



Maths Programme of Study – Year 5



| | Autumn | Spring | Summer |
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| Place Value and a Sense of Number | <p>Read, write, order and compare numbers to at least 1,000,000.</p> <p>Determine the value of each digit.</p> <p>Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 or 100,000.</p> <p>Use rounding to estimate solutions before calculating.</p> <p>Count forwards and backwards in steps of powers of 10 for any given number up to 1,000,000 (steps of 0.01, 0.01 up to steps of 100,000).</p> <p>Round numbers to the nearest power of 10 to estimate calculations.</p> <p>Partition numbers to support multiplication and division (the distributive law: $36 \times 5 = (30 \times 5) + (6 \times 5)$).</p> | <p>Interpret negative numbers in context.</p> <p>Count forwards and backwards with positive and negative whole numbers through zero.</p> <p>Know all multiplication facts to 12x12 and be able to derive facts for much larger and much smaller numbers.</p> <p>If I know that</p> <p>$11 \times 12 = 132$, then $13 \times 12 = 132 + 12 + 12$.</p> <p>Also $111 \times 12 = 10 \times 11 \times 12 + (1 \times 12)$.</p> <p>Use open and closed arrays to support derivations.</p> <p>Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</p> <p>Increase fluency by using patterning and building from known facts.</p> <p>e.g. $0.02 \times 0.1 = ?$</p> <p>$2 \times 1 = 2$</p> <p>$0.2 \times 1 = 0.2$</p> <p>$0.02 \times 1 = 0.02$</p> <p>$0.02 \times 0.1 = 0.002$</p> <p>Read, write, order and compare numbers with up to three decimal places.</p> <p>Multiply and divide any number by 10,100 and</p> | <p>Increase fluency by using patterning and building from known facts.</p> <p>e.g. $0.02 \times 0.1 = ?$</p> <p>$2 \times 1 = 2$</p> <p>$0.2 \times 1 = 0.2$</p> <p>$0.02 \times 1 = 0.02$</p> <p>$0.02 \times 0.1 = 0.002$</p> <p>Read, write, order and compare numbers with up to three decimal places.</p> <p>Multiply and divide any number by 10,100 and 1000.</p> <p>Round any number to an appropriate degree of accuracy to make the answer to a calculation make sense.</p> <p>Recognise and describe linear sequences using patterning.</p> <p>e.g. 2, 5, 8, 11, 14 (Add three to find the next term)</p> <p>Recognise and describe the term-to-term rule of linear sequences using patterning for support.</p> <p>Include fractions and negative numbers as appropriate.</p> <p>e.g. 7, 4, 1, -2, -5</p> |

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| | | 1000. | (term to term rule: subtract 3) |
| Problem Solving and Reasoning | Solve problems to develop the use of heuristics: focus on being systematic. Solve problems involving converting between units of time and interpreting information from timetables. Solve problems to develop the use of heuristics: focus on patterning. | Solve problems to develop the use of heuristics: focus on being systematic and making a list to find all possibilities. Solve problems using geometric reasoning and questioning: If I know this, then what else do I know? What is the same and what is different? Solve problems using multiplicative reasoning and questioning: What is the same and what is different? What if I change...? | Solve problems using mathematical reasoning and questioning. Ensure that pupils can offer solutions with a wide range of representations, including concrete and pictorial to demonstrate an understanding of structure. |
| Calculations | <u>Addition and Subtraction</u> Solve multi-step addition and subtraction problems in contexts using a range of representations. Decide which operation and method to use and why. Add and subtract whole numbers with more than four digits including using formal column methods alongside a full range of other representations (to demonstrate an understanding of structure and to support reasoning). <u>Multiplication and Division</u> Identify multiples and factors. Find all factor pairs of a number, and common factors of two numbers. Know prime numbers to 20. Multiply and divide whole numbers mentally drawing on known facts (use these to derive | <u>Addition and Subtraction</u> Add and subtract increasingly large numbers mentally using doubles, near doubles, one/ten more and less. Important to use jottings, approximations and different representations, models and images. 3000 – 999 is nearly 3000 – 1000 3000 – 183 = 3000 – 200 +17 3000 – 2760: count up from 2760 (240) – complements to 100 help (76+24). Fluently solve addition and subtraction problems in context, selecting the best method to use and justifying their choice. e.g. column addition for 546 + 328 but informal partitioning for 546 +122 and near doubles for 546 + 554 (=550+550) <u>Multiplication and Division</u> Multiply numbers up to 4-digits by a one or two digit number using a range of methods , | <u>Addition and Subtraction</u> Be able to add and subtract part and whole numbers , showing a variety of representations and justifying solutions. Secure formal written methods for addition and subtraction with models and images to encourage pupils to select effectively and reason appropriately. Solve multi-step problems in a range of contexts, with rounding for estimation <u>Multiplication and Division</u> Develop division strategies, using the idea of division as the inverse of multiplication, to enable pupils to reason about multi-step solutions and interpret remainders in context. Continue to develop formal methods for multiplication and division. Solve multi-step problems in a range of |

