

CURRICULUM PLAN



SUBJECT:	Maths (KS3)	YEAR GROUP:	9
SUBJECT INTENT:	Our Year 9 curriculum ensures students continue to revisit knowledge learnt throughout Years 7 and 8 so we can further deepen understanding and give students the opportunity to develop their reasoning and problem solving skills. We also introduce new and challenging content such as quadratic equations, Pythagoras' Theorem and compound measures. These topics will challenge students and develop resilience and confidence before commencing their GCSE course. In the units on similarity, congruence, angles and bearings, students start to develop chains of reasoning, preparing them for the complex geometrical proofs they will construct at Key Stage 4 and beyond. In Year 9 students will consolidate the mathematics they have learnt in Key Stages 2 and 3 and start to develop their exam technique ahead of their GCSE.		

TERM	TOPIC	CORE LEARNING	SEQUENCING
Autumn 1	Fractions and percentages	- Converting between fractions, decimals and percentages (U888) - Ordering fractions, decimals and percentages (U594) - Finding fractions of amounts without a calculator (U881) - Finding fractions of amounts with a calculator (U916) - Finding percentages of amounts without a calculator (U554) - Finding percentages of amounts with a calculator (U349) - Percentage change without a calculator (U773) - Percentage change with a calculator (U671) - Finding original values in percentage calculations (U286) - Finding the percentage an amount has been changed by (U278) - Simple interest calculations (U533)	<i>Building on...</i> Basic percentage work throughout Y7/8 that includes percentages of amounts, percentage in/decrease and decimal multipliers. Recurring decimals was the last topic taught in Y8. <i>Building towards...</i> Set up, solve and interpret the answers in exponential growth and decay problems, compound interest calculations and work with general iterative processes in KS4.
	Probability	- Expected results from repeated experiments (U166) - Calculating experimental probabilities (U580) - Frequency trees (U280)	<i>Building on...</i> Basic probability concepts and the probability of single events covered in Y7. <i>Building towards...</i> Modelling with probability trees and also more complex probability problems, including conditional probability at KS4.
	Standard form	- Multiplying and dividing numbers in standard form (U264) - Adding and subtracting numbers in standard form (U290) - Standard form with a calculator (U161)	<i>Building on...</i> This unit revisits the concepts of place value, the four operations, powers and roots covered in Y7/8, as well as the introduction of converting standard form in Y8. <i>Building towards...</i> Using standard form in Physics, plus further work on standard form in KS4.

	Inequalities	- Solving inequalities with the unknown on both sides (U738) - Solving double inequalities (U145) - Constructing and solving inequalities (U337)	<i>Building on...</i> Students will build on their equation solving skills developed in Y7/8, as well as their knowledge of place value and number lines. <i>Building towards...</i> Regions on graphs and solving quadratic inequalities in KS4.
Autumn 2	Quadratic equations	- Factorising monic quadratic equations (U178) - Factorising the difference of two squares (U963) - Factorising to solve monic quadratic equations of the form (U228)	<i>Building on...</i> Basic algebraic manipulation in Y7 and expanding quadratics in Y8. <i>Building towards...</i> This unit is a skill that will be used in multiple KS4 topics such as; solving quadratic simultaneous equations, sketching quadratics, roots of quadratics.
	Rearranging formulae	- Changing the subjects of formulae with one step (U675) - Changing the subjects of formulae with two or more steps (U181)	<i>Building on...</i> Balancing and inverse techniques of solving equations covered in Y7/8 as well order of operations. This unit will also require factorising skills covered in Y7. <i>Building towards...</i> Rearranging formulae in contextual problems in KS4.
	Constructions	- Constructing bisectors of angles (U787) - Constructing perpendicular bisectors and lines (U245)	<i>Building on...</i> Measuring and drawing angles in Y7. <i>Building towards...</i> Solving loci problems and more complex constructions at KS4.
	Circles	- Finding the arc length of sectors (U221) - Finding the area of sectors (U373) - Finding the surface area of cylinders (U464) - Finding the volume of cylinders (U915)	<i>Building on...</i> Area of 2D shapes from Y7 and the area and circumference of a circle as well as volume of prisms in Y8. This will also draw on previously taught skills of rounding to decimal places/significant figures and substitution into a formula. <i>Building towards...</i> Surface area of a cone, sphere and pyramid at Key Stage 4.
Spring 1	Rounding	- Finding error intervals (U657) - Truncating decimals (U108) - Finding error intervals for truncated numbers (U301) - Do simple calculations with bounds	<i>Building on...</i> This unit will revisit concepts of place value and rounding learned in KS2, as well as the rounding of significant figures and estimation in Y8. Understanding of inequality notation (Y8/9). Students will also be able to use knowledge of perimeter and area. <i>Building towards...</i> Calculations with bounds and limits of accuracy in KS4.
	3D shapes	Plans and elevations (U743)	<i>Building on...</i> Existing knowledge of 3D shapes (Y8), plus work on technical drawing in KS3 Design and Technology. <i>Building towards...</i> Fluency in understanding 3D representations in order to understand nets of 3D shapes and solve surface area problems using plans and elevations at KS4.

