Mathematics (AQA)

A Level Mathematics

A level mathematics builds from GCSE level mathematics and introduces calculus and its applications. It emphasises how mathematical ideas are interconnected and how mathematics can be applied to model situations mathematically using algebra and other representations, to help make sense of data, to understand the physical world and to solve problems in a variety of contexts, including social sciences and business. It prepares students for further study and employment in a wide range of disciplines involving the use of mathematics.

Content and Assessment

A Level Mathematics is examined over 3 separate exams which are all sat at the end of the 2 year course. Each exam is 2 hours long and requires the use of a calculator. Paper 1 is all Pure Mathematics and is worth 100 marks. Paper 2 is split in half; 50 marks for Pure mathematics followed by 50 marks of Mechanics. Paper 2 is also split in half; 50 marks for Pure mathematics followed by 50 marks of Statistics. All the pure mathematics content can be examined within all 3 papers.

You will be expected to answer every question and the exam will require the good use of a calculator and therefore we will recommend which calculator you use. Your calculator must include the following features: an iterative function and the ability to compute summary statistics and access probabilities from standard statistical distributions

Pure Mathematics (two thirds of the course)

A level mathematics builds on the skills, knowledge and understanding set out in the whole GCSE subject content for mathematics.
Students will study all of the following topics: proof, algebra and functions, co-ordinate geometry, sequences and series, trigonometry, exponentials and logarithms, differentiation and integration.

Statistics (one sixth of the course)

The topic areas in this module are: statistical sampling, data presentation and interpretation, probability, statistical distributions and statistical hypothesis testing.

Mechanics (one sixth of the course)
The topic areas in Mechanics are vectors, quantities and units in mechanics, kinematics, forces and Newton's laws, Moments.

Teaching

The classes will be smaller than GCSE, on average about 20 students. There will be many challenging activities, opportunities to work in groups, use of ICT, activities that test a deeper understanding and consolidation exercises. There is more emphasis on working independently and you will be expected to regularly attend study support at lunchtimes.

The Future

A recent report by the Centre for Economic Performance said that young people with A level Mathematics earn ten percent more than their Mathematically challenged counterparts. A shortage of highly numerate candidates in the jobs market means employers pay a premium for problem solving and number crunching skills of A level Mathematicians. Mathematics A level would be applicable for many courses and careers, such as Mathematics, Physics, Engineering, Computing, and Accountancy.

Independent Learning

Independent learning tasks in Mathematics

1. Review each lesson's notes and use the textbook to add to the class notes. At the end of each unit consolidate the notes to create a set of revision notes/mind-maps before completing the assessed homework.	
2. Use the websites that the school subscribes to, (www.mymaths.co.uk, www.mathsnetalevel.com, www.meiresources.org) to work on additional questions for the topic you are currently studying in class or to revise past topics. Make a note of questions that you find particularly challenging and revisit them after doing further work to revise the unit.	
3. Collect a selection of sample questions and assessments from the exam boards website. Cut out the questions and sort them by type. It is a valuable activity to just classify the question by determining what the question is asking you to do as this is something you will have to do quickly in the exam. Create a set of revision questions for each topic.	
4. Write a set of instructions/flow diagram for solving questions of a particular type. (e.g. solving questions that require you to find the equation of a straight line). These will prove invaluable at revision time. Designing a flow diagram for questions on a specific topic will help you appreciate all the different ways in which a particular method can be applied.	
5. Imagine one of your friends has missed a lesson. Prepare a 'lesson plan' that you could deliver to your friend to teach that covers a specific objective. For example, how to differentiate a polynomial of the form $y = ax^n$. Make sure that you include explanation, activities, questions, solutions and a homework!	
6. Create an activity similar to the ones we do in class: odd one out, matching, dominoes, hexagonal jigsaw etc. Use the questions from the textbook, doing each question so that you have the answer, or create your own questions. Don't forget to do your activity, or get a friend to do it, to check that it works.	