

## Y8 – Maths

Scheme	What are they learning?	Why are they learning it?	HOW will it help in the real world?	Does it fit with the school INTENT statement? If so, how?	How will it link to future learning?
Ratio and scale	<ul style="list-style-type: none"> <li>• Understand the meaning and representation of ratio</li> <li>• Understand and use ratio notation</li> <li>• Solve problems involving ratio in the form 1:n</li> <li>• Solve problems involving ratios in the form m:n</li> <li>• Divide in a given ratio</li> <li>• Express ratios in their simplest integer form</li> <li>• Express ratios in the form 1:n (H)</li> <li>• Compare ratios and fractions</li> <li>• Understand pi as a ratio</li> <li>• Understand gradient as a ratio (H)</li> </ul>	<ul style="list-style-type: none"> <li>• Ratio is a very common and this provides an introduction.</li> <li>• This unit also introduces the idea of Pi rather than just giving it as a numerical value.</li> </ul>	<p>To understand what ratios mean in the real world, especially when presented in gambling, to hopefully deter risky behaviours.</p>	<p>This unit will enable students to use different strands of mathematics and thus become independent thinkers.</p>	<ul style="list-style-type: none"> <li>• Year 9: Solving ratio &amp; proportion problems</li> <li>• Year 10: Ratios &amp; fractions, working with circles, vectors</li> <li>• Year 11: Multiplicative reasoning, show that...</li> </ul>
Multiplicative change	<ul style="list-style-type: none"> <li>• Solve problems involving direct proportion</li> <li>• Explore conversion graphs</li> <li>• Convert between currencies</li> <li>• Explore direct proportion graphs (H)</li> <li>• Explore relationships between similar shapes</li> </ul>	<ul style="list-style-type: none"> <li>• This unit pulls together ideas that may seem unique to one another but respond to the same skillset.</li> </ul>	<p>To understand the relationships between currencies and other conversions such as Celsius and Fahrenheit.</p>	<p>This unit enables students to gather a wider understanding of the world and other cultures through discussion of different currencies and map work.</p>	<ul style="list-style-type: none"> <li>• Year 9: Solving ratio &amp; proportion problems, enlargement &amp; similarity</li> <li>• Year 10: Congruence, enlargement &amp; similarity</li> <li>• Year 11: Multiplicative reasoning</li> </ul>

	<ul style="list-style-type: none"> <li>• Understand scale factors as multiplicative representations</li> <li>• Draw and interpret scale diagrams</li> <li>• Interpret maps using scale factors and ratios</li> </ul>				
Multiplying and dividing fractions	<ul style="list-style-type: none"> <li>• Represent multiplication of fractions</li> <li>• Multiply a fraction by an integer</li> <li>• Find the product of a pair of unit fractions</li> <li>• Find the product of a pair of any fractions</li> <li>• Divide an integer by a fraction</li> <li>• Divide a fraction by a unit fraction</li> <li>• Understand and use the reciprocal</li> <li>• Divide any pair of fractions</li> <li>• Multiply and divide improper and mixed fractions</li> <li>• Multiply and divide algebraic fractions</li> </ul>	<ul style="list-style-type: none"> <li>• Fractions is a key topic within the mathematics curriculum that students are required to have a concrete understanding of.</li> </ul>	Fractions are commonly used within proportion such as in baking and cooking.	This unit promotes higher level thinking through an introduction of algebraic fractions.	<ul style="list-style-type: none"> <li>• Year 9: Enlargement &amp; similarity, forming &amp; solving equations</li> <li>• Year 10: Ratios &amp; fractions, probability</li> <li>• Year 11: Algebraic reasoning, functions</li> </ul>
Working in the Cartesian plane	<ul style="list-style-type: none"> <li>• Work with coordinates in all four quadrants</li> <li>• Identify and draw lines that are parallel to the axes</li> <li>• Recognise and use the line <math>y=x</math></li> </ul>	<ul style="list-style-type: none"> <li>• This unit enables students to understand the relationship between visual graphs and abstract algebraic ideas.</li> <li>• Exploring the idea of gradient creates a base understanding for a</li> </ul>	To understand measures of locations such as coordinates on a map and the relationship between gradients and velocity.	This unit will provide a comprehensive introduction to ideas in algebraic mathematics that can be taken to the next stage of education and beyond, such as into careers in engineering.	<ul style="list-style-type: none"> <li>• Year 9: Pythagoras' theorem, rotation &amp; translation, enlargement &amp; similarity</li> <li>• Year 10: Congruence, similarity &amp; enlargement, representing solutions of</li> </ul>

