

# Maths YEAR 7

| Cycle 1: Topic   | Cycle 2: Topic   | Cycle 3: Topic   |
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| <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Commutativity, associativity, distributivity</li> <li>• Place Value Systems</li> <li>• Rounding: to nearest 10/100/1000, decimal places, significant figures</li> <li>• Order of operations</li> <li>• Positive and negative numbers</li> <li>• Introduction to algebra: expressions, equations and sequences</li> </ul> <p>Assessment:</p> <p>→ Year 7 Autumn PUMA (Progress in Understanding Mathematics) Assessment; 60 Minutes</p> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Properties of 2D shapes</li> <li>• Measure, draw and identify angles</li> <li>• Know and use angle facts, including angles in parallel lines</li> <li>• Construct triangle and quadrilateral</li> <li>• The Cartesian Plane: coordinates, midpoint, endpoint</li> <li>• Transform 2D figures</li> <li>• Area and perimeter of 2D shapes</li> </ul> <p>Assessment:</p> <p>→ Year 7 Spring PUMA (Progress in Understanding Mathematics) Assessment; 60 Minutes</p> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Prime numbers and factorisation</li> <li>• Understand, convert and use all operations with fractions</li> <li>• Find fraction and percentage of amount</li> <li>• Convert between fraction, decimal and percentages</li> <li>• Introduction to ratio with bar modelling</li> </ul> <p>Assessment:</p> <p>→ Year 7 Summer PUMA (Progress in Understanding Mathematics) Assessment; 60 Minutes</p> |
| <p>Curriculum Sequencing:</p> <p>Our all-through curriculum adopts a mastery/spiral approach to promote a deep mathematical understanding.</p> <p>Numerical and Algebraic units are sequenced at the start of Year 7 to ensure that students are numerate and fluent in the basics of algebra. This is with the view of deepening understanding</p>  |  |  |

of key concepts from KS2.

All core knowledge specified in this overview is contained within the KS3 National Curriculum, subject to some sequencing changes.

## Maths YEAR 8

| Cycle 1: Topic  | Cycle 2: Topic   | Cycle 3: Topic  |
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| <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>● Solving linear equations</li> <li>● Substitute into expressions, equations and formulae</li> <li>● Inequalities - forming, solving, representing on a number line</li> <li>● Finding angles in polygons and parallel lines</li> <li>● Construct and measure bearings</li> <li>● Performing basic constructions including equilateral triangles and perpendicular bisectors</li> </ul> <p>Assessment:</p> <p>→ Year 8 Autumn PUMA (Progress in Understanding</p> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>● Drawing straight line graphs</li> <li>● Finding the equations of straight line graphs</li> <li>● Finding area and perimeter of polygons including circles</li> <li>● Solving geometric problems involving algebra</li> <li>● Finding surface area and volume of 3D shapes</li> </ul> <p>Assessment:</p> <p>→ Year 8 Autumn PUMA (Progress in Understanding Mathematics) Assessment; 60 Minutes</p> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>● Convert between metric and imperial units</li> <li>● Understand direct and inverse proportion problems</li> <li>● Calculate rates of change including speed, distance and time</li> <li>● Construct basic statistical diagrams including bar graphs, pie charts and scatter graphs</li> <li>● Compare mean, median, mode and range</li> </ul> <p>Assessment:</p> <p>→ Year 8 Autumn PUMA (Progress in Understanding</p> |

Mathematics)  
Assessment; 60  
Minutes

Mathematics)  
Assessment; 60  
Minutes

Curriculum Sequencing:

Our all-through curriculum adopts a mastery/spiral approach to promote a deep mathematical understanding.

Algebraic units are sequenced at the start of Year 8 to ensure that students are numerate and fluent in the foundations to equip them with the skills that they need as they move into phase 4.

All core knowledge specified in this overview is contained within the Key Stage 3 National Curriculum, subject to some sequencing changes.

# Maths YEAR 9

| Cycle 1: Topic  | Cycle 2: Topic  | Cycle 3: Topic  |
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| <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Geometry and Graphs - Coordinates, Linear Graphs, Pythagoras' Theorem, Geometric Reasoning, Angle Sum in a Triangle, Interior &amp; Exterior Angles of Polygons</li> <li>• Algebra - Linear Equations, Formulae, Substitution, Changing the Subject, Solving Linear Inequalities, Graphing Linear Inequalities</li> </ul> <p>Assessment:</p> <p>→ Year 9 Autumn PUMA (Progress in Understanding Mathematics) Assessment; 60 Minutes</p> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Number - Indices &amp; Higher Powers, Decimal Approximation of Roots, Rules of Indices with Integer Values, Standard Form, Working with Very Large &amp; Very Small Numbers, Surds, Rational and Irrational Numbers, Recurring Decimals</li> <li>• Further Geometry - Transformations, Similarity and Congruence, Bearings, Trigonometric Ratios, Exact Values of Trigonometric Ratios</li> <li>• </li> </ul> <p>Assessment:</p> <p>→ Year 9 Spring PUMA (Progress in Understanding Mathematics) Assessment; 60 Minutes</p> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Further Algebra - Non-Linear Sequences, Quadratic Expressions and Equations, Factorising Quadratic Expressions, Quadratic Graphs, Solutions to Quadratic Equations</li> <li>• Probability and Statistics - Probability Scale, Sample Spaces, Discrete and Continuous Data, Calculating and Interpreting Statistical Measures, Grouped and Ungrouped Data</li> </ul> <p>Assessment:</p> <p>→ Year 9 Summer PUMA (Progress in Understanding Mathematics) Assessment; 60 Minutes</p> |

### Curriculum Sequencing:

Our all-through curriculum adopts a mastery/spiral approach to promote a deep mathematical understanding.

