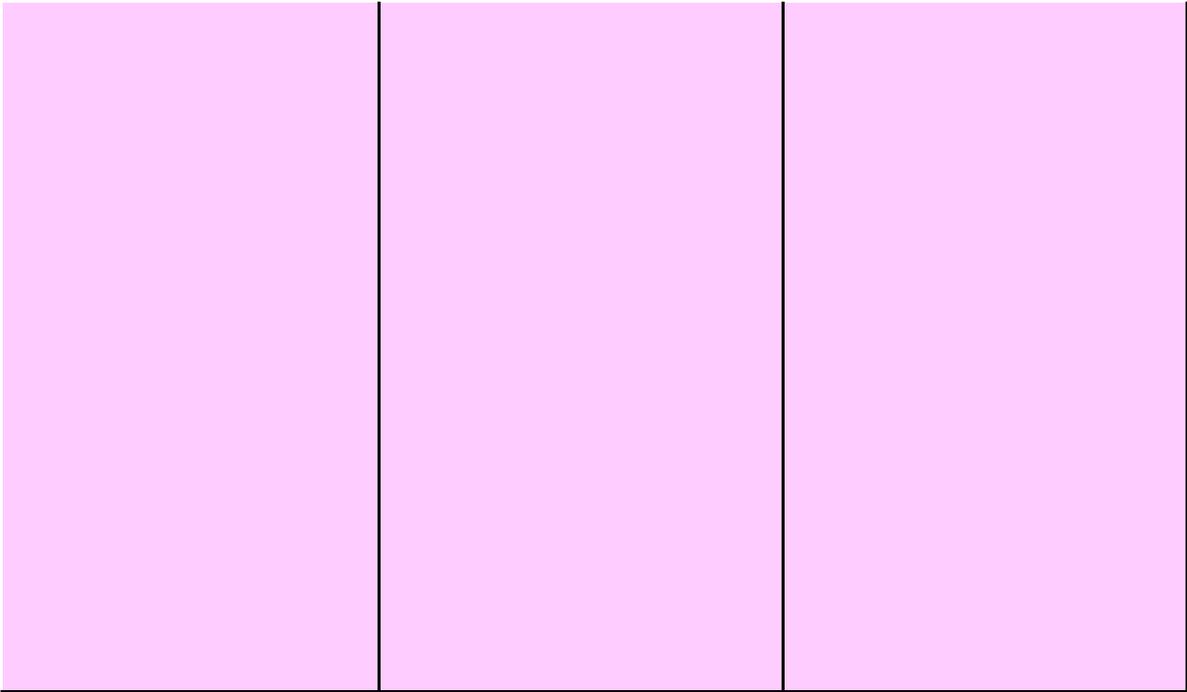


Maths Y7

Term	1	
Topic	Number 1	Number 2
Detail	Identify and use factors, multiples, prime numbers, powers and roots.	Ordering and comparing integers (positive and negative), fractions (including fractions greater than 1) and decimals
Mastered	Interpret, analyse and generate strategies to solve problems concerning factors, multiples, prime numbers, HCF, LCM and prime factor decomposition	Interpret, analyse and generate strategies to solve problems concerning the ordering and comparison of integers, fractions and decimals
Secure	Recall, use, select and apply the knowledge of factors, multiples, prime numbers, HCF and LCM effectively	Recall, use, select and apply the knowledge of ordering and comparing integers, fractions and decimals. Order a mix of fractions and decimals including positive, negative and fractions greater than 1.
Developing	Decompose a number and express it as a product of its prime factors. Identify the Highest Common Factor or Lowest Common Multiple of two or more numbers.	Order a mix of fractions, decimals including negative numbers. Use inequality symbols correctly.
Emerging	Identify and define a factor, multiple and prime number. Identify the common factors or multiples of two or more numbers. Understand powers. Identify square and cube numbers.	Order positive and negative integers including decimals.

