



# Books for Children with a Mathematical Focus

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**Sheila Ebbutt** assesses recent titles.

Mathematics education and politics are awash with different theories of how children learn mathematics. Professionals in the field ? mathematics co-ordinators, advisors, numeracy consultants, lecturers ? work to convince practitioners and parents about the depth and range of mathematical experiences and understandings that children need to become numerate. Politics and the media can trivialise these educational messages, and parents receive mixed and confusing messages about how their children should learn mathematics. Publishers come to their own conclusions about what parents will buy, and often produce the worst possible material for children. Which books really do help to develop mathematical understanding at Foundation Stage (3-5 year-olds) and at Key Stage 1 (infants). **Sheila Ebbutt** investigates. <!--break-->

There is a problem about producing books for children with an obvious educational purpose, such as developing their mathematical understanding. Unless you are very clever at it, the result can be dull worthiness. Children are often polite in their response to such books, but they are not fooled by it, and too much of this kind of thing could put them off both books and mathematics. Nowadays, books are so pleasurable to handle, so bright and colourful and innovative in their design, it can be hard initially to discern the good content from the mediocre.

From the huge pile of books I received for this article I tossed out some of the worst offenders. They included ill thought-out counting books with poor artwork and dull content, dreary stories with an obvious counting moral, books with a mathematical objective in mind that could not be conveyed in that way, and death-by-a-thousand-worksheets.

## **Weighing and measuring**

It is not possible to convey to five year-olds an understanding of weight with a pop-up activity picture book. Children learn to weigh by holding small heavy things, large light things, by doing cooking, by balancing objects, by sitting on a seesaw. Now, an ingenious story book can pose problems within the story that draws on these experiences, but this is very hard to write. So, beware of gorgeous books on weight, capacity, length and time, with no decent story line and tedious content, but with a moral educational fervour! Look instead for story books that pose problems about measuring, such as **Six Feet Long and Three Feet Wide** by Jeannie Billington and Nicola Smee. Whose feet do you use as a measure when you make a bed? There?s trouble if it?s the wrong person and the bed?s too short! Children love these conundrums, but they have to understand the problem from their own experiences. Books cannot give them the experiences, but they can set interesting riddles in intriguing contexts.

An unfortunate by-product of the drive for higher achievement in numeracy is a proliferation of arithmetic workbooks for children. It is a way of printing money for publishers, but not necessarily a way of helping children learn mathematics. Children who enjoy working through workbooks like doing this sort of thing. Children who don?t, don?t. There is an element of practice in the narrow sense: practising school-focused skills. There are some books that emphasise a problem-solving approach, but mostly the books look like prosaic school work. I count these books as a

means of getting parents to buy school books to help advance their children's arithmetical skills. They very rarely help and mostly hinder children's learning. They certainly will not help children apply the mathematical knowledge they have. Bored children are unlikely to be helped. An analysis of the range of these workbooks available for home purchase would take an article in itself, so I have not included any specific examples here.

### **Pre-school counting books**

Now pre-school children have their own mathematics curriculum. This is important and positive as long as the interpretation of the mathematical experiences children need is as wide-ranging as possible. The curriculum for the Foundation Stage expects, amongst other things, that children's mathematical understanding should be developed through stories, songs, games and imaginative play, so that children enjoy using and experimenting with numbers, including numbers larger than 10. There is a lot of scope here for publishers!

Toddlers get their own books now, some neatly attachable to the child's buggy. At this age, children need clear and understandable images. **My Numbers** is a 'Buggy Buddy' board book with photographs of babies and things to count, and a mirror at the back. The counting will be beyond the toddlers, but it is a book they will get really attached to. **A Bear with a Pear**, another 'Buggy Buddy' board book, is quite fun with bold illustrations. Pop-up books are magic, but some publishers use them better than others. **Arthur Counts!** is not inspired as a little board book, but the flaps will save it because it is always a delight to lift and probe. The counting will be incidental. **Count with Titch** by Pat Hutchins is a perfect board book for toddlers. The photographs of the objects are as clear as they can be, and there is a problem on each page: '5 drums. Where's the blue one?' We count up to ten with **Ten Tired Teddies**, and we count down from ten with **Wake Up! Ten Tired Teddies** - these are quite nice board books, with the teddies doing everyday things like brushing their teeth. **Billy Bunny's 123** has lovely realistic paintings of animals and creatures, full of detail that makes such sense to toddlers. There are seven beetles which are all different and so handsome, and nine hairy caterpillars. You are drawn to spend ages on each page.

