Teaching for Mastery Lesson Design at Barrow Hill Primary Academy A Primary Case Study

Teaching for Mastery Lesson Design Work Group

One of the biggest challenges facing schools as they adopt a teaching for mastery approach is how to design lessons. Working collaboratively with practitioners from across the East Midlands the project, we began by identifying the key features of mastery, before exploring a route through a lesson, that allowed teachers to link these together in a coherent manner. Essentially we were looking at how to turn theory into outstanding classroom practice. Though our research often went much wider what is captured here in these case studies, each participant school was asked to focus in on one aspect of lesson design, how it has been incorporated into classroom practice, and the impact it has had on learners.

Overview

Carly Powell is one of the upper KS2 teachers at Barrow Hill Primary Academy. Carly took part in East Midlands West maths hub Mastery Lesson Design Work group 2018 and although the school were already teaching Mastery Mathematics, The Lesson Design Project has had a very positive impact in the setting. She explained:

"Whilst we had been using a mastery approach for some time at Barrow Hill Primary Academy and had raised pupils' fluency and problem solving capabilities enormously, the Year 5 and 6 pupils still lacked confidence in reasoning. Through working with colleagues and developing the use of Stem sentences alongside the existing good mastery practise (such as: the use of a concrete, pictorial, abstract approach), I was interested to see if we could raise pupils' confidence in reasoning mathematically. Needless to say, it was extremely successful!"

What we did at Barrow Hill Primary Academy

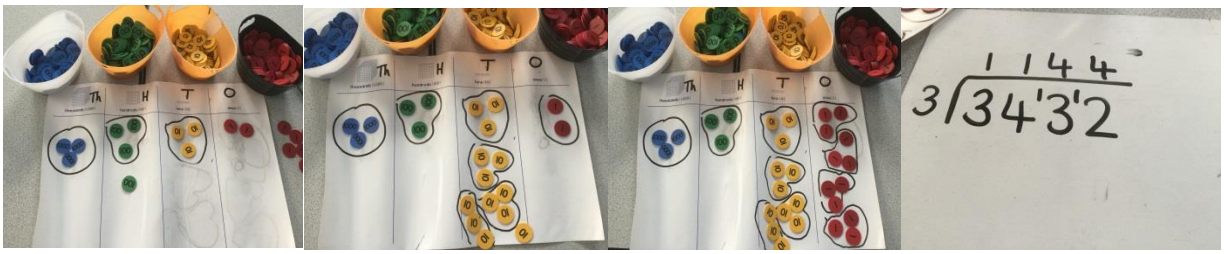
When we first embarked on our mastery journey, one of the main difficulties our Year 5 and 6 children were having was reasoning; often they could solve problems and had solid calculation skills but were unable to explain or reason effectively. The pupils seemed to lack the mathematical language necessary to verbalise their thinking and often their mathematical ability relied too heavily on learnt tricks which were not underpinned with any depth of understanding.

A few months into our journey and I began to see pupils reasoning begin to develop through the CPA approach (Concrete, Pictorial, Abstract) and they could often draw or show why with equipment but they still seemed to lack the vocabulary they needed to explain their thinking mathematically confidently. That's when I came across Stem sentences – a technique which enables the teacher to provide a sentence stem for children to communicate their ideas with mathematical precision and clarity. The sentence structures often expressed the key conceptual ideas or generalities and provided a framework to embed conceptual knowledge and build understanding whilst rehearsing the related mathematical vocabulary.

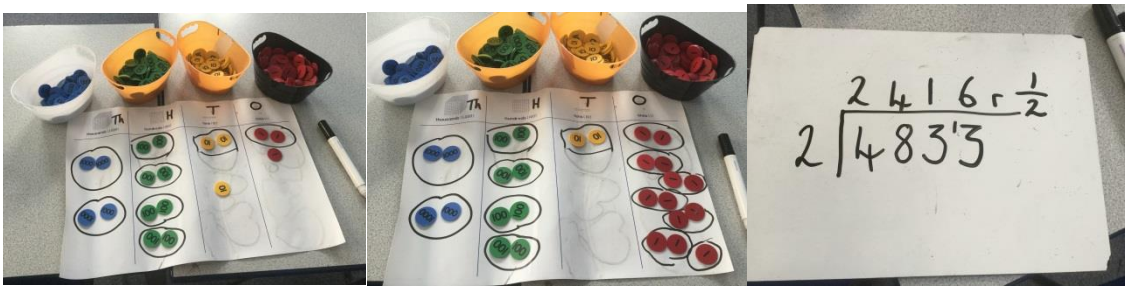
At first I was a little sceptical as to how well the children would take to this and whether or not it would be beneficial to them. The idea of repeating back what the teacher had just said and choral chanting seemed a little young for upper key stage 2 pupils and mirrored closely a great deal of their Early years and KS1 experiences. Having said this however, the fact that the children had experienced this style of teaching when developing their reading and phonics lower down in school meant that they took to it very easily. The children also quickly saw the benefits of the sentences as a summary of what they had learned in the lesson and enjoyed using them almost like mini-plenaries throughout the learning journey and as a scaffold for answering more complex questions.

