# Stories for primary mathematics

Cherri Moseley takes us into the mathematical world of story-telling.

Children love stories – the most difficult of classes will usually settle down for a story. We can exploit this simple fact across the curriculum, using stories as a vehicle for giving information and consolidating understanding at any point within a given topic. This is just as true in mathematics. An appropriate story can be used to support the introduction and development of a concept, to set a problem to be solved and to consolidate learning.

So why use stories in primary mathematics?

- Children love them!
- They are engaging, motivational, even inspirational – and not seen as 'work'
- They are often cross-curricular, interdisciplinary
- Stories make concepts more accessible
- Mistakes are non-threatening, risk taking is encouraged
- They are a vehicle for giving information and consolidating understanding at any time

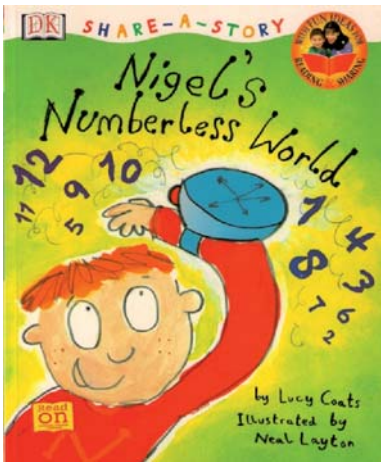
Stories range from the profound to the practical. In ***Nigel's Numberless World*** ① by Lucy Coats (ISBN 0-7513-7228-5), Nigel receives what appears to be some kind of watch for his birthday. When he presses the button on the side, all the numbers disappear – from everywhere. As we accompany Nigel throughout his birthday, we are forced to consider how to measure such things as time, location, price, measures, football scores, shoe sizes and much more without numbers. Whilst alternatives such as bartering, sand timers and sundials soon spring to the adult mind, children invariably have some amazingly inventive ideas. The story quickly convinces the reader/listener of the importance and the breadth of use of numbers in everyday life. Nigel beats his brother at number dominoes at the end of the story, which finishes with the line 'Tom had better look out – Nigel the Number Genius was on his way!' – a very positive, encouraging ending.

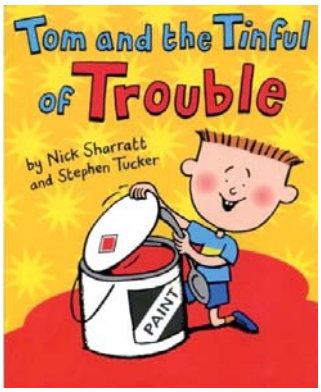
One of my favourite stories is ***Tom and the Tinful of Trouble*** ② by Nick Sharratt and Stephen Tucker (ISBN 0439944740) previously entitled ***The Time it Took Tom***, (ISBN 0590114271). Tom finds a tin of paint under the kitchen sink. It takes him seconds to decide what to do with it, minutes to get the lid off and hours to paint the living room – bright red. This is a great book for developing understanding of the relationship between units of time.

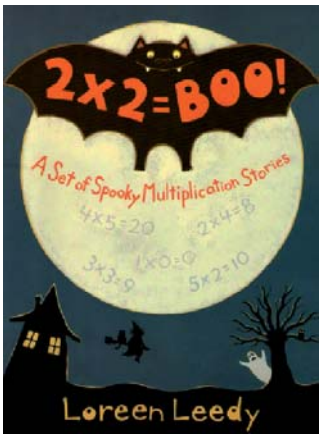
Count the seconds in a minute by counting along with a digital timer. You could use the framework ITP http://nationalstrategies.standards.dcsf.gov.uk/node/47764, whiteboard timer or a kitchen timer. Talk about the fact that 60 is never seen, the timer moves from 59 to 00. Use the ITP to display both analogue and digital time and compare how they change. Set the timer for, say, 15 minutes and ask the children to put their hands when they think the time is up. If you repeat this several times over the course of a week, children get so much better at estimating lengths of time. Download the song *Counting Time* from www.numberfun.co.uk/resource/song_resource_pack_taster.htm. The song also focuses on units of time. It plays at one beat per second and is great fun. When thinking about which time units they need, the children in my class quietly sing the song to themselves. Make, or better still, get the children to make Tom's units of time game. Make a game board showing units of time – seconds, minutes, hours, days, weeks, months and a set of cards, either drawn or from clip art, showing activities which last a particular length of time. Up to 4 players take turns to select a card from a bag or small tub. If the card matches one of the time periods on their board, they can keep the card and place it on the appropriate space. The winner is the first person to have a card in each space. In addition to making paper plate clocks, you can make three larger circles with a central pointer showing days of the week, number day (1st to 31st) and months of the year for a child-friendly perpetual calendar.

