



PUPPETS

bringing stories to life in science

BRENDA KEOGH, STUART NAYLOR,
BRIGID DOWNING, JANE MALONEY
AND SHIRLEY SIMON FOUND A VERY
POSITIVE RESPONSE WHEN THEY
INVESTIGATED THE USE OF PUPPETS TO
TELL SCIENCE STORIES

Exploring the use of stories in science

Motivating children in science can be a challenge for teachers. This is especially true as the children get older and science no longer has the novelty value that it had when they were younger. Enhancing children's motivation is not a simple process. In our experience one of the most important factors is creating a clear purpose for classroom activities. This can be done in a variety of ways, including using stories in which narrative and dialogue help to create meaningful problems for children.

Stories have been used as starting points for science for many years. Much-loved stories, such as *The lighthouse keeper's lunch* (Armitage and Armitage, 1994) and *The snowman* (Briggs, 1980), have created interesting contexts

for children's investigations. Local education authorities and publishers have provided resources to help teachers make the best use of these stories as a stimulus in science lessons. However, there can be some limitations to using children's storybooks as the basis for science lessons. Many of the commonly used stories were not originally written for use in science, so the link between the science and the story may be tenuous or contrived. Children may not see the connection between the stories and their everyday lives. Also the stories themselves may give no in-

dication of how the science might be explored.

Using puppets with stories

In our work with concept cartoons (Naylor and Keogh, 2000) we found that using puppets to represent the characters proved to be compelling for children. The puppets can create short, focused scenarios or stories related to the concept cartoons. These stories relate to children's everyday experience and appear to make the problems more real for the children. The response of both children and teachers to the use

of puppets in this way was very positive, which led us to wonder about the broader potential of puppets as starting points for science lessons.

Researching the use of puppets

During 2004 and 2005 we were fortunate to receive funding from the Nuffield Foundation to research this use of puppets in primary science. Although puppets are frequently used in language lessons and for emotional and social education (Thorp, 2005), we were not aware of any research into the use of puppets in science education. We already knew that puppets could 'bring stories to life' through narrative and dialogue, and wanted to explore whether puppets might have a positive impact on children's engagement in science lessons. We called this research the PUPPETS (*Puppets Promoting Engagement and Talk in Science*) project.

The main research took place with 13 teachers of key stage 2 children (7–11 year-olds) around Manchester and London. These teachers got used to having video cameras in their classrooms as we video-taped typical science lessons without puppets, and then went back to video-tape lessons where puppets were used. Puppets were used in whatever lessons the teachers happened to be teaching at that time. For example, one puppet had moved into a new house and needed to choose fabric for the cushions and rocks for a climbing area; another had a vegetable patch and wanted to know the best way to grow the vegetables; one puppet was confused that a worm looked the same at both ends and wanted to know which end was the head. We were able to analyse these lessons in detail. In this way we could look for any significant changes in the children's or the teachers' roles in the lessons. We also interviewed each of the teachers and a group of children from each class. The results of the research have been very encouraging,

suggesting that puppets can add an extra dimension to the use of stories in science lessons.

Puppets and children's engagement

The impact of puppets on the children's engagement was very obvious. The children could be seen focusing intently on the puppets, maintaining high levels of concentration, talking to the puppets and being eager to contribute to the lesson. Children in each group interviewed said that they preferred lessons with puppets and that the puppets helped them to learn. Typical comments were:

You want to answer questions more.

Last year I didn't really find science interesting – now it's my favourite subject.

This was backed up by teachers in their interviews, with comments such as:

Children were keen to tell the puppet what they knew but also listened more attentively.

All children were keen to ask or answer a question and join in discussion.

One teacher noted that:

The children responded brilliantly. Thought they may be cynical, especially year 5 boys, but they were especially motivated.

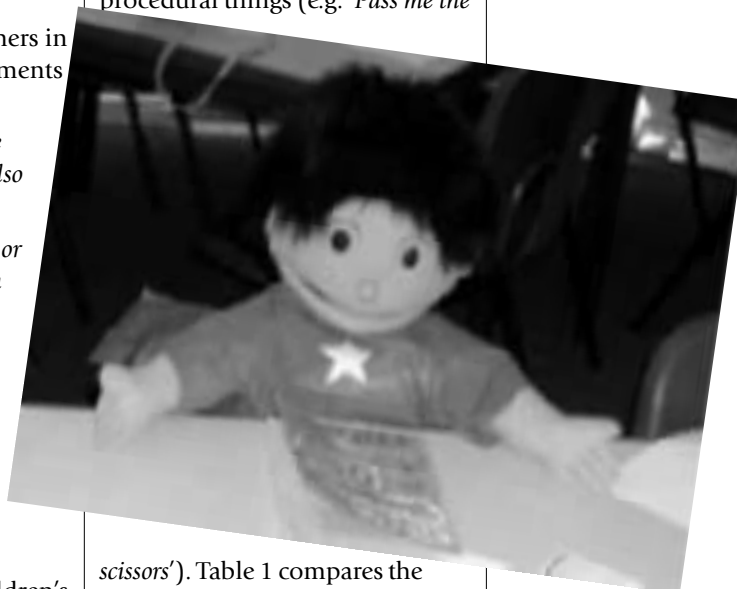
This positive impact on children's engagement is a valuable outcome of the research. Engagement is important in itself; it is also an essential prerequisite for thinking and talking about scientific ideas and for using higher-order thinking skills.

