

A global dimension to science education in schools



About this free course

This free course provides a sample of level 2 study in Education, Childhood & Youth

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Introduction

There are many compelling reasons for introducing a global dimension in science education. This unit, aimed at teachers in secondary schools explores why the global dimension in science education is so important and how you might incorporate it in your lessons.

This OpenLearn course provides a sample of level 2 study in [Education, Childhood & Youth](#)

Learning Outcomes

After studying this course, you should be able to:

- understand why the global dimension in science is so important
- understand what contributions have been made to science by 'non-Western' scientists
- deliver the curriculum so as to bring global science to life for students.

1. Introduction

1 1 The global dimension in science – why?

1.1 1 Why include a global dimension in science education?

Western science drew on a world heritage, on the basis of sharing ideas.

Sen (2002)

The global dimension refers to approaches to education ... which focus on global issues, events and interdependence. ... pupils will develop ... an understanding of different cultural and political perspectives, as well as knowledge of global matters.

ASE Global (2003)

We start by exploring some of the reasons why we should adopt a global approach in science education.

Activity 1

Read 'Reasons for teaching the global dimension in science' by clicking on the 'view document' link below.

[View document](#)

Note any statements with which you disagree and any statements you think should be added, then arrange the reasons in order of their importance. Of course, there is no one 'right answer' here.

Next, listen to the audio clip of part of a conversation with an Oxfordshire teacher, below. Note the reasons given for including a global dimension in science. Discuss which reasons are most important in your own context.

[Click play to listen to the audio file](#)

Audio content is not available in this format.

[Audio 1](#)

Having considered *why* the global dimension in science is so important, I shall now look at *how* to incorporate it in science lessons. Amartya Sen, winner of the 1998 Nobel Prize for Economics, raises some challenging questions for science educators.

- What contributions to science have been made by those outside the 'Western world'?
- Why should school science reflect the subject's diverse roots?
- How can you bring contemporary international science alive for your students?

- Can learning science from a global perspective motivate students and so raise achievement?

Through exploring these vital questions, I hope you will gain the motivation and confidence to incorporate the global dimension in the work of your science department.

1.2 Outside the 'Western World'

1.2.1 Science throughout history: a case of attribution?

Much of the science we now take for granted was first done by scientists outside today's industrialised nations. For example, Arabic medicine was in advance of European medicine throughout the Middle Ages, and from Salerno (the first recorded medical school, founded in the 10th century), to Vesalius (the first person to publish a book of human anatomy, in 1543), Western doctors learned from their Muslim counterparts.

Activity 2 gives an opportunity to learn more about some of the vital contributions made to science by those outside the 'Western World'. Please attempt this now.

Activity 2

Click 'view document' to open the 'Match the discovery to the place' activity.

View document

- Do the 'Match the discovery to the place' quiz – click 'view document' above to read the quiz. The answer sheet makes an interesting wall display if cut up and displayed with a world map.

Click "view document" to see the answers.

View document

- Go to the Association for Science Education's website. Select 'ASE Global' from the tabbed menu at the top of the page, then 'Global Dimension' and click on 'Hot Issues'. Choose an article about a contemporary scientific development that interests you, ideally one involving scientists from outside Europe or North America. Prepare a short talk to tell colleagues about it.

Next, examine activities that deliver the curriculum by introducing students to the exciting work of some non-Western scientists.

Some discoveries commonly attributed to modern scientists may have roots further back in history than commonly believed. For example, there is evidence that the Chinese Yellow Emperor discovered the circulation of blood in human bodies 2200 years ago, well before William Harvey.

To find out more about historical non-Western contributions to science try the following sources.

The homepage of educationalist Xiufeng Liu. Scroll down to and click on 'Multi-Cultural Science Education' and then click on 'Ethnic Scientists'.

University of Princeton website. Click the button for searching the Web then in 'Search', type 'Faces of Science'. Click on the first result, 'The Faces of Science: African Americans in the Sciences'.

Reiss, M. J. (1993) *Science Education for a Pluralist Society*, Milton Keynes, Open University Press (ISBN 0335157602).

Hill, D. (1994) *Islamic Science and Engineering (Islamic Surveys)*, Edinburgh, Edinburgh University Press (ISBN 0748604553).

For contemporary stories of worldwide scientific endeavour, the *New Scientist* online is an excellent starting point.

1.3 In the classroom

1.3.1 Teaching global science

Science draws on a rich cultural heritage and continues to be a global endeavour. How can you bring global science to life for your students?

Activity 3 will help to bring a global perspective to your science curriculum.

Click "view document" to open 'Investigating Housing in Saudi Arabia'.

View document

Click "view document" to open 'How can a mobile phone kill a gorilla ...'.

View document

Click "view document" to open 'Iron Technology'.

View document

Click "view document" to open 'Why Communicate?'.

View document

Click this link to go to Science Across the World.

Activity 3

In this activity you look at and test ready-to-use classroom activities that bring a global perspective to the science curriculum.

