



## **The Maths Mastery Approach at Loughton**

In 2015, Loughton introduced a Teaching for Mastery approach. Teaching for mastery at Loughton School is underpinned by the mind-set that every child can achieve. The rationale behind changing our approach to teaching mathematics lay within the research of Guskey (2009) and Skemp (1976); the Education Endowment Foundation's ongoing research based findings; training in partnership with the NCETM Maths Hub as well as the 2014 National Curriculum which states:

- *The expectation is that most pupils will move through the programmes of study at broadly the same pace.*
- *Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content.*
- *Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.*

At Loughton School, this began as a gradual process, progressing from Year 3 to most currently Year 6. This enabled the school to develop the children's mind-set and teacher's subject knowledge in a research based environment. We believe that whilst every child is different, they are all mathematicians. This is whether they are rapid graspers of numbers or concepts, deep thinkers at problem solving, able to verbally reason their ideas, good at making links between different areas of maths or perhaps resilient learners who try their best. As such, although we teach these year groups in classes, they are all challenged as individuals to achieve their full potential. All children have the opportunity to attend 'catch up, keep up' interventions throughout the week, as and when needed.

### **Rationale**

Mathematics equips children with a uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem solving skills, recognising patterns and links, and the ability to think in abstract ways. Mathematics is important in everyday life and we endeavour to ensure that children develop a positive and enthusiastic attitude towards mathematics.

It is important that a positive attitude towards mathematics is encouraged amongst all of our pupils to foster confidence and achievement in a skill that is essential to our society. We are committed to ensuring children achieve the concepts of their year group. To support staff and children we use some Government recommended textbooks within their learning.

## What is teaching for mastery?

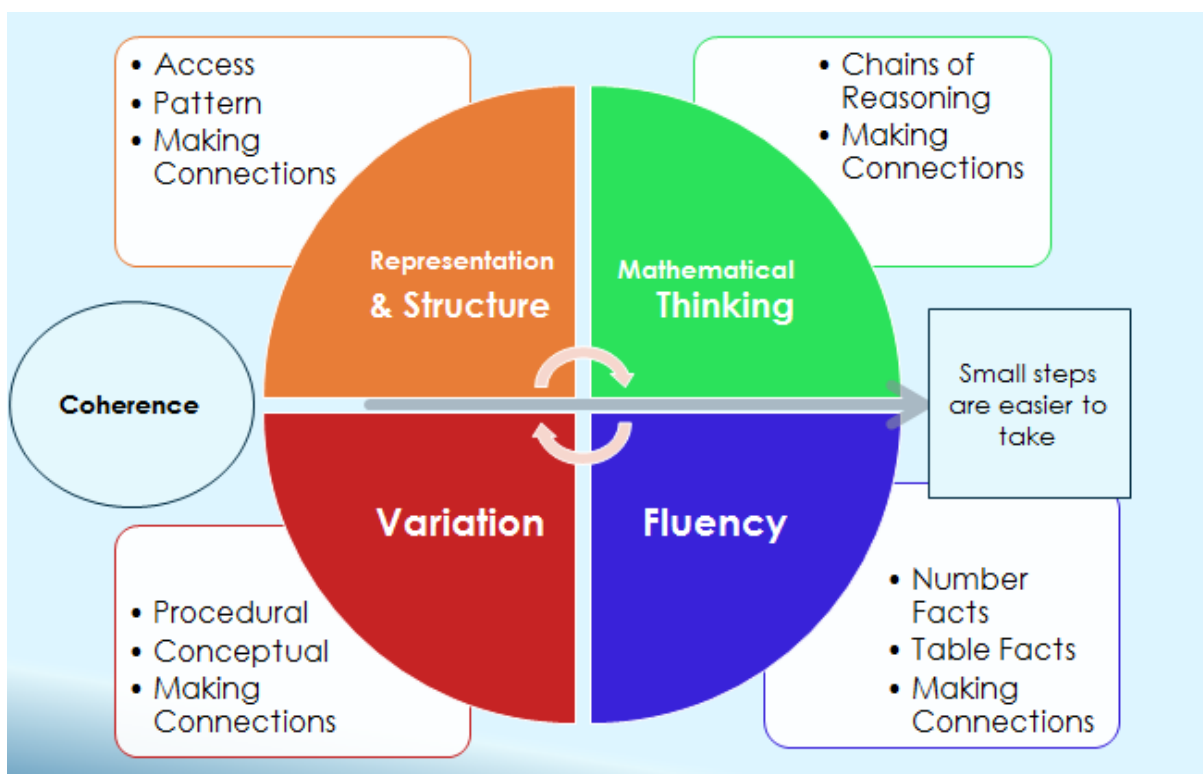
Teaching for mastery involves employing approaches that help pupils to develop a deep and secure knowledge and understanding of mathematics at each stage of their learning, so that by the end of every school year or Key Stage, pupils will have acquired mastery of the mathematical facts and concepts they've been exposed to, equipping them to move on confidently and securely to more advanced material (Stripp, 2016).

