The world of pattern

In the first of a two-part series on pattern, *Nicole Weinstein* looks at the concept that underpins it all – mathematics –and suggests resources to encourage children to design, build or observe patterns in order to make sense of the world around them

We live in a universe of patterns where every night the stars move in circles across the sky.' This is the opening line in Professor Ian Stewart's book *Nature's Numbers*, which takes readers on a journey into patterns in nature and the world around us and how this is linked to mathematics.

Investigating pattern is central to the mathematics curriculum for young children. With the very young, it can be explored though listening to rhythmic patterns and rhymes in stories and songs, or by pointing out simple patterns in books and pictures. Resources such as building blocks, peg boards or familiar objects can be used to create and recreate patterns and build models. Children might also use visual art and crafts – wrapping paper, fabric, Lego bricks – to demonstrate their understanding of pattern.

THE IMPORTANCE OF PATTERN

Mathematicians are often described as pattern spotters. Lynne McClure is director of the University of Cambridge's NRICH project, which provides professional development for teachers and early years practitioners wishing to embed rich mathematical tasks into everyday practice. She says that one way of identifying young children who have a particularly mathematical frame of mind is by observing whether they are 'fascinated' with patterns of all sorts, both those in shape and those in number.

She explains, 'Being confident with patterns means that a child has identified something general – and generality is a very important concept in maths.'

There are two main types of pattern relevant to small children – repeating patterns and growing patterns. For example, repeating patterns are 'Clap, stamp, clap, stamp' or 'Red, blue, blue, red, blue, blue'. And growing patterns are 'Stamp, stamp stamp, stamp stamp stamp' or '1,2,3,4' or '2,4,6,8'.

In both cases, there is a rule for deciding what comes next, which is the generality described above. A follow-up article will look at the pattern of language, movement and sound.

Ms McClure says that children usually develop an understanding of repeating patterns very early in their lives. She adds, 'Given that, it's clear that helping children to understand what a pattern is – to recognise one, and be able to continue it – is important. Teachers should look out for and ask questions about patterns all around us. Resources can be any objects that can be sorted and, therefore, be ordered. Songs and rhymes that have repeats, and using pattern in movement, are other opportunities.

'Later, children will be able to generate repeating patterns of their own. Growing patterns are more difficult because they tend to be linked to number and counting, but there are story books such as *The Enormous Turnip*, where the story gets longer and longer in a recognised order and these are a good introduction to growing patterns.'

1cm Plastic Pattern Blocks from Learning Resources (above); Finger Printers from Early Years (below)

RESOURCE IDEAS

Here are some resources that focus on promoting the mathematical and visual aspects of patterning.

- Fabric and textures are a great starting point for discussing pattern. Some children may be drawn to dots; others find circles or stripes appealing. They may have an understanding of pattern through the visual patterns that they see in everyday life – on wallpaper, wrapping paper or clothes. Patterns can also be found in dressing-up clothes, on drapes for den play, in photos, magazine cuttings or postcards. Try to include a range of cultural traditions, for example, in the home corner or when celebrating festivals. Try the Embroidered Toran (£12.50), the Indian Fabric (£19.99) or the Chinese Dragon Brocade Fabric (£13.95), all from Cosy Direct on 01332 370152. The Waterscape Box (£60) from www.mindstretchers.co.uk contain patterned fabric in different textures.
- Blocks and other construction materials are rich sources for pattern identification and creation. Pattern blocks are a fantastic resource for developing children's awareness of pattern. Try the Pattern Blocks – Wooden (£19.95) from Cosy Direct, or the 1cm Plastic Pattern Blocks (£18.95) from www.learningresources.co.uk. The regular shapes and pleasing look and feel of wooden blocks invite exploration of symmetry. Community Playthings, www.communityplaythings.co.uk, has blocks suitable for all ages.
- Some children enjoy using peg boards and threading beads to make patterns. Try the set of 36

MAIN PHOTO AT SHERINGHAM NURSERY SCHOOL BY JUSTIN THOMAS

wooden Sequencing Beads (£19.99) from www.reflectionsonlearning.co.uk, the Medium Peg Kit (£18.50) from www.wesco-eshop.co.uk, the Beads and Patterns Cards Set (£23.49) from www.earlyyears.co.uk or the Fine Motor Pattern Boards (£42.95) from www.tts-group.co.uk. Tips for early years practitioners on how to get the most out of peg and pin board activities can be found at http://nrich.maths.org/10057.

- Mathematical patterns can occur throughout the environment. Nesting boxes, Russian dolls and graded stacking cups are one way of exploring what came before and what comes next. Try the set of 50 mini Beautiful Babushkas (£69.95) or the Clever Circles (from £69.95), both from www.tts-group.co.uk.
- Take children into the local environment to search for patterns. Let them observe the variety of patterns found in tyres or shoe tracks, overlapping tiles on the roofs or in natural materials like fir tree cones. Or try the Box of Fir Cones (£40) from www.mindstretchers.co.uk. Ask children what shapes they see; what elements are the same and how do they differ?
- Provide opportunities for children to explore pattern in numbers. Simple board games using a dice provide more opportunities for talking about those patterns – but don't make the mistake of only presenting numbers in the pattern of the dice. Children need to see differences as well to make comparisons. Try doing activities with dominoes to give children the chance to create, look for and explain patterns. Visit the NRICH website, http://nrich.maths.org/9970, for ideas.
- Using a light panel provides a striking way for children to explore pattern. Try the Overhead Tangram (£7.99), the Overhead Pattern Blocks (£7.99) or the pack of 450 Power Polygons (£27.99) with the Ultra Bright LED Light Panels – A2 – (£119.99), all from www.reflectionsonlearning.co.uk. Or, for a multi-sensory experience in a darkened room, try the Remote Control Laser Beam (£79.99) or the LED Multi Spinner Ball (£4.89), both from Cosy Direct.
- Stones, shells, leaves, twigs and cones can be used to create all sorts of intricate patterns. Try Early Excellence's Natural ➤

Clockwise from left: Softie Four Ways Mirror from Reflections on Learning; children investigate pattern through maths and play; Sorting Stones by Yellow Door

CASE STUDY: BARNARDO'S NURSERY, BLYTH WEST CHILDREN'S CENTRE

Nicola Brunton, deputy manager at Blyth West Children's Centre in Northumberland, says, 'Our three- and four-year-olds love lotto and bingo games.