In Year 9, students will consolidate KS3 knowledge and equip with the knowledge and skills required to build solid foundations for the GCSE content.

Students will be introduced formally to Quadratics, Trigonometry and Probability.

All core knowledge specified in this overview is contained within the \_\_\_\_ National Curriculum, subject to some sequencing changes.

## Maths YEAR 10 Foundation

| Cycle 1:   | Cycle 2:   | Cycle 3:  |
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| <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>● Sharing ratio parts and wholes in a ratio</li> <li>● Comparing ratios</li> <li>● Relating Ratios and Fractions</li> <li>● Unitary Method</li> <li>● Recipe problems</li> <li>● Links between gradient and proportion</li> <li>● Similar shapes and enlargements</li> <li>● Speed, density and pressure</li> <li>● Real life graphs</li> <li>● Linear equations and inequalities involving</li> </ul> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>● Drawing linear graphs</li> <li>● Parallel Lines</li> <li>● Solving simultaneous equations</li> <li>● Sketching quadratic graphs</li> <li>● Expanding and Factorising quadratic expressions</li> <li>● Solving quadratic equations by factorising</li> <li>● Rules of indices</li> <li>● Standard Form</li> <li>● Simple and compound interest</li> </ul> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>● Constructing algebraic and geometric proof</li> <li>● Circles, including arcs and sectors</li> <li>● Plans and elevations</li> <li>● Surface area and volume of 3D shapes</li> <li>● Fundamentals of probability</li> <li>● Theoretical and Experimental Probability</li> <li>● Product rule for counting</li> <li>● Tree diagrams for independent and</li> </ul> |

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| <p style="text-align: center;">fractions and brackets</p> <p>Assessment:</p> <p>→ x1 GCSE Style<br/>Calculator Paper</p>  | <p style="text-align: center;">Assessment:</p> <p>→ x1 GCSE Style<br/>Non-Calculator Paper</p> | <p style="text-align: center;">dependent events</p> <p>Assessment:</p> <p>→ x1 GCSE Style<br/>Calculator Paper</p> <p>→ x1 GCSE Style<br/>Non-Calculator Paper</p> |
| <p>Curriculum Sequencing:</p> <p>Our all-through curriculum adopts a mastery/spiral approach to promote a deep mathematical understanding.</p> <p>In year 10, alongside consolidating and developing key numerical units, students are introduced to Geometric topics that rely heavily on algebraic and numerical skills to ensure that students have sufficient time over the year to practice and embed these important skills and concepts.</p> |  |  |
| <p>Links to National Curriculum: All core knowledge specified in this overview is contained within the KS4 National Curriculum, subject to some sequencing changes.</p>   |  |  |

# Maths YEAR 10 Higher

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| <p><b>Cycle 1:</b></p> <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Linear transformations</li> <li>• Similarity and Enlargement</li> <li>• Laws of Indices</li> <li>• Surds, including rationalising the denominator</li> <li>• Simple and compound interest</li> <li>• Quadratic Sequences</li> <li>• Parallel and Perpendicular Linear Graphs</li> </ul> <p>Assessment:</p> <p>→ x1 GCSE Style Calculator Paper</p> | <p><b>Cycle 2:</b></p> <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Solving Simultaneous Equations</li> <li>• Graphical Inequalities</li> <li>• Factorising Quadratics (<math>a &gt; 1</math>)</li> <li>• Completing the Square</li> <li>• Quadratic Formula</li> <li>• 3D Pythagoras</li> <li>• Non-right-angled trigonometry</li> <li>• Circles, including arcs and sectors</li> </ul> <p>Assessment:</p> <p>→ x1 GCSE Style Non-Calculator Paper</p> | <p><b>Cycle 3:</b></p> <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Plans and Elevations</li> <li>• Surface area and volume of 3D shapes</li> <li>• Limits of accuracy</li> <li>• Upper and lower bounds</li> <li>• Theoretical and Experimental Probability</li> <li>• Product rule for counting</li> <li>• Tree Diagrams for independent and dependent events</li> <li>• Conditional Probability, including Venn Diagrams</li> <li>• Algebraic Reasoning and Proof</li> </ul> <p>Assessment:</p> <p>→ x1 GCSE Style Calculator Paper</p> <p>→ x1 GCSE Style Non-Calculator Paper</p> |
| <p><b>Curriculum Sequencing:</b></p> <p>Our all-through curriculum adopts a mastery/spiral approach to promote a deep mathematical understanding.</p>   |  |   |

In year 10, alongside consolidating and developing key numerical units, students are introduced to Geometric topics that rely heavily on algebraic and numerical skills to ensure that students have sufficient time over the year to practice and embed these important skills and concepts.

