# AQA
# A level
# Mathematics

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# Course Overview

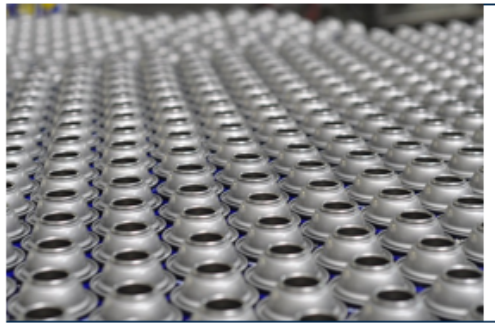
All content is compulsory, there are no choices in modules. This is the same across all exam boards. 5 period per week, 2 teachers: both teach Pure and then either Mech or Stats.

| **Pure** | **Mechanics** | **Statistics** |
|---|---|---|
| A: Proof<br>B: Algebra and functions<br>C: Coordinate geometry<br>D: Sequences and series<br>E: Trigonometry<br>F: Exponentials and logarithms<br>G: Differentiation<br>H: Integration<br>I: Numerical methods | J: Vectors<br>P: Quantities and units in mechanics<br>Q: Kinematics<br>R: Forces and Newton's laws<br>S: Moments | K: Statistical sampling<br>L: Data presentation and Interpretation<br>M: Probability<br>N: Statistical distributions<br>O: Statistical hypothesis testing |



# What is Pure Mathematics?

Methods and techniques which underpin the study of all other areas of mathematics, such as, proof, algebra, trigonometry, calculus, and vectors … enabling us to solve real world problems.



***What is the least amount of metal you need to make a cylindrical can that holds 330ml of fizzy drink?***



# What is Statistics?

Reaching conclusions from data in order to make informed decisions to help plan for the future.

***What is the probability of two '100 year floods' happening within the space of 5 years?***

***What assumptions have you made?***



# What is Mechanics?

The modelling of the world around us, the motion of objects and the forces acting on them.

***A golfer drives their ball from a tee on horizontal ground so that it has an initial velocity of 50ms$^{-1}$ at an angle of 40 degrees above the horizontal.***

***How far down the fairway will the ball land?***

Particularly useful for careers in physics or engineering

# Assessment

Year 12

No External Exams

June Y13

3 papers each 2 hours

Paper 1 – Pure only

Paper 2 – Pure and Mechanics

Paper 3 – Pure and Statistics

All assessments are formal written exams at the end of year 13. Calculators are required for each paper and the graphical calculator gives candidates a strong advantage therefore we encourage all students to purchase this through school early in year 12. Approximate cost £90. Financial support available, if needed.

Most of the marks are for steps in working rather than answers, so students must show their workings in a clear, rigorous and logical way.

Any of pure content can be assessed in any of the 3 papers, it is not divided by topic between the papers. All mechanics is assessed in paper 2 and the statistics content is assessed in paper 3.



# Why study Mathematics?

**Leads to versatile qualifications**
well-respected by employers and higher education

**Develop key employability skills**
e.g. problem-solving, communication, logical reasoning and resilience

**Increase knowledge and understanding**
of mathematical techniques and their applications

**Excellent preparation**
for a wide range of university courses

**Support the study of other A levels**

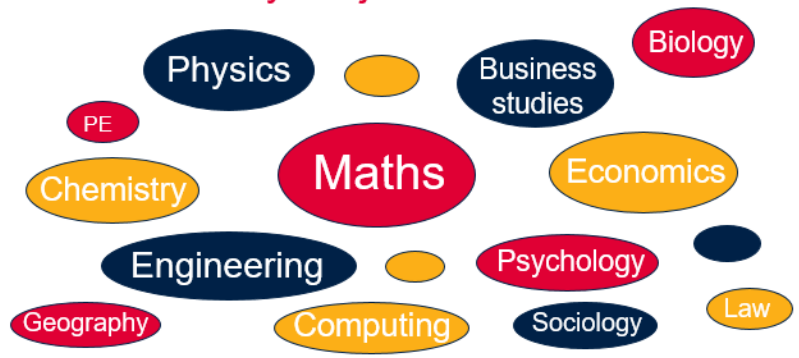
**Stimulating and challenging courses**

# Career routes

## What are the career opportunities?

Robotics Engineer
Acoustic consultant
Sports Announcer
Climatologist
Operations Research Analyst
Chartered accountant
Financial planner
Epidemiologist
Market Research Analyst
Geologist
Foreign Exchange Trader
Biologist
Geographer
Cryptanalyst
Biostatistician
Secondary school teacher
Technical Writer
Investment analyst
Computational Biologist
Meteorologist
Chemical Engineer
Petroleum Engineer
Data analyst
Game Designer
Chemist
Nuclear Engineer
Operational researcher
Economist
Astronaut
Cartographer
Engineer
Actuarial analyst
Architect
College Professor
Quantity surveyor
Software tester
Roller Coaster Designer
Biologist
Physician
Data scientist
Mathematician
Electrical Engineer
Financial trader
Research scientist
Hydrologist
Actuary
Cost Estimator
Market Analyst
Attorney
Urban Planner
Statistician
Political Scientist
Inventory Control Specialist
Animator
Mathematical Physicist
Air Traffic Controller
Maths Teacher
Stockbroker
Financial manager
Jet Fighter Pilot
National Security Analyst
Budget Analyst
Analyst
Mechanical Engineer
Politician
Purchasing Agent
Insurance underwriter
Psychometrician
Manager
Professional Photographer
Software engineer
Cryptographer
Computer Scientist
Software Developer
Mathematical Biophysicist
Forensic Analyst
Civil Service

### Many subjects use maths




### Maths in other A levels

| | |
|---|---|
| Geography | (no specific percentage but geographical skills include quantitative and qualitative skills equally) |
| Economics | (at least 20%) |
| Biology | (at least 10%) |
| Business | (at least 10%) |
| Psychology | (at least 10%) |
| PE | (at least 5%) |
| Sociology | (no specific percentage but you will be analysing data) |

# AQA Further Maths

If you opt for "Further Maths" it only takes one option block but includes A levels in both Maths and Further Maths. It is TWO full A levels.

- You will have 8 Maths lessons a week, split between 2 teachers: one will teach all the Pure and the other teacher will focus on Mech and Stats.
- At the end of Year 12 you will have 2 external exams for Further Maths at AS. You can choose to swap to A level Maths only at the end of Year 12 having completed the AS in Further Maths.
- In Year 13 you will continue with 8 lessons and will have 6 external exam papers at the end of the year. Leading to an A Level in Maths and a separate A Level in Further Maths.

# A Level Further Maths Topics

## Pure

- Proof
- Complex Numbers
- Matrices
- Further Algebra & Functions
- Further Calculus
- Further Vectors
- Polar Coordinates
- Hyperbolic Functions
- Differential Equations
- Numerical Methods

## Mechanics

- Dimensional Analysis
- Momentum & Collisions
- Work, Energy & Power
- Circular Motion
- Centres of Mass & Moments

## Statistics

- Discrete Random Variables
- Poisson Distribution
- Type 1 and Type11 errors
- Continuous Random Variables
- Chi Squared Test for Association
- Exponential Distribution
- Inference-One Sample t Distribution
- Confidence Intervals

# Other sources of information

AMSP website www.amsp.org.uk

Maths Careers website www.mathscareers.org.uk

Apprenticeship websites e.g. www.amazingapprenticeships.com

Universities and Colleges Admissions Service (UCAS) www.ucas.com

Russell Group Universities www.informedchoices.ac.uk

Tomorrow's Engineers www.tomorrowsengineers.org.uk

The Institute of Physics (IOP) www.iop.org

Nrich www.nrich.org.uk

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