

Mathematics Y8 Grammar, Set 1 and 2

Term	1		2		3		4		5		6			
Topic	Number 1	Number 2	Geometry	Statistics	Algebra	Ratio and Proportion	Algebra	Geometry	Ratio and Proportion	Algebra	Geometry	Algebra	Statistics	
Detail	Investigate and use prime factorisation to find the HCF and LCM of 2 or more numbers. Estimate calculations by rounding to a specific degree of accuracy. Explore the links between ordinary numbers and standard form.	Consolidate use of all four operations including with decimals, negative numbers, powers and roots.	Investigate and apply the circumference and area of a circle, extending to finding the volume of a prism including cylinders.	Understand the meaning of probability, explore experiments and outcomes, develop an understanding of probability.	Develop the use of algebra to explore the multiplying term, factoring an expression, simplifying expressions, using the laws of indices and algebraic substitution.	Explore connections between and incorporate a link to algebraic notation for sequences.	Explore angles in parallel lines and regular polygons.	Develop use of percentages in a variety of situations including finance.	Solve linear equations up to unknown on both sides and those with brackets and set in a context.	Explore linear equations up to unknown on both sides and those with brackets and set in a context.	Explore envelopes, representation of 3D shapes, bearings and scale diagrams. Students will need pencil, ruler, rubber, protractor, coloured pencils or pens	Explore graphs. Looking at gradients, y-intercepts, linear, quadratic and real life graphs.	Develop knowledge of averages, representing data and comparing data sets.	
Mastered	Interpret, analyse and generate strategies to solve problems concerning prime factorisation, estimation and standard form.	Interpret, analyse and generate strategies to solve problems with all four operations, negative numbers, powers, roots and decimals.	Interpret, analyse and generate strategies to use and solve problems involving area and circumference of a circle and volume of a prism.	Interpret, analyse and generate strategies to solve problems concerning probability.	Interpret, analyse and generate strategies to solve problems using multiplying algebraic notation, factoring an expression, collecting like terms, the laws of indices, algebraic substitution and changing the subject of a formula.	Interpret, analyse and generate strategies to use and solve problems involving sequences and the nth term.	Interpret, analyse and generate strategies to use and solve problems concerning angles in a variety of situations.	Interpret, analyse and generate strategies to use and solve problems with percentages.	Interpret, analyse and generate strategies to use and solve problems using linear equations.	Interpret, analyse and generate strategies to use and solve problems concerning enlargement, representation of 3D shapes, scale diagrams and bearings.	Interpret, analyse and generate strategies to use and solve problems containing linear, quadratic, distance-time and speed-time graphs.	Interpret, analyse and generate strategies to find averages, statistical representation to use and compare data sets.		
Secure	Recall, use, select and apply the knowledge of prime factorisation, estimation and standard form.	Recall, use, select and apply the knowledge of all four operations, negative numbers, powers, roots and decimals.	Recall, use, select and apply the knowledge of circumference of a circle and volume of a prism.	Recall, use, select and apply the knowledge of probability.	Recall, use, select and apply the knowledge of multiplying algebraic notation, factoring an expression, collecting like terms, the laws of indices, algebraic substitution and changing the subject of a formula.	Recall, use, select and apply the knowledge of sequences and the nth term.	Recall, use, select and apply the knowledge of angles in a variety of situations.	Recall, use, select and apply the knowledge of linear equations.	Recall, use, select and apply the knowledge of linear equations.	Recall, use, select and apply the knowledge of enlargement, representation of 3D shapes, scale diagrams and bearings.	Recall, use, select and apply the knowledge of linear, quadratic, distance-time and speed-time graphs.	Recall, use, select and apply the knowledge of averages, statistical representation to use and compare data sets.		
