

Further Mathematics KS5 Curriculum Overview

Links to KS4		There are many topics which are covered at both GCSE and A level Mathematics - e.g. functions, quadratics, transformations of graphs. To support transition to A level Further Mathematics, it is important that students understand how these topics can be built upon.						
Intent	Statement of Intent	Students will have the opportunity to: - Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language. - Solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and preserving in seeking solutions. - Communicate, justify, argue and prove using mathematical vocabulary.						
Timeline		Term 1 - 7 Weeks	Term 2 - 7 Weeks	Term 3 - 6 Weeks	Term 4 - 6 Weeks	Term 5 - 6 Weeks	Term 6 - 7 Weeks	
Implementation (Year 12)	Year 12 Overview	Further Mathematics introduces imaginary numbers, matrices transformations, vector equations and proof by induction. Applied topics cover algorithms, linear programming, networks & graphs plus the simplex method. The mechanics sections looks at work, energy & power, impulse & momentum, centre of mass and forces.						
	SOW	Pure Maths - Matrices - Complex numbers - Roots of polynomials - Sequences and series	Applied (Modelling with algorithms) - Algorithms - Networks and graphs - Linear programming	Pure Maths - Complex numbers and geometry - Vectors and 3D space Applied (Modelling with algorithms) - Simplex method - Reforming network problems as LPs	Pure Maths - Matrices and their inverses Applied (Mechanics) - Work, energy & power - Forces - Centre of mass	Pure Maths - Exponentials and Logs Applied (Mechanics) - Impulse & momentum - Dimensional analysis	Consolidation and Revision	
	Assessment Type & Unit Focus	RP1 - Terminology / initial content. (Sept/Oct) Each topic has a 'Topic Assessment'. These consist of questions which test an entire topic (e.g. Differentiation), and usually include exam-style questions. These topic assessments are set as homeworks and marked to a formal mark scheme. Students are given the mark scheme as part of their feedback.		RP2/PPE 1 - Exam style questions based on content covered Each topic has a 'Topic Assessment'. These consist of questions which test an entire topic (e.g. Differentiation), and usually include exam-style questions. These topic assessments are set as homeworks and marked to a formal mark scheme. Students are given the mark scheme as part of their feedback.		RP3/PPE3 - AS papers (pure & modelling with algorithms) set by OCR from previous summer exam Each topic has a 'Topic Assessment'. These consist of questions which test an entire topic (e.g. Differentiation), and usually include exam-style questions. These topic assessments are set as homeworks and marked to a formal mark scheme. Students are given the mark scheme as part of their feedback.		
Implementation (Year 13)	Year 13 Overview	Students begin to appreciate that mathematic skills are transferable to many other A levels. For instance, the skills developed can be applied to: - Mechanics in Physics, including moments, vectors and uniform acceleration - Balancing equations and calculating quantities in Chemistry - Data analysis in Biology - Evaluating statistics from studies in Psychology - Drawing graphs and evaluating macroeconomic indicators in Economics - Understanding algorithms in Computing - Evaluating arguments in Philosophy - Analysing financial performance in Business Studies More generally, the logical way of thinking and focus on clear methods gained from Maths A level provides a way of thinking about problems in a clear and methodical manner which can complement all subjects from essay-based to social sciences and beyond.						
	SOW	Pure Maths - Vectors - Matrices - Series & induction - Further calculus	Pure Maths - Applications of Integration - Polar coordinates Applied (Mechanics) - Maclaurin series - Hyperbolic functions - First order differential equations	Pure Maths - Complex numbers - Further vectors - Second order differential equations Applied (Mechanics) - Projectiles	Applied (Statistics) - Discrete random variables - Discrete probability distributions	Applied (Statistics) - Bivariate data - Chi-squared tests	Pure Maths - Revision for external exams Applied (Modelling with algorithms) - Revision for external exams Applied (Statistics) - Revision for external exams	
	Assessment Type & Unit Focus	Data input - assesses topics covered so far using past exam questions. Each topic has a 'Topic Assessment'. These consist of questions which test an entire topic (e.g. Differentiation), and usually include exam-style questions. These topic assessments are set as homeworks and marked to a formal mark scheme. Students are given the mark scheme as part of their feedback.		RP2/PPE 1 - assesses topics covered so far using past exam questions. Each topic has a 'Topic Assessment'. These consist of questions which test an entire topic (e.g. Differentiation), and usually include exam-style questions. These topic assessments are set as homeworks and marked to a formal mark scheme. Students are given the mark scheme as part of their feedback.		RP3/PPE2 - Paper 1 (pure) & Paper 2 (applied) reduced papers from most recent exam series Each topic has a 'Topic Assessment'. These consist of questions which test an entire topic (e.g. Differentiation), and usually include exam-style questions. These topic assessments are set as homeworks and marked to a formal mark scheme. Students are given the mark scheme as part of their feedback.		
Topic Texts		Why do buses come in threes? - <i>Rob Eastaway & Jeremy Wyndham</i> The Music of Primes - <i>Marcus du Sautoy</i> The Code Book - <i>Simon Singh</i> Exam board – OCR B (MEI) – the specification can be found here: https://www.ocr.org.uk/images/308768-specification-accredited-a-level-gce-further-mathematics-b-mei-h645.pdf						
Impact	Year 12 Tracking	RP1: T1, Wk3		RP2 (PPE1): T3, Wk2			RP3 (PPE2): T6, Wk4	
	Year 13 Tracking		RP1 (PPE1): T2, Wk1		RP2: T4, Wk1	RP3 (PPE2): T5, Wk1		
	How It Is Used / Skills Set Developed / Outcomes	Further mathematics hones the ability to solve mathematical problems as well as abstract and scientific ones. These problem-solving skills can then be applied to many different areas of life. It also teaches how to analyse patterns, structures and problems, which will in turn, help to develop a critical eye. This will come in handy in both further study and future careers. Mathematics at A level gives research skills enables finding solutions to problems, investigating theories, and therefore gives the ability to find new information more effectively. Finally, logical abilities will be developed providing the tools needed to tackle a number of diverse areas, from managing finances to planning projects.						
	Links to Higher Education	Only a small number of degrees list Further Mathematics A level as essential. Degree choices where A level Further Mathematics is useful include engineering, biomedical sciences (including Medical Science), Chemistry, Computer Science, Dentistry, Medicine, Optometry and Veterinary Science. Further mathematics is a "facilitating" subject. This means that it is among a list of A-level subjects which are asked for most frequently by universities.						
	Careers in the Curriculum	The logical thinking, problem-solving and decision-making skills learned while studying mathematics are highly valued by employers across many job sectors. These are a few examples of careers that use mathematical skills: Health Informatics Specialists, Accountant, Computer Programmer, Business Intelligence Analyst, Financial Analyst, Pharmacy Technician, Supply Chain Manager, Auditors and more.						