

Y10 (Foundation)

In Y10, students enter the first year of formal study for their GCSE. In many schools, students have been tiered into foundation or higher according to how well they fared with the more advanced topics in Y9. For students on both tiers, but particularly those on the foundation tier, core knowledge and skills are revisited, to ensure that students have the **fluency** and **conceptual understanding** necessary to access the entire KS4 curriculum. Having revisited knowledge and skills from KS3, students are equipped to fully explore the core concepts of **mathematical thinking, mathematical reasoning, and problem-solving**. This is done in every half term, as students build up to answering exam-style questions, and teachers model **mathematical language and notation** which is suitably formal for KS4.

	<u>Learning Period 1: Autumn</u>	<u>Learning Period 2: Autumn</u>	<u>Learning Period 3: Spring</u>	<u>Learning Period 4: Spring</u>	<u>Learning Period 5: Summer</u>	<u>Learning Period 6: Summer</u>
Topic title	Number	Percentages and Probability	Algebra	Geometry	Similarity	Probability and Statistics
Relevant core concepts	Mathematical thinking. Mathematical reasoning. Problem-solving. Mathematical language and notation.	Mathematical thinking. Mathematical reasoning. Problem-solving. Mathematical language and notation.	Mathematical thinking. Mathematical reasoning. Problem-solving. Mathematical language and notation.	Mathematical thinking. Mathematical reasoning. Problem-solving. Mathematical language and notation.	Mathematical thinking. Mathematical reasoning. Problem-solving. Mathematical language and notation.	Mathematical thinking. Mathematical reasoning. Problem-solving. Mathematical language and notation.
Key questions	<ul style="list-style-type: none"> - What is the difference between a factor and a multiple? - What are prime numbers and how can I use them to find the HCF and LCM of two or more numbers? - What is a power and root? - What are indices and how can I evaluate them? - How can I calculate with very large and very small numbers without a calculator? - What is a sequence and how do I identify different types of sequences? 	<ul style="list-style-type: none"> - How can I use percentage and decimal conversions to allow me to calculate percentages? - How are percentages used in everyday life? - How can I calculate a probability for an event or using experimental data? - How can I find all the possible outcomes of a situation using systematic listing? - What is set notation and how can I use a Venn diagram to organise data? 	<ul style="list-style-type: none"> - What are the core rules of algebra and how can I use them to transform expressions from one format to another? - What methods can I use to solve a quadratic equation? - How can I link those solutions to a quadratic graph? - How can I solve an equation with more than one variable? 	<ul style="list-style-type: none"> - How can shapes be transformed? - What is the impact of rounding numbers and how can I use it? - What is Pi and how can I use it to calculate area and circumference of a circle? - How can I use formulas to calculate volume and surface area of 3D shapes? 	<ul style="list-style-type: none"> - How can I use ratio to solve problems? - What is a compound measure and how can I use a formula to calculate it? - How can I use proportion to solve problems? - What is Pythagoras' theorem and how can I use it to find missing lengths on a right-angled triangle? - What is similarity and how does it link to shapes together? - How can I use right angled trigonometry to solve problems? 	<ul style="list-style-type: none"> - What is an average and how does it represent a data set? - What is the benefit of tabulating data? - How can I achieve a fair sample from a population? - How can I represent data in a visual format? - How can I make predictions from a data set?
