

# Year Two

## Mathematics Statutory Teaching



### Number – number and place value

#### Statutory requirements

Pupils should be taught to:

- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward
- recognise the place value of each digit in a two-digit number (tens, ones)
- identify, represent and estimate numbers using different representations, including the number line
- compare and order numbers from 0 up to 100; use  $<$ ,  $>$  and  $=$  signs
- read and write numbers to at least 100 in numerals and in words
- use place value and number facts to solve problems.

### Number – addition and subtraction

#### Statutory requirements

- solve problems with addition and subtraction:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods

- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

## **Number – multiplication and division**

### **Statutory requirements**

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

## **Number – fractions**

### **Statutory requirements**

- recognise, find, name and write fractions  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{2}{4}$  and  $\frac{3}{4}$  of a length, shape, set of objects or quantity
- write simple fractions for example,  $\frac{1}{2}$  of 6 = 3 and recognise the equivalence of  $\frac{2}{4}$  and  $\frac{1}{2}$

## Measurement

### Statutory requirements

- choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature ( $^{\circ}\text{C}$ ); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
- compare and order lengths, mass, volume/capacity and record the results using  $>$ ,  $<$  and  $=$
- recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
- find different combinations of coins that equal the same amounts of money
- solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change
- compare and sequence intervals of time
- tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times
- know the number of minutes in an hour and the number of hours in a day.

## Geometry – properties of shapes

### Statutory requirements

- identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line
- identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces
- identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]
- compare and sort common 2-D and 3-D shapes and everyday objects.

## **Geometry – position and direction**

### **Statutory requirements**

- order and arrange combinations of mathematical objects in patterns and sequences
- use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).

## **Statistics**

### **Statutory requirements**

- interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- ask and answer questions about totalling and comparing categorical data.

# Year Three

## Mathematics Statutory Teaching



### Number – addition and subtraction

#### Statutory requirements

- add and subtract numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

## Number – multiplication and division

### Statutory requirements

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which  $n$  objects are connected to  $m$  objects.

## Number – fractions

### Statutory requirements

- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example,  $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$ ]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

## Measurement

### Statutory requirements

- measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
- measure the perimeter of simple 2-D shapes
- add and subtract amounts of money to give change, using both £ and p in practical contexts
- tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks
- estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- know the number of seconds in a minute and the number of days in each month, year and leap year
- compare durations of events [for example to calculate the time taken by particular events or tasks].

## Geometry – properties of shapes

### Statutory requirements

- draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
- recognise angles as a property of shape or a description of a turn
- identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle
- identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

## Statistics

### Statutory requirements

- interpret and present data using bar charts, pictograms and tables
- solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.

# Year Four

## Mathematics Statutory Teaching



### Number – number and place value

#### Statutory requirements

- ☐ count in multiples of 6, 7, 9, 25 and 1000
- ☐ find 1000 more or less than a given number
- ☐ count backwards through zero to include negative numbers
- ☐ recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- ☐ order and compare numbers beyond 1000
- ☐ identify, represent and estimate numbers using different representations
- ☐ round any number to the nearest 10, 100 or 1000
- ☐ solve number and practical problems that involve all of the above and with increasingly large positive numbers
- ☐ read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.

## Number – addition and subtraction

### Statutory requirements

- **☐ add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate**
- **☐ estimate and use inverse operations to check answers to a calculation**
- **☐ solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.**

## Number – multiplication and division

### Statutory requirements

- **recall multiplication and division facts for multiplication tables up to  $12 \times 12$**
- **use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers**
- **recognise and use factor pairs and commutativity in mental calculations**
- **multiply two-digit and three-digit numbers by a one-digit number using formal written layout**
- **solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.**

## Number – fractions (including decimals)

### Statutory requirements

Pupils should be taught to:

- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths
- recognise and write decimal equivalents to  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with one decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to two decimal places
- solve simple measure and money problems involving fractions and decimals to two decimal places.

## Measurement

### Statutory requirements

- Convert between different units of measure [for example, kilometre to metre; hour to minute]
- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres
- find the area of rectilinear shapes by counting squares

- **estimate, compare and calculate different measures, including money in pounds and pence**

## **Time**

### **Statutory requirements**

- **read, write and convert time between analogue and digital 12- and 24-hour clocks**
- **solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.**

## **Geometry – properties of shapes**

### **Statutory requirements**

- **compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes**
- **identify acute and obtuse angles and compare and order angles up to two right angles by size**
- **identify lines of symmetry in 2-D shapes presented in different orientations**
- **complete a simple symmetric figure with respect to a specific line of symmetry.**

## **Geometry – position and direction**

### **Statutory requirements**

- **describe positions on a 2-D grid as coordinates in the first quadrant**
- **describe movements between positions as translations of a given unit to the left/right and up/down**
- **plot specified points and draw sides to complete a given polygon.**

## Statistics

### Statutory requirements

- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

# Year Five

## Mathematics Statutory Teaching



### Number – number and place value

#### Statutory requirements

- 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

### Statutory requirements

- 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

### Statutory requirements

- 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

### Statutory requirements

- 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)

### Statutory requirements

- 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,  $2/5 + 4/5 = 6/5 = 1 \frac{1}{5}$ ]
- 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,  $0.71 = 71/100$ ]
- 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  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{2}{5}$ ,  $\frac{4}{5}$  and those fractions with a denominator of a multiple of 10 or 25

## Measurement

### Statutory requirements

- 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 (cm<sup>2</sup>) and square metres (m<sup>2</sup>) and estimate the area of irregular shapes
- estimate volume [for example, using 1 cm<sup>3</sup> 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 shapes

### Statutory requirements

- 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 2
  - 1 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

### Statutory requirements

- 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

### Statutory requirements

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

# Year Six

## Mathematics Statutory Teaching



### Number – number and place value

#### Statutory requirements

- 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.

### Number – addition, subtraction, multiplication and division

#### Statutory requirements

- 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 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**
- **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**

### **Statutory requirements**

- **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.**

### **Number – fractions (including decimals and percentages)**

#### **Statutory requirements**

- **use common factors to simplify fractions; use common multiples to express fractions in the same denomination**
- **compare and order fractions, including fractions  $> 1$**
- **add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions**
- **multiply simple pairs of proper fractions, writing the answer in its simplest form [for example,  $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ ]**
- **divide proper fractions by whole numbers [for example,  $\frac{1}{3}$  divided by 2 =  $\frac{1}{6}$ ]**
- **associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example,  $\frac{3}{8}$ ]**

- **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 three decimal places**

### **Statutory requirements**

- **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.**

### **Ratio and proportion**

#### **Statutory requirements**

- **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 [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.**

## Algebra

### Statutory requirements

- 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.
- ? missing numbers, lengths, coordinates and angles
- ? formulae in mathematics and science
- ? equivalent expressions (for example,  $a + b = b + a$ )
- ? generalisations of number patterns
- ? number puzzles (for example, what two numbers can add up to).

## Measurement

### Statutory requirements

- ? 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 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 the area of parallelograms and triangles
- ? calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres ( $\text{cm}^3$ ) and cubic metres ( $\text{m}^3$ ), and extending to other units [for example,  $\text{mm}^3$  and  $\text{km}^3$ ].

## Geometry – properties of shapes

### Statutory requirements

- ? draw 2-D shapes using given 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.

## Geometry – position and direction

### Statutory requirements

- ? 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

### Statutory requirements

- ? interpret and construct pie charts and line graphs and use these to solve problems
- ? calculate and interpret the mean as an average.