This month’s issue focuses on Number. There are articles on reasoning, counting, numbers as labels and representing numbers. Ian Thompson is back with an article on maths and babies, and Maths to share uses As the bell goes, a series of audio reflections by teachers.

Contents

**Editor’s Entrée**
If you’re quick, there might just be time to book a place for BCME7, starting on 6 April at the University of Manchester. Nearly four days of bargain CPD and great fun too. Catch up on some news about nursery inspections, what’s new from the National Strategies, and find out more about the Maths Specialist Teacher (MaST) training.

**Ideas Box**
Add your ideas in the Early Years Forum. Any topic, any area, as long as it’s something to do with mathematics!

**Focus on…**
What can you do with ten black dots? Find out, with a little help from Donald Crews.

**R4U - Research for You**
Ian Thompson is back with a reprise of Wynn, Starkey and Cooper’s work, exploring reasoning about number and their inborn ‘accumulator’ with five-month-old babies.

**Case Study**
How much maths can you get from a mountain of Wellington boots? Read what one nursery class did – from counting, sorting and ordering to pictograms and more!

**Maths to share – CPD for you and your colleagues**
Have you discovered As the bell goes yet? We take a look at how you might use these reflections for CPD.
Editor’s Entrée

Play is recognised as so important to children’s well-being and development that the right to play is set down in the United Nations Convention on the Rights of the Child (1989), and play is a fundamental commitment within the Early Years Foundation Stage. *Learning, Playing and Interacting: Good practice in the Early Years Foundation Stage* is a new toolkit from the National Strategies. The toolkit considers the best approaches to play and learning for young children and clarifies the role of adults who support and enhance young children’s learning. One comment on the download page says this is publication is ‘a very welcome blast of common sense’.

Did you see the news item on 17 February when Ofsted confirmed that it is to privatise nursery inspections? Tribal Group has been made the “preferred bidder” for one area of England, but further announcements are expected. Ofsted said it has nominated its preferred bidders but that legal processes prevent it from confirming details at this point. Education consultants Tribal Group has said it has won a five-year contract worth £64m which is due to start in September 2010. Tribal says the deal would mean it would manage “inspection services for 45% of early years providers, including nurseries and childminders, in England”. “We are also looking forward to welcoming the Ofsted staff transferring to Tribal, who bring with them great depth of expertise and experience in this sector.” Read more on the BBC News website.

Don’t forget to take a look at the new issue of the *Primary Magazine, Issue 21* has a wealth of information and great ideas to develop classroom practice. Focusing on Brunel’s structures and Barbara Hepworth, as well as the usual history section, there will be plenty that is relevant to the Early Years. Issue 22 will focus on the general election, visualisation and the art of American artist Kenneth Nolan.

Are you considering undertaking the Mathematics Specialist Teacher (MaST) training? Take a look at the [MaST microsite](#), where you will find all the information you need to help you make your decision. If you’d like to find out about other people’s experiences of the course, read [Plus or Minus?](#) on page 13 of Issue 65 of the DCSF’s Primary Magazine. Katy Best and Sumana Jain are taking part in the pilot programme and will soon be fully-fledged Maths Specialists. There’s also a [MaST programme community](#) where you can join in with the discussions and ask questions.

Last chance! BCME7 starts on 6 April at the University of Manchester. There might just be space to squeeze you in if you’re quick! Nearly four days of bargain CPD and great fun too. There are plenty of sessions that will be of interest to you – download the [programme](#) and take a look.

And finally, the latest round of *Mathematics Knowledge Networks (MKN) applications* has just opened. Applications must be received no later than noon on Monday 10th May 2010, so you have some time to discuss your project and get the application ready. You will find lots of useful information and advice on the [MKN microsite](#) - where you can also download an application form and guidance notes.
Ideas Box

Add your ideas to the Ideas Box thread in the Early Years Forum. Just download a template, complete it and upload it to the forum, or simply post your ideas straight to the thread. We’ve even put together some simple guidance notes which show you how to do all of this, step-by-step!

