

# Mathematics Y8 set 4

Term	1			2		3		4			5		6					
Topic	Number 1	Number 2	Number 3	Geometry 1	Geometry 2	Algebra 1	Number 4	Ratio and Proportion 1	Algebra 2	Ratio and Proportion 2	Geometry 3	Number 5	Algebra 3	Geometry 4	Number 6	Algebra 4	Geometry 5	Statistics 1
<b>Detail</b>	Understand place value with integers, decimals and negative numbers.	Identify and use factors, multiples and prime numbers.	Consolidation of methods for addition, subtraction, multiplication and division.	Properties of 2D and 3D shapes including measuring and constructing diagrams. <b>Students will need a pencil, ruler, and protractor.</b>	Identify and use the angle sums of any polygon.	Substitute numbers into a given or created worded formula.	Understand and use fractions, decimals and percentages and their equivalents.	Explore how scale factors are used in a variety of contexts.	Investigate and describe linear number sequences.	Convert between a variety of units of measurement.	Discover and use angle facts with reasoning, to find missing angles.	Accurately perform arithmetic with fractions and percentages of an amount.	Introduction into formal use and solving of algebraic expressions in number problems.	Explore perimeter and area of 2D shapes and volume of some 3D shapes.	Understand rounding to a specific degree and use this skill to estimate calculations.	Accurately plot and describe coordinates in all four quadrants.	Perform and describe reflections and translations on a coordinate grid.	Construct and interpret line graphs and pie charts.
<b>Mastered</b>	Interpret, analyse and generalise strategies to solve problems concerning place value.	Interpret, analyse and generalise strategies to solve problems concerning factors, multiples, prime numbers, HCF, LCM and prime factor decomposition.	Interpret, analyse and generalise strategies to solve problems concerning addition, subtraction, multiplication and division. Perform long division accurately.	Interpret, analyse and generalise strategies to solve problems concerning properties of 2D and 3D shapes plus accurate measuring and construction.	Interpret, analyse and generalise strategies to solve problems concerning angles in any polygon.	Interpret, analyse and generalise strategies to solve problems given a written or simple algebraic formula.	Interpret, analyse and generalise strategies to use and solve problems given with integers, scale factors and ratio.	Interpret, analyse and generalise strategies to use and solve problems given number sequences.	Interpret, analyse and generalise strategies to use and solve problems when converting between units of measurement.	Interpret, analyse and generalise strategies to use and solve problems in angle diagrams.	Interpret, analyse and generalise strategies to use and solve problems containing arithmetic of fractions or using percentages to make comparisons.	Interpret, analyse and generalise strategies to use and solve problems involving area and perimeter of 2D shapes or volume of a cuboid.	Interpret, analyse and generalise strategies to solve problems involving coordinates.	Interpret, analyse and generalise strategies to solve problems involving translations and reflections.	Interpret, analyse and generalise strategies to solve problems involving pie charts and/or line graphs.	Interpret, analyse and generalise strategies to solve problems involving frequencies to work out angles for a pie chart, where frequency is a factor of 360°.		
<b>Secure</b>	Recall, use, select and apply the knowledge of place value effectively.	Recall, use, select and apply the knowledge of factors, multiples, prime numbers, HCF and LCM effectively.	Recall, use, select and apply the knowledge of addition, subtraction, multiplication and division. Solve multi-step problems involving any of the four operations.	Draw accurate nets for common 3D shapes. Define special triangles and quadrilaterals. Recall, use, select and apply the knowledge of the properties of shapes and angles.	Recall, use, select and apply the knowledge of angle sums of any polygon.	Recall, use, select and apply the knowledge of substitution into written formulae and create formulae using symbols to represent variables.	Recall, use, select and apply the knowledge of fractions, decimals and percentage equivalents. Find the percentage equivalence of any fraction.	Recall, use, select and apply the knowledge of linear number sequences.	Recall, use, select and apply the knowledge of converting between units of measurement.	Recall, use, select and apply the knowledge of basic algebra in angle diagrams.	Recall, use, select and apply the knowledge of basic algebra in number problems.	Recall, use, select and apply the knowledge of area and perimeter of 2D shapes or volume of a cuboid.	Recall, use, select and apply the knowledge of rounding and estimating.	Recall, use, select and apply the knowledge of translations and reflections.	Recall, use, select and apply the knowledge of frequencies to construct a pie chart or a line graph.			
