are asked to suggest any factor that **might** affect the germination of cress.

### Step 2 - Choosing the variables

Planning [2]		
I am going to find out what happens to ...	quantity of medium	
... when I change ...	closeness of seeds	
I am going to keep these the same (constant) to make it fair ...		
What could we measure or observe?		

Once again the table is made available to the children. This may be put up on the wall as a poster or written on the board or copies given to group leaders or to all the pupils.

The group are asked to select **one** variable that they will change

(independent variable) and one that they will measure (dependent variable). All the other variables must be kept the same if there is to be a fair test.

### Fair Testing

The concept of a fair test is crucially important in planning an investigation. The pupils should be taught to control the variables other than the dependent and independent variables in a conscious way.

Often the more 'obvious' a variable is, the more likely it is to be controlled, but the pupils should be trained to consider their set-up and decide on the variables to be controlled.

A fair test is one in which only the independent variable is seen to cause a change in the dependent variable. If, for example, two things change, say temperature and humidity, you cannot be sure which of these causes the change in the dependent variable; it may be temperature or it may be humidity or it may be a combination of both.

- It is only by carrying out a fair test that you can be sure that it is what you have changed (independent variable) that is affecting what you measured (dependent variable).
- It is easier to recognise that a test is fair than it is to plan and carry out a fair test.
- You will need to encourage the pupils to make sure that all relevant aspects have been controlled (kept the same).
- Most pupils need only say that they intend to keep certain things the same, but the most able pupils should be encouraged to discuss what value each control variable should have.

Note: the words independent variable and dependent variable do not need to be taught at this stage!

### Step 3 - Asking a question

#### Planning [3]

Making a prediction/hypothesis

When we increase/decrease	temperature
... we think that the	number of seeds germinating
will increase / decrease / stay the same	

At this stage, pupils are being asked to select the variable they want to investigate. They choose one of the things that they have said they could change and one of the things that they said they could measure.

The question posed is: If I change this (the chosen variable or independent variable), what will happen to that (the chosen measurement or dependent variable)?

### Step 4 - Planning the experiment

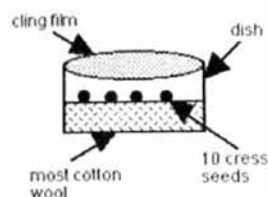
#### Planning [4]

Designing the experiment

Listing what you need

Describe how you will use them. Make a diagram if you want.

30 cress seeds  
cotton wool  
3 dishes  
cling film  
thermometer  
water



1. Put a layer of about 2 cm depth of cotton wool in each dish.
2. Add 5 cm<sup>3</sup> water to each.
3. Lay 10 cress seeds on top of each piece of cotton wool.
4. Cover the dish with cling film. Leave dish **A** at 10 °C, dish **B** at 20 °C and dish **C** at 30 °C.
5. Leave each for three days, then count how many seeds have sprouted in each dish.

The pupils now plan the experimental procedure. It is very important to stress that only **one** of the variables can be changed during the experiment. As a result the variable being measured will, presumably, change. All other variables must be kept constant to ensure a fair test.

### Step 5 - Carrying out the experiment

Before they carry out their experiment it is important that the teacher makes sure that the procedure to be followed is safe. For this reason it is important to include a **TEACHER CHECKPOINT** before the pupils are allowed to continue with the practical and to ensure that suitable safety precautions are used.

The pupils **collect evidence** by carrying out the experiment and carefully noting the changes occurring in the dependent variable. They may also measure the variables they are keeping constant to ensure that they are kept constant throughout their experimental procedure.

**Step 6 - Recording & Presenting (1)**

What we changed	What we measured
temperature (°C)	no. of seeds germinating
10	5
20	7
30	9

The pupils are encouraged to record the results from their investigation by producing a table of results. The table includes the independent variable (what they were changing) and the dependent variable (what they were measuring).

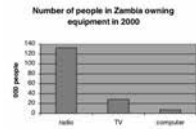
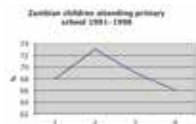
The production of the table of results will help the pupils in constructing a bar chart or graph of their results.

An average may need to be taken to get more accurate results.

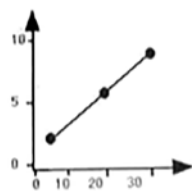
Graphs and charts are powerful tools because they enable pupils to see the result of what they changed (the independent variable) affecting what they measured (the dependent variable). This gives a picture of the information they have collected and helps them to identify patterns and trends. It also helps the pupils to develop understanding by relating pattern and trends to their scientific knowledge.

The type of graph that is appropriate depends on the type of variable used for the key variables i.e. what they change (independent variable) and what they measure (dependent variable). The table below shows the types of graphs that should be drawn for different types of variables.

