

# Curzon Maths Curriculum

## Our Intent

### Curzon specific aims of Maths

At Curzon we strive to develop all our pupils into confident, curious and resilient mathematicians. Our aim is that all pupils are determined to find solutions to problems, by drawing on their subject knowledge and fostering a strong “growth mindset”. We want our mathematicians to be able to apply their skills across a range of contexts so that Maths is a practical tool that has importance and relevance for our pupils in the world outside of a classroom.

We believe that everyone can “do” Maths. Our curriculum promotes resilience, enquiry, curiosity and the enjoyment of Maths. The Curzon value of courage is key to our Maths curriculum as we have observed that many of our pupils are anxious about Maths and tend to panic when faced with less familiar word problems.

We have high ambitions for all pupils. Our ethos is to enable all pupils to reach their potential. We do not place a ceiling on attainment and we aim that all pupils, including SEND, can participate fully, by using concrete and visual representations and pre teach programmes. Our curriculum is designed to ensure that higher attainers are challenged through deepening questions and being given the opportunities for more detailed reasoning.

We ensure children are secure in their declarative knowledge (I know that); have confidence in their procedural knowledge (I know how) by teaching children to select the most efficient methods (without the cognitive overload of too many methods) and can apply their knowledge to solve problems successfully – conditional knowledge.

Whilst following the National Curriculum, we have made our Maths curriculum unique to Curzon:

### Mastery curriculum

We aim to teach our pupils to master elements of Maths and to develop deep understanding. We have chosen to use the White Rose scheme as each unit is taught over a period of 2-3 weeks, allowing for a deepening of understanding. The scheme also enables pupils to apply their learning to different contexts and problems and make links with other areas of Maths.

## **Developing fluency and arithmetic skills**

We intend that our pupils become fluent in basic mathematical facts. We plan our curriculum to allow time outside of maths lessons for pupils to practise skills, such as quick recall of times tables. In order to be a successful mathematician, we believe that children need to have confidence using a range of methods of arithmetic and therefore this arithmetic method rehearsal is a key element of our curriculum.

## **Cross-curricular approach**

We emphasise cross-curricular links between Maths and other subjects as we aim that pupils retain their substantive knowledge by applying it in more than one curriculum area. For example, KS2 pupils use weighing scales to measure out ingredients in cookery and Year 5,6 pupils create their own line graphs in science.

*How this links with our school vision: growing in understanding and in resilience and the ability to solve real life problems.*

## **Implementation**

### **White Rose**

Curzon follows the White Rose scheme of work which is based on the mastery approach to Maths. Units are taught in longer chunks to enable pupils time to gain a deeper understanding of the concepts. Each unit is revisited and built upon each year. Reasoning and problem solving are integral parts of the programme and do not form stand alone lessons. Skills are carefully built up within each unit of work. E.g. in Year 5 mental methods for multiplication lead to informal written methods and finally to written methods. Clear links are made between different operations and between different areas of Maths, for example, pupils apply their multiplication skills to solve area problems. We follow the year group plans for each year group and our Snowy Owl class (Year 1 and 2) mixed follow the Year 1/2 plans.

### **How we teach Maths**

We teach using concrete, visual and abstract strategies and in small, clearly sequenced steps. Concrete and visual strategies are used in all year groups as temporary scaffolds – tools for helping pupils solve problems. Pupils will learn to “master” key areas of Maths such as: representation and structure, mathematical thinking and variation and fluency. Our teaching of Mathematics is not limited to a “discrete” Maths lesson as it is a vital part of our Science

and Cookery teaching and is used to enhance all of our curriculum, for example line graphs to represent the outcomes of experiments of time or weight and measurement in Cookery.

Pupils in all classes work on deepening their learning through activities, including: reasoning and problem questions, bar modelling, word problems and explaining misconceptions or errors.

We adapt the White Rose schemes of learning to fit the needs of our pupils. White Rose organises teaching into 2-3 week blocks allowing the pupils to learn each concept in depth. We ensure that we include a revision of key areas in our maths warm ups and plan to ensure a constant reinforcement of knowledge and skills so that knowledge becomes “sticky”.

