

Mathematics | Intent and Implementation

Why do we teach mathematics?

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.

What is our curriculum aim?

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.

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.





How is mathematics taught?

Maths is taught using a 'mastery' approach. Mastering maths means pupils acquiring a deep, long-term, secure and adaptable understanding of the subject and being able to apply concepts in many different contexts. Maths is taught in mixed-ability class groups, where the focus is on all pupils working together on the same lesson content at the same time, as happens in Shanghai and several other regions that teach maths successfully. This ensures that all can master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind. If a pupil fails to grasp a concept or procedure, this is identified quickly, and early intervention ensures the pupil is ready to move forward with the whole class.

Teaching is based on the NCETM approach using their curriculum prioritisation materials to provide a coherent sequence of lessons for our maths curriculum. Based on the Department of Education's guidance on curriculum prioritisation, teachers also use their accurate assessment of children's strengths and areas of development to identify the new mathematics that is to be taught, the key points and potential misconceptions to create a carefully sequenced journey through the learning. Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other. Our curriculum recognises the important role that knowledge and vocabulary (as a particularly important type of knowledge) plays in learning. The progression of vocabulary is identified and mapped across the curriculum. For example, understanding concepts such as 'equation' evolves with increasing complexity as children move through the key stages.

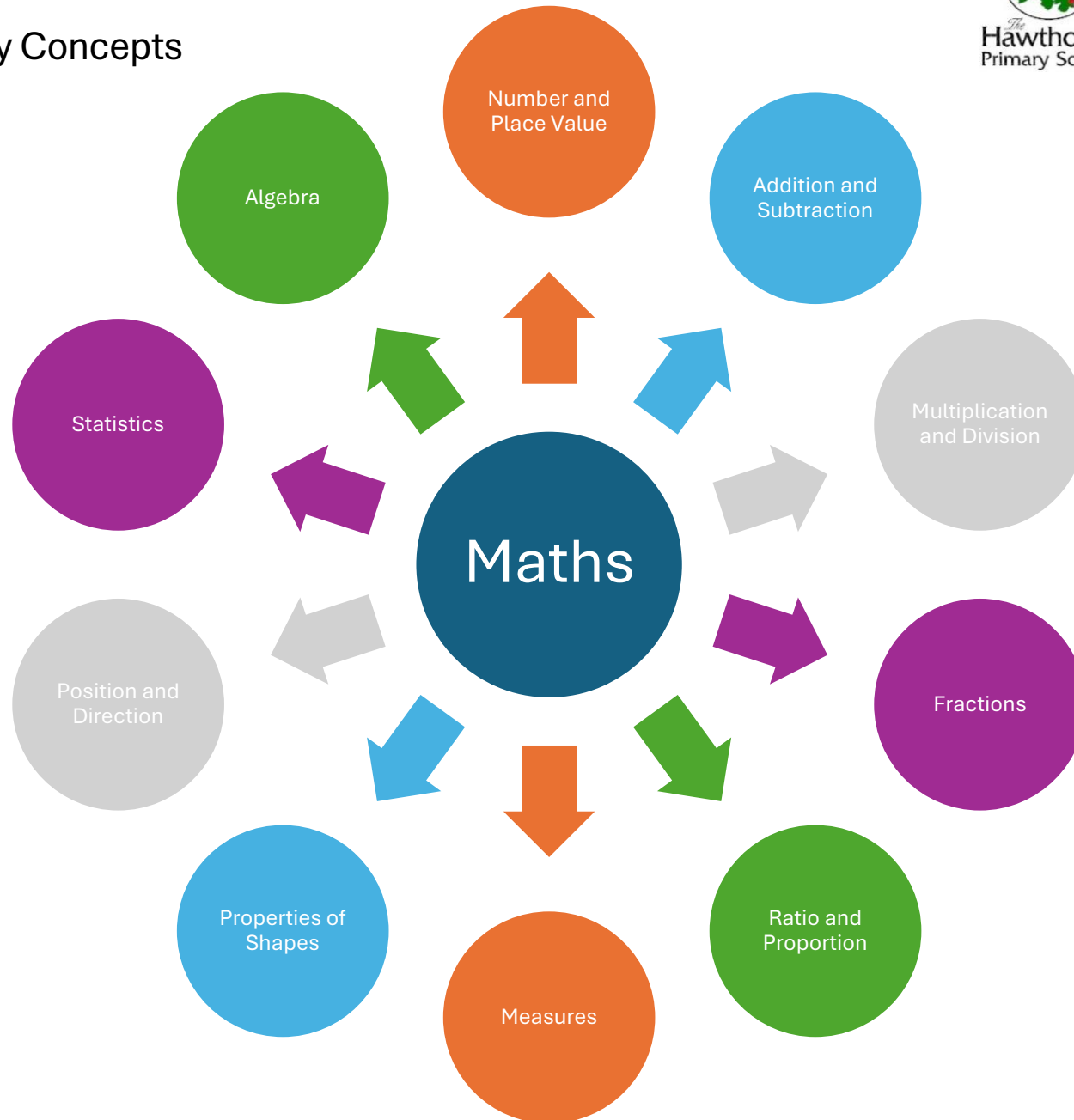
Teachers supplement the NCETM materials with resources from Oak Academy, I See Reasoning, NRICH and Dip and Pick materials to challenge and deepen children's reasoning and problem solving skills.

