



# Mathematics Policy

**‘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.’**

Using the national curriculum for mathematics, 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 down problems into a series of simpler steps and persevering in seeking solutions

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning, and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils’ understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Mathematics is a tool for everyday life. It is a whole network of concepts and relationships which provide a way of viewing and making sense of the world. It is used to analyse and communicate information and ideas and to tackle a range of practical tasks and real-life problems. It also provides the materials and means for creating new imaginative worlds to explore.

**National Curriculum updated 28<sup>th</sup> September 2021**



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## Using the Programmes of study from the National Curriculum we aim to develop:

- An enjoyment and curiosity of mathematics and for children to feel confident to become successful in this subject
- Children's abilities to use and apply mathematics to solve problems in both the classroom and in 'real life' contexts
- A confidence to communicate ideas in written form and orally
- Independent and collaborative ways of working, encouraging children to share ideas and solve problems together
- A wide range of mathematical vocabulary to be modelled and used in the classroom environment
- The children's automaticity in recalling mental facts accurately and quickly using effective written methods when needed
- Children's logical thinking, reasoning and ability to problem solve as transferable life skills.

## Our pupils will:

- Have a well-developed sense of place value and the number system
- Know by heart, age-appropriate number facts such as number bonds, multiplication tables, doubles, and halves
- Calculate accurately and efficiently, both mentally and in written format
- Draw on a range of calculation strategies
- Explain their methods and reasoning, using correct mathematical terminology
- Judge whether answers are reasonable and have strategies for checking them where necessary
- Suggest suitable units for measuring and make sensible estimates of measurement
- Explain and make predictions from numbers in graphs, diagrams, charts, and tables
- Develop spatial awareness and an understanding of the properties of 2D and 3D shapes
- Understand that proficiency in maths requires sustained effort and focus
- Be precise, accurate and systematic in their work



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## NEW CURRICULUM OUTLINE FOR EACH KEY STAGE

### EYFS

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space, and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

### Key Stage 1 (Years 1 and 2)

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the 4 operations, including with practical resources [for example, concrete objects and measuring tools]. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time, and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

### Lower Key Stage 2 (Years 3 and 4)

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the 4 operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12-multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word-reading knowledge and their knowledge of spelling.



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## Upper Key Stage 2 (Years 5 and 6)

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages, and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of year 6, pupils should be fluent in written methods for all 4 operations, including long multiplication and division, and in working with fractions, decimals, and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.

## Teaching and learning

All pupils are entitled to a broad mathematics curriculum in which their learning needs are identified and met. In Carlton Primary School, maths is taught in year groups, allowing teaching to focus specifically on the learning of a particular year group. We feel this improves the provision for all children. Pupils experience a range of practical and written activities on number, measurement, geometry, and statistics. We strive to ensure that pupils are equipped with the principles needed to work interchangeably with both word problems and equations and provide children with the time to explore these links.

Classrooms in our school are rich in discussion and are safe places to make mistakes, learn and succeed. Children are encouraged to 'coach' their peers and share ideas; but they are also given time to focus independently in a quiet and calm environment. We believe a balance in this way ensures the needs of all learners is met.

Mathematics contributes to many subjects, and it is important the children are given opportunities to apply and use maths in real contexts. It is essential that time is found in other subjects for pupils to develop their numeracy skills. For example, there should be regular opportunities for measuring in science, technology, and art, and for the collection and presentation of data in history and geography.

To provide adequate time for developing mathematics, maths is taught daily and discreetly for one hour. Lessons in Years 1-6 involve a five minute 'flashback 4' session where pupils are challenged with questions relating to previously taught mathematical concepts. This allows knowledge and methods to become deeply embedded and not 'lost' as new ideas are explored. Following this, teachers introduce children to the day's learning objective and provide an input on this. Slides from White Rose Maths Hub are used, which are familiar for



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the children. Children then complete their tasks where they have a go at using their new learning in a variety of question types, following the pattern of fluency, problem solving and reasoning. If pupils are struggling, teachers can address misconceptions and provide further teaching before children move on to the reasoning and problem-solving questions. This routine, familiar lesson structure ensures that children know what is expected of them and they can spend their time effectively.

