Mathematics Progression Map

Years 3 and 4

Topic/Text	Key Knowledge	Skills Progression	Rationale	Vocabulary
Place Value	Year 3 • Count from 0 in multiples of 4, 8, 50 and 100; • Find 10 or 100 more or less than a given number; • Recognise the place value of each digit in a three-digit number (hundreds, tens, ones); • Compare and order numbers up to 1000; • Identify, represent and estimate numbers using different representations; • Read and write numbers up to 1000 in numerals and in words; • Solve number problems and practical problems involving these ideas. Year 4 • Count in multiples of 6, 7, 9, 25 and 1000; • Find 1000 more or less than a given number; • Count backwards through zero to include negative numbers;	In Year 3, children build on their work in Year 2 to count in multiples of 2, 4, 3, 5, 8, 10, 50 and 100, and to find 10 or 100 more or less than a given number. They begin to explore numbers with up to three digits, identifying and representing them using concrete equipment, pictorial representations, words and numerals. Children apply the partitioning work begun in Year 2 to numbers up to 1000, continuing to recognise that numbers can be partitioned in different ways. They continue to use their developing understanding of place value to solve a range of problems. In Year 4, pupils work with numbers greater than 1000 for the first time. They begin to extend their knowledge of the number system to include the decimals and fractions they have encountered so far. Pupils are introduced to rounding for the first time, linking it to estimating answers to calculations and to estimating measures. Pupils encounter Roman numerals and should learn about them in their historical context, developing an understanding of how the place value system we use today and the concept of zero.	• Place value is the most important concept when teaching mathematics; it underpins the rest of the curriculum and provides an essential foundation of mathematical understanding. • If learners do not have a secure understanding of place value, they will struggle to understand, let alone master, any of the rest of the mathematics curriculum. Each class begins the academic year with a block of teaching on this area to ensure learners are ready to progress.	Year 3 ascending descending hundreds Year 4 negative numbers Roman numerals thousands round

	• Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones); • Order and compare numbers beyond 1000; • Identify, represent and estimate numbers using different representations; • Round any number to the nearest 10, 100 or 1000; • Solve number and practical problems that involve all of the above and with increasingly large positive numbers; • Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.			
Addition and Subtraction	Year 3 ● Add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds. ● Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction. ● Estimate the answer to a calculation and use inverse operations to check answers. ● Solve problems, including missing number problems,	In Year 3, pupils use their understanding of place value to hone their mental strategies for addition and subtraction. They build on the formal written methods introduced in Year 2 and apply these to larger numbers where the answer could total more than 100. In Year 4, children continue to develop their mental and written strategies, applying them to larger numbers and more involved problems.	• The related concepts of addition and subtraction have myriad real-life applications for children, e.g. working out how much more pocket money you need to save to buy a toy, figuring out how many squares to move in a board game and calculating how many football stickers you will have left if your parent forces you to give some to your younger sibling!	Year 3 column addition column subtraction exchange estimate Year 4 4-digit number operation method

	using number facts, place value, and more complex addition and subtraction. Year 4 ● Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. ● Estimate and use inverse operations to check answers to a calculation. ● Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.		● Learning addition and subtraction allows pupils to apply their place value knowledge in context, demonstrating that they have a secure understanding of the composition of numbers.	
Multiplication and division	Year 3 ● Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. ● 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. ● Solve problems, including missing number problems, involving multiplication and	In Year 3, pupils improve their fluency with the 2, 5 and 10 times tables explored in Year 2, and work on recalling and using multiplication and division facts for the 3, 4 and 8 times tables. These should be introduced mindfully, encouraging pupils to make connections with multiplication tables they already know, e.g. exploring that multiples of 4 are double multiples of 2. Pupils work on developing efficient mental methods, and should be encouraged to choose the most sensible approach based on the numbers in the question instead of defaulting to a formal written method. Strategies may include commutativity, partitioning and using known facts. Pupils develop reliable written methods for multiplication and division, progressing from expanded methods to formal ones as appropriate. Pupils continue to use multiplication and division to solve problems. In Year 4, pupils consolidate their understanding and recall of all multiplication tables and related division facts, and work on improving their speed and fluency.	● As with addition and subtraction, multiplication and division have various real-life uses which makes this topic an essential and exciting one. ● Due to the link between multiplication and repeated addition, this topic naturally follows on from learning about addition and subtraction. Without a solid understanding of these operations, children will be	Year 3 exchange derived fact Year 4 factor pairs distributive law remainders