All core knowledge specified in this overview is contained within the \_\_\_\_ National Curriculum, subject to some sequencing changes.

## Maths L2 Further Maths - Year 10

| Cycle 1:  | Cycle 2:  | Cycle 3:  |
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| <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Matrices - multiplying matrices, describing and combining transformations</li> <li>• Algebra 1 - simplifying expressions, solving linear equations, expanding brackets, binomial expansion, manipulating surds, product rule for counting</li> </ul> <p>Assessment:</p> <p>→ x1 Paper 1 style paper, Non-Calc (only content covered so far)</p> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Algebra 2 - factoring quadratics, simplifying algebraic fractions, completing the square</li> <li>• Coordinate Geometry - parallel/perpendicular lines, equation of a line, intersection of two lines, equation of a circle</li> </ul> <p>Assessment:</p> <p>→ x1 Paper 1 style paper, Non-Calc (only content covered so far)</p> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Algebra 4 - quadratic equations, the factor theorem, linear and quadratic inequalities</li> <li>• Geometry 1- Pythagoras' theorem, angle facts, trigonometric functions, graphs and identities</li> </ul> <p>Assessment:</p> <p>→ x1 full Paper 1</p> <p>→ x1 Paper 2 style paper, Calc (only content covered so far)</p> |



### Curriculum Sequencing:

Our all-through curriculum adopts a mastery/spiral approach to promote a deep mathematical understanding.

L2 Further Maths builds and deepens content knowledge from the GCSE course, as well as introducing students to some more complex topics. This increases pupil understanding at GCSE, and prepares them for taking an A-Level in Maths and Further Maths.

All core knowledge specified in this overview is contained within the AQA L2 Further Maths specification, which can be found here:

<https://filestore.aqa.org.uk/resources/mathematics/specifications/AQA-8365-SP-2018.PDF>

# Maths YEAR 11 Foundation

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| <p>Cycle 1:</p> <p><u>Core knowledge:</u></p> <p>Algebraic and Geometrical Reasoning:</p> <ul style="list-style-type: none"> <li>Algebraic Reasoning - develop simple mathematical arguments, show that two expressions are equivalent</li> <li>Vectors - use of column vectors, adding/subtracting, multiplying by a scalar,</li> <li>Constructions and Loci - use rulers, protractors and compasses to construct perpendicular bisectors, angle bisectors, triangles and loci</li> <li>Congruence - recognise congruent triangle and</li> </ul> | <p>Cycle 2:</p> <p><u>Core knowledge:</u></p> <p>Statistics:</p> <ul style="list-style-type: none"> <li>Basic Statistics - calculate averages for grouped and ungrouped data, use summary statistics to compare datasets</li> <li>Sampling - understand and describe different types of sampling</li> <li>Representing Data - choosing appropriate pictorial representation, interpret and construct graphs for time series data</li> <li>Scatter Graphs - plot and use scatter graphs, interpolate and extrapolate data to make estimates, identify correlation and</li> </ul> | <p>Cycle 3 - Revision</p> <p>In the final cycle before GCSEs start, lessons will focus on revision. This may be done in a range of ways:</p> <ul style="list-style-type: none"> <li>Reteaching content based on prior assessment results</li> <li>Timed exam practice</li> <li>Past papers</li> </ul> <p>Assessment:</p> <p>→ Formal GCSE Examinations</p> |
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| <p>prove congruence using SSS, ASA, AAS and RHS</p> <p>Assessment:</p> <p>→ Mini mocks - x1 GCSE Foundation Calculator style paper</p>  | <p>outliers</p> <p>Assessment:</p> <p>→ Mock Examinations; x3 GCSE Foundation style papers (x1 Non-Calculator, x2 Calculator)</p> |  |
| <p><b>Curriculum Sequencing:</b></p> <p>Our all-through curriculum adopts a mastery/spiral approach to promote a deep mathematical understanding.</p> <p>In year 11, alongside consolidating and developing key units, students are introduced to complex algebraic and statistical units. Revision and re-teaching for formal examinations will be determined via mock examinations and end-of-unit assessments.</p> |   |  |
| <p>All core knowledge specified in this overview is contained within the KS4 National Curriculum, subject to some sequencing changes.</p>   |   |  |

