



# KS3 Mathematics

	Content
Year 7 HT 1	<p><b>Ratio and proportion (with bar modelling):</b> Time, including converting and interpreting decimal proportions of hours and solving problems involving time; fractions, including non-calculator arithmetic and converting between fractions, decimals and percentages; ratio, direct proportion including scaling and judging 'best buys' and percentages.</p>
Year 7 HT 2	<p><b>Area and perimeter:</b> This unit builds on students' prior understanding of the perimeter of 2D shapes (total length around the edges) and their area (total space inside, measured in squares). The unit includes working with place value, all four operations without a calculator (adding, subtracting, multiplying and dividing) and rounding, all put into context of the shape work. We also review the names and properties of 3D shapes and extend their understanding of area to include surface area of simple 3D shapes (but not volume, which we will come back to later in the year). Finally, we look at the use of rounding to find approximate answers to problems, and using this to check 'actual' answers are the right size.</p>
Year 7 HT 3	<p><b>Algebra I (algebraic manipulation) including negative numbers and BIDMAS:</b> This unit works with Algebra, the order of operations ("BIDMAS") and positive and negative numbers, using letters to represent numbers and creating algebraic expressions from worded descriptions or familiar contexts, simplifying expressions by collecting like terms and expanding single brackets (multiplying terms in a bracket by a single term in front of it) and factorising (the opposite process).</p>
Year 7 HT 4	<p><b>Probability and Venn diagrams (sets):</b> In this unit students will develop their understanding of the language of likelihood and probability, use of numeric probabilities to measure chance more precisely, use the probability scale from 0 (impossible) to 1 (certain), use of fractions, decimals and percentages including conversions between them; consider probabilities of two combined events with tables and probability trees and look at Venn diagrams.</p>
Year 7 HT 5	<p><b>Algebra II (formulae and equations) including volume of 3D shapes:</b> The unit begins with substitution of values into worded formulae, algebraic expressions, including brackets, powers and substitutions with negative numbers and fractions; formulae and area and perimeter, volume of 3D shapes and substituting into volume formulae for cubes, cuboids and right prisms. Also solving single step linear equations, function machines and rearranging single step formulae.</p>
Year 7 HT 6	<p><b>Angles and Shapes:</b> Within this topic pupils will learn about reflective and rotational symmetry, 2D and 3D shapes and properties, nets, angle facts, angles in triangles and quadrilaterals and tessellation. This topic helps students to identify shapes they may see in day to day life and the properties of them.</p>
Year 8 HT 1	<p><b>Ratio and proportion:</b> This unit includes simplifying ratio, sharing in a ratio, time proportion, speed/distance/time including graphs, best buys, recipes, conversion graphs and exchange rates and distance-time graphs. Second part includes Fractions: equivalent fractions, fractions of amounts, converting and comparing between decimals-percentages-fractions, calculating percentages of amounts, percentage multipliers and increase/decrease by a percentage, compound interest and percentage change.</p>
Year 8 HT 2	<p><b>Area and Volume:</b> Includes perimeter of 2D shapes, their area and volume from year 7. Also working with place value, ordering and rounding whole numbers and decimals in the context of shape work and includes surface area of prisms and looking at finding volume of simple and complex prisms. In addition, pupils explore circles and name parts of circle, find area and circumference (perimeter) of a circle. Finally, we look at the Pythagoras' theorem in right angled triangles, finding the hypotenuse and shorter side.</p>
Year 8 HT 3	<p><b>Algebra III (factorising and solving equations and inequalities) including negative numbers and BIDMAS:</b> This unit includes the order of operations-BIDMAS and calculating with negative numbers, expanding single and double brackets and simplifying two single bracket, factorising simple expressions with HCF being a number, letter or both; and also at factorising simple quadratics. Also solving two-step and three-step equations and equations with variable on both sides and solving single and double-sided inequalities and representing inequalities on a number line.</p>



