



Subject: Mathematics

Year Group: KS4 Core

Curriculum Intent:

Students are encouraged to think deeply, challenge their understanding and ask questions. Our aim is to encourage and develop independent thinkers with the mathematical skills and confidence to take on the challenges of everyday life.

Our three key principles are to:

1. Develop fluency:

We recognise the importance of having a deep understanding, as many students will miss out on the opportunity to master mathematics if simply learning new procedures and processes. We enable students to develop their own understanding through consolidating key learning and developing that into a fluency of the subject. Students should be able to explain why as well as how something happens.

2. Reason mathematically:

It is essential that students get the opportunity to develop their mathematical reasoning both in and outside of the classroom to fully master the subject. We want students who think like mathematicians rather than people who simply do the maths. Students should have the opportunity to explore how and why maths works through the wide variety of mathematical topics through questioning, experimentation, exploring and creating their own theories to guide their own mathematical learning journey.

3. Solve problems:

We believe that students of all abilities should be able to problem solve in order to be successful in the wider world. Students should have the opportunity to develop their own problem solving skills to analyse, evaluate and structure answers to a wide range of problems. This should include using formal mathematical knowledge to interpret problems, model/predict solutions and select appropriate methods and techniques to apply to unfamiliar or non-routine problems.

College Values:

The Christ's College Mathematics department aims to ensure all students have the opportunity to make the best progress they are able to in Mathematics.

Students are encouraged to work cooperatively with each other to support the development of their understanding in lessons. Following the College behaviour policy, we encourage students to take responsibility for their learning through respecting others views and being tolerant of other viewpoints to further foster the community feeling.

When visiting our department you will see staff upholding and embracing the College values of love, cooperation, stewardship, respect and service as well as students being encouraged to do the same.





Christ's College Guildford

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Knowledge and Skills:

We follow the Edexcel 1MA1 GCSE Mathematics exam specification. All topics focus on our 3 key principles of fluency, reasoning and problem solving. All students will cover the following:

Number - Working with Integers decimals and negative numbers; inequalities; place value; indices; factors/HCF, multiples/LCM & primes; fractions, decimals & percentages; calculations involving fractions; use of standard units of mass, length, money & other measures; estimating answers; rounding & approximation; limits of accuracy; converting to/from and calculating with standard form.

Algebra - Algebraic notation & vocabulary; manipulating expressions & equations; simplifying expressions; rearranging formulae; substitution; solving equations & inequalities including those with brackets and the unknown on both sides of the equation; solving linear simultaneous equations; generating and using term-to-term & position-to-term rules in sequences; finding the nth term of a linear sequence; using coordinates in all 4 quadrants of a graph; plotting straight line graphs using y=mx+c; identifying the gradient & y-intercept of linear functions; using and creating real life graphs; recognise and plot other graphs such as cubic, quadratic & reciprocal graphs.

Ratio, Proportion & Rates of Change - Change freely between related standard units (eg. time, length, area); use of scale factors, scale drawings & maps; Simplifying ratios; 1:n; division by ratio; direct & indirect proportion; recipes; use of compound units (eg. density, speed); comparing lengths, area & volumes using ratio notation; set up, solve & interpret the answers of growth/decay problems including compound interest.

Geometry & Measures - Use conventional notation and conventions; construct line and angle constructions; constructing perpendicular lines; dealing with loci problems; properties of angles round a point, on a line & vertically opposite angles; angles in a triangle and other polygons; properties of 2D & 3D shapes; identify similar shapes; use basic congruence criteria for triangles (SSS, SAS, ASA, RHS); parallel lines & angle facts; interior & exterior angles of polygons; identify and use parts of the circle; plans & elevations; perimeter, area & volume of 2D/3D shapes; area & perimeter of circles (inc. arc lengths & areas of sectors); transformation of 2D shapes; Pythagoras' theorem; basic trigonometry (SOHCAHTOA); use standard measures & related concepts (eg. length, area, volume, etc); line segments & angles; describe & use 2D vectors (inc. vector addition and multiplication).

Probability - Record, describe & analyse experimental probabilities; understand randomness and chance; relate expected outcomes to 0-1 probability scales; exhaustive & mutually exclusive events sum to 1; understand how events affect future probabilities (independent & dependent/conditional probability); create & use probability space tables.

Statistics - Tables; charts & graphs (inc. frequency tables, bar charts, pie charts, scatter graphs, pictograms & line graphs); use of statistics and sampling; mean, median & mode (inc range).





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Assessment:

Students will be assessed during lessons both verbally and with the work they complete. More formal assessments will take place in the form of end of topic and term assessments.

Assessments will incorporate a range of Assessment Objectives:

- AO1 using and applying standard mathematical techniques
- AO2 reasoning, interpreting and communicating mathematically
- AO3 solving problems in mathematics and in other contexts

There will also be formal mock examinations during the year.

Homework:

In mathematics all homework will be set via Hegarty Maths on a weekly basis. This will be set at least 1 month after the content was taught in class so as to support the departmental focus of improving students' retrieval practice.

Cultural Capital:

Students are encouraged to attend the Maths Clinic where they can see further advice and guidance about their learning. We also engage in the UK Intermediate Maths Challenge as well as attending competitions with other local schools in the county as well as having the opportunity to participate in the National Cipher Competition, in which we have had great success in previous years.

Students are able to use Hegarty Maths to further develop their mathematical understanding through the use of Memri and Fix Up 5 (FU5) tasks. These aim to support knowledge retention through focussing on questions that students have either gotten correct (Memri) or incorrect (FU5) previously and brings them back in mixed up tasks.

Students are also encouraged to use sites like <u>https://corbettmaths.com/</u> and <u>https://keshmaths.com/gcse-maths-takeaway-3/</u> to practice exam style questions by topic. These sites also include worked solutions and videos on each topic.

