

## Key Stage 4 - Maths

	Topic / Objectives	Knowledge taught	Big picture links	Keywords	Key Skills
Autumn Term 1 <sup>st</sup> Half-term	Number Properties 1 Geometry and Measure / Angles Number Properties 2 Algebra	<ol style="list-style-type: none"> <li>4 operations for integers, decimals and directed numbers; multiply and divide fractions; BIDMAS; ordering fractions, decimals and %</li> <li>using angle formula to find unknown angles in 2D shapes; interior and exterior angles and angle sums; investigate properties of quadrilaterals</li> <li>substitute positive and negative values into expressions and formula; including brackets; using formula for 2D and 3D shapes</li> </ol> <p>writing numbers in standard form and calculating with standard form; writing product of prime factors; finding LCM and HCF</p>	<p>Science – number patterns in cell division</p> <p>English – to use relevant number facts when contrasting text</p> <p>Art – angles in art</p> <p>Maths skills are skills for life</p>	<p>BIDMAS, inverse, directed numbers; vertices, polygon, quadrilaterals, regular; estimate, significant figure, indices, standard form; formula, substitution, speed, density, mass</p>	<p>using algebraic techniques for substitution; numerical skills when converting between decimals, fractions and % and working with standard form; geometrical skills when working with shape and angles</p>
Autumn Term 2 <sup>nd</sup> Half-Term	Fractions, Decimals and Percentages Algebra 2 Collecting and Interpreting Data	<ol style="list-style-type: none"> <li>Using fractions, decimals and % to compare proportions Using % to solve problems involving money – interest, VAT, tax Solve problems involving % increase and decrease; original value problems</li> <li>Substitute positive and negative integers and fractions into expressions and formulae Use formulae for areas and perimeters and volumes Use of compound measures such as speed and density</li> <li>Be able to construct and interpret a variety of tables and charts Be able to compare averages and the range Be able to estimate the mean of a grouped frequency table.</li> </ol>	<p>Science – substituting into chemical formula and calculating.</p> <p>English – using war data in analysing war poetry.</p> <p>PSHCE – understanding the use of averages when researching facts.</p> <p>Maths skills are relevant to their daily lives</p> <p>The student becomes a resilient learner by exploring the different ways to solve problems</p>	<p>multiplier; depreciate, tax, VAT, equivalent, compound interest, upper and lower bounds; linear, quadratic, expand, factorise; construct, discrete, continuous, Venn Diagrams, sample, random</p>	<p>numerical skills to problem-solve when working with %; recall and manipulation of formula; interpreting charts and graphs when working with data</p>
Spring Term 1 <sup>st</sup> Half-Term	Sequences / Graphs Proportion1/Ratio/Scales Shape properties	<ol style="list-style-type: none"> <li>Find the nth term of linear and quadratic sequences Generate a sequence from a formula Be able to draw a scatter graph, find a line of best fit, identify correlation and use the graph to make predictions</li> <li>Understand equivalent ratios and divide quantities in a given ratio</li> </ol>	<p>Science – drawing graphs</p> <p>English – using number facts when exploring text</p> <p>Maths skills are relevant to different aspects of daily lives</p>	<p>Fibonacci, triangular, scatter graph, correlation; ratio, proportion, scale, terminating decimals, recurring</p>	<p>finding and using algebraic rules; using ratio and scale when working with plans and maps; geometrical skills when</p>