Developing	Use Venn diagrams and prime factorisation to find the HCF and LCM. Round to significant figures. Estimate calculations. Convert between ordinary numbers (big and small) and standard form.	Use BIDMAS with powers and roots. Round to significant figures. Estimate calculations. Multiplying and dividing with decimals. Converting between ordinary numbers (big and small) and standard form.	Calculate the radius or circumference of a circle when the circumference is known. Calculate the perimeter of composite shapes that include sectors of circles. Calculate the radius and diameter of a circle when the area is known. Calculate the area of composite shapes that include sectors of a circle. Find the volume of a cylinder.	Work out theoretical vs experimental probability for events. Know the probabilities for all outcomes is 1.	Factorise an expression by taking out common factors. Know and use the laws of indices - understand about the power zero and that negative powers can arise. Substitution into common scientific formulae. Change the subject of a formula when two steps are required.	Write a decimal or a fraction as a percentage. Identify proportion and fractions fluently in situations involving simple interest.	Find the position to term rule for a given sequence using algebra. Use the nth term of a sequence to make conclusions about a sequence.	Establish the size of an interior angle in a regular polygon. Solve angle chase problems with parallel lines.	Solve to find the original value when working with percentages. Solve financial problems involving simple interest. Solve problems that require exact calculation by using fractions.	Solve linear equations (can include brackets) with the unknown on both sides when the solution can be a negative integer or fraction. Recognise that the point of intersection of two graphs corresponds to the solution of a connected equation. Create and solve equations using perimeter, area and properties of 2D shapes and angles.	Describe and draw enlargements with a negative scale factor. Interpret plans and elevations. Create and interpret a scale diagram. Draw bearings.	Distinguish between a linear and quadratic graph. Plot graphs of quadratic functions in the form of $y = a(x-h)^2 + c$. Sketch a simple quadratic graph. Plot and interpret graphs of piece-wise linear functions in real life contexts. Plot and interpret distance-time graphs or speed-time graphs. Find approximate solutions to non-linear equations.	Use theoretical and experimental probability to calculate expected outcomes. Draw and interpret histograms, with equal class intervals, for grouped data. (Frequency diagrams) Plot and interpret line diagrams of bivariate data. Draw and use lines of best fit on a scatter diagram. Find the modal class, class containing the median and an estimate for the range and mean of a set of grouped data.	
Emerging	Recall factors, multiples, prime numbers, prime factors and prime factor decomposition. Rounding to decimal places. Multiply and divide by powers of 10. Use a calculator with standard form.	Recall factors, multiples, prime numbers, prime factors and prime factor decomposition. Rounding to decimal places. Multiply and divide by powers of 10. Use a calculator with standard form.	Know the vocabulary of circles. Find a connection between the circumference and diameter of a circle. Calculate the circumference of a circle. Calculate the area of a circle. Know and use the formulae for finding the area of a prism.	Know and use the vocabulary of probability. Understand the use of the 0-1 scale to measure probability. Find all the outcomes for an experiment which identifies the probabilities of the outcome.	Simplify algebraic notation by multiplying. Simplify an expression involving terms with combinations of variables e.g. $3a^2b + 4ab^2 + 2a^2b + 5b^2$ Substitute positive and negative numbers into formulae. Know the meaning of the subject of a formula and change the subject of a formula when one step is required.	Convert a fraction to a decimal terminating or recurring. Write a decimal as a fraction. Convert a fraction to a decimal by using. Use a calculator to change any decimal fraction to any decimal. Identify a ratio in a real life context, write a ratio to describe a situation. Understand the meaning of compound units.	Generate a sequence from term to term rule. Understand the meaning of a position to term rule. Use a position to term rule to generate a sequence.	Identify alternate and corresponding angles. Know the total of the exterior angles in any polygon and use this to solve the exterior angle of a regular polygon.	Find the percentage of an amount. Identify the multiplier for a percentage increase or decrease including when the percentage is greater than 100%. Use a calculator to increase an amount by a percentage greater than 100%.	Solve linear equations with the unknown on one side, when the solution can be a negative integer or fraction. Use substitution to solve solutions to linear equations.	Describe and draw enlargements with positive and fractional scale factors. Draw plans and elevations. Measure and state bearings.	Plot graphs of functions of the form $y = mx + c$. Understand the concept of and find the gradient of a straight line. Find the y-intercept of a straight line. Use the gradient to solve an intercept to sketch a linear graph.	Use Venn diagrams to find the elements of a set and their probabilities. List outcomes of an event systematically by using sample space diagrams and find probabilities. Explore different types of data. Collect, tabulate and construct a grouped frequency table. Know the different types of correlation in a scatter diagram. Find the mode, median and range from a frequency table of discrete data. Find the mean of a set of data and use the mean to find a missing number in a set of data.	