### **Counting books**

There are countless counting books available nowadays! Some will not stand the test of time because they are not interesting enough. Others will last and last. **Alfie's Numbers** is one of Shirley Hughes's miracles. Her drawings keep both adults and children amused for ages - she really knows what mess and havoc children cause - and she pops children behind curtains and under tables, and her eye for detail is wonderful. The paintings and the language that accompanies them entices you into the problem. You really want to count everything, and then you find more things to count. That's what I call a counting book! I want to count things in **How Many Monsters?** because I love the monsters, and I love lifting flaps. You lift the first flap and you see one monster's bum. Oh naughty! There is a two-headed monster, and one with three feet. Delicious. **Ten Dirty Pigs** starts at one end of the book, and **Ten Clean Pigs** at the other, so you get a clean counting book and a dirty one. They do amusing things: 'Five clean pigs powder their noses?', 'Eight dirty pigs wash creases and cracks?', and there is a rhythm of rhymes. **Ten, Nine, Eight** is an old favourite, a real calming-down-at-bedtime book, counting down from ten, and starting with '10 small toes all washed and warm'. I could fall asleep right now, clutching the book to me! I hope this book lasts for ever. **When One Cat Woke Up** has the cat doing mischievous things as we count. She fought with three teddy bears and unravelled six balls of wool. The illustrations are elaborate, and we are drawn to spot things and count.

Barefoot Books do a range of nicely produced counting books with interesting artwork that would add positively to any child's experience. **One Moose, Twenty Mice** uses photographed felt pictures, and you have to look for the cat on each page: 'sixteen spiders, but where's the cat?'. The counting, unusually, goes up to twenty, which is very helpful for extending children's knowledge of the counting sequence. There are lots of things to count. Each of the twenty mice has two beady eyes, for example. **Night-Time Numbers** is a collage book, with skeletons and witches and wolves and bats. Perhaps more of a morning book than a night time book, and not for the faint-hearted.

There are other counting books with interesting images, which would make conversation pieces with children. **A Shaker's Dozen** has photographs of things to do with Shakers, such as six Shaker tools and twelve Shaker pies, with

information about the Shakers on each page. It is an intriguing book, but the level of the content is beyond the scope of the counting. Another book that misses the age range is **Ten Little Rabbits**. The illustrations are detailed and involved, and the situations they illustrate are complex. The language is sophisticated with rhymes that six and seven year-olds love: 'Five wise storytellers trying to keep warm. Six nimble runners fleeing from a storm'. Yet it is presented as a board book, and the counting only goes up to ten. There is a mismatch with age and expectations here. A board book will not do for the age range, and the counting should involve larger numbers. **Five Chocolate Biscuits** is a counting down book, from five to one. The count down is woven round a space adventure, and the artwork is airbrushed and modern. Children will like this one. There is more lovely artwork in **While You Were Sleeping**, with detailed paintings of animals. 'While you were sleeping, four baby owls sat wide-eyed in an old oak tree.' The baby owls, cream and fluffy snuggle together on a branch and gaze out at us over a double-page spread. There are four owls, but only seven eyes, because one owl is looking to the side. There is scope for more sophisticated counting in this book, beyond the text. **Little Rabbits? First Number Book** has clear, detailed illustrations, and the book takes counting further. Each double page has a new set of problems: How many wheels on a pram, roller blades, a lorry?? Which car comes first, second, third? What numbers come after 10? It is a good browsing book to go back to over and again.

### Number rhymes and songs

There are books of number songs and rhymes, and there are counting books presented in rhyme. These have such appeal because the rhymes embed themselves into children's memories from such an early age.