Puppets and children's talk

Puppets were found to promote

children's talk and to change the nature of their talk. Children used more reasoning when they talked in response to the puppets than they did in typical science lessons. The teachers described how more children talked in science lessons with the puppets, how they listened more closely, gave fuller explanations and explained and justified their ideas more.

Observing the children's conversations when they were working in small groups allowed us to look more closely at the nature of the children's talk. We could identify when children appeared to be using evidence, justifying their ideas or reasoning about scientific concepts. Equally we could tell when they were talking about practical or procedural things (e.g. 'Pass me the



scissors'). Table 1 compares the time that groups of children spent on different types of talk and indicates the difference that the puppets made.

Interviews with the teachers helped to confirm what we had observed. Examples of their comments were:

It raises the level of the talk.

They are more prepared to think through ideas themselves.

Table 1 Comparison of small-group conversations without and with puppets

	Talk about practical or procedural things	Talk involving reasoning
Lesson 1 (no puppets)	72.5 minutes	48.5 minutes
Lesson 2 (with puppets)	30 minutes	128.5 minutes

Puppets and reluctant speakers

Some of the teachers noticed that the puppets were especially effective with children who were shy or reluctant to talk in science lessons, and that these children became more involved and more willing to engage in dialogue. For example, one teacher described a

girl who did not usually contribute, but:

... when I use the puppets she will put up her hand and contribute more than before I had the puppet.

Another teacher commented on how the puppets:

have engaged some of the needy children ... two in particular have said an awful lot because of the puppets.

This fits in with how puppets are used to explore sensitive or difficult topics in other subjects, such as health or sex education. In science it seemed that some children felt more comfortable talking with a puppet and would speak more freely because the

puppet did not have the status of the teacher in the class. Interviews with the children confirmed this impact on shy children. Their comments included:

It's more comfortable talking to the puppet.

I put my hand up more with the puppet because I understand it more.

Puppets and age range of children

Altogether we have carried out four studies:

- the main research study with children age 7–11;
- a pilot study with children age 5–11;
- two studies with initial teacher trainees working with children age 4–11.

No obvious relationship with the children's age emerged in any of the four studies. It was encouraging that the oldest children responded as positively as the youngest when the teacher used the puppets confidently. Since we carried out this research some teachers have started to use them with secondary school pupils – year 7 (age 11/12) and year 11 (age 15/16) – and early indications are that the puppets are being well received by pupils in this age group.

Puppets and stories

Narrative, dialogue, context and purpose: stories create all of these, and our research suggests that puppets can enhance the impact of stories in science lessons. In other words, the puppets can bring stories to life.

One of the challenges for the teachers in the project was finding suitable stories or scenarios that would enable them to use the puppets to good effect. We decided that we needed to create more stories related to the main areas of science normally covered in primary schools. The outcome of this work is a set of stories for key stage 2 (two books and animated CDs called *Spellbound science*), which present problems for the children to solve. The characters in the stories are based on two of the puppets (Jasmin and Benny), so that at the end of each story the puppets can continue the discussion with the children and explore with them how to solve the problem. For example, in one story Jasmin and Benny are trying to find their cats on a dark night and they discuss whether they need a torch so that the cats' eyes will glow. In another story Jasmin and Benny have been shopping and are trying to decide which foods need to go in the fridge.

Simultaneously, colleagues were developing the *Discovery dog* stories (Learning Excellence, 2005). These stories also present science challenges for children to solve, but this time aimed at key stage 1 children (5–7 year-olds). An obvious next step was to

develop a pair of dog puppets for use with their stories.

We plan to share the PUPPETS project more widely through a sponsored professional development programme across the UK. GlaxoSmithKline plc has allocated substantial funding to this, so that teachers can receive training in the use of puppets in science lessons. They will also be provided with suitable stories and a pair of puppets appropriate to their age range: *Spellbound science* for key stage 2 or *Discovery dog* for key stage 1. This phase of the project is due to start in September 2006. Details will be available through local education authority science advisers, through the Science Learning Centres and through the Association for Science Education (see websites).

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References

- Armitage, R. and Armitage, D. (1994) *The lighthouse keeper's lunch*. London: Scholastic.
- Briggs, R. (1980) *The snowman*. London: Puffin.
- Keogh, B. and Naylor, S. (2006) *Spellbound science*. Sandbach: Millgate House Publishing.
- Learning Excellence (2005) *Discovery dog*. Chorley: Learning Excellence.
- Naylor, S. and Keogh B. (2000) *Concept cartoons in science education*. Sandbach: Millgate House Publishing.
- Thorp, G. (2005) *The power of puppets*. Trowbridge: Positive Press.

Websites

- ASE: www.ase.org.uk
 Science Learning Centres:
www.sciencelearningcentres.org.uk

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More information about the PUPPETS project can be found at www.puppetsproject.com, from which puppets can also be purchased. Examples of the stories can be found at www.millgatehouse.co.uk and www.discoverydog.co.uk