

Mathematics Curriculum Overview 2023-24

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7 curriculum overview	Place value Addition and Subtraction Multiplication and Division	Sequences Understand & Use Algebraic Notation Equality & Equivalence	Directed number FDP Addition and Subtraction of Fractions	Constructing, Measuring & Using Geometric Notation Develop Geometric Reasoning	Fractions and percentages of amounts Developing number sense	Sets and probability Prime numbers and proof
Skills	Understand and use place value for decimals, measures and integers of any size Order positive and negative integers, decimals and fractions; use the number line Recognise and use relationships between operations including inverse operations Derive and apply formulae to calculate and solve problems involving: Perimeter Use the concepts and vocabulary factors (or divisors), multiples,	Generate sequence from term-to-term rule Make and test conjectures about the generalisations that underlie patterns and relationships Use algebra to generalise the structure of arithmetic. To solve linear equation Simplify and manipulate algebraic expressions to maintain equivalence See approximation through rounding to estimate answers	Use the four operations Interpret Pie chart Substitute numerical values into formulae and expressions, including scientific formulae To understand the relationship between fractions, percentages and decimals.	Identify and construct triangles Understand and use the relationship between parallel lines and alternate and corresponding angles Derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures 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	Interpret fractions and percentages as operators Begin to reason deductively in geometry, number and algebra Recall and use equivalences between simple fractions, decimals and percentages Substitution into expressions	Record, describe and analyse the frequency of outcomes of simple probability experiments Enumerate sets and unions and intersections of sets systematically Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors Use integer powers and associated real roots (square, cube and higher)

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	<p>common factors, common multiples, highest common factor, lowest common multiple</p> <p>Use algebraic methods to solve linear equations in one variable</p>					
Personal Development links	Using mathematical knowledge and skills to solve a problem for which one is accountable	Chairing a debate, allowing representations and directing the conversation to a conclusion.	Translating problems in mathematical or nonmathematical contexts into a process or a series of mathematical processes and solving them.	Using verbal and non-verbal communication skills in a dialogue about mathematics.	Able to communicate a mathematical process or technique (verbally or written) to peers and teachers and answer questions from others.	Making abstract deductions and draw conclusions from mathematical information
Career links	Tax advisor Baker Surveyor	Carpenter Air traffic controller Chemist	Data analyst Investment analyst	Pilot Aerospace engineer	Stock broker Financial advisor Articheet	Meteorologist Data Scientist Market researcher Economist

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 8 curriculum overview	<p>Ratio and scale</p> <p>Multiplicative change</p> <p>Multiplying and dividing fractions</p>	<p>Working in the cartesian plane</p> <p>Representing data</p> <p>Representations tables & probability</p>	<p>Brackets, equations & inequalities</p> <p>Algebraic techniques</p> <p>Sequence</p> <p>Algebraic techniques</p> <p>Indices</p>	<p>Fractions & percentages</p> <p>Standard form</p> <p>Developing Number sense</p>	<p>Angles in parallel lines & polygons.</p> <p>Area of trapezium & circles</p> <p>Line symmetry & reflection.</p>	<p>The data handling cycle</p> <p>Measure of location.</p>
Skills	<p>Make connections between number relationships, and their algebraic and graphical representations.</p> <p>Use scale factor, scale diagrams and maps.</p> <p>Interpret when the structure of a numerical problem requires proportional reasoning.</p> <p>Use of Calculation strategies to solve complex problems.</p>	<p>Make connections between different numerical, algebraic, graphical and diagrammatic representations.</p> <p>Use language and properties precisely to analyse probability and statistics.</p> <p>Generate theoretical sample spaces for single and combined events.</p> <p>Using 0-1 probability scale.</p>	<p>Understand and use standard mathematical formulae.</p> <p>Identify variables and express relationships between variables algebraically.</p> <p>Understanding collecting like terms</p> <p>Multiplying a single term over a bracket.</p> <p>Taking out common factors.</p> <p>Generate terms of a sequence from either a term-to-term rule or a position-to-term rule.</p> <p>Find the nth term of a sequence.</p>	<p>Interpret fractions and percentages as operators</p> <p>Work with terminating decimals and their corresponding fractions.</p> <p>Use integer powers and associate real roots (Square, cube and higher)</p> <p>Use standard units of mass, length, time, money and other measures.</p>	<p>Understand relationship between parallel lines, alternate and corresponding angles.</p> <p>Illustrate properties of triangles, quadrilaterals and circles.</p> <p>Solve problems involving perimeters of 2-D shapes, area of circles and composite shapes.</p> <p>Identify properties of reflection applied to given figures.</p> <p>Sketch and draw using conventional terms and notations with rotationally symmetric.</p>	<p>Describe, interpret and compare observed distributions of a single variable.</p> <p>Construct and interpret and compare tables, charts and diagrams.</p> <p>Understanding measures of central tendency (mean, mode, median) and spread (range, outliers)</p>

