Mathematics, Year 8, Long Term Plan

Week/ Lesson	Term	Topic	Knowledge	Skill
1 Lesson	Autumn T1	Reteach Lesson Year 7 - Algebra 1		
Unit 1 Lessons 1+2		Number Unit 1.1 Calculations	● apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals) ● recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); use conventional notation for priority of operations, including brackets, powers, roots and reciprocals ● 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	● Use written methods to add and subtract more than two numbers (including decimals). ● Use mental calculation for multiplication. ● Estimate answers to calculations.
Lessons 3+4		Unit 1.2 Divisibility and Division		● Know and use divisibility rules. ● Use a written method to divide decimal numbers by integers.
Lessons 5+6		Unit 1.3 Calculating with Negative Numbers		● Add, subtract, multiply and divide positive and negative numbers, including larger numbers and decimals.
Lessons 7+8		Unit 1.4 Powers and Roots		● Calculate using squares, square roots, cubes and cube roots. ● Give integers that a square root lies between
Lessons 9+10		Unit 1.5 Powers, Roots and Brackets		● Calculate combinations of squares, square roots, cubes, cube roots and brackets ● Use a calculator to check answers.
Lessons 11+12		Unit 1.6 More Powers, Multiples and Roots		● Use index notation ● Write a number as a product of its prime factors ● Use prime factor decomposition to find the HCF and LCM

			product notation and the unique factorisation theorem ● use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5; estimate powers and roots of any given positive number. .	
Unit 2 Lesson 1		Area and Volume Unit 2.1 Area of a Triangle	● identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres ● construct and interpret plans and elevations of 3D shapes ● use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.) ● know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders)	● Derive and use the formula for the area of a triangle ● Calculate the area of compound shapes made from rectangles and triangles
Lesson 2		Unit 2.2 Area of a Parallelogram and Trapezium		● Derive and use the formula for the area of a parallelogram ● Use the formula for the area of a trapezium
Lessons 3+4		Unit 2.3 Volume of Cubes and Cuboids		● Calculate the volume of cubes and cuboids. ● Calculate the volume of 3D solids made from cuboids ● Solve volume problems
Lessons 5+6		Unit 2.4 2D representations of 3D solids		● Sketch nets of 3D solids ● Draw 3D solids on isometric paper ● Draw plans and elevations of 3D solids
Lessons 7+8		Unit 2.5 Surface Area of Cubes and Cuboids		● Calculate the surface area of cubes and cuboids

Lessons 9+10		Unit 2.6 Measures		● Solve problems in everyday contexts involving measures ● Convert between different measures for area, volume and capacity ● Use tonnes and hectares ● Know rough metric equivalents of imperial measures.
2 Lessons		END OF TERM ASSESSMENT AND FEEDBACK		
1 Lesson	**Autumn T2**	**Reteach Lesson** Year 7: Geometry and Measures 2		
Unit 3 Lesson 1		**Statistics, Graphs and Charts** Unit 3.1 Pie Charts	● interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate use ● interpret, analyse and compare the distributions of data sets from univariate empirical distributions through: ● appropriate graphical representation involving discrete, continuous and grouped data, including box plots ● appropriate measures of central tendency (median, mean, mode and modal class) and	● Interpret pie charts ● Calculate angles and draw pie charts.
Lessons 2+3		Unit 3.2 Using tables		● Use two-way tables ● Calculate the mean from a frequency table. ● Use tables for grouped data, find modal class and estimate range.
Lesson 4		Unit 3.3 Stem and Leaf Diagrams		● Draw and interpret stem and leaf diagrams with different stem values. ● Find mode, median and range from stem and leaf diagrams
Lessons 5+6		Unit 3.4 Comparing Data		● Compare two sets of data using averages and range ● Compare two sets of data using the shape of a line graph or pie charts. ● Draw line graphs to compare two sets of data ● Choose the most appropriate average to use

