Year 6 Maths

highlighted objectives → DfE Ready-to-Progress Criteria

Place Value

Key Vocabulary

ten thousands (10,000s)
hundred thousands (100,000s)
millions (1,000,000s)
ten million (10,000,000)
place value
estimate
rounding
partition
compare
negative
interval
order
positive

End of Year Objective	'I know' statements	'I can' statements	Suggested manipulatives
To read and write numbers up to 10,000,000, determining the value of each digit	• I know the value of each digit in a given number • I know to use a comma to separate the millions, thousands and hundreds in larger numbers • I know that zero is sometimes used as a placeholder	• I can represent numbers to 10,000,000 in different ways • I can write numbers to 10,000,000 using both numerals and words • I can partition numbers to 10,000,000 using standard partitioning (based on place value) • I can partition numbers to 10,000,000 using non-standard partitioning	Place value grids/place value counters Bar models
To compare and order numbers up to 10,000,000	• I know that ascending means going from smallest to greatest • I know that descending means going from greatest to smallest • I know what the symbols <, > and = mean	• I can compare two numbers by looking at the place value columns from left to right • I can order three or more three-digit numbers • I can suggest a missing number that fulfils < or > statements (e.g. 304,530 < _____?)	Place value grids/place value counters Digit cards
To round any whole number accurately to the nearest multiple of different powers of 10	• I know that rounding means saying which multiple of a given power of 10 a number is closest to • I know that rounding is useful for estimating and simplifying calculations • I know that when the digit to the right is 4 or less, we round down • I know that when the digit to the right is 5 or higher, we round up	• I can identify the multiple of 10, 100, 1000, 10,000, 100,000 or 1,000,000 before and after a given number • I can round any number in different ways • I can suggest possible numbers that would round to a given number (e.g. numbers that would round to 20,000 when rounding to the nearest 1000)	Blank number lines
To use negative numbers in context	• I know that numbers less than zero can be described as 'negative' • I know that positive numbers are greater than negative numbers • I know that, for example, -3 is greater than -10	• I can count forwards and backwards through zero, including in different multiples • I can order and compare sets of numbers which include negative integers • I can find the difference between two integers, where one or both of the numbers are negative • I can use negative numbers in context (e.g. temperature, elevators, bank balances)	Vertical number lines (including negative numbers)

To calculate intervals on a numberline, including across zero, in order to find/estimate the position of numbers	• I know that the gaps on a number line are called intervals • I know that not all number lines use the same intervals • I know that estimating means having a sensible guess, and that my estimate may not be exactly the same as someone else's.	• I can work out what intervals a number line is counting up in • I can identify values on a numberline and mark given values, including negative values • I can identify the midpoint between two intervals • I can estimate the position of numbers on a number line	Blank number lines (vertical or horizontal) and number lines with various intervals
To solve problems involving number and place value, including those with more than one step	• I know what it means to work systematically, and why this is important • I know that some problems may have more than one possible answer	• I can apply my knowledge of place values to solve problems • I can solve problems with more than one step	Various, depending on problem and skills/knowledge required

Four Operations (Addition, subtraction, multiplication and division)

Key Vocabulary

column addition | remainder | brackets | factor | short division | long division | prime | composite | common factor | common multiple | column multiplication | long multiplication | squared (x^2) | cubed (x^3) | order of operations | inverse operation