	<ul style="list-style-type: none"> <li>Recognise and use lines of the form <math>y=kx</math></li> <li>Link <math>y=kx</math> to direct proportion problems</li> <li>Explore the gradient of the line <math>y=kx</math> (H)</li> <li>Recognise and use lines of the form <math>y= x + a</math></li> <li>Explore graphs with negative gradients (<math>y=-kx</math>, <math>y=a - x</math>, <math>x + y =a</math>)</li> <li>Link graphs to linear sequences</li> <li>Plot graphs of the form <math>y=mx+c</math></li> <li>Explore non-linear graphs (H)</li> <li>Find the midpoint of a line segment (H)</li> </ul>	<p>concept that is used throughout GCSE and A-Level.</p>			<p>equations &amp; inequalities, simultaneous equations</p> <ul style="list-style-type: none"> <li>Year 11: Gradients &amp; lines, non-linear graphs, using graphs</li> </ul>
<p>Representing data</p>	<ul style="list-style-type: none"> <li>Draw and interpret scatter graphs</li> <li>Understand and describe linear correlation</li> <li>Draw and use line of best fit</li> <li>Identify non-linear relationships</li> <li>Identify different types of data</li> <li>Read and interpret ungrouped frequency tables</li> <li>Read and interpret grouped frequency tables</li> <li>Represent grouped discrete data</li> </ul>	<ul style="list-style-type: none"> <li>This unit provides a basic understanding of what data is and how it can be understood.</li> </ul>	<p>To understand, interpret and criticise data displayed in the media.</p>	<p>This unit will give students the capability to become responsible citizens that can understand political media and thus create their own opinion based upon any data presented to them.</p>	<ul style="list-style-type: none"> <li>Year 9: Probability</li> <li>Year 10: Collecting, representing and interpreting data</li> <li>Year 11: Listing &amp; describing</li> </ul>

	<ul style="list-style-type: none"> <li>• Represent continuous data grouped into equal classes</li> <li>• Construct and interpret two-way tables</li> </ul>				
Tables & probability	<ul style="list-style-type: none"> <li>• Construct sample spaces for one or more events</li> <li>• Find probabilities from a sample space</li> <li>• Find probabilities from two-way tables</li> <li>• Find probabilities from Venn diagrams</li> <li>• Use the product rule for finding the total number of possible outcomes</li> </ul>	<ul style="list-style-type: none"> <li>• This unit provides an introduction to probability and how circumstances can be displayed.</li> </ul>	To understand the likelihood of real life events and help prevent issues such as gambling through understanding the low chance of certain events.	This unit enables students to understand risk and thus make informed decisions about risks they may take in life.	<ul style="list-style-type: none"> <li>• Year 9: Probability</li> <li>• Year 10: Probability</li> <li>• Year 11: Listing &amp; describing</li> </ul>
Brackets, equations and inequalities	<ul style="list-style-type: none"> <li>• Form algebraic expressions</li> <li>• Use directed number with algebra</li> <li>• Multiply out a single bracket</li> <li>• Factorise into a single bracket</li> <li>• Expand multiple single brackets and simplify</li> <li>• Expand a pair of binomials (H)</li> <li>• Solve equations, including with brackets</li> <li>• Understand and solve simple inequalities</li> <li>• Form and solve inequalities</li> <li>• Solve equations and inequalities with</li> </ul>	<ul style="list-style-type: none"> <li>• This unit provides students with knowledge required to approach more complex areas of maths, even up to degree level.</li> <li>• This unit combines the areas of number and algebra to further provide students with the tools necessary to approach many mathematical and scientific problems.</li> </ul>	To effectively use formulae within scientific areas and rearrange these where necessary.	This unit allows students to become STEM learners and approach different areas of learning with a mathematical, problem solving mind.	<ul style="list-style-type: none"> <li>• Year 9: Forming &amp; solving equations, algebraic representation</li> <li>• Year 10: Equations &amp; inequalities, simultaneous equations</li> <li>• Year 11: Expanding &amp; factorising, using graphs, functions</li> </ul>

