Maths Progression

By the end of Year 6 children will:

− have a positive attitude towards mathematics
− demonstrate resilience and a growth mindset by applying a range of strategies when becoming stuck
− be able to reason, problem solve and recall key facts to work fluently within mathematics
− be competent in showing their understanding in a variety of ways: conceptual, abstract, or concrete
− use 'number sense' to work flexibly when approaching a problem
− use metacognition to reflect on and improve their efficiency and accuracy
− be confident and competent within:
    • number: number, place value, the four operations, fractions (including decimals and percentages)
    • ratio and proportion
    • algebra
    • measurement
    • geometry – properties of shapes, position, and direction
    • statistics

EYFS links:

Mathematics

In Reception

- Count objects, actions and sounds
- Subitise
- Link the number symbol (numeral) with its cardinal number value
- Count beyond ten
- Compare numbers
- Understand the 'one more than/one less than' relationship between consecutive numbers
- Explore the composition of numbers to 10
- Automatically recall number bonds for numbers 0–10
- Select, rotate and manipulate shapes in order to develop spatial reasoning skills
- Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can
- Continue, copy and create repeating patterns
- Compare length, weight and capacity

Number ELG

- Have a deep understanding of number to 10, including the composition of each number
- Subitise (recognise quantities without counting) up to 5 Automatically recall (without reference to rhymes, counting or other aids) number
- bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts

Numerical Patterns ELG

- Verbally count beyond 20, recognising the pattern of the counting system
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place value	Count to and across 20 forwards and backwards beginning with 0 or 1 from any given number Count, read and write numbers to 20 in numerals Read and write numbers to 20 in numerals and words Given a number identify 1 more and 1 less Use objects to represent numbers up to 20 Use and estimate on a number line to 20 Use language of equal to, more than, less (fewer), most, least Count to and across 50 forwards and backwards beginning with 0 or 1 from any given number Count, read and write numbers to 50 in numerals Given a number identify 1 more and 1 less Use objects to represent numbers up to 50 Estimate on a number line to 50 Use language of equal to, more than, less (fewer), most, least Count to and across 100 forwards and backwards beginning with 0 or 1 from any given number Count, read and write numbers to 100 in numerals Given a number identify 1 more and 1 less Use objects to represent numbers up to 20 Use language of equal to, more than, less (fewer), most, least	Recognise the place value of each digit in a two-digit number (tens and ones) Identify and represent and estimate numbers using different representations including the number line Compare and order numbers from 0 to 100 using greater than and less than signs Read and write numbers to at least 100 in numerals and words Use place value and number facts to solve problems	Recognise the place value of each digit in a three-digit number (hundreds, tens and ones) Find 10 or 100 more of less than a given number Read and write numbers up to 1000 in numerals and words Compare and order numbers up to 1000 Identify, represent and estimate numbers using different representations Solve number problems and practical problems (apply partitioning)	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 Find 1000 more or less than a given number Count backwards through zero to include negative numbers 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, write, order and compare numbers to at least 1 000 000 and determine the value of each digit 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 Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 Solve number problems and practical problems that involve all of the above	Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit 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.
Addition & Subtraction	Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs	Solve problems using concrete objects and pictorial representations including those involving numbers, quantities and measures	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 4 digits using the **formal written methods** of columnar addition and subtraction Where appropriate, estimate and use inverse operations		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

