

**Maths Department - Year 8**

 <b>Shirley High Curriculum Map</b>	<i>The Year 8 curriculum builds upon the knowledge students have acquired in Year 7. The curriculum continues to cover the fundamental topics from the six key concepts of Mathematics at Key Stage 3: Algebra, Geometry and Measures, Number, Ratio, Proportion and Rates of Change, Probability and Statistics. Students are introduced to a range of interactive activities that promote an enjoyment of Mathematics as well as the necessary practice to ensure content retention.</i>					
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:
	(1) Number  (2) Area and volume	(3) Statistics, graphs and charts  (4) Expressions and equations	(5) Real-life graphs  (6) Decimals and ratio	(7) Lines and angles	(8) Calculating with fraction	(9) Straight-line graphs  (10) Percentages, decimals and fractions
<b>Why Now?</b>	(1) This unit revisits and builds upon content from units 2 and 4 in year 7 and involves some key skills used in the next unit.  (2) Pupils learn how to calculate the area of 2D shapes as well as the surface area and volume of 3D shapes.	(3) This unit revisits and builds upon content from unit 1 in year 7. Having been introduced to group data through graphs and charts pupils learn how to calculate averages and range from grouped data.  (4) This unit consolidates prior knowledge from Year 7 unit 3 but also introduces new fundamental concepts to pupils such as bracket expansion.	(5) The transition between unit 4 and unit 5 is helped due to the link between algebra and graphs. Pupils are introduced to graphs such as distance time graphs.  (6) This unit revisits and builds upon content from unit 7 in year 7 and unit 1 in year 8. Pupils use decimals imbedded in ratio.	(7) Having learnt about angles in unit 8 from year 7, pupils now learn about the rules of angles in parallel lines.	(8) This unit consolidates prior knowledge gained from unit 5 in year 7 before introducing calculations of all four operations with fractions.	(9) Pupils use their knowledge and understanding from units 4 and 5 to learn how to plot straight line graphs and obtain the equation of a straight line.  (10) Pupils build upon their understanding from unit 6 as they learn how to use the relationship between fractions, decimals and percentages in order to problem solve.
<b>Fundamental Concepts</b>	Number Geometry and measures	Statistics Algebra	Algebra Geometry and measures Number Ratio, proportion and rates of change	Geometry and measures	Number	Algebra Number
<b>Students will learn about ...</b>	(1) <b>Written</b> addition and subtraction using more than two numbers (including decimals). <b>Estimating</b> answers to calculations. <b>Understanding</b> divisibility rules and a written method to divide decimals by integers. <b>Calculating</b> with negative numbers. <b>Using</b> powers, roots, brackets, factors and multiples in calculations.  (2) <b>Deriving</b> and using formulae for the area of triangles, parallelograms, and trapezia. <b>Finding</b> volume of cubes, cuboids and other 3D solids. <b>Drawing</b> 2D representations of 3D solids. <b>Calculating</b> surface areas of cubes and cuboids. <b>Solving</b> problems in everyday contexts involving measures. <b>Converting</b> between different units of measurement.	(3) <b>Interpreting</b> and drawing pie charts. <b>Calculating</b> mean averages from frequency tables. <b>Using</b> two-way tables and tables for grouped data. <b>Drawing</b> and interpreting stem and leaf diagrams. <b>Comparing</b> two sets of data using statistics and shapes of graphs. <b>Constructing</b> line graphs. <b>Choosing</b> the most appropriate average to use. <b>Drawing</b> scatter graphs and lines of best fit. <b>Describing</b> types of correlation. <b>Understanding</b> misleading graphs.  (4) <b>Understanding</b> and simplifying algebraic expressions involving powers. <b>Expanding</b> and simplifying algebraic expressions and formulae using brackets and division. <b>Factorising</b> expressions. <b>Writing</b> and solving one-step equations using function machines. <b>Solving</b> and writing two-step equations using function machines. <b>Solving</b> equations using the balancing method.	(5) <b>Drawing</b> , using and interpreting graphs: conversion, distance-time and line. <b>Identifying</b> trends. <b>Drawing</b> and interpreting real-life linear and non-linear graphs.  (6) <b>Ordering</b> positive and negative decimals. <b>Rounding</b> numbers to decimal places, significant figures and appropriate degrees of accuracy. <b>Multiplying</b> any number by 0.1 and 0.01. <b>Multiplying</b> large numbers and decimals with up to and including two decimal places. <b>Dividing</b> by 0.1 and 0.01. <b>Solving</b> problems involving decimals and all four operations. <b>Dividing</b> a quantity into three or more parts in a given ratio. <b>Solving</b> ratio and proportion problems.	