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Personal Development links	Identifying a problem under your own initiative, planning a solution and analysing the result	Able to communicate a mathematical process or technique (verbally or written) to peers and teachers and answer questions from others.	Ability to select and apply knowledge and understanding of mathematical processes to unseen mathematical problems.	Working with other students in a maths based problem solving exercise.	Using mathematical knowledge and skills to solve a problem for which one is accountable.	Using many different pieces of mathematical information and synthesising this information to arrive at a solution to a mathematics-based problem.
Career links	Banking Baker Finance Real estate worker Professional chief	Economist Budget Analyst Market research analyst Atmospheric Scientist Mathematician	Financial advisor Landscape architect Nuclear engineer Computer science	Pharmacist Architects Doctors Mechanics	Construction Worker Mathematics teacher Interior designer Fashion designer Animator Game developer Surveyor Mechanical engineer	Data manager Human resource departments (often calculate mean salary for individuals) Weather forecaster Statistician

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 9 curriculum overview	Forming and solving equations Straight line graphs Testing conjectures	3D shapes Constructions and congruence	Numbers Using percentages Maths and money	Deduction Rotation and translation Pythagoras' Theorem	Enlargement and Similarity Solving ratio and proportion problems Rates	Probability Algebraic representation
Skills	Understand and use standard mathematical formulae, rearrange formulas to change subject. Interpret mathematical relationships both algebraically and graphically. To reason deductively geometry, number and algebra.	Use language and properties precisely to analyse algebraic expressions 2-D and 3-D shapes Draw and measure line segments angles in geometric figures, including interpreting scale drawings. Use the standard conventions for labelling sides and angles of triangle ABC, and know and use the criteria for congruence triangles.	Appreciate the infinite nature of the set of integers, real and rational numbers. Interpret fractions and percentages as operators Select and use appropriate calculations strategies to solve increasingly complex problems.	Apply properties of angles at a point, angles at a point on a straight line, vertically opposite angles. Identify properties of, and describe result of, translations, rotations and reflections applied to given figures. Use Pythagoras' Theorem to solve problems involving right-angled triangles.	Use scale factors, scale diagrams and maps. 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.	Enumerate sets and unions/intersections of sets systematically, using tables, grids and venn diagrams. Use quadratic graphs to estimate values of y for given values of x and vice versa.
Personal Development links	Develop problem solving through forming and solving equations in real-life examples	Develop applications in everyday life, like thinking about home projects.	Develop the importance of financial aspects of everyday situations.	Able to communicate a mathematical process or technique to peers and teachers and answer questions from others.	Using many different pieces of mathematical information and synthesising this information to arrive at a solution to a mathematics-based problem.	Using own learning to apply mathematical processes and link these together to prove and validate mathematical concepts. Uses a different mathematical

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						process to arrive at an answer.
Career links	Financial analyst	Architecture	Accountant	Surveyors	Dietician	Statistician
	Business Manager	Engineer	Banker	Engineers	Stock brokers	Economist
	Computer Programmer	Modelling	Auditor	Aviation	Bankers	Financial Analyst

