| Mathematical <br> aspect Non-negotiable end <br> points | Prior knowledge for pre assessment | Post assessment <br> Knowing more, remembering more |
| :---: | :---: | :---: |
| Number and place Knows how to calculate <br> value: <br> with negative and  <br> negative numbers positive numbers. | Knows how to read and interpret negative numbers and find differences between negative and positive numbers. <br> Knows how to read, write, order and compare numbers at least to $10,000,000$ and determine the value of each digit. <br> Knows how to round any whole number to a required degree of accuracy. | Knows how to count forwards and backwards through zero. <br> Knows how to calculate intervals through zero. <br> Knows how to use negative numbers in context. <br> Knows how to solve number problems and practical problems that involve all of the above. <br> Knows how to use vertical and horizontal number lines to support understanding. |
| Links to resources and policy documents: <br> Use the number line to answer the questions. <br> - What is 6 less than 4 ? <br> - What is 5 more than -2 ? <br> - What is the difference between 3 and -3 ? <br> Here are the temperatures in four cities at midnight and at midday <br> At midnight, how many degrees colder was Paris than Rome? $\qquad$ |   <br> Write the number three million, twenty five thousand and seventeen in figures. | Nikolas is finding the difference in temperature between midday and midnight. <br> The thermometer shows the temperature at midday. <br> At midright it is $7^{\circ} \mathrm{C}$ colder. <br> What is the temperature at midnight? |





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| Geometry: circles | Knows the parts of the circle. | Knows how unknown angles and lengths can be derived from known measurements. <br> Knows the conventional markings for parallel lines, sides of equal length, angles and right angles. | Knows how to illustrate and name parts of circles, including radius, diameter and circumference. <br> Knows the relationship between the radius and the diameter and recognises that the diameter is twice the length of the radius. |
| :---: | :---: | :---: | :---: |
| Links to resource <br> Using the labels com | d policy documents: <br> the diagram: <br> Radius <br> Diameter <br> Centre | Work out the value of $x$ and $y$. <br> Explain each step of your working. | Complete the table: <br> Four large circles and five small circles fit exactly inside this rectangle. <br> The diameter of a large circle is $\mathbf{1 7 . 5}$ centimetres. <br> Calculate the diameter of a small circle. <br> A bicycle wheel has a diameter of 64 cm . <br> What is the radius of the bicycle wheel? |
| Geometry: position and direction | Knows how to draw and label a pair of axes in all four quadrants with | Knows how to describe a translation or reflection of a shape, | Knows how to read and plot co-ordinates in all four quadrants. Knows which part of the axis is positive and negative. Knows how to draw shapes from co-ordinates given. |



| The diagram shows two identical triangles. <br> The coordinates of three points are shown. <br> Find the coordinates of point $A$. |  | Work out the value of $x$ and $y$. <br> Explain each step of your working. |  |
| :---: | :---: | :---: | :---: |
| Measurement: area, perimeter and volume | Knows how to recognise that shapes with the same area can have different perimeters and vice versa. Knows the formula for volume $/ \times b \times h$ | Knows how to calculate the area from scale drawings using given measurements. <br> Knows the conventional markings for parallel lines, sides of equal length, angles and right angles. Knows that approximately 5 miles $=$ 8 kilometres. <br> Knows the approximate conversions and are able to tell if an answer is sensible. | Knows that shapes with the same area can have different perimeters and vice versa. <br> Knows how to use their knowledge of factors to draw rectangles with different areas; that can make connections between side lengths and factors. <br> Knows that they can use their knowledge of finding the area of a rectangle to find the area of a parallelogram. <br> Knows that there is a link between the area of a triangle and the area of a rectangle or square. <br> Knows that a right-angled triangle with the same length and perpendicular height as a rectangle will have an area half the size. Knows that they can use the formula, base $\times$ perpendicular height $\div 2$ to calculate the area of a variety of triangles where different side lengths are given and where more than one triangle makes up a shape. |


|  |  | Knows when it is necessary to use the formulae for area and volume of shapes. <br> Knows how to calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm3) and cubic metres (m3) and extending to other units such as mm3 and km3. |
| :---: | :---: | :---: |
| Links to resources and policy documents: <br> Here is a quadrilateral drawn on a square grid. <br> On the same grid, draw a different quadrilateral that has the same area. <br> One book is 6 cm wide, 15 cm long and 0.5 cm thick. Eight identical books are placed on top of each other. <br> What volume is taken up by the books? <br> Calculate the volume of a cube with side length: $4 \mathrm{~cm} \quad 2 \mathrm{~m} \quad 160 \mathrm{~mm}$ <br> Use appropriate units for your answers. | What is the area of this shape if: <br> - each square is 2 cm in length? <br> - each square is 3.5 cm in length? <br> How to convert km to miles | Here is a parallelogram. <br> Calculate the area of the parallelogram. <br> Join the dots to draw a rectangle that has an area of $20 \mathrm{~cm}^{2}$ and a perimeter of 18 cm . |


