

# Maths Long Term Plans

	Autumn 1 1-7	Autumn 2 8-14	Spring 1 15-19	Spring 2 20-24	Summer 1 25-31	Summer 2 32-38
Year 7	<p>N1 Understand and use place value for decimals, measures and integers of any size. Order positive and negative integers, and decimals. Use the number line as a model for ordering of the real numbers. Use the four operations, including formal written methods, applied to integers and decimals. Use standard units of mass, length, time, money or other measures.</p> <p>G1 Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles,</p>	<p>A1 Recognise and use relationships between operations including inverse operations. Use and interpret algebraic notation. Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors. Substitute numerical values into formulae and expressions. Model situations or procedures by translating them into algebraic expressions.</p> <p>N2 Use the concepts and vocabulary of prime numbers, factors, multiples, common factors,</p>	<p>N2 Use the concepts and vocabulary of prime numbers, factors, multiples, common factors, common multiples, highest common factor and lowest common multiple. Order fractions. Use integer powers and associated real roots (squares, cubes).</p> <p>G2 Draw and measure line segments and angles in geometric figures. 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</p>	<p>A2 Work with coordinates in all four quadrants. Recognise, sketch and produce graphs of linear functions of one variable with appropriate scaling, using equations in <math>x</math> and <math>y</math> and the Cartesian plane. Reduce a given linear equation in two variables to the standard form <math>y = mx + c</math>. Use linear graphs to estimate values of <math>y</math> for given values of <math>x</math> and vice versa. Generate terms of a sequence from either term-to-term or a position-to-term rule.</p>	<p>NR1 Define percentage as "number of parts per hundred". Change freely between related standard units. Use ratio notation. Divide a given quantity into two parts in a given part:part ratio.</p>	<p>SP1 Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language. Describe, interpret and compare observed distributions of a single variable through; appropriate graphical representation involving discrete and continuous; and appropriate measures of central tendency (mode, median) and spread (range). Construct and interpret appropriate</p>

	<p>parallelograms, volume of cuboids. Calculate and solve problems involving perimeter of 2-D shapes. Use the standard conventions for labelling the sides and angles of a triangle ABC. Derive and illustrate properties of triangles and other plane figures using appropriate language. Use properties of cubes and cuboids to solve problems in 3-D.</p>	<p>common multiples, highest common factor and lowest common multiple. Order fractions. Use integer powers and associated real roots (squares, cubes).</p>	<p>and rotationally symmetric. Identify properties of, and describe the results of, translations, reflections and rotations applied to given figures.</p>			<p>tables, charts and diagrams, including frequency tables, bar charts, and pictograms for categorical data, and vertical charts for ungrouped data.</p>
Year 8	<p>N1 To secure and strengthen from Year 7 and include; Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals. Use standard units of mass, length, time, money or other measures including with decimal quantities. Round numbers and</p>	<p>A1 To secure and strengthen from Year 7 and include; Substitute numerical values into formulae and expressions, including scientific formulae. Simplify and manipulate algebraic expressions to maintain equivalence. Understand and use standard mathematical</p>	<p>N2 To secure and strengthen from Year 7 and include; Use the concepts and vocabulary of prime factorisation including using product notation and the unique factorisation property. Use the four operations with fractions. Interpret fractions as operators. Recognise powers</p>	<p>A2 To secure and strengthen from Year 7 and include; Recognise, sketch and produce graphs of quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane. Calculate and interpret gradients and intercepts of graphs of linear equations</p>	<p>NR1 To secure and strengthen from Year 7 and include; Interpret percentage change as a fraction or decimal, interpret these multiplicatively. Interpret percentages as operators. Use scale factors with maps. Express one quantity as a fraction of another where the fraction is less than</p>	<p>SP1 To secure and strengthen from Year 7 and include; Using the 0-1 probability scale. Understand that the probability of all possible outcomes sum to 1. Describe, interpret and compare observed distributions of a single variable through; appropriate graphical representation</p>

