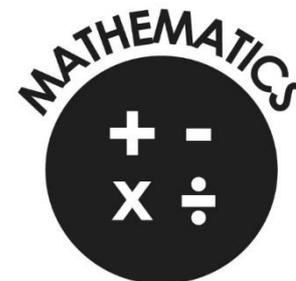


# Key Assessment Criteria



## *Being a mathematician*

The key assessment criteria for mathematics have been devised in such a way that they can be applied in all settings, regardless of the agreed programme of study. These criteria allow teachers to assess how well children are developing as mathematicians.

There are two sets of assessment criteria for mathematics:

1. Full version
2. Consolidated version (may be more helpful for sharing with parents/carers)

Teachers may wish to supplement these key assessment criteria with other criteria if they feel that this adds value.

This section also includes the 'expected standard' as outlined in preparation for revised statutory assessment/testing from 2016.

## Coverage within the mathematics National Curriculum

	Number and place value	Addition and subtraction	Multiplication and division	Addition, subtraction, multiplication and division	Fractions	Fractions, including decimals	Fractions, including decimals and percentages	Ratio and proportion	Algebra	Measurement	Geometry – properties of shape	Geometry – position and direction	Statistics
Yr 1	x	x	x		x					x	x	x	
Yr 2	x	x	x	x	x					x	x	x	x
Yr 3	x	x	x		x					x	x		x
Yr 4	x	x	x			x				x	x	x	x
Yr 5	x	x	x				x			x	x	x	x
Yr 6	x			x		x	x	x	x	x	x	x	x

# What the National Curriculum requires in mathematics at Y1

## Number and place value

- count to and across 100, forwards and backwards, beginning with 0 or 1, or 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 using 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 to 20 in numerals and words.

## Number – addition and subtraction

- 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

## Number – multiplication and division

- 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.

## Number fractions

- 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 parts of an object, shape or quantity.

Number

## Measurement

- compare, describe and solve practical problems for:
  - lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
  - mass/weight [for example, heavy/light, heavier than, lighter than]
  - capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]
  - time [for example, 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 [for example, before and after, next, first, 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.

Measurement

## Geometry – properties of shapes

- recognise and name common 2-D and 3-D shapes, including:
  - 2-D shapes [for example, rectangles (including squares), circles and triangles]
  - 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

Geometry

## Geometry – position and direction

- describe position, direction and movement, including whole, half, quarter and three-quarter turns.

# What the National Curriculum requires in mathematics at Y2

## Number and place value

- 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

- 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

- 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.

## Fractions

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

Number

## Measurement

- 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.

Measurement

## Geometry – properties of shapes

- 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

## Geometry – position and direction

- 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

- 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.

Statistics

# What the National Curriculum requires in mathematics at Y3



## Number and place value

- 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.

## Number – addition and subtraction

- 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

- 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.

## Fractions

- 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,  $75 + 71 = 76$ ]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

Number

## Measurement

- 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].

Measurement

## Geometry – properties of shapes

- 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.

Geometry

## Statistics

- 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.

Statistics

# What the National Curriculum requires in mathematics at Y4



## 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 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

- 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

- 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.

## Fractions, including decimals

- 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.

Number

## Measurement

- 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
- 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.

Measurement

## Geometry – properties of shapes

- 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

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

Statistics

## Statistics

- 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.

# What the National Curriculum requires in mathematics at Y5



## Number and place value

- 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

- 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

- 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

- 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
- 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,  $0.71 = \frac{71}{100}$ ]
- 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.

Number

## Measurement

- 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 ( $\text{cm}^2$ ) and square metres ( $\text{m}^2$ ) and estimate the area of irregular shapes
- estimate volume [for example, using  $1 \text{ cm}^3$  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.

Measurement

## Geometry – properties of shapes

- 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 ( $^\circ$ )
- identify:
  - angles at a point and one whole turn (total  $360^\circ$ )
  - angles at a point on a straight line and  $\frac{1}{2}$  turn (total  $180^\circ$ )
  - other multiples of  $90^\circ$
- 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

## Geometry – 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.

## Statistics

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

Statistics

# What the National Curriculum requires in mathematics at Y6



**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.

**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 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
- 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.

**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 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
- divide proper fractions by whole numbers
- associate a fraction with division and calculate decimal fraction equivalents for a simple fraction
- 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
- 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.

Number

**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 [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.

Ratio & proportion

**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.

Algebra

**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 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 (cm<sup>3</sup>) and cubic metres (m<sup>3</sup>), and extending to other units [for example, mm<sup>3</sup> and km<sup>3</sup>].

Measurement

**Geometry – properties of shapes**

- 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

**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**

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

Statistics

# KS1 Mathematics 2016: The expected standard

2016

In preparing for the new statutory assessment arrangements in 2016, the government has identified the bullet points below as the 'expected standard' in mathematics by the end of Key Stage One.