Oracy and discussion is a key part of teaching, with children being expected to describe what they notice and why at each point of learning. Children reason about what is the same and what is different and explain their approach to questions; this allows for the development of deeper understanding as well as providing assessment opportunities. We carefully build mathematical ideas using real world situations. Teachers model the concept followed by shared work before independent 'Intelligent Practice' that both reinforces children's procedural fluency and develops their conceptual understanding.

Concrete resources are available in all classrooms, with the expectation that children will move from the use of these through consistent visual representations to abstract as they gain a secure mental model of the concept. Throughout EYFS and KS1 children are introduced to a range of concrete resources and are strongly encouraged to use these to develop a deeper understanding of concepts by seeing it visually, rather than as an abstract. In KS2, resources are still available to all pupils and withdrawal of these is determined by need, not age or year group. Cognitive load is considered as we only use the smallest set of models and representations to underpin and support the understanding of the greatest number of mathematical models. Children meet familiar tools and approaches to signal explicit links between implicitly connected elements of mathematics.

Daily retrieval of prior learning happens at the beginning of each lesson through the use of memory maps where children practise a key area of mathematics from their learning last year, last term and the last lesson. This helps learning to become 'sticky' and for the knowledge to be retained in the child's long term memory.

Daily fluency sessions happen outside of the main maths lessons using a programme called Mastering Number. In EYFS, Key Stage 1 and Year 3, children secure firm foundations in their number sense to secure subitising, composition of numbers and understanding number relationships. In Years 4 and 5, children develop fluency in multiplication and division facts and a confidence and flexibility with number that exemplifies good number sense.



Maths | Progression Map - Numbers and Place Value

	Counting	Comparing Numbers	Rounding
Y1	<ul style="list-style-type: none"> Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. Count, read and write numbers to 100 in numerals Count in multiples of twos, fives and tens. Given a number, identify one more and one less. 	<ul style="list-style-type: none"> Use the language of: equal to, more than, less than (fewer), most, least. 	
Y2	<ul style="list-style-type: none"> Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward. 	<ul style="list-style-type: none"> Compare and order numbers from 0 up to 100; use <, > and = signs. 	
Y3	<ul style="list-style-type: none"> Count from 0 in multiples of 4, 8, 50 and 100. Find 10 or 100 more or less than a given number. 	<ul style="list-style-type: none"> Compare and order numbers up to 1000. 	
Y4	<ul style="list-style-type: none"> Count backwards through zero to include negative numbers. Count in multiples of 6, 7, 9, 25 and 100. Find 1000 more or less than a given number. 	<ul style="list-style-type: none"> Compare and order numbers beyond 1 000. 	<ul style="list-style-type: none"> Round any number to the nearest 10, 100 or 1000.
Y5	<ul style="list-style-type: none"> Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero. Count forwards or backwards in steps of powers of 10 for any given number up to one million. 	<ul style="list-style-type: none"> Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit. 	<ul style="list-style-type: none"> Round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000.
Y6	<ul style="list-style-type: none"> Use negative numbers in context, and calculate intervals across zero 	<ul style="list-style-type: none"> Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit. 	<ul style="list-style-type: none"> Round any whole number to a required degree of accuracy.

