

Year 8

In year 8, we build on the strong foundations of **fluency** and **conceptual understanding** built in Y7 to explore some of the more advanced core concepts, and brand-new mathematical ideas. In Autumn 1, students build on the fluency in algebra they built in Y7 Autumn 2 to *form* and solve equations and inequalities, and in doing so build their **mathematical reasoning**, and **problem-solving** abilities. Later in the half term, students explore sequences, and develop their **conceptual understanding** of algebra as a generalised arithmetic, by understanding how to algebraically describe the number sequences they encountered in their Primary education. In Autumn 1, students' schemas around algebra are extended to include geometric interpretations of the equations they have been solving so far. In Autumn 2 students revisit solving as a concept but now apply to their understanding of inequalities continuing to build on their **mathematical reasoning**, and **problem-solving**. This unit is also an application of the knowledge they have about the cartesian plane from Y7 Spring 2. In teaching students how to link these ideas, **mathematical language, representation and notation** will be crucial, as will a **conceptual understanding** of graphs as an infinity of individual coordinates. In Spring 1, students revisit the core concept of **proportional thinking** (from Y7 Summer 2), and apply the knowledge about graphs they have just learned in Y8 Autumn 2, to come to develop their **mathematical reasoning** in the arena of direct and inverse proportion. As with many units concerning ratio and proportion, fluency in the fundamental skills will be an important 'barrier to entry'. To support with this, the use of **multiple representations**, a focus on **mathematical language**, to build **conceptual understanding** will be important to teaching. In Spring 2, students encounter the curriculum area of probability and statistics for the first time in their lives. This is no longer covered in the Primary curriculum, and therefore, an extreme clarity in the **mathematical language** we introduce will be crucial to developing strong foundational understanding. Finally, in Summer 1 and Summer 2, students build on the 2 half-terms of geometry they learned in Y7, deepening their **fluency** and **mathematical thinking**, and extending these ideas to yet more formal contexts. This term will be an important term in developing students **problem-solving** skills, and supporting students to present their work in a way that supports clarity in their **mathematical reasoning**.

	<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	Using algebra	Graphs and ratio	Angles and circles	Proportion and Estimation	Bearings, volume and surface area	Handling Data
Relevant core concepts	Mathematical fluency Mathematical representation, language, and notation Mathematical thinking Conceptual understanding	Mathematical fluency Mathematical representation, language, and notation Mathematical thinking Problem-solving Conceptual understanding	Mathematical fluency Mathematical representation, language, and notation Mathematical thinking Conceptual understanding	Mathematical fluency Mathematical representation, language, and notation Mathematical thinking Conceptual understanding	Mathematical fluency Mathematical representation, Mathematical thinking Problem-solving Conceptual understanding	Mathematical fluency Mathematical representation, language, and notation Mathematical thinking Problem-solving
Key questions	<ul style="list-style-type: none"> - How can I form an equation to solve problems? - How do the numbers in a sequence link to their position in the sequence? - How can I describe the position of any point on a co-ordinate grid? - How can I link an algebraic equation to a straight line graph? 	<ul style="list-style-type: none"> - What are inequalities and how can I use them to define a range of numbers? - How can I apply my understanding of balancing to able me to solve inequalities? - What is a ratio and how can it be linked to fractions? - How can I use the bar method to solve ratio problems? - What are compound measures and how can I calculate them? 	<ul style="list-style-type: none"> - What relationships exist between angles on parallel lines? - How can I generalise the relationship between the number of sides of a polygon and the sum of its interior angles? - What is Pi? - What is a formula and how can I use it? 	<ul style="list-style-type: none"> - What is proportion and how can I use it in recipes? - Why is it necessary to round numbers to a given degree of accuracy? - How can I use estimations of calculations to check my work? 	<ul style="list-style-type: none"> - How are bearings used to give accurate directions? - What is meant by area and volume? 	<ul style="list-style-type: none"> - How can I use graphs and charts to visually represent data? - How can I use averages to allow me to compare different sets of data? - How can I use scatter graphs to display a relationship between two variables?
Key knowledge/ concepts and skills	<p><u>Unit 1 - Forming and solving equations</u> Solve equations with unknowns on both sides and fractions. Form an equation from a variety of different contexts</p> <p><u>Unit 2 - Sequences</u> Generating terms for a sequence. Finding the nth term for a linear sequence Be able to identify a non-linear sequence</p> <p><u>Unit 3 - Forming and solving inequalities</u> Form and solve inequalities with unknowns on both sides. Represent inequalities on a number line.</p>	<p><u>Unit 4 - Linear graphs</u> Plot co-ordinates in 4 quadrants. Draw straight line graphs Identify the gradient and y-intercept of a line. Identify parallel lines.</p> <p><u>Unit 5 - Ratio,</u> Use ratio notation to describe a relationship. Solve problems using ratio.</p> <p><u>Unit 6 - Real-life graphs and rate of change</u> Explore speed and density in context of proportional reasoning. Explore how graphs can be used to represent real life scenarios</p>	<p><u>Unit 7 - Angles in parallel lines and polygons</u> Review of Y7 angle facts work, including parallel line angles Be able to calculate the interior angle sum of a polygon given the number of sides. Be able to use the sum of interior and exterior angles to be able to solve problems.</p> <p><u>Unit 8 - Circles and composite shapes</u> Know and use the formulas for area and circumference of a circle Be able to apply understanding of circle formulae to part circles and compound shapes involving circles.</p>	<p><u>Unit 9 - Direct and inverse proportion</u> Represent proportional relationships using tables, graphs and algebraically. Solve proportion problems including inverse proportion.</p> <p><u>Unit 10 - Accuracy and estimation</u> Round numbers to a required number of decimal places/decimal places. Estimate sums by rounding. Understanding error intervals and truncation</p>	<p><u>Unit 11 - Bearings</u> Be able to draw and read bearings using the standard conventions. Solve problems involving bearings using angle facts.</p> <p><u>Unit 12 – 3D shapes</u> Be able to name different prisms and use the language associated with 3D shapes. Be able to draw plans and elevations of 3D shapes</p> <p><u>Unit 13 - Volume and surface area of prisms</u> Calculate the volume and surface area of cuboids, prisms (including cylinders) and composite shapes.</p>	<p><u>Unit 14 - Charts and averages</u> Be able to construct and read a variety of different charts such as bar charts, pictograms and line graphs. Be able to calculate the mean, median and mode from a variety of different contexts, including raw data, charts and discrete tables. Understand the difference between discrete and continuous data.</p> <p><u>Unit 15 - Scatter graphs</u> Construct a scatter graph and understand it allows us to see the relationship between two variables. Be able to construct a line of best fit and use it interpolate and extrapolate</p>
Assessment & Education Visit	Autumn 1 assessment		Mid year assessment	Spring 2 assessment Junior Maths Challenge		End of Year 8 Assessment