

Developing Early Maths through Story

Step-by-step advice for using storytelling as a springboard for Maths activities

By Marion Leeper

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Introduction



Who this book is for

Francis, playing with a handful of pegs and a wooden board, was shouting at the top of his voice. *'I can't help it!'*, he told me, *'Maths is so exciting!'*

This book is for any adult working with children – educator, care-giver, childminder, or teacher – who would like to find that excitement in the rich world of mathematics, and explore the mathematical possibilities in their everyday activities with children.

Mathematics and story

Traditional stories are full of numbers: three wishes, seven brothers, twelve princesses...

Numbers help to set up the pattern of the story: the first two pigs came to grief, but what about the third one? Children – and adults – use **stories to help them**

make sense of the world: stories give us words and images which help us express our feelings.

Mathematics, too, is a way of **ordering experience:** taking objects and events in the real world and working out connections between them.

The patterns of mathematics and the patterns of storytelling often overlap. I told the story of 'Teremok', (page 7) in which animals crowd into a tiny house. The next day I found Adam, age 3, barring the door of the playhouse, calling out: *'You can't come in'*. Why don't you say: "Come and live with us," I suggested, in the words of the story. Suddenly his whole attitude changed as he tried to see how many children he could fit in the house. His mathematical learning involved a whole lot of social and emotional learning too.

For adults, tuning into the emotional potential of sharing a plate of cakes, for instance, makes teaching mathematics easier: it becomes not just a dry set of logical rules but a **vital life skill**.

How to use this book

Using story as a way into mathematics can be empowering for adults and children alike and can take away some of the anxiety sometimes associated with mathematics. These **stories will embody abstract mathematical concepts**, making them easier for children to understand. The stories are interactive, leaving space in the story for children to respond and to join in, allowing them to explore ideas in their own way, and to take their learning off in new directions.

Each chapter starts with a story connected to a particular set of **learning objectives**. It shows how mathematical talk can be built into the story and suggests open-ended activities to follow up. To encourage rich talk and purposeful play, I've suggested real world objects and outdoor activities. The activities are aimed at children age 3-5, but each chapter includes suggestions of what mathematics might look like for younger children and babies.

Watching children make mathematical discoveries is deeply rewarding. As they tackle even the simplest operation, they access many different skills, making connections with what they already know. Even the mistakes they make give us an insight into what skilled learners they are. Each chapter gives examples of what children do and say, and suggests ways of capturing these 'footprints in the sand' – the fleeting glimpses of learning.

It is hoped that this book will encourage you to think of new and wonderful ways into the world of mathematics; and persuade you that mathematics is a powerful way for young children to explore their world.

Tips on telling stories

The traditional folktales in this book are intended to be told, not read. Although links are included where possible to appropriate picturebook versions, **telling the story** has many advantages:

- It allows you to get closer to the children, to make eye contact with them and notice how they respond.
- It encourages children to become involved, for instance by inviting them to join in with the text or the actions; by using their ideas.
- It models ways that children can make their own stories.

However, telling a story without a book is easier than it sounds. **You are already a storyteller if you have ever:**

- Stopped reading the words of a book to talk about the pictures.
- Changed the text, for instance, to make it longer or shorter.

- Told children something interesting that once happened to you.
- Simply played about with a story in any way.

A few strategies will make storytelling easy and fun:

- Start within your comfort zone, with a personal story or a familiar text. Keep the book near you just in case.
- Take a little time to plan the story. Divide it into three or four sections, and make a mental picture as a 'signpost' to each section. Work out your first and last sentence and you're away!
- Act larger than life when you tell a story. Start with a smile and a commanding voice. Exaggerate your gestures, your tone of voice – don't be afraid to clown around.
- Invite the children to take part: suggesting ideas, joining in with the words, or making sound effects.
- Respond to the children's cues. If they are getting restless, move on quickly; if they are interested, follow their suggestions, preferably without losing the thread of the story.
- If you can, listen to professional storytellers.
- Tell lots of stories! The more you do, the easier it gets.



