**Mathematics Policy**

2022/23

*“Mathematics is a creative and highly interconnected 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.”* ***(DfE – National Curriculum, 2014)***

**The aims of the 2014 National Curriculum are for our pupils to:**

* 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 down problems into a series of simpler steps and persevering in seeking solutions.

This policy should be read in conjunction with the following school policies for each pathway:

* Assessment Policy
* Marking Policy

**Intent**

*Why do we teach this? Why do we teach it in the way we do?*

Elm Tree Community Primary School provides a broad and varied Mathematics curriculum, through a variety of teaching approaches and learning situations, to meet the needs of all our pupils. At Elm Tree, we are committed to developing the pupils’ all-round approach to Maths using varied methods and cross-curricular input.

In teaching children mathematics, we aim for our children to have:

* A positive attitude towards mathematics
* Competence and confidence in mathematical knowledge, concepts and skills
* An ability to solve problems, reason, think logically and to work systematically and accurately
* An initiative and an ability to work both independently and in cooperation with others
* An ability to communicate clearly using mathematical terminology
* An ability to use and apply mathematics across the curriculum and in real life
* An understanding of mathematics through a process of enquiry and experiment
* to promote enjoyment of learning through practical activity, ICT, exploration and discussion

**Implementation**

*What do we teach? What does it look like?*

At Elm Tree we use the TT Education *'Path 2 Success'* to progress our children from shallow learning, to deep learning and ultimately profound learning.



**Stage 1- Experience It**

Children need rich experiences which they can relate in order to support them in developing their mathematical skill set. Children in this stage will be accessing continuous provision and being introduced to a range of rich vocabulary. During this stage our focus is on creating and replicating meaningful experiences and practical applications.

**Stage 2- Play with It**

This stage refers to the gamification of learning which can be seen in our Maths carousels. During this stage we use the power of games to practice key skills on a daily basis. Through mathematical games we are able to engage our children and provide challenge to develop both procedural and conceptual understanding.

**Stage 3- Use It**

This stage refers to the practical application of the skill and within our carousel approach this stage refers to the direct teaching of Maths and new input. When teaching Maths we use the CPA approach.

**Stage 4- Develop It**

Children need the opportunity to continue to develop the skill in context. This stage is underpinned by an active, talk-led, collaborative learning climate as this way children will be more likely to remember it. Children are given opportunities to talk about their knowledge of Maths through for example, A & B games or partner games.

**Stage 5- Connect It**

During this stage children are making connections across the curriculum. Children now have a deeper understanding of mathematical concepts and are beginning to make links in connections both within mathematical lessons, across the curriculum and ultimately into the wider world.

**CPA Approach**

At Elm Tree Community Primary School, Maths is taught through a mastery approach through concrete-pictorial-abstract (CPA). Through the use of these key stages in their learning, each child forms the understanding of maths concepts and skills at their specific level, which they are learning and can apply them to a range of contexts. We believe that children must be supported in developing their understanding of Problem Solving, Reasoning and Numeracy in a broad range of contexts in which they can explore, enjoy, learn, practise, and talk about their developing understanding.

Elm Tree are adopting a mastery approach throughout school using CPA through the White Rose Schemes.

**Abstract**

**Pictorial**

**Concrete**

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Concrete:

* Each skill or concept is first modelled with concrete materials (e.g. counters, cubes, base ten, bead strings.).
* Children are provided opportunities to practice and demonstrate mastery using concrete materials.

Pictorial:

* The maths concept or skill is next modelled at the representational (semi-concrete) level which involves drawing pictures that represent the concrete objects previously used (e.g. tallies, dots, circles)
* Children are provided opportunities to practice and demonstrate mastery by drawing solutions.

Abstract:

* The math concept/skill is finally modelled at the abstract level (using only numbers and mathematical symbols).
* Children are provided opportunities to practice and demonstrate mastery at the abstract level before moving to a new maths concept/skill.
* As a teacher moves through a concrete-pictorial-abstract sequence, the numbers and/or symbols should be used in conjunction with the concrete materials and representational drawings (promotes association of abstract symbols with concrete & representational understanding).

Concrete manipulatives are used to help children work through new concepts and challenging questions and provide a transition to pictorial and abstract. Maths lessons aren't about teaching tricks; they are about giving children the tools to understand the problem in front of them. In a mastery classroom, there doesn’t have to be a linear progression from concrete to pictorial to abstract. Instead, teachers apply a **cyclical approach**. For example, even when a pupil has worked out the answer using an abstract method, it is worth asking them to use concrete manipulatives to convince others that they are correct.

Providing the same bank of resources to all teaching staff will allow children to become familiar with different types of equipment across the school- thus providing consistency for our children.

**Impact**

*What will this look like? By the time children leave our school they will:*

By the end of KS2 we aim for children to be **fluent** and develop **mastery** in the fundamentals of mathematics with a conceptual understanding and the ability to recall and apply knowledge accurately. They should have **basic skills** to solve problems by applying their mathematics to a variety of situations, including in unfamiliar contexts and application to real-life scenarios.