# Maths YEAR 11 Higher

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| <p>Cycle 1:</p> <p><u>Core knowledge:</u></p> <p>Geometrical Reasoning:</p> <ul style="list-style-type: none"> <li>• Circle Theorems</li> <li>• Vectors and Vector Proofs - use of column vectors, adding/subtracting, multiplying by a scalar, using to prove geometric arguments</li> <li>• Further Transformations - enlarging shapes by fractional and negative scale factors, combining transformations</li> <li>• Constructions and Loci - use rulers, protractors and compasses to construct perpendicular bisectors, angle bisectors, triangles and loci</li> <li>• Congruence - recognise congruent triangle and prove congruence using SSS, ASA, AAS and RHS</li> </ul> <p>Proportional Reasoning:</p> <ul style="list-style-type: none"> <li>• Direct and Inverse Proportion - solving problems involving direct and/or inverse proportion, including quantities proportional to a power or root of another</li> <li>• Compound Measures - speed, density, pressure</li> <li>• Gradient and Area Under a Curve - estimate gradients of curves and areas under</li> </ul> | <p>Cycle 2:</p> <p><u>Core knowledge:</u></p> <p>Statistical Reasoning:</p> <ul style="list-style-type: none"> <li>• Statistics - construct and interpret histograms, cumulative frequency diagrams and boxplots, compare distributions using measures of spread and location</li> <li>• Scatter Graphs - plot and use scatter graphs, interpolate and extrapolate data to make estimates, identify correlation and outliers</li> </ul> <p>Functions:</p> <ul style="list-style-type: none"> <li>• Functions - use of function notation, finding inverses, composite functions</li> <li>• Recurrence Relations - use iterative processes and recurrence formulae</li> </ul> <p>Algebraic Reasoning:</p> <ul style="list-style-type: none"> <li>• Non-Linear Graphs - polynomial, reciprocal, exponential and trigonometric graphs</li> <li>• Algebraic Proof - develop mathematical arguments and use algebra to construct proofs</li> <li>• Further Quadratics - factorise quadratics with a <math>&gt; 1</math>, completing the square, sketching quadratic</li> </ul> | <p>Cycle 3:</p> <p>In the final cycle before GCSEs start, lessons will focus on revision. This may be done in a range of ways:</p> <ul style="list-style-type: none"> <li>• Reteaching content based on prior assessment results</li> <li>• Timed exam practice</li> <li>• Past papers</li> </ul> <p>Assessment:</p> <p>→ Formal GCSE Examinations</p> |
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| <p>graphs, interpret gradients and areas under real-world graphs</p> <p>Assessment:</p> <p>→ Mini Mock Examinations; x1 GCSE Higher Calculator Paper</p> | <p>functions</p> <p>Assessment:</p> <p>→ Mock Examinations; x3 GCSE Higher style papers (x1 Non-Calculator, x2 Calculator)</p> |  |
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### Curriculum Sequencing:

Our all-through curriculum adopts a mastery/spiral approach to promote a deep mathematical understanding.

In year 11, alongside consolidating and developing key units, students are introduced to complex algebraic and statistical units. Revision and re-teaching for formal examinations will be determined via mock examinations and end-of-unit assessments.

All core knowledge specified in this overview is contained within the KS4 National Curriculum, subject to some sequencing changes.

# Maths L2 Further Maths - Year 11

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| <p><b>Cycle 1:</b></p> <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Geometry 2 - area of a triangle, sine and cosine rule, lines and planes in three dimensions</li> <li>• Algebra 3 - functions, composite functions, graphs of functions, inverse functions</li> </ul> <p>Assessment:</p> <ul style="list-style-type: none"> <li>→ x1 full Paper 1, Non-Calc</li> <li>→ x1 Paper 2 style paper, Calc (only content covered so far)</li> </ul> | <p><b>Cycle 2:</b></p> <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Algebra 4 - simultaneous equations, indices, algebraic proof, sequences</li> <li>• Calculus - differentiation, tangents and normals, stationary points</li> </ul> <p>Assessment:</p> <ul style="list-style-type: none"> <li>→ x1 full Paper 1, Non-Calc</li> <li>→ x1 full Paper 2, Calc</li> </ul> | <p><b>Cycle 3 - Revision</b></p> <p>In the final cycle before GCSEs start, lessons will focus on revision. This may be done in a range of ways:</p> <ul style="list-style-type: none"> <li>• Reteaching content based on prior assessment results</li> <li>• Timed exam practice</li> <li>• Past papers</li> </ul> <p>Assessment:</p> <ul style="list-style-type: none"> <li>→ Formal L2 Further Maths examination</li> </ul> |
| <p><b>Curriculum Sequencing:</b></p> <p>Our all-through curriculum adopts a mastery/spiral approach to promote a deep mathematical understanding.</p> <p>L2 Further Maths builds and deepens content knowledge from the GCSE course, as well as introducing students to some more complex topics. This increases pupil understanding at GCSE, and prepares them for taking an A-Level in Maths and Further Maths.</p>  |  |   |
| <p>All core knowledge specified in this overview is contained within the AQA L2 Further Maths specification, which can be found here:<br/> <a href="https://filestore.aqa.org.uk/resources/mathematics/specifications/AQA-8365-SP-2018.PDF">https://filestore.aqa.org.uk/resources/mathematics/specifications/AQA-8365-SP-2018.PDF</a></p>   |  |   |

