Mathematics Year 9 Curriculum Overview

Year 9 Overview	Throughout Year 9, students deepen their understanding of key mathematical ideas and prepare for the more advanced topics they will meet at GCSE. The curriculum revisits important skills from earlier years while introducing new concepts that develop problem-solving, reasoning, and fluency. Across the year, students explore: **Number and Algebra** Students strengthen their algebraic skills by simplifying expressions, expanding and factorising brackets, and working confidently with formulas. They learn how to manipulate algebra in different forms and begin solving simultaneous equations. Work on standard form, ratio, proportion, and percentages helps students apply number skills to real-life and scientific contexts. **Geometry and Measures** Students extend their geometric knowledge through work on constructions, congruence, and similarity. They use accurate measuring tools and logical reasoning to compare and create shapes. Transformations—reflections, rotations, translations, and enlargements—are revisited and described using precise mathematical language. Later in the year, students study Pythagoras' theorem and basic trigonometry, learning how to calculate distances, heights, and angles in right-angled triangles. **Graphs and Functions** Students continue their work with coordinate geometry, including straight line graphs and introduction to non-linear graphs such as quadratics and reciprocals. They learn to interpret graphs, recognise key features, and use them to solve problems. This builds a strong foundation for future work with functions and equations at GCSE. **Probability and Data** Students are introduced to sets and Venn diagrams, using them to organise information and calculate probabilities. They build on earlier work with experimental and theoretical probability, learning the language of likelihood and how to analyse combined events. **Financial and Real-Life Maths** The Maths & Money unit helps students apply mathematical thinking to everyday decisions. They explore budgeting, income, deductions, and different ways of saving or borrowing money. Real-life scenarios build confidence in using maths outside the classroom **Problem-Solving and Reasoning** Throughout Year 9, students are encouraged to explain their thinking, make connections between topics, and apply skills in unfamiliar contexts. This prepares them for the reasoning and problem-solving demands of the GCSE course.

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Week Number	Themes/ Topics	Key Knowledge & Skills	Key Assessments
1-6 (Autumn 1)	Unit 1 Properties of Number	In this step, students strengthen their understanding of **factors, multiples and prime numbers**, building on what they have learned in previous years. They practise listing factors in a careful, organised way, using factor pairs to make sure they find all the factors of a number. This includes working with square numbers, where both numbers in a factor pair can be the same. Students learn the important differences between factors and multiples, and they are encouraged to use their times-table knowledge to recognise multiples more easily. They also use what they know about factors to decide whether a number is prime. Visual tools such as counters and bar models help students clearly see how numbers can be grouped and divided, supporting their understanding of these key concepts. • Factors, multiples and primes • Write a number as a product of prime factors • Use prime factors (E) • Highest common factor (HCF) and lowest common multiple (LCM) • Venn diagrams • Use a Venn diagram to calculate the HCF and LCM • Integers, real numbers and rational numbers • Introduction to surds (E)	End of unit assessment Dirt for end of unit assessment
	Unit 2 Percentages	In this step, students learn how to increase and decrease amounts by a given percentage, using both calculator and non-calculator methods. They build on their Year 8 knowledge of **multipliers**, which allow them to carry out a percentage change in just one calculation. While some students may still choose to find the percentage first and then add or subtract it, using multipliers is quicker and helps prepare them for more advanced topics, such as compound interest. Students explore the different multipliers needed for various percentage changes—for example, 40%, 4% or 0.4%—and bar models are used to show how the new amount relates to the original. Real-life contexts, such as financial problems, are included to help students understand where percentage increases and decreases are used in everyday life.	End of unit assessment Dirt for end of unit assessment.

