



Happy new year, and welcome to our Primary Magazine for the first Spring half term, where we have an article reflecting on the latest round of Shanghai teachers at the front of primary classrooms, and a teacher considers the rationale for what has become known as pre-teaching in maths.



### [How Do I Understand Addition? Let me Count the Ways,](#)

How would you teach a Year 1 class to add 5 to 27? In this issue report on how the calculation was approached by a Shanghai teacher from the recent England-China exchange. We also hear some reflections made by teachers about this lesson and others from the exchange.



### [Pre-teaching Intervention](#)

This is a teacher's account of using intervention sessions to help children access a lesson before it is taught, rather than after the lesson as catch-up. He suggests that the difference in timing has had a positive effect on the self-esteem and mathematical attainment of the children in his Y6 class.

And there are a couple of other things to draw to your attention as well:

- Debbie Morgan, our Primary Director, has played a key advisory role on the new CBeebies series [Numberblocks](#), which hit the screen this week: [find out more](#), and read [Debbie's blog](#) about her experience.
- Debbie has also appeared in a [new video](#) which promotes the use of concrete resources to help pupils grasp mathematical concepts, produced by [White Rose Maths Hub](#).
- We've also recently published the [first in a series of video interviews](#) with primary school heads on the leadership factors involved in embedding teaching for mastery within all aspects of maths teaching and learning a school. The first one features a school in Cheltenham, in the [GLOW Maths Hub](#) area.

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## How Do I Understand Addition? Let me Count the Ways

How would you teach a Year 1 class to add 5 to 27? How much time would you devote to teaching it? If you knew that some of the children were already capable of getting the correct answer to that sum, how would you extend these children mathematically?

These were the questions that teachers were prompted to think about when observing Shanghai teacher Du Juan, teaching a Y1 class on the 'return leg' of this year's England-China teacher exchange. More than 60 teachers from the [South Yorkshire Maths Hub](#) area observed Du teach a Y1 class in the school hall at Hayfield Lane Primary School in Doncaster.



Du poses the addition question to the class in the form of a problem:

***There are 27 eggs packed into boxes of ten. There are five eggs laid by the hen in the henhouse. How many eggs are there altogether?***



How many eggs are there in all?



\* helpfully, eggs are sold in boxes of ten in China!

" $27 + 5$ ", the calculation required to solve this problem, is what Du spends the main part of the lesson addressing.

It's not that she doesn't realise that some of the children can do this calculation before the lesson even starts. She understands that being able to do the calculation is only the beginning, particularly as it rapidly becomes clear that most children use a 'counting on' method. The egg box picture lends itself well to encouraging children to see the value of partitioning the five eggs into three and two, but she also demonstrates, and encourages children to try it with multilink cubes. She shows how a model that illustrates counting-on:



Can be shown in a way that illustrates partitioning:



As well as the concrete cubes demonstration and the pictorial illustration using the egg-box, Du uses a couple of different ways of writing the calculation to show the partition - see these [animated PowerPoint slides](#).

Teachers express their surprise, in the discussion afterwards, that Du even addresses the possibility of partitioning the bigger number (in this example, 27 into 25 and 2).

What we see in Du's lesson is not the sort of polished perfection that a teacher from this country might hope to put on for an observation. The Y1 children, in the high-pressure situation are stage-struck and fidgety. They find the teacher's accent and use of language a barrier, and the expectation to sit still in rows of desks for 40 minutes means that they lose concentration at times. But it seems that the local teachers observing have moved beyond expecting to see a lesson they can copy in their own classrooms. Instead they are successful in pulling out what is impressive from Du's lesson – the meticulous planning of progression, the relentless focus on a single calculation and the many different ways that it can be looked at to help expose the mathematical structure of adding over the 10s barrier.

After each showcase lesson, Maths Hub staff have organised a discussion amongst visiting teachers. Teachers in Doncaster were asked what they would take away from the lesson they saw. One was particularly impressed by how the children were encouraged to 'play' with the numbers, rather than simply being shown a method and repeatedly asked to practice it. Another seemed to have had the idea that "mastery" is 'the extension work that the top kids get to' challenged – she left saying that she liked the idea of starting with a problem that all children could be encouraged to solve. Others were pleased to see the 'ping-pong' lesson style (children working in short bursts interspersed by frequent teacher input) in action and resolved to try more of this in their classrooms.