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10 Foundation curriculum overview	Congruence, similarity & enlargement Trigonometry	Equations and Inequalities Simultaneous Equations	Angles and Bearings Working with Circles Vectors	Ratios and Fractions Percentages and Interest Probability	Collecting, Representing and Interpreting Data Non-Calculator Methods	Types of Number and Sequences Indices and Roots Manipulating Expressions
Skills	Use fractional scale factors for enlargements Apply relationships of similarity for lengths of shapes Apply Pythagoras' Theorem and trigonometry in 2D Develop problem solving skills from different parts of Mathematics	Expand and consolidate on algebraic capability from KS3 Select appropriate techniques to problem solve with algebraic methods Form and solve linear simultaneous equations algebraically and graphically	Interpret and use bearings, making connections with other parts of Mathematics Calculate arc lengths and areas of sectors Calculate the volume and surface area of spheres, cylinders and cones. Apply operations involving vectors through diagrammatic and column representations	Divide a given quantity into two parts. Compare area, length and volume using ratio Solve a variety of problems involving percentage change. Form and solve growth and decay problems, including compound interest Calculate the probability of independent and dependent events, using representations.	Construct and interpret tables, charts and diagrams for grouped and ungrouped data Describe and interpret distributions of a single variable and the relationships between two variables Calculate exactly with fractions Apply and interpret limits of accuracy when rounding	Consolidate knowledge of factors, primes, HCF and LCM. Calculate the nth term of a linear sequence Calculate with and simplify roots and integer indices Calculate with numbers in the standard form Simplify algebraic expressions,, including factorising quadratic expressions
Personal Development links	Develop adaptive learning skills to solve mathematics problems in contexts	Develop using mathematics skills to solve real world problems	Develop decision making by selecting the correct process to solve a problem	Develop personal responsibility for financial decisions	Develop analytical skills to interpret and present data	Develop ability to be a continuous learner by reflecting on the year, ahead of GCSEs in Year 11
Career links	Architecture Construction	Structural Engineer Jeweller Air Traffic Controller	Navigation Officer Pilot	Financial advisor Actuary Meteorologist	Statistician Market Research Sports Analyst	Librarian Chemical Engineering Forecaster

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10 Higher curriculum overview	Congruence, similarity & enlargement Trigonometry	Equations and Inequalities Simultaneous Equations	Angles and Bearings Working with Circles Vectors	Ratios and Fractions Percentages and Interest Probability	Collecting, Representing and Interpreting Data Non-Calculator Methods	Types of Number and Sequences Indices and Roots Manipulating Expressions
Skills	Use fractional and negative scale factors for enlargements Apply relationships of similarity for lengths, area and volume of shapes Apply Pythagoras' Theorem and trigonometry in 2D and 3D Apply the sine and cosine rule to calculate the area, sides and angles of any triangle.	Expand and consolidate on algebraic capability from KS3 Solve quadratic equations and inequalities through factorising and graphical methods Represent inequality solutions using set notation and graphs Solve linear/quadratic equations for two variables algebraically	Interpret and use bearings, making connections with other parts of Higher Mathematics Apply knowledge of scale factor to the surface area and volume of cylinders, cones and spheres. Apply and prove the standard circle theorems Use vectors to construct geometric arguments and proofs	Link ratio and fractions to the relationships between lengths area and volume in similar figures. Work with the general iterative processes Calculate and interpret conditional probabilities through appropriate representations	Construct and interpret histograms, cumulative frequency graphs and box plots Apply knowledge of quartiles and the inter quartile range Simplify expressions involving squares and surds Change recurring decimals into their corresponding fractions and vice versa Apply and interpret limits of accuracy, including upper and lower bounds	Calculate the nth term of a linear and quadratic sequence Interpret sequences involving surds Estimate powers and roots of any positive number Calculate with fractional indices Simplify and manipulate algebraic expressions and fractions Use algebraic expressions to construct proofs
Personal Development links	Develop adaptive learning skills to solve mathematics problems in contexts	Develop using mathematics skills to solve real world problems	Develop decision making by selecting the correct process to solve a problem	Develop personal responsibility for financial decisions	Develop analytical skills to interpret and present data	Develop ability to be a continuous learner by reflecting on the year, ahead of GCSEs in Year 11
Career links	Architecture	Structural Engineer	Navigation Officer	Financial advisor	Statistician	Librarian

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	Construction	Jeweller Air Traffic Controller	Pilot	Actuary Meteorologist	Market Research Sports Analyst	Chemical Engineering Forecaster
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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 11 F curriculum overview	Expanding and factorising Algebraic reasoning Changing the subject	Functions Geometric reasoning Multiplicative reasoning	Gradients & lines Non-linear graphs Using graphs	Listing & Describing Transforming & Constructing Show that..	Revision & Exam preparation Volume Circles Pythagoras' Theorem Trigonometry Angles Predicted papers	Summer exams
Skills	Simplify and manipulate algebraic expressions Know the difference between an equation and an identity Solve quadratic and simultaneous equations algebraically and graphically Form and solve an equation and interpret the solution Solve linear equations and inequalities Calculate the nth term of a linear sequence Test conjectures through the use of algebra	Deduce roots algebraically Apply Pythagoras' Theorem and trigonometry to find angles and lengths in right angle triangles Reason deductively in geometry and with bearings and vectors Interpret inverse and direct proportion equations. Link ratio to similarity and scale factors	Plot and interpret graphs. Use the form $y=mx+c$ to find the equation of a line and identify parallel lines Find approximate solutions using a graph Identify roots and intercepts of quadratic functions graphically Plot and interpret graphs of real contexts, such as speed, distance, time	Calculate probability of independent and dependent combined events Construct and interpret plans and elevations of 3D shapes Use integer and fractional scale factor for enlargements Describe translations of 2D vectors Apply the concepts of congruence and similarity Apply addition and subtraction of vectors and multiplication of vectors by a scalar	Model real-life situations mathematically and express the results using a range of formal representations Interpret mathematical relationships both algebraically and geometrically Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems, interpret their solution in the context of the problem given	Identify the areas in which to revise and relearn Revise problems which cover multiple aspects of the curriculum

