



TESSA

Teacher Education in Sub-Saharan Africa

Teaching Pack No.3

Early Primary

- Section 1 Literacy:** Ways to collect and perform stories
- Section 2 Numeracy:** Patterns in number charts
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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?

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

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).

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.

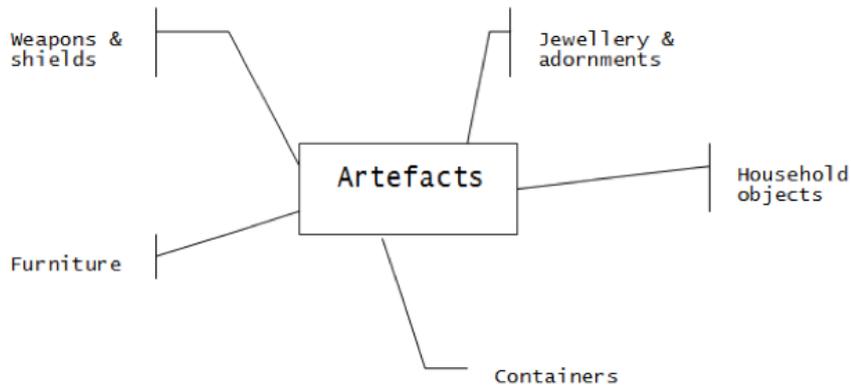
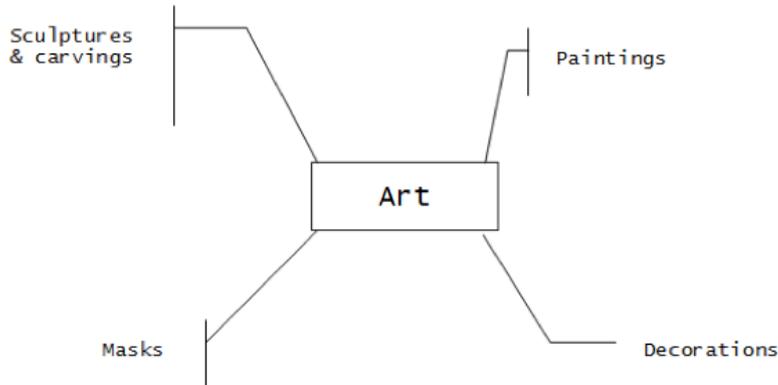
These sheets were pinned on the classroom noticeboard and left for a week for students to study. Not only were the students learning about artefacts in their own community, but they were also being given an opportunity to develop their thinking skills.

Activity 1

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.

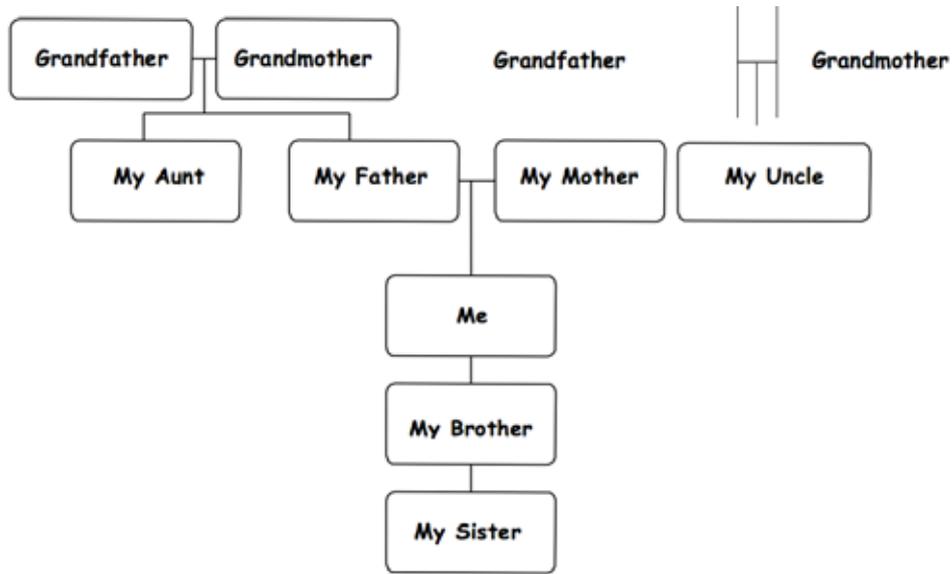
- To protect children.
- To provide food and shelter for children.
- To teach children how to live.
- To teach children the things they need to know, such as honesty and respect for others.
- Because children cannot support themselves.
- For adults to have companionship.
- Because people are social beings 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

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

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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