



# Maths Curriculum Statement



## How is Maths a Sacred Subject?

The ultimate purpose of Maths is the pursuit of truth. The thinking skills inherent in the Maths curriculum should inspire and enable learners to be innovative, creative, critical and analytical learners. Exploring the beauty of Mathematics enables all learners to engage with the transcendent dimensions of life, freeing them to be pioneers, trailblazers and the inventors needed today and in the future. The real-world context comes first, and the theory comes second.

## Intent

Here at St Mary's, we promote both a knowledge-rich and skills-based mathematics curriculum. Being proficient in Mathematics involves having rich and connected mathematical knowledge and being a strategic and reflective thinker and problem solver. Scientific research has shown that knowledge is essential to the development of critical thinking.

Research has also shown that those who are rich in knowledge gain new knowledge quicker and more effectively. This knowledge-based curriculum is what instils a love of Maths within our children. Their enthusiasm for the subject can be seen throughout the school. Many cross-curricular links are made with many of our foundation subjects. Children annually enjoy a 'Maths & PE Day' in support of the children's charity NSPCC where they can apply their knowledge to solve problems in a real-life context. Year 6 children also show off their mathematical knowledge by competing in the national UKMT Junior Challenge, designed for children aged between 10 and 14. We receive a number of Bronze, Silver and Gold certificates from our entries each year.

In lessons, all year groups follow the Power Maths scheme of work, recommended by the DfE, ensuring that our children are exposed to all key areas of the National Curriculum. Our interactive lessons engage and inspire the children to use their mathematical skills with fluency and independence, mastering skills that have been taught. 'Teaching for Mastery' ensures that every child succeeds in Maths, and the majority of children in the class move at the same pace. Children are challenged through activities and investigations that deepen their understanding of particular concepts.

Foundation Stage introduce number to the children focusing on number names, formation and ordering. The children then progress on to one- and two-digit calculations involving addition and subtraction using number lines and concrete objects. With apparatus, the children explore halving and doubling and children learn the names and properties of shapes.

The focus of teaching in Key Stage 1 is whole numbers, counting and understanding place value. This includes work with numerals, words and the four operations, using practical resources to support understanding. Pupils also develop their knowledge of shape and measure, including time.

Teaching in Lower Key Stage 2 ensures that pupils become increasingly fluent with the four operations, including number facts and the concept of place value. Children develop efficient written and mental methods and an ability to solve a range of problems, including with simple fractions and decimals. Lessons also develop further the children's understanding of measuring and shape. Children work on learning their multiplication tables up to, and including,  $12 \times 12$ .

In Upper Key Stage 2, children develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils develop their ability to solve a wider range of problems using written and mental methods of calculation. Children are introduced to algebra as a means for solving a variety of problems. Children are also taught to apply their knowledge of number to calculation involving shape and measure.

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## **Implementation**

Our Maths curriculum aims to ensure that:

- There is a progression of Maths skills across the school
- Children are taught and practice the 'most efficient' methods of calculation
- We provide meaningful, stimulating learning experiences using the children's real-life experiences as much as possible
- We inspire children to confidently recall and use their mathematical knowledge and skills
- Teaching staff model a high standard of problem solving to secure high expectations
- We provide a language-rich environment that promotes a use of correct mathematical terminology (stem sentences)
- Pupils are provided with a range of opportunities to apply key mathematical skills, across different contexts to develop mastery. This includes the use of the Concrete, Pictorial and Abstract (CPA) approach.
- All staff facilitate self-regulation and meta-cognition in our pupils by providing them with timely and effective feedback, thus developing them into resilient and independent learners.

## **Career Professional Development**

We develop strong subject knowledge amongst all staff which is achieved through: a focus on developing all teachers' subject knowledge, mathematical pedagogy and the provision of high-quality planning resources (Power Maths). Links are made with Christ the King Catholic Collegiate to share resources and knowledge.

CPD is delivered in conjunction with both the Maths departments at Saint John Fisher and the NCETM. St Mary's is enrolled on the NCETM 'Teaching for Mastery' course and receive regular training and updates on the latest guidance for the effective teaching of mathematics.

## **Teaching Style**

Excellent teaching, within St. Mary's Catholic Primary School, is based upon two key principles: research on the classroom practices of master teachers and research on cognitive supports to help pupils learn complex tasks. The child is encouraged to engage head, heart and hand, the 3 domains to learning are the emotional, the social and the cognitive. In addition to this, staff use an enquiry-based approach with the use of a 'hook' to draw children into the lesson. We consider these enquiries/questions and allow the children to discuss them in depth. This allows them to challenge their own ideology and build greater recognition. Through such discussions, St. Mary's enhances the children's thinking and communication skills, boosts their self-esteem, and improves their academic attainment; focusing on the enquiries with lenses of critical, caring, collaborative and creative thinking. The children are comfortable with epistemic uncertainty because they understand that the dilemma is more important than being right.