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	Unit 3 Area & Volume	• Percentage increase and decrease • Express a change as a percentage • Find the original value after a percentage change • Solve problems with percentages (non-calculator) • Solve problems with percentages (calculator) • Repeated percentage change • Understand interest • Simple interest • Compound interest In this step, students learn about the structure of 3-D shapes by exploring their **nets**—the flat patterns that can be folded to make a solid shape. They begin with familiar shapes such as cubes and cuboids and may take apart simple boxes to see how the faces fit together. As they become more confident, they look at nets for other shapes, including triangular prisms and pyramids, and explore how different nets can create the same 3-D shape. Students are supported in identifying which edges need to meet when a net is folded. This work also gives them the chance to revisit the names of 3-D shapes and use key vocabulary such as **face**, **edge** and **vertex** to describe their properties. • Nets • Area of a 2-D shape • Area and circumference of a circle • Surface area of cubes and cuboids • Surface area of a triangular prism (E) • Surface area of a cylinder (E) • Volume of a prism • Volume of a cylinder • Volume of cones, pyramids and spheres (E) • Convert metric units of area and volume (E)	End of unit assessment Dirt for end of unit assessment.
7-13 (Autumn 2)	Unit 4 Equations, Inequalities & Formulae	In this step, students strengthen and extend their understanding of solving equations and inequalities, building on what they learned in Year 8. They revisit the idea that a linear equation has one specific solution, while an inequality can have many possible solutions. To reinforce this, students practise identifying integer (whole-number) solutions to inequalities and then learn how non-integer solutions	End of unit assessment Dirt for end of unit assessment

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		can be written as fractions or decimals. Calculators may be used to support students where arithmetic becomes challenging. Students are reminded to check their solutions by substituting them back into the original equation to ensure they work. They also begin to see equations written in less familiar forms, such as **3 + 2m = 9** or **15 < $\frac{c}{5}$ + 1**, and learn how to approach them confidently. When ready, they move on to **compound inequalities**, such as **4 < 2x < 20**, which help develop a deeper understanding of how inequalities work. • Solve equations and inequalities • Solve equations and inequalities with brackets • Inequalities with negative numbers (E) • Solve equations and inequalities with unknowns on both sides • Solve problems with equations and inequalities • Substitute into formulae and equations • Change the subject of a formula (one-step) • Change the subject of a formula (two-step) • Change the subject of complex formula (E)	
	Unit 5 Fractions	In this step, students continue to develop their skills in adding and subtracting fractions, building on what they learned in Year 7. Some students may need a quick reminder of the method, and visual tools such as bar models and number lines can help them understand how fractions combine. Students practise a wide range of questions, including adding or subtracting more than two fractions, and working with fractions alongside whole numbers and mixed numbers. When tackling real-life problems, it is useful for students to think about how they would approach the question using whole numbers first, and then apply the same idea to the fractions. They are encouraged to estimate their answers to check whether their solutions make sense, and to use a calculator to verify their work when appropriate. This helps build confidence and accuracy when working with fractions.	End of unit assessment Dirt for end of unit assessment.

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		• Add and subtract fractions • Multiply and divide fractions • Fraction of an amount	
	Unit 6 Rates	In this step, students deepen their understanding of the relationship between **speed, distance and time**, building on the work they did in Year 7. They learn that speed is a **compound measure**, meaning it uses two different quantities together. For example, saying a car travels at 60 mph means it travels **60 miles every hour**. This helps students understand the meaning of "per" and why speed is described as a rate. Students use helpful visual tools—such as double number lines, bar models and ratio tables—to support their problem-solving. They are encouraged to pay close attention to the units given in each question so they understand what the situation is telling them. For instance, to work out a speed in kilometres per hour (km/h), students divide the distance in kilometres by the time in hours. This step helps students build confidence in choosing the correct method and interpreting real-life problems involving journeys and rates. • Speed, distance and time • Distance-time graphs • Solve flow problems and their graphs • Rates of change and their units • Convert compound units (E)	End of unit assessment Dirt for end of unit assessment.
	Unit 7 Standard Form	In this short step, students extend their Year 8 understanding of standard form by revisiting how to convert numbers to and from standard form and by applying it to problem-solving. Remind students of the correct structure: $A \times 10^n$, where $1 \leq A < 10$and $n$is an integer. They should be able to identify whether a number is written in standard form. This can be reinforced by showing examples like $12.6 \times 10^5$and asking them to rewrite them correctly. A place-value chart may be useful to support	End of unit assessment Dirt for end of unit assessment.

