

Year 12 Further Mathematics (2 sides max)

What we do:

We prepare students for the OCR two year Further Mathematics A Level course – Year 12 students take Year 1. Students must also take the two year Mathematics A Level course. OCR split the curriculum between Year 1 and Year 2 and we follow this split. We arrange the topics within each year based on our longer-term experiences teaching A Level Further Maths using two different teachers (sometimes three). Whilst all students start the course aiming to complete the full two years we also offer the option of an AS Level after one year. We offer the course to students with a Grade 8+ at GCSE (normally a Grade 9).

Why we do this:

Having two or three teachers teach the course is more robust than just having one teacher.

We arrange the topics to offer variety as well as increasing the level of difficulty in many later topics. They build on previous knowledge and this necessitates such sequencing and promotes retrieval.

We have an entry requirement for the course as we know from national figures that students who are below this threshold tend not to succeed.

Some centres run A Level Mathematics in Year 1 and then Further Mathematics in Year 2. This makes sequencing easier. We, however, prefer to run the A Level Mathematics alongside A Level Further Mathematics as this allows students the options of either dropping Further Mathematics after one year (to end up with a full Maths A Level and a FM AS Level), or dropping Further Mathematics altogether during Year 1. The reasons given for such decisions is normally the level of difficulty of the course or the workload resulting from taking four A Levels.

We offer Further Mathematics as students taking many STEM degrees, especially at the most sought after institutions, benefit from having taken A Level Further Mathematics.

Methods of deepening and securing knowledge: (these will be amended if not all aspects are covered – there is no expectation they will be)	
Spaced practice	Nearly all topics are visited on more than one occasion throughout the two years of Maths provision. This is sometimes to re-visit topics in preparation for assessments. On other occasions it is to prepare for the learning of deeper and more challenging learning within the same concept area.
Retrieval practice	Most topics build on previous topics that are revisited as part of the new learning. The regular topic assessments and frequent, larger, Aiming High assessments require a similar revisiting of previous understanding.
Interleaving	Most topics are visited on multiple occasions throughout the two years of Maths provision as they linked to new areas of learning and other concepts that are brought together in larger assessments. There are also concepts that occur in different subjects across the school that link the Maths curriculum with the curriculum of other subjects across the school.
Concrete examples	There are many abstract concepts taught throughout the Maths curriculum. In the teaching of many of these concrete examples are used either to make them more accessible or because of the requirements of assessments.
Dual coding	Students will encounter many examples of graphical or diagrammatic representations of numbers and mathematical concepts.

	Autumn term 1	Autumn term 2	Spring term 1	Spring term 2	Summer term 1	Summer term 2
Topic(s)	Pure - Complex numbers - Matrices - Vectors - Roots of equations	Statistics - Permutations and combinations - Discrete random variables - Discrete probability distributions Mechanics - Introduction to mechanics - Energy, work	Pure - Proof by induction Statistics - Correlation and regression - Hypothesis testing Chi Squared Mechanics Power - Momentum - Circular motion - Dimensional analysis	Finishing, consolidation, retrieval, interleaving	Pure - Binomial - Expansion - Modulus function - Differentiation	Mechanics - Iterative methods - Numerical integration - Vectors in Kinematics
Assessment	Topic Reviews	Topic Reviews Aiming High 1 Assessment	Topic Reviews	Topic Reviews Aiming High 2 Assessment	Topic Reviews	Topic Reviews Aiming High 3 Assessment
CEIAG (<i>Careers that are linked to that topic</i>)	<p>The progress of students is regularly monitored and reported. This feeds in to the on-going monitoring of students' progress across all subjects and links with helping students with the transition arrangements for beyond Year 13 (typically this is university).</p> <p>The Maths curriculum helps students develop skills in logical thinking, problem-solving and decision-making, which are valued by employers across many job sectors.</p> <p>Careers directly related to the Maths curriculum are Actuarial analyst, Actuary, Chartered accountant, Chartered certified accountant, Data analyst, Investment analyst, Research scientist (Maths), Secondary school teacher, Statistician, and Systems developer. Careers in which the Maths curriculum is useful include Civil Service fast streamer, Financial manager, Accountant, Financial trader, Insurance underwriter, Meteorologist, Operational researcher, Quantity surveyor, and Software tester.</p> <p>Further Maths gives students a significant advantage when applying for STEM degrees at many top universities.</p>					

Homework:
Regular homework is set to establish, reinforce, and revisit key concepts throughout the course. Revision tasks are set on the run up to the Aiming High (AH) assessments. Some Topic Reviews are done at home as part of homework or set as independent study for completion in the Study Centre.