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Personal Development links	<p>Throughout the five years of study the GCSE Maths course plays a crucial role in the personal development of Year 11 students by equipping them with essential skills and knowledge that are applicable in various aspects of life. Maths enhances problem solving skills, fostering logical thinking at critical analysis. Through mathematical concepts such as statistics and probability, GCSE Maths promotes data analysis and interpretation, enabling students to make informed decisions based on evidence and logical reasoning.</p> <p>Furthermore, GCSE Maths develops numeracy skills, enabling students to confidently handle everyday financial matters, budgeting, calculating discounts, and making informed decisions about money.</p>
Career links	<p>Proficiency in GCSE Maths expands career prospects across a wide range of industries, as many occupations require numerical and analytical skills. It can open doors to fields such as engineering, finance, technology, sciences, and more.</p>

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 11 H curriculum overview	Expanding and factorising Algebraic reasoning Changing the subject	Functions Geometric reasoning Multiplicative reasoning	Gradients & lines Non-linear graphs Using graphs	Listing & Describing Transforming & Constructing Show that..	Revision & Exam preparation Volume Circles Pythagoras' Theorem Trigonometry Angles Predicted papers	Summer exams
Skills	Use algebra to support and construct arguments (proofs) Translate simple situations or procedures into algebraic expressions Solve quadratic equations algebraically by factorising, by completing the square and by using the quadratic formula Interpret solutions to equations numerically using iteration	Interpret simple expressions as functions Recognise, sketch and interpret graph of quadratic functions Solve problems with composite and inverse functions Deduce turning points by completing the square Apply and prove the standard circle theorems Use vectors to construct geometric arguments and proofs Construct equations that describe direct and inverse proportion	Interpret gradient of graphs as a rate of change Freely move between different numerical, algebraic, graphical and diagrammatic representations Use the form $y=mx+c$ to identify perpendicular and parallel lines Find solutions to linear/quadratic simultaneous equations using a graph Recognise the exponential function	Use negative scale factors for enlargement Describe changes achieved by multi-step transformations Recognise graphs of the trigonometric functions Sketch translations and reflections of the graph of a given function Use the product rule for counting Interpret conditional probabilities through representations Work with recurring decimals and their corresponding fractions	Model real-life situations mathematically and express the results using a range of formal representations Interpret mathematical relationships both algebraically and geometrically Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems, interpret their solution in the context of the problem given	Identify the areas in which to revise and relearn Revise problems which cover multiple aspects of the curriculum

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			<p>Recognise and use the equation of a circle</p> <p>Interpret the gradient at a point on a curve as the instantaneous rate of change</p> <p>Calculate the gradients of graphs and areas under graphs</p>	<p>Show that using proofs, shapes, vectors and data.</p>		
<p>Personal Development links</p>	<p>Throughout the five years of study the GCSE Maths course plays a crucial role in the personal development of Year 11 students by equipping them with essential skills and knowledge that are applicable in various aspects of life. Maths enhances problem solving skills, fostering logical thinking at critical analysis. Through mathematical concepts such as statistics and probability, GCSE Maths promotes data analysis and interpretation, enabling students to make informed decisions based on evidence and logical reasoning.</p> <p>Furthermore, GCSE Maths develops numeracy skills, enabling students to confidently handle everyday financial matters, budgeting, calculating discounts, and making informed decisions about money.</p>					
<p>Career links</p>	<p>Proficiency in GCSE Maths expands career prospects across a wide range of industries, as many occupations require numerical and analytical skills. It can open doors to fields such as engineering, finance, technology, sciences, and more.</p>					

