The drama of science

The stage is set for a new, engaging and creative way of teaching science in primary schools. Sally Ashworth explores eight techniques you can use for exciting lessons.

Dramatic science, as its name suggests, is a method of exploring scientific concepts and processes and uses eight different drama techniques. It is the brainchild of Debra McGregor, a professor of education at Oxford Brookes University, and Wendy Precious, a teaching consultant with Entrust, Staffordshire's school support service. Their book, *Dramatic Science: Using Drama to Inspire Science Teaching for ages 5 to 8*, is publishing in April and contains detailed examples of how the eight techniques have been used by primary science teachers, with a pedagogical commentary by the authors. There is also guidance on using dramatic science as part of a thematic approach to primary science teaching and advice on making effective and accurate assessments of children's learning.

Although the book focuses on key stage 1, they have also developed the techniques for older primary children, and these are being used successfully by a growing band of key stage 2 teachers. Debra and Wendy began the project after becoming concerned that an increased focus on English and maths had lessened the status of science in primary schools, and that a culture of 'teaching to the test' meant that many children's experience of the subject was fairly limited and often bland. 'I'd seen that when I gave children practical activities to do, and there was discussion, there was a deep engagement with the subject matter that wasn't always there when they were asked to write things down,' says Debra. 'The dramatic science strategies help children connect science with their everyday experiences, which makes it relevant and exciting.'

Retaining knowledge and skills

Debra and Wendy realised their approaches to primary science were complementary after watching each other deliver separate training to a group of teachers in Stafford. They approached the Astra Zeneca Science Teaching Trust (now known as the Primary Science Teaching Trust) for funding, and 'dramatic science' was born. So far around 20 schools have taken part in three dramatic science projects in Staffordshire and the West Midlands, and feedback has been hugely positive.

Clarysly Deller, teacher and science coordinator at St Peter's CE (A) Primary School in Caverswall, Staffordshire, won a Primary Science Teacher Award in 2012, partly due to an observation of a science lesson in which she used some of the dramatic science strategies. She finds the techniques help her pupils retain knowledge and skills better than through written recording alone: 'They are remembering and retaining the things they have learned through drama, the things they have learned using their bodies, in a way we don't always see when they are writing about science,' she says. 'Even the children who don't particularly enjoy performing really get into it after a while. They might be a bit reticent at first, but when they see everyone else having a go, they join in as well.'

She adds that using alternative methods of assessment, such as taking photographs of the children demonstrating their knowledge and understanding through drama, has also helped reduce the amount of written recording for all involved.

Sally Ashworth
Teacher and journalist

Dramatic science in action

In dramatic science, the eight drama strategies (see p. 19) are used within a theme, such as exploration, sport, or being stranded on a desert island. The theme provides a context for the scientific learning and focuses on a different strand of science; for example, the exploration theme concentrates on life and living processes and the sports theme looks at materials and their properties.

So, as part of the sports theme, children might role-play a market place where they have to buy and sell fabrics to make clothes for different sportspeople, considering the properties of the materials as they make their choices. Why would Lycra be a good choice for a swimming costume? Would this wool work well for a leotard? Or they might be asked to mime taking part in a football match in a hot country and then in a

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cold country. How would they change their movements according to the temperature? If the football was made of ice, how would that change the way they kicked it?

Questioning skills

The eight techniques help children develop different skills and meet different objectives. Some are ideal for encouraging higher level questioning, others for developing observation, communication or creative thinking. The first and probably most familiar is *hot-seating*; teachers may not have used it in science lessons before but it lends itself perfectly to developing children's questioning skills. The teacher, teaching assistant, or even an able older pupil, dresses up and plays the role of an expert. Children are told in advance the purpose of the question and answer session; for example, to find out how an explorer survived a long journey to a faraway country.

If children ask too many closed questions (things like 'Were you frightened?) you can guide them to ask more open, focused ones to draw out the information needed, such as 'What did you eat?' or 'Where did you sleep?' The information they gather from the 'expert' can then form the basis of the next piece of drama.

Spontaneous role-play also encourages children to ask searching questions by putting them in role in a certain situation and asking them to think about what they would do and how they would behave. If they were zookeepers looking after elephants, what would they feed them, how much would they feed them, how would they feed them? What else would they need to do to keep the animals happy and healthy?