We believe that a secure knowledge of the times tables is essential to be a mathematician, therefore all of the pupils in Key stage 2 take part in a times tables scheme that helps them to have quick and accurate recall of the times tables. Once a week there is a dedicated times tables session where pupils work through three levels for each times table and they are rewarded for their successes and effort. Pupils also use Timetables Rockstars to practise at home. We also ensure that we revise key arithmetic skills to improve fluency, including these at the start of some lessons each week.

We ensure that all pupils are actively involved in all parts of Maths lessons. Discussion activities such as “Which is the odd one out” are set allowing pupils to develop their thinking and reasoning skills and apply their learning. Teachers and TAs regularly check for misconceptions, using strategies such as thumbs up/down to ascertain understanding of key concepts before moving on. Key concepts and phrases are often chanted to aid memory.

Teachers use our “chilli challenge” approach, giving pupils a choice of activities to ensure all pupils are engaged, stretched and challenged.

#### Early Years and Foundation Stage:

The majority of pupils enter slightly below national average. Extra time is spent during this phase to allow pupils to master essential skills such as one to one correspondence, subitising and recognition of shapes. Pupils complete small group guided activities with adults. At this stage, a lot of Maths is taught through pupil-initiated learning and the use of physical resources that help to stimulate interest and an early love of Maths.

#### Key Stage 1:

In Key Stage 1, pupils are taught the mental strategies required to begin to master the four operations of calculation. They begin to gain fluency and start to develop their reasoning skills. Pupils learn how numbers and operations have closely linked relationships and they explore inverse operations and number patterns.

## Key Stage 2

By the end of Key Stage 2, pupils become confident mathematicians. They have secure mental and written methods of calculation and they can apply these in a range of different contexts. They can explain their reasons to a solution or explain misconceptions using appropriate vocabulary.

### GDS stretch and challenge

Mathematical fluency is secure in all areas and GDS pupils are able to reason and explain mathematical concepts and procedures from their expected year group curriculum and use them to solve a variety of problems. The GDS pupil can independently make links between different areas of Maths to choose the most efficient method to solve a problem often identifying and manipulating patterns. When solving a problem with more than one possible answer, a GDS pupil will work methodically, accurately and logically to ensure that they have found all the answers.

Below are the schemes of learning that we follow to ensure our curriculum covers the National Curriculum for Mathematics.

Further detail about progression in number methods and fractions is to be found in our fractions and calculations policies.

## Curzon Long Term Curriculum Planning for Maths

### Early Years Foundation Stage pupils learn to:

- Count confidently up to 10
- Develop a deep understanding of the numbers to 10 and the relationships between them and the patterns within those numbers including even and odds and how quantities can be distributed evenly
- Subitise (recognise quantities without counting) up to 5
- Automatically recall number bonds to 5 (including subtraction facts) and some number bonds to 10, including double facts
- Verbally count beyond 20
- Compare quantities up to 10 in different contexts (greater than, less than, same as)
- Develop spatial reasoning skills
- Develop positive have a go attitudes and interests in Maths without worrying about making mistakes



**In Year 1 the pupils will learn to:**

- Count within 100, forwards and backwards, starting with any number.
- Reason about the location of numbers to 20 within the linear number system, including comparing using  $<$   $>$  and  $=$
- Develop fluency in addition and subtraction facts within 10.
- Count forwards and backwards in multiples of 2, 5 and 10, up to 10 multiples, beginning with any multiple, and count forwards and backwards through the odd numbers.
- Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers
- Read, write and interpret equations containing addition (  $+$  ), subtraction (  $-$  ) and equals (  $=$  ) symbols, and relate additive expressions and equations to real-life contexts.
- Recognise common 2D and 3D shapes presented in different orientations, and know that rectangles, triangles, cuboids and pyramids are not always similar to one another.
- Compose 2D and 3D shapes from smaller shapes to match an example, including manipulating shapes to place them in particular orientations.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number <b>Place value</b> (within 10) VIEW					Number <b>Addition and subtraction</b> (within 10) VIEW					Geometry <b>Shape</b> VIEW	Consolidation
Spring term	Number <b>Place value</b> (within 20) VIEW	Number <b>Addition and subtraction</b> (within 20) VIEW			Number <b>Place value</b> (within 50) VIEW	Measurement <b>Length and height</b> VIEW	Measurement <b>Mass and volume</b> VIEW					
Summer term	Number <b>Multiplication and division</b> VIEW			Number <b>Fractions</b> VIEW	Geometry <b>Position and direction</b> VIEW	Number <b>Place value</b> (within 100) VIEW	Measurement <b>Money</b> VIEW	Measurement <b>Time</b> VIEW			Consolidation	

**In Year 2 pupils will learn to:**

- Recognise the place value of each digit in two-digit numbers, and compose and decompose two-digit numbers using standard and nonstandard partitioning.