# Maths YEAR 12 A-Level

| Cycle 1:   | Cycle 2:   | Cycle 3:  |
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| <p>Pure Maths Core knowledge:</p> <ul style="list-style-type: none"> <li>Algebraic Expressions, Equations and Inequalities</li> <li>Quadratics and the discriminant</li> <li>Algebraic Methods and proofs</li> <li>Binomial Expansion</li> <li>Straight-Line Graphs and linear/quadratic models</li> <li>Circle problems</li> <li>Vectors with geometric problems and modelling</li> <li>Graphs and Transformations</li> </ul> | <p>Pure Maths Core knowledge:</p> <ul style="list-style-type: none"> <li>Introduction to differentiation: using the gradient function and modelling</li> <li>Integration: indefinite, definite and area under curves</li> <li>Trigonometric ratios and transforming trigonometric graphs</li> <li>Trigonometric identities and equations</li> </ul>  | <p>Pure Maths Core knowledge:</p> <ul style="list-style-type: none"> <li>Exponentials functions and modelling</li> <li>Laws of and solving logarithms</li> <li>Natural logarithms</li> <li>Proofs and Partial Fractions</li> <li>Functions and mappings</li> <li>Graphing inverse and composite functions</li> <li>The modulus function</li> <li>Combining transformations</li> </ul> |
| <p>Applied Maths Core knowledge:</p> <ul style="list-style-type: none"> <li>Sampling Methods</li> <li>Statistical Measures - Central Tendency and Spread, Standard Deviation and Variance</li> <li>Statistical Diagrams - Histograms, Cumulative Frequency, Reading and Interpreting Diagrams</li> <li>Correlation and Linear</li> </ul>   | <p>Applied Maths Core knowledge:</p> <ul style="list-style-type: none"> <li>Binomial Distribution - Modelling Using the Binomial Distribution, Finding Probabilities for Repeated Independent Events</li> <li>Hypothesis Testing for PMCC - Hypothesis Testing for Positive/Negative Correlation of a Population from a Sample</li> <li>Basic principles of mechanics - modelling</li> </ul> | <p>Applied Maths Core knowledge:</p> <ul style="list-style-type: none"> <li>2D Vectors - component forms, angles above/below axes</li> <li>Variable Acceleration - Differentiating, Integrating, solving problems involving graphs.</li> <li>Modelling problems, graphical problems</li> <li>Moments - uniform bodies, tilting problems, variable</li> </ul>                          |

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| <p>Regression - Product Moment Correlation Coefficient, Equation of Regression Line, Interpreting Coefficients</p> <ul style="list-style-type: none"> <li>• Probability - Laws of Probability, Probability Diagrams, Two Way Tables, Venn Diagrams</li> <li>• Probability Distributions - Tabular Distributions, Probability Mass Functions</li> </ul> <p>Assessment Point 1:</p> <ul style="list-style-type: none"> <li>→ Pure Maths Baseline assessment for course suitability in late September</li> <li>→ Applied Content is NOT covered in Assessment Point 1, course suitability is determined through the Pure Mathematics assessment ONLY. In-class Topic Assessments will be used for in-cycle assessment.</li> </ul> | <p>assumptions, components.</p> <ul style="list-style-type: none"> <li>• Constant acceleration formulae - SUVAT - involving gravity.</li> <li>• Newton's Second Law of Motion - Pulleys, Connected Particles, Reaction Forces</li> </ul> <p>Assessment Point 2:</p> <ul style="list-style-type: none"> <li>→ Adjusted A/S Past/Mock Pure Mathematics Paper including questions only on topics covered.</li> <li>→ One Complete A/S Past/Mock Paper on All Statistics Content</li> </ul> | <p>centre of mass.</p> <p>Assessment Point 3:</p> <ul style="list-style-type: none"> <li>→ End of Year Assessment - Full set of A/S Past/Mock Papers for Pure and Applied.</li> </ul> |
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### Curriculum Sequencing:

Due to the intertwining nature of Mathematics at this level and the higher prerequisite requirements, the sequencing is broadly centred around high-level concepts that allow students to revisit the skills and knowledge they already have before building on these and applying them in new contexts.

In some specific cases, the sequencing has been adapted to allow parallel courses to run smoothly and to provide pupils studying multiple strands of Mathematics with the most efficient and practical sequence through their learning. For example, Calculus content on A-Level Mathematics is moved forward in the course to support pupils sitting A-Level Further Mathematics in parallel.

All core knowledge specified in this overview is contained within the Pearson Edexcel A Level Mathematics (2017) course:

<https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/mathematics-2017.html>

# Maths YEAR 12 A-Level Further

| Cycle 1:  | Cycle 2:  | Cycle 3:  |
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| <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>● Imaginary and complex numbers</li> <li>● Multiplying complex numbers</li> <li>● Complex conjugates</li> <li>● Solving quadratic, cubic and quartic equations</li> <li>● Modulus-argument form</li> <li>● Argand Diagrams and Loci</li> <li>● Matrix multiplication</li> <li>● Determinants</li> <li>● Inverses of 2x2 and 3x3 matrices</li> <li>● Solving systems of simultaneous equations</li> <li>● Linear transformations in 2- and 3-Dimensions</li> <li>● Algorithms, including Bubble and Quick sort</li> <li>● Graphs and Networks, including Graph theory</li> <li>● Route Inspection</li> </ul> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>● Sums of natural, square and cube numbers</li> <li>● Roots of Polynomials</li> <li>● Proof by Induction</li> <li>● Equation of a line and plane in 3-dimensions in vector form</li> <li>● Scalar Product</li> <li>● Calculating angles and perpendiculars between lines and planes</li> <li>● Volumes of Revolution, including modelling</li> <li>● Critical Path Analysis</li> <li>● Discrete Random Variables</li> <li>● Binomial distribution</li> <li>● Poisson Distribution</li> <li>● Hypothesis Testing</li> <li>● Contingency Tables</li> </ul> <p>Assessment Point 2:</p> | <p>In the final cycle before AS Examinations start, lessons will focus on revision. This may be done in a range of ways:</p> <ul style="list-style-type: none"> <li>● Reteaching content based on prior assessment results</li> <li>● Timed exam practice</li> <li>● Past papers</li> </ul> <p>Post examinations, students will begin to study the following Year 13 content:</p> <ul style="list-style-type: none"> <li>● De Moivre's Theorem</li> <li>● Roots of Unity</li> <li>● The Planarity Algorithm</li> <li>● Floyd's Algorithm</li> <li>● Central Limit Theorem</li> </ul> <p>Assessment:</p> |



