**Loughborough CE Primary School – Mathematics Policy**



**Mathematics Policy**

Date: June 2021

 Review Date: June 2023

**Psalm 90:12** (NIV)

*“Teach us to number our days, that we may*

 *gain a heart of wisdom.”*



 Mathematics Policy

This policy outlines the teaching, organisation and management of the mathematics taught and learnt at Loughborough Church of England Primary School.

The school’s policy for mathematics is based on the National Curriculum for teaching mathematics Year 1 to 6 and EYFS Framework. The implementation of this policy is the responsibility of all teaching staff and should be read in conjunction with the school’s Calculation Policy.

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.

At Loughborough Church of England Primary School we aim to ensure that all pupils:

* become 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 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

**Our Vision for Mathematics**

* To promote a positive attitude towards mathematics in all pupils
* To ensure all pupils are engaged in and are enjoying exploring Mathematics
* To enable all pupils to find links between mathematics and other areas of the curriculum, including Science
* To ensure all pupils progress in mathematics and are challenged appropriately through an in depth understanding
* To use a wide range of concrete, pictorial and abstract representations to develop all pupils’ relational understanding of mathematics
* To ensure all pupils are confident using mathematical vocabulary when reasoning about mathematics
* To promote a growth mind set in all pupils, particularly when Problem Solving



**Teaching and Learning**

At Loughborough Church of England Primary School, we follow the White Rose Maths scheme of work from EYFS to Year 6. The teaching and learning of mathematics should include aspects of the following Mastery approach strategies in every lesson and/or over a series of lessons.

Teachers follow the White Rose Long and Medium-term plans, adapting these where necessary to inform lesson planning, teaching, learning and assessment.

**Fluency**

Fluency comes from deep knowledge and practice. This is the first stage of understanding.

Fluency includes: conceptual understanding, accuracy, rapid recall, retention and practice

* Accuracy – Pupils carefully completing calculations with no or few careless errors.
* Pace – Pupils are able to quickly recall the appropriate strategy to solve the calculation and progress through a number of questions at an age appropriate pace.
* Retention – Pupils will be able to retain their knowledge and understanding on a separate occasion to when the concept was first introduced.

The key to fluency is deep knowledge and practice and making connections at the right time for a child.

**Reasoning**

Verbal reasoning demonstrates that pupils understand the mathematics. Talk is an integral part of mastery as it encourages students to reason, justify and explain their thinking. This is tricky for many teachers who are not used to focusing on verbal reasoning in their mathematics lessons. You might, for example, get young learners to voice their thought processes. Older students could take part in class debates, giving them the space to challenge their peers using logical reasoning.

**Mathematical Talk**

A mastery classroom should never be a quiet classroom. The way pupils speak and write about 5

mathematics transforms their learning. Mastery approaches use a carefully sequenced, structured approach to introduce and reinforce mathematical vocabulary.

To encourage talk in mathematics, teachers may introduce concepts by including sentence structures (stem sentences). Pupils 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. This gives pupils the confidence to communicate their ideas clearly, before writing them down.

**Problem Solving**

Mathematical problem solving is at the heart of the Mastery 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. Through problem solving, pupils are required to select their mathematical knowledge and apply this to a new concept.

The **Concrete Pictorial Abstract** (**CPA**) approach is a system of learning that uses physical and visual aids to build a child's understanding of **abstract** topics. Pupils are introduced to a new mathematical concept through the use of **concrete** resources.

**Concrete**

Concrete is the “doing” stage, using concrete objects to model problems. Instead of the traditional method of mathematics teaching, where a teacher demonstrates how to solve a problem, the CPA approach brings concepts to life by allowing pupils to experience and handle physical objects themselves. Every new abstract concept is learned first with a “concrete” or physical experience.

For example, if a problem is about adding up four baskets of fruit, the pupils might first handle actual fruit before progressing to handling counters or cubes which are used to represent the fruit.

**Pictorial**

Pictorial is the “seeing” stage, using representations of the objects to model problems. This stage encourages pupils to make a mental connection between the physical object and abstract levels of understanding by drawing or looking at pictures, circles, diagrams or models which represent the objects in the problem.

Building or drawing a model makes it easier for pupils to grasp concepts they traditionally find more difficult, such as fractions, as it helps them visualise the problem and make it more accessible.

**Abstract**

Only once a child has demonstrated that they have a solid understanding of the “concrete” and “pictorial” representations of the problem, can the teacher introduce the more “abstract” concept, such as mathematical symbols. Pupils are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols, for example +, –, x, / to indicate addition, subtraction, multiplication, or division.

**Role of the Subject Leader**

* keep up-to-date with developments in Mathematics education and disseminate information to colleagues as appropriate.
* ensure that teachers are teaching within the scheme adopted and meeting the requirements of the National Curriculum.
* promote the integration of Mathematics within appropriate teaching and learning activities.
* inspire colleagues to deliver high quality teaching and learning opportunities.
* analyse data to identify strengths and weaknesses in outcomes; planning for improvement accordingly.
* write, monitor and evaluate an action plan for Mathematics for the School Development Plan.
* lead the evaluation and review of the school’s Mathematics policy.
* monitor and review the Mathematics provision within the school.