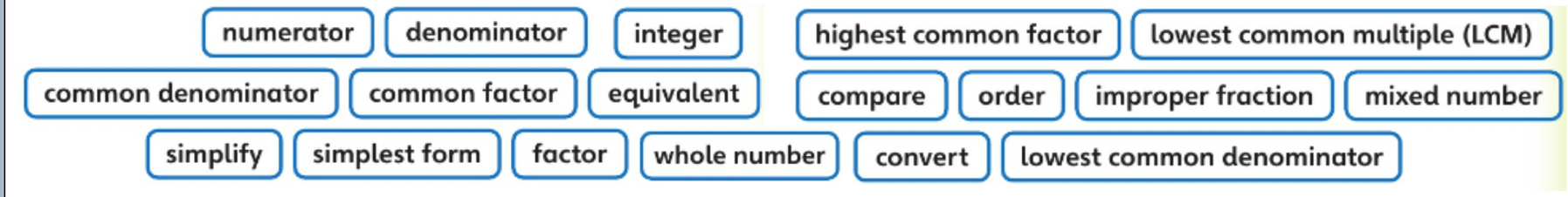
End of Year Objective	'I know' statements	'I can' statements	Suggested manipulatives
To multiply numbers up to 4-digits by 2-digit numbers using formal written methods	• I know that the digits must be lined up correctly when using column methods • I know to multiply the larger number by the ones first, then by the tens	• I can set out calculations correctly when using column method • I can multiply by 2-digit numbers • I can use zero as a placeholder	Place value counters
To divide numbers up to 4-digits by a 1-digit number using formal written methods (short division)	• I know that short division, also known as the bus stop method, can be used to divide larger numbers	• I can set out calculations correctly when using short division • I can exchange when appropriate	Place value counters
To divide numbers up to 4-digits by a 2-digit number using formal written methods (long division)	• I know that long division works from left to right • I know that long division involves repeated subtraction of known multiples to divide a larger amount	• I can set out calculations correctly when using long division • I can exchange when appropriate • I can write a list of multiples first to support my division • I can calculate using long division, including with remainders	Place value counters

To multiply and divide numbers by 10, 100 and 1000, giving answers with up to three decimal places	• I know that multiplying by 10 makes a number ’10 times the size’, while dividing by 10 makes a number ’10 times smaller’ • I know that multiplying a number by 100 makes a number ‘100 times the size’, while dividing by 100 makes a number ‘100 times smaller’ • I know that multiplying by 100 is the same as multiplying by 10 and 10 again • I know that multiplying and dividing by 10 is not as simple as adding or removing zeros • I know that zero can be used as a placeholder	• I can multiply and divide by 10, including decimals • I can multiply and divide by 100, including decimals • I can multiply and divide by 1000, including decimals • I can explain mistakes when multiplying and dividing by 10, 100 and 1000	Place value grids
To complete division calculations where the answers have remainders, interpreting these remainders in various ways (e.g. fractions, rounding, decimals)	• I know that remainders are the amount left over after a division • I know that the remainder cannot be greater than or equal to the number I am dividing by • I know that remainders can be shown as either fractions or decimals	• I can calculate divisions, including those with remainders • I can interpret problems correctly, knowing when to give the whole answer, just the remainder, or round up or down • I can write remainders as a fraction or as a decimal	Place value counters
To carry out calculations involving all four operations in the correct order	• I know that, in calculations with more than one operation, certain operations have priority and should be done first • I know that calculations in brackets should always be done first • I know that multiplication and division have equal priority, and should be completed before additions and subtractions	• I can use the acronym ‘BIDMAS’ to help remember the order of operations • I can complete calculations with more than one operation	
To use checking strategies such as rounding, using the inverse and adjusting to determine levels of accuracy	• I know that estimating helps to get a quick idea of what the answer to a calculation is near to • I know whether the actual answer would be greater or less than my estimate • I know that addition and subtraction can be described as ‘inverse operations’, as can multiplication and division • I know that fact families contain related addition and subtraction facts (e.g. 2+3=5, 3+2=5, 5-3=2, 5-2=3)	• I can round numbers to the nearest 10, 100 or 1000 • I can use estimation to decide if an answer is likely to be correct • I can use inverse calculations to ensure my calculations are accurate • I can use inverse calculations to solve missing number problems	Bar models (for inverse)
To find and identify common factors and multiples of two or more given numbers	• I know that a multiple is a number that can be divided by a given number without any remainders • I know that, more simply, a multiple is any number that is in the times-table of a given number • I know that a number is a factor of another number if it divides the number without a remainder (e.g. 5 is a factor of 35) • I know that a common multiple is a multiple that is shared by two or more numbers • I know that a common factor is a factor that is shared by two or more numbers	• I can use arrays to demonstrate and derive multiples of a given number • I can work systematically to find all the factors or multiples of a given number • I can identify common multiples of two or more numbers • I can identify common factors of two or more numbers	Counters/cubes (for arrays) Cuisenaire rods Numicon