As we developed the use of Stem sentences into our daily classroom practise, the children were sometimes were able to create their own using one particular individual's good explanation during the lesson alongside the use of concrete and pictorial representations. For example, when revising division using place value counters and place value grids in mixed ability pairings, children were asked to look at a range of calculations and suggest which ones would need some regrouping and which ones might have remainders. The children very quickly began creating stem sentences such as:

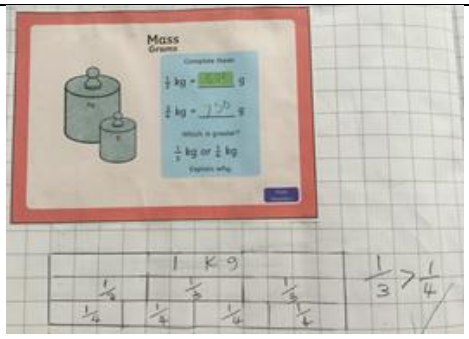
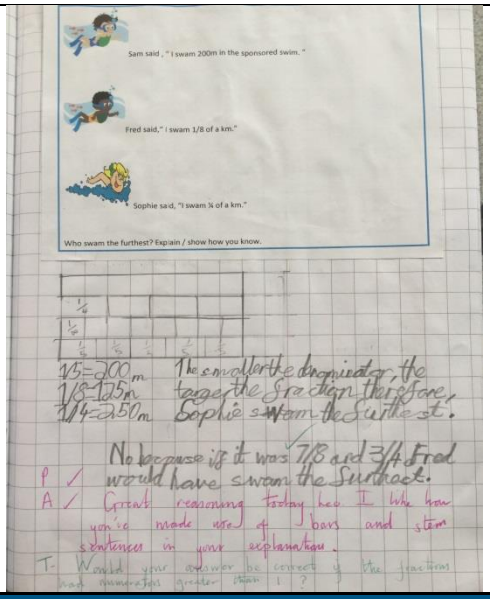
“When a number in any column (apart from ones) is not a multiple of the divisor then regrouping will occur. So 3432 divided by 3 will contain some regrouping because 400 is not a multiple of 3. ” Thomas (Y5)



“When the number in the ones column is not a multiple of the divisor, there will be a remainder. This is true if you regroup too. So, 3942 divided by 3 will not have a remainder because 12 is a multiple of 3 but 4833 divided by 2 will have a remainder because neither 3 or 13 or a multiple of 2. ” Megan (Y5)



What surprised me the most about the effectiveness of Stem sentences however was the pupils recall of them long after we had moved on to different concepts and areas of maths and how the pupils quickly saw the links. For example, after completing their fractions learning earlier in the year, pupils were recalling stem sentences such as: “The larger the denominator, the smaller the fraction. Therefore 1/10 is smaller than 1/4” when working with measure later in the year. They could see they could apply this thinking to their problem solving in the different context without being prompted thus enabling them to reason more mathematically than they were previously able to.

Typical response prior to using Stem sentences:	After using Stem sentences for around a term and a half:
	

Summary and next steps

The introduction of Stem sentences has really felt like the missing piece in the jigsaw for our children: it has given them a framework and the vocabulary to express generalisations and talk about their conceptual understanding confidently.

Our next steps at Barrow Hill Primary Academy will be to :

- Ensure the stem sentences continue to be verbally chanted and rehearsed across school once everyone is teaching using the Inspire text books.
- Develop the use of Stem sentences throughout school and have them displayed in classrooms during each learning journey.

More Information

For more information about this project, or other workgroups and opportunities available through the East Midlands West Maths Hub:
Visit our website: http://www.emwest.co.uk
Follow us on Twitter: EM_MathsHub
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