Keywords	Multiple, factor, common, divisible, prime number, composite number, power, index, exponent, root, cube, square	Positive number, negative number, integer, numerator, denominator, inequality, greater than, less than, equal
-----------------	---	---

R e s o u r c e L i n k s	NRICH: Factor-multiple chains	KM: Farey Sequences
	KM: Extend the idea of Eratosthenes' sieve to a 12 by 12 grid	KM: Decimal ordering cards 2
	KM: Exploring primes activities: Artistic Eratosthenes sieve	KM: Maths to Infinity: Fractions, decimals and percentages
	NRICH: The Moons of Vuvv	KM: Maths to Infinity: Directed numbers
	NRICH: Round and round the circle	NRICH: Greater than or less than?
	NRICH: Counting cogs	
	KM: Exploring primes activities: Factors of square numbers; Mersenne primes; LCM sequence; n^2 and $(n + 1)^2$; n^2 and $n^2 + n$; $n^2 + 1$; $n! + 1$; $n! - 1$; $x^2 + x + 41$	
	KM: Use the method of Eratosthenes' sieve to identify prime numbers, but on a grid 6 across by 17 down instead. What do you notice?	
	KM: Square number puzzle	
	KM: History and Culture: Goldbach's Conjectures	
	NRICH: Factors and multiples	
	NRICH: Powers and roots	



Career Opportunities	<u>Why Maths Matters</u>	<u>Cyber Security</u>

		2			
Number 3		Geometry 1		Algebra 1	
Consolidation of methods for addition, subtraction, multiplication and division		Construct and develop properties of 2D and 3D shapes Students will require a pencil, rubber, ruler, protractor and pair of compasses		Introduction to algebra, using algebra notation and substitution into a variety of functional representations.	
Interpret, analyse and generate strategies to solve problems concerning addition, subtraction, multiplication and division Perform long division accurately.		Interpret, analyse and generate strategies to solve problems concerning properties of 2D and 3D shapes.		Interpret, analyse and generate strategies to solve problems in an algebraic format.	
Recall, use, select and apply the knowledge of addition, subtraction, multiplication and division Solve multiple-step problems involving any of the four operations. Multiplication of decimal numbers. Division by a decimal		Recall, use, select and apply the knowledge of properties of 2D and 3D shapes Draw accurate nets for common 3D shapes Define special triangles and quadrilaterals. Construct other shapes using a ruler, protractor and/or a pair of compasses.		Recall, use, select and apply the knowledge of algebraic notation.	
Accurately perform long multiplication up to 4 digits x 2 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 triangles with a ruler, protractor and/or a pair of compasses. Classify 3D shapes by key vocabulary. Visualise a 3D shape from its net.		Substitute positive numbers into expressions and formulae. Multiply a single term over a bracket. Given a function, establish inputs from given outputs. Use a mapping diagram/expression to represent a function.	
Accurately perform column addition and subtraction Recall times tables up to 12 x 12 Perform short division accurately up to dividing a 3 digit number by a single digit		Identify faces, edges and vertices of any 3D shape. Know and identify parallel and perpendicular lines and use the correct notation. Understand regular polygons have line and rotation symmetry Use mathematical language to describe 2D and 3D shapes.		Know the meaning of expression, term, formula, equation and function. Understand and use basic algebraic notation . Use letters to represent variables and identify terms in an expression. Given a function, establish outputs from given inputs.	

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, operation, inverse	protractor, measure, nearest, construct, sketch, cube, cuboid, cylinder, pyramid, prism, net, edge, face, vertex (vertices), visualise, quadrilateral, square, rectangle, parallelogram, trapezium, kite, rhombus, delta, arrowhead, triangle, scalene, isosceles, equilateral, circle, radius, diameter, circumference, centre, parallel, diagonal	Algebra, expression, term, formula (formulae), equation, function, variable, mapping diagram, input, output, represent, substitute, evaluate, like terms, simplify, collect
--	---	---