To identify, calculate and use prime, square and cube numbers	• I know that a prime number has exactly two factors, one and itself • I know that numbers with more than two factors are known as composite numbers • I know that one is a special case, and is neither a prime nor a composite number, as it has one factor • I know that square numbers are the result of multiplying a number by itself • I know that cube numbers are the result of multiplying a number by itself and then by itself again	• I can recall prime numbers up to 19 • I can determine if a given number is prime, using my knowledge of multiplication • I can recognise or calculate square and cube numbers up to 12^2 and 12^3 • I can complete calculations which include square or cube numbers • I can reason about problems involving squares, cubes, primes and composites	Counters/cubes
To solve problems involving the four operations, including those with more than one step	• I know that some problems include more than one step • I know the importance of working systematically	• I can represent worded problems as bar models • I can identify the appropriate calculation for solving a problem • I can work systematically to find all possible answers	

Fractions

Key Vocabulary



End of Year Objective	‘I know’ statements	‘I can’ statements	Suggested manipulatives
To use common factors to simplify fractions, and use common multiples to express fractions in the same denomination	• I know that common factors are numbers that are divide into two given numbers without a remainder • I know that common multiples are numbers that are in the times-tables of two given numbers • I know that we can simplify fractions by finding equivalent fractions with the smallest numerator and denominator possible	• I can use common factors and multiples to find equivalent fractions • I can put fractions into their simplest form • I can explain how I know a fraction cannot be simplified further	
To compare and order fractions, including those greater than one	• I know that, when numerators are the same, the greater the denominator the smaller the fraction • I know that, if the denominator is the same, the greater the numerator the greater the fraction • I know that, if the denominators are multiples of each other, we can find equivalent fractions first	• I can compare fractions using inequality symbols (<, > and =) • I can compare fractions with denominators that are multiples using inequality symbols (<, > and =) • I can order three or more fractions	Bar models

To add and subtract fractions with different denominators (using knowledge of equivalent fractions)	• I know that, when the denominators are the same, only the numerator changes • I know that, if the denominators are not the same, we need to find equivalent fractions before we calculate	• I can add and subtract fractions with the same denominator • I can add and subtract fractions with different denominators • I can add three or more fractions • I can, where appropriate, answer as mixed numbers • I can, where appropriate, simplify my answers	Folded paper strips/bar models
To add and subtract mixed numbers with different denominators (using knowledge of equivalent fractions)	• I know that wholes and fractions can be combined to form mixed numbers • I know that, if the denominators are not the same, we need to find equivalent fractions before we calculate	• I can add and subtract mixed numbers by looking first at the wholes, then at the fractions • I can add and subtract mixed numbers by first converting to improper fractions • I can break the whole in order to support subtraction • I can consider when each method is most efficient	Bar models
To multiply any fraction by a whole number or by another fraction	• I know that multiplication can be seen as repeated addition • I know that, when multiplying a fraction by an integer, the numerator changes but the denominator does not • I know that, when multiplying fractions, we multiply the numerators together and the denominators together	• I can multiply fractions by an integer • I can multiply two fractions • I can write my answer as a mixed number where appropriate • I can simplify my answer where appropriate • I can use fractions as operators	
To divide a proper fraction by a whole number	• I know that, when the numerator is a multiple of the integer, the numerator changes but the denominator stays the same • I know that, when the numerator is not a multiple of the integer, we can divide fractions by multiplying the denominator by the integer	• I can divide fractions where the numerator is a multiple of the integer • I can divide any fraction by any integer	Cuisenaire rods Bar models
To solve problems involving adding, subtracting, multiplying or dividing fractions, including those with more than one step	• I know that some problems include more than one step • I know the importance of working systematically	• I can represent worded problems as bar models • I can identify the appropriate calculation for solving a problem • I can work systematically to find all possible answers	

