

Year 9 Mastery Scheme of Learning

Autumn 1

During this half term we initially concentrate on graphical representations – building on Year 7/8 work previously completed on reading scales and solving linear equations. Within the unit we focus on Cartesian coordinates, before moving on to consider linear graphs. We compare gradients and intercepts and focus on the generalised form $y = mx + c$. Next, we look at the graphical representation of direct and indirect proportion and extend this to consider real life problems.

Higher attaining students can model real life graphs involving inverse proportion and explore perpendicular lines.

We remain focused on algebra through the second part of the half term - looking at solving more complex equations and inequalities - building on prior learning from years 7 and 8. We apply these techniques to rearranging increasingly complex formulae.

At the end of this half term, we introduce students to the concept of forming and testing mathematical arguments - representing problems in an algebraic form to test conjectures focused on factors, multiples and primes.

Autumn 2

Within this half term we focus on shape. initially categorising 2 and 3 d shapes before moving onto plans and elevations and nets of increasingly complex shapes. This is used to scaffold our consideration of surface area of various shapes including cubes, cuboids, prisms and cylinders. Higher attaining students may extend this work to consider cones, pyramids and spheres.

Finally in this half term, we revisit constructions, building on prior learning from year 8 to construct and interpret scale drawings. We look at loci and various permutations of constructing perpendiculars and explore the concept of congruence.

Spring 1

In this half term we switch our focus to reasoning with number - revisiting and revising prior learning. We initially consider integers, real and rational numbers, before looking at understanding and using surds and working with directed numbers. We review prior work on highest common factor (HCF) and lowest common multiple (LCM) as well as working with fractions and standard form. We revisit solving ratio and proportion problems - extending this to consider reverse percentages. Higher attaining students may study repeated percentage change. This leads into a unit of study focused on various aspects of financial maths - bills and bank statements, compound interest, wages and tax and VAT. We also consider exchange rate problems and solve unit pricing problems.

Spring 2

This half term we return to geometry - revisiting and revising problem solving involving a wide range of angle facts and testing conjectures with angle and shape. We next turn to rotation and translation, considering order of rotational symmetry and translation using vectors. We combine prior work of reflection to look at combined transformations.

Finally we look at Pythagoras theorem and take a step by step approach to introduce students to understanding and applying the concept. We explore proofs of Pythagoras theorem and apply the theorem to line segment problems. Higher attaining students will use and apply Pythagoras in 3-d.

Summer 1

For this half term the focus returns to proportion. We revisit similarity and consider enlargement, using positive and fractional scale factors and centres of enlargement. Within this topic, we extend the work on similarity to problem solve and move on to consider ratios in right angled triangles as a precursor to trigonometry.

As part of our work on proportion, we review direct proportion, conversion graphs and problem solving. We solve more complex ratio problems, again encouraging students to dual code using bar models to support their work. Higher attaining students will solve problems involving ratio and algebra.

We next consider problems involving compound units such as distance, speed, time and density, mass, volume. To complete this unit we look at rates of change and their units and solve flow problems.

Summer 2

During the final half term of year 9 we revisit probability, extending previous work to consider relative frequency, expected outcomes, independent events. Students are taught how to use tree diagrams - extending this to problems without replacement for higher attaining students.

Finally, we revisit algebraic representations - drawing and interpreting quadratic graphs as well as interpreting reciprocal and piecewise graphs. Higher attaining students will gain experience in graphically solving non-linear simultaneous equations and will also consider the graphical representations of inequalities.

Year 9 Scheme of Work

Reasoning with Algebra			
	Straight line graphs	Forming and Solving Equations	Testing Conjectures
Autumn 1	Lines parallel to the axis, $y=x$ and $y=-x$ (R)	1 & 2-step equations and inequalities (R)	Factors, multiples and primes (R)
	Using tables of values (R)	Equations and inequalities with brackets (R)	True or false
	Compare gradients	Inequalities with negative numbers	Always, sometimes, never true
	Compare intercepts	Solve equations with unknowns on both sides	Show that
	Understand and use $y=mx+c$	Solve inequalities with unknowns on both sides	Conjectures about number
	Write an equation in the form $y=mx+c$ (H)	Equations and inequalities in context	Expand a pair of binomials
	Find the equation of a line from a graph	Formulae and equations	Conjectures with algebra
	Interpret gradients and intercepts of real-life graphs	Rearrange formulae (one-step)	Explore the 100 grid
	Model real-life graphs involving inverse proportion(H)	Rearrange formulae (two-step)	Expand three binomials (H)
	Explore perpendicular lines (H)	Rearrange complex formulae (H)	

