



This month's magazine is a rich and varied mix. Ian Thompson is back with his second article on counting and we have a case study from a Sure Start Children's Centre. Other articles feature financial education, young children's fascinations and a childminder mum's blog – so there really is something for everyone.

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### **Ideas Box**

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### **Focus on...**

The story of Jack and the Beanstalk was the vehicle for numeracy activities to explore money and financial education in the early years over a two-week period. Find out how you might use a traditional story to explore financial education.

### **R4U - Research for You**

Ian Thompson is back with the second of his two articles on counting. This time he shares an unpublished thesis by Bob Bruce. Bruce's model involves a three-part theory incorporating the concepts of oral counting, enumeration and counting for cardinality. Ian explains the differences between these three concepts and relates them to the classroom.

### **Case Study**

This month's case study focuses on a course held at a Sure Start Children's Centre. *Learning on a Shoestring* helps parents and carers to support their children's learning through play with everyday items found around the home.

### **Maths to share – CPD for you and your colleagues**

Explore how you might use the DCSF [now the DfE] document, [Finding and exploring young children's fascinations – Strengthening the quality of gifted and talented provision in the early years for CPD](#).



## Editor's Entrée



A Welsh university has launched the first online early years foundation degree to focus on babies and toddlers. [Glyndwr University](#) in Wrexham, North Wales, will be offering the two-year, part-time supported e-learning course, [The Learning and Development of Babies and Young Children](#), from September. The course will be operated through Moodle, a web-learning environment used by many universities and colleges. Aimed at experienced early years practitioners, the programme has already been successfully trialled, though only partly online. Students included nursery managers, childminders, a childminding network co-ordinator, children's centre managers, pre-school development workers and family workers. Applicants for the course should have at least two years' experience of working with children from birth to five and be employed or working in a voluntary capacity with young children, possibly in a supervisory role.

Cathy is a mother of two and an 'outstanding' rated childminder. She is passionate about giving children the best start in life and has created her own blog, [NurtureStore](#), to promote play and learning for young children. Take a look – you'll find lots of ideas for fun, easy to do, inexpensive activities using things around the home. There's a toy shop activity which includes sorting coins by colour and size; a water play washing up activity and several counting activities too. We're clearly on the same wavelength! Cathy's blog is a finalist in the first Mummy and Daddy (MAD) Blog Awards, celebrating the UK's best Mum and Dad blogs.



[Issue 24](#) of the Primary Magazine has great ideas to develop classroom practice. Focusing on the football World Cup, subtraction and cave art as well as the usual history and art sections, there is always plenty that is relevant to the early years. Look out for Issue 25 which will focus on sliced bread, multiplication and much more. You can't say we're not eclectic!

And finally, to consolidate your understanding of how children develop counting skills, take a look at Les Stave's article, [Counting - a deceptively simple skill](#). This appropriately titled article offers you some teaching and learning activities to support the development of counting as well as confirming some theories.



## 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 step-by-step [guidance notes](#), which show you how to do all of this.

Once you've uploaded your idea, why not tell the wider NCETM community about it? You can add a post to 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.

Any topic, any area, as long as it's something to do with early years mathematics!



## Focus on...Money

### Financial education in primary schools – using a mathematical fairy tale in the early years

'What Money Means' (WMM) is the ambitious five-year programme of the [Personal Finance Education Group \(pfeg\)](#) to increase the quantity and quality of personal finance education in primary schools. It is designed to give younger children the best foundation for managing their money now and in the future. pfeg's aim is to help teachers feel confident in tackling money with children of primary age.

One school involved in this work was Alderley Edge Primary School in Cheshire East LA. The work in Alderley was based on the work that had previously been developed and trialled in Applegarth Primary School, North Yorkshire. (There is a larger case study about Applegarth's work in the [WMM in Primary Schools booklet](#) on page 12. Teachers can order this resource at no cost to them from the pfeg website).



Pupils in the Alderley Edge reception class used the Jack and the Beanstalk fairy tale to develop a cross-curricular project that would enable children to improve their skills in handling money and budgeting. The underlying aim of the project was to develop innovative and practical approaches to personal finance education through the creative curriculum.

### Numeracy activities

The story of Jack and the Beanstalk was the vehicle for numeracy activities over a two-week period.



The key aspects were:

- recognising numbers up to 20
- recognising different forms of money
- understanding ways we get money – credit cards, cashpoint machine, vouchers, cheques
- understanding where we spend money and what we spend it on
- sorting coins – 1p, 2p, 5p, 10p, 20p – and recognising notes (more or less value)
- playing with money – exchanging, comparing
- keeping money safe
- counting real money and sorting coins
- making choices about how to spend money (real and imaginary through story of Jack)
- understanding how personal choices could affect how others feel.

