



Curriculum Map for Higher Maths Year 10

YEAR 10	Autumn 1	Autumn 2
Topics	Equations & Inequalities Probability	Multiplicative Reasoning
Substantive Knowledge – The Knowledge Taught By The Teacher	<ul style="list-style-type: none">Students will learn how to solve quadratic equations graphically, through factorisation, by using the quadratic formula and by completing the square.Students will learn how to solve linear and quadratic simultaneous equations.Students will learn how to solve linear and quadratic inequalities.Students will learn about mutually exclusive and independent events.Students will learn about conditional probability.	<ul style="list-style-type: none">Students will learn about percentage change and multipliers.Students will learn about compound percentages.Students will learn about the compound measures of density, pressure and speed and their units.
Disciplinary Knowledge – Concepts, Investigations, Conjecture, Proof, Problem Modelling and Problem Solving	<ul style="list-style-type: none">Understand and use standard mathematical formulae; rearrange formulae to change the subject.Understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size.	<ul style="list-style-type: none">Understand compound units such as speed, rates of pay, unit pricing, density and pressure.
Skills	<ul style="list-style-type: none">Simplify and manipulate algebraic expressions (including those involving surds) by factorising quadratic expressions of the form $ax^2 + bx + c$.Solve quadratic equations (including those that require rearrangement) algebraically by factorising, by completing the square and by using the quadratic formula.Solve two simultaneous equations in two variables (linear/linear or linear/quadratic) algebraically; find approximate solutions using a graph.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.Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments.	<ul style="list-style-type: none">Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts.Express a multiplicative relationship between two quantities as a ratio or a fraction.Set up, solve and interpret the answers in growth and decay problems, including compound interest and work with general iterative processes.

	<ul style="list-style-type: none"> Relate relative expected frequencies to theoretical probability, using appropriate language and the 0-1 probability scale. Enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams. 	
Links To Prior Learning	<ul style="list-style-type: none"> Building on expanding and factorising with single/double brackets including negative numbers and powers, substitution into formulae, solving algebraic fractional indices and rearranging formulae, linear and quadratic sequences. Building on probability scales and calculating simple probability of independent events, expected probability and finance to further develop understanding and calculating sample space diagrams, experimental probability, Venn diagrams and set notations, frequency trees and tree diagrams, dependent/conditional events. 	<ul style="list-style-type: none"> Building on calculating percentage of amounts, rearranging equations, distance equal speed divided by time from Year 9.
Literacy/ Numeracy	<ul style="list-style-type: none"> The language of quadratic equations and inequalities. The language of probability and sets. 	<ul style="list-style-type: none"> The language of multiplicative reasoning including growth and decay The language of compound measures such as speed, distance and time.
Cross Curricular	<ul style="list-style-type: none"> Any areas where quadratics are used such as Technology, Science and Engineering. Any areas where probability is required such as Business Studies. 	<ul style="list-style-type: none"> Any areas where compound measures (density, pressure and speed) are used such as Science and Technology. Any area where volume and capacity are used such as Science and Technology. Any areas where percentage change is used such as Science, Business Studies and Geography.
Assessment	<ul style="list-style-type: none"> Learning checks throughout with low stakes questioning and starters. Summative assessment at the end of the topic. 	<ul style="list-style-type: none"> Learning checks throughout with low stakes questioning and starters. Summative assessment at the end of the topic.

YEAR 10	Spring 1	Spring 2
Topics	Similarity & Congruence Further Trigonometry	Further Statistics
Substantive Knowledge – The Knowledge Taught By The Teacher	<ul style="list-style-type: none"> Students will learn the conditions of congruence and how to apply them to proofs. Students will learn about the ratios of length, area and volume in similar shapes. 	<ul style="list-style-type: none"> Students will learn about bias, random and stratified sampling. Students will learn to draw cumulative frequency diagrams and box plots. Student will learn how to estimate lower and upper quartiles and the Interquartile range.

