Maths Curriculum Overview - Year 9 Higher with Further Maths

	Unit	Details
Autumn One	**Number: Indices and Surds** **Algebra: Expressions, equations and sequences** **Interpreting and representing data.**	Pupils consolidate key number concepts such as estimation, place value and factors and primes. They will develop this into prime factorisation and using standard form, indices and surds. Pupils will then be able to generalise and manipulate algebraic expressions using index laws, expanding brackets and quadratic factorisation. This will give pupils the skills to use when solving equations with brackets and numerical fractions. We explore patterns and finding the nth term of both linear and quadratic sequences. Then pupils will develop their understanding of data and construct and use back-to-back stem and leaf diagrams, construct and use frequency polygons and pie charts and plot and interpret time series graphs. They will look at bivariate data, plot scatter graphs, draw lines of best fit and make predictions. They will then summarise data by finding averages and range from grouped frequency tables.
Autumn Two	**Fractions, ratio and percentages.** **Angles and trigonometry**	Pupils will first consolidate their Year 8 work on fractions before they compare, find quantities and solve problems with ratio. This will be linked to direct proportion and they will convert between currencies and measures. The concepts will then be developed into working out percentage increases and decreases and solving real-life problems involving percentages. Then time will be spent developing geometry from Year 8, with pupils first looking at angles in triangles and quadrilaterals. This will be extended to calculate interior and exterior angles and solving problems in polygons. We then look at right angled triangles and Pythagoras' theorem. This leads to investigating the ratio of the sides of a right-angled triangle and the formal methods of trigonometry. Pupils will learn how to utilise trigonometry in solving problems and know the exact values of the sine, cosine and tangent of special angles.
Spring One	**Graphs** **Area and Volume**	Firstly we revisit algebra, this time using graphs to express relationships. Pupils will find gradients and intercepts and learn to rearrange an equation into the form $y = mx + c$. They will then be able to sketch graphs and find the equation of a line given its gradient and one point on the line, or through two points. They will find midpoints and problem solve with parallel and perpendicular lines. This will then be applied in the context of distance–time graphs and velocity–time graphs, and lines of best fit on scatter graphs. Pupils will then draw quadratic graphs and solve quadratic equations using graphs. This will extend to recognising cubic and reciprocal graphs, and circles centred about the origin. At the start of this unit we ensure pupils can convert between units of measurement. They have learned in Year 8 to calculate the area of 2D shapes, so this is now developed to look at finding the perimeter and area of compound shapes and calculating volumes and surface areas of prisms. The area of a circle leads to finding arc length, area and perimeter of sectors. We then move on to looking at 3D shapes and find the volume and surface area of pyramids and cones.
Spring Two	**Transformations and Constructions**	This geometry topic develops both coordinate geometry and angle relationships from last year. Pupils will transform shapes using reflection, rotation, translation and enlargement, then identify and describe transformations from a diagram. They will then relate enlargement to scale drawings and solve problems involving bearings. This geometrical reasoning will then be used in constructing triangles using a ruler and compasses, constructing the perpendicular bisector of a line and constructing the shortest distance from a point to a line.
Summer One	**Equations and Inequalities** **Probability**	We then move on to developing the algebra learned in term 1 to finding the roots of quadratic functions and solving complex quadratic equations by factorising, formula and completing the square. They will then solve simultaneous equations, applying the method to solve problems such as real-life situations involving two unknowns. This will be extended to solving simultaneous equations with one quadratic equation. This topic will build on the concepts encountered in Year 8 to methodically list outcomes, and complete sample space diagrams. Pupils will find the probabilities of mutually exclusive outcomes and events and compare real results with theoretical expected values. They will then draw and use frequency and probability tree diagrams, using them to calculate conditional probability.
Summer Two	**Multiplicative reasoning** **Similarity and congruence**	Concepts encountered in the autumn term will be built upon, with pupils finding an amount after repeated percentage changes and solving growth and decay problems. This will lead to calculating rates and using compound measures before pupils learn how to use direct and indirect proportion. These skills are then used when solving problems involving congruence and similarity, before using the link between linear, area and volume scale factors to solve problems.