Decimals and Percentages	Key Vocabulary
	multiply, divide, decimal, decimal place (dp), simplify, per cent (%), percentage, parts, whole recurring decimal, placeholder, place value, decimal, fraction, divide, share, multiply tenths, hundredths, thousandths, products, convert, compare, order, equivalent fraction

End of Year Objective	'I know' statements	'I can' statements	Suggested manipulatives
To read and write numbers up to three decimal places, determining the value of each digit	• I know that 0.1 = one tenth • I know that 0.01 = one hundredth • I know that 0.001 = one thousandth • I know that there are ten thousandths in one hundredth, and ten hundredths in one tenth	• I can represent decimal numbers • I can state the value of each digit in a number with decimals • I can partition numbers using standard and non-standard partitioning	Place value grids/place value counters Part whole models
To multiply one-digit numbers with up to two decimal places by a whole number.	• I know that we can use column multiplication to multiply more complex numbers • I know times tables up to 12x12	• I can use related multiplication facts to multiply decimals by whole numbers (e.g. 5x5=25 so 0.5 x5=2.5) • I can use column methods to multiply decimal numbers by integers	Place value counters
To recall and use equivalences between simple fractions, decimals and percentages	• I know that ¼ = 0.25 = 25% • I know that ½ = 0.5 = 50% • I know that ¾ = 0.75 = 75% • I know that $^1/_5$ = 0.2 = 20%	• I can recall conversions for common fractions • I can use known facts to convert other fractions (e.g. if 1/5 = 20%, what is 3/5?)	Numicon boards/pegs/numicon
To associate fractions with division to calculate decimal-fraction equivalents	• I know that fractions can be interpreted as divisions (e.g. ¾ is equivalent to 3 ÷ 4) • I know that we can use short division to divide more complex numbers	• I can write fractions as divisions, and vice versa • I can use short division to divide the numerator by the denominator and find decimal equivalents	Place value counters
To find percentages of given amounts, or find the whole amount when given a percentage of it	• I know that 'per cent' means 'out of 100' • I know that percentages represent part of a whole amount	• I can calculate simple percentages of amount (1%, 10%, 20%, 25%, 50%) • I can combine simple percentages of an amount to calculate more complex percentages • I can find the whole when I know the percentage of an amount	

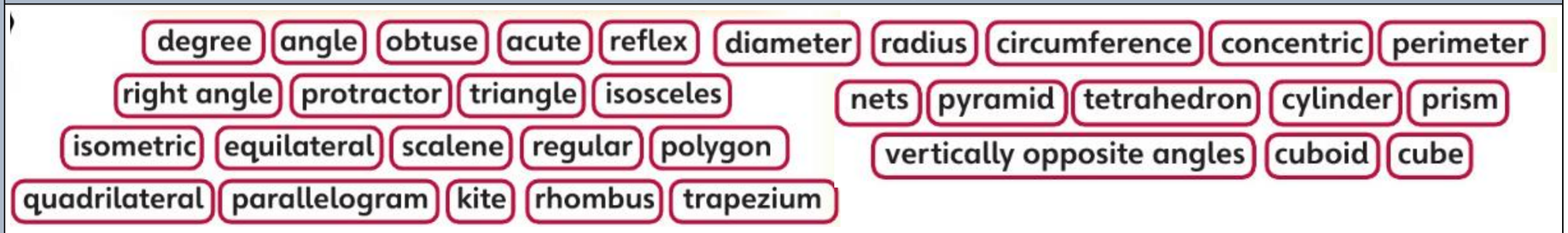
Measurement	Key Vocabulary
	metric, imperial, units of measurement (or measure), grams (g), kilograms (kg), pounds (lbs), ounces (oz), feet (ft), yards, millilitres (ml), litres (l), pints, capacity, millimetres (mm), centimetres (cm), metres (m), kilometres (km), inches (in), mass, miles, length, convert, conversion table, conversion graph, area, volume, perimeter, parallelogram, height, perpendicular, width, length, square centimetres (cm^2), square metres (m^2), base, estimate, formula, compound shape, dimensions, cubic centimetres (cm^3), cubic metres (m^3)