We’d love to hear your ideas for resources, activities and actions in the Early Years. Your ideas could be about a particular resource, a song, rhyme or ideas for (say) the sand. Alternatively, surprise us! We don’t want to restrict your ideas to physical resources. Once the ideas build, we will sort them into categories for easy access.

Any topic, any area, as long as it’s something to do with mathematics!

Once you’ve uploaded your idea, why not tell the wider NCETM community about it? You can add a post in the Early Years Forum in the Ideas Box thread – for example, you can share how you’ve used your resource, or how the children reacted to it, and any changes you’ve made to it as a result of putting it into practice. We hope to feature some of your ideas in the Early Years Magazine.

Don’t worry if you feel a little daunted by this – get in touch with us and we’ll be pleased to help!
Focus on…
Ten Black Dots

*Ten Black Dots* is a simple rhyming counting book by Donald Crews. Easily obtainable from online retailers, the book is likely to cost less than £4. The first page in the book asks “What can you do with ten black dots?” It then goes on to count to ten, showing two different ideas for each number. For five, the book suggests that “Five dots can make buttons on a coat or the portholes on a boat”. Each page offers an opportunity to count the dots and the last few pages show a growing pattern of dots. The pictures are simple enough to inspire children to make their own pictures and paintings including black dots.

With a bit of help from you, dots will be everywhere. Here are a few ideas you might find useful, though once you’ve shared the book with the children, they’ll have plenty more:

- draw or paint pictures and add some black dots. Count the dots and make a simple sentence to display with the pictures, perhaps in a speech bubble
- make a set of 1 to 6 dot cards and a number track from 1 to 6 for a simple matching game. As the children become more confident, race against a one-minute sand timer
- make a few sets of the one to six dot cards and play dot snap
- play any game which includes a spot dice. Commercial ladybird games are good too and there are several of them around. Other dot games such as dominoes are fun as well, if a bit more challenging
- use a large spot dice to generate a number and challenge children to carry out a particular activity that many times – jump, clap, hop etc
- look out for clothes with dots or spots on to count
- sort buttons into those with one, two, three or four holes
- laminate pictures of creatures that usually have spots, but with the spots missing. Children can then use marker pens to draw and count the spots they add to animals such as snakes, ladybirds, dogs and leopards
- cut out some large black dots and laminate them. Hide them around the room and outdoors for the children to find. Start off by hiding three, to make it easier for the children to check if they’ve found them all. Include one more each day. Alternatively, ask the children to decide if you should hide one more or one less and help them to work out how many that will be.

Before you know it, you’ll be having a spot (or dot – you’ll quickly find you and the children using both words) week and children will comment on the dots and spots they notice for a long time afterwards. And without even realising it, they’ll be practicing the number sequence, counting, sorting, ordering, consolidating instant recognition of the common dice and domino spot patterns, and much more.
R4U – Research for You
Maths and babies!
Ian Thompson, visiting professor at Northumbria University

It is often the case that we first become aware that young children might have some concept of number when we hear them say the word ‘two’ in a context where they are obviously referring to two objects. Inevitably, the children have to be old enough to be able to talk before such a situation can take place. However, Karen Wynn (1992, 1996) and other academics (Starkey and Cooper, 1980) have carried out some interesting research with infants who are not yet able to talk.

Representing number

It has been observed that infants generally spend more time looking at things that are new to them or that are unexpected. Based upon this observation, academics have developed a research technique known as ‘habituation/dishabituation’. By getting children used to displays that have a specific property (i.e. habituating them) researchers can then check whether the children are sensitive to this property by showing them other displays that do not have this particular property and ascertaining whether or not they look longer at the new displays.