When understanding in mathematics is deep, children will have recognised and grasped connections between the concept in question and other concepts within mathematics, whilst explaining why something in this mathematical area works. Due to the nature of mathematics continually building upon itself, it will mean children will have opened a window to future learning built upon patterns, connections and more advanced mathematical thinking at the next stage.

## The Essence of Teaching for Mastery – NCETM

### Key principles of our approach

Our teaching for mastery is underpinned by the NCETM's 5 big ideas:



### **Coherence:**

- Taking small steps.
- Focusing on one key point each lesson, allowing for deep and sustainable learning.

- Carefully thought out planning to enable a sequence that is built upon connections of new ideas and prior concepts.

### **Representation and structure:**

- Varied representation to expose the structure and concept of what is being taught.
- Concrete – pictorial – abstract approach.
- Key representations used, which children will meet time and time again to build and deepen their learning.

### **Why adopt a Concrete Pictorial Abstract approach?**

A mathematical concept or skill has been mastered when through exploration, clarification, practice and application over time, a person can represent it in multiple ways. They have the mathematical language to be able to communicate related ideas, and can think mathematically with the concept so that they can independently apply it to a totally new problem in an unfamiliar situation.

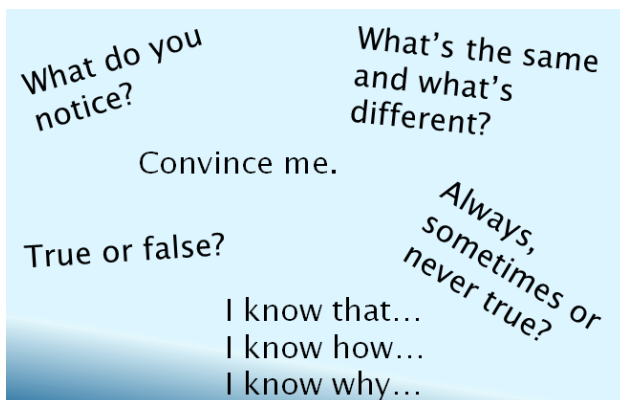
*Drury, H. (2015) Mastering Mathematics*

More information about this can be found in the link below:

<https://mathsnoproblem.com/en/mastery/concrete-pictorial-abstract/>

### **Variation:**

- The idea of teaching with variation is to highlight essential features of a concept or idea through varying the non-essential features.
- Variation within practice questions to allow for deep thinking and avoid mechanical repetition.
- Carefully planned activities / questions to expose key mathematical structures.
- Provides an opportunity help children think about the knowledge in another way.



### **Fluency:**

- Fluency demands more of learners than memorisation of a single procedure or collection of facts. It encompasses a mixture of efficiency, accuracy and flexibility.
- Quick and efficient recall of facts and procedures is important in order for learners' to keep track of the sub-problems, think strategically and solve problems.
- Fluency also demands the flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections and to make appropriate choices from a whole tool kit of methods, strategies and approaches.
- Being able to quickly and accurately recall fact is important in order to free up working memory to see the bigger picture and make decisions about when to use this knowledge and solve certain questions.