Where appropriate, concrete resources are encouraged and built into the planning throughout the year groups. The same resources are used consistently to ensure that they are familiar and useful to the children

At Carlton Primary School, we believe that if firm foundations are established in key mathematical concepts, then children are able to develop a deeper and more cohesive understanding of complex mathematics as they continue through school.

## Mastery and metacognitive approach

At Carlton Primary School we incorporate our whole school metacognitive approach to learning into our mathematics. All pupils regularly reflect on their understanding and confidence with their learning. This works alongside our mastery approach to mathematics teaching and learning. All teachers from EYFS through to Year 6 use White Rose Maths Hub as a base for their planning. This ensures a sequential and progressive mathematics experience for all children. EYFS use Master The Curriculum slides and activity ideas to support their daily mathematics. Children in Years 1 to 6 use the White Rose Maths workbooks to complete fluency, problem solving and reasoning tasks daily; as well as consolidation quizzes and activities which allow pupils to embed their knowledge. Children who grasp concepts with ease are challenged with mastery-based activities from National Centre for Excellence in the Teaching of Mathematics (NCETM), NRich, or the White Rose Maths Hub website. Children who find concepts trickier to understand receive extra adult support, extra concrete materials, and repeated fluency to ensure they make progress in each concept.

## Homework

Maths homework is provided weekly by the teacher in the format of a task or activity set on MyMaths. This is linked to the learning the children have been doing at the time in the classroom or sometimes addresses a particular concept that the children are struggling with. Teachers can also use the website to monitor which children have attempted the homework task and can also see which questions each child answered correctly.



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## Multiplication Tables

Children in years 2-6 use Times Tables Rock Stars to practice their multiplication tables and we encourage children to access the website at home as well as in school. This tool allows children to improve their speed and accuracy of multiplication facts and associated division facts.

## Vocabulary

As with all subjects at Carlton Primary School, the use of accurate vocabulary is a priority. A mathematics vocabulary progression document has been created which ensures that the correct terminology is being taught and used across school. The sequential structure of the document ensures progression through revisiting and embedment, alongside age-appropriate new vocabulary being taught and consistently used as children move up through the year groups. This document is available to view on the school website.

## Assessment

### **Formative Assessment**

Teachers integrate the use of formative assessment strategies such as effective questioning, clear learning objectives and effective feedback and response into their teaching. Throughout lessons teachers and teaching assistants hot mark, checking understanding and addressing misconceptions on the spot. This ensures any potential gaps in understanding are closed efficiently. Children reflect on their understanding daily by indicating in their books the level of confidence they feel about the learning objective. This is alongside regular conversations with teachers about their understanding. Children can also see their teachers' assessments of how they have achieved the learning objective through our tick system (see marking policy).

### **Summative Assessment**

Teachers use Progress in Understanding Mathematics (PUMA) termly assessments. These are used to support teacher assessments and in Pupil Progress meetings, to track the progress of all children.

National Curriculum tests are used at the end of Key Stage 1 and Key Stage 2. Teachers use past and sample papers to inform their assessments as they prepare pupils for these tests. Children are prepared for these tests and are familiar with the format and language in them.



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## Monitoring

Teaching staff monitor their pupils through observation, discussion, teacher assessment, marking work, end of unit assessing and termly testing.

The teaching of mathematics is monitored through:

- Lesson observations/learning walks
- Scrutiny of work/books
- In-school and locality moderation
- Pupil progress meetings
- Pupil voice sessions

## Inclusion

All children have equal access to the mathematics curriculum. Our school strives to meet the needs of all pupils and we ensure that all children feel safe and comfortable in their learning. As stated in the National Curriculum for England, *'Decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on'*. Teachers continuously monitor the progress and understanding of pupils and support and challenge are given based upon the needs of the children.

**This policy was written October 2022**

**This policy is due for review October 2023 (or periodically when circumstances arise).**