

Curriculum overview

KS3 and KS4 Mathematics

Terms/ Units	<u>Autumn 1</u>	<u>Autumn 2</u>	<u>Spring 1</u>	<u>Spring 2</u>	<u>Summer 1</u>	<u>Summer 2</u>
YEAR 7	Unit 1 Analysing and displaying data 1. Two-way tables and bar charts 2. Averages and range 3. Grouped data 4. More graphs 5. Pie charts 6. STEM: Scatter graphs and correlation Unit 2 Number skills 2.1 Factors, Primes and Multiples 2.2 Using negative numbers 2.3 Multiplying and dividing 2.4 Squares and square roots 2.5 More powers and roots 2.6 Calculations	Unit 3 Equations, functions and formulae 3.1 Simplifying algebraic expressions 3.2 Writing algebraic expressions 3.3 STEM: Using formulae 3.4 Writing formulae 3.5 Brackets and powers 3.6 Factorising expressions Unit 4 Fractions 4.1 Working with fractions 4.2 Adding and subtracting fractions 4.3 Fractions, decimals and percentages 4.4 Multiplying and dividing fractions 4.5 Working with mixed numbers	Unit 5 Angles and shapes 5.1 Angles and parallel lines 5.2 Triangles 5.3 Quadrilaterals 5.4 Polygons Unit 6 Decimals 6.1 Estimates and measures 6.2 Decimal numbers 6.3 Metric units 6.4 Adding and subtracting decimals 6.5 Rounding 6.6 Multiplying and dividing decimals 6.7 FINANCE: Calculating with money	Unit 7 Equations 7.1 Solving one-step equations 7.2 Solving two-step equations 7.3 More complex equations 7.4 Trial and improvement	Unit 8 Multiplicative reasoning 8.1 STEM: Metric and imperial units 8.2 Writing ratios 8.3 Sharing in a given ratio 8.4 Proportion 8.5 Proportional reasoning 8.6 Using the unitary method Unit 9 Perimeter, area and volume 9.1 Triangles, parallelograms and trapeziums 9.2 Perimeter and area of compound shapes 9.3 Properties of 3D solids 9.4 Surface Area 9.5 Volume 9.6 STEM: Measures of area and volume	Unit 10 Sequences and Graphs 10.1 Sequences 10.2 The nth term 10.3 Pattern sequences 10.4 Coordinates and line segments 10.5 Graphs
YEAR 8	Unit 1 Factors and powers 1.1. Squares, cubes and roots 1.2. Calculating with brackets and indices 1.3 LCM and HCF 1.4 Prime factor decomposition Unit 2 Working with powers	3) Unit 3 2D shapes and 3D solids 3.1 Plans and elevations 3.2 Surface area of prisms 3.3 Volume of prisms 3.4 Circumference of a circle 3.5 Area of a circle 3.6 Cylinders 3.7 Pythagoras' theorem 4) Unit 4 Real life graphs 4.1 Direct proportion 4.2 FINANCE: Interpreting financial graphs 4.3 Distance-time graphs 4.4 Rates of change 5. Misleading graphs	Unit 5 Transformations 5.1 Reflection and translation 5.2 Rotation 5.3 Enlargement 5.4 More enlargement 5.5 STEM: Combining Transformations 5.6 2D shapes and 3D solids Unit 6 Fractions, Decimals and Percentages 6.1 Recurring Decimals 6.2 Using percentages 6.3 Percentage change 6.4 FINANCE: Repeated percentage change	Unit 7 Constructions and loci 7.1 Accurate drawings 7.2 Constructing shapes 7.3 Constructions 1 7.4 Constructions 2 7.5 Loci	Unit 8 Probability 8.1 Comparing probabilities 8.2 Mutually exclusive events 8.3 Estimating probability 8.4 Experimental probability 8.5 Probability diagrams 8.6 Tree diagrams Unit 9 Scale drawings and measures 9.1 Maps and scales 9.2 Bearings 9.3 Scales and ratio 9.4 Congruent and similar shapes 9.5 Solving geometry problems	Unit 10 Graphs 10.1 Plotting linear graphs 10.2 The gradient 10.3 $y = mx + c$ 10.4 Parallel and perpendicular lines 10.5 Inverse functions 10.6 STEM: Non-linear graphs