Constructing in 2 and 3 Dimension			
	3D shapes	Constructions and Congruency	
Autumn 2	Know names of 2D and 3D shapes	Draw and measure angles (R)	
	Recognise prisms (including language)	Construct and interpret scale drawings (R)	
	Nets of cuboids and other 3D shapes	Locus of distance from a point	
	Sketch nets of cuboids and 3D shapes	Locus of distance from a straight line	
	Plans and elevations	Locus equidistant from two points	
	Find area of 2D shapes (R)	Construct a perpendicular bisector	
	Surface area of cubes and cuboids	Construct a perpendicular from a point	
	Surface area of triangular prisms	Construct a perpendicular to a point	
	Surface area of a cylinder	Locus of distance from two lines	
	Volume of cubes and cuboids	Construct an angle bisector	

	Volume of - prisms and cylinders	Construct triangles from given information (R)	
	Volumes of cones, pyramids & spheres (H)	Identify congruent figures	
		Explore congruent triangles	
		Identify congruent triangles	

Spring 1	Reasoning with number		
	Numbers	Using Percentages	Maths and Money
	Integers, real and rational numbers	Use the equivalence of frac, dec, perc(R)	Problems with bills & bank statements
	Understand and use surds (H)	Calc percentage increase and decrease (R)	Calculate simple interest
	Work with directed number (R)	Express a change as a percentage (R)	Calculate compound interest
	Solve problems with integers	Solve reverse percentage problems	Solve problems with VAT
	Solve problems with decimals	Solve percentage problems (non-calculator)	Calculate wages and taxes
	HCF and LCM (R)	Solve percentage problems (calculator)	Solve problems with exchange rates
	Adding and subtracting fractions (R)	Solve repeated percentage change (H)	Solve unit pricing problems
	Multiplying and dividing fractions (R)		
	Solve problems with fractions		
	Numbers in standard form (R)		

Spring 2	Reasoning with geometry		
	Deduction	Rotation and Translation	Pythagoras Theorem
	Angles in parallel lines (R)	Order of rotational symmetry of a shape	Squares and square roots (R)
	Angle problems using lines of reasoning	Rotational symmetry vs line symmetry	Hypotenuse of a right-angled triangle
	Angle problems with algebra	Rotate a shape about a point on a shape	Decide whether a triangle is right-angled
	Conjectures with angles	Rotate a shape about a point not on a shape	Calculate hypotenuse of a right-angled triangle
	Conjectures with shapes	Translate points and shapes by a given vector	Calculate missing sides in right-angled triangles
	Constructions & geometrical reasoning	Compare rotation and reflection of shapes	Use Pythagoras' theorem on coordinate axes
	Find the result of a series of transformations	Explore proofs of Pythagoras' theorem	

			Use Pythagoras' theorem in 3D shapes (H)
Summer 1	Reasoning with Proportion		
	Enlargement and similarity	Solving Ratio and Proportion Problems	Rates
	Recognise enlargement and similarity	Solve problems with direct proportion (R)	Speed, distance, time problems non calc
	Enlarge a shape by a positive integer scale factor	Direct proportion and conversion graphs (R)	Speed, distance, time problems calc
	Enlarge a shape from a point	Solve problems with inverse proportion	Use distance-time graphs
	Enlarge a shape by a positive fractional scale factor	Graphs of inverse relationships (H)	Problems with density, mass, volume
	Enlarge a shape by a negative scale factor (H)	Solve ratio problems given the whole or a part	Solve flow problems and their graphs
	Work out missing sides & angles in similar shapes	Solve best buy problems	Rates of change and their units
	Solve problems with similar triangles (H)	Solve problems involving ratio and algebra (H)	Convert compound units
	Explore ratios in right-angled triangles (H)		
Summer 1	Representations and Revision		
	Probability	Algebraic Representation	
	Single event probability (R)	Draw and interpret quadratic graphs	
	Relative frequency - include convergence	Interpret graphs, including reciprocal and piece-wise	
	Expected outcomes	Investigate graphs of simultaneous equations (H)	
	Independent events	Represent inequalities	
	Use tree diagrams (H)		
	Tree diagrams without replacement		
	Use diagrams to work out probabilities		