

KS4 Long Term Curriculum Plan: **Mathematics - Year 10 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.

In the Autumn term, the students start with a more advanced study of probability which builds on the previous study of probability at Key Stage 3. Students then move onto the more complex number skills of bounds, indices and surds in module 13 which support the study of more complex linear and quadratic equations in modules 15 and 16. Students then extend their understanding of representing data from Key Stage 3 in the module of sampling and more complex diagrams. Students also build on their previous geometry study with the module on circle theorems which builds on all geometry prior learning and finally finish with the module of further Pythagoras and trigonometry which combines students earlier work on algebra and geometry.

Term	Focus / Topic	Knowledge & Skills (from NC/Programmes of Study)	Assessment
Autumn 1	<ul style="list-style-type: none"> • know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$ • exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$ Module 11 - Probability Module 12 - Combined events Module 13 - Accuracy, powers & surds	Students should be able to: <ul style="list-style-type: none"> • use a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size • Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one • calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions • calculate exactly with fractions, {surds} and multiples of π; {simplify surd expressions involving squares [for example $12 \ 4 \ 3 \ 4 \ 3 \ 2 \ 3 = x = x = x$] and rationalise denominators} • apply and interpret limits of accuracy when rounding or truncating, {including upper and lower bounds} 	Topic/skills test
Autumn 2	Module 14 - Congruence & similarity Module 15 - Linear equations & inequalities	Students should be able to: <ul style="list-style-type: none"> • Apply the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar figures • solve linear inequalities in one {or two} variable{s}, {and quadratic inequalities in one variable}; represent the solution set on a number line, {using set notation and on a graph} 	w/c 15/11/21 - Year 10 assessment week

Spring 1	Module 16 - Quadratic equations	<p>Students should be able to:</p> <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 $a x^2 + bx + c$} solve quadratic equations {including those that require rearrangement} algebraically by factorising, {by completing the square and by using the quadratic formula}; find approximate solutions using a graph infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling Solve two simultaneous equations in two variables (linear/linear {or linear/quadratic}) algebraically; find approximate solutions using a graph. 	<p>Topic/skills test</p> <p>End of half-term assessment on all topics covered since the start of year 10.</p>
Spring 2	<p>Module 17 - Sampling & more complex diagrams</p> <p>Module 18 - Properties of circles</p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through: appropriate graphical representation involving discrete, continuous and grouped data, {including box plots} appropriate measures of central tendency (including modal class) and spread {including quartiles and inter-quartile range} identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment {apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results} 	<p>Topic/skills test</p> <p>End of half-term assessment on all topics covered since the start of year 10.</p>
Summer 1	<p>Module 19 - Proportionality</p> <p>Module 20 - Further Pythagoras & trigonometry</p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> understand that X is inversely proportional to Y is equivalent to X is proportional to $\frac{1}{Y}$; {construct and} interpret equations that describe direct and inverse proportion interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles {and, where possible, general triangles} in two {and three} dimensional figures {know and apply to calculate the area, sides or angles of any triangle} 	<p>Topic/skills test</p>
Summer 2	<p>Revision</p> <p>End of year exams</p> <p>Recapping and re-teaching</p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> Revise all year 10 topics for the end of year assessments 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 	<p>w/c 27/6/22 - Year 10 assessment week</p>

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