	<p><b>unknowns on both sides (H)</b></p> <ul style="list-style-type: none"> <li>• Form and solve equations and inequalities with unknowns on both sides (H)</li> <li>• Identify and use formulae, expressions, identities and equations</li> </ul>				
Sequences	<ul style="list-style-type: none"> <li>• Generate sequences given a rule in words</li> <li>• Generate sequences given a simple algebraic rule</li> <li>• Generate sequences given a complex algebraic rule</li> <li>• Find the rule for the nth term of a linear sequence (H)</li> </ul>	<ul style="list-style-type: none"> <li>• Builds upon previous learning from year 7 and begins to make more sense of the topic.</li> <li>• Mixing sequences with algebraic rules provides a basis for other areas of maths such as gradients.</li> </ul>	To recognise sequences and patterns within areas such as art and architecture.	This unit enables learners to promote their creativity and develop patterns.	<ul style="list-style-type: none"> <li>• Year 9: Straight line graphs</li> <li>• Year 10: Types of number &amp; sequences</li> <li>• Year 11: Algebraic reasoning, gradients &amp; lines</li> </ul>
Indices	<ul style="list-style-type: none"> <li>• Adding and subtracting expressions with indices</li> <li>• Simplifying algebraic expressions by multiplying indices</li> <li>• Simplifying algebraic expressions by dividing indices</li> <li>• Using the addition law for indices</li> <li>• Using the addition and subtraction law for indices</li> <li>• Exploring powers of powers (H)</li> </ul>	<ul style="list-style-type: none"> <li>• This unit enables students to identify more efficient ways to write numbers.</li> <li>• The laws of indices provide explanations of certain rules that students may not have previously understood.</li> </ul>	To understand areas of finance such as compound interest, APR and AER.	This unit builds a foundation for financial and scientific knowledge required in everyday life.	<ul style="list-style-type: none"> <li>• Year 9: Numbers, deduction</li> <li>• Year 10: Indices &amp; roots, percentages &amp; interest</li> <li>• Year 11: Non-linear graphs</li> </ul>

<p>Fractions and percentages</p>	<ul style="list-style-type: none"> <li>• Convert fluently between key fractions, decimals and percentages</li> <li>• Calculate fractions, decimals and percentages of an amount without a calculator</li> <li>• Calculate fractions, decimals and percentages of an amount using calculator methods</li> <li>• Convert between decimals and percentages greater than 100%</li> <li>• Percentage decrease with a multiplier</li> <li>• Calculate percentage increase and decrease using a multiplier</li> <li>• Express one number as a fraction or a percentage of another without a calculator</li> <li>• Express one number as a fraction or a percentage of another using calculator methods</li> <li>• Work with percentage change</li> <li>• Choose appropriate methods to solve percentage problems</li> <li>• Find the original amount given the percentage less than 100% (H)</li> </ul>	<ul style="list-style-type: none"> <li>• Having a strong understanding of fractions and percentages is essential in order to tackle large and complex problems.</li> <li>• This units provides the basis for understanding many financial mathematics topics.</li> </ul>	<p>To understand areas of finance such as shopping and sales, loans and savings/interest.</p>	<p>This unit provides learners with the understanding required to master complex problems. In addition, a thorough understanding of financial mathematics enables students to become independent citizens.</p>	<ul style="list-style-type: none"> <li>• Year 9: Maths &amp; Money, using percentages</li> <li>• Year 10: Percentages &amp; interest</li> <li>• Year 11: Multiplicative reasoning</li> </ul>
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	<ul style="list-style-type: none"> <li>Find the original amount given the percentage greater than 100% (H)</li> <li>Choose appropriate methods to solve complex percentage problems (H)</li> </ul>				
Standard index form	<ul style="list-style-type: none"> <li>Investigate positive powers of 10</li> <li>Work with numbers greater than 1 in standard form</li> <li>Investigate negative powers of 10</li> <li>Work with numbers between 0 and 1 in standard form</li> <li>Compare and order numbers in standard form</li> <li>Mentally calculate with numbers in standard form</li> <li>Add and subtract numbers in standard form</li> <li>Multiply and divide numbers in standard form</li> <li>Use a calculator to work with numbers in standard form</li> <li>Understand and use negative indices (H)</li> <li>Understand and use fractional indices (H)</li> </ul>	<ul style="list-style-type: none"> <li>This unit provides an explanation as to what numbers mean, where they may not have previously been understood, such as on a calculator display.</li> </ul>	To understand information displayed in a scientific way, such as about distances to space and the size of bacteria.	This unit provides students with contextual knowledge behind what number representations mean.	<ul style="list-style-type: none"> <li>Year 9: Rates</li> <li>Year 10: Non-calculator methods</li> <li>Year 11: Multiplicative reasoning</li> </ul>