Differentiation was relatively easy, especially when dealing with the counting and the sorting of money: coin exchange could be introduced to those children who were ready to move on while those who required more practice could carry on working on counting.

Although mathematics was the prime mover in the project, the cross-curricular nature of the activities developed significantly and a variety of learning opportunities grew out of the story. Other aspects of the curriculum drawn in included: CLLD (letters and sounds phonics), creative development (art and music), physical development, exploration and investigation (science), ICT and personal and social understanding.



The teachers found that the project developed in unexpected but worthwhile ways. The story proved to be very rich in the opportunities it provided. Other traditional tales would probably work well too. The children talked about the project a lot and their parents asked the staff many questions about it. Whenever the topic of money is raised, the children have remembered the Jack and the Beanstalk project and have retained a lot of what they had learned.

### **What the children learned about personal finance**

They learned how to:

- recognise different forms of money
- handle, sort and count money
- know where money comes from and how it is spent
- keep money safe and use it responsibly
- budget and make spending decisions.

*Article by Jan Campbell, reproduced with the kind permission of pfeg. The pfeg website has more information about pfeg, and further examples of effective practice.*





## R4U – Research for You

### The principal counting principles

Ian Thompson, Visiting Professor at Northumbria University

[An article](#) in last month's Early Years Magazine discussed Gelman and Gallistel's model of counting principles. A different model is outlined in the unpublished EdD thesis of Bob Bruce (discussed in some detail in Threlfall, 2008). His model involves a three-part theory incorporating the concepts of *oral counting*, *enumeration* and *counting for cardinality*. The Reception section of the original NNS Framework was based on a similar model; unfortunately, however, the EYFS guidance appears not to be!

According to Bruce, *oral counting* involves the ability to say the number words in the correct order on every occasion (using memory initially and pattern later for the larger numbers); *enumeration* involves number words being matched to objects without necessarily involving the intention of ascertaining how many there are (for example, counting stairs); and *counting for cardinality* is concerned with numerosity (i.e. the number of items in the collection).



#### Oral counting

Early years teachers will, no doubt, have encountered those proud parents or carers who insist that their children can count up to 100 or so, when what they actually mean is that they can recite some of the counting words in the correct order. Being able to recite in this way is only part of successful counting. On the other hand, children cannot even begin to count properly until they are able to recite at least the initial part of the chain. So, *oral counting* is a necessary, although not sufficient, prerequisite for ascertaining the number of items in a given collection (i.e. what we normally mean by 'counting').

The research of Fuson (1988) led her to conclude that when children are in the early stages of learning the number words they experience an initial *acquisition* stage followed by a later elaboration stage. She argued that during the first stage, children asked to count will begin with a correct *stable-conventional* string (e.g. 1, 2, 3, 4...) followed by a *stable-non-conventional* part (e.g. 6, 8, 9, 11...) that they use on each occasion, finishing with a *non-stable* part which changes each time. However, Bruce asked 93 children with an average age of four years four months to count as far as they could, starting at 'one'. 54% of them just stopped at the end of a correct string, with the remaining 46% continuing in a range of ways. There was no evidence of Fuson's *stable-non-conventional* string.



In the *elaboration* stage, children initially treat the counting word sequence as the continuous sound string *wontoothreefore...*, and only later progress from this *string level* to the realisation that the sequence actually comprises separate words. They have progressed to the *unbreakable chain* level, where the sequence of separate words can only be recited from the beginning: it cannot yet be broken into and generated from an arbitrary starting point. For these children, starting a count from 'four' is beyond their capability. Interestingly, some useful activities for helping children develop this understanding are to be found in the original NNS Framework – although not in the more recent PNS or EYFS materials. These activities include:

‘four’ is beyond their capability. Interestingly, some useful activities for helping children develop this understanding are to be found in the original NNS Framework – although not in the more recent PNS or EYFS materials. These activities include:

- continuing the recitation when it is begun from one by a classmate
- continuing the recitation when given a specific number name to start from
- starting the count from one given number name and stopping at another
- correcting the recitation of a puppet – Miss Count – who miscounts (see Thompson, 2008).

Activities such as these can help children come to treat the counting word sequence as a *breakable chain*, where counting does not always have to start from 'one'. This is a necessary understanding for children to acquire before they can progress to using the addition calculation strategy known as 'counting-on' or the subtraction/difference strategies known as 'counting up' or 'counting back'.

