



Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning
Number System	<p>To be able to use the concepts and vocabulary of prime numbers, highest common factors and lowest common multiples</p> <p>To be able to use positive integer powers and associated real roots and recognise powers of 2, 3, 4, 5</p> <p>To be able to recognise and use sequences of triangular, square and cube numbers, and simple arithmetic progressions.</p>	<p>Multiple</p> <p>Factor</p> <p>Indices</p> <p>Root</p> <p>Triangular number, Square number, Cube number, Prime number</p> <p>Linear sequence</p> <p>Index notation</p>	<p>Find the HCF and LCM of numbers and recognise and solve problems involving HCF and LCM</p> <p>Find prime numbers and test numbers to see if they are prime</p> <p>Read, write and evaluate powers</p> <p>Recognise and use triangular, square and cube numbers</p> <p>Define and find square /cube and other roots including the use of a scientific calculator</p>	<p>Know how to find common multiples of two given numbers</p> <p>Know how to find common factors of two given numbers</p> <p>Recall multiplication facts to 12×12 and associated division facts</p>	<p>There will be a written piece of homework each week to reinforce key concepts</p>
Calculating	<p>To be able to understand and use place value</p> <p>To be able to apply the four operations, including formal written methods, to integers and decimals</p> <p>To be able to use conventional notation for priority of operations, including brackets</p> <p>To be able to recognise and use relationships between operations, including inverse operations</p>	<p>Improper</p> <p>Mixed number</p> <p>Operation</p> <p>Inverse</p> <p>Power</p> <p>Long multiplication</p> <p>Short division</p> <p>Long division</p> <p>Remainder</p> <p>Integer</p>	<p>Multiply/divide a positive integer/ decimal by a power of 10</p> <p>Add /subtract numbers and decimals with same, and different, number of decimal places</p> <p>Multiply a number up to four-digits by a one or two-digit number or by a decimal up to 2dp</p> <p>Divide a number up to four-digits by a one or two-digit number and divide a decimal by an integer.</p> <p>Apply the order of operations correctly to multi-step calculations involving up to four operations and brackets</p>	<p>Fluently recall multiplication facts up to 12×12</p> <p>Fluently apply multiplication facts when carrying out division</p> <p>Know the formal written method of long multiplication</p> <p>Know the formal written method of short division</p> <p>Know the formal written method of long division</p> <p>Convert between an improper fraction and a mixed number</p>	<p>There will be a written piece of homework each week to reinforce key concepts</p>



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<p>Checking, approximating and estimating</p>	<p>To be able to round numbers and measures to an appropriate degree of accuracy</p> <p>To be able to estimate answers; check calculations using approximation and estimation</p> <p>To be able to recognise and use relationships between operations, including inverse operations</p>	<p>Approximate</p> <p>Round</p> <p>Decimal place</p> <p>Check</p> <p>Solution</p> <p>Estimate</p> <p>Accuracy</p> <p>Significant figure</p>	<p>Round a number to a specified number of decimal places</p> <p>Round a number to a specified number of significant figures</p> <p>Estimate calculations by rounding numbers to one significant figure</p>	<p>Approximate any number by rounding to the nearest 10, 100 or 1000, 10 000, 100 000 or 1 000 000</p> <p>Approximate any number with one or two decimal places by rounding to the nearest whole number</p> <p>Approximate any number with two decimal places by rounding to one decimal place</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>
<p>Counting and comparing</p>	<p>To be able to order positive and negative integers, decimals and fractions</p> <p>To be able to use the symbols =, ≠, <, >, ≤, ≥</p>	<p>Positive number</p> <p>Negative number</p> <p>Integer</p> <p>Numerator</p> <p>Denominator</p> <p>Mixed number</p> <p>Improper fraction</p>	<p>Use the signs <, > and = to compare numbers</p> <p>Order a set of integers and decimals</p> <p>Order fractions with the same denominator or denominators that are a multiple of each other</p> <p>Order fractions where the denominators are not multiples of each other</p> <p>Order a combination of integers, decimals, fractions and mixed numbers</p>	<p>Understand that negative numbers are numbers less than zero</p> <p>Order a set of decimals with a mixed number of decimal places (up to a maximum of three)</p> <p>Order fractions where the numerator is greater than 1</p> <p>Know how to simplify a fraction by cancelling common factors</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>



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Visualising and constructing	<p>To be able to use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons</p> <p>To be able to use the standard conventions for labelling and referring to the sides and angles of triangles</p>	<p>Edge</p> <p>Face</p> <p>Vertex (Vertices)</p> <p>Parallel</p> <p>Perpendicular</p> <p>Regular polygon</p> <p>Rotational symmetry</p>	<p>Understand and use labelling notation for parallel and perpendicular lines</p> <p>Identify line and rotational symmetry in polygons</p> <p>Use ruler and protractor to construct triangles, and other shapes, from written descriptions</p>	<p>Use a ruler to measure and draw lengths to the nearest millimetre</p> <p>Use a protractor to measure and draw angles to the nearest degree</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>