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		understanding where appropriate. Using real-world contexts—such as population sizes or bacteria counts—can also illustrate why standard form is an efficient way to represent very large or very small numbers. • Numbers in standard form • Compare and order numbers in standard form • Multiply and divide numbers in standard form • Add and subtract numbers in standard form	End of autumn assessment Dirt for end of autumn assessment
14-18 (Spring 1)	Unit 8 Maths & Money	In this unit, students build on their understanding of number and apply it to real-life financial situations. They revisit key ideas about earning, spending, saving, and borrowing, and learn how maths helps us make sensible decisions with money. Students explore different types of income and learn how payslips work, including deductions such as tax. They also look at how to manage money through simple budgeting tasks, comparing costs and planning spending. The unit introduces bank accounts and interest, helping students recognise how savings grow over time. Real-life examples—such as shopping choices, discounts, and comparing deals—are used to show why these skills are important. Students also consider borrowing, including loans and credit, and learn why understanding interest is essential. By working with practical scenarios, students gain confidence in using maths to navigate everyday financial situations. • Understand a bank account • Spending • Ways to pay • Ways to save • Jobs and pay • Investing • Borrowing (buying a house)	End of unit assessment Dirt for end of unit assessment

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		• Running a house or a business • Budgeting • Borrowing (loans) • Spending overseas • Insurance	
	Unit 9 Straight line graphs	In this unit, students build on their earlier work with coordinates and graphs. They revisit how to plot points on a coordinate grid and extend this knowledge to understand and interpret straight line graphs. Students explore the key features of a straight line: the **gradient**, which shows how steep the line is, and the **y-intercept**, which shows where the line crosses the vertical axis. They learn how these two values link to the equation of a straight line, typically written as $y = mx + c$. Throughout the unit, students practise drawing lines from equations, finding equations from graphs, and identifying gradients between two points. Real-life examples, such as comparing mobile phone tariffs or tracking distance and time, help show why straight line graphs are useful outside the classroom. By working through these practical scenarios, students gain confidence in understanding and interpreting linear relationships—an important foundation for algebra in later years. • Lines, parallel to the axes, y=x and y=-x • Explore gradients • Explore intercepts • y=mx+c • Rearrange equations to the form y=mx+c (E) • Find the equation of a line from a graph • Interpret gradient and intercepts of real-life graphs • Graph inequalities (E)	End of unit assessment Dirt for end of unit assessment.
	Unit 10 Ratio & Proportion	In this unit, students build on their earlier understanding of comparing quantities and explore how ratios and proportions are used in everyday situations. They revisit how to simplify ratios and how to divide amounts into given ratios, then extend these skills to more complex problems. Students learn how proportions help us understand relationships between quantities. They work with direct proportion—where one value increases at the same rate as another—and begin to recognise situations where this does or does not apply. They	End of unit assessment Dirt for end of unit assessment.

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		also use proportional reasoning to solve problems involving recipes, maps, scale drawings, and best-value comparisons. The unit reinforces the connections between ratio, fractions, and percentages, helping students choose the most efficient method for a task. Real-life contexts, such as comparing prices in different sizes or adjusting a recipe for more people, highlight why ratio and proportion are important and useful. By working through practical examples, students develop strong proportional reasoning skills that support later learning in algebra, geometry, and functional maths. • Direct proportion • Direct proportion and conversion graphs • Inverse proportion • Inverse proportion graphs (E) • Ratio problems (whole or part given) • Solve problems with ratio and algebra (E)	
19-24 (Spring 2)	Unit 11 Construction & Congruence	In this unit, students build on their earlier knowledge of shapes and geometric reasoning. They revisit how to use a ruler, protractor, and compass accurately, and learn how these tools help create precise mathematical constructions. Students practise constructing key geometric figures, such as perpendicular bisectors, angle bisectors, and triangles from given information. They learn why accuracy matters and how clear steps can ensure a correct and reliable construction. The unit also introduces **congruence**, which is the idea that two shapes are exactly the same size and shape, even if they are rotated or flipped. Students explore the conditions that guarantee congruent triangles and use this understanding to justify their reasoning when comparing shapes or solving problems. Real-life examples—such as design, engineering, and technical drawing—help show why precise construction and recognising congruent shapes are important skills beyond the classroom. By working through practical tasks, students gain confidence using geometric tools and develop clear, logical reasoning when working with shapes.	End of unit assessment Dirt for end of unit assessment

