KS5 Curriculum Overview

Mathematics

Exam Board & Syllabus: Edexcel

Curriculum Intent

Our aim is for the students to have developed a formal set of techniques to solve both abstract and real-world problems. In statistics and probability, students will be able to deal with models used to help predict what may happen in the future and in mechanics, they will have grasped the modelling of physical scenarios that support concepts in real life.

By the end of year 13, we aim for all students to have a very strong sense of number, algebra, geometry, proportional reasoning alongside their applied modules, mechanics and statistics. We seek to develop their critical thinking and problem solving skills, allowing them to progress in maths beyond A-Level or any future career.

What do students *do* with this knowledge or these skills?

Students will need to use their knowledge and skills to adapt to A-Level styled questions. These can contain many steps, form links between topics and in some cases be unlike any question the students will have seen before.

The students will develop their understanding of mathematics as a language, use the appropriate notation and present their arguments in a logical manner.

How does the KS5 curriculum build on that from KS4?

The KS5 curriculum builds on KS4 as students continue to advance their algebra skills as they bridge the gap from GCSE to A-Level. Students will go on to study brand new areas of maths within the applied modules and they will also be introduced to many new big ideas within the pure content, such as differentiation, integration, exponentials and logarithms.

What new knowledge or skills are students taught?		
Term	**Year 12**	**Year 13**
Autumn	- Algebra and functions - Further algebra - Algebra and functions - Vectors (2D) - Coordinate geometry in the (x, y) plane - Trigonometry	- Algebraic and partial fractions - Trigonometry - Proof - Functions and modelling - Series and sequences - The binomial theorem - Differentiation - Integration
Spring	- Differentiation - Integration - Exponentials and logarithms - Quantities and units in mechanics - Kinematics (constant acceleration) - Forces & Newton's laws - Kinematics (variable acceleration)	- Trigonometry - Parametric equations - Numerical methods - Vectors (3D) - Forces at any angle - Further kinematics - Applications of kinematics - Applications of forces - Moments
Summer	- Data presentation and interpretation - Statistical distributions - Probability - Statistical sampling - Statistical hypothesis testing	- The normal distribution - Probability - Regression and correlation
Rationale for this sequencing	The start of the A-Level course covers mostly pure content with a heavy focus on algebra. This content is a prerequisite for future topics in the A-Level course and the Further Mathematics A-Level course. Students will also be introduced to Mechanics and Statistics. The sequence is designed in a way that will enable students to form links between the topics and thereby access challenging questions. *The sequence of topic may vary from the above if there is more than one teacher educating one class.	Year 13 builds on the skills/topics learned in Year 12. For example, differentiation moves on from polynomials to differentiation trigonometric, exponential and logarithmic functions, alongside use of the chain, product and quotient rule. *The sequence of topic may vary from the above if there is more than one teacher educating one class.

Additional support at home

EASTERN LEARNING ALLIANCE

Additional reading for enjoyment, enhancement and extension	• How to solve it by George Polya (Penguin 1990) • How to study for a maths degree by Lara Alcock (OUP, 2013) • How to think like a mathematician by Kevin Houston (CUP, 2009)
Online resources to practice, consolidate and revise	• Maths Genie A-Level worksheets and solutions • Exam Solutions A-Level questions and video solutions • Maths & Physics Tutor exam papers past papers and papers by topic • Save My Exams revision notes and questions by difficulty level • Dr Frost past paper and shadow questions • Quick skills based worksheets
Workbooks & revision guides to practice, consolidate and revise	• Online access to all the textbooks and practice books in line with the A-Level maths course • Solution bank contains all the solutions to the textbook question exercises • CGP Revision Guides for Edexcel A-Level Maths are highly recommended