# 2014 MATHEMATICS CURRICULUM - Year 6

## Number - Number and place value

- Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit
- Round any whole number to a required degree of accuracy
- Use negative numbers in context, and calculate intervals across zero
- Solve number and practical problems that involve all of the above
- Use the whole number system, saying, reading and writing numbers accurately

## Ratio and proportion

- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- Solve problems involving the calculation of percentages eg. 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
- Recognise proportionally in contexts when the relations between quantities are in the same ratio (eg. similar shapes and recipes)
- Link percentages or 360° to calculating angles of pie charts
- Understand ratio when comparing quantities, sizes and scale drawings by solving a variety of problems (Use of notation a:b to record their work could be used)
- Solve problems involving unequal, eg. for every egg you need three spoonfuls of flour, 3/5 of the class are boys

## Number - Addition, subtraction, multiplication and division

- 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, or by rounding, as appropriate to 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, common multiples and prime numbers
- Use their knowledge of the order of operations to carry out calculations involving the four operations
- 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 estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division
- Undertake mental calculations with increasingly large numbers and more complex calculations
- Use all the multiplication tables to calculate mathematical statements
- Round answers to a specified degree of accuracy, (eg. to the nearest 10, 20, 50 etc, but not to a specified number of figures)
- Explore the order of operations using brackets, (eg. 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9)
- Relate common factors to finding equivalent fractions

## Number - Fractions (including decimals and percentages)

- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- Compare and order fractions, including factions > 1
- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions, where the denominator of one fraction is a multiple of the other (eg. 1/2 + 1/8 = 5/8) and progress to varied and increasingly complex problems
- Multiply simple pairs of proper fractions, writing the answer in its simplest form (eg. 1/4 x 1/2 = 1/8)
- Divide proper fractions by whole numbers (eg. 1/3 ÷ 2 = 1/6)
- Associate a fraction with division and calculate decimal fraction equivalents eg. 0.375 for a simple fraction eg. 3/8
- Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to 3 decimal places
- Multiply one-digit numbers with up to two decimal places by whole numbers
- Use written division methods in cases where the answer has up to two 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
- Use a variety of images to support the understanding of multiplication with fractions
- Use the 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 (eg. if 1/4 of a length is 36cm, then the whole length is 36 x 4 = 144cm)
- Practise calculations with simple fractions and decimal fraction equivalents, including listing equivalent fractions to identify fractions with common denominators
- Make conjectures about converting a simple fraction to a decimal fraction (eg. 3 ÷ 8 = 0.375) and for simple fractions with recurring decimal equivalents, round to three decimal places, or other approximations depending on the context

## 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
- Use symbols and letters to represent variables and unknowns in mathematical situations, such as:
    - missing numbers, lengths, coordinates and angles
    - formulae in mathematics and science
    - equivalent expressions (eg. a + b = b + a)
    - generalisations of number patterns
    - number puzzles (eg. what two numbers can add up to)

## Statistics

- Interpret and construct pie charts and line graphs and use these to solve problems
- Calculate and interpret the mean as average
- Connect angles, fractions and percentages to the interpretation of pie charts
- Use and draw graphs relating two variables, arising from their own enquiry and in other subjects
- Connect conversion from kilometres to miles in measurement to its graphical representation
- Know when it is appropriate to find the mean of a set of data

- Multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers
- Multiply decimals by whole numbers, starting with the simplest cases, such as 0.4 x 2 = 0.8, and in practical contexts, such as measures and money
- Divide decimal numbers by one-digit whole numbers, initially in practical contexts, such as measures and money
- Recognise division calculations as the inverse of multiplication
- Use rounding and estimation as a means of predicting and checking the order of magnitude of their answers to decimal calculations

## Measurement

- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three 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 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 the area of parallelograms and triangles
- 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 (eg. $mm^3$ and $km^3$)
- Know approximate conversions and are able to tell if an answer is sensible
- Using a number line, add and subtract positive and negative integers for measures such as temperature
- Relate the area of rectangles to parallelograms and triangles (eg. by dissection, and calculate their areas, understanding and using the formulae (in words or symbols)

## Geometry - Properties of shapes

- Draw 2-D shapes using dimensions and angles
- Recognise, describe and build simple 3-D shapes, including making nets
- Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
- Draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles
- Describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements
- Relationships can be expressed algebraically eg. d = 2 x r, a = 180 - (b + c)

## 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
- Draw and label a pair of axes in all four quadrants with equal scaling, including the use of negative numbers
- Draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes
- Express algebraically translating vertex (a, b) to (a - 2, b + 3); (a, b) and (a + d, b + d) being opposite vertices of a square of side d

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| • Introduce compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate | | |