

# **The principles of Mathematics Mastery and how they're delivered at Mile Cross Primary School**

## **INTENT:**

At Mile Cross Primary School, we deliver our Mathematics curriculum using the principles, research and structure of the Mathematics Mastery programme of teaching to ensure we follow the key aims of the National Curriculum. We aim to ensure that all pupils become fluent in the fundamentals of mathematics and in number so that pupils develop solid conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. Children at Mile Cross Primary are taught to reason mathematically by following a line of enquiry, finding connections and establishing relationships, whilst using mathematical language as a fundamental part of everyday learning. Our mathematics curriculum carefully sequences knowledge, concepts and procedures to build mathematical knowledge and skills systematically over time. Children are taught to 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.

## **IMPLEMENTATION:**

Mathematics Mastery is taught from Reception to Year 5 in whole class groups, and used as a teaching support in Year 6, following a step-by-step teaching approach ensuring children at Mile Cross are able to move through the curriculum at broadly the same pace. As a result of spending more time on fundamentals, the children can establish firm foundations on which to build their understanding. Because of our concrete-pictorial-abstract approach, children learn to see the connections in maths and understand that mathematics can be represented in different ways. Regular maths meetings also allow for fluency practise, rapid recall of number facts, pre-teaching and addressing post unit misconceptions.

The maths curriculum provides sufficient opportunities for planned revisits of previously learned knowledge, concepts and procedures; this is to ensure that, once learned, mathematical knowledge becomes deeply embedded in pupils' memories; freeing pupils' attention to work with independence, apply their mathematical knowledge to more complex mathematics. Those pupils behind age-related expectations are supported with pre-teaching, adapted tasks, concrete resources, targeted questioning and targeted support in lessons from adults. Children who grasp concepts rapidly are challenged with 'dimension for depth' questioning and tasks that deepen knowledge and understanding. All children are also supported to progress individually through the use of 'Whizz', a maths intervention programme being rolled out across the school, with the aim to close the gap for those children who are not meeting age-related expectations, support children with SEND in addressing misconceptions and secure foundational knowledge, as well as stretching and challenging children working above the expected standard.

We use the Mathematics Mastery programme as the basis of our teaching and planning within school. However, teachers plan lessons using their own professional judgement, daily formative assessment and feedback from pupils and the use of pre and post assessment quizzes, and are expected to modify activities and learning based on an assessment of pupils needs. Teachers use their professional judgement to determine how long to spend on a

particular objective. Teachers do not produce detailed written plans for each lesson. Feedback is provided to pupils verbally, through teacher marking, peer marking and self-marking. This informs teaching for the next lesson. Maths is included in other subject areas where appropriate exposing children to mathematical thinking and concepts across the curriculum. Home learning and deliberate practise of key number facts is encouraged across school through participation with Times Tables Rockstars and Maths Whizz.

In Year 6, children are taught in ability groups to prepare children for their transfer to high school and key stage 2 tests. In the main, groups work at the same pace as each other, teaching the same core lessons, but allowing teachers to spend appropriate amount of time on units of learning dependent on the needs of their group, ensuring the dimensions for depth elements are deepening knowledge in a way that is focused on those that need the support or extension of their knowledge.

Progress & attainment is recorded using school tracking systems and reported half termly on our school database and termly to SLT through pupil progress meetings. The maths subject leader monitors the quality of teaching and learning through: regular informal learning walks, book looks, professional dialogue and through the year visits and joint observations. CPD opportunities are provided based on focus areas and teaching needs.

### **IMPLEMENTATION:**

We believe that a structured Mastery approach, based on the Mathematics Mastery programme, and implemented throughout provision and focussed teaching sessions ensures children learn new concepts that they can then demonstrate in their own independent learning.

The three principles Mathematics Mastery Implementation of these:

#### Principle 1. Conceptual Understanding

- Mathematics tasks are about constructing meaning and making sense of relationships. Learners deepen their understanding by representing concepts using objects, pictures, symbols and words.
- Different representations stress and ignore different aspects of a concept and so moving between representations and making explicit links between them allows learners to construct a comprehensive conceptual framework that can be used as the foundation for future learning.
- We use the content of the national curriculum as the starting point for our curriculum but this is expanded upon by making explicit the foundational knowledge that learners need to understand in order to access this.
- Tasks are sequenced to help learners build a narrative through different topics. These topics are then sequenced in a logical progression that allows learners to establish connections and draw comparisons.
- Multiple representations are carefully selected so that they are extendable within and between different areas of mathematics. Using these rich models encourages learners to develop different perspectives on a concept.

## Principle 2: Language and Communication

- Mathematical language strengthens conceptual understanding by enabling pupils to explain and reason. This must be carefully introduced and reinforced through frequent discussion to ensure it is meaningfully understood.
- The more learners use mathematical words the more they feel themselves to be mathematicians. Talk is an essential element of every lesson and time is dedicated to developing confidence with specific vocabulary as well as verbal reasoning.
- The content of our curriculum carefully progresses in order to induct learners into the mathematical community. A large part of this community is confident use of the language, signs and symbols of mathematics. Verbal and non-verbal communication is part of every sequence of learning in the curriculum.
- This often starts with more informal language initially, building up to formal and precise mathematical language.
- Talk tasks are part of every lesson in the curriculum to help with this development.

## Principle 3: Mathematical Thinking

- By the time they reach school, all pupils have demonstrated a significant range of innate ways of thinking that can be harnessed in the classroom to develop mathematical thinking.
- We must support pupils to develop mathematical 'habits of mind' – to be systematic, generalise and seek out patterns.
- The creation of a conjecturing environment and considered use of questions and prompts are important elements of encouraging learners to think like mathematicians.
- Our curriculum is designed to give learners the opportunities to think mathematically. Throughout the curriculum you will see tasks that require learners to specialise and generalise, to work systematically, to generate their own examples, to classify and to make conjectures.
- This is aided by our prompts for thinking which help make these important parts of mathematics more explicit

## **IMPACT**

The Impact of using the Mathematics Mastery programme can be measured in a number of ways:

- **Increasing enjoyment, resilience, understanding and attainment in maths.** We believe our impact is best demonstrated by the teachers putting the Mathematics Mastery programme into action every day. Children and adults enjoy maths, they like the real-life examples used and the way the CPA approach builds understanding.
- **Improvements in the quality of teaching.** The teaching of Mathematics in school is regularly monitored. The increase in the amount of outstanding teaching, defined by the school's own assessment of what makes a lesson outstanding, shows a large measurable increase in the quality of mathematics teaching across the school in all age groups.