



Maths 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.

Aims

The national curriculum for mathematics aims 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 down problems into a series of simpler steps and persevering in seeking solutions.

Intent

We know that our children need strong academic foundations in core subjects to enable access to further education / training / the job market when they are older; we serve an area which is not universally prosperous and so we do emphasise the development of English and Mathematical skills both as taught subjects and as skills developed throughout the curriculum which are core requirements for that future.

Our children are also encouraged to develop Enterprise skills which focus on essential building blocks for the world of work: Teamwork & Leadership; Listening & Presenting; Aiming High & Staying Positive; Problem Solving & Creativity.

Our pupils will:

- have a well-developed sense of the size of a number and where it fits into the number system
- know by heart number facts such as number bonds, multiplication tables, doubles and halves
- use what they know by heart to figure out numbers mentally

- calculate accurately and efficiently, both mentally and in writing and paper, drawing on a range of calculation strategies
- make sense of number problems, including non-routine/'real' problems and identify the operations needed to solve them
- explain their methods and reasoning, using correct mathematical terms
- judge whether their answers are reasonable and have strategies for checking them where necessary
- suggest suitable units for measuring and make sensible estimates of measurements
- explain and make predictions from the numbers in graphs, diagrams, charts and tables
- develop spatial awareness and an understanding of the properties of 2d and 3d shapes

Our teaching must develop mastery through promoting:

- **Fluency** (confident competency in skills and grasp of methods)
- **Reasoning** (spotting patterns; applying what has been previously understood to new situation; logical thinking)
- **Variation** - the ability to identify key elements of concepts when contexts change
- **Representation** - the ability to visualise in diagrams or with objects to support mathematical thinking
- **Problem-solving** (application in contexts, tackling sophisticated problems by breaking down small steps and not just in word problems but in practical challenges, spatial arrangements etc)

Implementation:

At Monksdown primary School we use the National Curriculum for Mathematics as the basis of our mathematics programme. To ensure the teaching focuses on the concepts required to achieve the stated NC expectations, we use 'White Rose' as a basis for all teacher assessment.

White Rose for Mastery has an emphasis on investigation, problem solving and the development of mathematical thinking and a rigorous approach to the development of teacher subject knowledge are therefore essential components of our approach.

We teach mathematics, recognising the necessity of aligning learning with stages of conceptual development and have a no one left behind approach.

Pupils are provided with a variety of opportunities to develop and extend their

Mathematical skills, including:

- Paired work
- Whole class teaching
- Individual work

Pupils engage in:

- Development of mental strategies

- Written methods
- Practical work
- Investigational work
- Problem solving
- Mathematical discussion
- Consolidation of basic skills and number facts
- Maths games

We recognise the importance of establishing a secure foundation in mental calculation and recall of number facts before standard written methods are introduced. We use accurate mathematical vocabulary in our teaching and children are expected to use it in their verbal and written explanations.

It is important the children are given opportunities to apply and use Mathematics in real contexts. Maths is applied in measuring in science and technology, for the consideration of properties of shape and geometric patterns in technology and art, and for the collection and presentation of data in Science, History and Geography.

Additional enrichment opportunities are provided for pupils to further develop mathematical thinking e.g. through cooking, music, and maths investigations and games. Teachers plan problem solving and investigational activities regularly to ensure that pupils develop the skills of mathematical thinking and enquiry.

ICT is used in various ways to support teaching and to motivate children's learning and includes, use of iPads and computers. ICT is a powerful tool for the illustration of visual concepts. ICT will only be used in a daily maths lesson when it is judged to be the most efficient and effective way of meeting the lesson objectives.

The School has access to 'TT Rockstars.' These are online resources which challenge children with their knowledge and skills. Challenge can be against themselves or other 'players'. The software is used as part of our teaching programme and all children are allocated home access log in accounts.

In the **Early Years Foundation Stage**, mathematics is taught through tailored cross-curricular activities based initially around one-to-two-week studies in depth of a single number, through which all skills are taught. This is to embed skills in context, ensure repetition in the skills curriculum and thus aid mathematical fluency, variation and coherence.

A Typical Lesson

We base our approach on a proven 5 part lesson for every child Y1-Y6 consisting of:

- **A prep quick skills practice** – the core skills / facts needed for later in the lesson, but NOT teaching methods. Like the mental/oral starter. **Pre-learning assessment is used here** to see who actually needs to do these skills and who can try something harder later on.

- **The 'HOOK' - using** a real-life problem or one contrived to appear as if it has happened to the teacher/ a child. This will deliver the learning intended and instantly grab attention in the way that 'this is what you have to do' does not. Children have a go by themselves without teaching them, save where special needs make some support vital – but again, those children must also have a go at thinking for themselves as a rule. Naturally the teacher goes around and listens to children as they puzzle it out and challenge thinking / ask questions to encourage further thought. But at this point the teacher is not telling the child how to do it.
- **Share solutions / ideas with the whole class** and respect all approaches; share the attempts/ methods of children.
- **Refine and teach** the best way to do it; model a solution, check understanding as usual. **This includes a series of 'Mini-plenaries' and Mini-inputs' to accelerate learning and to check understanding**
- **Practise** – problem-solving and/or the skills needed to be competent at problem-solving.

Where fundamental skills are weak, children will need practise at pure calculations in some lessons, but the principle is that every child, every week tackles problems to develop that reasoning and application thinking we require.

Teachers work with the whole class, groups and individuals to sort out misconceptions, identify progress, to summarise key facts and ideas and what to remember, to make links to other work and to discuss next steps (including homework).

The above approach is used for the majority of lessons each week. For one lesson a week, teachers may incorporate a skills-practise lesson to strengthen arithmetical fluency reflective of the age-appropriate competencies that children should show. The frequency of these lessons and the repetitive element of practise within them is designed to support long-term gains in knowledge and skill.

This lesson incorporates mental arithmetic skills and developing skills in written methods, aligned with the expectations of the aligned White Rose units. The aim is accuracy and speed, so even the most able will be expected to complete practise, with speed as a target.