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 12 curriculum overview	Unit 1: Algebra and Functions Unit 2: Coordinate Geometry in the (x, y) Plane <u>Applied</u> Unit 1: Statistical Sampling Unit 2: Data Presentation and Interpretation	Unit 3a: Algebraic Methods Unit 3b: Algebraic Methods <u>Applied</u> Unit 3: Probability Unit 4: Statistical Distributions	Unit 4: Trigonometric Ratio and Equations Unit 6: Differentiation <u>Applied</u> Unit 5: Statistical Hypothesis Testing Unit 6: Quantities and Units in Mechanics	Unit 7: Integration Unit 5: Vector <u>Applied</u> Unit 7: Constant Acceleration (Kinematics 1) Unit 8: Forces & Newton's Laws	Unit 8: Exponentials and Logarithms <u>Applied</u> Unit 9: Variable Acceleration (Kinematics 2)	Unit 2: Algebraic and Partial Fractions (Y13) Unit 3: Functions and Modelling (Y13) <u>Applied</u> Unit 2: Probability (Y13)
Skills	<p>Non-routine problem solving - expert thinking, metacognition, creativity</p> <p>Systems thinking- – decision making and reasoning.</p> <p>Critical thinking - – definitions of critical thinking are broad and usually involve general cognitive skills such as analysing, synthesising and reasoning skills.</p> <p>ICT literacy- – access, manage, integrate, evaluate, construct and communicate.</p>					
Personal Development links	<p><u>Interpersonal skills</u></p> <p>Communication – active listening, oral communication, written communication, assertive communication and non-verbal communication.</p> <p>Relationship-building skills – teamwork, trust, intercultural sensitivity, service orientation, self-presentation, social influence, conflict resolution and negotiation.</p>					

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Collaborative problem solving – establishing and maintaining shared understanding, taking appropriate action, establishing and maintaining team organisation.

Intrapersonal skills

Adaptability – ability and willingness to cope with the uncertain, handling work stress, adapting to different personalities, communication styles and cultures, and physical adaptability to various indoor and outdoor work environments.

Self-management and self-development – ability to work remotely in virtual teams, work autonomously, be self-motivating and self-monitoring, willing and able to acquire new information and skills related to work.

Career links

All technical careers including, Mathematics, Statistics, Engineering, Science, Computing, Economics, Business, Commerce.

In addition, Mathematics develops strategic thinking and problem-solving skills which can support any career requiring these attributes such as Medicine, Architecture, Design, Insurance.

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 13 curriculum overview	Unit 4: Series and Sequences Unit 5: Algebraic and Partial Fractions <u>Applied</u> Unit 1: Regression and Correlation	Unit 6: Trigonometry <u>Applied</u> Unit 3 The Normal Distribution	Unit 7: Parametric Equations Unit 8: Differentiation <u>Applied</u> Unit 4: Moments Unit 5: Forces at any Angle	Unit 10: Integration (part 1) <u>Applied</u> Unit 6: Projectiles	Unit 11: Integration (part 2) Unit 12: Vectors (3D) <u>Applied</u> Unit 7: Applications of Forces	Unit 9: Numerical Methods Unit 1: Proof <u>Applied</u> Unit 8: Further Kinematics
Skills	<p>Non-routine problem solving - expert thinking, metacognition, creativity</p> <p>Systems thinking- – decision making and reasoning.</p> <p>Critical thinking - – definitions of critical thinking are broad and usually involve general cognitive skills such as analysing, synthesising and reasoning skills.</p> <p>ICT literacy- – access, manage, integrate, evaluate, construct and communicate.</p>					
Personal Development links	<p><u>Interpersonal skills</u></p> <p>Communication – active listening, oral communication, written communication, assertive communication and non-verbal communication.</p> <p>Relationship-building skills – teamwork, trust, intercultural sensitivity, service orientation, self-presentation, social influence, conflict resolution and negotiation.</p> <p>Collaborative problem solving – establishing and maintaining shared understanding, taking appropriate action, establishing and maintaining team organisation.</p> <p><u>Intrapersonal skills</u></p> <p>Adaptability – ability and willingness to cope with the uncertain, handling work stress, adapting to different personalities, communication styles and cultures, and physical</p>					

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	<p>adaptability to various indoor and outdoor work environments.</p> <p>Self-management and self-development – ability to work remotely in virtual teams, work autonomously, be self-motivating and self-monitoring, willing and able to acquire new information and skills related to work.</p>
Career links	<p>All technical careers including, Mathematics, Statistics, Engineering, Science, Computing, Economics, Business, Commerce.</p> <p>In addition, Mathematics develops strategic thinking and problem-solving skills which can support any career requiring these attributes such as Medicine, Architecture, Design, Insurance.</p>