	Represent and use number bonds and related subtraction facts within 20 Add and subtract one-digit and two-digit numbers to 20 including 0 Solve one step problems that involve addition and subtraction using concrete objects and pictorial representations Solve missing number problems	Solve problems applying knowledge of mental and written methods Recall and use addition and subtraction facts to 20 fluently and derive and use related facts up to 100 Add and subtract numbers using concrete objects, pictorial representations and mentally including a two-digit number and ones, a two-digit number and tens, 2 two-digit numbers and adding 3 one-digit numbers Show that addition 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	Use formal written methods of column addition and subtraction with up to three-digits Estimate the answer to a calculation and use inverse operation to check Solve problems including missing number problems and more complex addition and subtraction	to check answers to a calculation Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.		using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context Perform mental calculations, including with mixed operations and large numbers Identify common factors, common multiples and prime numbers Use their knowledge of the order of operations to carry out calculations involving the four operations 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 Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. Multiply and divide by 10, 100 and 1000
Multiplication & Division	Count in multiples of 2, 5 and 10 Solve one step problems involve multiplication and division calculating the answer using concrete objects, pictorial representations and arrays Use grouping, sharing and doubling	Count in steps of 2, 3 and 5 from 0 and in 10s from any number forward and backward Recall and use multiplication and division facts for the 2, 5 and 10 tables including recognising odd and even numbers Calculate using the 2, 5 and 10s tables and write them using multiplication, division and equals signs (eg. 2 x 5 = 10) Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts including problems in contexts	Count from 0 in multiples of 50 and 100 Write and use known times table facts to solve multiplication and division problems (including two-digit x one-digit) using mental and then formal written methods Solve problems including missing number problems involving multiplication and division (including scaling and correspondence problems)	Count in multiples of 25 and 1000 Use place value, known and derived facts to multiply and divide mentally including 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 (such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.)	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 (nonprime) numbers Establish whether a number up to 100 is prime and recall prime numbers up to 19 Compare and order fractions whose denominators are all multiples of the same number 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 numbers mentally drawing upon known facts 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	
Geometry (shape)	Recognise, handle and name common shapes in different rotations: 2-D rectangles (including squares), circles and triangles 3-D - cuboids (including cubes) pyramids and spheres.	Identify and describe the properties of 2D shape including the numbers of sides and line of symmetry in a vertical line Identify and describe the properties of 3D shapes including the number of edges, vertices and faces Compare and sort common 2D and 3D shapes and everyday objects	Draw 2D shapes and make 3D shapes using modelling materials Recognise 3D shapes in different orientations and describe them 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 a three-quarter turn and four make a full 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	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.	Identify 3-D shapes, including cubes and other cuboids, from 2-D representations Know angles are measured in degrees: Estimate and compare acute, obtuse and reflex angles Draw given angles, and measure them in degrees (°) Identify: angles at a point and one whole turn (total 360°) Identify angles at a point on a straight line and ½ a turn (total 180°) Identify other multiples of 90° Use the properties of rectangles to deduce related facts and find missing lengths and angles Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.	Recognise that shapes with the same areas can have different perimeters and vice versa Recognise 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 (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3]. Draw 2-D shapes using given dimensions and angles Recognise, describe and build simple 3-D shapes, including making nets Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. 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.
Geometry (position) (direction)	Describe position, direction and movement, including whole, half, quarter and three quarter turns. Include: Left, right, top, middle, bottom, on top of, in front of, above, between, around, near, close, far, up, down, forwards, backwards, inside and outside. Connect turns to clockwise movement.	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 anti-clockwise)		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.	
Fractions	Recognise, find and name a halve as one of two equal parts as a object, shape or quantity Recognise, find and name a quarter as one of four equal	Recognise, find, name and write fractions one-third, one-quarter, two-quarters and three-quarters of a length, shape, set of objects or quantity	Count up and down in tenths Recognise that tenths derive from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10	Add and subtract fractions with the same denominator SImplify fractions where appropriate. Recognise and show, using diagrams, families of	Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	Use common factors to simplify fractions; Use common multiples to express fractions in the same denomination