<p>Number sense</p>	<ul style="list-style-type: none"> <li>• Round numbers to powers of 10 and 1 significant figure</li> <li>• Round numbers to a given number of decimal places</li> <li>• Estimate the answer to a calculation</li> <li>• Understand and use error interval notation (H)</li> <li>• Calculate using the order of operations</li> <li>• Calculate with money</li> <li>• Convert metric measures of lengths</li> <li>• Convert metric units of weight and capacity</li> <li>• Convert metric units of area (H)</li> <li>• Convert metric units of volume (H)</li> <li>• Solve problems involving time and the calendar</li> </ul>	<ul style="list-style-type: none"> <li>• This unit provides essential mathematical knowledge that is used within a range of topics.</li> <li>• It is vital that all students can understand and answer problems involving time and the calendar to function in life.</li> </ul>	<p>To understand problems involving money, metric measures and time that are used in every day life.</p>	<p>This unit provides students with knowledge that they use every day. This includes time, calendars, money and estimation to determine whether a bill is correct.</p>	<ul style="list-style-type: none"> <li>• Year 9: Numbers, rates</li> <li>• Year 10: Percentages &amp; interest, congruence, similarity &amp; enlargement</li> <li>• Year 11: Show that...</li> </ul>
<p>Angles in parallel lines and polygons</p>	<ul style="list-style-type: none"> <li>• Understand and use basic angle rules and notation</li> <li>• Investigate angles between parallel lines and the transversal</li> <li>• Identify and calculate with alternate and corresponding angles</li> <li>• Solve complex problems with parallel line angles</li> <li>• Constructions triangles and special quadrilaterals</li> </ul>	<ul style="list-style-type: none"> <li>• This unit provides students with the knowledge required to answer questions across other topics such as Trigonometry and Pythagoras.</li> <li>• Constructions give students an opportunity to use physical techniques in the classroom.</li> </ul>	<p>To understand how angles work within construction and be able to construct 2D diagrams that could be used within architectural design.</p>	<p>This unit enables students to use a physical approach to solving problems rather than just relying on abstract ideas. This therefore allows students to decide what learners they want to be through using whichever methods work best for them.</p>	<ul style="list-style-type: none"> <li>• Year 9: Deduction, testing conjectures, 3D shapes</li> <li>• Year 10: Angles &amp; bearings, working with circles</li> <li>• Year 11: Geometric reasoning, transforming &amp; constructing</li> </ul>

