



## **NUMBER**

### **NUMBER AND PLACE VALUE**

#### **Year 1**

- Count to and across 100, forwards and backwards beginning with 0 or 1, of from any given number
- Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
- Given a number, identify one more and one less
- Identify and represent numbers and objects and pictorial representations including the number line, and use the language of equal to, more than less than (fewer) most, least
- Read and write numbers from 1-20 in numerals and words

#### **Year 2**

- Count in steps of 2, 3 and 5 from 0, and in tens from any number, forward or backward
- Recognise the place value of each digit in two-digit number (tens, ones)
- Identify, represent and estimate numbers using different representations including the number line
- Compare and order numbers from 0-100; use  $>$  and  $<$  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 and place value**

#### **Year 3**

Pupils should be taught to:

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- compare and order numbers up to 1000
- identify, represent and estimate numbers using different representations
- read and write numbers up to 1000 in numerals and in words
- solve number problems and practical problems involving these ideas.



## **Year 4**

### **Number and place value**

- 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 100
- identify, represent and estimate numbers using different representation
- 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.

## **Year 5**

### **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 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.

## **Year 6**

Number and place value

Pupils should be taught to:

- read, write, order and compare numbers up to 10 000 000 and determine the value of each digit



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- 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.

### **ADDITION AND SUBTRACTION**

#### **Year 1:**

- Read write and interpret mathematical statements involving addition, subtraction and equals signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract one-digit and two-digit numbers to 20, including zero
- Solve one-step problems that involve addition and subtraction using concrete objects and pictorial representations, and missing number problems such as  $7 = ? - 9$  (16)

#### **Year 2:**

##### **Addition and subtraction**

- solve problems with addition and subtraction
- using concrete objects and pictorial representations, including those involving 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 facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, including:
  - a two digit number and ones
  - a two digit numbers and tens
  - two two-digit numbers
  - adding three one-digit numbers
- show that addition of two numbers can be order (commutative) and subtraction from another cannot
- recognise and use the inverse relationship between addition and subtraction to check calculations and missing number problems

#### **Year 3:**

##### **Addition and Subtraction**



Pupils should be taught to:

- 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.

**Year 4:**

- 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.

**Year 5:**

- Add and subtract whole number 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.

**Year 6:**

- 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
- 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



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- use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

### **MULTIPLICATION AND DIVISION**

#### **Year 1:**

Pupils should be taught to:

- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

#### **Year 2**

- 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.

#### **Year 3**

- 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



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progressing to formal written methods

- solve problems, including missing number problems, involving multiplication and division, including integer scaling problems and correspondence problems in which  $n$  objects are connected to  $m$  objects

### **Year 4:**

- 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

### **Year 5:**

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- solve problems involving multiplication and division where larger numbers are used by decomposing them into their factors
- 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 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.

### **Year 6**

- 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
- 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, levels of accuracy.

## **FRACTIONS**

### **Year 1:**

Pupils should be taught to:

- Recognise, find and name a half as one of two equal parts of an object, shape or quantity
- Recognise, find and name a quarter as one of four equal

### **Year 2:**

Pupils should be taught to:

- 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 e.g.  $\frac{1}{2}$  of 6 = 3 and recognise the equivalence of  $\frac{2}{4}$  and  $\frac{1}{2}$ .

### **Year 3**



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- 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 (e.g.  $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$ )
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

### **Year 4:**

- 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 a 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 hundredth
- 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 units, 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.

### **Year 5:**

- 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 hundredth
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements  $> 1$  as a mixed number (e.g.  $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$ )





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- add and subtract fractions with the same denominator and 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 (e.g.  $0.71 = 71/100$ )
- 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 hundred, and as a decimal fraction
- solve problems which require knowing percentage and decimal equivalents of  $1/2$ ,  $1/4$ ,  $1/5$ ,  $2/5$ ,  $4/5$  and those with a denominator of a multiple of 10 or 25.

