Mathematics Year 8 Curriculum Overview

Year 8 Overview	Students will develop their mental and problem-solving skills. This will be done whilst studying the 5 main strands of Maths – number, ratio and proportion, algebra, shape and measure and data handling. All 5 areas will be applied to real life situations to develop and enhance their ability to be able to apply the skills learnt. Students will strengthen, deepen and extend their Mathematical knowledge developed during Year 7 beginning with basic ratio and proportion such as simplifying ratios and sharing in a ratio. This will enable pupils to develop a broad skill set to solve more complex future as their learning develops. A significant proportion of the year is spent on algebra to ensure pupils can use efficient and effective methods to fluently perform routine operations. These key algebra topics such as expanding brackets will be revisited again during starter activities in later years to ensure pupils retain these key skills. The summer term will be spent studying geometry and data handling to ensure pupils have had sufficient exposure to basic rules and principles such as angles in parallel lines and polygons. This will provide the building blocks for future learning. Students will also have at least one lesson a fortnight on MathsWhizz where each student will practice each objective of the curriculum, prepared to target specific gaps in their knowledge and understanding.

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Week Number	Themes/ Topics	Key Knowledge & Skills	Key Assessments
1-6 (Autumn 1)	Unit 1 Ratio	In this step, students learn how ratios are used to compare two or more quantities. They begin by describing comparisons using words—for example, "For every 2 squares, there are 3 circles"—before moving on to write these comparisons using ratio notation with a colon. Students are taught that the order of the numbers in a ratio is very important. For example, if the ratio of red counters to yellow counters is written as 3 : 4, then the ratio of yellow to red would be 4 : 3. Bar models are used to help students visualise how ratios show equal-sized parts. As they grow more confident, students move on to working with ratios that involve three or more quantities, such as 3 : 4 : 1. This helps them build a strong understanding of how ratios represent multiplicative relationships. • Understand ratio • Ratio problems (whole given) • Ratio problems (part given) • Ratio problems (difference given) • Simplify ratios • Express ratios in the form 1:n and n:1 (E) • Compare ratios and fractions • Solve problems with ratio	End of unit assessment Dirt for end of unit assessment.
	Unit 2 Proportion & Scale	In this step, students learn about situations where two quantities increase or decrease at the same rate—this is called **direct proportion**. They explore how these relationships work and use visual tools, such as double number lines, to clearly see how one amount changes in relation to another. Students are encouraged to try different methods for solving direct proportion problems. They learn the **unitary method**, where they find the value of one unit first,	End of unit assessment Dirt for end of unit assessment.

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		and the **scaling method**, which uses multipliers to move directly between values. They are taught to think carefully about which method is the most efficient based on the information given. This helps students build confidence and flexibility when approaching a variety of proportional reasoning problems. • Direct proportion • Conversion graphs • Convert between currencies • Direct proportion graphs • Similar shapes • Convert metric units • Scale diagrams • Interpret maps using scale and ratios	
	Unit 3 Algebraic Manipulation	Students are starting to create algebraic expressions, building on what they learned in Year 7. They'll learn that in algebra: • We don't use × or ÷ signs in expressions. • Numbers come before letters (e.g., **3a**, not **a3**). • When a letter is multiplied by itself, we use exponents (e.g., **a × a** is written as **a^2**). We begin with simple examples like "5 less than k" and explain how this is different from "k less than 5." As their confidence grows, students will write more complex expressions and use them in real-life contexts, such as finding the perimeter of shapes. To help understanding, students will use different representations—like counters, cubes, and function machines—so they can see how the ideas work in practice.	End of unit assessment Dirt for end of unit assessment.

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		• Form algebraic expressions • Identify and use formulae, expressions, identities and equations • Simplify expressions • Use directed number with algebra • Substitution with directed number • Expand a single bracket • Factorise into a single bracket • Expand single brackets and simplify • Expand double brackets of the form (x±a)(x±b) (E) • Factorise quadratic expressions (E)	
			End of unit assessment Dirt for end of unit assessment.
7-13 (Autumn 2)	Unit 4 Coordinates & Graphs	Students are exploring coordinates in all four quadrants, building on what they learned in Year 7. They'll deepen their understanding of the **x-axis**, **y-axis**, and the **origin** (the point where the axes meet). Key reminders for students: • The **x-coordinate** tells us the horizontal position of a point. • The **y-coordinate** tells us the vertical position. • The order matters: coordinates are written as (x, y). • This is important because it helps students recognise patterns, such as lines that are parallel to the axes. At first, students will work with pre-drawn axes, then move on to drawing their own. They'll also label the four quadrants to strengthen their understanding.	End of unit assessment Dirt for end of unit assessment.