(7) <b>Classifying</b> quadrilaterals by their geometric properties. <b>Solving</b> geometric problems using side and angle properties. <b>Identifying</b> alternate and corresponding angles on a diagram. <b>Understanding</b> proofs of angle facts. <b>Solving</b> problems using properties of angles in parallel and intersecting lines. <b>Calculating</b> the sum of the interior and exterior angles of a polygon. <b>Working</b> out the sizes of interior and exterior angles of a polygon. <b>Solving</b> geometric angle problems by setting up equations and reasoning.	(8) <b>Ordering</b> fractions. <b>Identifying</b> fractions as more than $\frac{1}{2}$ or less than $\frac{1}{2}$ . <b>Understanding</b> equivalent fractions. <b>Adding</b> and subtracting fractions with any size denominator. <b>Multiplying</b> integers and fractions by a fraction using appropriate methods. <b>Finding</b> the reciprocal of a number. <b>Dividing</b> integers and fractions by a fraction using appropriate strategies. <b>Writing</b> mixed numbers as an improper fraction. <b>Calculating</b> with mixed numbers using the four operations.	(9) <b>Recognising</b> when values are in direct proportion - with or without a graph. <b>Plotting</b> graphs and reading values to solve problems. <b>Plotting</b> a straight-line and working out its gradient. <b>Plotting</b> the graphs of linear equations. <b>Writing</b> the equations of straight-line graphs in the form $y = mx + c$ .  (10) <b>Converting</b> between fractions and decimals. <b>Converting</b> time between minutes, hours and hours & minutes. <b>Recalling</b> equivalent fractions and decimals and percentages. <b>Recognising</b> recurring and terminating decimals. <b>Ordering</b> fractions by converting them to decimals or equivalent fractions. <b>Using</b> different methods to find equivalence or compare two proportions. <b>Expressing</b> one number as a percentage of another when the units are different. <b>Working</b> out an amount increased or decreased by a percentage. <b>Using</b> a multiplier to calculate amounts increased or decreased by a percentage. <b>Using</b> mental strategies and the unitary method to solve percentage problems.
<b>Language for Life (Key terms/Vocabulary)</b>	(1) Doubling and halving, difference, rounding, adjusting, integer, divisible, deposit, instalment, withdrawal, bank balance, negative bank balance, overdraft, cubed, cube numbers, cube root, inverse, square root, positive square root, negative square root, index, power, product, prime factors, prime factor decomposition.  (2) Area, surface area, volume, base, perpendicular height, face, edge, vertex, vertices, unit of measure, metric, imperial, formula, compound shape, parallelogram, trapezium, net, plan, elevation, capacity, tonne, hectare (ha).	(3) Radius, pie chart, sector, key, two-way table, modal, modal class, stem and leaf diagram, average, mean, median, mode, range, correlation, line of best fit, negative correlation, no correlation, positive correlation, scatter graph, title, scales, axis, axis labels, pictogram, bar chart.  (4) Index form, product, simplify, expression, variable (letter), term, factor, equation, inequality, identity, expand, factorise, highest common factor (HCF), function, inverse, solve.	(5) Conversion, units, gradient, speed, distance-time, x-axis, y-axis, line graph, trend, interpret, function, linear, parabola, non-linear.  (6) Round, degree of accuracy, decimal place, significant figure, ascending, descending, unit ratio.	(7) Equilateral, isosceles, scalene, square, rectangle, rhombus, parallelogram, kite, trapezium, isosceles trapezium, diagonal, bisect, parallel, alternate angles, prove, proof, corresponding angles, irregular polygon.	(8) Lowest common denominator (LCM), fraction, mixed number, simplify, numerators, denominators, multiply, convert, decimal, reciprocal, division, counter example, mixed number, improper fraction.	(9) Direct proportion, gradient, parallel, straight-line graph, coefficient, midpoint, line segment, linear equation, Y-intercept, origin.  (10) Equivalent, terminating decimal, recur, recurring decimal, unit fraction, proportion, increase, decrease, simple interest, multiplier, strategies, and jottings.
<b>Extended writing Opportunities</b>	After each end of unit assessment pupils write a reflection based on the assessment.	After each end of unit assessment pupils write a reflection based on the assessment.	After each end of unit assessment pupils write a reflection based on the assessment.	After each end of unit assessment pupils write a reflection based on the assessment.	After each end of unit assessment pupils write a reflection based on the assessment.	After the end of year assessment pupils write a reflection based on the assessment.

