# Lanesfield Primary School



# Mathematics Policy

# 2023

## Our Vision

Our vision of Maths at Lanesfield centres on the key belief that **all pupils can do maths**. We aim to develop well-rounded mathematicians who have a resilient, growth mind-set. We will achieve this through our Maths Mastery curriculum. Through this approach, we will support pupils to develop a secure and deep understanding of fundamental mathematical concepts and procedures. Not only will our pupils develop a fluency of maths, they will also develop their problem solving and reasoning skills. We intend for every Lanesfield pupil to leave our school without a fear of Maths and with a recognition and value for their mathematical ability.

## Introduction

In September 2018, we began transitioning towards a mastery approach for the teaching and learning of mathematics. The rationale behind changing our approach lay within increasing research indicating the success of mastery maths. Furthermore, teaching for Mastery in Maths is fundamental to the government's education reforms and is reflected in the 2014 National Curriculum for mathematics. Additionally, the NCETM, DfE and OFSTED have all endorsed this evidence-based approach.

## Aims:

Through our Maths curriculum, we aim for our pupils to be able to:

- Develop a growth mind-set and positive attitude towards mathematics.
- Become confident and proficient with number, including conceptual and procedural fluency.
- Become problem solvers, who can reason, think logically, work efficiently and apply mathematical knowledge to new scenarios.
- Develop their use of mathematical language.
- Become independent learners and who are also able to work co-operatively with others.

## What is mastery?

Mastering maths means acquiring a **deep, secure** and **adaptable** understanding of the subject. At its core, the mastery approach rejects the idea that some children can't do maths. Instead, it recognises that by nurturing positive attitudes and building confidence in mathematics, all children can achieve.

Our teaching for mastery is underpinned by the NCETM's 5 Big Ideas.
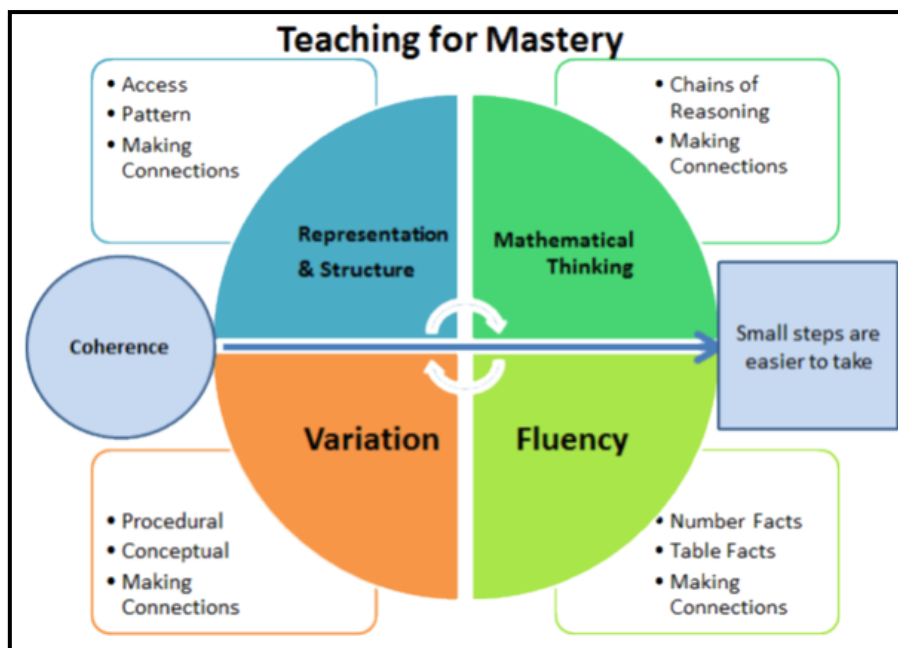
The 'Five Big Ideas' are drawn from research evidence underpinning teaching for mastery. They explain that good practice should include:

- **Mathematical Thinking** - Opportunities in a lesson that allow children to make chains of reasoning, connected with the other areas of their mathematics.
- **Representation and Structure** - ensures concepts are explored using concrete, pictorial and abstract representations. The children actively look for patterns as well as specialise and generalise whilst problem solving.
- **Coherence** - achieved through the planning of small-connected steps to link every question and lesson within a topic.
- **Variation** - teacher represents the concept being taught in more than one way and through intelligent practice. (Use both procedural and conceptual variation)
- **Fluency** – Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics.


## Principles of Teaching for Mastery

1. **It is achievable for all** – we have high expectations and encourage a positive 'can do' mind-set towards mathematics in **all** pupils.
2. **Deep and sustainable learning** – lessons are designed with careful small steps, questions and tasks in place to ensure the learning is not superficial.
3. **Whole-class teaching** – Pupils are taught through whole-class interactive teaching, where the focus is on all pupils working together on the same lesson content.
4. **Reasoning and making connections** – pupils are encouraged to make connections and spot patterns between different concepts and use precise mathematical language, which frees up working memory and deepens conceptual understanding.
5. **Conceptual and procedural fluency** – teachers move mathematics from one context to another (using objects, pictorial representations, equations and word problems).

There are high expectations for pupils to learn times tables, key number facts (so they are automatic) and have a true sense of number.