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	Unit 5 Multiplying and Dividing Fractions	• Coordinates in all four quadrants • Lines parallel to the axes • Table of values • Recognise and use the line y=x • Lines of the form y=mx • Link y=mx to direct proportion (E) • Introduce gradient (y=mx) • Lines with a negative gradient • Lines of the form y=x+c • Lines of the form y=mx+c • Find the midpoint of a line segment (E) • Solve problems with coordinates and graphs (E) • Quadratic graphs (E) Students are learning how to multiply a fraction by a whole number. To help them understand, we start by linking multiplication to repeated addition. This shows why only the **top number (numerator)** of the fraction is multiplied by the whole number. Students will use visual aids like **bar models** or **number lines** to make sense of the process. We begin with simple examples, such as multiplying a **unit fraction** (a fraction with 1 as the numerator) by an integer. This reminds students that multiplication can be done in any order (commutative property). As they grow more confident, they'll move on to multiplying **non-unit fractions**. If needed, we'll revisit skills like **simplifying fractions** and **changing between improper fractions and mixed numbers**, as these are often part of more complex multiplication problems. • Represent multiplication of fractions • Multiply a fraction by an integer	End of unit assessment Dirt for end of unit assessment.

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		• Find the product of a pair of any fractions • Divide an integer by a fraction • Divide a fraction by a unit fraction • Understand and use the reciprocal • Divide any pair of fractions • Multiply and divide improper and mixed fractions • Multiply and divide algebraic fractions	
	Unit 6 Symmetry & Reflection	Students are developing their understanding of **lines of symmetry**, building on what they learned in primary school. To help them, we use practical activities like **folding paper shapes** and using **mirrors** to check answers. At first, students focus on finding a single line of symmetry (horizontal, vertical, or diagonal). Once confident, they move on to shapes with **more than one line of symmetry** and explore how a shape's structure affects the number of lines it has. Students will also apply this learning to **everyday objects** and discuss the difference between **perfect symmetry in theory** and the small imperfections we see in real life. • Line symmetry • Rotational symmetry • Reflect a shape in a horizontal or vertical line • Reflect a shape in a diagonal line • Reflect a shape given equation of a line (E) • Describe a reflection (E)	End of unit assessment Dirt for end of unit assessment.

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14-18 (Spring 1)	Unit 7 Area, Volume & Destiny	Students will build on their previous knowledge of area and volume to explore these concepts in more depth and apply them to real-world situations. They will also be introduced to **density**, which links mass and volume. **Key learning points:** • **Area**: Students will calculate the area of a range of shapes, including compound shapes, and understand how area relates to surface coverage. • **Volume**: They will learn how to find the volume of 3D shapes such as prisms and cylinders, and understand how volume measures the space inside an object. • **Density**: Students will discover how density connects mass and volume using the formula. This helps explain why some objects float while others sink. • Using diagrams and practical examples to visualise area and volume. • Applying formulas and checking units carefully. • Exploring real-life contexts, such as packaging design, liquids, and materials, to see why these concepts matter. Understanding area, volume, and density is essential for everyday life—whether working out how much paint is needed for a wall, how much water a container can hold, or why certain objects behave differently in water	End of unit assessment Dirt for end of unit assessment.

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	Unit 8 Equations & Inequalities	• Name 2-D and 3-D shapesArea of a 2-D shape • Area of a compound shape • Recognise prisms (including language of edges and vertices) • Volume of cubes and cuboids • Convert metric units of mass and capacity • Understand the units of mass/density/volume • Solve problems with density, mass and volume • Area and volume in similar shapes (E) Students are building their skills in solving **equations** and **inequalities**, which are key parts of algebra. These ideas help students understand how to work with unknown values and compare quantities • **Equations**: Students learn to solve equations where the unknown is on one or both sides, using inverse operations to find the value of the variable. • **Inequalities**: They explore statements that show one value is greater or smaller than another (e.g., $x>3x > 3$x>3), and learn how to represent these on a number line. • **Real-life links**: These skills are useful for problem-solving in everyday situations, such as comparing costs or working out limits • Using clear step-by-step methods to isolate the variable. • Representing inequalities visually on number lines. • Applying these concepts to practical problems to see why they matter Equations and inequalities are the foundation for higher-level maths and many real-world applications, from budgeting to engineering. They help students develop logical thinking and problem-solving skills. • Solve simple 1- and 2-step equations • Solve more complex equations • Solve fractional equations	End of unit assessment Dirt for end of unit assessment.