		<p>Convert between families of fractions and decimals Write a ratio as a fraction and simplify Use the ratio 1:n for use with maps and scales and for problem solving including recipes Prove that a given recurring decimal can be written as a fraction</p> <p>3. To know and use mathematical vocabulary to describe the properties of 2D and 3D shapes To accurately draw triangles from a written description To be able to recognise congruence and use similarity in shapes</p> <p>To prove properties of a triangle using understanding of Pythagoras' Theorem.</p>	<p>Art – use of ratio in art products; fibonnaci sequence</p>	<p>decimals, unitary; enlargement, congruence, parallel, perpendicular, notation.</p>	<p>constructing shapes and recognising properites of shapes</p>
<p>Spring Term 2<sup>nd</sup> Half-Term</p>	<p>Algebra 3 Transformation Probability</p>	<p>1 To be able to change the subject of a formula including powers, roots and the subject appearing twice To find the difference of two squares To use algebra to understand and support a proof To be able to construct function machines</p> <p>2 To transform and describe translations and rotations To use the equation of the line of reflection to transform and describe reflections To transform and describe reflections with fractional and negative scale factors</p> <p>3 To use decimals and fractions to represent known probabilities To use a variety of representations to show all possible outcomes of an event e.g. Venn Diagrams, two way tables, tallies, sample space diagrams Be able to calculate the probability of an event occurring using a sample space diagram</p> <p>Construct and use tree diagrams to calculate probabilities</p>	<p>Science – probability and evolution, data English – using numerical data about the Russian Revolution</p> <p>To develop problem-solving skills as a tool which will enhance their performance and approach to the Maths GCSE exam papers</p>	<p>formula, input, output, operation, function, subject; enlarge, translate, similar, transformation; event, outcome, sample space diagram, frequency.</p>	<p>manipulating algebraic formula, explaining proofs and constructing formula machines; to fully describe a transformation and to follow instructions to transform a shape; to interpret diagrams when finding probabilities</p>

<p>Summer Term 1<sup>st</sup> Half-Term</p>	<p>Triangles and Constructions Interpreting Data Circles</p>	<ol style="list-style-type: none"> <li>1. Know and apply the criteria for congruent triangles To draw the 2D representations of a 3D (side, front and plan views) To sketch a 3D shape from 2D representations Use Pythagoras and trigonometry in a variety of contexts</li> <li>2. Draw and interpret pie charts, frequency diagrams, scatter diagrams, cumulative frequency, stem and leaf, box and whisker plots Calculate the average from grouped data and calculate the interquartile range from a cumulative frequency curve</li> <li>3. Calculate and use the formulas for area and circumference of circles and surface area and volumes of spheres, pyramids and cones</li> </ol> <p>To know and use circle theories.</p>	<p>Science – presenting data and using formula</p> <p>Art – plans and elevations; nets</p>	<p>hypotenuse, elevation, net; sin, cosine and tan; stem and leaf, histogram, frequency table, modal class, class interval, quartile, distribution; surface area, circumference, arc, tangent, sector, sphere, cone, prism</p>	<p>to interpret 2D representations of 3D shapes, to understand and use pythagorus theory when problem-solving; to interpret data and find averages from a variety of charts and graphs; to know and use theories and formula when working with 2D and 3D shapes.</p>
<p>Summer Term 2<sup>nd</sup> Half-Term</p>	<p>Proportion 2 Solving Equations and Inequalities Plotting and Sketching Graphs</p>	<ol style="list-style-type: none"> <li>1. To be able to draw graphs of straight lines in context; to be able to find gradients of straight lines and interpret them where appropriate as speed or rate of change To understand, use and construct formulae for proportion and inverse proportion</li> <li>2. Be able to solve linear equations including algebraic fractions; solve linear inequalities and represent the solution set on a number line Be able to solve two linear simultaneous equations algebraically and graphically; be able to solve quadratic equations by factorising including those that need rearranging</li> <li>3. Be able to plot linear and quadratic graphs; to find equations of straight lines by calculating gradients and y-intercepts; to be able to draw graphs of cubic, reciprocal and exponential functions; to understand the properties of perpendicular and parallel graphs and to find their equations.</li> </ol>	<p>Science – substituting into formula for density; using graphs</p> <p>To develop the student’s ability to become a resilient learner who can independently make decisions about how to start when solving a mathematical problem</p>	<p>direct, inverse proportion, gradient, graphical; solve, variable, root, simultaneous equations, represent graphically; intercept, reciprocal, asymptote, turning point, exponential, function</p>	<p>to use and interpret straight line graphs; to use algebraic methods to solve equations and represent solutions on a number line; to plot and interpret linear, quadratic and cubic graphs.</p>