End of Year Objective	'I know' statements	'I can' statements	Suggested manipulatives
To select the most appropriate metric unit of measurement to measure a given item	• I know which units are used to measure length, mass and capacity • I know that tonnes can be used to measure mass	• I can suggest why a unit of measurement is or isn't appropriate for a given context • I can give an estimate for the length/weight/capacity of everyday objects	Examples of different measuring devices (rulers, containers etc)
To convert between different metric measurements, using decimal notation where appropriate	• I know that kilo means 'one thousand' • I know that milli means 'one thousandth'	• I can multiply or divide by 10, 100 and 1000, and use this skill to convert between metric measures • I can compare different measurements by first converting them to the same unit	Place value grids (to support multiply and dividing by 10, 100, 1000)
To convert between metric and imperial units of measurement, using decimal notation where appropriate	• I know that some conversions between metric and imperial units are only approximate, and we use the ≈ symbol to show this • I know that one mile is greater than one kilometre (5 miles is approximately 8km) • I know the following conversion facts: 1 inch ≈ 2.5cm 1 foot = 12 inches 1 pound = 16 ounces 1 stone = 14 pounds 1 gallon = 8 pints	• I can use known facts to convert between metric and imperial measures	Bar models
To understand that shapes with the same area can have different perimeters and vice versa	• I know that perimeter is the total distance around the outside of a closed 2D shape • I know that area is the amount of space taken up by a 2D shape, and is measured in cm^2/m2	• I can draw different shapes with a specified perimeter or area • I can apply my knowledge of factor pairs to determine if rectangles will have the same area	Geoboards Centicubes

To recall and use formulae to calculate the area and perimeter of a shape	• I know that perimeter is the total distance around the outside of a closed 2D shape • I know that area is the amount of space taken up by a 2D shape, and is measured in cm^2/m2 • I know that the area of a rectangle can be found by calculating length x width	• I can calculate the area of squares and rectangles using the formula l x w • I can find the area a rectilinear shape by first splitting it into rectangles	
To calculate the area of parallelograms and triangles	• I know that area is the amount of space taken up by a 2D shape, and is measured in cm^2/m2 • I know that the area of a triangle can be found by calculating (base x height) ÷ 2 • I know that the area of a parallelogram can be found by calculating base x height	• I can calculate the area of triangles using the formula (base x height) ÷ 2 • I can calculi the area of parallelograms using the formula base x height	Paper shapes (fold/cut to make rectangles or squares)
To calculate, estimate and compare the volume of cubes and cuboids	• I know that volume is the amount of space taken up by a 3D shape, and is measured in cm^3 • I know that the volume of a cuboid can be found by calculating length x width x height	• I can calculate the volume of cuboids and prisms by multiplying the volume a single layer by the number of layers • I can calculate the volume of cuboids by using the formula l x w x h	Centicubes

Geometry: Shapes and angles

Key Vocabulary



End of Year Objective	'I know' statements	'I can' statements	Suggested manipulatives
To calculate unknown angles in shapes, on a line and around a point using known angle facts	• I know that angles around a point (a full turn) add up to 360° • I know that angles in a quadrilateral add up to 360° • I know that angles on a straight line (a half turn) add up to 180° • I know that angles in a triangle add up to 180° • I know that vertically opposite angles are equal	• I can calculate missing angles, using the inverse or finding the difference • I can use the properties of triangles to support calculating missing angles (e.g. isosceles triangles must have two equal angles) • I can investigate splitting polygons into triangles to calculate the total of the interior angles • I can calculate unknown angles in any polygon	Angle makers Paper shapes (cut angles and re-arrange around appoint or on a line)
To accurately draw 2D shapes using given dimensions and angles	• I know that a protractor can be used to measure and draw angles accurately • I know what the terms 'base', 'height', 'length' and 'width' mean	• I can line up and use a protractor correctly • I can line up and use a ruler correctly, measuring to the nearest mm • I can produce accurate drawings of shapes with known angles/sides	Protractors Rulers
To compare and classify geometric shapes based on their properties	• I know the names of different 2D shapes • I know that four-sided shapes are quadrilaterals, and have different names depending on their properties (e.g. square, rhombus, trapezium)	• I can identify and describe the properties of a given shape (sides, angles, lines of symmetry, parallel or perpendicular lines) • I can classify triangles and quadrilaterals based on their properties	2D shapes