### Enumeration

Bruce asked each child in his sample to count along a line of equally spaced identical blocks. Almost every child tackled the task consistently in one of three ways: touching each block; pointing at each block; or 'pointing' at each block with their eyes. Just over half of the children used pointing (with a finger) as their enumeration method. There was no significant difference in success rate between the 'touchers' and the 'pointers', although the 'visual counters' were not as successful. Bruce discusses possible reasons why 11% of his sample counted by eye – a strategy Fuson found only with older children.

The following enumeration activities – can be found in the 1999 NNS Framework:

- counting objects in different orders (e.g. starting with the middle object)
- counting sounds in regular or irregular patterns
- counting fleeting movements (e.g. skipping, jumping...)
- counting objects that are out of reach
- correcting Miss Count when she enumerates in different incorrect ways.

### Counting for cardinality

Bruce decided to use a 'give me x objects' task rather than the standard 'how many' task because of the problem of children responding to the latter task by just repeating the last word of the count without really understanding that counting can determine cardinality. The two strategies used were counting and 'grabbing' – looking quickly at the blocks and selecting them in groups. The most successful children were those who grabbed small quantities (two or three) and counted larger quantities. It is most likely that these children were 'subitising' (recognising small quantities by eye) and changing their strategy to counting when the quantity was out of their individual subitising range. The least successful were those who grabbed every time. This suggests that it might be better **not** to discourage the subitising of small quantities by insisting that all collections be counted.



And who said that counting was simple?

### References

- Fuson, K.C. (1988) *Children's Counting and Concepts of Number*. New York: Springer-Verlag.
- Threlfall, J. (2008), Development in oral counting, enumeration and counting for cardinality. In I. Thompson (ed), *Teaching and learning early number, 2nd edition*. Maidenhead: Open University Press.
- Thompson, I. (2008) Addressing errors and misconceptions with young children. In I. Thompson (ed), *Teaching and learning early number, 2nd edition*. Maidenhead: Open University Press.



## Case Study Learning on a Shoestring

Cherri Moseley from Bignold Primary School & Nursery relates her experience of 'Learning on a Shoestring'.

At the local Sure Start Children's Centre, parents, carers and children can take a number of short courses. One of these courses, *Learning on a Shoestring*, aims to encourage parents and carers to help their children to learn by playing with them using the everyday things you can find around you. Participants receive a certificate, useful evidence for childminders to demonstrate that they are engaging in ongoing learning.



Aimed at children aged one or older, the course runs for four weeks. Each week, the course leader brings in a range of everyday items from the specified area of the home and shows the participants how they might use them. Participants also receive a sheet of ideas, some of which they will have explored during the session and several they will not have had time for. During the kitchen/dining room session, five areas were set up around the room – setting the table; tins and packets; pasta sorting; fruit and vegetables and washing up.

The session began with some exploratory kitchen percussion while the course leader explained that the activities would help the children to develop skills to ease the eventual transition to school – matching, sorting, early language, mark making and much more. Curiosity was highlighted as a particularly important skill to develop and maintain, since it could ensure life-long learning. As if on cue, one child discarded her saucepan and spoon and headed over to a bulging bag and began to empty it. Mum explained that this was such a favourite activity at home that Anika now had her own kitchen cupboard to sort and put shopping in.



After a little time, exploring other activities such as sorting pasta shapes, the course leader brought out the water. She explained that from experience, she knows that once the water appears, everything else is likely to be ignored. We were sceptical that the children would remain focused for very long, but some 40 minutes later, when the children were still squeezing, pouring, spooning bubbles and generally getting themselves wet, that scepticism had well and truly disappeared. Parents concerned about water going everywhere and having a big mess to clear up were reassured by the small amount of water needed and the use of a plastic cloth covered by a towel to catch spills. A little washing up liquid in the water produced numerous bubbles as small sponges, cut from larger ones, were squashed and squeezed. Small containers, bottles and spoons were used for repeated pouring. The children constantly surprised us with their hand strength and accuracy. There was a magical moment when a wooden spoon handle was accurately pushed straight into a bottle through the narrow opening. The spoon was instantly removed and tried the other way up. Clearly recognising that it wasn't going to fit, the spoon was rapidly upended and reinserted by the handle before it was discarded. It all happened so quickly that there is no photograph, but I did manage to capture the rapt attention as a small plastic pot was selected and then used to pour bubbles into the same bottle.

When the pasta shapes were brought over to the water area, the children each added a handful to their water and began spooning pasta and bubbles into a pot, then from the pot back into the water container. The pasta kept its shape throughout; though it was a little soggy by the time we tidied up.

