

Dear Parents and Carers,

This academic year has seen some significant changes in the way we teach mathematics at Holy Trinity and we thought we would take this opportunity to share with you the impact of these changes; what has worked well and what our next steps are for the academic year 2018-19.

What is Maths Mastery?

Maths Mastery is built on the belief that all children can achieve in mathematics and is inspired by teaching approaches in Singapore and Shanghai. It stresses that abilities are neither fixed nor innate, but can be developed through practice, support, dedication and hard work. Natural talent is just a starting point and does not determine who has more or less potential to achieve.

A mathematical concept is deemed mastered when learners can represent it in multiple ways, can communicate solutions using mathematical language and can independently apply the concept to new problems. Mastery is a journey and long-term goal, achieved through exploration, clarification, practice and application over time. At each stage of learning, pupils should be able to demonstrate a deep, conceptual understanding of the topic and be able to build on this over time.

This is not about just being able to memorise key facts and procedures, which tends to lead to superficial understanding that can easily be forgotten. Pupils should be able to select which mathematical approach is most effective in different scenarios.

This has definitely been a learning curve for some of our more able mathematicians this year as they are competent with procedures and able to solve some very tricky problems but have found producing multiple representations or communicating their solutions with clarity more challenging.

Teaching the Mastery Approach

The revised 2014 National Curriculum is based on the mastery approach and incorporates three areas of learning mathematics: Fluency; Problem-Solving and Reasoning. It focuses heavily on deepening understanding rather than acceleration onto new content and we know this can then appear that children are being limited in their learning or not challenged enough; however this approach enables pupils to truly grasp a concept, and the challenge comes from investigating it in new, alternative and more complex ways.

Problem solving

Mathematical problem solving is at the heart of our approach. Pupils are encouraged to identify, understand and apply relevant mathematical principles and make connections between different ideas. This builds the skills needed to tackle new problems, rather than simply repeating routines without a secure understanding.

Mathematical concepts are explored in a variety of representations and problem-solving contexts to give pupils a richer and deeper learning experience. Pupils combine different concepts to solve complex problems, and apply knowledge to real-life situations.

Reasoning

The way pupils speak and write about mathematics transforms their learning. Mastery approaches use a carefully sequenced, structured approach to introduce and reinforce mathematical vocabulary. Pupils explain the mathematics in full sentences. They should be able to say not just what the answer is, but how they know it's right. This is key to building mathematical language and reasoning skills.

Fluency

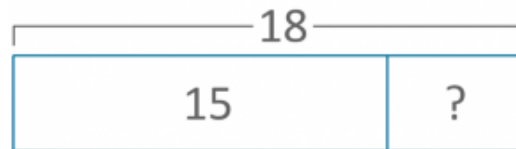
Pupils should be able to recall and apply mathematical knowledge both rapidly and accurately. However, it is important to stress that fluency often gets confused for just memorisation – it is far more than this. As well as fluency of facts and procedures, pupils should be able to move confidently between contexts and representations, recognise relationships and make connections in mathematics. This should help pupils develop a deep conceptual understanding of the subject. Frequent, carefully designed, intelligent practice will help them to achieve a high level of fluency.

The Bar Model

Bar models are pictorial representations of problems or concepts that can be used for any of the operations: addition, subtraction, multiplication and division. In word problems, bar models hold the huge benefit of helping children decide which operations to use or visualise problems.

They can look like this in Key Stage 1:

Austin has 18 Lego bricks. He used 15 pieces to build a small car. How many pieces does he have left?

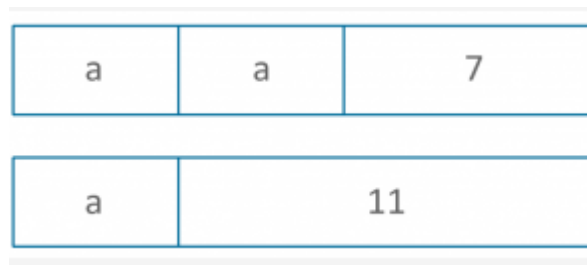


Children can see the operation they need to use is subtraction, $18 - 15 =$

And this in Year 6:

Can you work out the value of 'a'?

$$2a + 7 = a + 11$$



By drawing the bar model, children can quickly see that $a + 7 = 11$ and so $a = 4$.

Classroom Organisation

Teaching 'mastery for all' works best with mixed ability classes, hence our move from setting to whole class maths lessons this year. Research has shown that while setting benefits very able mathematicians, it does not impact the progress and attainment of other learners and can in fact hinder their progress. High attainers continue to achieve well and develop their reasoning skills, having to give more precision and clarity. Middle and lower attainers benefit from the language and skills of the more able in their class.

What have we implemented this Year?

- Whole class teaching
- Explored a range of teaching materials and schemes to find the best one for our pupils. There are many Mastery teaching materials available and we wanted to make sure that we selected the right ones for our pupils.
- Introduced the Bar Model as a strategy for representing problems – from simple addition and subtraction problems to more complex algebra problems.
- Focused on Fluency in every lesson and being the main component of homework.
- Challenge of Reasoning – being able to explain why something is right or wrong and give mathematical evidence to support is now incorporated in KSI and KS2 tests (and features heavily in the revised GCSEs) and so our lessons now reflect this.
- Marking more purposeful – we all know that feedback given during lessons has a far greater impact on children's progress and so teachers are now using this more and rather than spending time writing comments in books that may or not be read, they are using that time to review planning for the next day to address misconceptions and challenge further.

What have been the successes?

- We have seen children's confidence with problem solving increase when using the Bar Model. By drawing the model they are able to 'see' the problem more clearly and understand the necessary operations to solve it.
- Development of reasoning skills, particularly for higher attainers who previously when asked how they worked something out or how they knew it was right, would say 'I did it in my head' or 'I just know'.
- We have found one of the published schemes particularly suited to our pupils and are excited to be moving forward with using it across the school next year.
- Challenge groups set up for a range of abilities to work on maths problems and develop skills outside of lessons.
- In Year 6, both classes taught maths by the same teacher has meant consistency in curriculum and expectations. Going forward this is a model we may explore in other year groups.

What are our next steps for teaching Mathematics?

- Continue with mixed ability seating arrangements in class as it has proven to increase the confidence of all learners and develop the mathematical dialogue taking place in lessons.
- Fully resource classes for Bar Model and Reasoning lessons
- Introduce Challenge groups across the school – to set up a programme of challenge sessions that all learners will be able to participate in during the course of the academic year.
- Further staff training on maths mastery, the use of the Bar Model, and planning for challenge for all.
- Deliver a parent maths mastery workshop in the Autumn term to support parents with this approach to teaching and learning in mathematics.

We hope you found this information useful. Should you want more information on how to support your child with the mathematics curriculum please visit the school website and if you have any further queries please do not hesitate to contact either of us.

Many thanks

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Maths Leaders