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	Unit 9 Percentages	• Form and solve equations • Solve equations with unknowns on both sides • Understand and use inequalities • Inequalities on a number line • Solve simple inequalities • **F**orm and solve inequalities • Solve inequalities with unknowns on both sides (E) In this unit, students deepen their understanding of percentages and learn how they relate to fractions and decimals. They revisit key ideas such as finding a percentage of an amount and expressing one number as a percentage of another. As the unit progresses, students work with more complex percentages, including increases, decreases and percentage change. Students are introduced to efficient methods, such as using **multipliers**, which allow them to calculate percentage increases or decreases in a single step. They also explore real-life contexts—such as shopping discounts, interest, tax and comparisons—to help them see how percentages are used every day. Throughout the unit, students are encouraged to make connections between percentages, fractions and ratios, strengthening their overall number sense. These skills form an important foundation for later work in proportional reasoning and GCSE maths.	End of unit assessment Dirt for end of unit assessment.

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		• Percentage of an amount • Convert between percentages and decimals • Use multipliers to find percentages • Convert between decimals and percentages greater than 1 • Percentage increase using a multiplier • Percentage decrease using a multiplier 10 • Percentage increase and decrease using a multiplier • Express one number as a fraction or a percentage of another (calculator) • Express one number as a fraction or a percentage of another (non-calculator) • Percentage change • Find the original value given a percentage • Choose appropriate methods to solve percentage problems	
19-24 (Spring 2)	Unit 10 Indices	In this unit, students build on their understanding of powers and learn how indices (also known as exponents) help us represent repeated multiplication in a simple, efficient way. They begin by working with positive whole number powers, such as 3^2 or 5^3, and explore what these expressions mean. Students are introduced to the **rules of indices**, which help them simplify expressions involving powers—such as when multiplying or dividing numbers with the same base. They also learn about powers of 10, which supports their work with standard form in later years. As they become more confident, students apply these rules to a range of problems and learn to spot patterns in powers and calculations. Real-life examples, such as area and volume, help show where indices appear naturally in mathematics. This unit strengthens students' algebra skills, builds their confidence when working with larger numbers, and prepares them for more advanced index laws they will meet in Years 9 and 10.	End of unit assessment Dirt for end of unit assessment.

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	Unit 11 Standard Index Form	• Add and subtract expressions with indices • Multiply and divide expressions with indices • Addition law for indices • Subtraction law for indices • Addition and subtraction laws for indices • Powers of powers (E) • Negative indices (E) • Fractional indices (E) In this unit, students learn how to write very large or very small numbers in **standard form**, which is a concise way of expressing numbers using powers of 10. For example, instead of writing 5,000,000, students learn to write 5×10^6. This helps them handle numbers that would otherwise be difficult to read, write or calculate with. Students explore how to convert between ordinary numbers and standard form, and they begin to understand why this notation is useful—especially in science, geography and everyday contexts like population sizes, distances in space or microscopic measurements. As their confidence grows, students practise comparing numbers in standard form and performing simple calculations using this notation. They also revisit powers of 10 to strengthen their understanding of how standard form works. This unit helps students work more efficiently with large and small numbers and prepares them for more advanced scientific notation and calculator use in later years • Positive and negative powers of 10 • Numbers greater than 1 in standard form • Numbers between 0 and 1 in standard form • Standard form on a calculator	End of unit assessment Dirt for end of unit assessment.

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	Unit 12 Interpret and represnt data Number Sense	In this unit, students develop their ability to understand and present data in a range of different ways. They build on the charts and graphs introduced in earlier years—such as bar charts, line graphs and pie charts—and begin working with more detailed representations. Students learn how to read and interpret data carefully, spotting patterns, trends and comparisons. They also practise drawing accurate graphs and diagrams, understanding which type of representation is most suitable for different kinds of information. The unit introduces new tools such as **scatter graphs**, where students explore how two variables might be linked, and **line of best fit**, which helps them see overall trends in data. Throughout the unit, real-life contexts—such as weather data, sports performance or surveys—are used to help students see how data is used to make decisions. These skills support learning in subjects like science and geography and build a strong foundation for the statistics topics they will meet at GCSE. • Types of data • Outliers and errors • Averages and range • Choose the most appropriate average • Compare distributions using average and the range • Averages from an ungrouped frequency table • Represent and interpret grouped discrete data • Represent and interpret continuous data grouped into equal classes • Mean and mode from a grouped frequency table (E)	End of unit assessment Dirt for end of unit assessment.