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| <ul style="list-style-type: none"> <li>• Linear Programming</li> </ul> <p>Assessment Point 1:</p> <ul style="list-style-type: none"> <li>→ Baseline assessment for course suitability in late September</li> </ul>   | <ul style="list-style-type: none"> <li>→ Adjusted AS Past/Mock Paper including questions only on topics covered.</li> </ul> | <ul style="list-style-type: none"> <li>→ Formal AS Examinations</li> </ul> |
| <p>Curriculum Sequencing:</p> <p>Due to the prerequisite content required from Mathematics A Level, we have carefully considered the sequencing of this course and adapted it to provide pupils with the most efficient and practical sequence through their learning.</p> <p>Students will be introduced to key concepts, such as calculus, parallel to the Mathematics A Level to deepen and develop the fundamental skills required to thrive.</p>                                    |   |  |
| <p>All core knowledge specified in this overview is contained within the Pearson Edexcel A Level Further Mathematics (2017) course:</p> <p><a href="https://qualifications.pearson.com/content/dam/pdf/A%20Level/Mathematics/2017/specification-and-sample-assessment/as-l3-further-mathematics-specification.pdf">https://qualifications.pearson.com/content/dam/pdf/A%20Level/Mathematics/2017/specification-and-sample-assessment/as-l3-further-mathematics-specification.pdf</a></p> |   |  |

# Maths YEAR 12 Mathematical Studies

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| <p><b>Cycle 1:</b></p> <p><u>Core knowledge:</u></p> <ul style="list-style-type: none"> <li>Recap of GCSE content - linear graphs, circles, Pythagoras' Theorem, similarity and limits of accuracy, substitution into formulae</li> <li>Collecting and Sampling Data - understand and use different sampling techniques (random and non-random)</li> <li>Percentages - calculating compound interest, solving problems with decay or depreciation</li> <li>Taxation - calculate tax, national insurance and net pay for different annual salaries</li> <li>Fermi Estimates - use assumptions to make mathematically sensible estimates</li> </ul> <p>Assessment Point 1:</p> | <p><b>Cycle 2:</b></p> <p><u>Core knowledge:</u></p> <ul style="list-style-type: none"> <li>Types of Data</li> <li>Representing Data Numerically 1 - calculate measures of location and spread, percentiles, quartiles, deciles, standard deviation and variance of listed data</li> <li>Representing Data Diagrammatically 1 - construct and interpret stem and leaf diagrams and box plots, compare distributions of data</li> <li>Interest Rates - calculate and solve problems involving AER and APR</li> <li>Critical Path Analysis - construct activity networks, calculate early/late times and construct Gantt charts for compound projects</li> </ul> <p>Assessment Point 2:</p> <p>→ One Past/Mock Paper</p> | <p><b>Cycle 3:</b></p> <p><u>Core knowledge:</u></p> <ul style="list-style-type: none"> <li>Solutions to Financial Problems - currency exchange, inflation, student loans</li> <li>Critical Analysis - critically analyse data and statistics used in media/marketing etc, critique and correct mathematical arguments</li> <li>Representing Data Diagrammatically 2 - construct and interpret histograms and cumulative frequency diagrams</li> <li>Representing Data Numerically 2 - calculate and identify statistical measures from histograms and cumulative frequency diagrams</li> </ul> <p>Assessment Point 3:</p> <p>→ One Past/Mock Paper 1</p> |
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| → Baseline assessment for course suitability in late September | 1 style paper assessing content covered thus far |  |
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#### Curriculum Sequencing:

The course starts by consolidating core numerical and Mathematical skills from previous Key Stages that are essential for the course.

The course content is broadly arranged into high-level concepts where essential skills are learned and practiced first and then applied to contextual, often real-world, problems. The content is sequenced to support pupils building their critical skills such as estimating, interpreting and critiquing across all of the high-level concepts such as financial problems, critical paths, statistical analysis, probability and risk/cost-benefit analysis.

