



MATHS Y9- CURRICULUM PLANNING SEQUENCE

Subject	Year	Term	Big Ideas	Topics	Subject Learning Checklist	
Maths	Year 9	Term 1 - 56hrs	Shape and Space	Pythagoras	G20 / G20H Know the formula for Pythagoras' Theorem $a^2+b^2=c^2$ Apply it to find angles and lengths in right angled triangles and, where possible, general triangles in two and three dimensional figures	
				Trigonometry	G21 Know the exact values of $0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°	
					G22H Know and apply the sine rule, cosine rule, to find unknown lengths and angles.	
					G6 Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides including Pythagoras' Theorem and use known results to obtain simple proofs	
					R12 Compare lengths using ratio notation; make links to trigonometric ratios	
					Perimeter and area	G12 Identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres. Understand that cubes, cuboids, prisms and cylinders have a uniform cross centre.
				G16 Know and apply formulae to calculate area of: triangles, parallelograms; trapeziums, compound shapes, area of shapes on a grid. Work out surface area of shapes from nets. Volumes of cuboids, cylinders and other right prisms (including cylinders). Extension; Find the surface area of pyramids composite shapes		
				G17 Calculate the perimeter of a 2D shapes and composite shapes		
				Rounding	N15 Round numbers and measures to an appropriate degree of accuracy (eg to a specified number of decimal places or significant figures); use inequality notation to specify simple error intervals due to truncation or rounding	
					N16/N16H Apply and interpret limits of accuracy including upper and lower bounds	
				Circles	G9 Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment.	
					G17 Know and use the formulae: Circumference of a circle $=2\pi r$, Area of a circle $=\pi r^2$. Calculate the perimeters of 2D shapes including circles and composite. Calculate surface area of spheres, cones and composite solids shapes, solutions in terms of π may be asked for.	
					G18 Calculate arc lengths, angles and areas of sectors of circles	
				Algebra	Basic (Intro) Algebra	A1 Use and interpret algebraic notation, including: coefficients written as fractions rather than as decimal, brackets, it is expected that answers will be given in their simplest form without an explicit instruction to do so
						N3 Use conventional notation for priority of operations, including brackets, powers, roots and reciprocals
						A3 Understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors this will be implicitly and explicitly assessed
						A4/A4H Simplify and manipulate algebraic expressions (including those involving surds) by: collecting like terms, multiplying a single term over a bracket, taking out common factors. Expanding products of two binomials. Factorising quadratic expressions of the form x^2+bx+c , including the difference of two squares. Simplifying expressions involving sums, products and powers, including the laws of indices.
						A5 Understand and use standard mathematical formulae, rearrange formulae to change the subject including use of formulae from other subjects in words and using symbols
					Solving Equations	A2 Substitute numerical values into formulae and expressions, including scientific formulae
						A17 Solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation); find approximate solutions using a graph.
		Simultaneous Equations	A19/A19H Solve two simultaneous equations in two variables (linear / linear or linear/quadratic) algebraically. Find approximate solutions using a graph.			
			A21 Translate simple situations or procedures into algebraic expressions or formulae. Derive two simultaneous equations. Solve the equations and interpret the solution including the solution of geometrical problems and problems set in context.			
		Rearranging formulae	A6/A6H Know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments.			
			A5 Understand and use mathematical formulae; rearrange formulae to change the subject			
			A7 Where appropriate, interpret simple expressions as functions with inputs and outputs.			
		Coordinates and linear graphs	A8 Work with co-ordinates in all four quadrants			
			G11 Solve geometrical problems on co-ordinate axes			
			A9 Plot graphs of equations that correspond to straight line graphs in the co-ordinate plane. Use the form $y=mx+c$ to identify parallel lines and perpendicular lines. Find the equation of the line through two given points, or through one point with a given gradient			
		Indices	A10 Identify and interpret gradients and intercepts of linear functions graphically and algebraically			
			N6 Use positive integer powers and associated real roots (square, cube and higher). Recognise powers of 2, 3, 4, 5, including square numbers up to 15×15 . Know that $1000=10^3$ and $1 \text{ million} = 10^6$ Estimate powers and roots of any given positive number			
		Sequences	N7 Calculate with roots, and with integer and fractional indices			
			A23 Generate terms of a sequence from either a term-to-term or a position-to-term rule, including from patterns and diagrams.			
			A24 Recognise and use: sequences of triangular, square and cube numbers, simple arithmetic progression, Fibonacci type sequences, quadratic sequences, and simple geometric progressions (where n is an integer and r is a rational number > 0) other sequences			
			A25 Deduce expressions to calculate the n th term of linear and quadratic sequences			
		Number	Types of Number	N4 Use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation, and the unique factorisation theorem. Prime factor decomposition including product of prime factors written in index form.		
				N5 Apply systematic listing strategies and the use of the product rule for counting including using lists, tables and diagrams.		
			FDP	N7 Calculate with roots and with integer and fractional indices		
				N12 Interpret fractions and decimals as operators including interpreting percentage problems using a multiplier.		
			Fractions & Decimals	N10 Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $\frac{7}{2}$ or 0.375 and $\frac{3}{8}$) including ordering		
				N10H Change recurring decimals into their corresponding fractions and vice versa		
			Surds	N8 Calculate exactly with fractions, and multiples of $\sqrt{\quad}$		
				N8H Calculate exactly with fractions, and multiples of $\sqrt{\quad}$, surds. Simplify surd expressions involving squares (eg $\sqrt{12}=\sqrt{4 \times 3}=\sqrt{4} \times \sqrt{3}=\sqrt{3}$) and rationalise denominators		
			Percentages	R9 Define percentage as 'number of parts per hundred'. Interpret percentages and percentage changes as a fraction or decimal and interpret these multiplicatively. Express one quantity as a percentage of another. Compare two quantities using percentages. Work with percentages greater than 100%.		
				N12 Interpret fractions and percentages as operators		
Standard Form	N2 Understand and use place value (e.g. when working with very large or very small numbers) including questions in context.					
	N9 Calculate with and interpret standard form; where n is an integer with and without a calculator, and interpret calculator displays.					
Shape and Space	Angles		G1 Use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries. Use the standard conventions for labelling and referring to the sides and angles of triangles. Draw diagrams from written descriptions.			
			G3 Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles. Understand and use alternate and corresponding angles on parallel lines. Note: colloquial terms such as Z angles are not acceptable and should not be used.			
	Angles in polygons	G3 Derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons).				
		G4 Derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus. Including knowing names and using the polygons: pentagon, hexagon, octagon and decagon. Including knowing names and properties of isosceles, equilateral, scalene, right-angled, acute-angled, obtuse-angled triangles. and triangles and other plane figures using appropriate language.				
	Construction and loci	G2 Use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from / at a given point, bisecting a given angle); use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line.				
		R2 Use scale factors, scale diagrams and maps including geometrical problems.				
	Scale and bearings	G15 Measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings, including the eight compass point bearings and three-figure bearings.				
		G13 Construct and interpret plans and elevations of 3D shapes				
2D rep of 3D shapes	P1 Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees. Probabilities should be written as fractions, decimals or percentages.					
	P4 Apply the property that the probabilities of an exhaustive set of outcomes sum to 1. Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to 1.					

