

# KS3 Long Term Plan

**Year 7** – The Mathematics curriculum builds on the foundations of Key Stage 2. Students are deliberately equipped with expert vocabulary to allow them to accurately articulate their reasoning. Students begin a journey that develops them into flexible thinking, open minded problem solvers.

**Year 8** – The story of each topic continues through careful sequencing, with vocabulary being enhanced with more specialist terminology as students delve deeper into the topic. Prior knowledge is deliberately interleaved into every lesson, developing the ability of students to bring multiple concepts together, and hence increasing resilience.

**Year 9** – Students develop their critical thinking, applying their knowledge to analyse problems and highlight, and suggest reasons for, misconceptions to further cement their understanding. Deliberate links to real world applications of Mathematics, further education and careers continue to be made, raising aspiration and ambition.

Unit	Title	Year 7	NC Statement	Year 8	NC Statement	Year 9	NC Statement
1	<b>Sequences</b>	Continuing a sequence or pattern. Introduction to famous sequences such as Fibonacci. Creating and describing sequences. Complete a table of values to show a sequence.	A14, A16	Be able to work out the nth term of increasing and decreasing sequences. Solve problems involving a given nth term. Recognise geometric sequence.	A14, A15, A16	Generate a quadratic sequence from an nth term. Plot graphs of quadratic functions. Identify turning points/intercepts and lines of symmetry.	A9, A14
	Prior Knowledge	KS2 (see MTP for detail)		7.1, 7.8, 7.9		7.1, 8.1, 7.8, 8.8, 7.11, 8.11, 7.13, 8.13	
	Tier 3 Vocabulary	Consecutive, Fibonacci, Generate, Preceding, Term		Arithmetic, Coefficient, Function, Progression, Successive		Constant, Parabola, Roots, Difference, Vertex	
2	<b>Types of Number</b>	Solve problems with prime, squares, cube numbers. Identify factors and multiples. Use powers and roots. Perform basic operations on a calculator.	N3, N6, N7	Write numbers as a product of prime factors in index form and know the unique factorisation property. Find the HCF and LCM of 2+ numbers.	N3, N7	Convert to and from numbers written in standard form. Solve calculations and problems involving standard form	N7, N8
	Prior Knowledge	KS2 (see MTP for detail), 7.1		7.1, 8.1, 7.2		7.2, 8.2, 7.4, 8.4	
	Tier 3 Vocabulary	Common, Exponent, Index, Irrational, Rational		Base, Composite, Decomposition, Product, Simultaneously		Evaluate, Expansive, Microscopic, Minuscule, Monumental	
3	<b>Addition and Subtraction</b>	Be able to add and subtract integers and decimals. Understand and use inequality notation, including on a number line. Find the perimeter of shapes made of rectangles, squares and triangles and compound shapes made up of these.	N1, N2	Understand how to perform addition and subtraction with negative numbers. Solve addition and subtraction problems with negative numbers. Understand and complete bank statements.	N4	Form expressions for perimeter by collecting positive and negative terms. Solve perimeter problems involving the addition and subtraction of fractions. Complete frequency trees.	A1, A4, G1
	Prior Knowledge	7.1, 7.2		7.3, 8.1		7.3, 8.3, 7.6, 8.6, 7.8, 8.8, 7.9, 8.9	
	Tier 3 Vocabulary	Ascend, Descend, Frequency, Inverse, Sufficient		Credit, Balance, Debit, Directed, Owe		Associative, Commutative, Deduce, Inverse, Optimise	
4	<b>Multiplication and Division</b>	Multiply and divide decimals by first multiplying by powers of 10 to create integers. Be able to use and convert between standard units and find the mean of a set of numbers. Use of the order of operations.	N4, N5, N12, R1, S1	Understand how to multiply and divide with negative numbers. Solve multiplication and division problems involving negative numbers.	N4	Convert between units of area. Convert between compound units and solve compound measure problems (speed, density, pressure). Draw and interpret distance time graphs	R1, 10, N12