	<p>measures to an appropriate degree of accuracy, including with decimal places. Use a calculator to calculate results accurately.</p> <p>G1 To secure and strengthen from Year 7 and include; Derive and apply formulae to calculate and solve problems involving: perimeter and area of trapezia, volume of other prisms. Calculate and solve problems involving area of composite shapes. Derive and illustrate properties of quadrilaterals and circles using appropriate language. Use properties of prisms and cylinders to solve problems in 3-D.</p>	<p>formulae. Rearrange formulae to change the subject. Use algebraic methods to solve linear equations in one variable.</p> <p>N2 To secure and strengthen from Year 7 and include; Use the concepts and vocabulary of prime factorisation including using product notation and the unique factorisation property. Use the four operations with fractions. Interpret fractions as operators. Recognise powers of 2, 3, 4, 5 and distinguish between exact representation of roots and their decimal approximations.</p>	<p>of 2, 3, 4, 5 and distinguish between exact representation of roots and their decimal approximations.</p> <p>G2 To secure and strengthen from Year 7 and include; Interpreting scale drawings. Construct similar shapes by enlargement. Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles. Understand and use the relationship between parallel lines and alternate and corresponding angles. Derive and use the sum of angles in a triangle and use it to deduce the angle sum of any polygon, and to derive properties of regular polygons.</p>	<p>graphically. Use quadratic graphs to estimate values of y for given values of x and vice versa. Recognise arithmetic sequences and find the nth term.</p>	<p>1. Reduction of ratio to its simplest form. Divide a given quantity into two parts in a given part:whole ratio. Understand that a multiplicative relationship between two quantities can be expressed as a ratio or fraction. Solve problems involving percentage change, including: percentage increase, decrease and simple interest in financial mathematics. Solve problems involving direct proportion. Use compound units such as unit pricing.</p>	<p>involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers)</p>
Year 9	N1 To secure and strengthen from	A1 To secure and strengthen from	N2 To secure and strengthen from	A2 To secure and strengthen from	NR1 To secure and strengthen from	SP1 To secure and strengthen from

	<p>Year 8 and include; Interpret and compare numbers in standard form where the power is positive or negative or zero. Round numbers and measures to an appropriate degree of accuracy, including with significant figures. Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation. Use a calculator to calculate results accurately and interpret them appropriately. Appreciate the infinite nature of the sets of integers, real and rational numbers.</p> <p>G1 To secure and strengthen from Year 8 and include; Derive and apply formulae to calculate and solve volume of other prisms including</p>	<p>Year 8 and include; Model situations or procedures by translating them into algebraic formulae. Interpret mathematical relationships algebraically.</p> <p>N2 To secure and strengthen from Year 8 and include; Using the four operations with fractions including proper and improper fractions and mixed numbers. Work interchangeably with terminating decimals and their corresponding fractions.</p>	<p>Year 8 and include; Using the four operations with fractions including proper and improper fractions and mixed numbers. Work interchangeably with terminating decimals and their corresponding fractions.</p> <p>G2 To secure and strengthen from Year 8 and include; Derive and use the standard ruler and compass constructions; recognise and use the perpendicular distance from a point to a line as the shortest distance to the line. Construct similar shapes by enlargement using coordinate grids. Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including use of</p>	<p>Year 8 and include; Interpret mathematical relationships graphically. Model situations or procedures by using graphs. Calculate and interpret gradients and intercepts of graphs of linear equations algebraically. Use linear and quadratic graphs to find approximate solutions of simultaneous equations. Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs. Recognise geometric sequences and appreciate other sequences that may arise.</p>	<p>Year 8 and include; Express one quantity as a percentage of another, compare two quantities using percentages and work with percentages greater than 100%. Use scale factors with scale diagrams. Express one quantity as a fraction of another where the fraction is greater than 1. Relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions. Solve problems involving percentage change, including: percentage increase, decrease and original value problems. Solve problems involving inverse proportion. Use compound units such as speed and density.</p>	<p>Year 8 and include; Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams. Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities. Construct and interpret appropriate tables, charts and diagrams, including pie charts for categorical data, and vertical charts for ungrouped and grouped numerical data. 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>cylinders. Calculate and solve problems involving perimeter and area of 2-D shapes including circles. Know and use the criteria for congruence of triangles. Identify and construct congruent triangles. Use Pythagoras' theorem and trigonometric ratios in similar triangles to solve problems involving right angles. Use properties of pyramids, cones and spheres to solve problems in 3-D.</p>		<p>Pythagoras' theorem.</p>			
Year 10	<p>N1 To secure and strengthen from Year 9 and include; Apply systematic listing strategies, {including use of the product rule for counting}. Estimate powers and roots of any given positive number. Calculate exactly</p>	<p>A1 To secure and strengthen from Year 9 and include; Simplify and manipulate algebraic expressions (including those involving surds {and algebraic fractions}) by: factorising quadratic expressions of the</p>	<p>N2 To secure and strengthen from Year 9 and include; Calculate with roots, and with integer {and fractional} indices. Change recurring decimals into their corresponding fractions and vice versa.</p>	<p>A2 To secure and strengthen from Year 9 and include; Use the form <math>y = mx + c</math> to identify parallel {and perpendicular} lines; find the equation of the line through two given points, or through one point with a given gradient.</p>	<p>NR1 To secure and strengthen from Year 9 and include; Identify and work with fractions in ratio problems. Convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts.</p>	<p>SP1 To secure and strengthen from Year 9 and include; Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one. Use a probability model to predict the outcomes of future experiments;</p>