Maths | Progression Map - Numbers and Place Value

	Identifying and Representing Number	Reading and Writing Numbers and Recognising Place Value	Problem Solving
Y1	<ul style="list-style-type: none"> Identify and represent numbers using objects and pictorial representations including the number line. 	<ul style="list-style-type: none"> Read and write numbers from 1 to 20 in numerals and words. 	
Y2	<ul style="list-style-type: none"> Identify, represent and estimate numbers using different representations, including the number line. 	<ul style="list-style-type: none"> Read and write numbers to at least 100 in numerals and in words. Recognise the place value of each digit in a two-digit number (tens, ones). 	<ul style="list-style-type: none"> Use place value and number facts to solve problems.
Y3	<ul style="list-style-type: none"> Identify, represent and estimate numbers using different representations. 	<ul style="list-style-type: none"> Read and write numbers up to 1000 in numerals and in words. Recognise the place value of each digit in a three-digit number. 	<ul style="list-style-type: none"> Solve number problems and practical problems involving these ideas.
Y4	<ul style="list-style-type: none"> Identify, represent and estimate numbers using different representations. 	<ul style="list-style-type: none"> Read Roman numerals to 100 and know that over time, the numeral system changed to include the concept of zero and place value. Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones). 	<ul style="list-style-type: none"> Solve number and practical problems that involve all of the above and with increasingly large positive numbers.
Y5		<ul style="list-style-type: none"> Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit. Read Roman numerals to 1000 (M) and recognise years written in Roman numerals. 	<ul style="list-style-type: none"> Solve number problems and practical problems that involve all of the above.
Y6		<ul style="list-style-type: none"> Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit. 	<ul style="list-style-type: none"> Solve number problems and practical problems that involve all of the above.

Maths | Progression Map - Addition and Subtraction

	Mental Calculations	Written Calculations	Number Bonds
Y1	<ul style="list-style-type: none"> Add and subtract one-digit and two-digit numbers to 20, including zero. 	<ul style="list-style-type: none"> Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals. 	<ul style="list-style-type: none"> Represent and use number bonds and related subtraction facts within 20.
Y2	<ul style="list-style-type: none"> add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; three one-digit numbers. Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. 	<ul style="list-style-type: none"> Add and subtract numbers with up to two digits, using informal and formal written methods of columnar addition and subtraction. 	<ul style="list-style-type: none"> Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.
Y3	<ul style="list-style-type: none"> Add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds. 	<ul style="list-style-type: none"> Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction. 	
Y4	<ul style="list-style-type: none"> Add and subtract numbers mentally with increasingly large numbers. 	<ul style="list-style-type: none"> Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. 	
Y5	<ul style="list-style-type: none"> Perform mental calculations, including with mixed operations and large numbers. 	<ul style="list-style-type: none"> Add and subtract whole numbers with more than 4 digits, including using formal written methods. 	
Y6	<ul style="list-style-type: none"> Use knowledge of the order of operations to carry out calculations involving the four operations. 		

Maths | Progression Map - Addition and Subtraction

	Problem Solving	Inverse Operations
Y1	<ul style="list-style-type: none"> Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as: $7 = * - 9$ 	
Y2	<ul style="list-style-type: none"> Solve problems with addition and subtraction: <ul style="list-style-type: none"> using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods. 	<ul style="list-style-type: none"> Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
Y3	<ul style="list-style-type: none"> Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction. 	<ul style="list-style-type: none"> Estimate the answer to a calculation and use inverse operations to check answers.
Y4	<ul style="list-style-type: none"> Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. 	<ul style="list-style-type: none"> Estimate and use inverse operations to check answers to a calculation.
Y5	<ul style="list-style-type: none"> Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. 	<ul style="list-style-type: none"> Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.
Y6	<ul style="list-style-type: none"> solve multi-step problems involving all four operations in contexts, deciding which operations and methods to use and why. 	<ul style="list-style-type: none"> Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.



Maths | Progression Map - Multiplication and Division

	Multiplication and Division Facts	Order of Operations	Mental Calculations
Y1			
Y2	<ul style="list-style-type: none"> Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, 		<ul style="list-style-type: none"> Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
Y3	<ul style="list-style-type: none"> Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. 		<ul style="list-style-type: none"> Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.
Y4	<ul style="list-style-type: none"> Recall multiplication and division facts for multiplication tables up to 12×12. 		<ul style="list-style-type: none"> Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. Recognise and use factor pairs and commutativity in mental calculations.
Y5			<ul style="list-style-type: none"> Multiply and divide numbers mentally drawing upon known facts. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
Y6		<ul style="list-style-type: none"> Use their knowledge of the order of operations to carry out calculations involving the four operations. 	<ul style="list-style-type: none"> Perform mental calculations, including with mixed operations and large numbers.