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<p>Investigating Properties of Shapes</p>	<p>identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres</p> <p>derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language</p>	<p>Face, Edge, Vertex (Vertices)</p> <p>Cube, Cuboid, Prism</p> <p>Cylinder, Pyramid, Cone, Sphere</p> <p>Quadrilateral</p> <p>Square, Rectangle,</p> <p>Parallelogram, (Isosceles) Trapezium, Kite, Rhombus</p> <p>Delta, Arrowhead</p> <p>Diagonal</p> <p>Perpendicular</p> <p>Parallel</p> <p>Triangle Scalene</p> <p>Right-angled</p> <p>Isosceles</p> <p>Equilateral</p> <p>Notation</p> <p>Dash notation to represent equal lengths in shapes and geometric diagrams</p> <p>Right angle notation</p>	<p>Know the connection between faces, edges and vertices in 3D shapes</p> <p>Recognise and use nets of 3D shapes</p> <p>Know and solve problems using the properties and definitions of triangles</p> <p>Know and solve problems using the properties and definitions of special types of quadrilaterals (including diagonals)</p> <p>Know and solve problems using the properties of other plane figures</p>	<p>Know the names of common 3D shapes</p> <p>Know the meaning of face, edge, vertex</p> <p>Understand the principle of a net</p> <p>Know the names of special triangles</p> <p>Know the names of special quadrilaterals</p> <p>Know the meaning of parallel, perpendicular</p> <p>Know the notation for equal sides, parallel sides, right angles</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>



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<p>Algebraic Proficiency— Tinkering</p>	<p>understand and use the concepts and vocabulary of expressions, equations, formulae and terms</p> <p>use and interpret algebraic notation, including:</p> <p>ab in place of $a \times b$, $3y$ in place of $y + y + y$</p> <p>and</p> <p>$3 \times y$, a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$, a/b in place of $a \div b$, brackets</p> <p>simplify and manipulate algebraic expressions by collecting like terms and multiplying a single term over a bracket</p> <p>where appropriate, interpret simple expressions as functions with inputs and outputs</p> <p>substitute numerical values into formulae and expressions</p> <p>use conventional notation for priority of operations, including brackets</p>	<p>Algebra</p> <p>Expression</p> <p>Term</p> <p>Formula (formulae),</p> <p>Equation</p> <p>Function</p> <p>Variable</p> <p>Mapping diagram</p> <p>Input</p> <p>Output</p> <p>Represent</p> <p>Substitute</p> <p>Evaluate</p> <p>Like terms</p> <p>Simplify</p> <p>Collect</p> <p>Notation</p> <p>See Key concepts (GCSE subject content statements) above</p>	<p>Know the meaning of expression, term, formula, equation, function</p> <p>Know and use basic algebraic notation (the ‘rules’ of algebra)</p> <p>Simplify a simple expression by collecting like terms</p> <p>Simplify more complex expressions by collecting like terms</p> <p>Manipulate expressions by multiplying an integer over a bracket (the distributive law)</p> <p>Manipulate expressions by multiplying a single term over a bracket (the distributive law)</p> <p>Substitute positive numbers into expressions and formulae</p> <p>Given a function, establish outputs from given inputs and inputs from given outputs</p>	<p>Use symbols (including letters) to represent missing numbers</p> <p>Substitute numbers into worded formulae</p> <p>Substitute numbers into simple algebraic formulae</p> <p>Know the order of operations</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>



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Pattern Sniffing	generate terms of a sequence from a term-to-term rule	Pattern Sequence Linear Term Term-to-term rule Ascending Descending	Recognise simple arithmetic progressions Use a term-to-term rule to generate a linear sequence Use a term-to-term rule to generate a non-linear sequence	Know the vocabulary of sequences Find the next term in a linear sequence Find a missing term in a linear sequence Generate a linear sequence from its description	There will be a written piece of homework each week to reinforce key concepts.
Measuring Space	use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.) use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate change freely between related standard units (e.g. time, length, area, volume/capacity, mass) in numerical contexts measure line segments and angles in geometric figures	Length Distance Mass Weight Volume Capacity Metre, centimetre, millimetre Tonne, kilogram, gram, milligram Litre, millilitre Hour, minute, second Inch, foot, yard Pound, ounce Pint, gallon Line segment	Use a ruler to accurately measure line segments to the nearest millimetre Use a protractor to accurately measure angles to the nearest degree Convert fluently between metric units of length Convert fluently between metric units of mass Convert fluently between metric units of volume / capacity Convert fluently between units of time Convert fluently between units of money	Convert between metric units Use decimal notation up to three decimal places when converting metric units Convert between common Imperial units; e.g. feet and inches, pounds and ounces, pints and gallons Convert between units of time Use 12- and 24-hour clocks, both analogue and digital	There will be a written piece of homework each week to reinforce key concepts.