- Reason about the location of any two digit number in the linear number system, including identifying the previous and next multiple of 10.
- Secure fluency in addition and subtraction facts within 10, through continued practice.
- Add and subtract across 10.
- Recognise the subtraction structure of 'difference' and answer questions of the form, "How many more...?".
- Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two digit number.
- Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two digit numbers.
- Recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables.
- Relate grouping problems where the number of groups is unknown to multiplication equations with a missing factor, and to division equations (quotitive division).
- Use precise language to describe the properties of 2D and 3D shapes, and compare shapes by reasoning about similarities and differences in properties.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number <b>Place value</b> VIEW				Number <b>Addition and subtraction</b> VIEW				Geometry <b>Shape</b> VIEW			
Spring term	Measurement <b>Money</b> VIEW		Number <b>Multiplication and division</b> VIEW				Measurement <b>Length and height</b> VIEW		Measurement <b>Mass, capacity and temperature</b> VIEW			
Summer term	Number <b>Fractions</b> VIEW			Measurement <b>Time</b> VIEW			<b>Statistics</b> VIEW		Geometry <b>Position and direction</b> VIEW		Consolidation	

### In Year 3 pupils will learn to:

- Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three digit multiples of 10.

- Recognise the place value of each digit in three-digit numbers, and compose and decompose three-digit numbers using standard and non-standard partitioning.
- Recall multiplication facts, and corresponding division facts, in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number.
- Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10).
- Calculate complements to 100.
- Add and subtract up to three-digit numbers using columnar methods, **particularly the expanded column method**.
- Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part–part–whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction.
- Apply known multiplication and division facts to solve contextual problems with different structures, including quotitive and partitive division.
- Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.
- Add and subtract fractions with the same denominator, within 1.
- Recognise right angles as a property of shape or a description of a turn, and identify right angles in 2D shapes presented in different orientations.
- Draw polygons by joining marked points, and identify parallel and perpendicular sides.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number <b>Place value</b> <a href="#">VIEW</a>		Number <b>Addition and subtraction</b> <a href="#">VIEW</a>				Number <b>Multiplication and division</b> <a href="#">VIEW</a>					
Spring term	Number <b>Multiplication and division</b> <a href="#">VIEW</a>		Measurement <b>Length and perimeter</b> <a href="#">VIEW</a>		Number <b>Fractions</b> <a href="#">VIEW</a>			Measurement <b>Mass and capacity</b> <a href="#">VIEW</a>				
Summer term	Number <b>Fractions</b> <a href="#">VIEW</a>	Measurement <b>Money</b> <a href="#">VIEW</a>	Measurement <b>Time</b> <a href="#">VIEW</a>			Geometry <b>Shape</b> <a href="#">VIEW</a>		Statistics <a href="#">VIEW</a>		Consolidation		

### In Year 4 the pupils will learn to:

- Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size.
- Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.
- Understand and apply the distributive property of multiplication.
- Reason about the location of mixed numbers in the linear number system.
- Convert mixed numbers to improper fractions and vice versa.
- Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers.

- Draw polygons, specified by coordinates in the first quadrant, and translate within the first quadrant.
- Identify regular polygons, including equilateral triangles and squares, as those in which the side-lengths are equal and the angles are equal. Find the perimeter of regular and irregular polygons.
- Identify line symmetry in 2D shapes presented in different orientations. Reflect shapes in a line of symmetry and complete a symmetric figure or pattern with respect to a specified line of symmetry.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number <b>Place value</b> VIEW				Number <b>Addition and subtraction</b> VIEW		Measurement <b>Area</b> VIEW	Number <b>Multiplication and division</b> VIEW		Consolidation		
Spring term	Number <b>Multiplication and division</b> VIEW		Measurement <b>Length and perimeter</b> VIEW		Number <b>Fractions</b> VIEW			Number <b>Decimals</b> VIEW				
Summer term	Number <b>Decimals</b> VIEW	Measurement <b>Money</b> VIEW	Measurement <b>Time</b> VIEW	Consolidation	Geometry <b>Shape</b> VIEW		Statistics VIEW	Geometry <b>Position and direction</b> VIEW				