### **Year 6:**

#### **Fractions (including decimals and percentages)**

Pupils should be taught to:

- 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 (e.g.  $1/4 \times 1/2 = 1/8$ )
- divide proper fractions by whole numbers (e.g.  $1/3 \div 2 = 1/6$ )
- associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g.  $3/8$ )
- identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three 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

### **RATIO AND PROPORTION: YEAR 6**

**Pupils should be taught to:**



- 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 (e.g. of measures) 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: year 6**

#### **Pupils should be taught to:**

- express missing number problems algebraically
- use simple formulae expressed in words
- generate and describe linear number sequences
- find pairs of numbers that satisfy number sentences involving two unknowns
- enumerate all possibilities of combinations of two variables

### **MEASUREMENT**

#### **Year 1:** parts of an object shape or quantity

Pupils should be taught to:

Compare, describe and solve practical problems for:

- Lengths and heights (eg long/short, longer/shorter, tall/short, double/half)
- Mass or weight (heavy/light, heavier than, lighter than)
- Capacity volume (full/empty, more than, less than, quarter)
- Time (quicker, slower ,earlier, later)
  
- Measure and begin to record the following:
  - Lengths and heights
  - Mass/weight
  - Capacity and volume
  - Time (hours minutes, seconds)
  
- Recognise and know the value of different denominations of coins and notes
- Sequence events in chronological order using language such as: before and after, next, today, yesterday, tomorrow, morning ,afternoon and evening.
- Recognise and use language relating to dates, including days of the week, weeks, months and years
- Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times

#### **Year 2**



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- 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.

### Year 3

- 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, hours and o'clock; use vocabulary such as 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.

### Year 4

- Pupils should be taught to:
- Convert between different units of measure (e.g. 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
- read, write and convert time between analogue and digital 12 and 24-hour clocks



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- solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

### Year 5

- convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
- understand and use 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 squares and rectangles 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 (e.g. using 1 cm<sup>3</sup> blocks to build cubes and cuboids) and capacity (e.g. using water)
- solve problems involving converting between units of time
- use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.

### Year 6

- 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 centimetre cubed (cm<sup>3</sup>) and cubic metres (m<sup>3</sup>), and extending to other units such as mm<sup>3</sup> and km<sup>3</sup>



## **GEOMETRY**

### **(year 1)**

Properties of shapes

Pupils should be taught to:

- Recognise and name common 2D and 3D shapes including:
  - 2 D shapes (rectangles, circles and triangles)
  - 3 D shapes (cuboids, pyramids and spheres)

### **Year 2**

#### **Properties of shapes**

Pupils should be taught to:

- identify and describe the properties of 2-D shapes, including the sides and symmetrical 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, a triangle on a pyramid
- compare and sort common 2-D and 3-D shapes and everyday objects.

### **Year 3**

Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them

- recognise that angles are 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.

### **Year 4**

- 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



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- complete a simple symmetric figure with respect to a specific line of symmetry.

### Year 5

#### Properties of shapes

##### 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  $\frac{1}{2}$  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.

### Year 6

##### Pupils should be taught to:

- 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.

## **POSITION AND DIRECTION**

### **(year 1)**

Pupils should be taught to:

- Describe position, directions and movements, including half, quarter and three quarter turns.

### **Year 2:**

#### **Position and direction**

Pupils should be taught to:

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

### **Year 4:**

#### **Position and direction**

- 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 up/down
- plot specified points and draw sides to complete a given polygon.

### **Year 5:**

#### **Position and direction:**

- 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

### **Year 6**



Pupils should be taught to:

- 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**

### **Year 2:**

Pupils should be taught to:

- 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 3:**

- interpret and present data using bar charts, pictograms and tables
- solve one-step and two-step questions such as 'How many more?' and 'How many fewer?' using information presented in scaled bar charts and pictograms and tables

### **Year 4:**

- 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 5**

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

### **Year 6:**

Pupils should be taught to:

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





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