KM: Long multiplication template	KM: Visualising 3D shapes	KM: Pairs in squares. Prove the results algebraically.
KM: Dividing (lots)	KM: Tessellating Tess	KM: Algebra rules
KM: Interactive long division	KM: Fibonacci's disappearing squares	KM: Use number patterns to develop the multiplying out of brackets
KM: Misplaced points	KM: Unravelling dice	KM: Algebra ordering cards
KM: Maths to Infinity: Multiplying	KM: Investigate 'Platonic Solids'	KM: Spiders and snakes. See the 'clouding the picture' approach
NRICH: Cinema Problem	NRICH: Making spirals	KM: Maths to Infinity: Brackets
NRICH: Funny factorisation	NRICH: Cut nets	NRICH: Your number is ...
NRICH: Skeleton	NRICH: Making cuboids	NRICH: Crossed ends
NRICH: Long multiplication	KM: Investigate 'Tessellations'	NRICH: Number pyramids and More number pyramids
	KM: Investigate exploring Pi (ratio of the circumference to the diameter)	
	KM: Shape work: Many of the activities are suitable for this unit.	
	NRICH: Quadrilaterals	
	KM: 6 point circles, 8 point circles and 12 point circles can be used to support and extend the above idea	
	NRICH: Where Are They?	

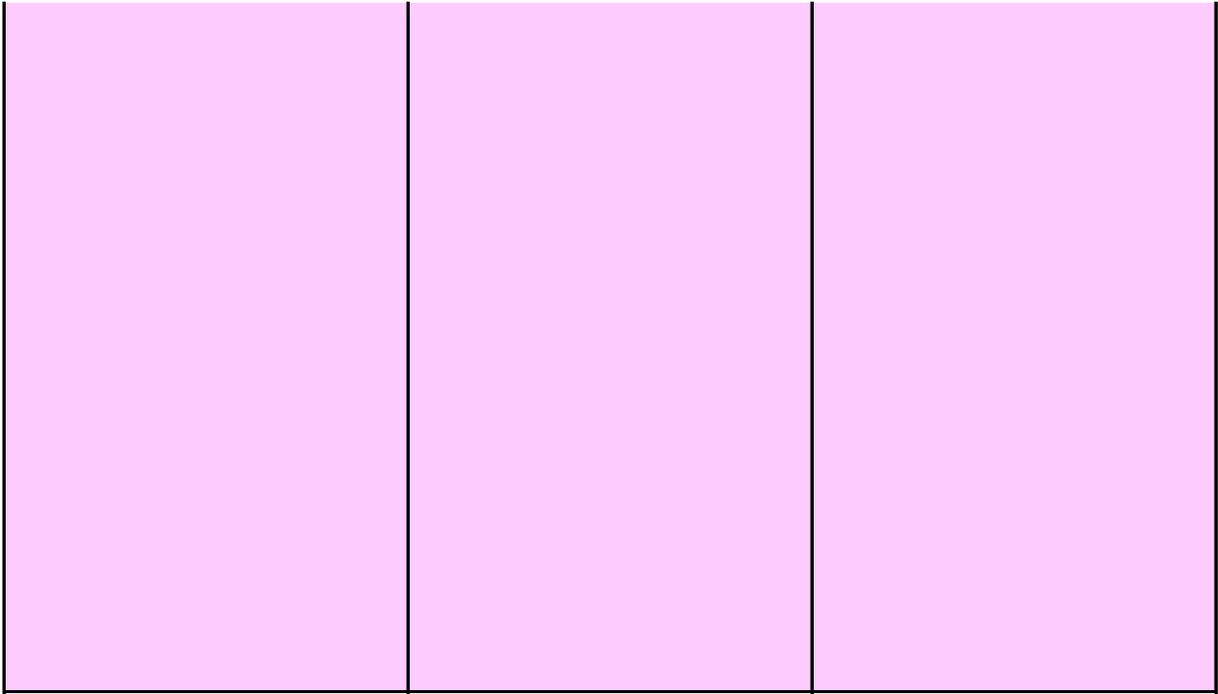
	KM: Shape work (selected activities)	
	KM: Rotational symmetry	
	NRICH: Notes on a triangle	
	KM: Euler's formula	
	KM: Visualising 3D shapes	
	KM: Dotty activities: Shapes on dotty paper	
	KM: What's special about quadrilaterals? Constructing quadrilaterals from diagonals and summarising results.	
	KM: Investigating polygons. Tasks one and two should be carried out with irregular polygons.	
	NRICH: Property chart	
	NRICH: Quadrilaterals game	