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	Unit 12 Similarity	• Draw and measure angles • Construct and interpret scale drawings • Construct triangles using ASA, SAS and SSS • Construct an angle bisector • Construct a perpendicular bisector • Construct a perpendicular from or to a point • Construct more complex polygons • Identify congruent figures • Congruent triangles In this unit, students extend their understanding of shapes by exploring **similarity**—the idea that shapes can have the same proportions but different sizes. They learn to recognise when shapes are similar and how all corresponding angles stay equal while side lengths change in the same ratio. Students work with **scale factors**, learning how to enlarge or reduce shapes accurately and how to calculate missing side lengths using proportional reasoning. They also learn to distinguish between similarity and congruence, understanding that congruent shapes are the same size, while similar shapes simply share the same proportions. Real-life contexts, such as scale models, maps, and drawings, help students see why similarity is useful outside of the classroom. They also begin to apply similarity to right-angled triangles, laying early foundations for future work on trigonometry. Through practical examples and reasoning tasks, students build confidence working with scale, proportion, and geometric relationships. • Recognise enlargement and similarity • Work out unknown lengths and angles in similar shapes • Solve problems with similar triangles (E) • Ratio in right-angled triangles (E)	End of unit assessment Dirt for end of unit assessment.

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	Unit 13 Algebraic Manipulation	In this unit, students deepen their understanding of algebra by learning to rearrange and simplify expressions with increasing confidence. They build on earlier skills and begin working with more complex algebraic structures. Students revisit how to collect like terms and simplify expressions, then extend this to expanding and factorising increasingly challenging expressions. This includes multiplying out brackets, factorising into single or multiple brackets, and recognising common factors. They also learn how to substitute values into expressions accurately and how to use algebra to represent patterns or general rules. These skills help students prepare for more advanced topics, such as solving equations and working with functions later in the year. Real-life examples—like using formulas in science or calculating totals in practical situations—show why algebra is a powerful tool for describing and solving problems. By practising clear, step-by-step methods, students build confidence in manipulating algebraic expressions and develop a strong foundation for future mathematical learning. • Expand single brackets and simplify • Factorise into a single bracket • Expand double brackets • Use identities • Factorise quadratic expressions (E) • Solve quadratic equations (E) • Expand triple brackets (E)	End of unit assessment Dirt for end of unit assessment.
25-30 (Summer 1)	Unit 14 Pythagoras' Theorem	In this unit, students are introduced to **Pythagoras' theorem**, a key idea in mathematics that links the lengths of the sides in a right-angled triangle. They learn that the square of the longest side (the hypotenuse) is equal to the sum of the squares of the other two sides. Students begin by identifying right-angled triangles and practising how to apply the theorem to calculate missing side lengths. They learn to use the theorem both ways: finding the hypotenuse and finding one of the shorter	End of unit assessment Dirt for end of unit assessment

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		sides. Clear diagrams and step-by-step methods help students understand why the theorem works and how to use it accurately. The unit also explores real-life applications, such as measuring diagonals, distances, or heights, helping students recognise why Pythagoras' theorem is practical and useful outside the classroom. By working with a range of problems, students develop confidence in applying the theorem and gain an important foundation for future work in trigonometry and geometry. • Solve equations with squares and square roots • Identify the hypotenuse • Determine whether a triangle is right-angled • Pythagoras theorem (find the hypotenuse)' • Pythagoras theorem (find any side)' • Use Pythagoras theorem on coordinate axes' • Proofs of Pythagoras theorem (E)' • Pythagoras theorem in 3-D shapes (E)'	
	Unit 15 Non-linear graphs	In this unit, students extend their graphing skills by exploring **non-linear graphs**—graphs that curve rather than form a straight line. They learn how these graphs behave and how they differ from the linear graphs studied earlier in the year. Students begin by plotting simple curves such as quadratics (e.g., $y = x^2$) and cubic or reciprocal graphs. They learn how to generate values for a table, plot accurate points, and recognise the general shape of each type of curve. As they become more confident, they start to interpret features of these graphs, such as turning points or how the graph behaves as values get larger or smaller. The unit also focuses on using non-linear graphs to solve problems. Students read information from graphs, estimate values, and explore real-life situations where curved relationships appear—such as speed-time graphs or growth patterns.	End of unit assessment Dirt for end of unit assessment.