	<ul style="list-style-type: none"> <li>Investigate the properties of special quadrilaterals</li> <li>Understand and use the properties of diagonals of quadrilaterals</li> <li>Understand and use the sum of exterior angles of any polygon</li> <li>Understand and use the sum of interior angles in any polygon</li> <li>Calculate missing interior angles in regular polygons</li> <li>Prove simple geometric facts (H)</li> <li>Construct an angle bisector (H)</li> <li>Construct a perpendicular bisector of a line segment (H)</li> </ul>				
<p>Area of trapezia and circles</p>	<ul style="list-style-type: none"> <li>Calculate the area of triangles, rectangles and parallelograms</li> <li>Calculate the area of a trapezium</li> <li>Calculate the perimeter and area of compound shapes (1 and 2)</li> <li>Investigate the area of a circle</li> <li>Calculate the area of a circle and parts of a circle without a calculator</li> <li>Calculate the area of a circle and parts of a circle with a calculator</li> </ul>	<ul style="list-style-type: none"> <li>Having a good understanding of shapes before moving onto more complex ideas such as Trigonometry, Pythagoras and vectors is essential.</li> </ul>	<p>To understand area and perimeter to be used within construction or decorating a house.</p>	<p>This unit provides students with the tools required to understand shapes and their use within areas of STEM and their personal life, such as decorating.</p>	<ul style="list-style-type: none"> <li>Year 9: Testing conjectures, deduction</li> <li>Year 10: Angles &amp; bearings, working with circles</li> <li>Year 11: Geometric reasoning, transforming &amp; constructing</li> </ul>

<p>Line symmetry and reflections</p>	<ul style="list-style-type: none"> <li>• Recognise line symmetry</li> <li>• Reflect a shape in a horizontal or vertical line 1 (shapes touching the line)</li> <li>• Reflect a shape in a horizontal or vertical line 2 (shapes not touching the line)</li> <li>• Reflect a shape in a diagonal line 1 (shapes touching the line)</li> <li>• Reflect a shape in a diagonal line 2 (shapes not touching the line)</li> </ul>	<ul style="list-style-type: none"> <li>• Developing skills required for any technical and physical area of mathematics and other STEM subjects.</li> </ul>	<p>To understand 2D diagrams so that the concepts behind these can be implemented within construction, architectural or artistic design.</p>	<p>This unit enables students to develop their accuracy and precision, essential for any physical work they may go on to do in their life.</p>	<ul style="list-style-type: none"> <li>• Year 9: Testing conjectures, rotation &amp; translation, enlargement &amp; similarity</li> <li>• Year 10: Congruence, similarity &amp; enlargement, angles &amp; bearings</li> <li>• Year 11: Transforming &amp; constructing</li> </ul>
<p>The data handling cycle</p>	<ul style="list-style-type: none"> <li>• Set up a statistical enquiry</li> <li>• Design and criticise questionnaires</li> <li>• Draw and interpret pictograms, bar charts and vertical line charts</li> <li>• Draw and interpret multiple bar charts</li> <li>• Draw and interpret pie charts</li> <li>• Draw and interpret line graphs</li> <li>• Choose the most appropriate diagram given the data</li> <li>• Represent and interpret groups quantitative data</li> <li>• Find and interpret the range</li> </ul>	<ul style="list-style-type: none"> <li>• Developing an understanding of where data comes from and how students can gather it themselves.</li> </ul>	<p>To be able to conduct data gathering as well as criticise data that may be presented in the media in the “fake news” era.</p>	<p>This unit provides students with a greater understanding of what data is, where it comes from and how it can be accurately analysed to make informed decisions in life.</p>	<ul style="list-style-type: none"> <li>• Year 9: Probability</li> <li>• Year 10: Collecting, representing &amp; interpreting data</li> <li>• Year 11: Listing &amp; describing</li> </ul>

	<ul style="list-style-type: none"> <li>• Compare distributions using charts</li> <li>• Identify misleading graphs</li> </ul>				
Measures of location	<ul style="list-style-type: none"> <li>• Understand and use the mean, median and mode</li> <li>• Choose the most appropriate average</li> <li>• Find the mean from an ungrouped frequency table (H)</li> <li>• Find the mean from a grouped frequency table (H)</li> <li>• Identify outliers</li> <li>• Compare distributions using averages and range</li> </ul>	<ul style="list-style-type: none"> <li>• How to analyse data that students have previously learned about.</li> <li>• How to perform basic analysis that can then be taken into higher learning such as GCSE or A-Level statistics.</li> </ul>	To accurately analyse data and understand averages when presented by a company or in the news.	This unit empowers students to not just be learners, but be able to critically analyse information that is presented to them.	<ul style="list-style-type: none"> <li>• Year 9: Probability</li> <li>• Year 10: Collecting, representing &amp; interpreting data, probability</li> <li>• Year 11: Listing &amp; describing</li> </ul>