



Mathematics Policy



Introduction

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

(National Curriculum, 2014)

National Curriculum Aims:

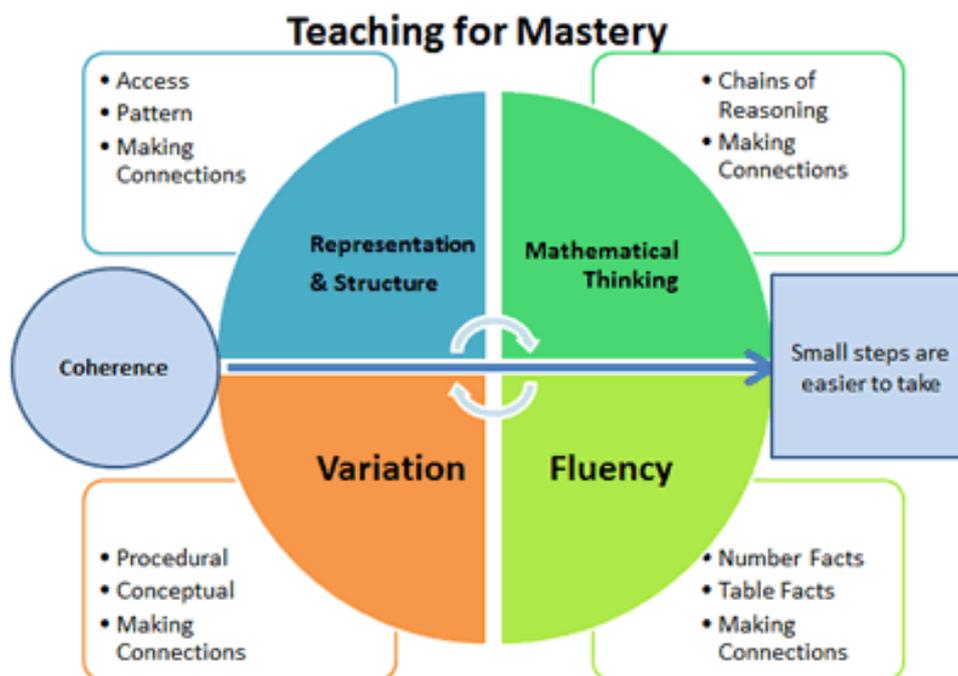
- **fluent** in the fundamentals of Mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- **reason and explain** Mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their Mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Intent - Our Vision

At Outwood we recognise Mathematics is a creative discipline that provides the fundamental skills for understanding and navigating today's constantly changing world. We believe a fundamental understanding in the basics of Mathematics enables our children to have the best possible future. We want all children at Outwood to experience the beauty, power and enjoyment that mathematics has to offer and to develop a sense of curiosity about the subject with a clear understanding. It is also crucial for children to flexibly apply their mathematical knowledge rapidly and accurately in our ever changing world. At Outwood we foster positive 'can do' attitudes and we promote the fact that 'we can all do maths!' We believe all children can achieve in mathematics, and teach for secure and deep understanding of mathematical concepts through manageable and sequence steps. We use mistakes and misconceptions as an essential part of learning and provide challenge through rich and sophisticated problems. At our school, the majority of children will be taught content from their year group only. They will spend time becoming true masters of content, applying and being creative with new knowledge in multiple ways. We believe this is the best way to set them up with the highest chances of success for their future lives and careers.

Implementation – Teaching for Mastery

Mastering maths means pupils acquiring a deep, long-term, secure and adaptable understanding of the subject. The phrase ‘teaching for mastery’ describes the elements of classroom practice and school organisation that combine to give pupils the best chances of mastering maths. Achieving mastery means acquiring a solid enough understanding of the maths that’s been taught to enable pupils to move on to more advanced material. There are five big ideas that underpin ‘Teaching for Mastery’ and make up how we implement our mathematics curriculum:



Coherence

Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

Representation and Structure

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation

Mathematical Thinking

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others

Fluency

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics

Variation

Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

The Essence of Teaching for Mastery:

- Maths teaching for mastery rejects the idea that a large proportion of people 'just can't do maths'.
- All pupils are encouraged by the belief that by working hard at maths they can succeed.
- Pupils are taught through whole-class interactive teaching, where the focus is on all pupils working together on the same lesson content at the same time, as happens in Shanghai and several other regions that teach maths successfully. This ensures that all can master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind.
- If a pupil fails to grasp a concept or procedure, this is identified quickly and early intervention ensures the pupil is ready to move forward with the whole class in the next lesson
- Lesson design identifies the new mathematics that is to be taught, the key points, the difficult points and a carefully sequenced journey through the learning. In a typical lesson pupils sit facing the teacher and the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion.
- Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other.
- It is recognised that practice is a vital part of learning, but the practice used is intelligent practice that both reinforces pupils' procedural fluency and develops their conceptual understanding.
- Significant time is spent developing deep knowledge of the key ideas that are needed to underpin future learning. The structure and connections within the mathematics are emphasised, so that pupils develop deep learning that can be sustained.
- Key facts such as multiplication tables and addition facts within 10 are learnt to automaticity to avoid cognitive overload in the working memory and enable pupils to focus on new concepts.

In addition to the five big ideas:

- Children will work with mixed ability pairs to promote mathematical talk
- The Concrete, pictorial, abstract (CPA) approach will be used to support and expose mathematical structure (linked to working wall and our calculation policy)
- Children and adults to use Outwood's Mathematical Toolkit to look at how they are understanding concepts
- Assessment for learning strategies will be used
- Vocabulary and sentence stem used to promote mathematical language and thinking structure (linked to working wall)
- Explicitly modelled concepts are taught by adults and children
- Adequate practice time for children (including high quality variation and intelligent practice)
- A range of activities including problem solving, reasoning and fluency opportunities
- Aspire questions to enhance the rapid graspers
- Additional practice for children who may need it as well as same day intervention
- Planned questioning to encourage deep thinking and expose mathematical structure and questions

Implementation – Cont.

Lesson Design:

Long Term Planning –

<https://www.ncetm.org.uk/classroom-resources/cp-curriculum-prioritisation-in-primary-maths/>

Yearly overview – with links to Ready to Progress, Curriculum Prioritisation and NCTEM Spine Materials

Medium Term Planning – ‘Ready to Progress’ and ‘Curriculum Prioritisation Units’ Combined

Curriculum Prioritisation Units -

<https://www.ncetm.org.uk/classroom-resources/cp-curriculum-prioritisation-in-primary-maths/>

Click on Year Group to access units – the follow links can be accessed within the units:

Ready to Progress -

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1017683/Maths_guidance_KS_1_and_2.pdf

Specific Year Groups

You will find for each Ready to Progress Criteria:

- Previous Knowledge
- Ready to Progress Document
- Future Applications

- Teaching Guidance (including representation and structure)
- Language focus
- Making Connections
- Assessment Questions

NCETM Spines

<https://www.ncetm.org.uk/teaching-for-mastery/mastery-materials/primary-mastery-professional-development>

Short Term Planning –

- ‘S’ Planning to include an overview of the topic with small steps, learning intentions, misconceptions and representations planned
- Flip charts and power points to form the daily lesson.
- Short term planning proforma is optional to support you if you wish

Impact

By the end of primary school we aim for children to be fluent in the fundamentals of mathematics with a conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. They should have the skills to solve problems by applying their mathematics to a variety of situations with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios.

Mathematics Policy Summer 2022

Children will be able to reason mathematically by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.