	parts as a object, shape or quantity	Write simple fractions (e.g. half of 6 = 3) and recognise the equivalence of two-quarters and one-half Link division facts to fractions (eg. 40 2 = 20 / 20 is half of 40) Count in fractions up to 10 on a number line using half and two-quarter equivalence	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 (eg. 5/7 + 1/7 = 6/7) Compare and order unit fractions and fractions with the same denominators Solve problems with all of the above	common equivalent fractions Count up and down in hundredths; recognise that hundredths arise when dividing an 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 Solve simple measure and money problems involving fractions.	Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, ⅖ + ⅘ =6/5 = 1 ⅕] Add and subtract fractions with the same denominator and denominators that are multiples of the same number Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	Compare and order fractions, including fractions > 1 Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, ¼ × ½ = ⅛] Divide proper fractions by whole numbers [for example, 3 1 ÷ 2 = 6 1]
Money	Recognise and know the value of different denominations of coins and notes	Recognise and use symbols for pounds and pence Combine amounts to make particular value Find different combinations of coins that equal the same amount 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 pounds and pence in practical contexts Solve problems involving money (and giving change) in a range of real-life contexts	Convert between different units of measure [for example, 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. Estimate, compare and calculate different measures, including money in pounds and pence		
Time	Compare, describe and solve practical problems for time (quicker, slower, earlier, later) Measure and begin to record time (hours, minutes, seconds) Tell the time to the hour and half-past the hour and draw the times on a clockface to show these times	Compare and sequence intervals of time Tell and write the time to 5 minutes including quarter-past/to the hour and draw the hands on a clock to show these times Know the number of minutes in an hour and the number of hours in a day	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, 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			

Length & Height & Perimeter & Area	Compare, describe and solve practical problems for lengths and heights (long, short, longer, shorter, tall, short, double/half) Measure and begin to record lengths and heights	Choose and use appropriate standard units to estimate and measure length and height in any direction (cms, m) to the nearest appropriate unit using rulers Compare and order lengths and record the results using greater than, less than and equals	Measure, compare, add and subtract lengths (m, cm, mm) Measure the perimeter of simple 2D shapes Solve simple problems involving length/height including converting between units	Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres Find the area of rectilinear shapes by counting squares Relate area to arrays and multiplication (to develop the understanding of using l x w) Convert between different units of measure [for example, kilometre to metre estimate, compare and calculate different measures	Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints Solve problems involving converting between units of measure including time Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres Calculate and compare the area of rectangles (including squares), using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes (including polygons and compound shapes) Estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]	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
Mass & Volume & Capacity & Temperature	Compare, describe and solve practical problems for mass/weight (heavy, light, heavier than, lighter than); capacity and volume (full, empty, more than, less than, half, half full, quarter) Measure and begin to record mass/weight, capacity and volume	Choose and use appropriate standard units to estimate and measure mass (kg and g), temperature (°C) and capacity (L and ml) to the nearest appropriate unit using scales, thermometers and measuring vessels Compare and order mass, volume/capacity and record the results using greater than, less than and equals	Measure, compare, add and subtract mass (kg, g) and volume/capacity (L and ml) Solve simple problems involving mass and volume/capacity			
Statistics		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	Interpret and present data using bar charts, pictograms and tables Solve one-step and two-step questions using information presented in scaled bar charts, pictograms and tables	Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs	Solve comparison, sum and difference problems using information presented in a line graph Complete, read and interpret information in tables, including timetables.	Interpret and construct pie charts and line graphs and use these to solve problems Calculate and interpret the mean as an average.
Decimals Percentages				Recognise and write decimal equivalents of any number of tenths or hundredths Recognise and write decimal equivalents to ¼ , ½ , ¾ Multiply and divide whole numbers and those involving	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 Read and write decimal numbers as fractions [for example, 0.7 = 71/100] Recognise and use	Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places

				decimals by 10, 100 and 1000 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 decimals to two decimal places.	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, and as a decimal Solve problems which require knowing percentage and decimal equivalents of ½, ¼, ⅕, ⅖, 4/5 and those fractions with a denominator of a multiple of 10 or 25. Read, write, order and compare numbers with up to three decimal places Add and subtract decimals from 1, with different numbers of decimal places and across 1 Round decimals with two decimal places to the nearest whole number and to one decimal place Solve problems involving number up to three decimal places Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	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 Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, ⅜] Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
Ratio						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 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.
Algebra						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.