### Background to the England-China Teacher Exchange

2016/17 is the third year in which English and Chinese teachers have taken part in a classroom exchange. First, English teachers have spent a fortnight in Shanghai schools learning about Chinese maths teaching pedagogy. Shortly after, Chinese teachers have been welcomed into their exchange partners' schools to teach a class of English children for a fortnight. The Maths Hubs programme website has more about the [2014 England-China Exchange](#) (involving primary schools) and the [2015 Exchange](#) (involving secondary schools).

One of the purposes of the return leg of the exchange has been to provide first-hand experience of Chinese teaching techniques for many more English teachers. Classrooms have been opened up to small

groups of teachers, for observation and lessons have been analysed afterwards. Each Maths Hub has also been holding two large showcase events where a lesson is staged in the school hall, observed by up to 100 teachers.

For a flavour of a Y6 lesson given by a different Chinese teacher (in a [Surrey Plus Maths Hub](#) school), and of what most impressed teachers about it, listen to teachers talking in this [six-minute video](#).

The bravery of the Chinese visitors, some of whom have never left Shanghai before, has been striking to all the local teachers. Teachers returning from Shanghai suggest this is a result of a very different culture of lesson observation in China. Teachers are regularly observed by colleagues, as a basis for ongoing collaborative lesson development. Observations are weekly and formative, rather than less often only to be graded. (Indeed many Shanghai schools have classrooms with one-way viewing windows so that groups of teachers can observe lessons without influencing them). Implementing more formative peer observation is something that many schools and Maths Hubs in England are now experimenting with, but many English teachers remain shy about opening their doors. One head teacher, visiting a showcase event in the [London South East Maths Hub](#) area commented:

*'I was so impressed when Lilly (the Chinese teacher) stood up at the end of her lesson and asked the hall full of teachers, for comments. She said "This was not perfect – tell me how I can do better". This is not something you would see teachers in this country do – it's not part of our professional culture.'*

No teacher can adopt teaching for mastery from seeing one showcase lesson from one Chinese teacher teaching a class of English children she doesn't know. But the events have given Maths Hubs the opportunity to raise awareness and interest in other opportunities to learn about teaching for mastery – opportunities to see local teachers who have adapted this approach successfully in their own classrooms, and opportunities to engage in professional development where teachers support and develop one another rather than being talked at by an expert. These opportunities are available from Maths Hubs all over the country. To find out what is happening in your region – contact your [local hub](#).



## Pre-teaching Intervention: looking at another way to help children keep up

by Dan Polak, a primary school teacher from Devon

Recently my school has been involved in a project based around the idea of 'pre-teaching'. The idea was developed in the belief that pre-teaching new lesson material to specific children could reduce the need for 'catch-up' or even 'keep up' intervention, normally done after a teaching episode. Some suggest that children may feel more positive about intervention prior to the lesson and therefore, that it may boost their self-esteem. When schools intervene after a lesson, the child has already struggled with a concept and could, potentially, feel deflated when they miss another part of the curriculum to re-visit work they've already found difficult.

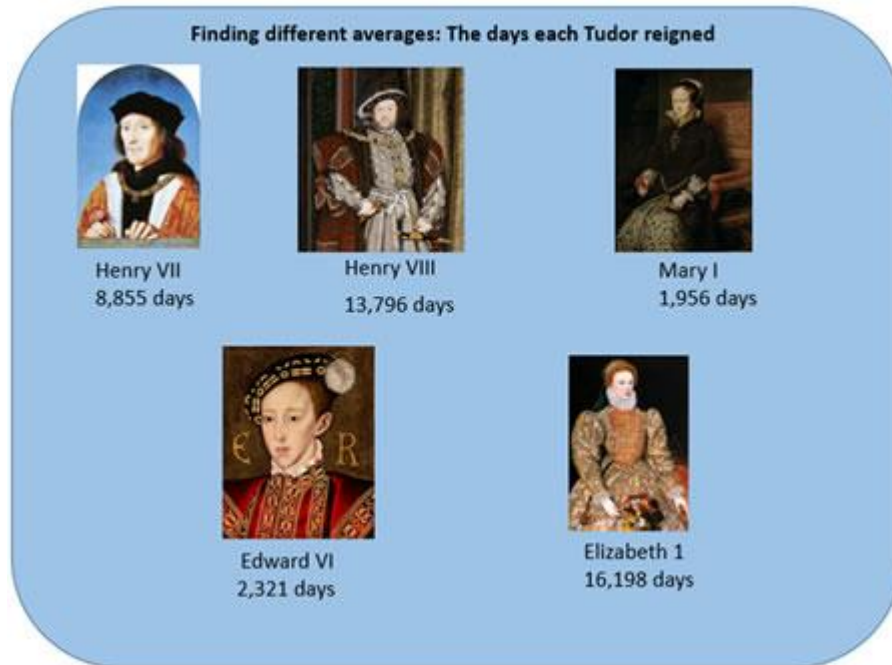
The idea of pre-teaching is to anticipate these problems and identify the children who may need extra support prior to the lesson. The project was run by [Babcock](#) (the organisation that runs school education in Devon), and our advisors gave us [this article](#) to read, which chronicles one teacher's experience of using pre-teaching successfully.