6. **Problem solving is central** – this develops pupils' understanding of why something works so that they truly have an appreciation of what they are doing rather than just learning to repeat routines without grasping what is happening.
7. **Challenge through greater depth** - rather than accelerated content, (moving onto next year's concepts) teachers set tasks to deepen knowledge and improve reasoning skills within the objectives of their year group.

## Curriculum Design and Planning

- Staff use NCETM Professional Development materials (Spines) to enhance their own subject knowledge and design a coherent and comprehensive conceptual pathway through the mathematics.
- Staff use White Rose Maths, Mastering Number (EYFS and KS1) and Third Space Learning resources as planning tools. The focus is on the whole class progressing together.
- Lessons use ping-pong strategies. Teacher-led discussion is interspersed with short tasks involving pupil-to-pupil discussion and completion of short activities. Teacher input usually lasts around 30 minutes giving ample time for independent practice whilst the teacher delivers rapid intervention, should somebody require it. Independent practice includes reasoning, problem solving and higher-order thinking activities.
- Key questions are planned to challenge thinking and develop learning for all pupils.
- Teachers plan to address misconceptions- this is often a fluid process.
- Contexts and representations are carefully chosen to develop reasoning skills and to help pupils link concrete ideas to abstract mathematical concepts.
- CPA (concrete-practical-abstract) model is used throughout school from EYFS to Year 6. Practical apparatus are used to support conceptual understanding.
- Arithmetic is taught daily in KS2, this is a 10 minute session which soley focuses on arithmetic style questions.
- Opportunities for extra fluency practice (instant recall of key facts, such as number bonds, times tables, division facts, addition and subtraction facts) should be provided outside mathematics lessons (morning starters or pre/post-lunch).
- Two times tables lessons (20-30mins) are taught every week in years 2, 3 and 4 with years 5 and 6 completing one times table lesson.
- Gaps in pupils' knowledge and understanding are identified early by in-class questioning. They are addressed rapidly through individual or small group intervention, on either the same day or the next day, which may be separate from the main mathematics lesson, to ensure all pupils are ready for the next lesson.

Below are examples of children's work that demonstrate fluency, reasoning and problem solving.







## Eight Classroom Norms to Establish

1. Everyone can learn mathematics to the highest levels.
2. If you 'can't do it', you 'can't do it *yet*'.
3. Mistakes are valuable.
4. Questions are important.
5. Mathematics is about creativity and problem solving.
6. Mathematics is about making connections and communicating what we think verbally and through writing full sentences.
7. Depth is much more important than speed.
8. Maths lessons are about learning, not performing.

## Assessment

Assessment in Maths should be done following the Assessment and Feedback Policy. Below are examples of effective questioning: examples that are more detailed can be found in the Maths Subject Folder on SharePoint.

| Closed question | Open question: possible suggestions |
|---|---|
| Which quadrilateral is a square? | Why is this quadrilateral a square? <br><br> Why isn't this quadrilateral a square? |
| What is ¼ of 16 ? | How do you find ¼ of a number? <br><br> 4 is a fraction of a number. What fraction of what number? Give examples. |
| How many lines of symmetry does this shape have? | How would you draw a shape with 4 (or any number of) lines of symmetry? |
| What are the factors of 8? | Why has 8 got four factors? <br><br> Give some examples of numbers with four factors and explain what else they have in common |
| Using a 6 sided dice, what is the probability of throwing a 2? | Using a 6 sided dice, why would the probability of throwing a 2 be 1/6 ? <br><br> Using a 6 sided dice, why would the probability of throwing a 2, NOT be 2/6? |

| Objective: To Add Decimal Numbers | |
|---|---|
| **Closed Question** | **Open Question** |
| $7.7 + 6.85 = \#.\#\#$ | $\#.4 + 3.\#\# = \#.\#\#$ |
| $3.5 + \# = 10$ | $\# + \# = 10$ |
| <table><tr><td>+</td><td>2.2</td><td>5.1</td></tr><tr><td>3.4</td><td></td><td></td></tr><tr><td>7.2</td><td></td><td></td></tr></table> | <table><tr><td>+</td><td></td><td></td></tr><tr><td></td><td>5.6</td><td>8.5</td></tr><tr><td>9.4</td><td></td><td></td></tr></table> |
| 3.5, 5.5, 7.5, …. | … , … , 3.5, … , … , |
| $0.3 + 0.8 = \#$ | Two decimal numbers sum to a number greater than one. (Always, sometimes or never true) |

## Early Years Foundation Stage (EYFS)

Children in EYFS explore mathematical concepts through active exploration and their everyday play-based learning. Children are taught key concepts and develop number sense using a hands-on practical approach. EYFS practitioners provide opportunities for children to manipulate a variety of objects which supports their understanding of quantity and number. The CPA approach is used when teaching children key mathematical skills. Practitioners allow children time for exploration and the use of concrete objects helps to support children's mathematical understanding. Mathematics in the early years provides children with a solid foundation that will enable them to develop skills as they progress through their schooling and ensures children are ready for the National Curriculum.

## Resources

Each classroom has its own bank of practical resources that will be in use on a daily basis. In addition, a central resource bank has been established for the school in the external mobile.

Reviewed by: Miss Bayliss September 2023

Next Review: July 2025