Security Engineers	Cyber Security Analyst	Accountancy
------------------------------------	--	-----------------------------

3		
Number 4	Ratio and Proportion 1	Algebra 2
Understanding the connection between fractions and percentages between quantities.	Understand, describe and use a ratio	Describe and use rules for sequences.
Interpret, analyse and generate strategies to solve problems involving comparing fractions and percentages.	Interpret, analyse and generate strategies to solve problems involving ratio	Interpret, analyse and generate strategies to solve problems involving sequences.
Recall, use, select and apply the knowledge of fractions and percentages	Recall, use, select and apply the knowledge of ratio	Recall, use, select and apply the knowledge of sequences.
Express one quantity as a fraction of another. Write a quantity as a percentage of another.	Find a unit ratio e.g. 1 : n Divide a ratio into two parts.	Use a term to term rule to generate a linear/non-linear sequence
Write a fraction in its simplest form. Convert between mixed numbers and top-heavy fractions. Understand percentage and write a percentage as a fraction in its simplest form.	Describe a ratio in the correct notation. State a ratio of measurements in the same units. Simplify a ratio to its lowest terms and also	Find the term to term rule for any sequence including non-numerical sequences.

fractions, improper fraction, proper fraction, vulgar fractions, top-heavy fraction, percentage, proportion	ratio, proportion, compare, comparison, part, simplify, common factor, cancel, lowest terms, unit	pattern, sequence, linear, term, term-to-term rule, ascending, descending
---	---	---

KM: Crazy cancelling, silly simplifying	KM: Division in a ratio and checking spreadsheet	KM: Maths to Infinity: Sequences
NRICH: Rod fractions	KM: Maths to Infinity: FDPRP	KM: Growing patterns
	KM: Stick on the Maths: Ratio and proportion	NRICH: Shifting times tables
Learning review	NRICH: Toad in the hole	NRICH: Odds and evens and more evens
KM: 7M3 BAM Task	NRICH: Mixing lemonade	
	NRICH: Food chains	
	NRICH: Tray bake	