|  |  |  | Complete the sentences for each cuboid. <br> The length is: $\qquad$ <br> The width is: $\qquad$ <br> The height is: $\qquad$ <br> The area of the base is: $\qquad$ $\times$ $\qquad$ $=$ $\qquad$ <br> Volume $=$ The area of the base $\times$ $\qquad$ $=$ $\qquad$ <br> If each cube has a volume of $1 \mathrm{~cm}^{3}$, find the volume of each solid. |
| :---: | :---: | :---: | :---: |
| Fractions: calculating | Knows how to calculate with fractions. Knows that dividing by 2 is the same as multiplying by $\frac{1}{2}$. | Knows how to add and subtract fractions with different denominators by identifying equivalent fractions with the same denominator. <br> Knows how to convert improper fractions and mixed numbers. | Knows how to add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. <br> Knows that when denominators are not multiples of the same number, they need to multiply the denominators together to find the LCM. <br> Knows that there are different methods for subtracting mixed fractions: exchanging wholes for fractions and subtracting the wholes and fractions separately and converting the whole number to an improper fraction. <br> Knows how to multiply simple pairs of proper fractions, writing the answer in its simplest form. <br> Knows how to divide proper fractions by whole numbers. |



Eva has a full tin of paint. She uses $\frac{1}{3}$ of the tin on Friday, $\frac{1}{21}$ on
Saturday and $\frac{2}{7}$ on Sunday. How much paint does she have left?
Tommy is adding mixed numbers. He adds the wholes and then Tommy is adding mixed numbers. He adds the wholes
adds the fractions. Then, Tommy simplifies his answer.

$$
1 \frac{1}{2}+2 \frac{1}{6}=1 \frac{3}{6}+2 \frac{1}{6}=3 \frac{4}{6}=3 \frac{2}{3}
$$

Use Tommy's method to add the fractions.
$3 \frac{1}{2}+2 \frac{3}{8}=\quad 34 \frac{1}{9}+5 \frac{2}{5}=\quad 12 \frac{5}{12}+2 \frac{1}{7}=$

Whitney is calculating $\frac{5}{8}+\frac{3}{16}$
She finds the lowest common multiple of 8 and 16 to find a common denominator.
LCM of 8 and 16 is $16 \quad \frac{5}{8}=\frac{10}{16} \quad \frac{10}{16}+\frac{3}{16}=\frac{13}{16}$
Use this method to calculate:
$\frac{1}{3}+\frac{2}{9}=\quad \frac{3}{7}+\frac{7}{21}=\quad \frac{8}{15}+\frac{1}{5}=\quad \frac{3}{16}+\frac{3}{8}+\frac{1}{4}=$

Convert the mixed numbers to improper fractions to calculat $4 \frac{4}{5}-1 \frac{9}{10}=2 \frac{1}{7}-1 \frac{1}{3}=\cdot 3 \frac{5}{12}-1 \frac{7}{9}=3 \frac{5}{11}-1 \frac{4}{5}=$

Use <, > or = to make the statements correct.

$$
\begin{aligned}
& \frac{1}{4} \times \frac{1}{2} \bigcirc \frac{1}{4} \times 2 \\
& \frac{1}{4} \times \frac{1}{3} \bigcirc \frac{1}{4} \div 3
\end{aligned}
$$

Eva has a full tin of paint. She uses $\frac{1}{3}$ of the tin on Friday, $\frac{1}{21}$ on Saturday and $\frac{2}{7}$ on Sunday. How much paint does she have left?

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|  |  |  | Mo is dividing $\frac{1}{3}$ by 2 <br> I have divided one third into 2 equal parts. Each part is worth $\frac{1}{6}$$\frac{1}{3} \div 2=\frac{1}{6}$   <br>    <br> -- -----   <br> Draw diagrams to calculate: $\frac{1}{3} \div 3=\quad \frac{2}{3} \div 3=\quad \frac{1}{5} \div 3=\frac{2}{5} \div 3=$ |
| :---: | :---: | :---: | :---: |
| Fractions: calculating with decimals | Knows how to multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. <br> Knows how to multiply decimals by whole numbers in practical contexts, such as measures and money. Knows how to divide decimal numbers by one-digit whole number, in practical contexts involving measures and money. | Knows how to round decimals and use the correct notation for recurring decimal places. | Knows how to multiply one-digit numbers with up to two decimal places by whole numbers. <br> Knows how to use written division methods in cases where the answer has up to two decimal places. <br> Knows how to solve problems which require answers to be rounded to specified degrees of accuracy. <br> Knows how to recall and use equivalences between simple fractions, decimals and percentages, including in different contexts; Know common fractions, such as thirds, quarters, fifths and eighths as decimals. |



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