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<p>Investigating Angles</p>	<p>apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles</p>	<p>Angle Degrees Right angle Acute angle Obtuse angle Reflex angle Protractor Vertically opposite Geometry Geometrical</p> <p>Notation Right angle notation Arc notation for all other angles The degree symbol (°)</p>	<p>Recognise and solve problems using vertically opposite angles</p> <p>Recognise and solve problems using angles at a point</p> <p>Recognise and solve problems using angles at a point on a line</p>	<p>Identify angles that meet at a point</p> <p>Identify angles that meet at a point on a line</p> <p>Identify vertically opposite angles</p> <p>Know that vertically opposite angles are equal</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>



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<p>Calculating Fractions, Decimals & Percentages</p>	<p>apply the four operations, including formal written methods, to simple fractions (proper and improper), and mixed numbers</p> <p>interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively</p> <p>compare two quantities using percentages</p> <p>solve problems involving percentage change, including percentage increase/decrease</p>	<p>Mixed number</p> <p>Equivalent fraction</p> <p>Simplify</p> <p>Cancel</p> <p>Lowest terms</p> <p>Proper fraction</p> <p>Improper fraction</p> <p>Top-heavy fraction</p> <p>Vulgar fraction</p> <p>Percent, percentage</p> <p>Multiplier</p> <p>Increase</p> <p>Decrease</p> <p>Notation</p> <p>Mixed number notation</p> <p>Horizontal / diagonal bar for fractions</p>	<p>Add proper and improper fractions</p> <p>Add mixed numbers</p> <p>Subtract proper, improper fractions and mixed numbers</p> <p>Multiply proper and improper fractions</p> <p>Multiply mixed numbers</p> <p>Divide a proper fraction by a proper fraction</p> <p>Divide improper fractions</p> <p>Divide a mixed number by a proper fraction/mixed number</p> <p>Identify the multiplier for a percentage increase or decrease</p> <p>Use calculators to find a percentage of an amount using multiplicative methods</p> <p>Use calculators to increase and decrease an amount by a percentage using multiplicative methods</p> <p>Compare two quantities using percentages</p> <p>Know that percentage change = $\frac{\text{actual change}}{\text{original amount}}$</p> <p>Calculate the percentage change in a given situation, including percentage increase / decrease</p>	<p>Add and subtract fractions with different denominators</p> <p>Add and subtract mixed numbers with different denominators</p> <p>Multiply a proper fraction by a proper fraction</p> <p>Divide a proper fraction by a whole number</p> <p>Simplify the answer to a calculation when appropriate</p> <p>Use non-calculator methods to find a percentage of an amount</p> <p>Convert between fractions, decimals and percentages</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>



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Solving Equations & Inequalities	<p>recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)</p> <p>solve linear equations in one unknown algebraically</p>	<p>Algebra, Algebraic Algebraically Unknown Equation Operation Solve Solution Brackets Symbol Substitute</p> <p>Notation</p> <p>The lower case and upper case of a letter should not be used interchangeably when worked with algebra</p> <p>Juxtaposition is used in place of '×'. 2a is used rather than a2.</p> <p>Division is written as a fraction</p>	<p>Solve one-step equations when the solution is a positive integer or fraction</p> <p>Solve two-step equations when the solution is a positive integer or fraction</p> <p>Solve two-step equations when the solution is a positive integer or fraction</p> <p>Solve multi-step equations including the use of brackets when the solution is a positive integer or fraction</p> <p>Solve equations when the solution is an integer or fraction</p>	<p>Know the basic rules of algebraic notation</p> <p>Express missing number problems algebraically</p> <p>Solve missing number problems expressed algebraically</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>



