

The Programme of Study for Maths is derived from the National Curriculum for Maths in England, which provides a coherent and structured framework for the progression of mathematical knowledge and skills from the Early Years Foundation Stage (EYFS) through to Key Stage 4 (KS4). It outlines a carefully sequenced body of knowledge and key concepts, ensuring continuity and progression across all key stages. Many of these concepts are revisited and developed in greater depth throughout the primary and secondary phases, supporting cumulative learning and mastery over time.

Mathematics – PROGRAMME OF STUDY – KS3						
Prior learning: KS2	Number	Algebra	Ratio, Proportion and rates of change	Geometry and measures	Probability	Statistics
	<p>Place and place value: read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit</p> <p>count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000</p> <p>interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero</p> <p>round any number up to 1 000 000 to the nearest 10, 100,</p>	<p>Number – fractions (including decimals and percentages)</p> <p>compare and order fractions whose denominators are all multiples of the same number</p> <p>identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths</p> <p>recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for</p>	<p>Measurement</p> <p>convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) $\frac{1}{10}$</p> <p>understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints $\frac{1}{10}$ measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres $\frac{1}{10}$ calculate</p>	<p>Geometry – properties of shapes</p> <p>identify 3-D shapes, including cubes and other cuboids, from 2-D representations $\frac{1}{10}$</p> <p>know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles $\frac{1}{10}$ draw given angles, and measure them in degrees (o) $\frac{1}{10}$</p> <p>identify: $\frac{1}{10}$ angles at a point and one whole turn (total 360o) $\frac{1}{10}$ angles at a point on a straight line and 2 1 a turn (total 180o) $\frac{1}{10}$ other multiples of 90o $\frac{1}{10}$ use the properties of rectangles to deduce related facts and find</p>		<p>solve comparison, sum and difference problems using information presented in a line graph $\frac{1}{10}$ complete, read and interpret information in tables, including timetables.</p>

	<p>1000, 10 000 and 100 000</p> <p>solve number problems and practical problems that involve all of the above</p> <p>read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</p> <p>Addition and Subtraction:</p> <p>add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</p> <p>add and subtract numbers mentally with increasingly large numbers</p> <p>use rounding to check answers to</p>	<p>example, $52 + 54 = 56 = 151$]</p> <p>add and subtract fractions with the same denominator and denominators that are multiples of the same number</p> <p>multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams [read and write decimal numbers as fractions [for example, $0.71 = 10071$]</p> <p>recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents</p> <p>round decimals with two decimal places to the nearest whole number and to one decimal place</p>	<p>and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes [estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water] solve problems involving converting between units of time use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.</p>	<p>missing lengths and angles [distinguish between regular and irregular polygons based on reasoning about equal sides and angles.</p> <p>Position and direction</p> <p>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</p>		
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	<p>calculations and determine, in the context of a problem, levels of accuracy</p> <p>solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p> <p>Multiplication and Division:</p> <p>identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers</p> <p>know and use the vocabulary of prime numbers, prime factors and composite (no</p> <p>prime) numbers \square</p> <p>establish whether a number up to 100 is prime and recall</p>	<p>read, write, order and compare numbers with up to three decimal places</p> <p>solve problems involving number up to three decimal places</p> <p>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</p> <p>solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{4}$ and those fractions with a denominator of a multiple of 10 or 25.</p>				
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	<p>prime numbers up to 19</p> <p>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</p> <p>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</p> <p>multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</p> <p>recognise and use square numbers and cube numbers, and</p>					
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	<p>the notation for squared (2) and cubed (3)</p> <p>solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes</p> <p>solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign</p> <p>solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.</p>					
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	Working mathematically: Pupils should read, spell and pronounce mathematical vocabulary correctly					
Taught content:						
Knowledge/ Skills KS3	Number	Algebra	Ratio, Proportion and rates of change	Geometry and measures	Probability	Statistics
	<p>understand and use place value for decimals, measures and integers of any size</p> <p>order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥</p> <p>use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property</p>	<p>use and interpret algebraic notation, including: ab in place of $a \times b$</p> <p>$3y$ in place of $y + y + y$ and $3 \times y$</p> <p>a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$; $a^2 b$ in place of $a \times a \times b$</p> <p>$b a$ in place of $a \div b$</p> <p>coefficients written as fractions rather than as decimals</p> <p>brackets</p> <p>substitute numerical values into formulae and expressions, including scientific formulae</p> <p>understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors</p>	<p>change freely between related standard units [for example time, length, area, volume/capacity, mass] use scale factors, scale diagrams and maps</p> <p>express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1</p> <p>use ratio notation, including reduction to simplest form</p> <p>divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio</p> <p>understand that a multiplicative</p>	<p>derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders)</p> <p>calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes</p> <p>draw and measure line segments and angles in geometric figures, including interpreting scale drawings</p> <p>derive and use the standard ruler and compass</p>	<p>record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale</p> <p>understand that the probabilities of all possible outcomes sum to 1</p> <p>enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams</p> <p>generate theoretical sample spaces for single and combined events with equally</p>	<p>describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers)</p> <p>construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped</p>

