



Curriculum Map cover sheet

Subject: Further Maths	Year Group 12 and 13	Key Stage 5
Links to prior learning Builds on all prior learning in key stages 1-4 and A-level Maths across the 5 main strands: • Number • Algebra • Geometry • Statistics • Ratio and proportion	Retrieval Practice • Regular use of mini-whiteboards for formative assessment. • Starters designed to retrieve prior knowledge • Revision plans shared to aid in spacing out retrieval of content across the course	Adaptive teaching strategies . • Scaffolding provided if necessary plus stretch and challenge. • Use of mini-whiteboards allows teachers to adapt to the needs of students based on the feedback received and to support or stretch as necessary.
Literacy • Students will read and interpret mathematical problems, use and spell mathematical vocabulary accurately, and write clear explanations and justifications for their answers using full sentences. • Develop skills in reading mathematical texts and extracting key information from worded problems. • Practice setting out mathematical workings logically and coherently.	Oracy • Students will explain their reasoning and solutions verbally, using precise mathematical language. • Participate in group discussions to justify answers, challenge ideas, and build shared understanding. • Develop confidence in presenting mathematical arguments and solutions to the class.	Numeracy • Students will develop fluency and confidence with number operations, including mental and written methods for whole numbers, decimals, and fractions. • Apply numeracy skills to solve real-life problems involving money, measures, time, and data. • Use estimation, rounding, and checking strategies to ensure accuracy and efficiency in calculations. • Convert between fractions, decimals, and percentages, and use ratio and proportion to solve contextual problems. • Strengthen number sense through

		regular practice of mental arithmetic and use of known number facts.
Careers across the Curriculum A-level Maths opens doors to diverse careers in finance, engineering, science, IT, education, business, and more, making it a versatile subject that supports career aspirations across the curriculum	Wider Curriculum opportunities • Maths clubs • Students will have opportunities to participate in maths competitions and enrichment activities such as UKMT Maths Challenge, puzzle weeks, ritangle competition, cipher challenge etc... • Physics & Maths: Solving differential equations to model motion or electrical circuits. • Biology & Maths: Using statistical tests to analyse experimental results. • Economics & Maths: Applying calculus to optimise profit or cost functions. • Art & Maths: Exploring the golden ratio or geometric transformations in design projects. • Psychology & Maths: Designing experiments and interpreting data using statistical methods..	Super Curriculum Link to super curriculum document
Assessment and feedback • Formative assessment used each and every lesson in the form of mini-whiteboards, cold calling, mini tests etc... and whole class/individual feedback given. • A summative assessment will be sat after most units and will be marked by the class teacher. Solutions will be provided and students will make notes/corrections and will be retaught content if needed. Students will add a note of topics they are weak at to their PLC and revise these in their independent study time		

- An end of year Mock will consolidate all knowledge throughout the year and feedback will be given on this test and students can update their PLC accordingly and undertake necessary practice to fix misconceptions