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<p>Calculating Space</p>	<p>use standard units of measure and related concepts (length, area, volume/capacity)</p> <p>calculate perimeters of 2D shapes</p> <p>know and apply formulae to calculate area of triangles, parallelograms, trapezia</p> <p><i>calculate surface area of cuboids</i></p> <p>know and apply formulae to calculate volume of cuboids</p> <p>understand and use standard mathematical formulae</p>	<p>Perimeter, area, volume, capacity, surface area</p> <p>Square, rectangle, parallelogram, triangle, trapezium (trapezia)</p> <p>Polygon</p> <p>Cube, cuboid</p> <p>Square millimetre, square centimetre, square metre, square kilometre</p> <p>Cubic centimetre, centimetre cube</p> <p>Formula, formulae</p> <p>Length, breadth, depth, height, width</p> <p>Notation</p> <p>Abbreviations of units in the metric system: km, m, cm, mm, mm², cm², m², km², mm³, cm³, km³</p>	<p>Calculate perimeters of 2D shapes</p> <p>Use and apply the formula to calculate the area of triangles</p> <p>Use and apply the formula to calculate the area of trapezia</p> <p>Use and apply the formula to calculate the volume of cuboids</p> <p>Find the surface area of cuboids (including cubes)</p>	<p>Understand the meaning of area, perimeter, volume and capacity</p> <p>Know how to calculate areas of rectangles, parallelograms and triangles using the standard formulae</p> <p>Know that the area of a triangle is given by the formula $\text{area} = \frac{1}{2} \times \text{base} \times \text{height}$</p> <p>$= \text{base} \times \text{height} \div 2 = \frac{\text{bh}}{2}$</p> <p>Know appropriate metric units for measuring area and volume</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>



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Mathematical Movement	<p>work with coordinates in all four quadrants</p> <p><i>understand and use lines parallel to the axes, $y = x$ and $y = -x$</i></p> <p>solve geometrical problems on coordinate axes</p> <p>identify, describe and construct congruent shapes including on coordinate axes, by considering rotation, reflection and translation</p> <p>describe translations as 2D vectors</p>	<p>(Cartesian) coordinates</p> <p>Axis / axes,</p> <p>x & y-axis,</p> <p>Origin</p> <p>Quadrant</p> <p>Translation,</p> <p>Reflection,</p> <p>Rotation</p> <p>Transformation</p> <p>Object, Image</p> <p>Congruent</p> <p>Congruence</p> <p>Mirror line</p> <p>Vector</p> <p>Centre of rotation</p> <p>Notation</p> <p>Cartesian coordinates should be separated by a comma and enclosed in brackets (x, y)</p> <p>Vector notation $\begin{pmatrix} a \\ b \end{pmatrix}$ where a = movement right and b = movement up</p>	<p>Solve geometrical problems on coordinate axes</p> <p>Write the equation of a line parallel to the x-axis or the y-axis</p> <p>Identify and draw the lines $y = x$ and $y = -x$</p> <p>Construct and describe reflections in horizontal, vertical and diagonal mirror lines (45° from horizontal)</p> <p>Describe a translation as a 2D vector</p> <p>Construct and describe rotations using a given angle, direction and centre of rotation</p> <p>Solve problems involving rotations, reflections and translations</p>	<p>Work with coordinates in all four quadrants</p> <p>Carry out a reflection in a given vertical or horizontal mirror line</p> <p>Carry out a translation</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>



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<p>Presentation of Data</p>	<p>interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data and know their appropriate use</p>	<p>Data, Categorical data, Discrete data</p> <p>Pictogram, Symbol, Key</p> <p>Frequency</p> <p>Table</p> <p>Frequency table</p> <p>Tally</p> <p>Bar chart</p> <p>Time graph, Time series</p> <p>Bar-line graph,</p> <p>Vertical line chart</p> <p>Scale, Graph</p> <p>Axis, axes</p> <p>Line graph</p> <p>Pie chart</p> <p>Sector</p> <p>Angle</p> <p>Maximum, minimum</p> <p>Notation</p> <p>When tallying, groups of five are created by striking through each group of four</p>	<p>Interpret and construct frequency tables</p> <p>Construct and interpret bar charts and know their appropriate use</p> <p>Construct and interpret comparative bar charts</p> <p>Construct and interpret pie charts and know their appropriate use</p> <p>Construct and interpret vertical line charts</p> <p>Choose appropriate graphs or charts to represent data</p>	<p>Construct and interpret a pictogram</p> <p>Construct and interpret a bar chart</p> <p>Construct and interpret a line graph</p> <p>Understand that pie charts are used to show proportions</p> <p>Use a template to construct a pie chart by scaling frequencies</p>	<p>There will be a written piece of homework each week to reinforce key concepts.</p>



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Measuring Data	interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean and mode) and spread (range)	Average Spread Consistency Mean Median Mode Range Measure Data Statistic Statistics Approximate Round	Find the mode of set of data Find the median of a set of data including when there are an even number of numbers in the data set Calculate the mean from a frequency table Find the mode from a frequency table Find the median from a frequency table Calculate and understand the range as a measure of spread (or consistency) Analyse and compare sets of data, appreciating the limitations of different statistics (mean, median, mode, range)	Understand the meaning of 'average' as a typicality (or location) Calculate the mean of a set of data	There will be a written piece of homework each week to reinforce key concepts.