<b>Developing</b>	Multiply and divide numbers up to 3 decimal places by 10, 100 and 1000. Add and subtract using positive and negative numbers.	Decompose a number and a digit into a product of its prime factors. Identify the Highest Common Factor or Lowest Common Multiple of two or more numbers.	Accurately perform long multiplication up to 4 digits x 4 digits. Accurately perform short division. Divide up to a 4 digit number by a two digit number. Apply the order of operations (BIDMAS) correctly.	Construct and measure angles up to 360° accurately using a protractor. Use a variety of different shapes. Find all the angles in a cube. Classify 2D shapes using given categories. A number of sides, lines of symmetry.	Recall and use the angle sum of a quadrilateral. Use angle properties of special triangles and quadrilaterals.	Substitute numbers into a two-step word formula written in words. Use symbols to represent variables and create a formula from given information.	Compare fractions by finding equivalent fractions. Recall the conversion of some fractions into decimal fractions. E.g. 1/2, 1/4, 1/10 etc.	Recognise enlargement and identify the scale factor. Solve problems involving similar shapes using scale factors or when written as a ratio.	Generate a linear sequence from its description. Find a number sequence and find a missing term.	Convert between adjacent metric units e.g. mm, cm, m, km and vice versa. Convert between imperial units.	Identify and use vertically opposite angles. Use known facts to find missing angles.	Add and subtract fractions with equivalent fractions. Multiply fractions. Divide fractions. Multiplying by a decimal by a decimal. Use decimal or fraction equivalents to find a percentage of an amount.	Find solutions to using number problems with 'no answer', 'solve using missing number problems expressed algebraically.	Find the area of a parallelogram. Find and use the area of a triangle. Find the volume of a cuboid using $V = lwh$ .	Approximate any number to a specified degree of accuracy nearest 20, 50, specific decimal place. Understand estimating as the process of finding a rough value of an answer or calculation by rounding to one significant figure.	Solve problems involving coordinates.	Describe a translation. Describe a reflection which uses one of the axes as a mirror line.	Use a table of frequencies to work out angles for a pie chart, where frequency is a factor of 360°.
<b>Emerging</b>	Identify and understand place value in numbers up to 3 decimal places. Multiply and divide whole numbers by 10, 100 and 1000.	Identify and define a factor, multiple and prime number. Identify the common factor or lowest common multiple of two or more numbers.	Accurately perform column multiplication up to 4 digits x 4 digits. Accurately perform short division. Divide up to a 4 digit number by a two digit number.	Construct and measure angles up to 360° accurately using a protractor. Use the mathematical language to describe 2D and 3D shapes. Construct 3D shapes from their nets.	Find and use the angle sum of a triangle and a straight line.	Recognise a simple formula written in words. Substitute numbers into a one-step formula written in words. Understand that a fraction is a way of representing division. Recall standard fraction/decimal/percentage equivalences (e.g. 10%, 25%, 50%, 75% etc).	Write a fraction in its simplest form. Find equivalent fractions. Compare fractions by drawing diagrams and using fraction walls. Understand that a fraction is a way of representing division. Recall standard fraction/decimal/percentage equivalences (e.g. 10%, 25%, 50%, 75% etc).	Solve problems involving scale factors including real life questions. Explore enlargement using scale factors.	Recognise a linear sequence using mathematical language and find the next term.	Convert between adjacent metric units e.g. mm, cm, m, km and vice versa (using length, mass and capacity).	Identify and use angles that meet at a point. Identify and use angles that meet at a point on a line.	Converts between mixed numbers and top heavy fractions. Add and subtract fractions with the same denominators. Find equivalent fractions. (step from Term 3). Multiplying by a decimal. Finding a percentage of an amount using non calculator methods (up to multiples of 10).	Solve using number problems expressed in words. Recall the basics of algebraic notation.	Find perimeters of different 2D shapes. Recognise that shapes with the same area can have different perimeters and vice versa. Estimate the volume of a cuboid using appropriate units. Find the volume of a cuboid by counting cubes.	Approximate any number by rounding (up to 1,000,000).	Plot coordinates in all four quadrants. Describe coordinates in all four quadrants.	Perform a translation. Perform a reflection using one of the axes as a mirror line.	Read values from a line graph. Understand that pie charts are used to show proportion. Draw and measure angles in a pie chart.