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| | <p>new facts). Multiply and divide part and whole numbers by 10 and 100. Establish prime numbers to 50. Know that non-prime numbers are called composite numbers. Recognise and use square numbers with notation (n^2): Use arrays to show which numbers are square and which are not (25 can be drawn as a 5x5 square, 26 cannot). <u>Fractions</u> Compare and order, add and subtract fractions whose denominators are all multiples of the same number ($\frac{3}{4} + \frac{5}{8} = \frac{6}{8} + \frac{5}{8} = \frac{11}{8} = 1\frac{3}{8}$). Use a bar model to support visual memory and understanding. Recognise mixed numbers and improper fractions. Convert from one form to the other (bar models) and write mathematical statements as above. Add and subtract fractions with denominators being multiples of the same number.</p> | <p>including more formal written methods (long multiplication and short division~ chunking for 2-digit numbers with increasingly efficient chunks). Establish if a number is prime up to 100 (use the 100 square and eliminate all multiples (sieve of Eratosthenes)). Secure more formal written methods for multiplication and division, with appropriate models and images to support. Interpret remainders in context. Recognise square and cube numbers. Use correct notation (n^2, n^3). <u>Fractions</u> Read and write decimal numbers as fractions ($0.61 = \frac{61}{100}$), up to thousandths. Round decimals with two dps to 1 dp and the nearest whole number. Identify equivalent fractions (using the multiplicative relationship between numerator and denominator ~ for $\frac{1}{8}$ the denominator is always 8x the numerator). Recognise the % symbol as number of parts per hundred. Write percentages as a fraction or a decimal (e.g $20\% = 0.2 = \frac{1}{5}$). Multiply proper fractions and mixed numbers by whole numbers, using materials and diagrams to support understanding of structure and reasoning.</p> | <p>contexts, with rounding for estimation. <u>Fractions</u> Link fractions to division. See that division by 2 is the same as halving the group etc. Use a bar model to support this idea. Secure an understanding of equivalence with proper and improper fractions. Introduce the idea of ratio as a fraction (3:1 is the same as $\frac{3}{4}$ share and $\frac{1}{4}$ share) Link fractions to division. See that division by 2 is the same as halving the group etc. Be able to convert between common fractions, decimals and percentages using place value understanding and % as parts per hundred. Solve simple problems which include all three representations of part-whole to encourage pupils to shift easily between them.</p> |
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| | | Solve problems that require knowing % and decimals equivalents, including fractions with a denominator of 10 or 25. | |
| Measurement | <p>Measure and calculate the perimeter of composite rectilinear shapes in cm and m. Convert between different units of metric measure.</p> <p>Calculate and compare the area of a rectangle or square using standard units (m^2, cm^2).</p> <p>Estimate the area of irregular shapes.</p> <p>Use four operations, decimal notation and scaling to solve problems involving length.</p> <p>Use four operations, decimal notation and scaling to solve problems involving mass.</p> | <p>Use four operations, decimal notation and scaling to solve problems involving money.</p> <p>Use four operations, decimal notation and scaling to solve problems involving area volume.</p> <p>Understand and use equivalences between common metric and imperial units such as inches, pounds and pints.</p> <p>Estimate volume (using cm^3 blocks to construct cubes and cuboids) and capacity (using liquids and different containers ~ milk containers are good as you can get 1, 2 and 4 litres easily).</p> | <p>Calculate and measure the perimeter and area of compound rectilinear shapes. Find missing values for sides or areas.</p> <p>Construct cuboids from cm cubes.</p> <p>Calculate and count to find volumes.</p> <p>Measure, compare and convert between units of length using knowledge of PV and reasoning (km, m, cm and mm). Practical contexts needed here.</p> <p>Measure, compare and convert between units of mass and capacity (g, kg, l and ml) using knowledge of PV and reasoning. Practical contexts needed here.</p> |
| Geometry | <p>Identify 3-D shapes including cubes and other cuboids from 2-D representations (nets).</p> <p>Know that angles are measured in degrees.</p> <p>Estimate and compare acute, obtuse and reflex angles.</p> <p>Know that angles around a point (one complete turn) are equivalent to 360°.</p> <p>Draw given angles and measure them in degrees.</p> <p>Use the properties of rectangles to deduce related facts and find missing lengths and angles.</p> <p>Distinguish between regular and irregular</p> | <p>Know that angles at a point on a straight line are equal to 180°, right angles are equal to 90°. Explore other multiples of 90° in the context of parts of a turn.</p> <p>Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.</p> <p>Compare and classify 2-D and 3-D shapes based on angle, side and symmetry properties. Use the terms parallel and perpendicular</p> | <p>Draw given angles, use an angle measurer accurately.</p> <p>Use angles to reason about regular and irregular polygons.</p> <p>Find missing angles around a point and on a straight line.</p> |

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| | polygons based on reasoning about equal sides and angles. | | |
| Statistics | Complete, read and interpret information in tables, including timetables. Solve comparison, sum and difference problems using information presented in a line graph (continuous data). | | Time graphs (story graphs). Be able to interpret and construct line graphs that tell a story over time (e.g. of a journey). Draw, compare and interpret simple pie charts where the sectors are multiples of 90° . Reason that this represents one quarter of the data. |