Some books take well-known songs and rhymes and turn them into books. **Two Little Dicky Birds** weaves the old finger rhyme in to a pop-up story. The children would be familiar with the rhyme, and they would enjoy the pop-ups. Not much counting, though. **Little Miss Muffet Counts to Ten** takes the nursery rhyme and invents new verses, with illustrations to match: 'When along came six poodles, With oodles of noodles?? I can imagine the whole class enjoying this together. **Over in the Grasslands** is a nicely illustrated book of the song. There are two books of **Five Little Ducks**, both from Orchard Books, which is another way of presenting the finger rhyme and song. One is cute and safe for toddlers, and the other shows a wicked fox presenting danger.

There are books of action and counting rhymes. **One, Two, Skip a Few!** has counting on rhymes, an adding rhyme 'Five eggs and five eggs, that makes ten?', ordering rhymes 'Said the first little chicken??', counting back rhymes, and so on. It is useful to have rhymes that represent different situations with numbers. **A Caribbean Counting Book** is a bookful of catchy, exciting counting on and back rhymes, and **Fruits** is a counting to ten poem where the context will make more interesting discussion than the counting. There is gloopy mud language as well as counting to ten in **One Duck Stuck**, which makes it all fun, and the pictures make the counting interesting. **Catnap** is a counting down from ten pop-up book 'hooray!' but the rhyme is rather dull doggerel. The flaps are fun, and the pictures nice. **Fred and Ted's Treasure Hunt** is an action book, which would get all children whirling round 'Take eight steps forward and five back again. Whirl round and round while you count up to ten'. Very good fun. **Number One, Tickle Your Tum** is a simple counting and action rhyme picture book for little children, and will help them learn the number sequence as well as making them laugh.

### Picture books

Some picture books involve mathematics and counting, but don't shout about it. One of the best is **Mister Magnolia** by Quentin Blake. Mr Magnolia has only one boot. He has lots of other things, including a dinosaur (what a magnificent brute!), and you want to search for and count them. But you are not invited to. Mr Magnolia leaps and performs as only Quentin Blake knows how. This book is true problem solving without drawing attention to itself. Whimsy and fanciful language is appealing in a picture book: **When Sheep Cannot Sleep** takes us with Woolly the insomniac sheep through surreal landscapes where there are things to count if you search. We end with counting twenty-two Zs as Woolly sleeps. But counting is not mentioned. In **Lucy & Tom's 123 and ABC** the story involves us in day-to-day lives, but it is the illustrations that encourage us to look and count and check and count again. There is more than counting here, there is putting things in order, discussion of heavy and light, big numbers, solving problems galore,

seesaws, Granny's sixtieth birthday? The discussion potential is endless. A more mundane way of putting in lots of mathematics is **Traffic Jam**, which has lots of detailed pictures of traffic and escaping sheep and cyclists, and lots of questions to ask. Children will enjoy poring over the pictures and sorting out what is going on. We help **The Very Clever Farmer** count. He can do everything else. But he can't count. This is such a nice idea, because children love to help a duffer.

The most successful books with a mathematical focus are those that are well written, well illustrated, and do not have apparent worthy intentions. They are books that offer challenges and problems that emanate from the reader? Mister Magnolia only has one boot, but how many parrots has he got in that picture? How many people are at Alfie's birthday party, and where's Alfie? What are all the things on the table, and are there enough? The story engages us and we want to find more things out. These are truly problem-solving books. Nice counting books are nice, but really and truly good mathematical picture books are very hard to find because they are so hard to write.