<p><b>Maths Across the Curriculum</b></p>	<p>(1) <b>Factors</b> is a concept that links to common morals or ideology which may arise in subjects such as religious studies, modern foreign languages, English language and literature, history and geography.</p> <p>(2) <b>Calculating</b> areas is used in science and design and technology. <b>Calculating</b> volume is used in science when problem solving in relation to density, mass and volume.</p>	<p>(3) <b>Pupils</b> learn statistical techniques that are used in many other subjects such as science, geography and psychology.</p> <p>(4) <b>Pupils</b> learn the fundamental concepts of algebra that are used in subjects such as biology, chemistry, physics, computer science and geography.</p>	<p>(5) <b>Distance time-graphs</b> are used in science. <b>Line graphs</b> are used in subjects such as science and geography.</p> <p>(6) <b>Ratios</b> and proportionality arise in subjects such as food technology, design and technology, science and geography.</p>	<p>(7) <b>Lines and angles</b> arise in subjects such as design and technology and physics.</p>	<p>(8) <b>Fractions</b> are used in subjects such as food technology, geography and design and technology.</p>	<p>(9) <b>Straight lines</b> and their respective equations are used in many subjects such as physics, geography and food technology.</p> <p>(10) <b>Fractions</b>, decimals and percentages are used in subjects such as food technology, geography, English, history, design and technology and media. <b>Assessments</b> across all subjects in the curriculum will be reported back to pupils as either fractions or most commonly percentages. Therefore, pupils will have the necessary skills to understand and evaluate their attainment.</p>
<p><b>Links to careers/ aspirations</b></p>	<p>(1) <b>Pupils</b> will acquire key skills for careers in finance and accounting.</p> <p>(2) <b>Pupils</b> learn how to calculate areas which is used in careers involving carpentry, architecture and design.</p>	<p>(3) <b>Pupils</b> learn to use fundamental statistical techniques that are widely used in a range of professions from sports commentator to community management.</p> <p>(4) <b>Pupils</b> learn the fundamental concepts of algebra that are used in careers involving astrology, architecture, computer engineering, market research analysis, finance and economy.</p>	<p>(5) <b>Graphs</b> are one of the key tools used in statistical analysis, market research and economics.</p> <p>(6) <b>Ratio</b> is used by the human resource teams of companies to ensure their company has a representative demographic.</p>	<p>(7) <b>Pupils</b> learn how to calculate angles within parallel lines which is a skilled used in architecture and engineering.</p>	<p>(8) <b>Fractions</b> are used in sales, construction, architecture and art and design.</p>	<p>(9) <b>Graphs</b> are one of the key tools used in statistical analysis, market research and economics. Straight line graphs are particularly useful for price comparison services.</p> <p>(10) <b>Percentages</b>, decimals and fractions are imperative in the fields of data analysis, community management and journalism.</p>
<p><b>Cultural Capital</b></p>	<p>(1) <b>Pupils</b> learn how to divide monetary values which can be useful in day-to-day tasks such as shopping and splitting the cost of a meal between friends.</p> <p>(2) <b>Pupils</b> will be able to use skills learnt in this unit to make informed purchases such as buying furniture for a room.</p>	<p>(3) <b>Pupils</b> learn that statistics can be misleading which will better prepare them to think independently when exposed to advertising and marketing campaigns across social media clubs. This is particularly true when witnessing a mean average that may be skewed due to an outlier.</p> <p>(4) <b>Pupils</b> are exposed to a method of solving linear equations known as balancing. This idea can be used as a template for pupils to understand social distress with regards to issues involving equality. By understanding that with equations, like forces in physics, one action must have an equal and opposite action in order to maintain balance.</p>	<p>(5) <b>Pupils</b> will come across real life graphs when viewing utility bills on smart phone devices and observing sports statistics.</p> <p>(6) <b>Pupils</b> learn that not everything is shared equally among beneficiaries. They will learn how to deal with ratios involving decimals that can help them to better understand exchange rates when changing currency whilst travelling.</p>	<p>(7) <b>Pupils</b> will appreciate that despite having obvious similarities quadrilateral shapes are not all the same. This process of appreciating all the properties of 2D shapes can then be linked to stigma and stereotyping in society.</p>	<p>(8) <b>Pupils</b> can use their understanding of fractions to better understand the statistics and likelihoods they are exposed to through media.</p>	<p>(9) <b>Pupils</b> learn to interpret statistical data represented graphically. This will empower them in better understanding information they are exposed to through articles, books and other media.</p> <p>(10) <b>Being</b> able to convert seamlessly between fractions, decimals and percentages enables students to compare statistics that have been presented using differing forms of number.</p>
<p><b>Practical Application of Skills</b></p>	<p>(1) <b>Pupils</b> can use their understanding of highest common factors and lowest common multiples to solve daily task such as preparing meals and planning catering for a party.</p> <p>(2) <b>Pupils</b> can help their parents to purchase suitable furniture in their homes having considered the area of space available and the area required for the furniture.</p>	<p>(3) <b>Pupils</b> can decipher whether a given statistic witnessed in advertising is misleading.</p> <p>(4) <b>Pupils</b> can use their understanding of range when shopping for items online to appreciate that the first price they see may not be the cheapest price available for that product.</p>	<p>(5) <b>Pupils</b> can interpret real life graphs when viewing utility bills on smart phone devices and observing sports statistics.</p> <p>(6) <b>Pupils</b> learn how to share quantities in a given ratio and how to keep variables in proportion. These skills are useful when cooking by following or adapting a recipe.</p>	<p>(7) <b>Pupils</b> can use their understanding of angles in parallel lines when slicing food into smaller portions. By using slices that cause parallel lines it will increase the accuracy of having similarly sized portions due to the equal angles created.</p>	<p>(8) <b>Pupils</b> can use their understanding of converting between mixed numbers and improper fractions when following recipes or instructions on daily consumptions medicine.</p>	<p>(9) <b>Pupils</b> can use their understanding of direct proportion to adapt a recipe to cater for more (or less) people than the original recipe is designed for.</p> <p>(10) <b>Converting</b> between time represented as a decimal in hours to minutes can be very useful when planning journeys.</p>