Working with five-month-old infants, Starkey and Cooper (1980) repeatedly showed each individual child various visual displays containing two spots, and measured the ‘looking time’ for each showing. The infants were then shown several new displays – some with two spots, others with three – and once again their ‘looking time’ was measured. A parallel group had been shown the three-spot displays initially. The researchers discovered that in the case of both groups, the infants looked longer when they were shown displays with a new number of spots. A different study habituated children to displays comprising pictures of two (or three) randomly distributed household objects that were different in each display. Once again, the results were the same. The researchers argued that this showed that the infants were discriminating between the two numbers.

Reasoning about number

Wynn (1996) argues that there is more to numerical knowledge than the ability to distinguish different numbers, as this does not necessarily entail an ability to reason about those numbers. In order to explore the situation further she carried out a series of studies to examine infants’ numerical reasoning capacities. In one study, five-month-old babies were split into two groups: a ‘1 + 1’ group and a ‘2 – 1’ group. Those children in the first group were shown a single object – a puppet – being placed into an empty display area. A small screen then rotated up to hide the puppet from view, and the researcher’s hand entered the display area from the side holding a second identical puppet. This action could be seen clearly by the child. The researcher then placed the second puppet out of the child’s sight behind the screen. This meant that the infants could see the nature of the arithmetical operation being performed but were unable to see the result of the operation.

The display case had been designed to allow objects to be removed without the children realising. During the next stage, the screen rotated downwards to reveal either one or two puppets, and the time...
the infants spent looking at the display was recorded. The researchers predicted that the children would be surprised by an apparently impossible result; they would look longer when they saw just one puppet than they would when they saw two. This was in fact what did happen. Infants in the ‘2 - 1’ group were similarly presented with a sequence of events that illustrated the subtraction of one object from two objects, with a hand that was visible to the children entering the display to remove one of the puppets. In this case, the screen rotated down to reveal either one or two puppets and, as was predicted, the infants looked longer at the unexpected result when the ‘subtraction’ resulted in two items rather than one.

In another experiment, infants were shown an addition of 1 + 1 where the outcome was either two or three objects. Once again, the prediction was that the infants would look longer at the apparently impossible outcome (three items) than at the expected outcome (two objects). This, too, was the pattern of results obtained: infants were surprised when the addition appeared to result in three items, but not when it resulted in two items (i.e. they looked longer at three than at two). Wynn (1992) argues that these results suggest that infants can calculate the results of both additions and subtractions.

The Accumulator

Wynn uses the research findings described above to help her argue the case for an inborn mechanism which she calls ‘an accumulator’. This is the equivalent of Chomsky’s argument in the literacy field of a ‘LAD’ (i.e. a ‘language acquisition device’). Wynn argues that the fact that the abilities described above are evident at a very early age in human infancy suggests that we come into this world already equipped with the concept of number. This has become known as the nativist explanation.

Many people (myself included) accept the standard empiricist explanation of how we possess such knowledge, namely, that we acquire our understanding of numerical relationships from our observations of the physical world and the results of our own actions on, and interactions with, this world. Wynn (1992) argues that there is sufficient evidence available to enable us to ask serious questions about this account. However, whether or not you accept the nativist explanation, the empiricist explanation or indeed, whether you prefer a completely different account of how we come to be able to understand number, you have to admit that the results of these studies are fascinating in their own right.

References

Case Study

Bignold Nursery

Bignold Nursery is part of Bignold Primary School. The school is housed in an old Victorian building near the centre of Norwich, so the outdoor area is small and prone to puddles. A call for wellington boots produced a mini mountain of boots of assorted colours and patterns. Since the boots did not belong to any particular child and there were several identical pairs, getting sorted out to go outside could be rather time consuming as the children could never find the right boots. Jaz Ryan, nursery teacher, decided it was time for some ‘welly maths’, but could never have predicted the rich mathematical experiences which were to come.

