**MATHS PROGRESSION THROUGH SOLAR STEPS**

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| **NUMBER** |
| **Stage 1 &2** | **Stage 3&4** | **Stage 5 & 6** | **Yr 1&2** | **Yr 3&4** | **Yr 5&6** | **Yr 7&8** | **Yr 9** |
| * Number rhymes & patterns
* Shows interest in counting & numbers
* Recognising & representing number 1 and 2
* Demonstrate an understanding of the concept of 1:1 correspondence
* Distinguish between 'one' and 'lots', when shown an example of a single object and a group of objects.
 | * Recognising, representing & sequencing numerals 0-5
* Rote counting and aware of numbers up to 10
* Recognising amounts in groups Recognise more & less.
* Demonstrate an understanding of the concept of numbers up to 5 by putting together the right number of objects when asked.
 | * Recognising, representing & sequencing numerals 0-20
* Use ordinal numbers to 10
* To read and write numbers in numerals up to 20
* To solve number problems involving addition and subtraction of single digit numbers up to 10Group objects into twos to count
* Demonstrate an understanding that the number of objects remains the same when they are rearranged.
 | * Partition a two digit number into tens and ones to demonstrate place value
* To read, write and compare numbers up to 100
* To count in twos, fives and tens forwards and backwards from 100
* To add / subtract any two digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus
* Identify ½, 2/4, ¾, 1/3, ¼ of a number or shape, and know all parts must be equal parts of the whole
 | * To read, write and compare numbers to 1000 in numerals and words
* Count in multiples of 6, 7, 9, 25 and 1,000
* To multiply and divide a two digit number by a one digit number using written and mental method
* To add and subtract a three digit number and ones/ tens / hundreds mentally s
* Multiply two-digit and three-digit numbers by a one-digit number using formal written layout
* To compare, order, add and subtract fractions
 | * Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
* Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
* Add and subtract whole numbers with more than 4 digits,
* Multiply and divide numbers up to 4 digits by a one or two digit number and interpret remainders
* Add, subtract, multiply and divide fractions with the same denominator/ multiples of the same number
 | * Identify and work with fractions in ratio problems: Sharing a quantity in a given ratio ? 8.4 x 5/7
* Simplify and manipulate algebraic expressions, including factorising quadratic expressions
* Calculate ratio, proportion and rates of change: compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity
* Calculate with roots, and with integer and fractional indices: missing formula
 | * Apply systematic listing strategies, including use of the product rule for counting : missing formula
* Change recurring decimals into corresponding fractions and vice versa:
* Solve quadratic equations algebraically by using the quadratic formula: missing formula.
* Set up, solve and interpret the answers in growth and decay problems, including compound interest and work with general iterative processes.
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| **SHAPE AND SPACE** |
| **Stage 1 &2** | **Stage 3&4** | **Stage 5 & 6** | **Yr 1&2** | **Yr 3&4** | **Yr 5&6** | **Yr 7&8** | **Yr 9** |
| * Fills and empties containers
* Use shapes to make pictures
 | * Respond to & recognise movement terms
* Handles 3-D shapes
* Matches & recognises 2-D shapes – circle, square, triangle
* Identify up to 2 colours
 | * Familiar with directional terms
* Recognise some common 2D shapes
* Sort & identify difference between 2-D & 3-D shapes
* Name some days of the week / months of the year
 | * Recognise and name a selection of 2D shapes - circle, triangle, square, rectangle
* To recognise and name a hexagon and pentagon
* Name and describe properties of 2D and 3D shapes including number of sides, vertices, edges, faces and lines of symmetry
* To identify line symmetry and right angles in 2d shapes
 | * Draw 2D shapes and make 3D shapes
* Compare and classify shapes based on their properties and sizes
* Find perimeter of simple 2D shape, measure, calculate the perimeter of a rectilinear figure in centimetres and metres
 | * Convert between miles and kilometres
* Calculate and compare the area of rectangles, triangles and parallelograms
* Estimate volume, capacity and recognise when it is possible to use formulae
* Accurately measure/draw lines with a ruler to the nearest millimetre and angles with a protractor
* Estimate and compare acute, obtuse and reflex angles
* Recognise, describe and build simple 3-D shapes, including making nets
 | * Construct 2D and 3D shapes, interpret plans of 3D shapes
* Understand and describe translations, rotations and enlargements of 2D shapes.
* Describe the changes and invariance achieved by rotations, reflections & combinations.
* Understand and describe translations, rotations and enlargements of 2D shapes.
* Interpret bearings for directions & one point from another point.
* Apply subtraction and multiplication of vectors by a scalar.
 | * Construct and interpret plans and elevations of 3D shapes.
* Describe the changes and invariance achieved by combinations of rotations, reflections and translations.
* Use 2D vectors to describe single translations, reflections and enlargements that have the same effect as a combination of transformations.
* Apply diagrammatic and column representations of vectors, arguments and proofs.