	<ul style="list-style-type: none"> Students will learn about the ratio of length in similar shapes. Students will learn about the graphs of the sine, cosine and tangent functions. Students will learn the sine and cosine rules and the trigonometric form of the formula for the area of a triangle. 	<ul style="list-style-type: none"> Students will learn how to draw and interpret histograms.
Disciplinary Knowledge – Concepts, Investigations, Conjecture, Proof, Problem Modelling and Problem Solving	<ul style="list-style-type: none"> Understand the difference between congruence and similarity including the basic congruence criteria for triangles. Understand how trigonometric values for angles are derived. Understand the derivation of the cosine and sine rules. 	<ul style="list-style-type: none"> Understand the link between collecting data and using it in real life.
Skills	<ul style="list-style-type: none"> Compare lengths, areas and volumes using ratio notation; make links to similarity (including trigonometric ratios) and scale factors. Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS). Calculate: surface area and volume of spheres, pyramids, cones and composite solids. Work with coordinates in all four quadrants. know and apply the sine rule $a/\sin A = b/\sin B = c/\sin C$, and cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$, to find unknown lengths and angles. know and apply Area = $1/2absinC$ to calculate the area, sides or angles of any triangle. 	<ul style="list-style-type: none"> Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling apply statistics to describe a population. Interpret and construct diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs and know their appropriate use. Apply statistics to describe a population.
Links To Prior Learning	<ul style="list-style-type: none"> Building on understanding of transformations, scale drawings and constructions, volume and area of 2D and 3D shapes including circles. Building on Pythagoras Theorem and trigonometry. 	<ul style="list-style-type: none"> Building on interpreting and representing data using two-way tables, back-to-back stem and leaf, drawing pie charts, scatter graphs using bivariate data including line of best fit, grouped frequency tables and estimated mean from frequency tables.
Literacy/ Numeracy	<ul style="list-style-type: none"> The language of similarity and congruence. The language of Pythagoras and trigonometry. 	<ul style="list-style-type: none"> The language of statistics.
Cross Curricular	<ul style="list-style-type: none"> Any areas which use enlargement such as Technology and Art. Any areas which need to be able to calculate lengths and angles in non-right-angled triangles such as Science and Engineering. 	<ul style="list-style-type: none"> Any areas which use sampling of data or grouped continuous data such as Geography, Science, Business and Psychology.
Assessment	<ul style="list-style-type: none"> Learning checks throughout with low stakes questioning and starters. Summative assessment at the end of the topic. 	<ul style="list-style-type: none"> Learning checks throughout with low stakes questioning and starters. Summative assessment at the end of the topic.

YEAR 10	Summer 1	Summer 2
Topics	Equations & Graphs Circle Theorems	Further Algebra
Substantive Knowledge – The Knowledge Taught By The Teacher	<ul style="list-style-type: none"> • Student will learn how to solve linear and quadratic simultaneous equations graphically. • Students will learn about the maxima and minima of quadratic functions using graphs. • Students will learn how to draw inequalities graphically. • Students will learn about the graphs of cubic functions. • Students will learn the equation of a circle and its graph. • Students will learn about the iterative process and how it be used to find the roots of equations. • Students will learn the circle theorems and about circle geometry. 	<ul style="list-style-type: none"> • Students will learn about changing the subject of more complex formulae. • Students will learn how to solve equations involving algebraic fractions. • Students will learn about algebraic proof. • Students will learn how to rationalise the denominator with surds. • Students will learn about functions including their composites and inverse.
Disciplinary Knowledge – Concepts, Investigations, Conjecture, Proof, Problem Modelling and Problem Solving	<ul style="list-style-type: none"> • Understand the link between functions and their graphs. • Understand the basic concept behind iteration. • Understand the link between circle geometry and circle theorems. 	<ul style="list-style-type: none"> • Understand the link between algebra with surds. • Understand that proof can be through a counter example.
Skills	<ul style="list-style-type: none"> • Identify and interpret roots, intercepts, turning points of quadratic functions graphically, identify turning points by completing the square. • Recognise, sketch and interpret graphs of quadratic functions and simple cubic functions. • Solve quadratic equations (including those that require rearrangement) and find approximate solutions using a graph. • Recognise and use the equation of a circle with centre at the origin; find the equation of a tangent to a circle at a given point. • 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. 	<ul style="list-style-type: none"> • Simplify surd expressions involving squares and rationalise denominators. • Rearrange formulae to change the subject. • Argue mathematically to show algebraic expressions are equivalent and use algebra to support and construct arguments and proofs. • Where appropriate, interpret simple expressions as functions with inputs and outputs; interpret the reverse process as the 'inverse function'; interpret the succession of two functions as a 'composite function' (the use of formal function notation is expected). • Solve quadratic equations (including those that require rearrangement) algebraically by factorising.

Links To Prior Learning	<ul style="list-style-type: none"> • Building on quadratic formula, completing the square, solving simultaneous equations linear and non-linear and solving linear inequalities. • Building on $y = mx+c$, linear graphs, line segments, quadratic functions, area and perimeter of circles including sectors of circles and surface area of cylinders. 	<ul style="list-style-type: none"> • Building on manipulating surds, simplifying complex expressions, expanding and factorising with single/double brackets including negative numbers and powers, substitution into formulae, solving algebraic fractional indices and rearranging formulae, linear and quadratic sequences.
Literacy/ Numeracy	<ul style="list-style-type: none"> • The language of quadratic, cubic and circular functions. • The language of simultaneous equations. • The language of iteration. • The language of circle geometry. 	<ul style="list-style-type: none"> • The language of algebraic fractions. • The language of surds. • The language of proof. • The language of functions.
Cross Curricular	<ul style="list-style-type: none"> • Any areas which use graphs of quadratic, cubic or circular functions such as Geography and Science. • Any areas which represent inequalities graphically such as Business. 	<ul style="list-style-type: none"> • Any areas which uses algebra, surds or proof.
Assessment	<ul style="list-style-type: none"> • Learning checks throughout with low stakes questioning and starters. • Summative assessment at the end of the topic. 	<ul style="list-style-type: none"> • Learning checks throughout with low stakes questioning and starters. • Summative assessment at the end of the topic.