

A-LEVEL MATHEMATICS

Mathematics plays a vital role in many aspects of the modern world and in areas of our working life such as Business, Economics, Engineering, Management, Medicine and Computer Science. Advances in technology and the breaking down of traditional barriers between arts and sciences mean that mathematicians are in great demand. Science-based subjects such as Physics, Chemistry and Biology require some clear knowledge of results and processes which go beyond GCSE but the ability to apply secure mathematical thinking is highly regarded in many other disciplines.

The A-level Mathematics courses are designed to enable you to develop your mathematical knowledge and understanding in a way which increases your confidence in solving problems in the real world. Emphasis is placed upon the ability to reason logically, develop sound mathematical arguments and use Mathematics as an effective means of communication. These invaluable skills can be transferred to a wide range of contexts and situations. At this level — as well as its practical side — you can expect to discover and appreciate the aesthetic and creative aspects of Mathematics.

COURSE CONTENT

We follow the Edexcel GCE Mathematics Course.

Pure Mathematics involves the continued study of algebra, trigonometry and co-ordinate geometry but also introduces you to the exciting new areas of calculus, series, vectors and numerical methods.

Mechanics illustrates the applications of Mathematics to physical problems. Emphasis is placed on the ability to model a real problem mathematically, solve it and then interpret the resulting solution back in terms of the original problem.

Decision Mathematics involves the study of mathematical algorithms in the solution of certain practical problems and their use in decision making processes.

Statistics illustrates the application of the concepts of mathematical probability to the drawing of inferences from data. Again, emphasis is placed upon experimentation, modelling and the analysis of real data.

COURSE STRUCTURE

Mathematics is a very broad field of study and this is reflected in the various units which make up the syllabus. There are 18 Mathematics modules in total which we can offer in several different combinations tailored to your requirements.

To achieve an AS Mathematics award, you need — in the Lower Sixth — to follow a broad-based course consisting of Core Mathematics 1 and 2 with one Applications module chosen from Mechanics, Statistics and Decision Mathematics. To qualify for the full A-level in Mathematics you will then — in the Upper Sixth — go on to study Core Mathematics 3 and 4 with one further Applications module.

You should choose your applied options so that they may provide the most appropriate mathematical background for your other areas of study but also to suit your personal taste and interests. For those studying Mechanics there is an obvious link with Physics. For those studying Statistics there are links with Biology, Economics, Geography, Psychology and any subject where data handling is involved.

The **Further Mathematics** course is offered with Mechanics, Statistics as well as Decision Mathematics as applied options. The depth of study is clearly greater than that required for A-level Mathematics. In addition to the modelling and interpretative aspects of the subject there is an emphasis on the structures and techniques, the ability to develop mathematical arguments, make logical deductions and manipulate mathematical expressions.

This course introduces key concepts and ideas central to Mathematics — e.g. complex numbers, hyperbolic functions, matrices — and allows you to study in more depth topics such as differential equations, series and calculus techniques whilst gaining further insight into the applied side of Mathematics.

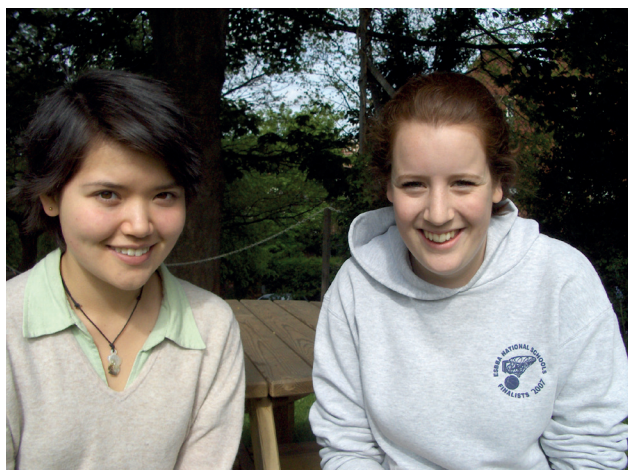
The course is particularly suitable for those who enjoy their Mathematics and wish to embrace the challenges it offers to extend them fully. Anyone wishing to study Mathematics further on leaving school is strongly advised to take this course.

For AS Further Mathematics, you will complete Further Pure Mathematics 1 plus two further Applications modules and for a full A-level Further Mathematics, you will complete a total of three Pure modules and three Applications modules.

Mathematics and Further Mathematics count as two of your subjects in Lower Sixth, and AS or A-level in Further Mathematics count as separate, additional qualifications. This is ideal preparation if you wish to undertake university studies in Mathematics, Engineering, Physics or Natural Science and universities are keen to encourage more students to follow this highly respected option.

OTHER OPPORTUNITIES

The department endeavours to offer an annual Mathematics Workshop or extra-curricular lectures to introduce you to areas of Mathematics which may be outside your chosen course; this has proved to be very popular.



Students in the Lower and Upper Sixth are strongly encouraged to read extensively around the subject and a selection of suitable books are offered throughout the A-level course. Many of our girls have found this additional reading invaluable when going for their university interviews.

In addition, all Mathematics Sixth Formers take part in the national Senior Mathematics Challenge. Many of our students gain an award in this contest and it is a valuable addition to your UCAS application.

ASSESSMENT

All the modules are equally weighted and all examinations are 1 hr 30 minutes in length.

ENTRY REQUIREMENTS

Girls wishing to study Mathematics in the Sixth Form are expected to have a good GCSE pass (Grade B or above). If you wish to take Further Mathematics, you will normally be expected to have gained a grade A at GCSE.

DIFFERENCE BETWEEN GCSE & A-LEVEL

The subject is studied to a wider degree and to a greater depth than at GCSE level. The approach is more rigorous. Ultimate success depends upon the ability to understand concepts, solve problems independently and to use the language and notation of the subject correctly. There is a continued emphasis on the application of Mathematics but the approach is rather more analytical than at GCSE level.

Mastering and practising techniques which will be used in familiar and unfamiliar situations as well as building up methodically a thorough understanding of the principles involved are the key to a successful and rewarding completion of any Mathematics course.