Putting the lid on the water container did not deter Rose. She made do with the bubbles she had already collected, pouring from one container to another. It was only when her trousers were well and truly soaked that she became aware of the fact that she was wet and allowed herself to be moved for



the clear up to begin. Before long, everything and everyone was clean and dry and it was time to go home, complete with the sheet of ideas for learning through play in the kitchen/dining room.

Next week we will be sorting the laundry in the bathroom. The course leader knows from experience not to bring the water out first, and she's right!

### **Kitchen/dining room**

Setting the table – name the items. Look at sizes of spoons etc. Left and right. Which things go together – cup and saucer or knife and fork? How many things do we need? Could play cafés using notebook to take orders. Story – *Goldilocks and the Three Bears*. *The Tiger who came to Tea*.

**Tins or packets of food** – sort by shape, roll/not roll, colour, empty/full. Build with them – stacking, count how high. Play shops, have paper handy to make shopping lists.

**Washing up** – find all the cups etc. Which holds the most/least? How many smaller containers fill the larger one? Squeezing sponges. Home play, copying adult. SAFETY!!  
Songs – *This is the way we wash the...*

**Pasta/beans** – sorting by type, shape, colour. Make patterns/pictures. Sort into grids.  
Song – *Oats and beans and barley grow*.

**Fruit and vegetables** – sorting by colour, type, long/short, fat/thin. Cut open, look at patterns, talk about half. Grow carrot tops etc. Have a shop.  
Story – *The Very Hungry Caterpillar*. *Handa's Surprise*.  
Song – *One potato, two potato*.

**Pans/tins** – match lids. Play as instruments. Pretend cooking. Draw round items, can they match?



### **Brief reflection**

I would not have been convinced of how little water was needed unless I had seen it myself. Nor would I have believed that the water, bubbles, assorted containers and sponges would retain the children's attention for so long. I was reminded of schemas, something I had not thought or read about for some time.

Schemas are spatial movement patterns observed in babies and young children. The child repeats the same actions over and over again, often incorporating them when playing, arranging objects or in drawing. Chris Athey (1990) led a research project into young children's thinking. She focused on the patterns of behaviour in two- to five-year-old children, collecting over 5 000 observations from 20

children. Her definition of schema was: "A pattern of repeatable behaviour into which experiences are assimilated and that are gradually co-ordinated. Co-ordination leads to higher levels and more powerful schemas." (Athey, 1990). According to Skemp, schemas make learning possible. They allow children to integrate existing knowledge and act as a tool for future learning. Early schemas include grouping and sorting, containing, transporting and so on. These are logic- and mathematical-based concepts which children need to underpin future mathematical learning. One of the features of schemas is that the child is engrossed, often concentrating for extended periods of time.

These children were certainly engrossed, repeatedly pouring and squeezing for an extended period of time. This could perhaps have been evidence that the children were in a transferring or transporting schema phase, since they were continually transferring water and bubbles from one container to another.

### **References**

- Athey, C, (ed.) (1990). *Extending Thought in Young Children: A Parent-Teacher Partnership*. London, Paul Chapman Publishing.
- Gifford, S. (2005). *Teaching mathematics 3 – 5*. Maidenhead, Open University Press.
- Worthington, M. And Carruthers, E. (2003). *Children's Mathematics: Making Marks, Making Meaning*. London, Paul Chapman Publishing.



## Maths to share - CPD for you and your colleagues

Very young children are often extraordinarily creative and sophisticated in their thinking skills. Practitioners are responsible for creating nurturing environments where all children can encounter rich experiences and explore their emerging capacity for learning.

[Finding and exploring young children's fascinations – Strengthening the quality of gifted and talented provision in the early years](#) was published by the then DCSF [now the DfE] in March of this year. It aims to support headteachers, early years practitioners, managers of early years settings (including children's centres), childminders and private, voluntary and independent settings, as well as local authority early years teams and G&T leads, to develop appropriate and effective provision for gifted and talented children in the early years.



The publication lends itself to use as a staff development course. Each section includes a case study and 'A practitioner asks' piece which are used to 'explore how each child's unique strengths, interests, aptitudes and passions can be celebrated and nurtured'. 'Questions for reflection' stimulate discussion at the end of each section.

One way of using this resource could be if each section was reviewed by one person, who could then summarise it for colleagues, print out the 'A practitioner asks' and the case study to share and facilitate the discussion of the 'questions for reflection'. They could also be responsible for collecting the agreed next steps, though not necessarily for their implementation. Decisions on how to take things forward would need to be taken after each reflection.

The questions for reflection are available to [download in PDF format](#).

These questions will certainly stimulate discussion to help your setting consider how to support and develop children's extraordinary creativity and sophisticated thinking skills.