Number Zero – Empty



EYFS Maths Objectives

- ✓ Know that things exist, even when out of sight (Number 16-20 mths).
- ✓ Separate a group of three or four objects in different ways, beginning to recognise that the total is still the same (Number 30-50 mths).

Teremok, or The Little House in the Forest

This traditional folktale from Russia, about animals sharing a house, explores different ways of dividing up a group of objects; the concepts of none, more and gone; and feelings about friends and sharing.

Once upon a number: zero

Zero plays the same part in the dance of numbers

Resources

A box with a lid, a toy mouse and other woodland animals, a woodland role play scene made with a pile of leaves and other natural objects arranged on a piece of fabric.

that silence plays in a piece of music. Although it's a mathematically difficult concept, children like the idea of a number that represents nothing at all: when children have guessed a million exciting things that might be inside, the sight of an empty box is an enchanting surprise.

Why this story?

For babies, noticing that something has gone is the beginning of learning about number. When they realise that the mouse is still in the box, even when the lid is on, they also understand that their mother can be out of the room, but will still come

Story outline: Teremok, or The Little House in the Forest

Mousie Brown was running through the forest looking for a new home. She found a box. 'I wonder who lives here?' she said.

'Tere-tere-mok,

Who will answer when I knock?'

No answer! There was nobody in the box.

'Just right for me,' said Mousie Brown and climbed in the box. She hadn't been there long when mole shuffled past. He knocked on the box:

'Tere-tere-mok,

Who will answer when I knock?'

'It's Mousie Brown. Come and live with me,'

They hadn't been there long when the squirrel came jumping past. She knocked on the box:

'Tere-tere-mok,

Who will answer when I knock?'

It's Mousie Brown and mole. Come and live with us.'

They hadn't been there long when the frog hopped past. He knocked on the box:

'Tere-tere-mok,

Who will answer when I knock?'

'It's Mousie Brown, mole and squirrel. Come and live with us.'

Then clumsy brown bear came stamping past. He knocked on the box with his big bear claws and called out in a big bear voice:

'Tere-tere-mok,

Who will answer when I knock?'

'It's Mousie Brown, mole, squirrel and frog. You can't live with us: you're too big.'

'Then I'll just sit on top,' said the brown bear. Out jumped Mousie Brown, mole, squirrel and frog and ran back to their own homes, just in time, before the bear sat on the box and squashed it flat.

Story summary

Mousie Brown and her 3 friends live in the woods. Mousie Brown finds an empty box to live in.

One by one, her friends come and join her in the box. There's just room for all of them.

The big bear can't fit in the box, so he sits on top and squashes it.

back – an important step towards independence as well as mathematical awareness.

For older children, 'zero' plays an important but invisible part in the story: as the animals meet and make friends in the box, they have to leave their real homes empty. In this story, re-arranging toys together and apart, and finding out all the different ways of making four, is also a way of thinking about friendship and joining groups. Children with containing schemas, who like wrapping things up and putting them in boxes, enjoy this story.

Joining in with the story

The children can help arrange the woodland scene, establishing that there is one animal in each place: one mole in a hole, one squirrel in a bush, one frog on a log, one mouse in the grass. They can use the props to help re-enact the story, choosing

which animal will knock on the box next, and remembering who is already in the box. (You can also use the names of the children for the characters: Rumi the squirrel, Charlotte the mole.)

The children can knock on the floor in time to the words, getting the rhythm of the language in their bodies, an important skill for learning to count. A repetitive story like this makes it easy for children to join in with the words. And of course, there are many opportunities for children to count how many animals inside the box, how many outside, and to work out that there are always four animals. But even if numbers are not mentioned, a lot of mathematical thinking is still going on.

Big questions

- Can you see all the animals? How many are there altogether? How else could we arrange them?