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25-30 (Summer 1)	Unit 13 Angles in Parallel Lines & Polygons	This block builds on KS2 and Year 7 understanding of angle notation and relationships, extending all student to explore angles in parallel lines and thus solve increasingly complex missing angle problems. Links are then made to the closely connected properties of polygons and quadrilaterals. The use of dynamic geometry software to illustrate results is highly recommended, and students following the Higher strand will also develop their understanding of the idea of proof. They will also start to explore constructions with rulers and pairs of compasses. • Basic angles rules and notation • Angles between parallel lines and a transversal • Alternate and corresponding angles • Alternate, corresponding and co-interior angles • Solve complex problems with angles in parallel lines • Properties of special quadrilaterals and their diagonals • Find sides and angles in special quadrilaterals • Exterior angles of a polygon • Interior angles of a polygon • Interior angles in a regular polygon • Prove simple geometric facts (E)	End of unit assessment Dirt for end of unit assessment.
	Unit 14 Tables & probability	In this unit, students build their understanding of probability by learning how to organise information clearly and use tables to work out the likelihood of different outcomes. They begin by using simple **frequency tables** and **two-way tables**, which help them keep track of how often events occur and how different categories combine. Students then apply this information to calculate probabilities, using fractions, decimals or percentages to describe how likely an event is. They explore key ideas such as certain, likely, unlikely and impossible events, building a strong foundation in understanding chance.	End of unit assessment Dirt for end of unit assessment

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		Throughout the unit, students tackle real-life scenarios—such as choosing items at random or analysing survey results—to help them see where probability is used in everyday decision-making. These activities encourage logical thinking and careful reasoning. This unit prepares students for more advanced probability work in later years, including sample spaces, tree diagrams and the comparison of theoretical and experimental probability. • Probability vocabulary • The probability scale • Probability of a single event • Use the sum of probabilities being equal to 1 • Probability experiments • Sample spaces for 1 or more events • Probabilities from sample space diagrams • Two-way tables • Probabilities from two-way tables • Frequency trees • Probabilities from frequency trees	
31-38 (Summer 2)	Unit 15 Circles	In this unit, students deepen their understanding of the key features of a circle and learn how to use the formulas linked to its geometry. They begin by identifying important parts of a circle such as the **radius**, **diameter**, **circumference**, **centre** and **chord**, ensuring they can recognise each feature in diagrams. Students are introduced to the formulas for calculating the **circumference** (the distance around a circle) and the **area** (the space inside it). They learn how the	End of unit assessment Dirt for end of unit assessment

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		diameter, radius and the number π (pi) are used in these calculations, and they practise choosing the correct formula for different problems. As they gain confidence, students apply these skills to a range of contexts, such as finding missing lengths, solving problems involving measurements and working with parts of circles, including semicircles and quarter circles. Throughout the unit, students also improve their ability to draw and interpret diagrams accurately. This topic builds a strong foundation for later geometry work and helps students understand how circles appear in real-life situations—from wheels and clocks to design and engineering. • Circle vocabulary • Pi as a ratio • Circumference of a circle • Perimeter of parts of a circle • Area of a circle • Area of parts of a circle • Area and circumference of a circle • Perimeter of compound shapes with circles • Perimeter and area of compound shapes with circles	
	Unit 16 Graphs & Charts	In this unit, students develop their skills in reading, interpreting and creating a variety of graphs and charts. They revisit familiar representations—such as bar charts, pictograms and line graphs—and learn how to draw them accurately using clear scales and labels. Students explore how different types of charts are used to show different kinds of information. They learn how to interpret pie charts, time-series graphs and two-way tables by identifying trends, comparing values and drawing conclusions from the data presented.	End of unit assessment Dirt for end of unit assessment.

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		Throughout the unit, students work with real-life contexts, such as weather data, sports results and surveys, helping them understand how graphs and charts are used to communicate information in everyday situations. They also practise choosing the most suitable graph or chart depending on the data they are working with. This topic builds confidence in handling data and prepares students for more advanced statistical work in later years, including scatter graphs, averages and more complex data analysis. • Pictograms and bar charts • Vertical line charts • Draw pie charts • Interpret pie charts • Line graphs • Choose the most appropriate graph or chart • Compare distributions using graphs • Misleading graphs and charts	End of unit assessment Dirt for end of unit assessment.
	Unit 17 Sequences	In this unit, students build their understanding of number patterns by exploring a variety of sequences. They start by identifying the **term-to-term rule**—the pattern that tells you how to move from one term to the next—such as adding or subtracting the same amount each time. Students then learn how to work out missing terms and generate new terms, helping them recognise the structure and behaviour of different sequences. They explore **arithmetic sequences**, where the numbers increase or decrease by a constant amount, and begin to see how these patterns connect to algebra.	

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		As their understanding develops, students are introduced to **position-to-term rules**, which give a formula for finding any term in a sequence. This helps them understand sequences more deeply and prepares them for future algebra work. Throughout the unit, students also encounter sequences in real-life contexts and puzzles, encouraging them to think logically, spot patterns and justify their reasoning. This topic supports their progression into more advanced work with algebra and functions in later years. • Generate and describe a sequence given a rule in words • Generate a sequence given a simple algebraic rule • nth term of a linear sequence • Generate a sequence given a complex algebraic rule (E)	