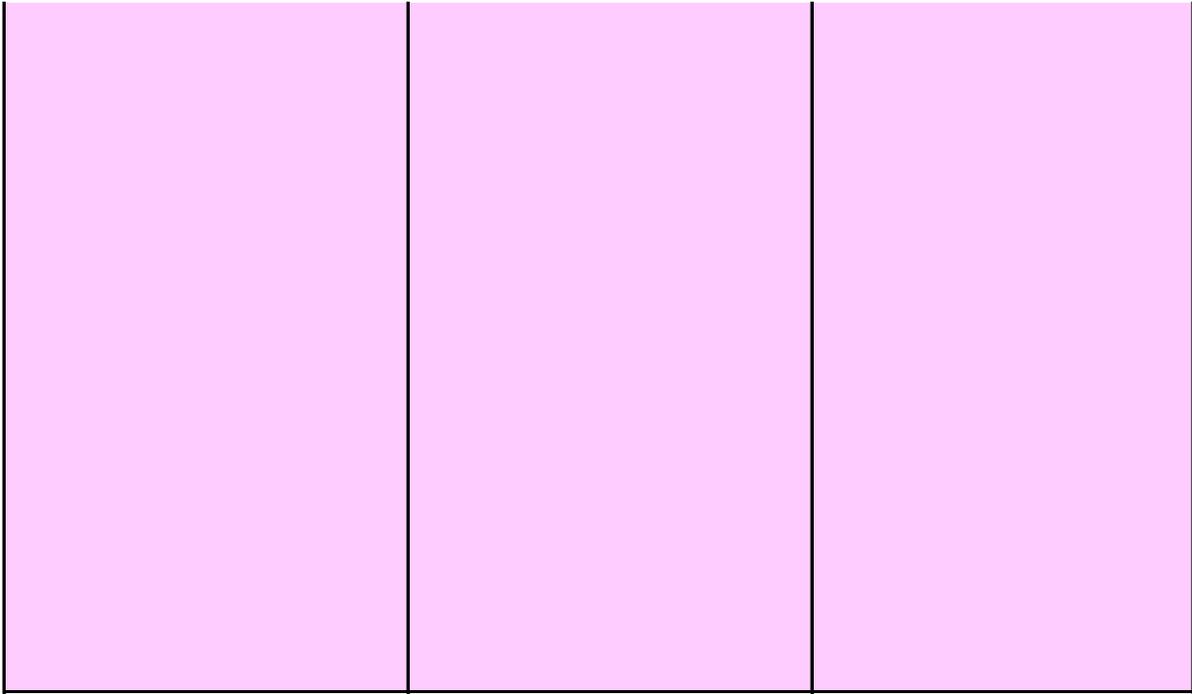


<u>Forensic Accountancy</u>	<u>Architect</u>	<u>Regional Planning</u>
-----------------------------	------------------	--------------------------

		4	
Geometry 2	Number 5	Algebra 3	
Accurately measure/construct with a ruler and protractor, Convert between different units of measurement and understand and use the angle sum of a triangle .	Accurately perform arithmetic with fractions and calculating with percentages.	Finding a methodical approach to solving linear equations.	
Interpret, analyse and generate strategies to solve problems involving measurement, converting units and angles.	Interpret, analyse and generate strategies to use and solve problems containing arithmetic of fractions or using percentages to make comparisons.	Interpret, analyse and generate strategies to solve problems involving solving equations.	
Recall, use, select and apply the knowledge of measurement, converting units and angles.	Recall, use, select and apply the knowledge of arithmetic with fractions, calculating with percentages. Multiply mixed numbers. Divide mixed numbers. Calculate percentage change	Recall, use, select and apply the knowledge of solving linear equations. Solve three-step equations (including brackets)	
Convert between non-adjacent metric units e.g. mm-m, g-tonnes and vice versa. Calculate missing angles in geometrical diagrams.	Add and subtract fractions with the different denominators using equivalent fractions. Multiply fractions. Divide fractions. Multiplying a decimal by a decimal. Use decimal or fraction equivalents to find a percentage of an amount. Identify and use the multiplier for a percentage increase or decrease	Solve two step equations (including with brackets) when the solution is a whole number or fraction - showing a methodical approach and checking by substitution.	
Convert between units of time and money. Convert between adjacent metric units e.g. mm-cm, cm-m, m-km and vice versa (using length, mass and capacity) Measure accurately with a ruler and protractor to the nearest millimetre/degree. Know and use that angles in a triangle add to 180° .	Converts between mixed numbers and top heavy fractions. Add and subtract fractions with the same denominators. Multiplying by a decimal.	Solve one step equations by using inverse operations	

length, distance, mass, weight, volume, capacity, metre, centimetre, millimetre, tonne, kilogram, gram, milligram, litre, millilitre, hour, minute, second, inch, foot, yard, pound, ounce, pint, gallon, line segment, angle, degrees, right angle, acute, obtuse, reflex, protractor, vertically opposite, geometry, geometrical	mixed number, equivalent fraction, simplify, cancel, lowest terms, proper fraction, improper fraction, top-heavy fraction, vulgar fraction, percent, percentage, multiplier, increase, decrease	algebra, algebraic, algebraically, unknown, equation, operation, solve, solution, brackets, symbol, substitute
--	---	--

KM: Sorting units	KM: Stick on the Maths: Percentage increases and decreases	KM: Spiders and snakes. The example is for an unknown on both sides but the same idea can be used.
KM: Another length	KM: Maths to Infinity: FDPRP	NRICH: Inspector Remorse
KM: Measuring space	KM: Percentage methods	NRICH: Quince, quonce, quance
KM: Another capacity	KM: Mixed numbers: mixed approaches	NRICH: Weighing the baby
KM: Stick on the Maths: Units	NRICH: Would you rather?	
NRICH: Temperature	NRICH: Keep it simple	
KM: Maths to Infinity: Lines and angles	NRICH: Egyptian fractions	
KM: Stick on the Maths: Angles	NRICH: The greedy algorithm	
NRICH: Triangle problem	NRICH: Fractions jigsaw	
NRICH: Square problem	NRICH: Countdown fractions	
NRICH: Two triangle problem		