Maths | Progression Map - Multiplication and Division

	Written Calculations	Inverse Operations
Y1		
Y2	<ul style="list-style-type: none"> Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs. 	
Y3	<ul style="list-style-type: none"> Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, using mental and progressing to formal written methods. 	<ul style="list-style-type: none"> Estimate the answer to a calculation and use inverse operations to check answers.
Y4	<ul style="list-style-type: none"> Multiply two-digit and three-digit numbers by a one-digit number using formal written layout. 	<ul style="list-style-type: none"> Estimate and use inverse operations to check answers to a calculation.
Y5	<ul style="list-style-type: none"> Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers. Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context. 	
Y6	<ul style="list-style-type: none"> Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. Divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division where appropriate for the context divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding. 	<ul style="list-style-type: none"> Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Maths | Progression Map - Multiplication and Division

	Problem Solving	Multiples, Factors, Primes, Squares and Cubes
Y1	<ul style="list-style-type: none"> Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. 	
Y2	<ul style="list-style-type: none"> Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. 	
Y3	<ul style="list-style-type: none"> Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects 	
Y4	<ul style="list-style-type: none"> Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems. 	<ul style="list-style-type: none"> Recognise and use factor pairs and commutativity in mental calculations.
Y5	<ul style="list-style-type: none"> Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates. 	<ul style="list-style-type: none"> Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19 Recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³).
Y6	<ul style="list-style-type: none"> Solve problems involving addition, subtraction, multiplication and division. 	<ul style="list-style-type: none"> Identify common factors, common multiples and prime numbers.

Maths | Progression Map - Fractions

	Counting in Fractions	Recognising Fractions	Comparing Fractions
Y1		<ul style="list-style-type: none"> Recognise, find and name a half as one of two equal parts of an object, shape or quantity. Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity. 	
Y2	<ul style="list-style-type: none"> Pupils should count in halves and quarters up to 10. 	<ul style="list-style-type: none"> Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity. 	
Y3	<ul style="list-style-type: none"> Count up and down in tenths. 	<ul style="list-style-type: none"> Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators. Recognise that tenths arise from dividing an object into 10 equal parts and in dividing one – digit numbers or quantities by 10. Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators. 	<ul style="list-style-type: none"> Compare and order unit fractions, and fractions with the same denominators.
Y4	<ul style="list-style-type: none"> Count up and down in hundredths. 	<ul style="list-style-type: none"> Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. 	
Y5		<ul style="list-style-type: none"> Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. 	<ul style="list-style-type: none"> Compare and order fractions whose denominators are all multiples of the same number.
Y6			<ul style="list-style-type: none"> Compare and order fractions, including fractions >1.

The Spiral Curriculum: Core Faculty

Maths | Progression Map - Fractions



	Comparing Decimals	Equivalence (including Fractions, Decimals and Percentages)	Rounding Decimals
Y1			
Y2		<ul style="list-style-type: none"> Write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$. 	
Y3		<ul style="list-style-type: none"> Recognise and show, using diagrams, equivalent fractions with small denominators. 	
Y4	<ul style="list-style-type: none"> Compare numbers with the same number of decimal places up to two decimal places. 	<ul style="list-style-type: none"> Recognise and show, using diagrams, families of common equivalent fractions. Recognise and write decimal equivalents of any number of tenths or hundredths. Recognise and write decimal equivalents to $\frac{1}{4}$; $\frac{1}{2}$; $\frac{3}{4}$ 	<ul style="list-style-type: none"> Round decimals with one decimal place to the nearest whole number.
Y5	<ul style="list-style-type: none"> Read, write, order and compare numbers with up to three decimal places. 	<ul style="list-style-type: none"> Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. Read and write decimal numbers as fractions (e.g. $0.71 = \frac{71}{100}$). Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. Recognise the per cent symbol (%) and understand that per cent relates to “number of parts per hundred”, and write percentages as a fraction with denominator 100. 	<ul style="list-style-type: none"> Round decimals with two decimal places to the nearest whole number and to one decimal place.
Y6	<ul style="list-style-type: none"> Identify the value of each digit in numbers given to three decimal places. 	<ul style="list-style-type: none"> Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $\frac{3}{8}$). Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. 	<ul style="list-style-type: none"> Solve problems which require answers to be rounded to specified degrees of accuracy.