Keywords	Prime factor, prime factorisation, product, Venn diagram, Highest Common Factor, Lowest Common Multiple, standard form, significant figure	Negative number, directed number, operation, PI, using multiplication, division, power, index (index), roots	Circle, centre, radius, diameter, chord, circumference, PI, arcs, cross-section, cylinder, polygon, polyhedron, solid (index), nets	Probability, theoretical probability, even, outcome, impossible, unlikely, even, chance, likely, certain, equally likely, mutually exclusive, exhaustive, possibility space, experiment	Product, variables, term, coefficient, probability, fraction, factors, power, index, formula, formulae, subject, change the subject	Fraction, mixed number, improper fraction, power, percentage change, original amount, multiplier, simple interest, exact	Sequence, linear, term, difference, term-to-term rule, recursive, term-to-term rule, according, descending	Angles, right angle, acute, obtuse, reflex, vertically opposite, geometry, geometric, parallel, alternate angles, corresponding angle, interior angle, exterior angle, regular polygon	Simplify, cancel, lowest terms, percent, percentage, percentage change, original amount, multiplier, simple interest, exact	Algebra, algebraic, algebraically unknown, results, operations, solve, solution, subset, graph, symbol, intersection	Similar, similarity, enlarge, enlargement, scaling, scale factor, linear, coordinate geometry, y-intercept, substitution, gradient, symbol, object, image, scale drawing, bearing, plan, elevation	Plot, equation, function, formula, linear, coordinate geometry, y-intercept, substitution, gradient, symbol, object, image, scale drawing, bearing, plan, elevation	Outcome, event, experiment, combined experiment, frequency tree, numeral, set, Venn diagram, probability, sample space, equally likely outcomes, theoretical probability, random, bias, fairness, relative frequency, data, categorical data, discrete data, continuous data, grouped data, table, frequency table, frequency histogram, scale, graph, axis, area, scatter graph, scatter diagram, bivariate data, linear correlation, positive correlation, negative correlation, average, spread, consistency, mean, median, mode, range, statistics, approximately, round, calculate an estimate, grouped frequency, midpoint	

Resource Links	Like the number 5040, when writing prime factorisations	KM: Summing up	KM: Circle connections, Circle connections v2	KM: Probability scale and likelihood version	KM: Missing powers	KM: FDP conversion, Templates for taking notes	KM: Spreadsheet sequences	KM: Alternate and corresponding angles	KM: Stick on the Maths: Proportional reasoning	KM: Solving equations	KM: Outdoor Leisure 1.1	KM: Plotting graphs	KM: Sample spaces	
	KM: Ben Nevis	KM: Developing negatives	KM: Circle circumference, Circle problems	KM: Probability loop cards	KM: Laws of indices. Some useful questions	KM: Fraction sort Tasks one and two only	KM: Generating parallels	KM: Paraphrasing parallels	KM: Stick on the Maths: Multiplicative methods	KM: Stick on the Maths: Constructing and solving equations	KM: Airports and hillsides	KM: Matching graphs	KM: Race game	
	KM: Astronomical numbers	KM: Sorting calculations	KM: Circumference searching	KM: Dice and spinners interactive	KM: Maths to Infinity: Indices	KM: Maths to Infinity: Indices	KM: Brackets and sequences	KM: Investigating polygons	KM: Percentage identifying	NRICH: Think of Two Numbers	KM: Plans and elevations	KM: Autograph 1	KM: Stick on the Maths L4HD3	
	KM: Interesting standard form	KM: Maths to Infinity: Directed numbers	KM: Maths to Infinity: Area and Volume	KM: Scientific substitution (Note that page 2 is hard)	NRICH: Temperature	KM: Proportion for real	KM: Stick on the Maths: Linear sequences	KM: Stick on the Maths: corresponding angles	NRICH: One or both	NRICH: Antiques roadshow	KM: Transformation template	KM: Autograph 2	NRICH: Prize Giving (frequency trees)	
	KM: Powers of ten	Standards Unit: No Evaluating directed number statements	KM: Stick on the Maths: Circumference and area of a circle				KM: Stick on the Maths: Linear sequences	KM: Stick on the Maths: Geometrical problems		KM: Enlargement 1	KM: The hare and the tortoise	Get Mike's 'sumo' counter game by using gmail: al.walsh@bt.com or al.walsh@bt.com	KM: Gathering data	
	KM: Maths to Infinity: Standard form	NRICH: Working with directed numbers	KM: Stick on the Maths: Right prisms				KM: Investigating proportionality	NRICH: Charlie's beautiful machine	KM: Stick on the Maths: Geometrical problems		KM: Enlargement 2		KM: Spreadsheet statistics	
	Powers of ten film (external site)		NRICH: Blue and White				NRICH: In proportion	NRICH: A little light thinking	NRICH: Raty		Use investigating transformations http://www.investigatingtransformations.co.uk/			KM: Spreadsheet statistics
	The scale of the universe animation		NRICH: Efficient Cutting				NRICH: Ratio or proportion?	NRICH: Go forth and generalise			KM: Solid problems (plans and elevations)			KM: Stick on the Maths HD2: Selecting and constructing graphs and charts
			NRICH: Cola Can				NRICH: Roasting old chestnuts 3				KM: Stick on the Maths: plans and elevations			KM: Stick on the Maths HD3: Working with grouped data
							Standards Unit: NG Developing proportional reasoning			Webquest: Building houses	NRICH: Who's the fastest of them all?			KM: Swillans