<p>use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals</p> <p>recognise and use relationships between operations including inverse operations</p> <p>use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations</p>	<p>simplify and manipulate algebraic expressions to maintain equivalence by: collecting like terms multiplying a single term over a bracket taking out common factors expanding products of two or more binomials</p> <p>understand and use standard mathematical formulae; rearrange formulae to change the subject</p> <p>model situations or procedures by translating them into algebraic expressions or formulae and by using graphs</p> <p>use algebraic methods to solve linear equations in one variable (including all forms</p>	<p>relationship between two quantities can be expressed as a ratio or a fraction</p> <p>relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions</p> <p>solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics</p> <p>solve problems involving direct and inverse proportion, including graphical and algebraic representations □ use compound units such as speed, unit pricing and density to solve problems.</p>	<p>constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line</p> <p>describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric</p> <p>use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for</p>	<p>likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.</p>	<p>and grouped numerical data</p> <p>describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.</p>
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	<p>interpret and compare numbers in standard form $A \times 10^n$ $1 \leq A < 10$, where n is a positive or negative integer or zero</p> <p>work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $2\frac{7}{10}$ or 0.375 and $\frac{375}{1000}$)</p> <p>define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these</p> <p>multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%</p>	<p>that require rearrangement)</p> <p>work with coordinates in all four quadrants</p> <p>recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane</p> <p>interpret mathematical relationships both algebraically and graphically</p> <p>reduce a given linear equation in two variables to the standard form $y = mx + c$; calculate and interpret gradients and intercepts of graphs of such linear equations numerically,</p>		<p>congruence of triangles derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies</p> <p>identify properties of, and describe the results of, translations, rotations and reflections applied to given figures</p> <p>identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids</p> <p>apply the properties of angles at a point, angles at a point on a straight line,</p>		
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	<p>interpret fractions and percentages as operators</p> <p>use standard units of mass, length, time, money and other measures, including with decimal quantities</p> <p>round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures]</p> <p>use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation</p> <p>use a calculator and other technologies to calculate results accurately and then interpret them appropriately</p>	<p>graphically and algebraically</p> <p>use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations</p> <p>find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs</p> <p>generate terms of a sequence from either a term-to-term or a position-to-term rule</p> <p>recognise arithmetic sequences and find the nth term</p> <p>recognise geometric sequences and</p>		<p>vertically opposite angles</p> <p>understand and use the relationship between parallel lines and alternate and corresponding angles</p> <p>derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons</p> <p>apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs</p> <p>use Pythagoras' Theorem and trigonometric ratios</p>		
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	<p>appreciate the infinite nature of the sets of integers, real and rational numbers</p>	<p>appreciate other sequences that arise.</p>		<p>in similar triangles to solve problems involving right-angled triangles</p> <p>use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D</p> <p>interpret mathematical relationships both algebraically and geometrically</p>		
<p>Working mathematically: Develop fluency Reason mathematically Solve problems</p>						
<p>Subsequent learning: Higher paper</p>					<p>P9 Use expected frequencies with two-way tables, tree diagrams and Venn diagrams to calculate and interpret conditional probabilities</p>	<p>S3 Construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use</p>

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