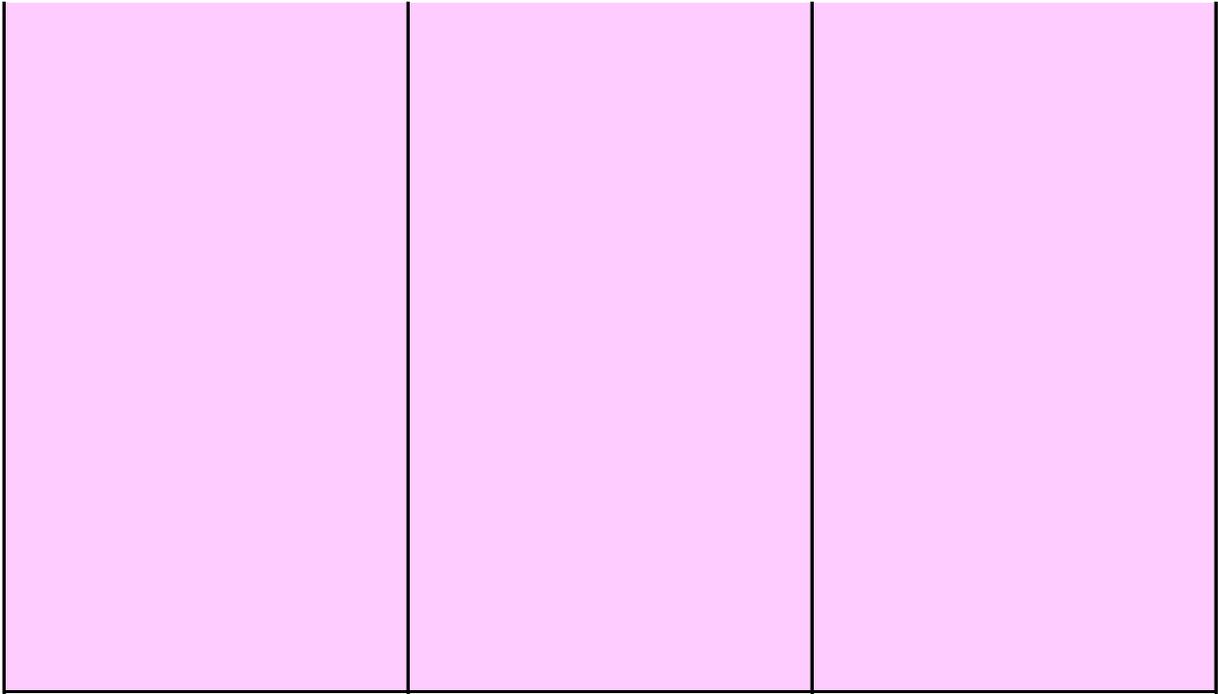


<u>Maths in Cooking</u>	<u>Chef</u>	<u>Electronic Engineering</u>	<u>Quantity Surveyor</u>
-------------------------	-------------	-------------------------------	--------------------------

5		6
Geometry 3	Number 6	Geometry 4
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.	Perform and describe reflections, translations and rotations on a coordinate grid.
Interpret, analyse and generate strategies to use and solve problems involving area and perimeter of 2D shapes or volume of a cuboid.	Interpret, analyse and generate strategies to estimate calculations by using rounding.	Interpret, analyse and generate strategies to solve problems involving translations and reflections.
Recall, use, select and apply the knowledge of area and perimeter of 2D shapes or the volume of some 3D shapes.	Recall, use, select and apply the knowledge of rounding and estimating.	Recall, use, select and apply the knowledge of translations and reflections. Draw and identify the lines $y = x$, $y = -x$ and perform reflections in these lines. Describe and use a 2D vector as a translation.
Find the area of a parallelogram. Find and use the area of a triangle. Know and use the formula for the area of a trapezium. Calculate the surface area of a cuboid. Find the volume of a cuboid using $V = lwh$	Approximate any number to a specified degree of accuracy e.g. 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.	Describe a translation. Describe a reflection which uses one of the axes as a mirror line. Perform and describe a rotation using a given angle, direction and centre of rotation.
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 cube or cuboid using appropriate units. Find the volume of a cuboid by counting cubes.	Approximate any number by rounding (up to 1,000,000)	Perform a translation Perform a reflection using one of the axes as a mirror line.