Key knowledge/concepts and skills	<p><u>Unit 1 - Factors, multiples, and primes</u> Identify factors, multiples and primes Write a number as a product of prime factors Find the HCF and LCM of two number by listing and Venn diagram</p> <p><u>Unit 2 - Powers and Roots</u> Understand what is meant by squaring, cubing and their inverses.</p> <p><u>Unit 3 - Indices</u> Use the index laws to evaluate numerical indices (including fractional and negative) Use the index laws to simplify algebraic indices (including fractional and negative)</p> <p><u>Unit 4 - Standard form</u> Convert between standard form and ordinary numbers Calculate with numbers in standard form using all 4 operations</p> <p><u>Unit 5 - Sequences</u> Understand how the different types of sequences are generated including arithmetic, geometric, Fibonacci and triangular numbers Generate a sequence given the nth term Assess if a number appears in a sequence Find the nth term of a linear sequence.</p>	<p><u>Unit 6 - Fractions, Decimals and Percentages</u> Convert between equivalent fractions and improper fractions to mixed numbers 4 operations with fractions Fractions of amounts Convert between fractions, decimals and percentages</p> <p><u>Unit 7 - Percentages</u> Calculate percentage changes Work out the percentage of an amount Calculate compound interest/depreciation Solve problems with growth and decay</p> <p><u>Unit 8 - Probability, Sets and Venn diagrams</u> Calculate basic probabilities and relative frequency</p> <p>Use sample space diagrams and the product rule for counting to systematically list outcomes Use and create tree diagrams with/without replacement I can use a Venn diagram to sort data and solve problems Use set notation for Venn diagrams</p>	<p><u>Unit 9 - Algebra (KS3 review)</u> Simplify expressions by expanding single brackets and collecting like terms Rearrange and substitute into a formula Form and solve equations with variables on both sides Factorise into a single bracket</p> <p><u>Unit 10 - Quadratics</u> Expand two brackets Factorise quadratics into two brackets including difference of two squares Use factorising to solve quadratics.</p> <p><u>Unit 11 - Quadratic graphs</u> Be able to recognise and draw quadratic graphs Understand the link between solving quadratics and the roots of a graph Be able to use a quadratic graph to find solutions</p> <p><u>Unit 12 - Simultaneous Equations</u> Solve linear simultaneous equations Form linear simultaneous equations from a variety of contexts.</p>	<p><u>Unit 13- Transformations</u> Be able to perform the 4 transformations (rotation, reflection, translation and enlargement (including fractional)) Be able to describe which transformation has taken place</p> <p><u>Unit 14 - 2D shapes including circle geometry</u> Rounding and estimation of calculations Calculating area of triangles, quadrilaterals and composite shapes. Calculate the area and circumference of circles and part circles Calculate the area and perimeter of sectors</p> <p><u>Unit 15- Pythagoras' Theorem</u> Use Pythagoras' theorem to be able to solve problems.</p> <p><u>Unit 16 - 3D shapes</u> Recognise vocabulary linked to 3D shapes including plans and elevations</p> <p><u>Unit 17 - Volume and Surface Area</u> Calculate the volume of 3D shapes including prisms, cones, spheres and pyramids, using a given formula where appropriate. Calculate the surface area of prisms including cylinders.</p>	<p><u>Ratio review</u> Share in a given ratio Solve problems when given part of a ratio Write ratios as fractions and equations Combine ratios</p> <p><u>Unit 18 - Compound Measure and direct and indirect proportion</u> Use compound measures such as density and speed to solve problems Solve direct and inverse proportion problems using graphs and algebra where appropriate Apply proportional logic to recipe questions</p> <p><u>Unit 19 - Similarity and Trigonometry</u> Be able to use the principles of similarity to solve problems with similar shapes Use SOHCAHTOA to find missing lengths and angles in right angled triangles</p>	<p><u>Unit 20 - Averages and Spread</u> Calculate the averages and measures of spread of a set of data Calculate averages from ungrouped and grouped data tables</p> <p><u>Unit 21- Data collection and Sampling</u> Tabulate and classify data Identify different types of sampling Calculate group sizes for stratified sampling</p> <p><u>Unit 22 - Presenting Data including Scatter Graphs</u> Construct and interpret pie charts Interpret time series graphs Plot scatter graphs and identify correlation/relationships Use a line of best fit to extrapolate/interpolate Construct and interpret frequency polygons</p>
Assessment & Educational Visit Opportunities	Autumn 1 assessment		Mid year assessment Intermediate Maths challenge	Spring 2 assessment		End of Year 10 Assessment