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Progression in Mathematics Strands

A pathway from Year 1 to Year 6

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Guidance Notes

Progression Maps

The progression maps are structured using the topic headings as they appear in the National Curriculum:

Number - Number and Place Value

Number - Addition and Subtraction

Number - Multiplication and Division

Number – Fraction (including decimals and Percentages)

Ratio and Proportion

Measurement

Geometry - properties of shapes

Geometry – position and direction

Statistics

Each of the above categories has been divided into sub categories to illustrate progression in key areas.

All programmes of study are included.

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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place Value: Counting	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	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number	count in multiples of 6, 7, 9, 25 and 1 000 count backwards through zero to include negative numbers	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 interpret negative numbers in context count forwards and backwards with positive and negative whole numbers, including through zero	use negative numbers in context and calculate intervals across zero
Place Value: Represent	identify and represent numbers using objects and pictorial representations read and write numbers to 100 in numerals read and write numbers from 1 to 20 in words and numerals	read and write numbers to at least 100 in numerals and in words identify, represent and estimate numbers using different representations, including the number line	identify, represent and estimate numbers using different representations read and write numbers up to 1000 in numerals and in words	identify, represent and estimate numbers using different representations 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	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	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit

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Place Value: Use PV and Compare	given a number, identify one more and one less	recognise the place value of each digit in a two-digit number (tens, ones) compare and order numbers from 0 up to 100; use greater than , less than & = signs	recognise the place value of each digit in a three-digit number (hundreds, tens, ones) compare and order numbers up to 1000	find 1000 more or less than a given number recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) order and compare numbers beyond 1000	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
Place Value: Problems & Rounding		use place value and number facts to solve problems	solve number problems and practical problems involving these ideas	round any number to the nearest 10, 100 or 1 000 solve number and practical problems that involve all of the above and with increasingly large positive numbers	round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000 solve number problems and practical problems that involve all of the above	round any whole number to a required degree of accuracy use negative numbers in context, and calculate intervals across zero solve number and practical problems that involve all of the above

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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition & Subtraction: Recall, Represent, Use	read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs represent and use number bonds and related subtraction facts within 20	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	estimate the answer to a calculation and use inverse operations to check answers	estimate and use inverse operations to check answers to a calculation	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	

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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition & Subtractions: Calculations	add and subtract one-digit and two-digit numbers to 20, including zero	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 adding three one-digit numbers	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	add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) add and subtract numbers mentally with increasingly large numbers	perform mental calculations, including with mixed operations and large numbers use their knowledge of the order of operations to carry out calculations involving the four operations

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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition & Subtraction: Solve Problems	solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ - 9	solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods	solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

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Multiplication & Division: Recall, Represent, Use		recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	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	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})	identify common factors, common multiples and prime numbers use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

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Multiplication & Division: Calculations		calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	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 (appears also in Mental Methods)	multiply two-digit and three-digit numbers by a one-digit number using formal written layout	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 multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 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 multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication perform mental calculations, including with mixed operations and large numbers 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, as appropriate for the context

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Multiplication & Division: Solve Problems	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	solve one-step problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	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	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	solve problems involving multiplication and division including using including using their knowledge of factors and multiples, squares and cubes Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	solve problems involving addition, subtraction, multiplication and division
Multiplication & Division: Combined Operations					solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	use their knowledge of the order of operations to carry out calculations involving the four operations

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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions: Recognise & Write	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	recognise, find, name and write fractions $^{1}/_{3}$, $^{1}/_{4}$, $^{2}/_{4}$ and $^{3}/_{4}$ of a length, shape, set of objects or quantity	count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in 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	count up and down in hundredths; recognise that that hundreds arise when dividing an object by one hundred and dividing tenths by ten	identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. $^{2}/_{5} + ^{4}/_{5} = ^{6}/_{5} = 1^{1}/_{5}$)	
Fractions: Compare		recognise the equivalence of 2/4 and ½	recognise and show, using diagrams, equivalent compare and order unit fractions, and fractions with the same denominators	recognise and show, using diagrams, families of common equivalent fractions	compare and order fractions whose denominators are all multiples of the same number	use common factors to simplify fractions; use common multiples to express fraction in the same denomination Compare and order fractions; including fractions greater than 1

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Fractions: Calculations		write simple fractions for example, ½ of 6 = 3	add and subtract fractions with the same denominator within one whole (e.g. $^{5}/_{7} + {}^{1}/_{7} = {}^{6}/_{7}$) for example,	add and subtraction fractions with the same denominator	add and subtract fractions with the same denominator and multiples of the same number multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions divide proper fractions by whole numbers (e.g. $^{1}/_{3} \div 2 = {}^{1}/_{6}$) multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $^{1}/_{4} \times {}^{1}/_{2} = {}^{1}/_{8}$)
Fractions: Solve Problems			solve problems that involve all of the above	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		

