

# How to manage maths



Supporting those teaching mathematics can be as big a challenge as supporting those learning it, but says **Patti Barber**, help is at hand...

**T**he role of mathematics subject leader is a very important one because maths is such an important subject. It can be challenging, as it's a hard subject, but the beauty of maths is that it does all make sense.

Teachers are often worried by this of all subjects. Often, this can be because of their own learning and teaching in school, which may have enabled them to pass their GCSE but not to understand the actual mathematics. To make things tougher, many primary teachers have not studied maths since then. Richard Skemp, the maths education pioneer, calls this 'instrumental' versus 'relational' learning. Relational learning is defined as knowing both what to do and why; instrumental learning he describes as 'rules without reason'.

The biggest challenge primary school teachers face when teaching is to help the children to understand the mathematics in a 'relational' way. A Nuffield review of mathematical learning aimed 'to identify the issues that are fundamental to understanding children's mathematical learning' and focused throughout on 'key understandings in mathematics'.

Many children are confused by the subject content. Some areas of maths, such as fractions, are very difficult to learn about and also to teach. The understanding does not just happen – it takes time to evolve. The best teachers in primary schools want children to understand maths, and as a subject leader you can help teachers to value the importance of understanding.

## Right and wrong

One of the ways to help understanding is to work with children's answers and make sense of them. Rather than just marking them 'wrong', we can use children's misconceptions in mathematics to see how they are thinking. We can learn a lot about their understanding and build on this.

Using misconceptions as a positive model moves away from the traditional view of maths having right and wrong answers, and by moving away from one correct answer mathematics can become a more creative subject.

The importance of the role of subject leaders in maths has been highlighted by *The Independent Review of Mathematics Teaching in the Early years and Primary Schools* (the 2008 Williams Review), which recommends the

provision of mathematics specialist teachers 'with deep subject and pedagogical knowledge' in all schools. This has led to the MaST (Mathematics Specialist Teachers) training courses. These courses are run by universities and supported by Local Authorities, and teachers are released from school and also out of school time to train to become maths specialist teachers.

What qualities do you need to be a subject leader? You don't have to have a maths degree to be a great maths teacher. A small scale study in 1997 for the then Teacher Training Agency found that having an A level in mathematics was not strongly correlated with effective teaching of numeracy, as measured by higher gains in pupils' attainment. You need to be sensitive and sympathetic to support the many teachers who have panics about maths.

## we can use children's misconceptions in mathematics to see how they are thinking

### The main issues

#### 1 Content subject knowledge

Although you don't need a maths degree, you do need to understand the subject knowledge – this will then help with understanding the importance of how it's structured in terms of progression within each area, as supported by the National Curriculum (2000). It has also been highlighted by both the National Numeracy Strategy (1999) and the last government's Framework for Primary Mathematics (2006). We don't yet know what will come next.

The subject knowledge enables you to see connections between different representations of the same mathematical idea and which representation is more appropriate for use to solve particular problems. It enables one to make links across the curriculum. There are exciting ways of linking maths and art, for example, through geometry and pattern, and there are strong links with science through measurement, and geography with maps and scales.

#### 2 Pedagogical subject knowledge

Pedagogical subject knowledge involves different approaches to delivering the mathematics curriculum. This includes choosing the most helpful examples to illustrate an idea or concept. It is being aware of the most useful resources to support learning, e.g. using the array for teaching multiplication or the empty number line for adding and subtracting. It involves using questioning to improve learning. It means understanding that children need to discuss and work collaboratively, and knowing that flexible groupings support learning (research shows that children who stay in the lowest sets for maths learn less and those in the top sets learn more). It includes making links between topics in maths and the way they arise again in different contexts.

#### 3 Working with colleagues

The role of subject leader involves working with colleagues in the school in staff meetings and in their classes. Individual teachers have different combinations of pedagogical skills, mathematical knowledge and experience of teaching, so support should be flexible enough to suit individual needs. It involves drawing up school policies about maths – this will be even more important once the Numeracy Strategy ends next year. It means involving parents in the maths their children are doing via regular parent meetings and workshops, and helping the staff to make it clear to parents what their children are learning in maths and why. The role will also involve working with support staff and helping them to recognise how to support children in mathematics.

Luckily, help can be obtained from the NCETM website [www.ncetm.org.uk](http://www.ncetm.org.uk), where there is a self-evaluation tool designed to allow teachers to improve their subject knowledge and pedagogical subject knowledge in maths. The website has lots of ideas for CPD and ideas for staff meetings. There are helpful primary and early years magazines too, which are full of ideas for the classroom, and there is the Nrich website (<http://nrich.maths.org/public>) which now has an early years section full suggestions on ways to support children's learning in maths.

**Patti Barber is lecturer in primary education at the Institute of Education, London**

## Expand your knowledge

NEW MATHS COURSES FROM THE IOE...

### MA MATHEMATICS EDUCATION

**Date: October 2010 onwards (1 year full-time, 2 years part-time)**

### DESIGNING MATHEMATICAL LEARNING AND TEACHING WITH DIGITAL TECHNOLOGIES

**Date: Autumn term 2010**

### ISSUES IN MATHEMATICS EDUCATION

**Date: Autumn term 2010**

To find out more visit [www.ioe.ac.uk](http://www.ioe.ac.uk) or email [enquiries@ioe.ac.uk](mailto:enquiries@ioe.ac.uk)