First, the children examined the boots and noticed that each boot had a number on the bottom. By comparing boots with different numbers on, the children were able to explore bigger, biggest, smaller, smallest and even inside and outside. One child decided to find out if there was a number on her shoe. There was great excitement when she found out that there was, so everyone else had to look too. The children then drew around their shoes, with lots of talk about right and left as they did so. Each foot was cut out and the children had fun ordering the cut-outs. Size 9½ caused a problem. One child asked what it said and was told 9½. When the adult explained that it meant half way between 9 and 10, he insisted that those must go with the nines ‘because that’s what you said first’. Other discussion centred around the shape of the shoe, with more room needed for toes, because ‘the toe bit is bigger’. Toes were counted and everyone had five on each foot, a surprise because the numbers on the boots and shoes were different.

Next, the cut-outs were painted. One child wanted Ben Bear to paint too, commenting ‘He can sit and wait his turn’. He put an apron on the bear and held him for a friend to draw around his feet. He then helped Ben Bear with his paint brush. But what size were his feet? Ben Bear’s helper compared Ben’s feet with the smallest cut-outs, which were ‘number 6’. After some thought he said, “They are number 3”, and the feet were labelled accordingly.

Mini feet were made and each child added a cut-out to the pictogram. Displayed at child height, children frequently went to look at it and one of the adults was on alert to support discussion where necessary. “I’m the only 6”, “8 is best, we’re the biggest!” and many other comments found their way to the children’s learning stories to illustrate their understanding.

Finally, a chart was made showing which boot size each child needed. The boots were sorted and clipped in pairs with labelled clips. With the chart displayed next to the boots, children check which size they need and find a pair of that size independently. Finding the right boots when getting ready to play outdoors is now a quick, easy part of the routine.

- A photo gallery is available to view as a PDF
As the bell goes is a series of audio reflections by teachers. A group of volunteer teachers were given a digital recorder for their ‘instant’ reflections at the end of a session. Listening to fellow teachers talking about their practice and insights is always of interest and is bound to spark off useful debates and initiate many experiments and activities in classrooms. Each reflection will give you fresh ideas, and maybe a few pitfalls to avoid.

Use the clips as a stimulus for a staff meeting. You could echo this month’s case study by listening to what Helen Williams had to say about Measuring Aliens. Helen recalls an outside activity where children were asked to measure some alien footprints. After their experiences in the nursery, the children at Bignold might have tried to give the footprints a size number.

Begin the staff meeting by reading the case study. Print out a copy for each colleague. Discuss how teachers in your setting organise getting ready to go outdoors when it is wet. Does anyone have any ideas for improving any problems experienced? A key element of professional development is to have the opportunity to articulate your own practice and beliefs to others (and often to oneself for the first time).

Listen to Helen’s reflection and brainstorm ideas for activities using feet and shoes. Consider what resources you have. Shoe shops will often donate unwanted shoe boxes if asked. Label the boxes and sort shoes or boots into the matching box. Perhaps you could pool collections of wellingtons or shoes to prompt the kinds of activities and conversations the children had at Bignold. You will undoubtedly come up with several additional ideas – for example, comparing current shoes with a child’s first pair of shoes, or with those of a parent or sibling. You may even generate enough ideas for a boots and shoes or feet week! Ask everyone to make a commitment to try something new in their room and report back at the next session. If you have access to a digital recorder, ask colleagues to make their own audio reflection to share at the next meeting. You could send the reflections in for inclusion on the portal.

Alternatively, choose one or more reflections from the Early Years section to stimulate discussion on an area you would like to explore. Brainstorm ideas for activities and make a commitment to try some out in your setting. Remember to record your own reflection at the end of a session to share with colleagues and add to those on the portal. If you prefer, you can now make immediate voice recording using the new Audio Reflection Tool to record and store audio learning journal entries into your Personal Learning Space (PLS). Just click on the Learning Journal icon in your PLS. At the top (mid-right) of the page, you will see two, deep red, rectangular boxes – one to add a new written entry, the other to add a new audio entry. You’ll need to log in to access your PLS: if you’re not registered, why not do so now?