**Mathematics Year 5 – Programme of Study Descriptors**

**Number and Place Value:**

Pupils should be taught to:

* read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
* count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
* interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
* round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
* solve number problems and practical problems that involve all of the above
* read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

**Number – Addition and Subtraction:**

Pupils should be taught to:

* add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
* add and subtract numbers mentally with increasingly large numbers
* use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
* solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

**Number – Multiplication and Division:**

Pupils should be taught to:

* identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
* know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
* establish whether a number up to 100 is prime and recall prime numbers up to 19
* multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
* multiply and divide numbers mentally drawing upon known facts
* divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
* multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
* recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
* solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
* solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
* solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

**Number – Fractions (including decimals and percentages):**

Pupils should be taught to:

* compare and order fractions whose denominators are all multiples of the same number
* identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
* recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example,  +  =  = 1]
* add and subtract fractions with the same denominator and denominators that are multiples of the same number
* multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
* read and write decimal numbers as fractions [for example, 0.71 = ]
* recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
* round decimals with two decimal places to the nearest whole number and to one decimal place
* read, write, order and compare numbers with up to three decimal places
* solve problems involving number up to three decimal places
* recognise the per cent symbol (%) and understand that per cent relates to ‘number of parts per hundred’, and write percentages as a fraction with denominator 100, and as a decimal
* solve problems which require knowing percentage and decimal equivalents of , , , ,  and those fractions with a denominator of a multiple of 10 or 25.

**Measurement:**

Pupils should be taught to:

* convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
* understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
* measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
* calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes
* estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]
* solve problems involving converting between units of time
* use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

**Geometry – Properties of Shape:**

Pupils should be taught to:

* identify 3-D shapes, including cubes and other cuboids, from 2-D representations
* know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
* draw given angles, and measure them in degrees (o)
* identify:
  + angles at a point and one whole turn (total 360o)
  + angles at a point on a straight line and  a turn (total 180o)
  + other multiples of 90o
* use the properties of rectangles to deduce related facts and find missing lengths and angles
* distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

**Geometry – Position and Direction:**

Pupils should be taught to:

* 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.

**Statistics:**

Pupils should be taught to:

* solve comparison, sum and difference problems using information presented in a line graph
* complete, read and interpret information in tables, including timetables.