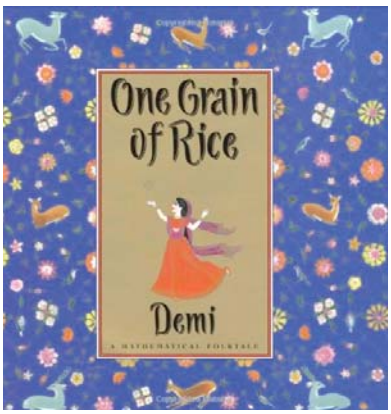
***2X2=BOO!*** ③ by Loreen Leedy (ISBN 0-8234 -1272-5) is too much fun to be scary. Mr. Bones, the cook uses his five times table to turn Mrs Tibia's recipe for one into Boo Stew for five. Children from Mount Cameron Primary School, East Kilbride, had great fun making their own Boo Stew, practicing their times table facts at the same time. This story is a gift for Halloween – pair it with Funnybones for a spooky topic. You could use the book for multiplication and division, multiples, arrays, investigations (e.g. 5×5 multiplication square – which numbers are missing? Why?), number sequences (use a calculator for big numbers), doubling, investigate the rules of divisibility and much more.

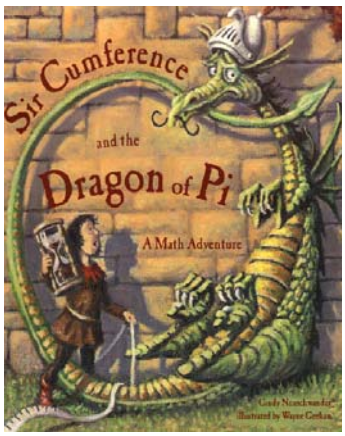
In ***One Grain of Rice: A Mathematical Folktale*** ④ by Demi (ISBN 059093998X), an Indian Raja keeps nearly all of his country's rice for himself. He believes he is wise and fair, storing the food as protection against famine. However, when a time of famine does indeed come, he refuses to share the rice and his people are hungry. A village girl called Rani does a good deed for the Raja and is allowed to choose her own reward. She chooses a single grain of rice, doubled every day for 30 days. Her single grain rapidly grows to many millions and the Raja learns a valuable lesson. The book gives access to large numbers through doubling. The beautiful illustrations and surprising fold out pages

① 


② 


③ 


④ 


⑤ 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certainly add to the wow factor of big numbers. Explore doubling by using a set of domino doubles. Extend beyond double 6 (or 9) by drawing your own dominoes. What patterns might you use to make the dominoes easy to read quickly? Use a Doubling Tower to explore repeated doubling. If the ground floor flat is number 1, what number is the penthouse?

Stories are not just for younger children. ***Sir Cumference and the Dragon of Pi*** ⑤ by Cindy Neuschwander (ISBN 1-57091-164-9) explains how to find pi while ***Sir Cumference and the First Round Table*** ⑥ (ISBN 1-57091-152-5) explains diameter, radius and circumference. There are a number of books in this series, all using the same characters and 'knights of the round table' theme. ***The Number Devil*** by Hans Magnus Enzenberger (ISBN 1-86207-391-0) is an amazing mathematical adventure suitable for key stage 3 children and adults alike. The book deals with some challenging mathematical concepts at the same time as being a good, fun read.

New stories are being published all the time. Most will appear to have nothing to do with mathematics at first glance. Look again with your mathematical hat on and you will soon be struck by the possibilities. I recently came across ***Orange Pear Apple Bear*** by Emily Gravett (ISBN 978-1-4050-9022-3). At first sight, this is a very simple book where the order of 4 words is simply changed, resulting in some fun pictures of the bear. Read the story, and then produce an apple, an orange, a pear and a small teddy to explore finding all possibilities. Begin with one item; move on to ways to arrange two items, then three then all four. This is much more fun with a story starter and the actual items. Children will have to discover their own shorthand for recording and may begin to work systematically.

Mathematical stories have proved to be an excellent vehicle for both delivering and enhancing the curriculum. Sometimes I use a book in the plenary to help us to summarize and check our understanding. We might write what we consider to be a missing page, verbalise a calculation or talk about what might happen next, mathematically.

Try out some of the books on the booklist and you'll soon become hooked. Browse your local bookshop with that mathematical hat on, or search any Internet bookshop using key words such as mathematics, numeracy or a particular area such as time coupled with the age range you are interested in. But before you do, take another look at your existing favourites with your mathematical hat on.

Cherri Moseley is an independent primary mathematics consultant, writer and teacher.


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