The Spiral Curriculum: Core Faculty

Maths | Progression Map - Fractions



	Adding and Subtracting Fractions and Decimals	Multiplying and Dividing Fractions and Decimals
Y1		
Y2		
Y3	<ul style="list-style-type: none"> Add and subtract fractions with the same denominator within one whole (e.g. $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$). 	
Y4	<ul style="list-style-type: none"> Add and subtract fractions with the same denominator. 	<ul style="list-style-type: none"> Find the effect of dividing a one- or two-digit number by 10 and 100.
Y5	<ul style="list-style-type: none"> Add and subtract fractions with the same denominator and multiples of the same number. Recognise and convert mixed numbers and improper fractions. 	<ul style="list-style-type: none"> Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.
Y6	<ul style="list-style-type: none"> Add and subtract fractions with different denominators and mixed numbers. 	<ul style="list-style-type: none"> Multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$). Multiply one-digit numbers with up to two decimal places by whole numbers. Divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$). Multiply one-digit numbers with up to two decimal places by whole numbers. Multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places. Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000. Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction. Use written division methods in cases where the answer has up to two decimal places.



Maths | Progression Map - Ratio and Proportion

Y1	
Y2	
Y3	
Y4	
Y5	
Y6	<ul style="list-style-type: none">• Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.• Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison.• Solve problems involving similar shapes where the scale factor is known or can be found.• Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

The Spiral Curriculum: Core Faculty

Maths | Progression Map - Measures



	Comparing and Estimating	Telling the Time
Y1	<ul style="list-style-type: none"> Compare, describe and solve practical problems for: lengths and heights (e.g. long/short, longer/shorter, tall/short, double/half); mass/weight (e.g. heavy/light, heavier than, lighter than); capacity and volume (e.g. full/empty, more than, less than, half, half full, quarter); time (e.g. quicker, slower, earlier, later). Sequence events in chronological order using language. 	<ul style="list-style-type: none"> Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. Recognise and use language relating to dates, including days of the week, weeks, months and years.
Y2	<ul style="list-style-type: none"> Compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$. Compare and sequence intervals of time. 	<ul style="list-style-type: none"> Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times. Know the number of minutes in an hour and the number of hours in a day.
Y3	<ul style="list-style-type: none"> Compare durations of events, for example to calculate the time taken by particular events or tasks. Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight. 	<ul style="list-style-type: none"> Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks. Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight.
Y4	<ul style="list-style-type: none"> Estimate, compare and calculate different measures, including money in pounds and pence. 	<ul style="list-style-type: none"> Read, write and convert time between analogue and digital 12 and 24-hour clocks. Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.
Y5	<ul style="list-style-type: none"> Calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes (also included in measuring). Estimate volume (e.g. using 1 cm^3 blocks to build cubes and cuboids) and capacity (e.g. using water). 	<ul style="list-style-type: none"> Solve problems involving converting between units of time.
Y6	<ul style="list-style-type: none"> Calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3. 	<ul style="list-style-type: none"> Use time zones to calculate times around the world.

Maths | Progression Map - Measures

Measuring and Calculating	
Y1	<ul style="list-style-type: none"> Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time (hours, minutes, seconds). Recognise and know the value of different denominations of coins and notes.
Y2	<ul style="list-style-type: none"> Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml). Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value. Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.
Y3	<ul style="list-style-type: none"> Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml). Measure the perimeter of simple 2-D shapes. Add and subtract amounts of money to give change, using both £ and p in practical contexts.
Y4	<ul style="list-style-type: none"> Estimate, compare and calculate different measures, including money in pounds and pence. Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres. Find the area of rectilinear shapes by counting squares.
Y5	<ul style="list-style-type: none"> Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling. Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres. Calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes.
Y6	<ul style="list-style-type: none"> Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. Recognise that shapes with the same areas can have different perimeters and vice versa. Calculate the area of parallelograms and triangles. Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units. Recognise when it is possible to use formulae for area and volume of shapes.

The Spiral Curriculum: Core Faculty

Maths | Progression Map - Measures



	Angles	Converting Units of Measurement
Y1		
Y2		<ul style="list-style-type: none"> Know the number of minutes in an hour and the number of hours in a day.
Y3	<ul style="list-style-type: none"> Recognise angles as a property of shape or a description of a turn. Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn. Identify whether angles are greater than or less than a right angle. Identify horizontal and vertical lines and pairs of perpendicular and parallel lines 	<ul style="list-style-type: none"> Know the number of seconds in a minute and the number of days in each month, year and leap year.
Y4	<ul style="list-style-type: none"> Identify acute and obtuse angles and compare and order angles up to two right angles by size. 	<ul style="list-style-type: none"> Convert between different units of measure (e.g. kilometre to metre; hour to minute). Read, write and convert time between analogue and digital 12 and 24-hour clocks. Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.
Y5	<ul style="list-style-type: none"> Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. Identify: <ul style="list-style-type: none"> Angles at a point and one whole turn (total 360°) Angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°) Other multiples of 90°. 	<ul style="list-style-type: none"> Convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre). Solve problems involving converting between units of time. Understand and use equivalences between metric units and common imperial units such as inches, pounds and pints.
Y6	<ul style="list-style-type: none"> Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. 	<ul style="list-style-type: none"> Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places. Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. Convert between miles and kilometres.