Currently in Year 5 and 6 we have access to Times Table Rockstars to promote the multiplication table facts in a fun, competitive way!



### **Structure of a lesson**

We teach the children daily lessons of mathematics. Our lessons include an '**In focus**' task, which provides an opportunity to explore a mathematical concept associated with that day's learning within a real life context. This allows for a deepened discussion where precise mathematical vocabulary will be used, possible methods discussed and representations of the problems explored amongst the peers within the class. It is also a time for the children to discuss what they already know, allowing the teacher to use assessment for learning strategies to understand prior knowledge and extend individuals thinking.

**Guided practice:** practicing the mathematical concepts that are being taught under the guidance of the teacher and peer support. This is the time for the children to make their mistakes and discuss misconceptions as a class. This practice is featured throughout the lesson.

**Independent practice:** where the children will practice the mathematical skill they have been taught independently. During this part, the teacher will assess the children, picking up any misconceptions that may arise and noticing any children who may need same day intervention.

As a school we assess children using the National Curriculum Age Related Expectations (ARE). We use formative assessment throughout the year a written test at the end each term. From this we report a summative assessment to parents. Children's progress throughout the year is monitored through tracking sheets, scrutinising work books, learning walks, lesson observations, discussions with children and pupil progress meetings with teachers. We use the NCETM (National Centre for Excellence in Teaching Mathematics) assessment materials to model tasks for formative assessment purposes.

### **Our journey so far:**

Over time, members of our maths team have been working closely with the Maths Hub and other local schools, in a working group studying the approach to maths teaching in Shanghai, a high performing country. 85% of their children go on to study maths at a high level as opposed to 15% in the United Kingdom. That said, we cannot take on the whole approach because we do not have the same social and cultural background as Shanghai. In China all children are taught by Mathematics specialists who might only teach 8-10 lessons per week, using the rest of the week to plan, mark and deliver intervention. Regular lesson study with colleagues plays a significant role in CPD in China. We do, however, take what we can and apply this to our setting. We have teachers at Loughton that have observed lessons taught by Shanghai teachers and have worked with experts in maths to design appropriate units of work based on our national curriculum.

We have been investing in high quality training, especially since the 2014 curriculum, over the last 3 years to further improve teachers' subject knowledge and knowledge about how to teach and assess mathematics. Once again we have maths training throughout this academic year for each member of the teaching staff and support staff at our school. We also have our own 'maths mastery specialist', Charlie McNeaney, who is enrolled onto a 2 year specialist course with the maths hub. Part of her role is to conduct teacher research groups to further develop practice within the Enigma Hub area and of course within Loughton School.

Curriculum evenings, parents' evenings, our website, and booklets explaining content has kept the parents well informed about how we are teaching mathematics thus far. We always welcome questions from new and prospective parents about our maths approach. Please ask to see a member of the senior management team or the maths team for any further information.

Across the school we have additional small booster groups of children who require the curriculum to be taught at a slower pace than their peers with higher adult support. These smaller groups are seen as fluid rather than set and children may be able to re-join their class within the year. They are likely to move between this group and their class for various units. We still have every belief that these children are mathematicians but may just require smaller steps to help them to see links within their learning.

*Reviewed November 2018 by the maths team.*

References:

Stripp, C. (2016) (online) Available from: <https://schoolsweek.co.uk/what-is-teaching-for-mastery-in-maths/> (Last accessed 14<sup>th</sup> November 2018)

NCETM (2016) The Essence of Maths Teaching for Mastery (online) Available from: <https://www.ncetm.org.uk/files/37086535/The+Essence+of+Maths+Teaching+for+Mastery+june+2016.pdf> (Last accessed 14<sup>th</sup> November 2018)