### What type of graph should be used?

What is...		Type of table	Type of graph
... changed? (independent variable) e.g.	... measured? (dependent variable) e.g.		
<b>WORDS</b> type of cloth	<b>WORDS</b> amount of wear		no graph
<b>WORDS</b> type of cloth	<b>NUMBERS</b> size of stain (cm <sup>2</sup> )		
<b>NUMBERS</b> length of elastic band (cm)	<b>WORDS</b> pitch of note		no graph
<b>NUMBERS</b> concentration of acid (%)	<b>NUMBERS</b> no. of bubbles		

### Looking for a pattern in the results

What we measured		<p>By careful examination of the bar chart or graph, the pupils should be able to identify any trend or pattern that appears in their results.</p> <p>In this case, there is an increase in the number of seeds germinating with increasing temperature.</p>
number of seeds germinating		
	temperature (°C)	

Finding a pattern in the results		
When we increased	temperature (°C)	The pupils are now asked to 'make sense' of their results.
There was	number of seeds germinating	
an increase in the		
a decrease in the		
no change in the		

Drawing a valid conclusion			
Was the investigation a fair test?	Yes	No	<p>If they are satisfied that the experiment represented a fair test, they may now draw a conclusion from their investigation.</p> <p>If the experiment was not a fair test, no conclusion may be reached.</p>
The conclusion from our investigation is ...			
The number of seeds germinating is controlled by temperature. When you increase the temperature the number of cress seeds germinating increases.			

After the practical part of the investigation is over, a reporting back session is vital. The importance of this stage is frequently underestimated and sometimes bypassed altogether (although admittedly often because of pressure of time). The reporting back session needs careful handling if the learning outcomes are to be fully achieved. Here the pupils should try to use their own evidence to justify the conclusions at which they have arrived.

The reporting stage can be followed by a 'consolidation' stage where the pupils are encouraged to use the information they have gained to further advance their knowledge and understanding. This kind of reflective discussion, where the group outcomes are shared, can be very useful.

[http://www.ise5-14.org.uk/Prim3/New\\_Guidelines/Investigations/Poss\\_approach.htm](http://www.ise5-14.org.uk/Prim3/New_Guidelines/Investigations/Poss_approach.htm)

## Using explaining and demonstrating to assist learning

### Introduction

Explaining is the giving of understanding to another. Demonstrations are ways of assisting the explanation process by using artefacts or other methods to show pupils something so that they understand it better.

### Explaining

An explanation used in a lesson can help pupils to understand:

- concepts or ideas – including those that are new or unfamiliar to pupils, for example ‘density’ or ‘volume’;
- cause and effect – rain is caused by air cooling, a flat battery means the car won’t start;
- processes – how things work, how people and animals behave;
- relationships – between people, things and events: the role of grandparents in a family, why flies are insects and spiders are not, the common features of important yearly festivals.

To explain well, you, the teacher, have to understand the subject matter well (what is to be taught). For example, if you do not understand that a spider is not an insect, neither will your pupils.

### Key knowledge features about explaining

When explaining new concepts or ideas, four key features will help you structure and sequence your explanation:

- Labels and names. The actual words used to name the concept (insect, electricity, colour, ambition).
- Attributes. There are two kinds, namely:
  - ‘Must have’ features, which are essential parts of the concept like ‘wings’ (bird) ‘thorax’ (insect);
  - ‘May have’ features that may occur, but not always. A sparrow is brown, but not all birds are. Some insects have hard shells, but not all do.
- Examples. In your explanations you will need to give examples that illustrate what you mean. For example, ants and flies are insects, but a snail, though it has antennae, is not an insect. It is a mollusc.
- Finally, you will have a set of ‘must have’ rules at the end that apply to what you are explaining. So your rules for insects would be: six legs, a head, thorax, abdomen, two antennae, and two or four wings.

### **Assisting learning by demonstrating**

How explaining is done is just as important as having good subject knowledge. Just giving out information is not enough. Demonstrating an idea or a concept in a practical way often assists pupil learning. This can be done by:

- using pictures, diagrams, models, specimens and artefacts to show what you mean;
- getting pupils themselves to examine the subject of your explanation. For instance, as you explain about a plant, they can see what you are talking about better if they have a specimen in front of them;
- enabling all pupils to see clearly what you are explaining. A demonstration provides the link between 'knowing about' and 'being able to do.' Let them experiment in small groups by handling, drawing, discussing, watching and experimenting. Demonstrations are most effective when they are accurate, when pupils are able to see clearly and understand what is going on, and when brief explanations and discussion occur during the demonstration.
- asking for feedback from the pupils about their understanding of what they have seen.