	Prior Knowledge	7.1, 7.2, 7.3		7.1, 8.1, 7.2, 8.2, 7.3, 8.3, 7.4		7.1, 8.1, 9.1, 7.2, 8.2, 9.2, 7.3, 8.3, 9.3, 7.4, 8.4, 7.7, 8.7, 8.11	
	Tier 3 Vocabulary	Dividend, Divisor, Integer, Obelus, Quotient		Debt, Imaginary, Product, Rational, Real		Compound, Density, Gradient, Pressure, Rate	
5	<b>Rounding and Estimation</b>	Rounding numbers to the nearest 10, 100, 1000, integer and a given number of decimal places and significant figures	N13	Work our estimates for calculations by first rounding numbers to 1 significant figure. Include calculations where working with numbers between 0 and 1.	N13, N14	Find the Upper and Lower bounds and write Error Intervals of measurements and calculations.	N13, N14
	Prior Knowledge	7.3		7.3, 7.4, 7.5, 7.7		7.3, 9.3, 7.4, 9.4, 7.7, 8.7, 7.8	
	Tier 3 Vocabulary	Accuracy, Approximate, Convention, Significant, State		Component, Profit, Quote, Under/Overestimate		Bound, Dimension, Error, Interval, Mensuration	
6	<b>Fractions, Decimals and Percentages</b>	Convert between fractions, decimals and percentages. Be able to order fractions, decimals or percentages (or a combination of all 3). Add and subtract fractions. Create percentages and fractions from given information. Find percentages and fractions of amounts.	N2, N4, N10, N11, R3	Increase or decrease an amount by a given fraction or percentage, including with use of a multiplier. Be able to multiply and divide fractions, including integers and mixed numbers. Solve problems involving all four operations with fractions.	N4, R8	Calculate a percentage change and reverse percentage problems. Work with percentages greater than 100%. Solve repeated percentage increase/decrease, simple interest and compound interest/depreciation problems.	N10
	Prior Knowledge	7.2, 7.3, 7.4		7.2, 8.2, 7.3, 7.4, 7.6, 7.7, 7.16		7.2, 8.2, 7.3, 9.3, 8.4, 9.4	
	Tier 3 Vocabulary	Convert, Equivalent, Express, Multiplier, Recurring		Budget, Expenditure, Margin, Revenue, Turnover		Accumulate, Depreciate, Exponential, Interest, Salary	
7	<b>Area and Volume</b>	Be able to calculate the area of squares, rectangles, trapeziums, triangles and parallelograms, including compound shapes and questions where conversion between units is required.	G1, R1	Use and recall the formulae for area and circumference of a circle and area and perimeter of part circles. Include finding the area of compound shapes and other geometric problems involving circles.	A2, G2, R1	Be able to name prisms, draw nets of 3D shapes (identifying number of faces, edges and vertices). Calculate the surface area and volume of prisms. Carry out an investigation into Pythagoras' Theorem.	G1, G13, G14, G15
	Prior Knowledge	7.1, 7.2, 7.3, 7.4, 7.6		7.2, 8.2, 7.3, 7.4, 7.5, 8.5, 7.6, 8.6, 7.7, 7.8, 7.12		7.3, 9.3, 7.4, 9.4, 7.7, 8.7, 7.8, 8.8	
	Tier 3 Vocabulary	Compound, Enclosed, Parallel, Perpendicular, Region		Chord, Circumference, Diameter, Equidistant, Radius		Capacity, Hypotenuse, Occupy, Similar, Substitute	
8	<b>Algebraic Manipulation</b>	Ensure understanding of the words: equation, expression and formula. Substitute positive integers, decimals and fractions into an expression or formula. Collect like terms involving positive terms. Expand and simplify single brackets involving positive terms.	A1, A2, A3, A4	Collect like terms involving positive and negative terms. Substitute negative numbers into expressions. Expand and simplify brackets involving negative terms. Factorise a linear expression. Simplify algebraic expressions using the multiplication and division of integer powers. Include negative indices and coefficients.	A2, A4, A14	Expand and simplify double brackets. Factorise and solve quadratic expressions. Understand the difference of two squares.	A4, A9