Maths | Progression Map – Properties of Shape

	Identifying and Drawing Shapes and their Properties	Comparing and Classifying Shapes
Y1	<ul style="list-style-type: none"> Explore characteristics of everyday objects and shapes and use mathematics language to describe them. Select, rotate and manipulate shapes in order to develop spatial reasoning skills. 	
Y2	<ul style="list-style-type: none"> Recognise and name common 2-D and 3-D shapes, including: 2-D shapes e.g. rectangles (including squares), circles and triangles; 3-D shapes e.g. cuboids (including cubes), pyramids and spheres. 	
Y3	<ul style="list-style-type: none"> Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces. identify 2-D shapes on the surface of 3-D shapes. 	<ul style="list-style-type: none"> Compare and sort common 2-D and 3-D shapes and everyday objects.
Y4	<ul style="list-style-type: none"> Draw 2-D shapes and make 3-D shapes using modelling materials Recognise 3-D shapes in different orientations and describe them. 	
Y5	<ul style="list-style-type: none"> Identify lines of symmetry in 2-D shapes presented in different orientations. Complete a simple symmetric figure with respect to a specific line of symmetry. 	<ul style="list-style-type: none"> Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.
Y6	<ul style="list-style-type: none"> Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. Draw given angles, and measure them in degrees ($^{\circ}$). 	<ul style="list-style-type: none"> Use the properties of rectangles to deduce related facts and find missing lengths or angles. Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

Maths | Progression Map – Position and Direction

	Position, Direction and Movement	Pattern
Y1	<ul style="list-style-type: none"> Describe position, direction and movement, including half, quarter and three-quarter turns. 	
Y2	<ul style="list-style-type: none"> Use mathematical vocabulary to describe position, direction and movement including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise). 	<ul style="list-style-type: none"> Order and arrange combinations of mathematical objects in patterns and sequences.
Y3	<ul style="list-style-type: none"> Describe positions on a 2-D grid as coordinates in the first quadrant. Describe movements between positions as translations of a given unit to the left/right and up/down. 	
Y4	<ul style="list-style-type: none"> Plot specified points and draw sides to complete a given polygon. 	
Y5	<ul style="list-style-type: none"> Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed. 	
Y6	<ul style="list-style-type: none"> Describe positions on the full coordinate grid (all four quadrants). Draw and translate simple shapes on the coordinate plane, and reflect them in the axes. 	

Maths | Progression Map – Statistics

	Interpreting, Constructing and Presenting Data	Solving Problems
Y1		
Y2	<ul style="list-style-type: none"> Interpret and construct simple pictograms, tally charts, block diagrams and simple tables. Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity. Ask and answer questions about totalling and comparing categorical data. 	
Y3	<ul style="list-style-type: none"> Interpret and present data using bar charts, pictograms and tables. 	<ul style="list-style-type: none"> Solve one-step and two-step questions [e.g. ‘How many more?’ And ‘how many fewer?’] using information presented in scaled bar charts and pictograms and tables.
Y4	<ul style="list-style-type: none"> Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. 	<ul style="list-style-type: none"> Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.
Y5	<ul style="list-style-type: none"> Complete, read and interpret information in tables, including timetables. 	<ul style="list-style-type: none"> Solve comparison, sum and difference problems using information presented in a line graph.
Y6	<ul style="list-style-type: none"> Interpret and construct pie charts and line graphs and use these to solve problems. 	<ul style="list-style-type: none"> Calculate and interpret the mean as an average.



Maths | Progression Map – Algebra

	Equations	Formulae	Sequences
Y1			
Y2			
Y3			
Y4			
Y5			
Y6	<ul style="list-style-type: none"> Express missing number problems algebraically. Find pairs of numbers that satisfy number sentences involving two unknowns. Enumerate all possibilities of combinations of two variables. 	<ul style="list-style-type: none"> Use simple formulae. 	<ul style="list-style-type: none"> Generate and describe linear number sequences.