'For the younger ones, we make our own lotto cards where they have to match the picture with the one pulled out of the bag. This helps give them to recognise patterns. We do the same with matching numbers on bingo cards.

'They each have a white board marker to cross off their numbers on the laminated card. We start with the numbers one to five and then we add numbers up to ten and later 20.

'We also encourage them to explore pattern in other ways. We have matching activities where the children can match the animal print fabric or paper to the picture of the animal.

'We have lots of games where children can compare sizes and make patterns with toys, but the best by far is our collection of buttons.

'Children prefer this because it's not a toy and they love to put the buttons in size order, sort them into colours or place them on mirrors and see the effects.'

Clockwise from left: Beautiful Babushkas and Wonderful Wooden Basket, both from TTS; Overhead Tangram from Reflections on Learning

Materials Collection, which includes a set of 15 Starfish (£5.99) and a set of Lotus Pods (£6.50, or its Heuristic Play Collections. Let children explore the patterns that these resources make when they are placed in mirror sets, like the Softie Four Way Mirror (£32.99) from Reflections on Learning.

- Provide a variety of items – buttons, pegs, keys, shells – to encourage pattern making and categorisation. Hang different patterned socks on washing lines for children to pair up or create hanging patterns. Try the Wooden Cotton Reels (£9.95), the Giant Tree Blocks (£42.95) or the pack of 128 pieces of natural Sorting Stars (£14.95), all from Cosy Direct. Or the set of 20 Sorting Stones (£20) from www.yellow-door.net, with five bug body shapes painted on them – circle, square, rectangle, triangle and hexagon – in four colours. The Wonderful Wood Basket (£39.95) from www.tts-group.co.uk contains a wide variety of woods from all over the world.
- Support children to recognise the patterns of dots that represent numbers. Try the Ladybird Number Bond Stones (£17.99) and the Toadstool Counting Steps (£19.99), which are painted in dice patterns, both from Cosy Direct.
- Explore pattern through art. Create wallpaper or wrapping paper patterns on a small or large scale using the set of four Easy Grip Pattern Makers (£2.99), the Art Spinner (£6.99) or the Pendulum Painter (£17.95), all from Cosy Direct. Or try the Fun Foam Paint Rollers (£13.95), the Patterned Palm Printers (£4.99), the Giant Outdoor 'Big Art' Tools (£44.95) or the outdoor Wheelie Painter (£61.95), all from www.tts-group.co.uk. Use the set of eight Finger Printers (£3.59) from www.earlyyears.co.uk to create patterns on a small scale. Include a variety of interesting papers – patterned wrapping paper, glossy paper, transparent paper, tissue paper, gold paper and shiny paper – and different thicknesses of paintbrushes and crayons or pens.
- Make patterns in dough and other malleable materials. Try the Wooden Dough Tool Set of 12 (£8.99) from Cosy Direct, with the Soft Dough Pots (£9.99) from www.earlyyears.co.uk. ■

MORE INFORMATION

- 'EYFS Best Practice: All about... Pattern, Part 1' by Linda Pound, www.nurseryworld.co.uk/nursery-world/feature/1097616/eyfs-practice-about-pattern
- The NRICH site publishes tasks and activities for children and teachers in the early years, http://nrich.maths.org/early-years.

BOOKS

Pattern is an integral part of our everyday environment and the means by which we make sense of that world. Here are some examples of children's books exploring different kinds of pattern.

- Growing patterns – see classics such as *There Was an Old Lady Who Swallowed a Fly* by Pam Adams and *The Enormous Turnip*, of which there are various versions including one by Nicola Baxter and *The Gigantic Turnip* by Aleksei Tolstoy and Niamh Sharkey. In *The Very Noisy House* by Julie Rhodes and Korky Paul, noise cascades up then calm descends through every floor of an old house (see www.nurseryworld.co.uk/nursery-world/review/1119363/noisy-house). In *Billy's Beetle* by Mick Inkpen, the chain of people joining the hunt for a beetle grows and grows.
- Patterns in daily life – see books by the likes of Sarah Garland, such as *Going Shopping* and *Doing the Washing*, and Ken Wilson-Max, such as *Lenny Goes to Nursery School*. For contrasting patterns in lifestyles, see *Town Mouse, Country Mouse* by Jan Brett.
- Patterns in nature – see *The Tiny Seed* by Eric Carle and *Jasper's Beanstalk* by Nick Butterworth and Mick Inkpen.
- Visual patterns – check out stories by Nick Sharratt (in particular, *My Mum and Dad Make Me Laugh*, *Pants* and *Socks*), Anthony Browne's *Gorilla*, *Little Beauty* and *Silly Billy*, and Stella Blackstone's *Bear About Town* and *Bear on a Bike*. There's also *We All Went on Safari* sensory tale from www.playtoz.co.uk. This story set includes a selection of African-inspired sensory-rich resources, perfect for introducing pattern through stories and animals.