

| Area of Curriculum | Mathematical Stories: | | |
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| | Disciplinary | Substantive | |
| Number and Place Value | <ul style="list-style-type: none"> • Read and write numbers up to ten million. • Be able to identify the value of any digit up to ten million, including being able to label the columns of such a number. • Order and compare numbers up to ten million. • Interpret negative numbers in context, such as temperature or debt, and calculate intervals across 0. • Round any number up to ten million to the nearest 10, 100, 1000, 10000, 100000. • Solve written, numerical, and practical problems involving the information and knowledge included in this unit. | <p>Knowledge</p> <ul style="list-style-type: none"> • Know that each column increases by a power of 10. • Know that number have the following columns: Ten Million, Millions, Hundred Thousand, Ten Thousand, Thousands, Hundreds, Tens, Ones. • Know that negative numbers are less than 0. • Know that rounding can help us to estimate quantity. | <p>Vocabulary</p> <ul style="list-style-type: none"> • Powers of 10 • Columns • Greater than • Less than • Zero • Negative (minus) numbers. • Positive numbers <ul style="list-style-type: none"> • Integer |

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| Four Operations | <ul style="list-style-type: none"> • Use rounding (in unit 1) to approximate answers and check. • Be able to solve addition and subtraction problems in a range of ways, including multi-step word problems, deciding which operations to use. • Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. • Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, decimals, or by rounding, as appropriate for the context. • Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context. • Perform mental calculations, including with mixed operations and large numbers. • Identify common factors and common multiples of numbers. • Identify prime numbers by spotting dividers or calculating the factors. • Use knowledge of the order of operations to complete calculations involving more than one operation (BIDMAS). • Solve problems involving addition, subtraction, multiplication and division. • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. | <p>Knowledge</p> <ul style="list-style-type: none"> • Know that there are different words for addition, subtraction, multiplication, and division, and know a range of these. • Know that addition and multiplication are commutative, but subtraction and division are not. • Know that addition and multiplication are associative. • Know that prime numbers have two factors, 1 and themselves, and that other integers (except 1) are composite. • Recall prime numbers up to 19. • Know that the integer answer to a division is called the quotient, and represents the whole number of groups made. • Know that the remaining numbers after a division is called the remainder and refers to what is left that could not be equally divided. • Know the notation for squared and cubed. • Know the order of operations (BIDMAS). | <p>Vocabulary</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> • Commutative, • Associative, • Indices, • Prime Number, • Composite Number, • Factors, </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> • Multiples, • Common Factors, • Common Multiples, • Quotient, • Remainder. </td> </tr> </table> | <ul style="list-style-type: none"> • Commutative, • Associative, • Indices, • Prime Number, • Composite Number, • Factors, | <ul style="list-style-type: none"> • Multiples, • Common Factors, • Common Multiples, • Quotient, • Remainder. |
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| Fractions, decimals, and Percentages | <ul style="list-style-type: none"> • Use common factors to simplify fractions and use common multiples to express fractions in the same denomination. • Compare and order fractions, including fractions >1. • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. • Multiply simple pairs of proper fractions, writing the answer in its simplest form. • Divide proper fractions by whole numbers. • Associate a fraction with division and calculate decimal fraction equivalents. • Use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity, for example if a quarter is 36cm, then the whole is $36 \times 4 = 144\text{cm}$. • Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places. • Multiply one-digit numbers with up to 2 decimal places by whole numbers. • Use written division methods in cases where the answer has up to 2 decimal places. • Solve problems which require answers to be rounded to specified degrees of accuracy. • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. <p>NB: Percentages to be covered in further detail in Unit 4.</p> | <p>Knowledge</p> <ul style="list-style-type: none"> • Know that different fractions can represent the same amount (equivalent fractions). • Know that mixed numbers and improper fractions are two ways of representing the same amount. • Know the following fraction to decimal to percentage equivalencies: <div style="margin-left: 20px;"> $0.1 = \frac{1}{10} = 10\%$ $0.01 = \frac{1}{100} = 1\%$ $0.5 = \frac{5}{10} = \frac{1}{2} = 50\%$ </div> <div style="margin-left: 20px; margin-top: 10px;"> $0.25 = \frac{25}{100} = \frac{1}{4} = 25\%$ $0.75 = \frac{75}{100} = \frac{3}{4} = 75\%$ $0.2 = \frac{2}{10} = \frac{1}{5} = 20\%$ </div> • Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100'. <p>Vocabulary</p> <ul style="list-style-type: none"> • Numerator, • Denominator, • Whole, • Mixed numbers, • Improper fractions, • Decimal places, • Percentage • Equivalency |