First, choose three activities from the resources above. These include articles on housing in Saudi Arabia, the effect of obtaining resources required for mobile phone manufacture on gorilla habitats, iron technology in Tanzania and Scotland, and satellites communications.

The web link given above is to the Science Across the World site, where there is information on acid rain. Under 'Most Popular Topics' click on 'See all available topics'; and then 'Acid Rain'.

For each of the three resources you select:

- identify which aspect of the curriculum it delivers and for which students it might be appropriate;
- try it out with colleagues (if you want to!);
- identify aspects of the activity you particularly like;
- consider whether the activity has any shortcomings.

Next, select one of the three activities you chose above to try out in your classroom, making any changes you think necessary. Use the activity as part of a lesson. Evaluate the effectiveness of the activity by reflecting on the lesson, talking to pupils and assessing their work. Did the activities motivate students? Share your experiences with colleagues.

The UPD8 resource site contains numerous activities for secondary school pupils. Click on Topics in the top navigation bar to see the list of activities and choose one or two which are relevant to your classes. (You will need to join UPD8 to download activities.)

1.3.2 Exploring other activities

After trying Activity 3 you may want to explore some of the other resources given or even develop your own, in which case the Global Dimension section of the ASE site or the *New Scientist* online may be helpful starting points.

One way of bringing global science into the classroom is by using 'off-the-shelf' activities that:

- exemplify curriculum content – for example, iron was extracted from its ore in a precursor of the blast furnace 2000 years ago in Tanzania;
- extend curriculum content – for example, when studying fuels, consider the work of United Arab Emirates' scientists who are developing fuels for diesel engines from jojoba plant oil (go to <http://www.planet-science.com>, select Sci-Teach, then scroll down, click on 'hot topics' and find on the map the University of the United Arab Emirates);
- help to deliver 'Ideas and Evidence' ;
- provide new contexts for scientific enquiry, such as designing a fair test to test a new HIV/AIDS vaccine.

Of course, it is vital to avoid perpetuating negative cultural and racial stereotypes. For advice on this, please see TeachGlobal under 'Courses B and E'.

1.4 Global approaches

1.4.1 Global science in the classroom

Other cultures have had flourishing examples of science that should be much more widely known by pupils... Pupils can be helped to see that science is a cultural activity, and it is inevitably the case that different cultures produce different sciences.

Reiss (2000) p. 17

There are many ways of helping students appreciate that science is a global pursuit. In Activity 4 you are asked to consider a variety of ways of incorporating the global dimension in the work of your department.

Activity 4

Listen to the audio clip below in which a teacher from Oxfordshire continues his conversation and tells of the ways his department is planning to incorporate a global dimension into science lessons.

Audio content is not available in this format.

[Audio 2](#)

Discuss the extent to which you would like to include the global dimension in the work of your department. In the light of your discussion and the ideas from the Oxfordshire school, consider these questions.

- Where in your schemes of work could you incorporate some of the activities you have seen in this unit? Could 'global anecdotes' be included, too? A starting point might be to refer to the discoveries described in the quiz in Activity 2 at appropriate places in schemes of work.
- Would it be worth setting up a simple system to collect news of interesting and relevant contemporary developments in science? Could each 'story' be linked to a scheme of work?
- What other opportunities exist for promoting the global dimension in science, for example, through display or student projects?

As well as using resources like those in Section 3 'In the classroom', you could try:

- telling anecdotes – when studying light, you might mention that, 700 years ago, Quatb al-din from Iraq explained that rainbows are made when light rays are reflected and refracted by atmospheric water;
- referring to news stories – about Nigeria's new satellite and about Brazilian researchers' claims that coffee makes sperm swim faster, both of which relate directly to the curriculum. Click the links below to view these articles.

Click "view document" to open 'Nigeria Satellite Takes Images of Nigeria, Liberia'.

[View document](#)

Click "view document" to open 'Coffee makes sperm speed up'.

[View document](#)

Some teachers incorporate anecdotes and add newspaper cuttings to schemes of work. This enables the global dimension to permeate science teaching and learning without being a time-consuming 'add-on'.

1.4.2 And finally

In this unit you have looked at:

- *why* the global dimension in science is so important;
- *what* contributions have been made to science by 'non-Western' scientists;
- *how* to deliver the curriculum so as to bring global science to life for students.

Many teachers have found that including the global dimension in science is exciting and motivating for both teacher and students – I hope that you do, too!

Conclusion

This free course provided an introduction to studying Education, Childhood & Youth. It took you through a series of exercises designed to develop your approach to study and learning at a distance, and helped to improve your confidence as an independent learner.

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Philippa Hulme taught science in British and African schools for 15 years. She now tutors on the PGCE courses at Oxford University and the Open University, as well as training VSO volunteers. She is also an editor for Science UPD8, an initiative of the Association for Science Education and Sheffield Hallam University.

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'Nigeria Satellite Takes Images of Nigeria, Liberia' by Andy Ekugo, 27th October 2003. © This Day online newspaper, Lagos. www.thisdayonline.com;

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