

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 fractions, negative numbers, powers and roots.	Explore enlargement, representation of 3D shapes, bearings and scale diagrams. Students will need pencil, ruler, rubber, protractor, coloured pencils or pens.	Understand the meaning of probability, explore experiments and outcomes, develop an understanding of probability	Develop the use of algebra to incorporate multiplying term, factoring an expression, simplifying expressions, using the laws of indices and algebraic substitution	Explore connections between fractions, decimals, percentages, ratio, proportion and how they can be applied to compound units.	Investigate sequences 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.	Investigate and apply the circumference and area of a circle, extending this to find the volume of a prism including cylinders.	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, with motion 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 solve problems concerning enlargement, representation of 3D shapes, scale diagrams and bearings.	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 compound units.	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 involving area and circumference of a circle and volume of a prism.	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, decide which 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 3D shapes, scale diagrams and bearings.	Recall, use, select and apply the knowledge of probability for all outcomes.	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 compound units.	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 area and circumference of a circle and volume of a prism.	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 and comparison of 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 of BIDMAS with powers and roots. Substituting negative numbers into expressions. Multiplying and dividing with decimals. Using multiplication with short division including with decimals.	Describe and draw polygons with a negative scale factor. Enlargement and rotation. Draw bearings. Draw diagrams.	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. Substitute into common scientific formulae. Change the subject of a formula when two steps are required.	Write a decimal or a fraction as a sequence using algebra. Identify proportion and fractions fluently in situations involving simple interest. Know the connection between speed, distance and time.	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. Recognise that the point of intersection of two graphs corresponds to the solution of a connected equation. Create and solve equations using part, inter, area and perimeter of a shape and angles.	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. Calculate the area of compound shapes that include sections of a circle. Find the volume of a cylinder.	Calculate the radius or diameter of a circle when the circumference is known. Calculate the perimeter of compound shapes that include sections of a circle. Calculate the radius and diameter of a circle when the area is known. Calculate the area of compound shapes that include sections of a circle. Find the volume of a cylinder.	Distinguish between a linear and quadratic graph. Plot graphs of quadratic functions in the form of $y = x^2 + c$. 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 diagram) Plot and interpret scatter 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 and use all decimals, all four operations with positive and negative numbers, powers and roots. Multiplying and dividing with powers of 10. Use a calculator with standard form.	Describe and draw polygons with a negative scale factor. Draw plans and elevations. Measure and state bearings.	Know and use the vocabulary of probability. Understand the use of the 0-1 scale to measure probability. List all the outcomes for an experiment which identifies the probabilities of the outcomes.	Simplify algebraic notation by multiplying. Simplify an expression involving terms with combinations of variables. eg. $3a^2b + 4ab^2 + 2a^2b + 3b^2$ 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 and identify if a fraction is terminating or recurring. Write a decimal as a fraction. Convert a fraction to a decimal by using a calculator to change any decimal fraction to a decimal 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 find 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 check solutions to linear equations.	Know the vocabulary of circles. Find a connection between the circumference and diameter of a circle. Calculate the circumference of a circle when either the radius or diameter is known. Use the gradient of a straight line. Use the gradient and y-intercept to sketch a linear graph.	Use Venn diagrams to list the elements of a set and their probabilities. List outcomes of an event systematically by using sample space diagrams and find probabilities. Use frequency trees to record outcome of probability experiments and make conclusions. Explore different types of data. Collect data to 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	1	2	3	4	5	6							