#### *Details of books discussed*

**Six Feet Long and Three Feet Wide**, Jeannie Billington, ill. Nicola Smee, Walker Books, 0 7445 6837 4, £6.99 hbk

**My Numbers**, Campbell Books 'Buggy Buddies', 0 333 76275 4, £2.99 board

**A Bear with a Pear**, Nick Sharratt, Campbell Books 'Buggy Buddies', 0 333 74497 7, £2.99 board

**Arthur Counts!**, Marc Brown, Red Fox, 0 09 926575 3, £2.50 board

**Count with Titch**, Pat Hutchins, Red Fox, 0 09 928169 4, £2.99 board

**Ten Tired Teddies**, Prue Theobalds, Uplands Books, 0 9512246 4 6, £3.99

**Wake Up! Ten Tired Teddies**, Prue Theobalds, Uplands Books, 1 897951 22 1, £3.99 board

**Billy Bunny's 123**, Maurice Pledger, Templar, 1 84011 090 2, £3.99 board

**Alfie's Numbers**, Shirley Hughes, Bodley Head, 0 370 32591 5, £7.99 hbk

**How Many Monsters?**, Mara van der Meer, Frances Lincoln, 0 7112 1499 9, £10.99 pbk

**Ten Dirty Pigs/Ten Clean Pigs**, Carol Roth, ill. Pamela Paparone, North-South Books, 0 7358 1089 3, £9.99 hbk

**Ten, Nine, Eight**, Molly Bang, Red Fox, 0 09 935441 1, £4.50 pbk

**When One Cat Woke Up**, Judy Astley, Frances Lincoln, 0 7112 0636 8, £3.99 pbk

**One Moose, Twenty Mice**, Clare Beaton, Barefoot Books, 1 902283 38 4, £4.99 pbk

**Night-Time Numbers**, Susan L Roth, Barefoot Books, 1 84148 000 2, £9.99 hbk

**A Shaker's Dozen**, Kathleen Thorne-Thomsen and Paul Rocheleau, Chronicle Books, 0 8118 2299 0, £9.99 hbk

**Ten Little Rabbits**, Virginia Grossman, ill. Sylvia Long, Chronicle Books, 0 8118 2132 3, £4.99 board

**Five Chocolate Biscuits**, Peter Day, Red Fox, 0 09 926516 8, £2.99 pbk

**While You Were Sleeping**, John Butler, Orchard Books, 1 84121 141 9, £10.99 hbk

**Little Rabbits? First Number Book**, Kate Petty, ill. Alan Baker, Kingfisher, 0 7534 0348 X, £4.99 pbk

**Two Little Dicky Birds** , Nick Denchfield and Ant Parker, Macmillan, 0 333 74540 X, £5.99 hbk

**Little Miss Muffet Counts to Ten** , Emma Chichester Clark, Red Fox, 0 09 925609 6, £4.99 pbk

**Over in the Grasslands** , Anna Wilson and Alison Bartlett, Macmillan, 0 333 74187 0, £9.99 hbk

**Five Little Ducks** , Penny Dann, Little Orchard, 1 84121 103 6, £2.99 pbk

**Five Little Ducks** , Ian Beck, Orchard Books, 1 85213 497 6, £4.99 pbk

**One, Two, Skip a Few!** , ill. Roberta Arenson, Barefoot Books, 1 902283 00 7, £4.99 pbk

**A Caribbean Counting Book** , Faustin Charles, ill. Roberta Arenson, Barefoot Books, 1 901223 86 8, £4.99 pbk

**Fruits** , Valerie Bloom, ill. David Axtell, Macmillan, 0 333 65312 2, £4.99 pbk

**One Duck Stuck** , Phyllis Root, ill. Jane Chapman, Walker Books, 0 7445 6344 5, £4.99 pbk

**Catnap** , Krisztina Nagy, David & Charles, 1 86233 109 X, £6.99 hbk

**Fred and Ted's Treasure Hunt** , Hilda Offen, Hutchinson, 0 09 176803 9, £9.99 hbk

**Number One, Tickle Your Tum** , John Prater, Bodley Head, 0 370 32378 5, £6.99 hbk

**Mister Magnolia** , Quentin Blake, Red Fox, 0 09 940042 1, £4.99 pbk

**When Sheep Cannot Sleep** , Satoshi Kitamura, Red Fox, 0 09 950540 1, £4.50 pbk

**Lucy & Tom's 123 and ABC** , Shirley Hughes, Hamish Hamilton, 0 241 14075 7, £9.99 hbk

**Traffic Jam** , Annie Owen, Little Orchard, 1 86039 571 6, £3.50 pbk

**The Very Clever Farmer** , Denis Bond, ill. Steve Cox, Little Hippo, 0 439 01458 1, £3.99 pbk

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