Key Learning in Mathematics – Year 6

Number – number and place value

- *Count forwards or backwards in steps of integers, decimals, powers of 10*
- Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- Identify the value of each digit to three decimal places
- *Identify, represent and estimate numbers using the number line*
- *Order and compare numbers including integers, decimals and negative numbers*
- *Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more/less than a given number*
- Round any whole number to a required degree of accuracy
- *Round decimals with three decimal places to the nearest whole number or one or two decimal places*
- Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- Use negative numbers in context, and calculate intervals across zero
- *Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal*
- Solve number and practical problems that involve all of the above

Number – addition and subtraction

- *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)*
- *Select a mental strategy appropriate for the numbers in the calculation*
- *Recall and use addition and subtraction facts for 1 (with decimals to two decimal places)*
- Perform mental calculations including with mixed operations and large numbers *and decimals*
- *Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction)*
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Use knowledge of the order of operations to carry out calculations
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Solve problems involving all four operations, *including those with missing numbers*

Number – multiplication and division

- *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)*
- Identify common factors, common multiples and prime numbers
- *Use partitioning to double or halve any number*
- Perform mental calculations, including with mixed operations and large numbers
- 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
- Divide numbers up to 4 digits by a two-digit whole number using the formal written methods of short or long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- Use written division methods in cases where the answer has up to two decimal places
- Use estimation *and inverse* to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Use knowledge of the order of operations to carry out calculations
- Solve problems involving all four operations, *including those with missing numbers*

Number – fractions, decimals and percentages

- Compare and order fractions, including fractions > 1 *(including on a number line)*
- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
- Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375 and $\frac{3}{8}$)
- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions

Geometry – properties of shapes

- Compare/classify geometric shapes based on the properties and sizes
- Draw 2-D shapes using given dimensions and angles
- Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- Recognise, describe and build simple 3-D shapes, including making nets
- Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
- Find unknown angles in any triangles, quadrilaterals, regular polygons

- Multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)
- Divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$)
- *Find simple percentages of amounts*
- *Solve problems involving fractions*
- Solve problems which require answers to be rounded to specified degrees of accuracy
- Solve problems involving the calculation of percentages (e.g. of measures and such as 15% of 260) and the use of percentages for comparison

Ratio and proportion

- Solve problems involving the relative sizes of two quantities where missing values can be found using integer multiplication/division facts
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples
- Solve problems involving similar shapes where the scale factor is known or can be found

Geometry – position and direction

- Describe positions on the full coordinate grid (all four quadrants)
- Draw and translate simple shapes on the coordinate plane, and reflect them in the axes

Statistics

- *Continue to complete and interpret information in a variety of sorting diagrams (including sorting properties of numbers and shapes)*
- Interpret and construct pie charts and line graphs and use these to solve problems
- *Solve comparison, sum and difference problems using information presented in all types of graph*

Algebra

- Use simple formulae
- Generate and describe linear number sequences
- Express missing number problems algebraically
- Find pairs of numbers that satisfy an equation with two unknowns
- Enumerate possibilities of combinations of two variables

Measurement

- Use, read and write standard units of length, mass, volume and time using decimal notation to three decimal places
- Convert between standard units of length, mass, volume and time using decimal notation to three decimal places
- Convert between miles and kilometres
- Recognise that shapes with the same areas can have different perimeters and vice versa
- Calculate the area of parallelograms and triangles
- 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 (cm^3) and cubic metres (m^3), and extending to other units (e.g. mm^3 and km^3)
- *Calculate differences in temperature, including those that involved a positive and negative temperature*
- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate