



# GCSE Mathematics Year 11

Mathematics teachers are striving for all students to develop an interest in studying the subject at a higher level. Students will be encouraged to explore the links between mathematics and other fields of study. Students will develop an awareness of the relevance of mathematics to the world of work and to situations in society in general.

*Mathematics knows no races or geographic boundaries; for mathematics, the cultural world is one country.- David Hilbert*

Students will Learn:-

## Term 1

### Area and volume

All students will cover – Find the area and perimeter of rectangles, triangles, quadrilaterals and circles including arcs and sectors. Find the volume and surface area of cuboids, prisms, sphere, cone and pyramid.

Students aiming for the higher tier also need to cover – the above plus Similar shapes and rates of flow.

### Statistics

All students will cover - Use tally charts, two-way tables, Bar charts, pictograms, Pie charts, Time series, Scatter graphs, Stem and leaf graphs. Finding averages and range.

Students aiming for the higher tier also need to cover – the above plus Histograms, cumulative frequency and boxplots.

### Number

All students will cover – Rounding, estimating, rounding errors, types of numbers, Indices and standard form.

Students aiming for the higher tier also need to cover – Surds, upper and lower bounds.

## Term 2

### Geometric reasoning

All students will cover – Bearings, construction and loci.

Students aiming for the higher tier also need to cover geometric proof.

### Sequences

All students will cover – term to term rules, nth term rules.

Students aiming for the higher tier also need to cover quadratic sequences, proof and iterative methods.

### Simultaneous equations

All students will cover – solving simultaneous equations.

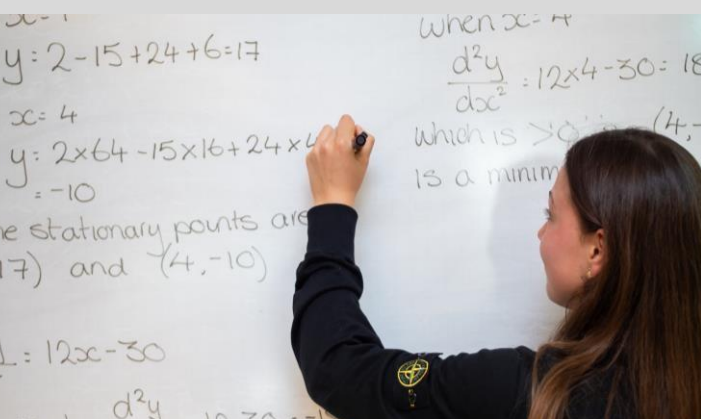
Students aiming for the higher tier will also need to cover quadratics with linear and graphing to solve simultaneous equations.

## Term 3

### **Revision**

### **How will we assess learning?**

- Homework book exercises
- Mathswatch
- Exam style questions/ Past Papers
- Problem solving book
- Understanding of key vocabulary, definitions
- Common denominator, reciprocal
- Index, index notation Variable, expression, term, product, expanding, binomial



# International Opportunities



## Within the curriculum

- Use literacy rates as percentages or any other international data. History of fractions. [https://rich.maths.org/2515 Tasks for fractions](https://rich.maths.org/2515%20Tasks%20for%20fractions) [https://rich.maths.org/public/topic.php?group\\_id=2&code=19](https://rich.maths.org/public/topic.php?group_id=2&code=19)
- International Al-Khwarizmi Born 830AD. Developed Algebra Muslim mathematician and astronomer whose major works introduced Hindu-Arabic numerals and the concepts of algebra into European mathematics. Standard form – km between planets.
- Use international data. Baye's theorem <https://www.mathsisfun.com/data/bayestheorem.html> Thomas Bayes 1702 – 1761 English Statistician. Abraham de Moivre French mathematician 1667 – 1754 developed game theory and actuarial mathematics.
- Famous buildings – Pantheon.
- The school emblem. Flags of the world. Symmetry of buildings.
- Singaporean bar modelling method Al-ge-bra is Arabic Use science equations. Use scientific formulas, cooking formulas, mobile phones etc. Fibonacci sequence – The magic of Fibonacci numbers Arthur Benjamin – TED talk Sequence within voting systems – resource within the international folder. Pascal's triangle Sierpinsky's triangle.
- a Greek letter Leonhard Euler 1707 – 1783 A Swiss mathematician who developed notation including the use of  $e$ . Srinivasa Ramanujan 1887-1920 An Indian mathematician who discovered the formula for  $\pi$  Using circles to estimate areas of fields. <http://www.agritechtalk.org/Uno%20How%20Visit%201%20part%201.html>
- Pythagoras was a Greek mathematician c.560 – c.480BC <https://rich.maths.org/2721>
- Bhaskara was an Indian mathematician who dealt with complicated formula with zero-digits. He was acknowledged by mathematicians in Europe in the 12th century, and thus considered by many as the man who invented the quadratic equation. Simultaneous equations in real life – in international folder
- 'M' comes from the Latin word 'modus' meaning measure (some say from the French word 'monter' - to climb). 'C' is for Cartesian plane. Cartesian plane was named by Rene Descartes.
- Thales c.636 – c.546 BC Angles at the base of an isosceles triangle are equal. Vertically opposite angles are equal. Euclid born 300BC A Greek mathematician who was the 'founder of geometry' proved the exterior angles theory.

**"Pure Mathematics is, in its way, the poetry of logical ideas." Albert Einstein**

## Key Vocabulary

- Event, outcome, equally likely, random, mutually exclusive, independent events, dependent events, relative frequency, conditional.
- Plan, elevation, net, isometric grid
- Line of symmetry, scale factor, rotation, enlargement, translation
- Consecutive, term, term-to-term rule, arithmetic sequence, geometric sequence, position-to-term rule
- Primary, secondary, qualitative, quantitative, discrete, continuous, population sample, representative
- Circumference, sector, arc, congruence, similar, scale factor
- Pythagorean triple, hypotenuse, sine, cosine, tangent.
- Roots, solution, simultaneous equation
- Exchange rates, proportion
- Perpendicular, locus (loci), bisect
- Gradient, y-intercept, x-intercept, parallel, perpendicular, number line, inequality
- Circumference, arc, sector, segment, tangent, chord