Keywords																		
Place value, digit, negative, decimal, increase, decrease	Multiple, factor, common, divisible, prime number, composite number	Addition, subtraction sum, total, difference, minus, less, column addition, column subtraction, operation, multiply, multiplication, times, product, commutative, short multiplication, long multiplication, estimate, division, long division, remainder, quotient, dividend, divisor	Protractor, measure, nearest, centimetre, kilometre, cube, cuboid, composite, irregular, square, equilateral, isosceles, scalene, trapezium, kite, rhombus, delta, pentagon, hexagon, octagon, nonagon, decagon, dodecagon, polygon, interior, exterior, angle	Formulae, formulae, expression, variable, substitute	Fraction, improper fraction, proper fraction, vulgar fraction, top heavy fraction, percentage, decimal, proportion, simplify, equivalent, lowest terms division	Proportion, quantity, integer, similar, enlargement, scale factor, group, share, multiples	Pattern, sequence, linear, term, ascending, descending	Unit, kilometre, metric, imperial, millimetre, centimetre, metre, litre, millilitre, milligram, gram, kilogram, length, distance, volume, capacity, tonne, hour, minute, second, inch, foot, yard, pound, ounce, pint, gallon	Angle, degrees, right angle, acute angle, obtuse angle, reflex angle, protractor, vertically opposite	Mixed number, equivalent fraction, simplify, cancel, lowest terms, proper fraction, improper fraction, top heavy fraction, numerator, denominator, percent, percentage	Algebra, algebraic, algebraically, symbol, expression, variable, substitute, equation, unknown, enumerate	Perimeter, area, volume, capacity, square, rectangle, parallelogram, triangle, composite, rectilinear, polygon, cube, cuboid, millimetre, centimetre, metre, kilometre, square millimetre, square centimetre, square metre, cubic centimetre, cubic metre, formulae, formulae, convert, length, breadth, width, height, depth	Approximate, round, decimal place, check, solution, answer, estimate, accurate, accuracy	2-D, grid, axis, axes, x-axis, y-axis, origin, quadrant, Cartesian coordinate, bar chart, bar graph, pie chart, sector, angle, protractor, degree, maximum, minimum	2-D, grid, axis, axes, x-axis, y-axis, origin, quadrant, Cartesian coordinate, point, translation, reflection, object, image, congruent, congruence	Table, scale, axis, axis, graph, frequency, time graph, line graph, line chart, bar chart, degree, maximum, minimum	Table, scale, axis, axis, graph, frequency, time graph, line graph, line chart, bar chart, degree, maximum, minimum	Table, scale, axis, axis, graph, frequency, time graph, line graph, line chart, bar chart, degree, maximum, minimum

Resource Links																		
<p><a href="#">KM: Maths to Infinity - Directed numbers</a></p> <p><a href="#">KM: Reading and writing</a></p> <p><a href="#">KM: Use Powers of ten to demonstrate connections</a></p> <p><a href="#">KM: Exploring primes activities - Eratosthenes sieve to 12 by 12 grid</a></p> <p><a href="#">KM: The Moon of View</a></p> <p><a href="#">NRICH: Round and round the circle</a></p> <p><a href="#">NRICH: Counting cogs</a></p>	<p><a href="#">NRICH: Factor-multiple chains</a></p> <p><a href="#">KM: Extend the idea of Eratosthenes' sieve to a 12 by 12 grid</a></p> <p><a href="#">KM: Exploring primes activities - Eratosthenes sieve</a></p> <p><a href="#">NRICH: The Moon of View</a></p> <p><a href="#">NRICH: Round and round the circle</a></p> <p><a href="#">NRICH: Counting cogs</a></p>	<p><a href="#">KM: Long multiplication template</a></p> <p><a href="#">KM: Maximise, minimise - Adapt ideas to fit learning intentions.</a></p> <p><a href="#">KM: Maths to Infinity - Complements</a></p> <p><a href="#">KM: Maths to Infinity - Multiplying and dividing</a></p> <p><a href="#">NRICH: Become Maths Detectives</a></p> <p><a href="#">NRICH: Exploring number patterns you make</a></p> <p><a href="#">NRICH: Reach 100</a></p> <p><a href="#">KM: Dividing (lots)</a></p> <p><a href="#">KM: Maths to Infinity - Multiplying and dividing</a></p> <p><a href="#">KM: Interactive long division</a></p> <p><a href="#">KM: Interactive target boards</a></p> <p><a href="#">KM: Shape work - Many of the activities are suitable for this unit.