Lesson 7		Unit 3.5 Scatter Graphs	spread (range, including consideration of outliers, quartiles and interquartile range) ● apply statistics to describe a population ● 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 while knowing the dangers of so doing	● Draw scatter graphs ● Describe types of correlation ● Draw a line of best fit on a scatter graph.
Lesson 8		Unit 3.6 Misleading Graphs		● Interpret graphs and charts ● Explain why a graph or chart could be misleading
Unit 4 Lesson 1		**Expressions and Equations** Unit 4.1 Algebraic Powers	● use and interpret algebraic manipulation, including: ● ab in place of a × b ● 3y in place of y + y + y and 3 × y ● a^2 in place of a × a, a^3 in place of a × a × a, a^2b in place of a × a × b ● a/b in place of a ÷ b ● coefficients written as fractions rather than as decimals ● brackets ● substitute numerical values into formulae and expressions, including scientific formulae ● understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors ● simplify and manipulate algebraic expressions (including	● Understand and simplify algebraic powers ● Write and use expressions involving powers
Lessons 2+3		Unit 4.2 Expressions and Brackets		● Expand brackets. ● Write and simplify algebraic expressions and formulae using brackets and division
Lesson 4		Unit 4.3 Factorising Expressions		● Factorise expressions
Lessons 5+6		Unit 4.4 One Step Equations		● Find the inverse of a simple function ● Write and solve one-step equations using function machines. .
Lesson 7		Unit 4.5 Two Step Equations		● Solve two-step equations using function machines ● Solve problems using equations
Lesson 8		Unit 4.6 The Balancing Method		● Solve equations using the balancing method

			those involving surds and algebraic fractions) by: ● collecting like terms ● multiplying a single term over a bracket ● taking out common factors ● expanding products of two or more binomials ● factorising quadratic expressions of the form x^2+bx+c , including the difference of two squares; factorising quadratic expressions of the form ax^2+bx+c ● simplifying expressions involving sums, products and powers, including the laws of indices ● understand and use standard mathematical formulae; rearrange formulae to change the subject ● 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 and proofs ● where appropriate, interpret simple expressions as functions with inputs and outputs; ; interpret the reverse process as the 'inverse function'; interpret the succession of two functions as a 'composite function' (the use	

			of formal function notation is expected) ● solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation); find approximate solutions using a graph	
2 Lessons			Review, consolidate and Extend	
2 Lessons			END OF TERM ASSESSMENT AND FEEDBACK	
1 Lesson	Spring T1	**Reteach Lesson** Year 8: Unit 1 Number		
Unit 5 Lesson 1		**Real-life graphs** **5.1 Conversion graphs**	● identify and interpret gradients and intercepts of linear functions graphically and algebraically ● plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration	● Use and interpret conversion graphs. ● Plot conversion graphs from a table of data
Lesson 2		**5.2 Distance-time graphs**		● Interpret distance-time graphs. ● Plot distance-time graphs from descriptive text. ● Draw and use graphs to solve distance-time problems.
Lesson 3		**5.3 Line graphs**		● Plot line graphs from tables of data ● Interpret line graphs.
Lesson 4		**5.4 More line graphs**		● Draw and interpret line graphs and identify trends.
Lessons 5+6		**5.5 Real-life graphs**		● Draw and interpret linear and non-linear graphs from a range of sources
Lesson 7		**5.6 Curved graphs**		● Draw and interpret curved graphs from a range of sources
		Reteach Lesson: Year 8 Unit 2: Area and Perimeter		

Unit 6 Lessons 1+2		**Decimals and ratio** **6.1 Ordering decimals and rounding**	● order positive and negative integers, decimals and fractions; use the symbols =, ≠, <, >, ≤, ≥ ● apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals) ● round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures); use inequality notation to specify simple error intervals due to truncation or rounding ● 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, concentrations)	● Round decimals to two or three decimal places. ● Round numbers to a given number of significant figures ● Round numbers to an appropriate degree of accuracy ● Order decimals of any size, including positive and negative decimals
Lessons 3+4		**6.2 Place-value calculations**		● Multiply large numbers. Multiply decimals with up to and including two decimal places. ● Multiply any number by 0.1 and 0.01.
Lessons 5+6		**6.3 Calculations with decimals**		● Divide by 0.1 and 0.01. ● Multiply and divide by decimals. ● Solve problems involving decimals and all four operations.
Lessons 7+8		**6.4 Ratio and proportion with decimals**		● Divide a quantity into three or more parts in a given ratio ● Use ratios involving decimals ● Solve ratio and proportion problems involving decimals. ● Use unit ratios
2 Lessons		Review, consolidate and extend		
2 Lessons		END OF TERM ASSESSMENT AND FEEDBACK		