I was initially unsure about how to select these children from my Y6 class. Three children, who have participated on a daily basis throughout the project, were chosen because they often seemed to struggle with working independently. I also told the whole class some details about the project and invited them to join those pre-teaching sessions they thought would help them access the following lesson's content.

While my class go outside for ten minutes before break to do a daily physical activity (DPA) with my teaching assistant, I invite my project children to stay with me to discuss the maths lesson, which takes place after break (we move their DPA slot to the afternoon). I usually tell the class what I plan to do in my pre-teach session and normally have two or three extra children who choose to join us.

There are many ways to 'pre-teach'. You can run through a question you'll ask in the following lesson. You can play a game using the skills that may be needed. You can cover the language that will be useful to their understanding. I normally choose to teach a common misconception, as these children will then be able to help others when they make these familiar mistakes. This has been exceptionally effective in raising the status of these learners, who aren't usually called on by other children to help them. They are often seen by their peers as having a low status in the classroom, but since the project began, more children are choosing to ask them for help. They know that, as a result of a pre-teaching session, these children are likely to have the keys to unlock a problem.

One of the first times I used pre-teaching was to help guard against the common error of using 'average' as word to describe just the mean, and to remind children about how to work out each type of average. The lesson involved a question where I wanted the class to find different averages based on real facts about the Tudor reigns. The resource I used is:



I wanted each child to be able to find the mean, mode and median of these Tudor reigns (including noticing when there is no mode). My project group stayed with me and I started with this on the board:

**Median:**

**Mode:**

**Mean:**

Can you explain each one?

One child said that he knew the mean was the average and he thought the others might be too, but couldn't tell me how to work them out. The others couldn't explain what the words meant at all. We took their ages, (11, 11, 10, 10, 10) and worked out each average with a brief explanation of each one. I felt like ten minutes was a very short time to introduce this whole concept and I had barely covered the very basics by the time the bell had gone and they went to break. I felt like I had talked at them, and not been able to really get to grips with the understanding of averages.

However, when the class came back in after break, I was struck by the confidence of the children I had worked with. Each child from my session was able to confidently tackle another averages question with different numbers, sometimes helping others with their understanding. The pre-taught children had immediately been given an opportunity to broaden their shallow understanding by having to re-phrase it to others. When their peers asked for help, they responded by referring to the pre-teach session but also used these discussions to truly understand what they were trying to explain. One of my weakest mathematicians worked with my strongest and helped! They really helped.

I pulled her aside and asked about how the pre-teach session had helped her access the lesson and she said something illuminating and that I didn't expect. She said that she usually feels like she spends the

first part of a lesson trying to work out how to do something everyone else seems to be able to do. With this lesson, she said: "I feel I have a shortcut."

At the beginning of the project, my class had taken the sample 2016 KS2 papers. My lowest score was 25 out of 110. After six weeks of this project, I was interested to see whether it was having a significant effect on my class, so we took an edited version, with the numbers changed but the same questions. The whole class had made fantastic progress, which I believe owes a lot to the fact that I have mini-experts in the class each day.

The greatest progress was made by the three project children. They occupied the top three places in the class in terms of how many marks they had gained between tests. That 25 turned into a 68. An extraordinary level of progress, but I wasn't surprised because that child has turned into a different mathematician. I can see it in how these children behave in lessons. They are valued and confident, something which is typically lacking in a lower achiever's lesson experience. Another child improved by even more, from 35 to 80. Another went from 42 to 77. On average, they improved by 41 marks. Or 43. As they would tell you, it depends on which average you use.

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