All core knowledge specified in this overview is contained within the AQA L3 Mathematical Studies specification, which can be found here:

<https://filestore.aqa.org.uk/resources/mathematics/specifications/AQA-1350-SP-2014.PDF>

# Maths YEAR 12 A-Level Statistics

| Cycle 1:   | Cycle 2:   | Cycle 3:   |
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| <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Statistical Measures, Variance &amp; Standard Deviation, Outliers, Reading and Interpreting Diagrams, Misrepresentation.</li> <li>• Probability, Sample Spaces, Probability Diagrams, Conditional Probability, Mutually Exclusive and Independent Events</li> <li>• Random Variables, Expectation, Probability Distributions, Binomial Distribution</li> <li>• Correlation, Linear Regression, Spearman's Rank Correlation Coefficient, PMCC</li> </ul> <p>Assessment Point 1:</p> <p>→ Baseline assessment for course suitability in late September</p> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Continuous Random Variables, Normal Distribution, Finding Unknown Parameters, Sampling Methods, Suitability of Sampling Methods, Sampling Distribution of the Mean of a Normal, Normal Approximation to a Binomial Distribution with Large <math>n</math>,</li> <li>• Hypothesis Testing - PMCC, Spearman's Rank, Sample Mean (Normal), Proportion, Contingency Tables, Association</li> </ul> <p>Assessment Point 2:</p> <p>→ Reduced A/S Past/Mock Paper 1</p> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Sign Tests - One-Sample Sign Tests, One-Sample Wilcoxon Signed-Rank Test, Wilcoxon Rank-Sum Test, Paired Sign Test, Paired Wilcoxon Signed-Rank Test.</li> </ul> <p>Assessment Point 3:</p> <p>→ Full set of two A/S Statistics Past/Mock Papers</p> |

## Curriculum Sequencing:

All core knowledge specified in this overview is contained within the KS3 National Curriculum, subject to some sequencing changes.

# Maths YEAR 13 A-Level Mathematics

| Cycle 1:  | Cycle 2:   | Cycle 3:   |
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| <p>Pure Maths Core knowledge:</p> <ul style="list-style-type: none"> <li>● Radian measure</li> <li>● Inverse and reciprocal trigonometric functions</li> <li>● Addition &amp; double angle formulae</li> <li>● Differentiating all functions</li> <li>● Product, chain and quotient rule</li> <li>● Differential equations</li> <li>● Integrating all functions</li> <li>● Integrating by substitution and parts</li> <li>● Trapezium rule</li> </ul> <p>Applied Maths Core knowledge:</p> <ul style="list-style-type: none"> <li>● Hypothesis Testing for 'p' for a Binomial Distribution, Finding Critical Values, One-Tailed Tests, Two-Tailed Tests</li> <li>● Normal Distribution - Finding Probabilities, Inverse Normal</li> </ul> | <p>Pure Maths Core knowledge:</p> <ul style="list-style-type: none"> <li>● Parametric equations</li> <li>● Arithmetic &amp; geometric sequences</li> <li>● Further binomial expansion</li> <li>● Binomial expansion with partial fractions</li> <li>● Numerical methods</li> <li>● Vectors</li> </ul> <p>Applied Maths Core knowledge:</p> <ul style="list-style-type: none"> <li>● Normal Distribution - Standard Normal Distribution, Approximating a Binomial Distribution with Large n, Hypothesis Testing for the Mean of a Normal Distribution.</li> <li>● Application of Forces - static particles, rigid bodies, dynamics &amp; inclined planes.</li> <li>● Further kinematics - differentiating vectors,</li> </ul> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>● Revision for A-Level examinations</li> </ul> <p>Assessment:</p> <p>Formal Examinations for End of Course</p> |

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| <p>Distribution, Finding Unknown Parameters.</p> <ul style="list-style-type: none"> <li>• Friction - horizontal plane, inclined planes, involving components</li> <li>• Projectiles - horizontal projection, projection at any angle, general projectile formulae.</li> </ul> <p>Assessment Point 5:</p> <p>→ Full set of A/S Past/Mock Papers</p> | <p>vectors in 3D, integrating vectors</p> <p>Assessment Point 6:</p> <p>→ Full set of A Level Past/Mock Papers</p> |  |
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### Curriculum Sequencing:

Due to the intertwining nature of Mathematics at this level and the higher prerequisite requirements, the sequencing is broadly centred around high-level concepts that allow students to revisit the skills and knowledge they already have before building on these and applying them in new contexts.

In some specific cases, the sequencing has been adapted to allow parallel courses to run smoothly and to provide pupils studying multiple strands of Mathematics with the most efficient and practical sequence through their learning. For example, Calculus content on A-Level Mathematics is moved forward in the course to support pupils sitting A-Level Further Mathematics in parallel.