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		Through practical plotting and interpretation tasks, students build a strong understanding of how non-linear relationships work and develop important skills that support future learning in algebra and science. • Substitute into quadratic expressions • Draw simple quadratic graphs • Draw more complex quadratic graphs • Interpret quadratic graphs • Interpret reciprocal and exponential graphs • Draw cubic graphs (E) • Interpret cubic graphs (E) • Interpret roots, intercepts and turning points (E	
	Unit 16 Sets & Probability	In this unit, students develop their understanding of uncertainty and learn how to use mathematical language and diagrams to describe probability more clearly. They build on earlier work with simple probability and are introduced to the idea of **sets**, which help organise information. Students learn key set notation, such as how to show items that belong to a group or how two groups overlap. They use **Venn diagrams** to sort information and to represent probabilities visually. This helps them understand ideas like mutually exclusive events (where two things cannot both happen) and combined events (where more than one condition can be true). They also revisit the probability scale, using fractions, decimals, and percentages to describe how likely events are. Students calculate probabilities from given information and use Venn diagrams to find the probability of different outcomes. Real-life examples—such as sorting data, analysing survey results, or thinking about combinations of events—help students see why probability and sets are useful tools in everyday decision-making. Through clear diagrams and practical problems, students develop strong reasoning skills and gain confidence in describing, organising, and analysing uncertain situations.	End of unit assessment Dirt for end of unit assessment.

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		• Identify and represent sets • Intersection of a set • Union of a set • Complement of a set (E) • Probability of a single event • Use diagrams to work out probabilities • Relative frequency • Expected outcomes • Independent events • Probabilities from Venn diagrams	End of year Exam Dirt for end of year exam
31-38 (Summer 2)	Unit 17 Transformations	In this unit, students build on their earlier understanding of shapes by learning how to describe and perform **transformations** accurately. They revisit reflections, rotations, translations, and enlargements, and learn how each transformation changes a shape's position or size while keeping it recognisable. Students practise carrying out transformations on squared grids and coordinate axes, using precise mathematical language to describe what has happened—for example, stating the centre of rotation or the scale factor of an enlargement. They also learn how to recognise when a shape has been transformed and to identify which transformation was used. Real-life links, such as design, symmetry in art, and computer graphics, help students understand how transformations appear outside the classroom. By working through clear, visual examples, students develop confidence in reasoning about movement, position, and scale. • Enlargement (positive scale factor) • Enlargement from a point (positive scale factor) • Enlargement (fractional scale factor) • Enlargement (negative scale factor) (E) • Describe an enlargement • Rotation about a point • Describe a rotation • Translation • Describe a translation • Reflection • Find the result of a series of transformations (E)	End of unit assessment Dirt for end of unit assessment

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	Unit 18 Simultaneous Equations	In this unit, students are introduced to **simultaneous equations**, where two equations must be solved together to find values that satisfy both. They begin by solving linear pairs using methods such as substitution and elimination. Students learn how to set up simultaneous equations from real-life contexts, such as comparing costs or finding unknown values in number problems. They also interpret solutions by looking at where two lines meet on a graph, helping them see the connection between algebra and geometry. This topic strengthens students' understanding of equations and prepares them for more advanced algebra in later years. Through step-by-step methods and practical examples, students gain confidence in solving problems where two conditions must be met at once. • Use one value to find another • Introduction to simultaneous equations • Solve simultaneous equations using graphs • Solve simultaneous equations (no adjustments) • Manipulating equations • Solve simultaneous equations (adjust one) • Solve simultaneous equations (adjust both) (E) • Solve simultaneous equations by substitution (E)	End of unit assessment Dirt for end of unit assessment.
	Unit 19 Trigonometry	In this unit, students are introduced to **basic trigonometry**, which links angles and side lengths in right-angled triangles. They learn how the sine, cosine, and tangent ratios allow us to calculate missing angles or sides when certain information is known. Students begin by identifying the hypotenuse, adjacent, and opposite sides, then practise choosing the correct trigonometric ratio to solve problems. Clear diagrams support their understanding, and they learn how to rearrange formulas to find unknown values. Real-life contexts—such as measuring heights, distances, or slopes—help students see why trigonometry is such a powerful and widely used mathematical tool. By working through practical tasks, students build confidence in applying trigonometric ratios and develop key skills that support future study in mathematics, science, and technology.	End of unit assessment Dirt for end of unit assessment.

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		• Identify hypotenuse, opposite and adjacent sides • Use the tangent ratio to find unknown side lengths • Use sine and cosine ratios to find unknown side lengths • Use sine, cosine and tangent ratios to find unknown angles • Choose the right method • Key angles in right-angled triangles (E) • Trigonometry in 3-D shapes (E)	