YEAR 9	Unit 1 Number 1.1 Number problems and reasoning 1.2 Place value and estimating 1.3 HCF and LCM 1.4 Calculating with powers (indices) 1.5 Zero, negative and fractional indices 1.6 Powers of 10 and standard form 1.7 Surds	Unit 2 Algebra 2.1 Algebraic indices 2.2 Expanding and factorizing 2.3 Equations 2.4 Formulae 2.5 Linear sequences 2.6 Non-linear sequences 2.7 More expanding and factorising	Unit 3 Interpreting and representing data 3.1 Stem and leaf diagram 3.2 Frequency Polygons 3.3 Time series 3.4 Scatter Graphs 3.5 Averages from grouped frequency table 3.6 Pie charts and two-way tables	Unit 4 Fractions, ratio and percentages 4.1 Fractions 4.2 Ratios 4.3 Ratio and Proportion 4.4 Percentages 4.5 Fractions, decimals and percentages Unit 5 Angles and Trigonometry 5.1 Angle properties of triangles and quadrilaterals 5.2 Interior angles of a polygon 5.3 Pythagoras theorem 5.4 Trigonometric ratios	Unit 6 Graphs 6.1 Linear graphs 6.2 Speed distance time graph (rates of change) 6.3 Real-life graphs 6.4 Line segments and midpoints 6.5 quadratic graphs 6.6 Cubic and reciprocal graphs Unit 7 Area and Volume 7.1 Perimeter and Area of different shapes (including compound) 7.2 Units of measure and accuracy 7.3 Prisms, 7.4 Circles 7.5 Sectors of circles 7.6 Cylinders and Spheres 7.7 Pyramids and cones	Unit 8 Transformations and constructions 8.1 Draw plans and elevation of 3D solids 8.2 Reflection and Rotation 8.3 Enlargement 8.4 Translations 8.5 Bearings and Scale drawings 8.6 Construction 8.7 Loci
YEAR 10	Unit 5 and 13 Angles Trigonometry 1. Angles on parallel lines 2. Pythagoras 3. Trig Ratios 4. Angle of elevation and depression 5. Area of triangle rule 6. Sine rule 7. Cosine rule 8. Exact values	Unit 2 Algebra 2.1 Algebraic indices 2.2 Expanding and factorising 2.3 Equations 2.4 Formulae 2.5 Linear Sequences 2.6 Non-Linear Sequences 2.7 Expanding and factorising (quadratics) Unit 3 Interpreting and representing data 3.1 Stem and leaf diagram 3.2 Frequency Polygons 3.3 Time series 3.4 Scatter Graphs	Unit 4 Fractions, ratio and percentages 4.1 Fractions 4.2 Ratios 4.3 Ratio and Proportion 4.4 Percentages 4.5 Fractions, decimals and percentages Unit 6 Graphs 6.1 Linear graphs 6.2 Speed distance time graph (rates of change) 6.3 Real-life graphs 6.4 Line segments and midpoints	Unit 8 Transformations and constructions 8.1 Draw plans and elevation of 3D solids 8.2 Quick Review of Transformations 8.5 Bearings and Scale drawings 8.6 Construction 8.7 Loci Unit 9 Equations and inequalities 9.1 Solving Quadratic equations 9.2 Completing the square 9.3 Solving simultaneous equations	Unit 11 Multiplicative Reasoning 11.1 Compound measures 11.2 Direct and indirect Proportionality Unit 12 Similarity and Congruence 12.1 Congruence 12.2 Geometric Proof and Congruence 12.3 Similarity 12.4 Similarity in 3D solids	Unit 13 Trigonometry 13.1 Graph of sine and cosine 13.2 the tangent function 13.3 3D Trigonometry and Pythagoras 13.4 Transforming trigonometric graphs Unit 14 Further Statistics 14.1 Sampling 14.2 Cumulative frequency 14.3 Box plots 14.4 Drawing histograms 14.5 Interpreting histograms

