
USING STORIES TO SUPPORT SCIENCE AT KS1

Stories are key to primary education, capturing children's imaginations and engaging all in the narrative. "Stories and poems are the mainstay of primary education; children of all ages love them". However very few teachers use stories as a stimulus for science based lessons: in a sample of 60 teachers, only four use stories in science (Feasey, 2006). Although teachers recognise the importance of stories in primary education, they are reluctant to use stories in science for a variety of reasons, including feeling insecure when selecting text for scientific purposes. In this essay, I will show that stories can be used in a variety of ways to introduce a number of science topics covered in the key stage 1 curriculum. I will then expand in detail showing how two stories can cover a range of activities appropriate for a key stage 1 class.

Stories can be used in a number of ways within a science topic. Very often teachers use stories as a starting point for teaching science topics (Hewlett, 2008). Children's books such as *Titch* (Hutchins, 1997) can be used to introduce the topic of 'Ourselves' looking at the differences between the children in the class, and *Oliver's Vegetables* (French, 2007) can be used to introduce the topic of healthy eating. Using stories as an introduction improves children motivation and concentration and allows children to see a reason for carrying out a scientific investigation (Cavendish, Stopps, & Ryan, 2006). If children are able to see a clear purpose for carrying out their activity, they are more likely to stay on task and stay motivated. Stories are easier for children to remember than a "stream of facts typical in expository text" (Butzow & Butzow, 1998, p. xi). Stories also give children opportunities to link scientific concepts to real life situations that are presented through the stories. "Stories of actual people grappling with real life problems are excellent ways of helping children to experience difficult issues or ideas" (Turner & Bage, 2006). Many difficult topics can be covered through use of a story. Concepts involving electricity or forces can be hard for children to understand, but the characters of the story providing, and overcoming, problems allow children space to think about and understand the scientific processes.

An effective way for teachers to use stories is to read sections of the book, stopping at key points within the text to investigate what may happen next. This is most effective when children have not seen or read the story before. This approach allows children to become involved with the planning of an investigation. If the story of *Humpty Dumpty* was used as a stimulus of an experiment, the teacher would have to stop the story prior to Humpty falling off the wall. Children could then design and carry out their activity to find out what happens to Humpty and how 'he' may be saved from breaking (Lowe, 2006). Other stories that can be used as stimuli for practical experiments include *The Lighthouse Keeper's Lunch* (Armitage & Armitage, 1994) where practical experiments about light and transport can be explored as well as talking about healthy eating.

Stories can also be used to allow children to experience places and concepts which teachers are not able to provide within a classroom setting. For example, it is not easy for children to explore animal habitats, particularly tropical or seaside environments or into space but by using stories as a basis for science lessons, children can explore the features of different places. Stories can also make long processes, such as the life cycle of a plant or animal, short and easy to see. Books such as *The Tiny Seed and the Giant Flower* (Carle, 1970) and *Ten Seeds* (Brown, 2001) show the development of plants from seeds to flowering, which can take a long time to show in class through practical experiments. These books can also be used as an introduction to work in this topic and the class can then go on to completing their own research.

Scientific skills are a major part of the primary national curriculum and these can be developed through the use of stories. "Literature could provide excellent opportunities for developing questioning, prediction and observation skills where the work is set in contexts familiar to the children" (Grugeon & Gardner, 2000). Pupils can question the science relating to the story, for instance asking what may happen next if a certain variable is applied. This questioning will lead on to the children predicting and subsequently hypothesizing based on previous knowledge of the subject matter. As mentioned above, science can be used to introduce an investigation allowing the children to develop the skills of planning, testing, observing and recording. The skills can be developed in a number of ways using the story as a stimulus. Younger children can use illustrations as a way of observing and then subsequently recording their findings. For instance, children could observe and identify the fruits in the book *Handa's Surprise* (Browne, 2006) which could either build upon or lead into work on healthy eating and food groups.

There are other reasons for using stories as stimuli for science teaching. “Stories can be fantastic for introducing new vocabulary” (Dunne, 2006). By using stories in science children’s vocabulary increases, allowing not just scientific vocabulary but also descriptive words. As well as children’s vocabulary, storytelling improves their listening and comprehension skills and this helps in both their science work as well as having links to the English curriculum, where skills in the listening section of the national curriculum can be built upon.

When selecting a story to support science, teachers should look for a number of key criteria. All stories should be age appropriate, having suitable vocabulary, clear illustrations and an engaging storyline. The story needs to have a clear and engaging narrative, Ian Dunne (2006) suggests “a good story needs to have some dynamism – something actually happens”. Along with an appealing storyline, when selecting a text the teacher needs to consider whether it has links to the curriculum and if the children can see these links. “Stories provide a vehicle to link previously learnt concepts with new ideas” (Hewlett, 2008, p. 94). Stories selected for use in science lessons should both allow children to explore new concepts but also to allow them to build on previously learnt scientific knowledge.

As well as selecting stories that are appealing to children, teacher also need to consider whether children will be led to any misconceptions by the story’s narrative or illustrations. It is important for teachers to remember that children will gain a lot of information from the illustrations and so these need to be considered alongside the narrative. In the story *The Hungry Caterpillar* (Carle, *The Hungry Caterpillar*, 1995), the caterpillar eats a number of foods that caterpillars do not naturally eat, such as ice cream and watermelon, not the natural diet of caterpillars. Although this could simply be told to children, it could lead to investigative work with the children planning an investigation into what caterpillars eat, leading to children retaining far more of the information and knowledge.