Unit 7 Lesson 1	**Spring T2**	**Lines and angles** **7.1 Quadrilaterals**	● 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; 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) ● derive and apply the properties and definitions of special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language	● Classify quadrilaterals by their geometric properties. ● Solve geometric problems using side and angle properties of special quadrilaterals.
Lesson 2		**7.2 Alternate angles and proof**		● Identify alternate angles on a diagram ● Understand proofs of angle facts.
Lesson 3		**7.3 Angles in parallel lines**		● Identify corresponding angles. ● Solve problems using properties of angles in parallel and intersecting lines.
Lesson 4		**7.4 Exterior and interior angles**		● Calculate the sum of the interior and exterior angles of a polygon. ● Work out the sizes of interior and exterior angles of a polygon.
Lesson 5		**7.5 Solving geometric problems**		● Solve geometrical problems showing reasoning ● Solve problems involving angles by setting up equations
1 Lesson		Review, consolidate and extend		
2 Lessons		END OF TERM ASSESSMENT AND FEEDBACK		
2 Lessons		**Review** Consolidation of Previous Units		
1 Lesson	**Summer T1**	**Reteach Lessons** Year 8 Unit 3: Statistics, Graphs and Charts		
Unit 8 Lesson 1		**Calculating with fractions** 8.1 Calculating with fractions	● order positive and negative integers, decimals and fractions; use the number line as a model	● Identify fractions as more than 1/2 or less than ½ ● Order fractions

Lesson 2		8.2 Adding and subtracting fractions	for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ ● interpret and compare numbers in standard form $A * 10n$ 1≤A<10, where n is a positive or negative integer or zero	● Add and subtract fractions with any size denominator
Lesson 3		8.3 Multiplying fractions		● Multiply integers and fractions by a fraction ● Use appropriate methods for multiplying fractions
Lesson 4		8.4 Dividing fractions		● Find the reciprocal of a number ● Divide integers and fractions by a fraction ● Use strategies for dividing fractions
Lesson 5		8.5 Calculating with mixed numbers		● Write a mixed number as an improper fraction ● Use the four operations with mixed numbers
1 Lesson		**Reteach Lessons** Year 8: Unit 4: Expressions and Equations		
Unit 9 Lessons 1+2		**Straight Line Graphs** 9.1 Direct proportion on graphs	● plot graphs of equations that correspond to straight-line graphs in the coordinate plane; use the form y = mx + c to identify parallel and perpendicular lines; find the equation of the line through two given points, or through one point with a given gradient ● identify and interpret gradients and intercepts of linear functions graphically and algebraically ● solve problems involving direct and inverse proportion, including graphical and algebraic representations ● use compound units such as speed, rates of pay, unit pricing, density and pressure	● Recognise when values are in direct proportion with or without a graph ● Plot graphs and read values to solve problems
Lessons 3+4		9.2 Gradients		● Plot a straight-line graph and work out its gradient
Lessons 5+6		9.3 Equations of straight lines		● Plot the graphs of linear equations ● Write the equations of straight-line graphs in the form $y = mx + c$

			● compare lengths, areas and volumes using ratio notation; make links to similarity (including trigonometric ratios) and scale factors	
2 Lessons		Check, strengthen & extend		
2 Lessons		END OF TERM ASSESSMENT AND FEEDBACK		
1 Lesson	**Summer T2**	**Reteach Lesson** Year 8: Unit 4: Lines and Angles		
Unit 10 Lesson 1		**Percentages, decimals & fractions** 10.1 Fractions and decimals	● order positive and negative integers, decimals and fractions; use the symbols =, ≠, <, >, ≤, ≥ ● work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8); change recurring decimals into their corresponding fractions and vice versa ● interpret fractions and percentages as operators. ● define percentage as 'number of parts per hundred'; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; ● express one quantity as a percentage of another; compare two quantities using percentages; work with percentages greater	● Change time to decimal hours ● Recall equivalent fractions and decimals ● Recognise recurring and terminating decimals ● Order fractions by converting them to decimals or equivalent fractions
Lessons 2+3		10.2 Equivalent proportions		● Recall equivalent fractions, decimals and percentages ● Use different methods to find equivalent fractions, decimals and percentages ● Use the equivalence of fractions, decimals and percentages to compare two proportions
Lessons 4+5		10.3 Writing percentages		● Express one number as a percentage of another when the units are different ● Work out an amount increased or decreased by a percentage ● Use mental strategies to solve percentage problems
Lessons 6+7		10.4 Percentages of amounts		● Use a multiplier to calculate amounts increased or decreased by a percentage

			than 100%; solve problems involving percentage change, including percentage increase/decrease and original value problems, and simple interest including in financial mathematics	● Use the unitary method to solve percentage problems
1 Lesson		Check, strengthen & extend		
2 Lessons		END OF TERM ASSESSMENT AND FEEDBACK		
3 Lessons		REVISION FOR END OF YEAR ASSESSMENT		
3 Lessons		END OF YEAR ASSESSMENT AND FEEDBACK		