		3.5 Averages from grouped frequency table	6.5 quadratic graphs 6.6 Cubic and reciprocal graphs Unit 7 Area and Volume 7.2 Prisms 7.4 Circles 7.5 Sectors of circles 7.6 Cylinders and Spheres 7.7 Pyramids and cones	9.4 Solving linear and quadratic equations Unit 10 Probability 10.1 Combined Events 10.2 Mutually Exclusive events 10.3 Experimental Probability 10.4 Independent events and tree diagrams 10.5 Conditional probability 10.6 Venn diagrams and set notation		
YEAR 11	Unit 18 Vectors and geometric proof 18.1 Vectors and vector notation 18.2 Vector arithmetic 18.3 More vector arithmetic 18.4 Parallel vectors and collinear points 18.5 Solving geometric problems	Unit 19 Proportion and graphs 19.1 Direct proportion 19.2 More direct proportion 19.3 Inverse proportion 19.4 Exponential functions 19.5 Non-linear graphs 19.6 Translating graphs of functions 19.7 Reflecting and stretching graphs of functions	Mock Exams Revision	Revision Mock Exams		
KEY ASSESSMENT FOCUSES	Tests after every Unit (Unit Tests covering specific areas of mathematics) End of Term Assessment (Assessment which tests the skills needed in termly Units) End of year Exam Tests are designed to work towards EDEXCEL STYLE Exam Problems					
Working Mathematically at KS3	At KS3 Pupils will have the opportunity to develop: Fluency to: - consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots - select and use appropriate calculation strategies to solve increasingly complex problems - use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships - substitute values in expressions, rearrange and simplify expressions, and solve equations - move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs] - develop algebraic and graphical fluency, including understanding linear and simple quadratic functions - use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics. Mathematical Reasoning to:					

	• extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations • extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically • identify variables and express relations between variables algebraically and graphically • make and test conjectures about patterns and relationships; look for proofs or counter- examples • begin to reason deductively in geometry, number and algebra, including using geometrical constructions • interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning • explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally. Solve problems to: • develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems • develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics • begin to model situations mathematically and express the results using a range of formal mathematical representations • select appropriate concepts, methods and techniques to apply to unfamiliar and non- routine problems. • use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property
Working Mathematically at KS4	Through the KS4 content, pupils will be taught to: Develop fluency • consolidate their numerical and mathematical capability from key stage 3 and extend their understanding of the number system to include powers, roots {and fractional indices} • select and use appropriate calculation strategies to solve increasingly complex problems, including exact calculations involving multiples of p{and surds}, use of standard form and application and interpretation of limits of accuracy • consolidate their algebraic capability from key stage 3 and extend their understanding of algebraic simplification and manipulation to include quadratic expressions, {and expressions involving surds and algebraic fractions} • extend fluency with expressions and equations from key stage 3, to include quadratic equations, simultaneous equations and inequalities • move freely between different numerical, algebraic, graphical and diagrammatic representations, including of linear, quadratic, reciprocal, {exponential and trigonometric} functions • use mathematical language and properties precisely. Reason mathematically • extend and formalise their knowledge of ratio and proportion, including trigonometric ratios, in working with measures and geometry, and in working with proportional relations algebraically and graphically • extend their ability to identify variables and express relations between variables algebraically and graphically • make and test conjectures about the generalisations that underlie patterns and relationships; look for proofs or counter-examples; begin to use algebra to support and construct arguments {and proofs} • reason deductively in geometry, number and algebra, including using geometrical constructions

- interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning
- explore what can and cannot be inferred in statistical and probabilistic settings, and express their arguments formally
- assess the validity of an argument and the accuracy of a given way of presenting information.

Solve problems

- develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems
- develop their use of formal mathematical knowledge to interpret and solve problems, including in financial contexts
- make and use connections between different parts of mathematics to solve problems
- model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their solutions may have been affected by any modelling assumptions
- select appropriate concepts, methods and techniques to apply to unfamiliar and non- routine problems; interpret their solution in the context of the given problem.