## **Assessment - Quizzing**

The benefit of retrieval practice is one of the most robust findings in cognitive psychology (Roediger & Karpicke, 2006; Storm, Bjork & Storm, 2010). Low-stakes multiple choice quizzes, at the start and end of each unit, are efficient, effective and motivating for pupils, whilst providing teachers with vital information

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about what pupils have misunderstood, and/or what they are struggling to remember. These questions can be easily recycled, utilising the spacing effect to ensure content is retained for the long term instead of being forgotten soon after the lesson or unit has ended. We believe that regular low stakes testing/quizzing helps and it is better if that testing is spaced or looped. We know that interleaving information - interrupting it with unrelated information but then coming back to its original focus of study – seems to be effective. It is more effective when it is interleaved with material that is in some way conceptually or thematically connected.

### **Assessment – Summative (NTS)**

Summative assessment also has an important place in our classroom assessment (Biggs 1998). At St Mary's, quality assessment provides information to pupils, teachers and parents in effective and useful ways. Summative assessments are made at each data point in the form of the 'NTS Standardised Termly Tests'. This provides further understanding of the level at which a child is working and informs a more rounded judgement of their abilities. Teachers use this information to inform planning for groups and individual pupils.

### **Lesson Plans**

Each mathematical unit consists of up to fifteen, carefully sequenced 'knowledge lessons', which enable the children practice skills and apply them to a range of 'real life' concepts. These lessons, can be contrasted with popular but ultimately less effective 'discovery-based' lessons described by Kirschner, Sweller and Clark (2006) as 'minimally guided instruction'. In line with findings from cognitive load theory (Baddeley & Hitch, 1974; Baddeley 1986; Rosenshine 2012; Sweller, 1988) lessons are chunked into small sessions of explicit teaching followed by regular opportunities for all children to think, apply and practice key skills and knowledge.

### **Planning/Flipcharts**

Each lesson includes a slide show to support the teacher in delivering the content of the lessons clearly and precisely. The slides aid pupil memory by making effect of 'dual coding' (Paivio 1986; Mayer & Moreno, 2003). Dual coding can improve the absorption of new knowledge without increasing pupils' cognitive load, with the benefits of receiving explanations through both visual and auditory channels being well established in research literature.

### **Enquiry-based learning**

At the beginning of each lesson, pupils will answer a series of questions in which they are required to draw upon knowledge learned throughout the previous units. This ensures that pupils are able to synthesise and elaborate on the knowledge that they have acquired throughout this and previous units, whilst also setting them up for success in secondary school. Answering these questions strengthen the storage strength of the material learnt, whilst helping knowledge to move from inflexible status to being more flexible.

### **Cross Curricular**

Wherever possible, the Maths curriculum is enhanced by interweaving content through other subjects. Examples of this includes; Maths and PE day, NSPCC Number Day and data collection and analysis in science.

### **Oracy within Mathematics**

Throughout our Maths lessons, the children are given an opportunity to think, pair and share their ideas using manipulatives as a tool for discussion. Each lesson begins with an enquiry which enables the children to explore, justify their choices and reason mathematically. Teachers model accurate use of vocabulary through the choral repetition of stem sentences and have high expectations of the children using these in their own conversations. All children are challenged and encouraged to explain their mistakes both in pairs and to a wider audience.

### **Impact**

By the end of the curriculum, all pupils will have a coherent knowledge and understanding of a wide range of mathematical concepts. Children will have acquired the skills of being able to think critically and develop the ability to recall and reuse their mathematical knowledge and methods in a range of scenarios. We strive to ensure that our children's attainment is in line with or exceeds their potential when we consider the varied starting points of all our children. The age-related expectations are paramount when it comes to measuring attainment. We robustly and systematically track the progress and attainment of all children throughout the year, aiming for accelerated progress in all pupils. We aim for the percentage of pupils working at age related expectations and greater depth standard within each year group will be at least in line with national averages.

This will be assessed through a multi-faceted approach including: termly NTS assessments, quizzes pre and post units of study and skillful questioning lesson by lesson. These will be moderated across year groups within the school and MAC as a form of summative assessment and means of ensuring progression throughout the curriculum. The Maths Lead will monitor the quality and impact of the curriculum through regular pupil voice, book monitoring and lesson drop-ins and assess the extent to which pupils know more and remember more.