Term 3 - 48 hrs

Probability	Probability	P7	Construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities	
		P2	Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes or multiple future experiments	
P3		Relate relative expected frequencies to theoretical probability, using appropriate language and the 0 – 1 probability scale		
P5		Understand that empirical unbiased samples tend towards theoretical probability distributions with increasing sample size		
P6		Enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams		
P8		Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions. Know when to add and when to multiply two or more probabilities.		
P9		Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree		
Data		Statistical Measure	S4	Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through: appropriate measures of central tendency (median, mean, mode and modal class), spread (range, including consideration of outliers, quartiles and inter-quartile range). Students should know and understand the terms: primary data, secondary data, discrete data and continuous data.
			S5	Apply statistics to describe a population.
	S1		Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling.	
	S3		Construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use	
	S4		Interpret, analyse and compare distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data, including box plots. Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through consideration of outliers, quartiles and inter-quartile range.	
	S6		Draw estimated lines of best fit. Make predictions. Interpolate and extrapolate apparent trends whilst knowing the dangers of doing so.	
Number	Numerical Methods.	A20	Find approximate solutions to equations numerically using iteration including the use of suffix notation in recursive formulae.	
		N1	Apply the four operations, including formal written methods, to decimals – both positive and negative.	
		N2	Apply the four operations, including formal written methods, to simple fractions (proper and improper) and mixed numbers - both positive and negative. Understand and use place value (e.g. when calculating with decimals). Including questions set in context (knowledge of terms used in household finance, for example profit, loss, cost price, selling price, debit, credit and balance, income tax, VAT, interest free).	
		N8	Calculate exactly with fractions	
Ratio	Ratio	N11	Identify and work with fractions in ratio problems.	
		R2	Use scale factors, scale diagrams and maps including geometrical problems.	
		R3	Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1	
		R4	Use ratio notation, including reduction to simplest form	
		R5	Divide a given quantity into two parts in a given part:part or part:whole ratio. Express the division of a quantity into two parts as a ratio. Apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing and concentrations). Including better value or best buy problems.	
		R6	Express a multiplicative relationship between two quantities as a ratio or fraction.	
		R7	Understand and use proportion as equality of ratios.	
		R8	Relate ratios to fractions and to linear functions.	
Data	Scattergraphs	S6	Use and interpret scatter graphs of bivariate data. Recognise correlation and know that it does not indicate causation. Draw estimated lines of best fit. Make predictions Interpolate and extrapolate apparent trends whilst knowing the dangers of doing so. know and understand the terms positive correlation, negative correlation, no correlation, weak correlation and strong correlation.	
	Collecting and representing data	S2	Interpret and construct tables, charts and diagrams including, for categorical data: frequency tables, bar charts, pie charts, pictograms, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data, know their appropriate use, including choosing suitable statistical diagrams.	
		S4	Interpret, analyse and compare distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data, including boxplots. Know and understand the terms primary data, secondary data, discrete data and continuous data.	
		S3/S3H	Construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use	