perimeter, area, volume, capacity, surface area, square, rectangle, parallelogram, triangle, trapezium (trapezia), polygon, cube, cuboid, square millimetre, square centimetre, square metre, square kilometre, cubic centimetre, centimetre cube, formula, formulae, length, breadth, width, height, depth	approximate, round, decimal place, check, solution, answer, estimate, order of magnitude, accurate, accuracy, significant figure, cancel, inverse, operation	2-D, grid, axis, axes, x-axis, y-axis, origin, quadrant, (cartesian) coordinates, point, translation, reflection, transformation, rotation, object, image, congruent, congruence, vector, centre of rotation
---	--	--

KM: Equable shapes (for both 2D and 3D shapes)	KM: Approximating calculations	KM: Lines
KM: Triangle takeaway	KM: Stick on the Maths: CALC6: Checking solutions	KM: Moving house
KM: Surface area		KM: Transformations: Bop It?
KM: Class of rice		KM: Dynamic Autograph files: Reflection, Rotation, Translation
KM: Stick on the Maths: Area and Volume		KM: Autograph transformations
KM: Maths to Infinity: Area and Volume		KM: Stick on the Maths SSM7: Transformations
NRICH: Can They Be Equal?		NRICH: Transformation Game



<u>Maths teacher</u>	<u>Builder</u>	<u>Zoo Keeper</u>
<u>Training Manager</u>		<u>Video Game Developer</u>

Statistics 1

Construct and interpret a range of statistical charts and diagrams.
Students will need a pencil, ruler, protractor and pair of compasses.

Interpret, analyse and generate strategies to solve problems involving statistical diagrams and averages.

Recall, use, select and apply the knowledge of statistical diagrams and averages.

Use a table of frequencies to work out the angles for a pie chart, where frequency is a factor of 360° .
Use the mean to find a missing number in a data set.
Calculate the mode, median and mean from a frequency table.

Construct and interpret pictograms, bar charts and tables. Read values from a line graph. Understand that pie charts are used to show proportion.
Draw and measure angles in a pie chart.
Find the mode, median, mean and range of a set of data.

data, scale, axis, axes, graph, frequency, time graph, time series, line graph, pie chart, sector, angle, protractor, degrees, maximum, minimum, categorical data, discrete data, pictogram, symbol, key, frequency table, tally, bar chart, bar-line graph, vertical line chart,

[KM: Stick on the Maths HD6: Graphs and diagrams](#)

[NRICH: Match the Matches](#)

[NRICH: Graphing Number Patterns](#)

[NCETM: A little bit of history \(Britain since 1945\)](#)

[KM: Constructing pie charts](#)

[KM: Maths to Infinity: Averages, Charts and Tables](#)

[NRICH: Picturing the World](#)

[NRICH: Charting Success](#)

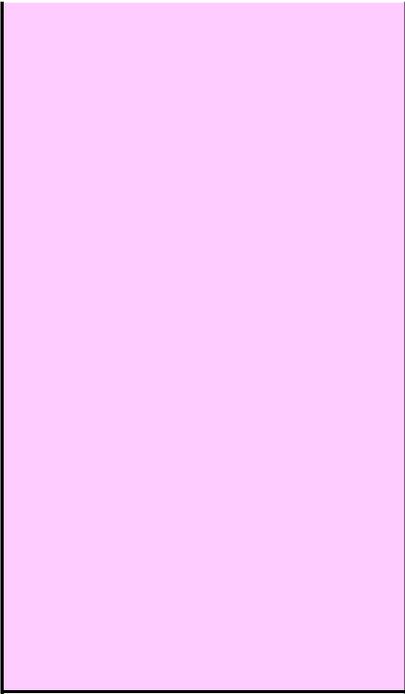
[KM: Maths to Infinity: Averages](#)

[KM: Maths to Infinity: Averages, Charts and Tables](#)

[KM: Stick on the Maths HD4: Averages](#)

[NRICH: M, M and M](#)

[NRICH: The Wisdom of the Crowd](#)



Maths in Hair and Beauty