**In Year 5 pupils will learn to:**

- Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.
- Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors.
- Multiply any whole number with up to 4 digits by any one-digit number using a formal written method.
- Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context.
- Find non-unit fractions of quantities.
- Find equivalent fractions and understand that they have the same value and the same position in the linear number system.
- Recall decimal fraction equivalents for  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$  and  $\frac{1}{10}$ , and for multiples of these proper fractions.
- Compare angles, estimate and measure angles in degrees ( $^{\circ}$ ) and draw angles of a given size.
- Compare areas and calculate the area of rectangles (including squares) using standard units.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number <b>Place value</b> <a href="#">VIEW</a>		Number <b>Addition and subtraction</b> <a href="#">VIEW</a>		Number <b>Multiplication and division</b> <a href="#">VIEW</a>			Number <b>Fractions A</b> <a href="#">VIEW</a>				
Spring term	Number <b>Multiplication and division</b> <a href="#">VIEW</a>		Number <b>Fractions B</b> <a href="#">VIEW</a>		Number <b>Decimals and percentages</b> <a href="#">VIEW</a>			Measurement <b>Perimeter and area</b> <a href="#">VIEW</a>		Statistics <a href="#">VIEW</a>		
Summer term	Geometry <b>Shape</b> <a href="#">VIEW</a>		Geometry <b>Position and direction</b> <a href="#">VIEW</a>		Number <b>Decimals</b> <a href="#">VIEW</a>			Number <b>Negative numbers</b> <a href="#">VIEW</a>	Measurement <b>Converting units</b> <a href="#">VIEW</a>		Measurement <b>Volume</b> <a href="#">VIEW</a>	

**In Year 6 pupils will learn to:**

- Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000)
- Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and nonstandard partitioning.
- Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.
- Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.
- Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number)
- Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.
- Solve problems involving ratio relationships.
- Solve problems with 2 unknowns.
- Recognise when fractions can be simplified, and use common factors to simplify fractions.
- Express fractions in a common denomination and use this to compare fractions that are similar in value.
- Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number <b>Place value</b> VIEW		Number <b>Addition, subtraction, multiplication and division</b> VIEW				Number <b>Fractions A</b> VIEW		Number <b>Fractions B</b> VIEW		Measurement <b>Converting units</b> VIEW	
Spring term	Number <b>Ratio</b> VIEW		Number <b>Algebra</b> VIEW		Number <b>Decimals</b> VIEW		Number <b>Fractions decimals and percentages</b> VIEW		Measurement <b>Area, perimeter and volume</b> VIEW		<b>Statistics</b> VIEW	
Summer term	Geometry <b>Shape</b> VIEW		Geometry <b>Position and direction</b> VIEW		Themed projects, consolidation and problem solving							

## Assessment

Assessment of pupils' learning in Maths is an ongoing monitoring of pupils' understanding, declarative knowledge (I know that), procedural knowledge (I know how) and conditional knowledge (being able to apply facts) by the class teacher throughout lessons. Teachers use quick fire formative assessment activities in lessons, such as true/false, thumbs up/down, show me on your whiteboard and short paired tasks. This assessment is then used to inform support and challenge for each pupil.

We formally assess the pupils termly using White Rose tests on the concepts that they have had the opportunities to master and use findings from these assessments to plan future warm ups and shape our teaching of the next units. We assess pupil's times tables skills weekly and in a termly big test. Summative data for each term is recorded on Bromcom and analysed by the subject leader.

## **Impact**

Book scrutiny, learning walks and lesson observations show evidence of a wide range of mastery activities in all classes. Results at the end of KS2 are above national standards.

By the time our pupils leave Curzon they will:

- show resilience when a question seems initially difficult
- have an excellent grasp of basic number skills and the confidence to try strategies out.
- be able to demonstrate excellence of understanding in every strand of the curriculum – as evidenced through analysis of KS2 data.
- make links between different areas of Maths and know how Maths is used in other curriculum areas
- be able to demonstrate a deep understanding of Maths through their ability to investigate problems in novel ways, applying what they have learnt to a range of contexts.
- be able to generate sound explanations for the patterns that they find.