Year 12 Themes, Concepts & Ideas	Autumn 1 – 26/28	Autumn 2 – 17/24	Spring 1 – 18/21	Spring 2 – 20/21	Summer 1 – 19/24	Summer 2 - ?/21
Core Pure Decision 1 Further Mechanics 1	CP1. Complex Numbers (6 hrs) CP2. Argand Diagrams (6 hrs) CP3. Series (3 hrs) FM1. Momentum and Impulse (4 hrs) D1. Algorithms (7 hrs)	CP4. Roots of Polynomials (6 hrs) D2. Graphs and Networks (6 hrs) FM2. Work Energy Power (5 hrs)	CP5. Volumes of Revolution (5 hrs) CP6. Matrices (7 hrs) D3. Algorithms on Graphs (6 hrs)	CP7. Linear Transformations (7 hrs) CP8. Proof By Induction (4 hrs) D4. Route Inspection (4 hrs) D6. Linear Programming (5 hrs)	CP9. Vectors (7 hrs) FM4. Elastic Collisions in One Direction (4 hrs) D8. Critical Path Analysis (8 hrs)	Revision for mock if time Trig and Differentiation from the old Core 3 Required for Year 2 FM
Knowledge and understanding	Chapter 1 Complex - Imaginary and complex numbers - Multiplying complex numbers - conjugation - Roots of quad eq - Solving cubic and quartic equations Chapter 2 Argand Diagrams - Argand diagrams - Modulus and Argument - Modulus Argument form of a complex number	Chapter 4 Roots of Polynomials - Roots of quadratic - Roots of cubic - Roots of quartic - Expressions relating to roots of a polynomial - Linear transformations of roots Chapter 2 Graphs and Networks - Modelling with graphs - Graph theory	Chapter 5 Volumes of Revolution - Around x-axis - Around y-axis - Adding and subtracting volumes - Modelling Chapter 6 Matrices - Introduction to matrices - Matrix multiplication - Determinants - Inverting 2x2 - Inverting 3x3	Chapter 7 Linear Transformations - Linear transformations in 2 dimensions - Reflections and rotations - Enlargements and stretches - Successive transformations - Linear transformations in 3 dimensions - Inverse of a linear transformation Chapter 8 Proof By Induction	Chapter 9 Vectors - Equation of a line in 3 dimensions - Equation of a plane in 3 dimensions - Scalar product - Calculating angles between lines and planes - Points of intersection - Finding perpendiculars Chapter 4 Elastic Collisions - Direct Impact - Direct collision on smooth plane	Trig Chapter 6 and 7 Core 3 - Sec, cot, cosec - Graphs of - Identities and equations Inverse - Addition formula - Double angle - Equations and identities using double angle - Solving trig problems - Factor Formula - Differentiation from old Core 3 Chapter 8 - Chain/product/quotient rules
Knowledge and understanding continued	- Loci - Regions Chapter 3 Series - Sums of Natural numbers - Sums of squares and cubes Chapter 1 Momentum and Impulse - Momentum in one direction - Conservation of Momentum - Momentum as a Vector Chapter 1 Algorithms - Understanding algorithms - Flow charts - Bubble sort - Quick sort - Bin-packing algorithms - Order of an algorithm	- Special types of graph - Representing graphs and networks using matrices Chapter 2 Work, Energy Power - Work done - Kinetic and potential energy - Conservation of mechanical energy and the work-energy principle - Power	- Solving systems of equations using matrices Chapter 3 Algorithms on Graphs - Kruskal's algorithm - Prim's algorithm - Applying Prim's to a distance matrix - Dijkstra's algorithm to find the shortest path - Floyds Algorithm	- Proof by Mathematical Induction - Divisibility results - Matrices Chapter 4 Route Inspection - Eulerian graphs - Using route inspection algorithm - Networks with more than four odd nodes Chapter 6 Linear Programming - Linear programming problems - Graphical Methods - Locating the optimal point - Solution with integer values	- Loss in KE - Successive direct Impacts Chapter 8 Critical Path Analysis - Modelling a project - Dummy activities - Early and late events - Critical activities - The float - Gantt charts - Resource histograms - Scheduling diagrams	- Exponential /log differentiation - Differentiating trig functions
Prior Subject specific skills GCSE Previously taught in year 12	Simplifying expressions Index laws Expanding brackets, Solving equations (unit 2). Sketching graphs , Solving inequality Factorising Simultaneous equations Trigonometry Surd, Quadratic graphs.	Tabulating data Solving Equations Rearranging equations Factorising factorising Algebraic long division Graphs Surd Quadratic Equations Equations of Motion	Transformations Functions Graphs Solving Equations Rearranging equations Integration	Transformations 3D coordinates Solving Equations Simultaneous Equations including a quadratic Plotting graphs Gradients Networks	Integration Sketching graphs Factorising Expanding Solving Equations Vectors	Trig ratios Differentiation Trig equations Trig identities Trig surds

Further Maths A-Level Curriculum Implementation

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 13	Calculus Volumes of revolution <i>Further Maths "Year 2" core pure content</i> Complex numbers De Moivre Roots of unity Series Polar Coordinates Calculus Improper integrals Inverse trig functions	Calculus (cont'd) Inverse trig functions Hyperbolic functions Partial fractions Polar graphs and areas Differential equations First order Second order Simple harmonic motion Modelling Coupled Hyperbolics	Further Mechanics cont'd Work energy power Hooks Law Momentum Collisions Impulses	Further Mechanics cont'd Work energy power Hooks Law Momentum Collisions Impulses	Revision	Exam period