All core knowledge specified in this overview is contained within the Pearson Edexcel A Level Mathematics (2017) course:

<https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/mathematics-2017.html>

# Maths YEAR 13 A-Level Further Mathematics

| Cycle 1:  | Cycle 2:  | Cycle 3:  |
|---|---|---|
| <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Maclaurin Series</li> <li>• Hyperbolic functions, including inverse functions, graphs and identities</li> <li>• Improper Integrals</li> <li>• Mean value of a function</li> <li>• Differentiating and Integrating Inverse Trigonometric Functions, Hyperbolic Functions and Partial Fractions</li> <li>• The Simplex Algorithm</li> <li>• Critical Path Analysis</li> <li>• Transportation Problems</li> </ul> <p>Assessment Point 5:</p> <p>Full AS Style Examination</p> <ul style="list-style-type: none"> <li>→ Paper 1: Core Pure</li> <li>→ Paper 2: Decision 1 and Further Statistics 1</li> </ul> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• First Order Differential Equations</li> <li>• Second Order Homogeneous and Non-homogeneous Differential Equations</li> <li>• Modelling with first order differential equations</li> <li>• Simple Harmonic Motion</li> <li>• Damped and Forced Harmonic Motion</li> <li>• Coupled first-order simultaneous differential equations</li> <li>• Volumes of Revolutions, including parametric curves</li> <li>• Polar coordinates</li> <li>• Flows in Networks</li> <li>• Dynamic Programming</li> <li>• Recurrence Relations</li> <li>• Game Theory</li> <li>• Decision Analysis</li> </ul> <p>Assessment Point 6:</p> <p>Full A Level Style Examination</p> <ul style="list-style-type: none"> <li>→ Paper 1: Core Pure</li> <li>→ Paper 2: Core Pure</li> <li>→ Paper 3: Further Statistics 1</li> <li>→ Paper 4: Decision 1</li> </ul> | <p>In the final cycle before A Level Examinations start, lessons will focus on revision. This may be done in a range of ways:</p> <ul style="list-style-type: none"> <li>• Reteaching content based on prior assessment results</li> <li>• Timed exam practice</li> <li>• Past papers</li> </ul> <p>Assessment:</p> <ul style="list-style-type: none"> <li>→ Formal A Level Examinations</li> </ul> |

### Curriculum Sequencing:

Due to the prerequisite content required from Mathematics A Level, we have carefully considered the sequencing of this course and adapted it to provide pupils with the most efficient and practical sequence through their learning.

Students will be introduced to key concepts, such as calculus, parallel to the Mathematics A Level to deepen and develop the fundamental skills required to thrive.

All core knowledge specified in this overview is contained within the Pearson Edexcel A Level Further Mathematics (2017) course:

<https://qualifications.pearson.com/content/dam/pdf/A%20Level/Mathematics/2017/specification-and-sample-assessment/a-level-13-further-mathematics-specification.pdf>



# Maths YEAR 13 A-Level Further Mathematics

| Cycle 1:  | Cycle 2:  | Cycle 3:  |
|---|---|---|
| <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• Maclaurin Series</li> <li>• Hyperbolic functions, including inverse functions, graphs and identities</li> <li>• Improper Integrals</li> <li>• Mean value of a function</li> <li>• Differentiating and Integrating Inverse Trigonometric Functions, Hyperbolic Functions and Partial Fractions</li> <li>• The Simplex Algorithm</li> <li>• Critical Path Analysis</li> <li>• Transportation Problems</li> </ul> <p>Assessment Point 5:</p> <p>Full AS Style Examination</p> <ul style="list-style-type: none"> <li>→ Paper 1: Core Pure</li> <li>→ Paper 2: Decision 1 and Further Statistics 1</li> </ul> | <p>Core knowledge:</p> <ul style="list-style-type: none"> <li>• First Order Differential Equations</li> <li>• Second Order Homogeneous and Non-homogeneous Differential Equations</li> <li>• Modelling with first order differential equations</li> <li>• Simple Harmonic Motion</li> <li>• Damped and Forced Harmonic Motion</li> <li>• Coupled first-order simultaneous differential equations</li> <li>• Volumes of Revolutions, including parametric curves</li> <li>• Polar coordinates</li> <li>• Flows in Networks</li> <li>• Dynamic Programming</li> <li>• Recurrence Relations</li> <li>• Game Theory</li> <li>• Decision Analysis</li> </ul> <p>Assessment Point 6:</p> <p>Full A Level Style Examination</p> <ul style="list-style-type: none"> <li>→ Paper 1: Core Pure</li> <li>→ Paper 2: Core Pure</li> <li>→ Paper 3: Further Statistics 1</li> <li>→ Paper 4: Decision 1</li> </ul> | <p>In the final cycle before A Level Examinations start, lessons will focus on revision. This may be done in a range of ways:</p> <ul style="list-style-type: none"> <li>• Reteaching content based on prior assessment results</li> <li>• Timed exam practice</li> <li>• Past papers</li> </ul> <p>Assessment:</p> <ul style="list-style-type: none"> <li>→ Formal A Level Examinations</li> </ul> |

### Curriculum Sequencing:

Due to the prerequisite content required from Mathematics A Level, we have carefully considered the sequencing of this course and adapted it to provide pupils with the most efficient and practical sequence through their learning.

Students will be introduced to key concepts, such as calculus, parallel to the Mathematics A Level to deepen and develop the fundamental skills required to thrive.

All core knowledge specified in this overview is contained within the Pearson Edexcel A Level Further Mathematics (2017) course:

<https://qualifications.pearson.com/content/dam/pdf/A%20Level/Mathematics/2017/specification-and-sample-assessment/a-level-13-further-mathematics-specification.pdf>