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Decimals: Recognise & Write				recognize and write decimal equivalents of any number of tenths or hundredths recognize and write decimal equivalents to ¼, ½, ¾,	read and write decimal numbers as fractions (for example, 0.71 = 71/100) recognize and use thousandths and relate them to tenth, hundredths and decimal equivalents	identify the value of each digit in numbers given to three decimal places
Decimals: Compare				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	round decimals with two decimal places to the nearest whole number and to one decimal place read, write, order and compare numbers with up to three decimal places	

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Decimals: Calculations & Problems				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	solve problems involving numbers up to three decimal places	multiply and divide by 10, 100 and 1000 giving answers up to three decimal places multiply one-digit numbers with up to two decimal places by whole numbers use written division methods in cases where the answer has up to two decimal places solve problems which require answers to be rounded to specified degrees of accuracy

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Fractions, Decimals & Percentages				solve simple measure and money problems involving fractions and decimals to two decimal places	recognize the percent symbol (%) and understand that percent relates to number of parts per hundred, and write percentages as fraction with denominator 100 and as a decimal solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25	associate a fraction with division and calculate decimal fraction equivalents (for example, 0.375) for a simple fraction (for example, 3/8)

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Ratio & proportion						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

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Algebra	solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7=?-9	recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems	solve problems, including missing number problems			use simple formulae generate and describe linear number sequences express missing number problems algebraically find pairs of numbers that satisfy an equation with two unknowns enumerate possibilities of combinations of two variables

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Measurement: Using Measures	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] measure and begin to record the following: **lengths and heights mass/weight capacity and volume time** (hours, minutes, seconds**)**	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) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels compare and order lengths, mass, volume/capacity and record the results using greater than, less than and =	measure, compare, add and subtract: **lengths** (m/cm/mm); **mass** (kg/g); **volume/capacity** (l/ml)	Convert between different units measure (for example, kilometre to metre; hour to minute) estimate, compare and calculate different measures	convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) use all four operations to solve problems involving measure (e.g. **length, mass, volume, money**) using decimal notation including scaling	solve problems involving the calculation and conversion of **units of measure**, using decimal notation up to three decimal places where appropriate 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 convert between miles and kilometres

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Measurement: Money	recognise and know the value of different denominations of **coins and notes**	recognize and use symbols for pounds and pence; combine amounts to make a particular value find different combinations of coins that equal the same amounts of money solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change	add and subtract amounts of **money** to give change, using both £ and p in practical contexts	estimate, compare and calculate different measures, including money in pounds and pence	use all four operations to solve problems involving measure (for example, money)	

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Measurement: Perimeter, Area, Volume			Measure the perimeter of simple 2-D shapes	Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres Find the area of rectilinear shapes by counting squares	Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres and square metres and estimate the area of irregular shapes Estimate volume (for example, using 1cm cubed blocks to build cuboids (including cubes) and capacity 9for example, using water)	Recognize that shapes with the same areas can have different perimeters and vice versa Recognize when it is possible to use formulae for area and volume of shapes Calculate the area of parallelograms and triangles Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres and cubic metres and extending to other units (for example, mm cubed and km cubed)
			calculate the time taken by particular events or tasks)			

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Geometry: 2-D Shapes	recognise and name common 2-D and 3-D shapes, including: 2-D shapes [e.g. rectangles (including squares), circles and triangles]	identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] compare and sort common 2-D and 3-D shapes and everyday objects	draw 2-D shapes	compare and classify geometric shapes, including quadrilaterals and triangles based on their properties and sizes identify lines of symmetry in 2-D shapes presented in different orientations	distinguish between regular and irregular polygons based on reasoning about equal sides and angles	draw 2-D shapes given dimensions and angles compare and classify geometric shapes based on their properties and sizes illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
Geometry: 3-D Shapes	recognise and name common 3-D shapes (for example cuboids including cubes, pyramids and spheres	recognise and name common 3-D shapes (for example cuboids including cubes, pyramids and spheres compare and sort common 3-D shapes and everyday objects	make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them		identify 3-D shapes, including cubes and other cuboids, from 2-D representations	recognise, describe and build simple 3-D shapes, including making nets

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Geometry: Angles & Lines			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	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	know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles draw given angles and measure them in degrees identify: identify: angles at a point and one whole turn (total 360°) angles at a point on a straight line and ½ a turn (total 180°) other multiples of 90°	find unknown angles in any triangles, quadrilaterals, and regular polygons recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles

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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Geometry: Position & Direction	describe position, direction and movement, including whole, half, quarter and three-quarter turns	order and arrange combinations of mathematical objects in patterns and sequences 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 anticlockwise)		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 plot specified points and draw sides to complete a given polygon	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	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

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Statistics: Present & Interpret		interpret and construct simple pictograms, tally charts, block diagrams and simple tables	interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	complete, read and interpret information in tables, including timetables	interpret and construct pie charts and line graphs and use these to solve problems
Statistics: Solve Problems		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 totaling and comparing categorical data	solve one-step and two-step questions (for examples, 'How many fewer?' and 'How many more?' using information presented in scaled bar charts and pictograms and tables	solve comparison sum and difference problems using information presented in a bar charts, pictograms, tables and other graphs	solve comparison, sum and difference problems using information presented in a line graph	calculate and interpret the mean as an average