	division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects. Year 4 • Recall multiplication and division facts for multiplication tables up to 12 × 12. • 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. • Multiply two-digit and three-digit numbers by a one-digit number using formal written layout. • 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 such as n objects are connected to m objects.	They use this fluency to solve a range of calculations mentally, e.g. understanding that if they know 6 x 7 = 42, they can solve 4200 ÷ 7. They use their developing understanding of commutativity to explore the best way to multiply a set of three numbers. Pupils move from multiplying a 2-digit number by a 1-digit number to multiplying a 3-digit number by a 1-digit number using a formal written method.	unable to succeed in more advanced mathematical concepts, such as fractions, which they will cover later in the year. Building their understanding of multiplication tables, identifying relationships and describing patterns will underpin work on algebra in Upper KS2.	
Fractions and decimals	Year 3 • Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in	In Year 3, pupils build on their exploratory work in Year 1 and 2 to work with fractions in different contexts. They consolidate their understanding of what is meant by the numerator and denominator of a fraction and use this to find unit and non-unit fractions of a quantity, set of objects or a shape; they apply their understanding of	• Proficiency with fractions is an important foundation for learning more advanced	Year 3 tenths Year 4 decimal equivalence hundredths

	dividing one-digit numbers or quantities by 10. • Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators. • Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators. • Recognise and show, using diagrams, equivalent fractions with small denominators. • Add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7). • Compare and order unit fractions, and fractions with the same denominators. • Solve problems that involve all of the above. Year 4 • Recognise and show, using diagrams, families of common equivalent fractions. • Count up and down in hundredths; recognise that hundredths arise when dividing an	multiplication and division to do this accurately. They use number lines to explore fractions and use diagrams such as fraction walls and bar models to find equivalent fractions. Pupils add and subtract fractions with the same denominator, recognising that the denominator does not change as there are still the same number of parts in the whole. They begin to compare and order unit fractions and fractions with a common denominator. In Year 2, pupils are introduced to a greater range of fractions, including their first examples of non-unit fractions, e.g. ¾. They continue to explore the concept of fractions as equal parts of a quantity, set of objects or shape. They begin to solve real-life problems involving fractions. In Year 4, pupils build on their understanding of tenths to work with hundredths - counting up and down in hundredths, recognising that one hundred hundredths make one whole and understanding the relationship between tenths and hundreds. They are introduced to decimals for the first time and learn to make the connection between fractions and decimals, recognising the decimal equivalents to familiar fractions. They visit their place value learning from the beginning of the year and extend their understanding to tenths and hundredths. Pupils understand how to use multiplication and division to calculate non-unit fractions. They continue to explore equivalent fractions and begin to understand how to simplify fractions using multiples and factors, e.g. rather than simply knowing that 4/8 is the same as ½, they are able to explain why this is. Pupils continue to practise adding and subtracting fractions with the same denominator, to become fluent through a variety of increasingly complex problems beyond one whole. They make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with one or two decimal places in several ways, such as on number lines. In Year 4, pupils learn decimal notation and the language associated with	mathematics. Fractions are a student's first introduction to abstraction in mathematics and, as such, provide the best introduction to algebra, which they will encounter later in the year. • The fractions topic naturally follows on from the learning on multiplication and division, as pupils need to have a secure understanding of sharing and grouping in order to understand that fractions are always equal parts of a set or quantity. They will use everything they have learned while studying the four operations to work with numbers which are less than 1. It is essential that fractions learning is rooted in real-life contexts as much as possible, so that children are able to make sense of what could otherwise be a challenging abstract concept; this will help to avoid	convert proper fractions improper fractions decimal point

| | | object by one hundred and dividing tenths by ten.
• Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.
• Add and subtract fractions with the same denominator.
• Recognise and write decimal equivalents of any number of tenths or hundredths.
• Recognise and write decimal equivalents to ¼, ½ and ¾.
• Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.
• Round decimals with one decimal place to the nearest whole number compare numbers with the same number of decimal places up to two decimal places.
• Solve simple measure and money problems involving fractions and | it, including in the context of measurements. They will build on this when they come to the block on measures. | misconceptions such as adding the denominator when adding a pair of fractions. | |