	Prior Knowledge	7.1, 7.2, 7.3, 7.4, 7.6, 7.7		7.1, 8.1, 7.2, 8.2, 7.3, 8.3, 7.4, 8.4, 7.6, 8.6, 7.7, 7.9		7.1, 8.1, 9.1, 7.2, 8.2, 7.3, 8.3, 9.3, 7.4, 8.4, 7.8, 8.8, 7.9, 8.9, 7.11, 8.11	
	Tier 3 Vocabulary	Coefficient, Notation, Represent, Term, Variable		Expand, Factorise, Linear, Unknown, Variable		Algebraist, Binomial, Intercept, Solution, Trinomial	

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9	<b>Solving Equations</b>	Use of a function machine to generate an output. Understand inverse operations to create an input. Be able to create a formula/equation from a function machine and from worded problems, and then solve.	A6, A7, N6	Form and solve equations and inequalities involving fractions and brackets and equations involving unknowns on both sides. Rearrange a formula where the subject appears once.	A5, A6, A7, N6	Form and solve simultaneous linear equations through elimination and substitution. Include functions in other forms to $y = mx + c$ .	A5, A6, A7, N6
	Prior Knowledge	7.3, 7.4, 7.6, 7.7, 7.8		7.3, 8.3, 7.4, 8.4, 7.5, 8.5, 7.6, 7.7, 7.8, 8.8, 7.9, 7.12		7.3, 8.3, 9.3, 7.4, 8.4, 7.5, 8.5, 7.6, 7.8, 8.8, 9.8, 7.9, 8.9, 7.11, 8.11	
	Tier 3 Vocabulary	Formulate, Input, Linear, Output, Solve		Constant, Expression, Operation, Satisfy, Simplify		Balance, Elimination, Equilibrium, Homogeneous, Intersection	
10	<b>Ratio and Proportion</b>	Introduce ratio notation. Express a ratio as a fraction. Simplify a ratio to its simplest form. Be able to divide an amount into a given ratio. Express a ratio as 1:n or n:1.	R3, R4, R5	Recognise and solve problems that involve direct proportion, using the unitary method to solve. Solve Best Buy problems by finding the cost per unit mass, mass per unit cost or by scaling.	R6, R9, R10	Solve problems involving direct and inverse proportion algebraically by finding the constant of proportionality. Recognise graphs showing direct and inverse proportion.	R6, R7, R9
	Prior Knowledge	7.4, 7.6, 7.8		7.4, 7.6, 7.10		7.8, 8.8, 9.8, 7.9, 8.9, 9.9, 7.10, 8.10, 7.11, 8.11	
	Tier 3 Vocabulary	Antecedent, Consequent, Express, Part, Quantity		Cost, Unit, Multiplicative, Scale, Unitary		Asymptote, Proportionality, Growth, Origin, Reciprocal	
11	<b>Coordinates and Graphs</b>	Be able to plot co-ordinates in each of the 4 quadrants. Solve worded problems in a variety of contexts. Plot graphs of linear functions when given complete or incomplete tables of values.	A8, A9	Work with the equation of a line. Calculate the gradient of a line, identify the y intercept and write the equation in the form $y = mx + c$ .	A9, A11	Find the equation of a line from one given coordinate pair and the equation of a parallel line. Solve a pair of simultaneous equations by identifying their point of intersection. Interpret and use conversion graphs.	A12
	Prior Knowledge	7.1, 7.4, 7.6, 7.7, 7.8		7.1, 8.1, 7.3, 8.3, 7.4, 8.4, 7.7, 7.8, 7.9, 8.9, 7.11		7.1, 8.1, 7.3, 8.3, 7.4, 8.4, 9.4, 7.6, 7.8, 8.8, 7.9, 8.9, 9.9, 9.10, 8.11	
	Tier 3 Vocabulary	Axes, Euclidean, Horizontal, Linear, Vertical		Cartesian, Function, Gradient, Parameter, Rate		Analyse, Intersect, Parallel, Rearrange, Solution	
12	<b>Angles</b>	Form and solve equations applying the angle facts of angles at a point, on a straight line and in a right angle. Prove that intersecting angles are equal use the angle facts of angles in parallel lines. Form and solve equations involving angles in triangles.	G6, G10, G11, G12	Apply known angle facts to find interior angle sum of quadrilaterals and other polygons. Find interior and exterior angles of regular and irregular polygons. Use bearings to describe position and draw given bearings.	G7, G12	Recall finding missing sides using Pythagoras. Find missing angles and side lengths in right angled triangles by using trigonometry. Know exact values of sin, cos and tan for 30, 45, 60 and 90 degrees.	G14
