Reasoning about the Number System
Value of digits
- Read and write numbers up to 10 000 000 and determine the value of each digit
- Use negative numbers in context, and calculate intervals across zero EG. temperature changes
- Identify the value of each digit in numbers given to three decimal places
- Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- Recall and use equivalences between simple fractions, decimals and percentages, including in different context
- Use common factors to simplify fractions
- Use common multiples to express fractions in the same denomination
- Associate a fraction with division and calculate decimal fraction equivalents (for example, 0.375) for a simple fraction (EG 3/8)

Ordering and comparing
- Order and compare numbers up to 10 000 000 and determine the value of each digit
- Compare and order fractions, including fractions > 1

Rounding
- Round any whole number to a required degree of accuracy

Number properties
- Identify common factors, common multiples and prime numbers

Problem Solving
- Solve number and practical problems that involve all of the above.

Reasoning about Fractions including decimals
- Solve problems which require answers to be rounded to specified degrees of accuracy

Reasoning about Ratio and Proportion
- Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
- 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
- Solve problems involving unequal sharing and grouping using knowledge of multiples

Reasoning about Addition and Subtraction
- Perform mental calculations, including with mixed operations and large numbers. EG.456 + 2999, 7 – 0.9, 4567 - 999
- Use their knowledge of the order of operations to carry out calculations involving addition and subtraction
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Solve problems involving addition, subtraction, multiplication and division
- Use their knowledge of the order of operations to carry out calculations involving the four operations.
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate

Reasoning about Fractions within addition and subtraction
- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions

Reasoning about Measures
- Use, read, write and convert between standard units, converting measurements of length, mass and volume from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- Use, read, write and convert between standard units, converting measurements of time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- Convert between miles and kilometres
- Recognise that shapes with the same areas can have different perimeters and vice versa
- Recognise when it is possible to use formulae for area and volume of shapes
- 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].

Reasoning about Algebra
- Use simple formulae – area /volume/perimeter
- Generate and describe linear number sequences EG. what comes next in this sequence? 4,8,16,32,... why?
- Express missing number problems algebraically EG. *2a = 30 what is a? 2c + t = 36 if t = 6 what is c?*
- Find pairs of numbers that satisfy an equation with two unknowns. EG. if 2a + b = 10 and a and b are both less than 10 what are my options?
- Enumerate possibilities of combinations of two variables

Reasoning about Multiplication and Division
- Perform mental calculations, including with mixed operations and large numbers e.g. 540 ÷ 6, 30 x 60
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Multiply one-digit numbers with up to two decimal places by whole numbers
- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division.
- Interpret remainders as whole number remainders, fractions, 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.
- Use written division methods in cases where the answer has up to two decimal place
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy EG with division word problems

Reasoning about Fractions within multiplication and division
- Multiply simple pairs of proper fractions, writing the answer in its simplest form
- Divide proper fractions by whole numbers

Reasoning about Geometry - Properties of shape
3-D Shape
- Recognise 3-D shapes
- Describe 3-D shapes
- Build simple 3-D shapes, including making nets

Angles
- Recognise angles where they meet at a point and find missing angles
- Recognise angles where they are on a straight line and find missing angles
- Recognise angles which are vertically opposite, and find missing angles

2-D shape
- Draw 2-D shapes using given dimensions and angles.
- Calculate the area of triangles.
- Calculate the area of parallelograms
- Compare and classify geometric shapes based on their properties and sizes.
- Find unknown angles in any triangles
- Find unknown angles in any quadrilaterals
- Find unknown angles in any regular polygons
- Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius

Geometry – position and direction
- Describe positions on the full coordinate grid (all four quadrants)
- Draw and translate simple shapes on the coordinate plane
- Reflect simple shapes in the axes

Reasoning about Statistics
- Construct pie charts and use these to solve problems
- Interpret pie charts and line graphs and use these to solve problems
- Construct line graphs and use these to solve problems
- Interpret line graphs
- Calculate and interpret the mean as an average