Modelling is another technique which can be used to develop children's questioning skills. Asked to model how a tadpole turns into a frog, for example, they will need to ask and answer several questions before they can act out the process accurately: 'Do the front or back legs appear first?' and so

From top: using scientific language to describe an unusual plant; examining the plant; tableau showing the qualities needed to be an accurate oberver and recorder.

> PUPILS SEE THAT SCIENCE IS SOMETHING PEOPLE DEVOTE THEIR WHOLE LIVES TO: MARY ANNING ACTUALLY HAD TO DISCOVER THE THINGS THAT THEY ARE LEARNING ABOUT

on. Clarysly Deller used this technique to help children grasp the concept of microorganisms and said the activity prompted lots of excitement and questioning. She asked two children outside the classroom to put hand cream and glitter on their hands. They then had to enter the room and shake hands with or give a high five to every child. 'When they saw how much glitter was on their hands, and just how hard it was to wash off, it really drove home the concept of how easily germs can be spread,' she says.

Checking understanding

The techniques of *miming*, *movement* and *freeze frame* are useful when you need to see exactly how each child in the class understands an idea or process. With the sport example, if you ask them to mime playing with a chocolate football in a hot country and then with an ice football in a cold country, how do their movements change? Do they demonstrate an understanding of melting? If you tell them to 'freeze', can they articulate their ideas and explain their movements?

Exploring new ideas

On the table is a good way of sparking children's interest in a new topic and developing skills of careful and thoughtful observation. An object, often unusual, such as a plant or fruit brought back by an explorer from an expedition far away, is slowly revealed. This can be done using a digital microscope (or Easi-scope) so the children get the chance to see the object in minute detail.

As the object is slowly revealed, the questions mount up and children can play the parts of scientists, jotting down their findings in a notebook. Which questions can they answer by looking at the object? Which questions do they need to go and find out the answers to?

For a *mind movies* activity, ask children to close their eyes and listen carefully to music or sounds that in some way relate to their science theme such as waves washing up on the shore. With guiding questions from you, children build up a picture of a place in their minds. 'What can you see/hear/feel on this desert island?' 'What do you think you should do next?' 'What will you eat and drink?'

This eighth technique encourages children to think creatively and to start speculating about different possibilities. Pupils get the opportunity to explore the lives of real scientists by playing roles in a *mini historical play*. You might dress as fossil hunter Mary Anning and read a simple story about her life and work. The children then become characters in the narrative, accompanying you to an imaginary beach, where they hunt for and discover fossils. The aim of this technique is to make the notion of scientific discovery real for children and to give them a better understanding of the nature of science.

As Clarysly Deller puts it: 'They are often amazed to realise that science is something that people devote their whole lives to and that people like Mary Anning actually had to discover the things that they are learning about. It makes it very real.'

Assessment opportunities

Observing children taking part in dramatic science activities provides many valuable assessment opportunities. Pupil's understanding, or lack of, is clearly demonstrated each time they are asked to act or mime something; not only by their movements but by the questions they raise or the conversations they have with each other. The approach gives them chance to develop scientific skills and curiosity about the world of science in a creative, fun and hands-on way, which its creators hope will ignite a lifelong interest in a subject which is not always taught as imaginatively as it could be.

As Debra puts it: 'If children are immersed in science, and having fun, that's when they really progress.' **PTU**

- *More information about dramatic science, including useful videos and an example dramatic science unit, can be found here: http://www.pstt.org.uk/ext/cpd/dramatic-science/index.html*

The eight techniques

These teaching strategies are the building blocks of Dramatic Science.

- On the table: Children look closely at various objects and use their observational and questioning skills to find out more about them.
- Spontaneous role-play: Working in small groups, children are given a scenario and must take on different roles within it, exploring contrasting views and ideas.
- Freeze frame and tableau: Children act out different concepts and are asked to stop and explain their actions and interpretations.
- Hot-seating: A teacher or other suitable volunteer takes on the role of an expert and children ask questions.
- Mind movies: Using audio and/or visual stimuli, children are asked to imagine themselves in a different place or situation and answer questions about where they are, what they can see and what they can hear.
- Modelling: Children act out how something works or behave; for example, how does a tadpole become a frog?
- Miming movement: Children mime what it would be like to be something or to have something happen to them.
- Mini historical plays or monologues: Children act out aspects of famous scientists' lives or listen to a teacher in role giving a speech about his/her life and work.