	Pythagoras' theorem	- Using Pythagoras' theorem in 2D (U385) - Applying Pythagoras' theorem in 2D (U828)	<i>Building on...</i> Understanding of powers, roots, substitution, equations and rounding taught throughout KS3. <i>Building towards...</i> Pythagoras' theorem features in numerous topics that follow at KS3/4, including surface area and volume, coordinate geometry and trigonometry. At KS4 students will also work with Pythagoras in 3D.
	Ratio and proportion	- Writing and simplifying ratios (U687) - Sharing amounts in a given ratio (U577) - Solving direct proportion word problems (U721) - Solving inverse proportion word problems (U357) - Currency conversion (U610)	<i>Building on...</i> Students did a lot of work on proportion at KS2 and this was revisited in Y7, ratios in Y8. Proportional reasoning has also been embedded in other topics throughout KS3, for example unit conversion, value for money problems, scale drawing, pie charts. <i>Building towards...</i> This unit builds towards solving problems involving direct and inverse proportion, including graphical and algebraic representations at KS4 but also covers a fundamental skill that can be applied to many units throughout KS3/4.
Spring 2	Linear graphs	- Plotting straight line graphs (U741) - Finding equations of straight line graphs (U315) - Interpreting equations of straight line graphs (U669)	<i>Building on...</i> Plotting coordinates and substitution into expressions. <i>Building towards...</i> Plotting quadratic graphs unit in the Summer term Y9. Also higher level coordinate geometry at KS4.
	Compound measures	- Calculating with speed (U151) - Calculating with rates (U256)	<i>Building on...</i> Work in KS3 Science including use of formulae triangles. This unit pulls together multiple units that were covered throughout Y7/ 8 such as time, fractions, proportion, substitution, solving equations and units of measure. Rounding skills. <i>Building towards...</i> Further work on compound measures in Physics at KS3/4 as well as more complex compound measures and kinematic graphs in the next unit and at KS4.
	Motion-time graphs	- Plotting distance-time graphs (U403) - Interpreting distance-time graphs (U914) - Calculating speed from distance-time graphs (U462) - Plotting distance-time graphs using speeds (U966)	<i>Building on...</i> Plotting coordinates in Y7 as well as calculating the gradient of a line from the linear graph topic earlier this term. <i>Building towards...</i> More complex calculations involving distance time and velocity time graphs at KS4 such as solving the acceleration or the distance travelled. Understanding key kinematic terminology used in KS4 maths and Physics.
	Quadratic graphs	- Plotting graphs of quadratic functions (U989) - Interpreting graphs of quadratic functions (U667) - Solving quadratic equations graphically (U601)	<i>Building on...</i> Prior Y9 topics of quadratic equations unit in Autumn term and linear graphs in Spring term. Consolidation and use of substitution and plotting coordinates. <i>Building towards...</i> Solving non-linear simultaneous equations at KS4 and further work on linear and non-linear graphs.

Summer 1	Angles and bearings	- Combining angle facts (U655) - Angles on parallel lines (U826) - Using quadrilateral properties to find angles (U329) - Angles in polygons (U427) - Measuring and drawing bearings (U525) - Calculating bearings (U107) - Solve problems involving bearings	Building on... Angles in parallel lines and scale drawings in Y8, and protractor and measurement skills from KS2 and Y7. Scale drawings will also use students' prior knowledge of proportion. <i>Building towards...</i> Trigonometric problems including those involving bearings at KS4. As well as multi-step angle questions and circle theorems. Students will start to construct chains of reasoning, leading to geometric proof at KS4 and beyond.
	Transformations	- Translation (U196) - Reflection (U799) - Rotation (U696) - Enlargement by a positive scale factor (U519) - Mixed transformations (M881)	<i>Building on...</i> Symmetry taught in Y7, as well as translation, reflection and equations of horizontal and vertical lines taught in Y8. Understanding ratio and proportion for scale factor or enlargement. <i>Building towards...</i> More complex transformations including graph transformations and invariance at KS4. Proving similarity of shapes and understanding scale factors for length, area and volume.
Summer 2	Similarity and congruence	- Understanding similarity (U551) - Finding unknown sides in similar shapes (U578) - Understanding congruence (U790) - Congruent triangles (U866) - Constructing triangles (U187)	<i>Building on...</i> Transformations in the previous unit. <i>Building towards...</i> Problem solving involving similar area and volume at KS4. The skill of building a chain of reasoning will also develop understanding of geometrical proofs in KS4 and beyond.
	Handling data and statistical diagrams	- Plotting scatter graphs (U199) - Interpreting scatter graphs (U277) - Using lines of best fit (U128) - Types of data (U322) - Presenting data and making conclusions (U571) - Comparing populations using diagrams (U520) - Choosing suitable averages and solving problems (U717) - Interpreting frequency tables with grouped data (U312) - Finding averages from grouped data (U877) - Drawing and interpreting frequency polygons (U840)	<i>Building on...</i> Basic statistical diagrams knowledge in KS3 including bar charts, frequency tables, stem and leaf, and pie charts as well as averages taught in both Y7/8. <i>Building towards...</i> More complex statistical graphs at KS4 such as histograms, cumulative frequency curves and box plots. Also, these data representations will be used in other subjects with a statistical element. Thinking critically about the best representations for certain types of data.
	Column vectors	- Understanding column vectors (U632) - Adding and subtracting column vectors (U903) - Multiplying column vectors by a scalar (U564) - Identifying parallel vectors (U660)	<i>Building on...</i> Work on translation earlier in Y9. <i>Building towards...</i> Complex vector problems including in algebraic proofs in KS4. Vector use in Mechanics at A-Level.