

Year 11 (Higher)

In our students' final year of study, we begin by drawing on all of the knowledge and skills they have developed over their 4 years with us to introduce some of the most challenging GCSE content, including trigonometric graphs, algebraic proof, and functions at higher tier. Students are now refining and fully developing their **problem-solving** and **mathematical reasoning** skills in preparation for their exam. In the periods of revision that are scheduled, teachers identify gaps in knowledge and underdeveloped skills in their students, and revisit elements of the KS4 curriculum accordingly. Often, these areas of weakness will not be in **fluency**, but in students' ability to **reason mathematically** with the knowledge they have, or **problem-solve** in unseen situations. They will use this time to hone these core concepts fully.

	<u>Learning Period 1: Autumn</u>	<u>Learning Period 2: Autumn</u>	<u>Learning Period 3: Spring</u>	<u>Learning Period 4-6: Spring/Summer</u>
Topic title	Geometric reasoning and proof	Inequalities and graphs	Algebra and graphs	Exam preparation
Relevant core concepts	Mathematical fluency, Mathematical representation, language, and notation, Problem-solving	Mathematical fluency Mathematical representation, language, and notation Conceptual understanding	Mathematical representation, language, and notation Mathematical fluency Conceptual understanding Problem-solving	Mathematical representation, language, and notation Mathematical fluency Conceptual understanding Problem-solving
Key questions	<p>What is a column vector?</p> <p>How can I use vectors to solve problems?</p> <p>How can I prove that two vectors exist on a straight line?</p> <p>How can I find interior and exterior angles of any sized polygon?</p> <p>How can I prove circle theorems using angle facts?</p> <p>What is bearing and how can I use parallel line angle facts to find them?</p> <p>What is congruency and how can I use it to prove two shapes are congruent?</p> <p>How can I use a compass to construct loci?</p>	<p>How can I use my understanding of balancing to solve an inequality?</p> <p>How can I represent an inequality graphically?</p> <p>What is the relationship between the equation of a line and a parallel or perpendicular line?</p> <p>What are the different types of graphs can I generate?</p> <p>How can I apply my understanding of graphs to D-T and V-T graphs?</p> <p>What do trigonometric graphs look like and how can I use them to find multiple solutions?</p>	<p>How can I prove number patterns using algebra?</p> <p>What is iteration and how can it be used to gain an approximate solution to a cubic?</p> <p>What is function notation?</p> <p>How do I use my understanding of function notation to transform functions graphically?</p>	<p>What do the exam papers look like and how can I apply my knowledge to answering exam style questions?</p>
Key knowledge/concepts and skills	<p>Unit 25 - Vectors Use column vector notation and be able to add/subtract vectors Solve problems with vectors using ratios and fractions Prove that vectors are co-linear</p> <p>Unit 26 - Geometric reasoning Be able to calculate interior and exterior angles of polygons</p> <p>Unit 27 - Circle theorems Reason using the circle theorems Use circle theorems to derive proofs</p> <p>Unit 28 - Bearings Understand the conventions involved in bearings Use parallel line angle facts to reason with bearings</p> <p>Unit 29 - Congruence and similarity Identify congruency using the SAS, ASA, SSS and RHS rules Prove that two shapes are congruent Be able to use a scale factor to convert between lengths, area and volumes in similar shapes</p> <p>Construction and loci Construct angle bisectors and perpendicular bisectors using a compass Construct loci to solve problems</p>	<p>Unit 30 - Linear graphs Be able to find the equation of a line from two points Be able to find lines that are parallel or perpendicular to a line and that pass through a specified point</p> <p>Unit 31 - Inequalities Solve linear inequalities Identify regions indicated by one or more inequality Solve quadratic inequalities</p> <p>Unit 32 - Non-linear graphs Identify a variety of different graphs including quadratic, cubic, reciprocal and exponential graphs Identify the equation of circle and understand how to find the radius and centre point from the equation Plot and interpret distance-time and velocity-time graphs Calculate and interpret the area under D-T and V-T graphs Interpreting rate of change from a graph</p> <p>Unit 33 - Trigonometric graphs Identify the graphs of $y=\sin x$, $y=\cos x$ and $y=\tan x$ Be able to recall exact trigonometric values Be able to use the trigonometric graphs to find values</p>	<p>Unit 34 - Algebraic proof and reasoning Be able to represent odd, even and consecutive integers algebraically Derive proofs algebraically</p> <p>Unit 35 - Recurrence relations Use an iterative relationship to generate a solution Be able to rearrange a quadratic/cubic equation to derive an iteration formula</p> <p>Unit 36 - Functions Apply function notation Be able to calculate composite functions Be able to find an inverse function</p> <p>Unit 37 - Transformation of graphs Be able to transform graphs given an equation using standard function notation</p> <p>Unit 38 - Further graphs Interpret the meaning of the gradient of a graph in terms of a rate of change</p>	<p>Bespoke revision lessons for each class based on previous mock exams</p> <p>Exam practise using past exam papers</p>
Assessment & Educational Visit Opportunities		Y11 mocks -November 10 th – 21 st	Y11 mocks 9 th Feb – 27 th Feb	GCSE examinations start Paper 1 – 14 th May Paper 2 – 3 rd June Paper 3 – 10 th June