Stories can be rewritten and the characters can be put into new circumstances in order to best fit the curriculum required by the school and the class that will be hearing the story. It is also possible for teachers to adapt well known children’s stories so that a more clear understanding of the scientific concepts being taught can be shown. Graham Lowe (2006) gives the example of “*Goldilocks and the Three Variables*”, an adaptation of the traditional tale, modified to allow a clear focus for a follow-up investigation.

So far, I have shown that stories can be used in a number of ways throughout the key stage one science curriculum. Next, I will explain in detail how one story can be used as a starter for a number of science activities.

THE TINY SEED AND THE GIANT FLOWER

The book *The Tiny Seed* (Carle, 1970) tells the story of a group of flower seeds as they travel across the world. The story starts in autumn as the seeds are blown by the wind across the world. Some seeds fall in places where it will not be possible for them to grow, for instance in the sea and on mountain tops but the 'tiny seed' carries on to land in the good land. Other seeds land there too but they are either eaten by birds or their flowers are killed by humans. However the little seed grows into "a big and beautiful flower". The story ends with the big giant flower's seed pod opening and more seeds being released. A similar book is Ruth Brown's *Ten Seeds* (2001), however I chose *The Tiny Seed* as it has more of a narrative and children feel as though they are going on a journey.

This story has obvious links to the science national curriculum. The story can allow the teacher to explore areas in Sc2 *Life processes and living things*, specifically green plants, where children learn about what plants need to live and grow, and living things in their environment, where children learn about caring for their local environment (DFEE, 1999). The story can also support the teaching of QCA schemes of work for key stage one: unit 1B *Growing plants*, unit 2B *plants and animals in the local environment* and unit 2C *variation* (QCA, 1998).

The most obvious activity that can take place is for children to grow their own plants. The children can explore why some of the seeds in the book did not grow. For example, each table group could take one of the pages from the book where a seed is not able to grow, such as the sea or the desert. The children could then recreate these conditions and set a seed to see if it will grow, and to what extent, in the given conditions. This experiment will need at least half a term to fully develop but can allow children to look after their plants daily and allows for cross-curricular work, particularly mathematics work on measurement, to take place throughout the half term period. A number of skills can be developed when completing this activity. As a teacher, I would encourage children to plan this investigation themselves and would ensure that

the children understand what they need to do to ensure a fair test. As the investigation progresses the children will be developing and using the skills of observing and measuring. This investigation covers Sc2 3a “to recognise that plants need light and water to grow” and 3c “that seeds grow into flowering plants” sections of the key stage one science curriculum. The scientific attitudes of *respect for living things* and *sensitivity to the living and non-living environment* are developed throughout a topic on plants and living things. Other attitudes that can be explored when doing this activity include tolerance of uncertainty and curiosity, particularly if the children are unaware of what plants need to grow. When doing this experiment, the health and safety of the children needs to be considered. The seeds and plants that children will be handling need to be carefully selected so that the children do not come into contact with potentially harmful chemicals and pesticides (ASE, 2001).

The book can also be used as an introduction to naming and understanding the parts of the plant. The national curriculum states that children need to be able to name the leaf, flower, stem and root of flowering plants (DFEE, 1999). As a teacher, I would use this activity as a starting point for the topic of flowering plants and would use the illustrations from the book to introduce the children to the different parts that are common to all flowering plants. I would then go on to show children a wide variety of plants. After they have seen a variety, I could then ask the children to compare the different parts of a plant. For instance, the class could look at the leaves of two different plants, comparing their shape, colour and texture. I would then ask children what each of the different parts are for. At key stage 1, the national curriculum expects children to be familiar with the leaf, flower, stem and root of flowering plants. After completing this activity, I would then get the children to make their own plants using a collection of different materials. This is a cross curricular activity, as the children will be covering topics in the art and the design and technology curriculums as well as science. After the children have made their own plants, they can then label the different parts of their own flower. This activity allows the children to build on the skills of observing, as children will be seeing real flowers and then constructing models based on their observations, and the scientific attitudes of creativity and inventiveness.

Another activity that could follow on from reading the book could be an activity linked to another area from the science curriculum. The previous two activities have been based in the *Green plants* area of the national curriculum, but children are also required to study living things in their local environment (DFEE, 1999). For this activity, children will need to go outside of the classroom to observe and record what plants they find in the local environment. This may be

either in a local park or green space or in the school playing fields. The national curriculum states that children need to find out about plants in the local environment and to identify similarities and differences between plants in different local environments. Children can collect primary data about plants in their local environment in a variety of ways. Children could take digital photographs, make sketches or complete a simple tally chart. When returning to the classroom I would discuss the children's findings and modelling the use of graphs or charts, allowing a cross curricular link to mathematics. We could then explore other areas, investigating what type of plants live in different environments. Dependant on the school's location and situation it may be that children are able to investigate a different local area, for instance a wooded area, or it may be that children have to explore other locations through the use of ICT. This allows the children to explore a wider range of habitats. I would include this activity even if the children have been able to visit two locations as the use of ICT can allow children to explore locations around the world and the children can see the differences in plants in, for example, rain forests and deserts. This activity covers a number of scientific attitudes and skills. The attitudes of curiosity and respect for living things can be covered and the skills of observing, measuring and recording and communicating can be completed by the children as they carry out this investigation.

In this essay, I have shown how stories can be used as a stimulus for science teaching in the primary classroom. Selection of the story is essential in allowing pupils to engage with the science based activities, giving practical work a purpose and allowing children to see how science can be used in real life scenarios. I have also shown that one book can be used as a stimulus for many activities within a topic, and can be used both as a starting point to a topic or specific investigation. Stories can be read fully, or finished prematurely allowing the children to investigate 'what if' type situations.

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