### **Explaining is not one-way**

Always remember that to avoid pupil confusion in your explanations and demonstrations, you need to fully involve them to check that they understand what you are saying and doing. Important points to be aware of are:

- asking them questions to find out what they already know and understand;
- finding out about misconceptions that are holding them back and which need to be 'unlearned';
- using small groups to exchange ideas and understanding about the topic you are explaining or demonstrating, then:
- asking them to explain to you and to each other what they understand about the current topic;
- being prepared to use different words with different pupils to make your explanations clearer.

### **Summary**

When explaining or demonstrating to really assist learning you need to:

- include the four key features named above;
- focus on clarity and a sequence to your explanation;
- check understanding as you go along, through questions and discussion;
- use effective teaching aids for your demonstrations that everyone is able to see;
- involve pupils in your explanations.



## Being a resourceful teacher in challenging circumstances

Many teachers work in difficult contexts. They may have large classes. They may have few resources. The pupils in these contexts are not likely to have resources at home to compensate for limited school resources.

A group of teachers working in such circumstances recently brainstormed suggestions about how to be resourceful despite such difficult conditions. They came up with many ideas and decided that the following seven were most useful:

- Make maximum use of the local environment as a teaching aid. All schools have an environment that can be exploited for discussion, investigations and sources of classroom data.
- Make maximum use of the local community as a teaching aid. Parents and others are an important source for stories, for remembering what things were like in the past, and for having opinions on everyday issues.
- Exploit the communication systems currently in place. Nearly all communities now have access to radio, often with many channels available. Use the systems available to stimulate debate and discussion.
- Make teaching aids from materials around the school. Old boxes, magazines, newspapers and even plastic bottles can be turned into teaching aids (one of the teachers in the discussion group described how she had built a model of a volcano using such materials, the model could be opened out to show the 'inner workings' of the volcano).
- Cooperate with other schools, directly or by exchange of letters. This can be highly motivating for pupils and it opens up all sorts of possible exchanges of information (for example, exchanges of information between urban and rural schools can lead to interesting comparisons).
- Let the school become a resource for the local community: one teacher described how mothers joined in the reading classes and thus improved their own literacy.
- Set up a school garden: plants can be grown in even a small area. Pupils of all ages can benefit from participating in the planning, planting, growing and use stages in the development of a garden.

*The TESSA programme would like to receive letters or emails about ideas for teaching in challenging conditions.*

## Using the local community/environment as a resource

### Introduction

It is important that you plan and prepare your lessons so that they stimulate your pupils' interest. Part of this planning involves identifying resources that will engage your pupils in learning. One valuable resource you can explore and use is your local environment, where not only do you have people who have expertise in a wide range of topics but you also have access to a range of natural resources.

Using such dynamic resources will:

- motivate your pupils;
- stimulate their thinking;
- open their eyes to the richness and diversity around them;
- develop a link with the local community;
- provide you with support;
- link the curriculum to your pupils' lives;
- introduce them to new experiences.

### Using local experts in your classroom

Maybe you are doing some work on money in mathematics or you are doing pattern in your art lessons. How could you introduce these topics to your pupils in a way that will capture their interest? One way would be to invite in a local shopkeeper to talk about how they use money in their work or a local dressmaker who uses traditional patterned fabrics. Your pupils will be interested to hear about what the visitors do and will want to ask questions and so this needs to be carefully planned. If you choose to do this you need to be clear what you would like your pupils to gain and learn from the experience and then follow the steps below to prepare.

### Before the visit

- Ask your principal/head teacher's permission to invite the visitor.
- Identify who you would like to ask.
- Ask if they would be willing to come.
- Talk to your class about the visit and what they would like to know.
- Ask them to write an invitation to the visitor.
- Plan with your class the questions they want to ask.
- Agree together with your class who will do this.
- Discuss how you will sit when the visitor comes – in rows or in a horseshoe shape so that everyone can see.
- Confirm the visit with your guest and tell them what will happen.
- Ask them to bring some things to show the class.

**On the day of the visit**

Arrange for some pupils to meet the visitor at the appointed time at the school gate and bring them to the class. Introduce the visitor to the class and allow them to talk for a short time to the class about what they do (10–15 minutes), showing what they have brought if appropriate. Encourage your pupils to ask questions. When the visit is finished, ask one of your class to thank the visitor for coming.

**After the visit**

Think how you will use what your pupils have seen and heard. You could ask them to share their ideas in groups and make lists or posters of the key things they learned. You could plan more lessons using the ideas and information as the context for them to learn more about the topic. They could research more about the topic. They could share their ideas with other classes or their parents at a special parents evening or exhibition.