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| Ratio and Proportion | <ul style="list-style-type: none"> Be able to find the percentage of amounts and solve problems that require this knowledge. Children should be able to solve these both by: <ul style="list-style-type: none"> a) finding 1% and multiplying by the required percentage. b) breaking the percentage into total parts, and summing these. For example, $45\% = 4 \times 10\% + 5\%$. Be able to compare percentages of different amounts. Solve problems involving the relative sizes of 2 quantities where missing values can be found by using integer multiplication and division facts. Solve problems involving similar shapes where the scale factor is known or can be found. Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. Pupils solve problems involving unequal quantities, for example, 'for every egg you need 3 spoonfuls of flour', '3/5 of the class are boys'. | <p>Knowledge</p> <ul style="list-style-type: none"> Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100'. Know that a colon denotes ratio. For example, the ratio between a and b is denoted a:b. Know how to find some key percentages quickly: <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">$1\% \rightarrow \div 100$</td> <td style="text-align: center;">$10\% \rightarrow \div 10$</td> <td style="text-align: center;">$20\% \rightarrow \div 5$</td> </tr> <tr> <td style="text-align: center;">$50\% \rightarrow \div 2$</td> <td style="text-align: center;">$25\% \rightarrow \div 4$</td> <td style="text-align: center;">$5\% \rightarrow \div 20$</td> </tr> </table> <p>Vocabulary</p> <ul style="list-style-type: none"> Ratio, Proportion, Scale Factor. | $1\% \rightarrow \div 100$ | $10\% \rightarrow \div 10$ | $20\% \rightarrow \div 5$ | $50\% \rightarrow \div 2$ | $25\% \rightarrow \div 4$ | $5\% \rightarrow \div 20$ |
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| Algebra | <ul style="list-style-type: none"> Be able to label missing aspects of a question with a letter, such as a missing side on a triangle. Be able to find a variable when set equal to an amount, for example $5a + 3 = 7$. Use simple formulae to find an amount. E.g. If $a=3$ and $b=5$, what is $a + b$? Express missing number questions algebraically. Generate and describe linear number sequences. Find pairs of numbers that satisfy an equation, such as what could a and b be, if $a + b = 5$? Enumerate possibilities of combinations of 2 variables. Be able to solve questions which require the use of a formula, such as the cost of something. For example, the cost = number of items x price + postage. | <p>Knowledge</p> <ul style="list-style-type: none"> Know that multiplication is denoted without the 'x' symbol. For example, $5 \times a = 5a$. Know that a linear equation increases by the same amount. <p>Vocabulary</p> <ul style="list-style-type: none"> variable, formula, equation, satisfy, linear. |

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| Measure | <ul style="list-style-type: none"> • Solve (word) problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate. • Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to 3 decimal places. • Be able to convert between miles and kilometres, using the ratio of 5 miles = 8 kilometres. • Recognise and use formulae to calculate the perimeter and area of shapes (see substantive knowledge). • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units [for example, mm³ and km³]. | <p>Knowledge</p> <ul style="list-style-type: none"> • Know that there are 1000 grams in a kilogram. • Know that there are 1000 ml in a litre. • Know that there are 10 mm in a cm. • Know that there are 100 cm in a m. • Know that there are 1000m in a km. • Know that there are 5 miles per 8 kilometres, which means that a mile is 1.6 kilometres. • Know that the perimeter of a shape is the sum of the length of the outside edges. • Know that the area of the shape is the space inside. • Know that the area of a rectangle = length x width. • Know that shapes with the same area can have different perimeters. • Know that volume relates to the space inside a 3-D shape. • Know the volume of cuboid is calculated by length x width x depth. • Know that the area of a triangle is (length x width) ÷ 2. • Know that the area of a parallelogram is width x height. | <p>Vocabulary</p> <ul style="list-style-type: none"> • area, • perimeter, • convert, • volume, • formulae, • miles. |

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| Geometry | <ul style="list-style-type: none"> • Be able to draw 2-D shapes using a ruler and a protractor, when given measurements. • Recognise, describe and build simple 3-D shapes, including making nets, and be able to identify whether a net will form a 3-D shape by visualising it. • Compare and classify geometric shapes based on their properties, including regularity. • Find the missing angle in triangles, quadrilaterals, and regular polygons. • Illustrate and name the parts of a circle. • Find the diameter or radius of a circle, given the other. • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. • Describe positions on the full coordinate grid (all 4 quadrants), • Draw and translate simple shapes on the coordinate plane, and reflect them in the axes. | <p>Knowledge</p> <ul style="list-style-type: none"> • Know the nets of a cube, cuboid, prism, cone, cylinder, square-based pyramid, and tetrahedron. • Know that a triangle's internal angles add to 180°. • Know that a quadrilateral's internal angles add to 360°. • Know that a regular polygon's internal angles add to $180 \times (\text{the number of sides} - 2)$. • Know the diameter is twice the radius. • Be able to label the following parts of a circle: <ul style="list-style-type: none"> ○ diameter, ○ radius, ○ circumference. |
| | | <p>Vocabulary</p> <ul style="list-style-type: none"> • Nets, • Polygons, • Diameter, • Radius, • Circumference, • axes, • quadrants, • translate, • reflect. |

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| Statistics | <ul style="list-style-type: none"> • Be able to interpret pie charts, using knowledge of ratio and percentage. • Construct pie charts given a data set. • Use and construct charts taught in previous years, such a pictogram, bar charts, and line graphs. • Find the mean of a set of results. | <p>Knowledge</p> <ul style="list-style-type: none"> • Know that 1% of a pie chart = 3.6° of the slice. • Know the mean is calculated by adding the data and dividing by the number of data points. • Know that mean relates to average amount. |
| | | <p>Vocabulary</p> <ul style="list-style-type: none"> • Pie chart, • Mean, • Average. |

