**MATHS PROGRESSION THROUGH SOLAR STEPS**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **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. |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **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. |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **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. |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **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 |