	decimals to two decimal places.			
Measure	Year 3 ● 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. ● 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 and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight. ● Know the number of seconds in a minute and the number of days in each month, year and leap year. ● Compare durations of events [for example to calculate the time taken by particular events or tasks]. Year 4 ● Convert between different units of measure [for	In Year 3, pupils continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (for example, 1 kg and 200g) and simple equivalents of mixed units (for example, 5m = 500cm). They make comparisons using simple scaling by whole numbers, e.g. to see that an object of 1m is five times as long as one measuring 20cm. Pupils continue to become fluent in recognising the value of coins, by adding and subtracting amounts, including mixed units, and giving change using manageable amounts. They record £ and p separately. Pupils use both analogue and digital 12-hour clocks and record their times with increasing accuracy (to the nearest minute). In Year 4, pupils build on their understanding of the relationship between different units of measure, e.g. metres and kilometres, grams and kilograms, to convert between them. They continue to explore the perimeter of 2-D shapes, and learn how to calculate the perimeter of a rectilinear shape rather than measuring every side and adding them together. They are introduced to the concept of area for the first time, initially finding the area of a rectilinear shape drawn on squared paper by counting squares. Pupils are introduced to the decimal recording of money, moving on from recording £ and p separately, and they solve simple real-life money problems, e.g. calculating how much several items in a shop cost in total, then calculating how much change is required. Pupils build on their confidence with reading analogue and digital 12-hour clocks in Year 3 to read, write and convert time between 12 and 24-hour time.	● Understanding how measurement works is crucial to being able to quantify the world around us - the skills pupils will begin to develop in this topic will go on to help them in everyday life well beyond primary school. ● Children continue to contextualise their understanding of the four operations by applying them to real-life contexts and practical activities, simultaneously developing their problem-solving skills.	Year 3 millimetre (mm) perimeter analogue clock Roman numerals 12-hour clock 24-hour clock am/pm noon midnight leap year digital Year 4 kilometre (km) rectilinear figure area convert

	example, kilometre to metre; hour to minute]. ● Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres. ● Find the area of rectilinear shapes by counting squares. ● Estimate, compare and calculate different measures, including money in pounds and pence. ● Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change. ● Compare and sequence intervals of time. ● 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.			
Geometry – properties of shape	Year 3 ● Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them. ● Recognise angles as a property of shape or a description of a turn.	In Year 3, pupils' knowledge of the properties of shapes is extended to symmetrical and non-symmetrical polygons and polyhedra. Pupils extend their use of the properties of shapes. They should be able to describe the properties of 2-D and 3-D shapes using accurate language, including lengths of lines and acute and obtuse for angles greater or lesser than a right angle. In Year 4, pupils begin to categorise 2-D shapes based on their properties and to describe them using more	● As with measure, understanding geometry gives pupils the language they need to be able to make sense of the world around them and the objects they come across in their everyday lives. Discussing and	Year 3 right-angled triangle heptagon octagon polygon properties prism orientation angle acute angle obtuse angle

	• 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. Year 4 • Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. • Identify acute and obtuse angles and compare and order angles up to two right angles by size. • 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.	specific geometric properties, e.g. recognising that triangles can be classified as equilateral, isosceles or scalene; they share common properties as triangles, but each have their own properties which differentiate them. They look closely at polygons, deciding whether they are regular or irregular by measuring the length of each side. Pupils begin to explore acute and obtuse angles more closely, comparing and ordering angles by size, in preparation for measuring angles using a protractor in Year 5. They recognise line symmetry in 2-D shapes and complete patterns to make them symmetrical.	categorising different shapes helps to develop problem-solving skills and improves children's ability to organise visual information. By convincing a partner that a shape cannot be a triangle because it has four sides, for instance, pupils practise their logical thinking and reasoning skills. • Pupils will continue to use their skills in addition, subtraction, multiplication and division to solve problems.	right angle turn half turn three quarter turn horizontal line vertical line perpendicular lines parallel lines Year 4 isosceles equilateral scalene trapezium rhombus parallelogram kite geometric shape quadrilateral
Geometry – Position and direction	Year 4 • 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.	Pupils are introduced to coordinates in the first quadrant, and describe the movement between given points using the language of translation.	• The study of positional language supports pupils in being able to respond to and give directions. As they move up the school, a secure grasp of this topic will enable pupils to understand more complex	Year 4 coordinates first quadrant grid translation plot polygon axis

	● Plot specified points and draw sides to complete a given polygon.		mathematical concepts including angles, coordinates and transformation. They will also apply their understanding to learning to code in computing. ● This block builds directly on pupils' learning about properties of shapes, as they will need to have a secure understanding of what different types of triangles, quadrilaterals, etc, look like in order to plot them on coordinate grids.	
Statistics	Year 3 ● Interpret and present data using bar charts, pictograms and tables. ● Solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables. Year 4 ● Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.	In Year 3, pupils understand and use simple scales (for example, 2, 5, 10 units per cm) in pictograms and bar charts with increasing accuracy. They continue to interpret data presented in many contexts. Pupils understand and use a greater range of scales in their representations. Pupils begin to relate the graphical representation of data to recording change over time.	● The study of statistics offers an opportunity to reinforce pupils' understanding of number, place value and the four operations in the solving of problems. Pupils construct and interpret graphs and charts using real-life examples related to their own experiences, and make the most of using them in other areas of the curriculum, e.g. science.	Year 3 table bar chart Year 4 time graph discrete data continuous data line graph

	Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.		This block gives pupils the opportunity to apply their work on the four operations in a variety of contexts in order to interpret different types of charts and graphs and to pose their own questions. Covering this content at this point in the year also ensures that pupils will be able to confidently apply their skills in constructing and interpreting charts and graphs in their science work across the year.	