## Using role play/dialogue/drama in the classroom

### Introduction

Pupils, and adults too, learn best when they are actively engaged in the learning experience. Role play, dialogue and drama are very active ways to explore what your pupils already know. By interaction with others and sharing their ideas, your pupils can build a broader and/or deeper understanding of the topic.

The three strategies in this key resource allow pupils to develop their thinking skills, work in contexts that allow them to talk about more sensitive issues and use their creativity and imagination to extend their knowledge and to resolve problems. You will have to plan your lessons carefully and think how you introduce them to the techniques. You will need to think about whether you work with the whole class at once or with small groups. This may depend on the size of your class and their ages.

All of the three methods below have strengths that allow you to use them across a range of curriculum areas.

So, how can you use these strategies in your classroom, what things do you need to think about if you want to use them and what benefits will they bring?

### Dialogue

An important part of your role in helping your pupils learn has to be helping them to think about what they know and what they do not know or cannot do. Unless you encourage them to talk about their ideas and listen to other people's viewpoints they will not be able to extend their own understanding as much as they could. Straightforward reading and answering questions exercises do not challenge their thinking and ideas as much as activities where they have to apply the ideas to relevant situations. For example, pupils will understand the idea of gravity and how things fall to the ground much better if they have to plan and investigate ways to slow down how things fall. By discussing what they are going to do, they have to think about what they already know, why and how things fall, and what they could do to slow them down.

Talking in groups of about four/five will give all pupils the opportunity to speak and listen to other's ideas, but sometimes just asking pupils to talk in pairs for a few minutes for one key idea to share with the class can be just as valuable.

Shy pupils, who do not normally participate in larger class discussions, may feel more confident about speaking in these smaller groups and so you would be able to find out more about what they know and how they think.

As a teacher, you need to be aware of your pupils' interests and knowledge and how they learn so that you can match your teaching better to their needs.

Give pupils frequent opportunities to talk in groups about different topics and make sure they have enough time to do it.

### Role play

Role play is when pupils are assigned a role and, during a small scenario, act as they think the person they are being would act in such a situation. For example, in one of your citizenship or life skills classes, you may be exploring how to resolve conflict in the playground. Rather than use an incident from your class, you can make up a scenario in which a similar incident occurred. It may be in a home or community setting, but while the story is detached from the playground, the issues are the same.

You could assign pupils to roles and give them time to think about the little scene they are going to develop or you could just ask them to do it without any planning time. You will need to try both ways to see the benefits for yourself of both approaches. You could have just one group performing in front of the rest of the class or you could let all the class work in small groups at once (so no group is being watched). You could put your pupils into groups and ask them to assign roles themselves before giving them time to explore how they might resolve the conflict.

If you have a large class or a small classroom you may have to allow some groups to work outside. These pupils need to be aware of their responsibility to be sensible and not disturb other classes at work, although as they work you will be moving around and supporting them. You will have to think about what kind of feedback you want from the groups about their experiences and feelings. Some groups will be more willing than others to show their role plays. Some may prefer to tell you what they have learned from doing the role plays.

### Drama

Using drama in the classroom is a good strategy to motivate most pupils. It can be used in many different ways and provides opportunities for the whole class to be involved in the creative process of producing a drama. Not everyone has to be an actor in the drama; some pupils can be used in other ways that may relate more to their talents and personality. Drama or telling a story through acting or dancing can be a stimulating way to encourage pupils to think about issues such as relationships, power struggles in history, local environmental issues and debates. It is not unlike role play but has an end product. This is a production of some kind that can be shown to the rest of the class, the school at assembly or to the parents and the local community.

This will give the pupils something to work towards and motivates them. It is useful to use both scripted plays and improvised plays to explore their ideas around an issue. Drama is also a good way to assess what your pupils understand about a topic. For example, one class did a play about their understanding of how the brain works using pretend telephones to show how messages go from the brain to the ears, eyes, nose, hands and mouth and back.

If you decide to use drama in your classroom, you could use a scripted play that has been written down, or you could draft an outline and let the pupils write the script for themselves. They could also improvise their drama and then work out what to say as they practise acting out the scene(s).

When setting up a drama lesson – or series of lessons, as dramas take time to develop – these are the things you need to remember:

- Be clear why you are using drama to help your pupils learn.
- Give clear instructions and explanations about the purpose of the drama.
- Have an outline of a drama in mind if your pupils need such support when improvising so you can make suggestions.
- Build in time for them to practise.
- Be ready to give support and suggest ideas when they have difficulty.
- Use language lessons for them to write their plays and the dialogue.
- The play can relate to a topic in science or social studies or citizenship/life skills lessons.
- Give them opportunities to perform to an audience whenever possible as this will boost their self-esteem and confidence, even for those who work only on the production rather than performance side.
- Involve your pupils as much as you can in all the stages of the process and decision making.

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