MATHEMATICS

The Mathematics Department aims to provide help, encouragement and advice to individuals and to groups, so enabling them to experience something of the enjoyment and sense of achievement that derive from:

- a fluent, confident understanding of the technical aspects of mathematics
- developing problem-solving skills and strategies
- forming connections with situations encountered in other areas of curriculum
- appreciating the richness of mathematics as a vital, "unfinished" human activity.

External examinations are taken by all to IGCSE level, with many in the Sixth Form continuing to study Mathematics and/or Further Mathematics to AS and A2 level.

Each year the girls are given the opportunity to take part in the UK Mathematics Trust programmes. Regular help surgeries are provided and a range of extension activities offered through the School's Alpinist programme.

MATHEMATICS IN THE LOWER & MIDDLE SCHOOL (First, Second & Third Years)

In the Lower & Middle School the aim is to give girls an appreciation of the wide applicability and central importance of mathematics in the scientific and human worlds as a powerful tool to communicate information, to describe, to explain and, above all, to predict. Every effort is made to form connections with previous experiences of mathematics and with situations encountered in other areas of the curriculum.

The syllabus is designed to establish solid foundations for all the girls, both for their IGCSE Mathematics course and for their use of mathematics in other subjects, and outside the classroom.

This aspiration is achieved by building strength and confidence in their mathematical skills. Central to this is numerical ability. Arithmetic, fractions, decimals and percentages are important areas, and these basic skills are all developed before the use of calculators is introduced. The broad-based syllabus also includes topics from areas such as geometry, algebra, vectors and statistics, these being introduced in the First Year and regularly revisited and extended in the Second and Third Years.

Girls are encouraged to see this learning process as a building of ideas, with new work depending on previous topics. There is therefore regular revision, together with periodic tests to reinforce earlier study.

First Year students start off in mixed ability classes but are set into three divisions after the first half term, often splitting into four divisions higher up the School. They follow a common syllabus, but higher sets are stretched through extension topics related to current work as well as by using more searching exercises. There is much flexibility in the setting of these divisions, with girls regularly changing classes as they progress through the School.

Calculators are introduced in the Third Year, although a significant amount of work will continue to be done without their aid. The Department has a policy of encouraging the purchase of a common calculator by the girls in order to facilitate teaching. Mathematics classes also make use of the School's ICT suites with, for example, classes on data-handling through use of Autograph, geometry through Cabri and web-based learning tools in other disparate subject areas.

MATHEMATICS IN THE UPPER SCHOOL (Fourth & Fifth Years)

In the Upper School the focus of studies turns by necessity to the external examinations at the end of the Fifth Year. Fortunately, the assessment objects of our chosen course are limited and allow considerable scope and time for investigations that develop problem-solving skills and strategies.

The Syllabus

Edexcel's IGCSE syllabus which has standards equivalent to Edexcel's UK GCSE Mathematics examination

Assessment pattern

Two terminal examinations.
No coursework elements.

Mathematics Syllabus Content

The course explores in considerable depth number, algebra, geometry and statistics. These studies build upon the foundations established during the Lower School years.

The absence of extended coursework tasks enables the girls to explore additional valuable topics such as Set Theory, Functions and Calculus.

As in the Lower & Middle School, appropriate use of ICT is encouraged as an aid to statistical analysis and development of mathematical reasoning.

MATHEMATICS IN THE SIXTH FORM

The A level Mathematics course demands much of its students but also gives much in return. Students starting this course should have achieved a high grade in the IGCSE course, but also need to be comfortable in applying skills learnt at IGCSE. In particular they must demonstrate a strong grasp of algebra. Those following this course will develop skills of analysis, logical argument, problem solving and communication.

Syllabus

Edexcel syllabus Mathematics and Further Mathematics, first examined in 2006

Assessment pattern

6 Modules for Mathematics, with 12 modules for Further Mathematics.
No coursework elements

Mathematics Syllabus Content

At AS the syllabus consists of two core modules in Pure Mathematics, together with one applied module in Mechanics. At A2 there are two more core Pure modules added to which students must select a second applied module which could be in either Mechanics or Statistics. Those students following the Further Maths course are taught separately with lessons in Pure Mathematics, Mechanics, Statistics and Decision Mathematics, these being timetabled into two option blocks. Over the course of two years they take a total of twelve modules gaining two A levels, Maths and Further Mathematics, or nine modules if opting for A level Maths and AS Further Mathematics.

Mathematics and University Entrance

A level Maths is required or preferred in a number of subject areas including Natural Sciences (especially Physics/Engineering), Computer Sciences, Economics and Medicine. Any students considering reading Mathematics, Engineering, Physical Sciences or Computer Science at Oxbridge should consider taking the Further Maths course, but this would also provide strong support to many disparate disciplines including those listed above.
Mathematics (either on its own or in combination with another subject) is arguably one of the most flexible of all degrees, leaving graduates with an unsurpassed range of openings.