	• I know that three-sided shapes are triangles, and can be classified depending on their properties (scalene, equilateral or isosceles)	• I can compare and sort shapes based on their properties • I can say if a shape is regular or irregular	
To recognise, describe and build 3D shapes (including the use of nets)	• I know the names of different 3D shapes • I know what the faces, edges and vertices refer to in 3D shapes • I know that nets can be used to create a 3D shape	• I can describe 3D shapes based on their properties (faces, edges, vertices) • I can identify the 2D shapes that make up the faces of a 3D shape • I can make and use nets to build 3D shapes • I can work out what shape will be made from a given net • I can complete a net by adding missing faces in the correct position	3D shapes 3D shape nets
To name and label parts of a circle (radius, diameter and circumference)	• I know that the centre of a circle is equally distant from every part of the edge of the circle • I know that the radius is the distance from the centre to the edge of a circle • I know that the diameter is the distance across a circle • I know that circumference is the distance around a circle (its perimeter)	• I can label the parts of a circle	
To calculate the radius of a circle from the diameter and vice versa	• I know that the radius is the distance from the centre to the edge of a circle • I know that the diameter is the distance across a circle • I know that the radius must be half of the diameter	• I can calculate the diameter when I know the radius of a circle • I can calculate the radius when I know the diameter of a circle	

Geometry: Position and Direction	**Key Vocabulary**
	quadrant, four quadrants, translate, vertices, reflect, reflection, translation, x-axis, y-axis, axis, positive, negative, vertex, axes, horizontal, vertical

End of Year Objective	‘I know’ statements	‘I can’ statements	Suggested manipulatives
To plot points and describe their position on the full co-ordinate grid (all four quadrants)	• I know that the horizonal axis is known as the x-axis and the vertical axis is known as the y-axis • I know that where the x and y axes meet (0,0) is known as the origin • I know that co-ordinates state the x-axis value and then the y-axis value, and why this is important	• I can use co-ordinates to describe where a point or shape is on a grid with four quadrants • I can plot points and shapes on a four-quadrant grid to match given co-ordinates • I can determine which quadrant a point will be in, without using a grid for support • I can use properties of shapes and my knowledge of co-ordinates to work out co-ordinates of other	Counters (to act as points on the grid which can be physically moved)

	• I know that the axes can be extended through zero to include negative numbers, and this splits the grid into four quadrants	vertices in a shape, including when there are no gridlines	
To draw and translate simple shapes on a co-ordinate grid	• I know that, in geometry, 'translate' means 'move'. • I know that points can be translated left, right, up, down, or a combination of these • I know that a translated shape should look identical to the original, but be in a different position • I know that when a point/vertex is translated left or right, the y-coordinate remains the same, and when it is translated up or down, the x-coordinate remains the same	• I can translate single points or full shapes on a four-quadrant grid by following given instructions • I can describe a translation that has taken place • I can use my knowledge of coordinates to work out the new coordinates of translated points, including when there are no gridlines and on grids with four quadrants	Tracing paper
To reflect shapes in given lines of symmetry and in the axes	• I know that reflected shapes look identical to the original image but face the opposite direction • I know to count how far each vertex is from the mirror line to work out the co-ordinates of the reflected shape	• I can reflect a given point or shape in the x or y axes • I can reflect a given point or shape in a horizontal or vertical line of symmetry, including when there are no gridlines	Mirrors