	<p>with fractions, {surds} and multiples of <math>\pi</math>; {simplify surd expressions involving squares and rationalise denominators}. Calculate with numbers in standard form. Apply and interpret limits of accuracy when rounding or truncating, {including upper and lower bounds}.</p> <p>G1 To secure and strengthen from Year 9 and include; Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios). Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment. Apply and prove the standard circle</p>	<p>form <math>ax^2 + bx + c</math>, including the difference of two squares. Simplifying expressions involving sums, products and powers, including the laws of indices. Know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments {and proofs}. Where appropriate, interpret simple expressions as functions with inputs and outputs; {interpret the reverse process as the 'inverse function'; interpret the succession of two functions as a 'composite function'}. Solve quadratic equations {including those that require rearrangement} algebraically by</p>	<p>G2 To secure and strengthen from Year 9 and include; Interpret and use fractional {and negative} scale factors for enlargements. Describe the changes and invariance achieved by combinations of rotations, reflections and translations. Construct and interpret plans and elevations of 3D shapes. Interpret and use bearings. Describe translations as 2D vectors. Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; {use vectors to construct geometric arguments and proofs}.</p>	<p>Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically {and turning points by completing the square}. Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function <math>y = \frac{1}{x}</math>, <math>x \neq 0</math>, {the exponential function for positive values of <math>k</math>, and the trigonometric functions (with arguments in degrees) for angles of any size} . Sketch translations and reflections of the graph of a given function}. Plot and interpret graphs (including reciprocal graphs {and exponential graphs}) and graphs of non-standard functions in real contexts, to find approximate solutions to</p>	<p>Understand that X is inversely proportional to Y is equivalent to X is proportional to <math>\frac{1}{Y}</math> , {construct and} interpret equations that describe direct and inverse proportion. Interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion. Interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of instantaneous and average rate of change (gradients of tangents and chords) in numerical, algebraic and graphical contexts. Set up, solve and interpret the answers in growth and decay problems, including compound interest {and work with</p>	<p>understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size. Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions. Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams. Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling. Interpret and construct tables and line graphs for time series data. Construct and interpret diagrams</p>
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	<p>theorems concerning angles, radii, tangents and chords, and use them to prove related results. Calculate arc lengths, angles and areas of sectors of circles. Calculate surface areas and volumes of spheres, pyramids, cones and composite solids. Apply the concepts of congruence and similarity, including the relationships between lengths, {areas and volumes} in similar figures. Apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles {and, where possible, general triangles} in two {and three} dimensional figures. Know the exact values of <math>\sin\theta</math>, <math>\cos\theta</math> and <math>\tan\theta</math> for 0, 30, 45, 60 and 90 degrees. Know and apply the</p>	<p>factorising, {by completing the square and by using the quadratic formula}. Find approximate solutions to equations numerically using iteration. Translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution. Solve linear inequalities in one {or two} variable{s}, {and quadratic inequalities in one variable}; represent the solution set on a number line.</p> <p>N2 To secure and strengthen from Year 9 and include; Calculate with roots, and with integer {and fractional} indices. Change recurring</p>		<p>problems such as simple kinematic problems involving distance, speed and acceleration. Calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts. Recognise and use the equation of a circle with centre at the origin; find the equation of a tangent to a circle at a given point. Find approximate solutions to quadratics by using a graph. Solve two simultaneous equations in two variables (linear/linear {or linear/quadratic}) algebraically; find approximate solutions using a graph. Solve linear</p>	<p>general iterative processes}.</p>	<p>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. Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through: appropriate graphical representation involving discrete, continuous and grouped data, {including box plots} appropriate measures of central tendency (including modal class) and spread {including quartiles and inter-quartile range}. Apply statistics to describe a population. Use and interpret scatter graphs of bivariate data; recognise correlation and know that it does</p>
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	<p>sine and cosine rules.          Know and apply  <math>Area = \frac{1}{2}absinC</math>          to calculate the area, sides or angles of any triangle.</p>	<p>decimals into their corresponding fractions and vice versa.</p>		<p>inequalities in one {or two} variable{s}, {and quadratic inequalities in one variable}; using set notation on a graph. Recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric progressions{and other sequences}. Deduce expressions to calculate the nth term of linear {and quadratic} sequences. Interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of instantaneous and average rate of change (gradients of tangents and chords) in numerical, algebraic and graphical contexts.</p>		<p>not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing.</p>
Year 11	A bespoke package	A bespoke package	REVISION	REVISION	REVISION	