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| **MEASURE** |
| **Stage 1 &2** | **Stage 3&4** | **Stage 5 & 6** | **Yr 1&2** | **Yr 3&4** | **Yr 5&6** | **Yr 7&8** | **Yr 9** |
| * Identify big and small where there is a marked difference
 | * Identify the big or small object from a selection of two
* Recognise hot, cold, long, short, light, heavy, straight, round.

Recognises object long and short where the difference is great | * To order 6 objects by size
* To identify smallest and largest from a selection of pictures
* Identify objects we can measure – ruler / scales / measuring jug
 | * To measure using non-standard units length, weight, mass, capacity, volume
* To measure and record using standard units for length, weight/mass, capacity/volume
* To estimate and measure length, mass and capacity
* To solve simple word problems for length, weight/mass, capacity/volume
 | * To add and subtract length, mass and volume
* To find perimeter of simple 2D shapes, measure, calculate the perimeter of a rectilinear figure in centimetres and metres
* Convert between different units of measure
* Use multiplication to convert from larger to smaller units
* Solve time problems converting between different units
* To know there are 60 seconds in a minute
* To use, write & convert between analogue and digital 12 and 24 hour clocks
 | * Convert between different units of metric measure
* Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places
* Calculate, estimate and compare volume of cubes and cuboids using standard units
* Use knowledge of place value and multiplication and division to convert between standard units.
* Accurately measure/draw lines with a ruler to the nearest millimetre and angles with a protractor
 | * Compare lengths, areas and volumes using ratio notation and / or scale
* Calculate length of an arc and angles of sectors of circles.
* Apply Pythagoras’ Theorem to find angles, lengths and trigonometric ratios in right-angled triangles.
* Know & apply the sine rule to work out the length of a side in a triangle.
* Apply the concepts of congruence and similarity, including the relationships between lengths in similar figures.
* Interpret bearings for directions and of one point from another point.
 | * Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios).
* Calculate arc lengths, angles and areas of sectors of circles.
* Apply Pythagoras’ Theorem and trigonometric ratios to find angles and lengths in right-angled triangles and, where possible, general triangles in two and three dimensional figures.
* Know and apply the sine rule to work out the length of a side or angle in any triangle.
* Use the cosine rule; a2 = b2 + c2 − 2bc cos a to find unknown lengths and angles.
* Apply the formula Area = ½ ab sin c to calculate the area, sides or angles of any triangle whether the included angle is acute or obtuse.
* Interpret and use bearings for directions of one point from another point.
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| **USING AND APPYLING**  |
| **Stage 1 &2** | **Stage 3&4** | **Stage 5 & 6** | **Yr 1&2** | **Yr 3&4** | **Yr 5&6** | **Yr 7&8** | **Yr 9** |
| * Aware if container is empty
* Choose between 2 songs given object of references e.g. duck or frog
* Group similar objects together e.g. put all cars in the garage and all animals on the farm
* Finds the same and separate difference
* Recognise big containers fit lots and small containers fit few.
* Solve simple problems e.g. make sure the box is big enough to fit the item
 | * Sort by given criteria – objects, or colour or size.
* Copy a simple pattern, movement, size or object
* Recognise shape from a choice of up to four.
* Matching pictures, colours and objects (up to four)
* Recognise obvious error in a group
* Begin to count and ask how many.
* Copy a 2-stage repeated pattern.
 | * Pupils can identify and copy a 4-stage repeated pattern.
* Create their own repeated pattern up to 3.
* Playing a turn taking game with numbers up to 6.
* Use ordinal language to describe position.
* Estimates amounts and lengths up to 15.
* To solve simple practical problems using numbers to 20 or ordinal numbers.
* To apply mathematical language in a range of situations such as trips or role play.
 | * To identify, interpret, create and answer questions about a Pictogram, Block Graph, tally Chart, Venn diagram
* To name and identify more than two 2D shapes within the school environment
* Begin to enquire and ask questions relating to numbers, shapes and pattern.
 | * To identify, construct, interpret, and answer questions about a bar charts, pictograms and tables.
* To identify and label the x and y axis
* To solve two step questions about data
* Classify objects and display in a Venn diagram and Carroll diagram
* To understand and use the mean, mode, range and range to describe sets of data
 | * To construct and interpret a bar chart, pie chart, data base and line graph.
* Find the mode, mean, median and range
* Begin to decide which representations of data are most appropriate and why
* Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts.
* Draw and label a pair of axes in all four quadrants with equal scaling, including the use of negative numbers.
 | * Understand and write a probability as a fraction, decimal or percentage
* Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete data
* Use the form y = mx + c to identify parallel and perpendicular lines
* Sketch graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function
 | * Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving grouped data, including box plots
* Solve linear inequalities in one or two variable(s), and quadratic inequalities in one variable; represent the solution set on a number line, using set notation and on a graph
* Check Formula Recognise, sketch and interpret graphs of linear functions y = 1/x with x ? 0, for the exponential function y = kx for positive integer values of k, and the trigonometric function y = sin x, y = cos x and y = tan x for angles of any size.
* Solve quadratic equations (including those that require rearrangement) algebraically by factorising, by completing the square and by using the quadratic formula; find approximate solutions using a graph
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