Why study Mathematics?

Mathematics is one of the most useful and versatile subjects you can study in the Sixth Form.

If you enjoy the intellectual challenge that mathematics offers and the great satisfaction that is gained from working through difficult mathematical problems, then you have chosen the right subject.

There are very few career routes that do not value A-Level mathematics and many that demand A-Level mathematics.

What do I need to know or be able to do before taking this course?

A sound mathematical basis is crucial to be able to follow the course. Therefore, a grade 7 in GCSE mathematics is essential.

Features of the course:

Over the two years, you study a combination of algebraic techniques in order to solve co-ordinate geometry, trigonometry and sequences problems amongst others. In addition, you will study mechanics and statistics.

Pure mathematics includes proof; algebra and functions; coordinate geometry in the (x, y) plane; sequences and series; trigonometry; exponentials and logarithms; differentiation; integration; numerical methods and vectors.

Mechanics studies things that move and what causes them to move, and things that do not move and the forces within them. The topics include: quantities and units in mechanics; kinematics; forces and Newton's laws and moments.

Statistics allow you to analyse data using increasingly sophisticated techniques. The topics include: statistical sampling; data presentation and interpretation; probability; statistical distributions and statistical hypothesis testing.

Key information:

Topics for Study:	Pure Mathematics, Statistics, Mechanics
Assessment summary	Paper 1: Pure Mathematics, 2 hour examination (33.33%)
	Paper 2: Pure Mathematics, 2 hour examination (33.33%)
	Paper 3: Statistics and Mechanics, 2 hour examination (33.33%)
Entry requirements	Grade 7 in GCSE Mathematics
Exam Board	Edexcel
Subject lead contact details:	Mrs Ford, Head of Mathematics;
	NFord@qegs.cumbria.sch.uk

Why study Further Mathematics?

Further mathematics is an extension of the A-Level mathematics course and you must take A-Level mathematics to be able complete further mathematics.

What do I need to know or be able to do before taking this course?

A sound mathematical basis is crucial to be able to follow the course. Therefore, a grade 7 in GCSE mathematics is essential and a grade 8 is desirable.

Features of the course:

Students will extend their algebra techniques by looking into topics such as complex numbers, matrices and alternative co-ordinate systems. In addition, students can study further mechanics or try out a very different type of mathematics called decision. Decision mathematics studies a range of algorithms, for example understanding how a satellite navigation system calculates a route using an algorithm.

Further Pure Mathematics: Proof, complex numbers, matrices, further algebra and functions, further calculus, further vectors; polar coordinates, hyperbolic functions, differential equations, coordinate systems, further numerical methods, inequalities, groups, further calculus, further matrix algebra, further complex numbers, number theory, further sequences and series.

Further Mechanics: Momentum and impulse, collisions, centres of mass, work and energy, elastic strings and springs, further kinematics, further dynamics, motion in a circle, statics of rigid bodies, elastic collisions in two dimensions.

Decision Mathematics: Algorithms and graph theory, algorithms on graphs, algorithms on graphs II, critical path analysis, linear programming, transportation problems, allocation (assignment) problems, flows in networks, dynamic programming, game theory, recurrence relations, decision analysis.

Key information:

Topics for Study:	Further Pure Mathematics, Further Statistics, Further Mechanics, Decision Mathematics
Assessment summary	Paper 1: Further Pure Mathematics, 1 hour 30 minutes (25%) Paper 2: Further Pure Mathematics, 1 hour 30 minutes (25%) Paper 3: Further Mathematics Option 1, 1 hour 30 minutes (25%) Paper 4: Further Mathematics Option 2, 1 hour 30 minutes (25%)
Entry requirements	Grade 7 in GCSE Mathematics
Exam Board	Edexcel
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