

KS4 Long Term Curriculum Plan: **Mathematics - Year 11 Higher**

Curriculum Aim: The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Link to prior learning: See KS3 National Curriculum for Mathematics

Rationale of sequencing: In mathematics, students follow a spiral curriculum that allows them to study requisite skills before moving onto more complex concepts. Students will revisit topics in subsequent years and build on prior knowledge and connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. Decisions about progression should be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems.

Autumn 1 focuses on building students' fluency in algebra, specifically algebraic fractions and proof, and further graphs. This is a more challenging topic which requires the student to apply skills learnt in the previous module to provide mathematical proofs algebraically. This naturally leads to our final module covering vector geometry and vector proofs which again builds on the skills considered in similarity and congruency and algebraic proof.

Term	Focus / Topic	Knowledge & Skills (from NC/Programmes of Study)	Assessment
Autumn 1	Module 21 - Algebraic fractions, functions & proof Module 22 - Further graphs	<p>Students should be able to:</p> <ul style="list-style-type: none"> • Simplify and manipulate algebraic fractions by: <ul style="list-style-type: none"> factorising quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares; {factorising quadratic expressions of the form $ax^2 + bx + c$} • Simplifying expressions involving sums, products and powers, including the laws of indices . • Know the difference between an equation and an identity; • Argue mathematically to show algebraic expressions are equivalent. • Use algebra to support and construct arguments and proofs. • Calculate or estimate gradients of graphs and areas under graphs including quadratic and other non-linear graphs. • Interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts. • Recognise, sketch and interpret graphs of simple cubic functions, the reciprocal function $y = \frac{1}{x}$ with $x \neq 0$, the exponential function $y = k^x$ for positive values of k, and the trigonometric functions (with arguments in degrees), $y = \sin(x)$, $y = \cos(x)$ & $y = \tan(x)$ for angles of any size. • Sketch translations and reflections of the graph of a given function. • Plot and interpret graphs (including reciprocal graphs {and exponential graphs}) and graphs of non-standard functions in real contexts, 	w/c 04/10/21 - Year 11 assessment week

		<ul style="list-style-type: none"> Find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration 	
Autumn 2	Module 23 - Vector geometry	Students should be able to: <ul style="list-style-type: none"> Apply addition and subtraction of vectors. Multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; 	PPE fortnight starting w/c 06/12/21
Spring 1	Module 23 - Vector geometry	Students should be able to: <ul style="list-style-type: none"> Use vectors to construct geometric arguments and proofs. 	Topic/skills test
Spring 2	Revision for final exams	Students should be able to: <ul style="list-style-type: none"> Revise all GCSE topics for the final exams Following on from the assessments teachers will re-teach gaps from the weak areas in the assessments This will be personalised based on each class and their results analysis from the end of year exams 	PPE week starting w/c 21/03/22
Summer 1	Revision Public exams	Students should be able to: <ul style="list-style-type: none"> Revise all GCSE topics for the final exams Following on from the assessments teachers will re-teach gaps from the weak areas in the assessments This will be personalised based on each class and their results analysis from the end of year exams 	Public exams
Summer 2	Public exams	Public exams	Public exams

Further Information

The exam board used for Mathematics is **Edexcel** - <http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics2015.html>

Hegarty Maths- <https://hegartymaths.com/> (All students are given individual logins and passwords to support with classwork, homework and revision)

Equipment - All students must attend lessons with pens (including a green pen), pencil, long ruler, rubber, protractor, pair of compasses, scientific calculator and exercise book