

OCTOBER 2020

NEWSLETTER

GREAT NORTH MATHS HUB

In this month's issue:

The Importance of Talking Mathematically - is language alone enough?

Exploring the use of representations to maximise learning

Maths Week England

NCETM - Updates



Welcome to the October edition of our newsletter. It's not been the 'normal' October we are used to in the maths hub office with no face to face delivery starting and no trips to national meetings. But whilst we haven't yet started our face to face activity, we have been working hard behind the scene to ensure that, in the current climate, all of our Work Groups are accessible online.

All of our fantastic Local Leaders of Maths Education (LLME) community have been working together with an external consultant to explore how we can deliver effective professional development online. We've had fun, we've learnt a lot and we are ready to share this new approach to professional development with you all over the coming months. We cannot thank our LLME enough for giving their time, energy, enthusiasm and commitment to adapt to this new way of delivery, all whilst still working in their own schools.

Without our LLME and their wonderful schools agreeing to release them, we wouldn't be able to deliver the wide programme of professional development that we do. So in this edition is full of thanks for the schools and settings in which our LLME are based.

Our articles this month come from our wider leadership team of Teaching for Mastery Leads. Jo Morrison and Lisa Heatherington reflect on the importance of mathematical talk and Helen Chambers, our secondary Teaching for Mastery Lead considers how the use of manipulatives and representations in home learning can impact on learning in the classroom.

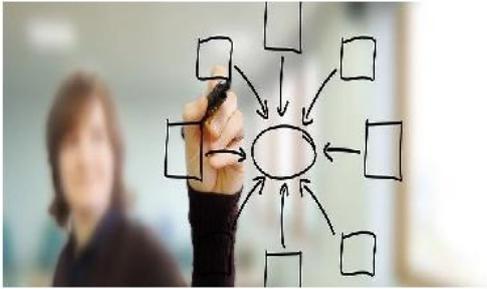
All that is left for us to say to all of our colleagues across the region is to have a wonderful, restful break after a very different first half term back in school.

#EncourageSupportCollaborate

The Importance of Talking Mathematically - is language alone enough?

Lisa Heatherington and Jo Morrison - Primary Teaching for Mastery Leads

Sentence stems, talk partners, I say, you say, we all say are regular features in Primary schools across the country. However, what could the impact be if mathematical language stands alone, lacks coherence or is not meaningful to learners?



Representations minus language = a lack of opportunities for discussion or reasoning
Language minus representations = can be rote learned and easily forgotten.

Making maths meaningful allows pupils to visualise, think more deeply and makes experiences more memorable. This could be a first, then and now story, a numberline, manipulatives or a drawn model to emphasise mathematical structure. The more ways a concept is explored, the deeper the understanding. All of these experiences can be strengthened when accompanied by maths talk.

We know the importance of discussion and the power of precise vocabulary, however when language is not used in conjunction with visuals, vital connections are not made. Language and visuals are processed differently but giving access to both, using the two connected, can enable more capacity of working memory to be assessed. It enables experiences to be expressed, generalised and linked and enables the language to have context and be able to be visualised or imagined. This can support learners to have sustained understanding of mathematical concepts.

Without a whole-school approach to language, the result could be compartmentalised learning and learners seeing maths as a succession of new concepts to tackle and remember. Learners find remembering dis-jointed concepts difficult as they have not been able to create learning pathways. Using a coherent approach to mathematical language across lessons, topics and year groups supports learners to build on, activate and apply prior understanding and generalisations and experiences. This can allow them to make connections, emphasising how different elements of Maths are connected, supporting learners to create a web of related ideas. The process of retrieval supports retention of this language and the linked experiences.

Daniel Willingham says that, “Memory is the residue of thought”, but how do we know what thoughts are being learned? Verbalising thoughts enables learners to reflect on and clarify their thinking and unless all learners have the opportunity to do this, even a knowledge of language, concepts could remain unclear or misconceptions could be internalised. Modelling thinking aloud and using representations, such as Dienes, and structure, such as number-lines, to share their thinking can support learners to reason and make more effective use of precise mathematical language. “Show me what you’re thinking” can be an effective prompt for learners to frame and explain their thinking using visual aids.

Planning regular opportunities to develop mathematical language is essential. There should be intentionality and understanding that this key language is not merely added into a lesson, but carefully interwoven to support the foundations for clear, deep and sustained mathematical understanding.

The PD materials and recently published Ready to Progress materials written by the NCETM to guide primary teaching could be used to support teachers and Maths leaders to create a coherent and rich approach to language. Including stem sentences and key learning from years one to six alongside representations and example activities, it could be used to support planning and delivery of lessons.

References: Why don't students like school - Daniel Willingham

Rosenshine Principles in Action - Tom Sherrington

Exploring the use of representations to maximise learning.

Helen Chambers - Secondary Teaching for Mastery Lead

Is there scope in using homework to prepare our learners for the lesson perhaps? We have been working on a flipped learning approach to maximise the learning potential in the classroom, but coupling it with the careful use of representations to deepen understanding before the key information is taught. In particular, using double sided counters to demonstrate ratios have been our focus so far.

Pupils were given a handful of red and blue counters electronically as their home learning preparation task. The class had previously been working extensively on the stem sentence, 'For every # red there are # blue'. They had to put the counters into the ratio of 3 red for every 2 blue, coming prepared to the next lesson with as many different solutions using their quantity of counters (the pupils each had a different amount of counters). Images of their work were shared on screen at the start of the next lesson and evaluated by the pupils as a hook to demonstrate how the total quantity of counters changes, yet the ratio remains the same.

They then progressed onto recognising common factors and, using a similar approach, a prepared slide showed the ratio 3:5 represented using the same red and blue counters. Pupils were asked to describe the ratio shown in each image using both a stem sentence and ratio notation and choose which image showed the ratio in its simplest form.

Multiplicative links were made between each diagram, creating a chain of their thoughts. The simplified ratio was very clearly at the end of the chain.

Pupils progressed onto using arrays to organise their counters into the given ratios and quite fluently simplified them by reducing the overall quantity of counters to express the ratios in their simplest form.

The flipped learning approach certainly helped pupils understanding. They had time to play and explore themselves without the hustle and bustle of the classroom and without the constant watching of their peers and their solutions. Using the counters electronically instead of having the physical items to hand did not detract from the outcomes and it has given me heart that we can adapt the way we use manipulatives in a flipped approach



Maths Week England

When we return after half term, Maths Week England will be taking place (9th - 14th November). To sign up and to access the free resources, go to

<https://mathsweekengland.co.uk/>

Share with us on Twitter any of the activities that you and your pupils take part in!

Updates from NCETM

Colleagues at the Advanced Maths Support Programme (AMSP) have designed a set of study modules for students starting Year 12. They are aimed at easing the transition for these students who, due to lockdown, have missed some of their Year 11 teaching. These materials can be found here:

<https://amsp.org.uk/resource/gcse-alevel-transition-resources>

NCETMs podcast series continues with the focus on teaching through a pandemic. In the first of this series, a Year 4 teacher reflects on how he has adapted his use of manipulatives for Covid-19 restrictions. You can listen to his podcast here:

<https://www.ncetm.org.uk/podcasts/teaching-through-the-pandemic-1-martyn-yeo/>

The second in the series, Gemma Scott, a secondary head of maths talks about formative and summative assessment strategies under Covid-19 restrictions. YOU can listen to the podcast here:

<https://www.ncetm.org.uk/podcasts/teaching-through-the-pandemic-2-gemma-scott/>

#EncourageSupportCollaborate