Statistics

Key Vocabulary

mean, average, bar chart, percentage, pie chart, segments, line graph, fraction, data

End of Year Objective	'I know' statements	'I can' statements	Suggested manipulatives
To interpret and present information in a line graph	• I know that line graphs can be used to represent continuous data • I know that the horizontal axis is known as the x-axis, and the vertical axis is known as the y-axis • I know that 'time' or 'duration' is often shown on the x-axis	• I can draw line graphs, labelling the axes and scales accurately • I can choose an appropriate scale based on the numbers given • I can interpret line graphs with more than one set of data (two lines) • I can infer about a situation based on a given line graph	
To interpret and construct pie charts	• I know that pie charts show information as proportion/part of a total • I know that we divide 360° (a whole turn) by the number of data entries to calculate the size of each section in a pie chart	• I can identify the greatest/least amounts on a pie chart • I can calculate the total number represented by a pie chart • I can calculate the value of different sections in a pie chart • I can construct pie charts using my knowledge of fractions	

To calculate and interpret the mean of a set of data	• I know that 'finding the mean' is one way of finding the average of a set of values • I know that the mean is the size of each part when the whole is shared equally • I know that the mean is calculated by dividing the total by the number of values	• I can calculate the mean of a set of data • I can find missing values in a set of data when I know the mean	Cubes
Ratio and Proportion	**Key Vocabulary** ratio, proportion, part, whole, scale, scale factor, similar, notation		
End of Year Objective	**'I know' statements**	**'I can' statements**	**Suggested manipulatives**
To identify ratios, and use them to calculate amounts	• I know we can use ratio to compare one amount with another • I know that ratios represent a multiplicative relationship between amounts • I know that a colon is used to show the ratio between two amounts	• I can identify the ratio between two amounts • I can simplify ratios by dividing by common factors • I can calculate missing amounts when given the ratio	Counters Double number lines
To identify, calculate and use scale factors to enlarge shapes	• I know that scale drawings have the same proportions as the original, but enlarged or reduced in size • I know that the scale factor gives the ratio between the original and its scale drawing • I know to multiply the lengths of a shape by the scale factor to enlarge it • I know the divide the lengths of a shape by the scale factor to reduce it	• I can use scale factors to enlarge/reduce shapes • I can calculate the scale factor that has been used • I can calculate the dimensions of the original shape when given the scale factor	
To identify shapes that are similar	• I know that similar shapes have equal corresponding angles and that their corresponding sides are in proportion	• I can identify if shapes are similar, including when the shapes are shown in different orientations	

Algebra	**Key Vocabulary** sequence, rule, term, algebra, formula, substitute, generalise, equation, solution, expression, calculation, operation, calculate		
End of Year Objective	**'I know' statements**	**'I can' statements**	**Suggested manipulatives**
To write, use and solve simple formulae and expressions, including where there are multiple possibilities	• I know the order of operations (BIDMAS) • I know that letters can be used to represent an unknown number • I know that, for example, '3t' means 3 x t • I know that a formula has an equals sign, but an expression does not	• I can use function machines with one or two steps, calculating either the input or the output • I can substitute numbers into algebraic expressions to find their value (If x=____, then…) • I can solve algebraic equations with more than one step	Cuisenaire rods Cubes
To generate and describe linear number sequences	• I know that letters can be used to represent an unknown value • I know that the finding the 'nth term' allows us to identify the rule for a linear sequence	• I can identify what is similar and what is different about a sequence of numbers • I can identify the rule for a given sequence, including when there is more than one part	Cuisenaire rods
To express and solve missing number problems algebraically	• I know that missing number problems can be represented algebraically (e.g. 4 + x = 6)	• I can rebalance equations to find the value of a missing/unknown number • I can solve problems with two unknowns using reasoning	Cuisenaire rods
To find pairs of numbers that satisfy an equation with two unknowns	• I know that equations with two missing values can have several possible solutions	• I can use substitution to identify pairs of possible values • I can work systematically to find all the possible values	