	Prior Knowledge	7.3, 7.7, 7.9		7.7, 7.9, 8.9, 7.12, 7.14		7.5, 8.5, 9.5, 7.6, 9.7, 7.9, 8.9, 7.12, 8.12	
	Tier Three Vocabulary	Alternate, Complementary, Corresponding, Supplementary, Transversal		Concave, Convex, Exterior, Interior, Tessellation		Cosine, Identity, Sine, Tangent, Trigonometric	
13	<b>Transformations</b>	Identify lines of symmetry of a 2D shape and the order of rotational symmetry. Reflect shapes in horizontal and vertical mirror lines, including where the equation of these lines are given. Reflect shapes in diagonal mirror lines.	G8	Transform shapes by translation using column vectors. Rotate shapes using a centre of rotation. Describe a given translation or rotation.	G8	Enlarge shapes using a scale factor, both integer and fractional, from a centre of enlargement. Link enlargement and similarity, to identify the effects on side length and angle size.	R2, G9, G13
	Prior Knowledge	7.11, 7.12		7.11, 7.12, 8.12, 7.13		7.4, 7.6, 9.10, 7.11, 7.12, 8.12, 9.12, 7.13, 8.13	
	Tier 3 Vocabulary	Equidistant, Image, Plane, Reflective, Symmetric		Active, Passive, Centre, Congruent, Translational		Factor, Proportional, Scale, Similar, Vertex	
14	<b>Constructions</b>	Use a straight edge and compass to construct: midpoint of a line, perpendicular bisector, perpendicular from point to a line and angle bisector	G4	Accurately use shape notation (parallel, identifying lines of symmetry, equal sized lines and angles). Accurately draw triangles using a protractor and compass. Draw a locus for a given rule.	G6, G9	Use SSS, SAS, ASA and RHS properties to prove the congruence of triangles. Solve practical problems involving scale drawings and loci.	R2, G3, G6, G9
	Prior Knowledge	7.7, 7.12		7.7, 7.12, 8.12, 7.14		7.7, 7.12, 8.12, 9.12, 9.13, 7.14, 8.14	
	Tier 3 Vocabulary	Arc, Bisect, Construct, Locate, Midpoint		Equiangular, Isosceles, Regular, Scalene, Edge		Condition, Equivalence, Isometry, Locus, Satisfy,	
15	<b>Probability</b>	Understand and use the probability scale, using appropriate language. Calculate the probability of a single event.	P1, P2	Can list possible outcomes of combined events. Interpret and complete sample space diagrams and two-way tables to calculate probabilities.	P4	Populate and interpret Venn diagrams. Understand and use set notation. Use Venn diagrams to solve probability problems.	P3
	Prior Knowledge	7.3, 7.4, 7.6		7.2, 8.2, 7.3, 7.4, 7.6, 7.15		7.2, 8.2, 7.3, 7.4, 7.6, 7.15, 8.15	
	Tier 3 Vocabulary	Bias, Chance, Event, Random, Trial		Combination, Permutation, Space, Sample, Systematic		Enumerate, Population, Set, Union, Universal	
16	<b>Statistics</b>	Interpret and draw tally charts, grouped frequency tables, pictograms and bar charts. Calculate the mean, median, mode and range of a set of data. Determine the most appropriate average to use.	S1, S2	Interpret and draw line graphs. Calculate averages from a frequency table. Identify the modal and median classes from a grouped frequency table. Work out an estimate for the mean.	S1, S2	Interpret and draw scatter graphs, being able to identify outliers. Interpret and draw pie charts.	S2, S3
	Prior Knowledge	7.3, 7.4, 7.6, 7.11		7.3, 7.4, 7.6, 7.11, 8.11, 7.16		7.4, 7.6, 7.11, 8.11, 9.11, 7.12, 7.14, 8.14, 9.14, 7.16, 8.16	
	Tier 3 Vocabulary	Analysis, Tendency, Frequency, Numerical, Spread		Bimodal, Class, Intermediate, Midpoint, Modal		Causation, Correlation, Deviation, Outlier, Variance	