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Year 8 HT 4	<p><b>Factors, multiples and indices:</b></p> <p>This units includes factors, multiples and primes, LCM and HCF by listing and using Venn diagrams, prime numbers and factors, multiplying and dividing by 10, 100, 1000; Index laws (multiplication, division, powers, negative, unit fractions); standard form converting to and from for large and small numbers and calculations in standard form. Second part of this units focuses on powers, roots (calculating and estimating)</p>
Year 8 HT 5	<p><b>Algebra IV:</b></p> <p>This unit includes substituting positive and negative numbers into worded and one step and two step algebraic formulae, rearranging formulae, sequences (term-to-term rule, continuing sequences), special sequences, calculating and using nth term. Second part of this unit involves coordinates in all four quadrants, coordinate geometry, midpoints, horizontal and vertical lines, plotting straight lines, equation of a straight line <math>y=mx+c</math>, calculating <math>y=mx+c</math> from a graph and 2 points.</p>
Year 8 HT 6	<p><b>Data Handling and Averages:</b></p> <p>Students will learn how to collect and represent data, this will include bar charts, pictograms and other representations. They will also learn how to find the mean, median, mode and range of data with some students being able to apply this to frequency tables.</p>
Year 9 HT 1	<p>This unit builds on Year 7 Unit 6: Geometry II; Year 8 Unit 2: Circles Year 8 Unit 4: Number (Pythagoras). It includes measuring, drawing and estimating angles, calculating missing angles in a diagram using multiple angle rules (straight line, around a point, triangle, quadrilateral, vertically opposite angles), Parallel Lines (identifying corresponding, alternate and co-interior angles and using their properties), recognising Polygons and calculating interior and exterior angles. Other topics include measuring and drawing Bearings, using Pythagoras' theorem to calculate hypotenuse, shorter side and perimeter and area of a right-angled triangle; Trigonometry and Circle Theorems. Pythagoras; theorem is combined with angles in triangles and linked to trigonometry for some students.</p>
Year 9 HT 2	<p>The third unit in year 9 brings together all of the topics that fall under algebraic manipulation. This includes expanding and factorising, algebraic fractions, and index laws. The unit includes adding, subtracting, multiplying and dividing fractions and mixed numbers and adding, subtracting, multiplying and dividing simple algebraic fractions. Other topics are expanding single, double and triple brackets and factorising simple and quadratic expressions. Also rules of indices and adding, subtracting, multiplying, dividing and simplifying surds.</p>
Year 9 HT 3	<p>The fourth unit in year 9 covers probability and averages. This builds directly on the probability work covered in year 7 and the averages work covered in year 8. This includes Probability-calculating Theoretical probability and Relative frequency, Sample space diagram and Product rule for counting, Probability Tree Diagrams and Venn Diagrams. Other topics are calculating Averages and Range- mean, median mode, range and comparing two data sets. Also Frequency Tables and tally charts.</p>
Year 9 HT 4	<p>This unit builds on Year 7 Unit 6: Geometry II; Year 8 Unit 2: Circles Year 8 Unit 4: Number (Pythagoras). It includes measuring, drawing and estimating angles, calculating missing angles in a diagram using multiple angle rules (straight line, around a point, triangle, quadrilateral, vertically opposite angles), Parallel Lines (identifying corresponding, alternate and co-interior angles and using their properties), recognising Polygons and calculating interior and exterior angles. Other topics include measuring and drawing Bearings, using Pythagoras' theorem to calculate hypotenuse, shorter side and perimeter and area of a right-angled triangle; Trigonometry and Circle Theorems. Pythagoras; theorem is combined with angles in triangles and linked to trigonometry for some students.</p>



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For the fifth unit in year 9, students continue to build on the work started in the two year 8 algebra units. Algebra II looked at solving equations and inequalities, while algebra IV looked at sequences and graphs. This includes Equations-solving one, two and three steps equations, simultaneous equations and quadratic equations by factorising and using quadratic formula. Also Sequences-term to term rule, triangle numbers, square numbers, nth term of arithmetic, quadratic and geometric sequence. Other topics are Coordinates and calculating midpoints, Plotting Graphs-straight line, quadratic, cubic, exponential and reciprocal graphs, also Features of graphs and Inequalities-solving, displaying solution on a number line and plotting inequalities on a graph and identifying a region that satisfies multiple inequalities.

Year 9 HT 5

For the final unit in year 9, students have the opportunity to revisit and build on the work they did on transformations in year 8, as well as looking at the final areas of geometry that have not been covered in KS3.

It includes Vectors and translation-translating a shape by using vectors, adding and subtracting column vectors, multiplying column vector by a scalar. Reflection and rotation-reflecting and rotating a shape on a grid and performing and describing single and multiple transformations.

Enlargement-enlarging a shape by an integer and fractional scale factor without and with a centre of enlargement. Other topics are Similar shapes-calculating and using integer and fractional scale factors to find missing length, perimeter, area and volume in similar shapes and showing that two shapes are similar. Plans and elevation-recognising and drawing plan, front and side of a 3-D shape and drawing a 3d shape given its plan, front elevation and side elevation and Construction-Constructing an SAS, ASA, SSS triangle, constructing a perpendicular and angle bisector and applying multiple loci in context.

Year 9 HT 6