</a></p> <p><a href="#">NRICH: Quadrilaterals</a></p> <p><a href="#">KM: 6 point circles, 8 point circles and 12 point circles can be used to support and extend the above idea</a></p> <p><a href="#">NRICH: Where Are They?</a></p>	<p><a href="#">KM: Visualising 3D shapes</a></p> <p><a href="#">KM: Tessellating Tess</a></p> <p><a href="#">KM: Fibonacci's disappearing squares</a></p> <p><a href="#">KM: Unravelling dice</a></p> <p><a href="#">KM: Investigate 'Platonic Solids'</a></p> <p><a href="#">NRICH: Making spirals</a></p> <p><a href="#">NRICH: Cut nets</a></p> <p><a href="#">NRICH: Making cuboids</a></p> <p><a href="#">KM: Investigate 'Tessellations'</a></p> <p><a href="#">KM: Investigate exploring Pi (ratio of the circumference to the diameter)</a></p> <p><a href="#">KM: Shape work - Many of the activities are suitable for this unit.</a></p> <p><a href="#">NRICH: Quadrilaterals</a></p>	<p><a href="#">KM: Investigating polygons - Tasks one and two.</a></p> <p><a href="#">KM: Special polygons</a></p> <p><a href="#">NRICH: Round a Hexagon</a></p> <p><a href="#">NRICH: Quadrilaterals</a></p> <p><a href="#">KM: 6 point circles, 8 point circles and 12 point circles can be used to support and extend the above idea</a></p>	<p><a href="#">NCEM: Year 6 Algebra Activities A and D.</a></p> <p><a href="#">KM: FDP conversion</a></p> <p><a href="#">KM: Carpets</a></p> <p><a href="#">KM: Fraction and decimal tables</a></p> <p><a href="#">NRICH: Matching fractions</a></p> <p><a href="#">NRICH: Fractions made faster</a></p>	<p><a href="#">KM: Proportional reasoning tables</a></p> <p><a href="#">NRICH: Orange Drink</a></p> <p><a href="#">NRICH: Pumpkin Pie Problem</a></p> <p><a href="#">NRICH: Jumping</a></p> <p><a href="#">NCEM: Activity Set A</a></p> <p><a href="#">NCEM: Activity Set B</a></p> <p><a href="#">NCEM: Activity Set C</a></p> <p><a href="#">NCEM: Activity Set D</a></p>	<p><a href="#">KM: Maths to Infinity - Sequences</a></p> <p><a href="#">NRICH: Times Tables Shifts</a></p> <p><a href="#">NRICH: Domino Sets</a></p> <p><a href="#">NCEM: Activity B - Sticky Triangles</a></p> <p><a href="#">NCEM: Activity D - Generating Sequences</a></p>	<p><a href="#">KM: Fascinating Food</a></p> <p><a href="#">KM: Weighing up the options</a></p> <p><a href="#">NRICH: Place Your Orders</a></p> <p><a href="#">NRICH: Thousands and Millions</a></p> <p><a href="#">NCEM: Activity F - A little bit of history - Marco Polo</a></p>	<p><a href="#">KM: Maths to Infinity - Lines and Angles</a></p> <p><a href="#">NRICH: Fractions Jigsaw</a></p> <p><a href="#">NRICH: Peaches Today, Peaches Tomorrow</a></p> <p><a href="#">NRICH: Andy's Marbles</a></p> <p><a href="#">NRICH: Would you rather?</a></p>	<p><a href="#">KM: Combinations of variables</a></p> <p><a href="#">NRICH: Plenty of Pens</a></p> <p><a href="#">NRICH: Your Number...!</a></p> <p><a href="#">NRICH: Number Pyramids</a></p> <p><a href="#">NCEM: Activity A - Racketball and Design a board game</a></p> <p><a href="#">NCEM: Activity E - Matchbox Algebra</a></p>	<p><a href="#">KM: Checking, approximating, estimating</a></p> <p><a href="#">KM: Stick on the Maths - CALC: Checking results</a></p> <p><a href="#">NRICH: Maths to Infinity - Rounding</a></p> <p><a href="#">KM: Alfred and the prize money</a></p> <p><a href="#">NRICH: Four Go</a></p> <p><a href="#">NCEM: Activity A11</a></p> <p><a href="#">NCEM: Activity G</a></p>	<p><a href="#">KM: Stick on the Maths - ALG7: Coordinates in four quadrants</a></p> <p><a href="#">NRICH: Cops and Robbers</a></p> <p><a href="#">NRICH: Eight Hidden Squares</a></p> <p><a href="#">NRICH: Coordinate Tan</a></p>	<p><a href="#">NRICH: Transformation Tease</a></p> <p><a href="#">NCEM: Activity B - Battleships</a></p> <p><a href="#">NRICH: Matching the Matches</a></p> <p><a href="#">NCEM: A little bit of history (Britain since 1945)</a></p>	<p><a href="#">KM: Stick on the Maths - HD6: Graphs and diagrams</a></p> <p><a href="#">NRICH: Graphing Number Patterns</a></p> <p><a href="#">NCEM: A little bit of history (Britain since 1945)</a></p>				