	<p>is designed each year for the needs of individual groups aimed at supporting their revision and progress towards their November PPE examination. The package is designed from the ongoing monitoring of security and strength of the Maths syllabus from Y7 to Y10.</p>	<p>is designed each year for the needs of individual groups aimed at supporting their revision and progress towards their November PPE examination. The package is designed from the ongoing monitoring of security and strength of the Maths syllabus from Y7 to Y10. In addition, following the PPEs the students will follow a gap analysis package aimed at supporting their group and individual progress.</p>				
Sixth Form resit	<p>Groundwork: Number All 4 operations Rounding Fractions, decimals and percentages Laws of indices Prime factors LCM and HCF</p> <p>Groundwork: Algebra Simplify expressions Index notation Substitution Coordinates</p>	<p>Straight-line graphs</p> <p>Angle properties in shapes</p> <p>Accuracy</p> <p>Circles</p> <p>Equations and inequalities</p> <p>Probability</p> <p>Sequences</p>	<p>Constructions</p> <p>Quadratics</p> <p>Quadratic graphs</p> <p>Ratio and compound measures</p> <p>Proportion</p> <p>Simultaneous equations</p>	<p>Pythagoras' theorem</p> <p>Statistical graphs and measures</p> <p>Transformation of shapes and vectors</p> <p>Bivariate data</p> <p>Sampling</p> <p>Probability of combined events</p>	<p>Trigonometry</p> <p>Further graphs</p> <p>Mathematical arguments</p> <p>REVISION</p>	

	<p>Groundwork: Geometry Angles in polygons and parallel lines Perimeter Area</p> <p>Groundwork: Statistics Pictograms Bar charts Pie charts Line graphs Stem and leaf diagrams</p> <p>Percentage</p> <p>Indices and roots</p> <p>Algebraic manipulation</p>			<p>Volume and surface area</p>		
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