Keywords	Prime, prime factor, prime factorisation, product, Venn diagram, Highest Common Factor, lowest common multiple, standard form, significant figure	Negative number, directed number, operation, inverse, using multiplication, short division, power, index (index), use	Similar, similar, enlarge, enlargement, scaling, scale factor, magnification, object, image, scale drawing, bearing, plan, elevation	Probability, theoretical probability, even, outcome, possible, unlikely, even, chance, likely, certain, equally likely, mutually exclusive, exhaustive, possibility space, experiment	Product, variable, term, coefficient, probability, factor, factors, power, index, formula, formulae, subject, change the subject	Fraction, mixed number, how many, fraction, power, percentage, ratio, proportion, simplifying, cancelling, speed, distance, time, compound units, multiplier, unitary method, unit	Sequence, linear, term, difference, term-to-term rule, formula, term-to-term rule, according, ascending	Angles, right angle, acute, obtuse, reflex, vertically opposite, angles, 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, brackets, operations, solve, solution, bracket, symbol, substitution, graph, point of intersection	Circle, centre, radius, diameter, chord, circumference, Pi, perimeter, area, sector, circular, polygon, polygonal, solid	Plot, equation, function, formula, linear, coordinate plane, graph, y-intercept, substitution, gradient, slope, piece-wise linear, model, intercept, speed, distance, time	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, axis, 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	1	2	3	4	5	6		
Resource Links	<p>Like the number 5040, when writing prime factorisations</p> <p>KM: Ben Nevis</p> <p>KM: Astronomical numbers</p> <p>KM: Interesting standard form</p> <p>KM: Powers of ten</p> <p>KM: Maths to Infinity: Standard form</p> <p>Powers of ten film (external site)</p> <p>The scale of the universe animation</p>	<p>KM: Summing up</p> <p>KM: Developing negatives</p> <p>KM: Sorting calculations</p> <p>KM: Maths to Infinity: Directed numbers</p> <p>Standards Unit: No Evaluating directed</p> <p>NRICH: Working with directed numbers</p> <p>IM: Investigating Fractions from 0 to 1</p> <p>Answers to multiplication and division: Dynamic</p> <p>KM: Solid problems (films and elevations)</p> <p>KM: Stick on the Maths: Plans and elevations</p> <p>Web/Wip applet: Building houses</p> <p>NRICH: Who's the tallest of them all?</p>	<p>IM: Probability scale and likelihood version</p> <p>KM: Missing powers</p> <p>KM: Laws of indices. Some useful questions.</p> <p>NRICH: Dice and spinners interactive</p> <p>KM: Scientific substitution. (Note that page 2 is hard)</p> <p>NRICH: Temperature</p> <p>KM: Proportion for real</p> <p>KM: Investigating proportionality</p> <p>NRICH: In proportion</p> <p>NRICH: Ratio or proportion?</p> <p>NRICH: Roasting old chestnuts 3</p> <p>Standards Unit: NG Developing proportional reasoning</p>	<p>KM: FDP conversion. Templates for taking notes.</p> <p>KM: Fraction sort. Tasks one and two only.</p> <p>KM: Maths to Infinity: Fractions, decimals and percentages</p> <p>NRICH: Matching</p> <p>KM: Stick on the Maths: Linear sequences</p> <p>KM: Investigating proportionality</p> <p>NRICH: Charlie's delicious machine</p> <p>NRICH: A little light thinking</p> <p>NRICH: Ratio or proportion?</p> <p>NRICH: Roasting old chestnuts 3</p> <p>Standards Unit: NG Developing proportional reasoning</p>	<p>KM: Alternate and corresponding angles</p> <p>KM: Generating parallels</p> <p>KM: Investigating polygons</p> <p>KM: Maths to Infinity: Lines and angles</p> <p>KM: Stick on the Maths: Corresponding angles</p> <p>NRICH: Charlie's delicious machine</p> <p>NRICH: Raty</p> <p>NRICH: Go forth and generalise</p> <p>Standards Unit: NG Developing proportional reasoning</p>	<p>KM: Solving equations</p> <p>IM: Stick on the Maths: Constructing and solving equations</p> <p>NRICH: Think of Two Numbers</p> <p>NRICH: One or both</p> <p>NRICH: Antiques roadshow</p> <p>NRICH: Blue and White</p> <p>NRICH: Efficient Cutting</p> <p>NRICH: Cola Can</p>	<p>IM: Circle connections, Circle connections v2</p> <p>IM: Circle circumference, Circle problems</p> <p>KM: Matching graphs</p> <p>KM: Autograph 1</p> <p>KM: Autograph 2</p> <p>KM: The hare and the tortoise</p> <p>KM: Stick on the Maths: Path graphs</p> <p>NRICH: Blue and White</p> <p>NRICH: Efficient Cutting</p> <p>NRICH: Cola Can</p>	<p>KM: Sample spaces</p> <p>KM: Race game</p> <p>KM: Stick on the Maths L4HD3</p> <p>NRICH: Prize Giving (frequency trees)</p> <p>IM: Make a 'sumo' / sumo game by using multipl</p> <p>KM: Gathering data</p> <p>AM: Spreadsheet statistics</p> <p>KM: Stick on the Maths HD2: Selecting and constructing graphs and charts</p> <p>KM: Stick on the Maths HD3: Working with grouped data</p> <p>KM: Swillans</p> <p>KM: Lottery project</p> <p>NRICH: Half a Minute</p>