## Number

- Count in multiples of 2, 5 and 10, to 100, forwards and backwards
- Count forward in multiples of 3, to 18
- Count in steps of 10, forward and backwards (e.g. 97, 87...)
- Read & write numbers to at least 100 in numerals, and phonetically attempts to write numbers to 100 in words
- Use place value in whole numbers up to 100 to compare and order numbers, sometimes using < and > signs correctly
- Identify, represent and estimate within a structural environment (e.g. estimate 33 on a number line)
- Use place value and number facts to solve problems (e.g.  $60 - XX = 20$ )
- Recall and use addition and subtraction facts
- Subtract two simple 2-digit numbers, which do not involve bridging ten (e.g. 36-24)
- Add three 1-digit numbers, where they use known addition or doubling facts
- Add and subtract numbers using concrete objects and pictorial representations, including:
  - a 2-digit number and ones
  - a 2-digit number and tens
  - adding two 2-digit numbers
  - adding three 1-digit numbers
- Use inverse operations to solve missing number problems for addition and subtraction
- Solve simple 2-step problems with addition and subtraction
- Recall and use multiplication and division facts for the x10 table using the appropriate signs
- Recognise odd and even numbers
- Solve simple problems involving multiplication and division
- Know that addition and multiplication of two small numbers can be done in any order (commutative) and subtraction of one number from another cannot
- Recognise and find half of a set of objects or a quantity and begin to find  $\frac{1}{3}$  or  $\frac{1}{4}$  of a small set of objects with support
- Recognise, find and name fractions  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{2}{4}$ , and  $\frac{3}{4}$  of a shape
- Recognise the equivalence of two quarters and one half in practical contexts

# KS1 Mathematics 2016: The expected standard

2016

In preparing for the new statutory assessment arrangements in 2016, the government has identified the bullet points below as the 'expected standard' in mathematics by the end of Key Stage One.

## Measurement

- Compare and order lengths, mass, volume/capacity
- Choose and use appropriate standard units to measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (l/ml) to the nearest appropriate unit using rules, scales, thermometers and measuring vessels and begin to make good estimates.
- Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value and find different combinations of coins to equal the same amounts of money
- Recognise, tell and write the times: o'clock; half past and quarter past and are beginning to recognise quarter to the hour; draw hands on a clock face to show half past and o'clock times
- Solve simple problems in a practical context involving addition and subtraction of money using the same unit, including giving change

## Geometry

- compare and sort common 2-D shapes (e.g. semi-circle, rectangle and regular polygons such as pentagon, hexagon and octagon) and everyday objects, identifying and describing their properties (e.g. the number of sides or vertices, and are beginning to recognise symmetry in a vertical line)
- compare and sort common 3-D shapes (e.g. cone, cylinder, triangular prism, pyramid) and everyday objects, identifying and describing their properties (e.g. flat / curved surfaces, and beginning to count number of faces and vertices correctly)
- identify 2-D shapes on the surface of 3-D shapes and images of them (e.g. a circle on a cylinder and a triangle on a pyramid)
- order and arrange combinations of mathematical objects in patterns (e.g. continue a repeating pattern)
- use mathematical vocabulary to describe position, direction (e.g. left and right) and movement including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter and half turns

# KS1 Mathematics 2016: The expected standard

2016

In preparing for the new statutory assessment arrangements in 2016, the government has identified the bullet points below as the 'expected standard' in mathematics by the end of Key Stage One.

## Statistics

- interpret simple pictograms (where the symbols show one to one correspondence), tally charts, block diagrams (where the scale is divided into ones, even if only labelled in multiples of two) and simple tables
- answer questions by counting the number of objects in each category and sorting the categories by quantity
- answer questions about totalling and begin to compare simple categorical data (e.g. when the pictures or blocks are adjacent)

## Solve problems, communicate and reason mathematically

- solve problems by applying their mathematics in a range of contexts (including money and measures, geometry and statistics) using the content described above; use and interpret mathematical symbols and diagrams; and begin to communicate their reasoning; for example:
  - use place value and number facts to solve problems (e.g.  $40 + XX = 70$ )
  - use inverse operations to solve missing number problems for addition and subtraction (e.g. There were some people on a bus, six get off leaving seventeen people on the bus. How many were on the bus to start with?)
  - solve simple 2-step problems with addition and subtraction, which require some retrieval (e.g. There are 12 kittens in a basket, 6 jump out and only 2 jump back in. How many are in the basket now?)
  - solve simple problems involving multiplication and division (e.g. Ahmed buys 3 packs of apples. There are 4 apples in each pack. How many apples does he buy?)
  - solve problems with one or two computational steps using addition, subtraction, multiplication and division and a combination of these (e.g. Joe has 2 packs of 6 stickers; Mina gives him 2 more stickers. How many stickers does he have altogether?)
  - solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (e.g. Identify three coins with a total value of 24p or find the two items which cost exactly £1 altogether from a list such as: 70p, 40p, 50p and 30p)

# KS2 Mathematics 2016:

## The expected standard

2016

In preparing for the new statutory assessment arrangements in 2016, the government has identified the bullet points below as the 'expected standard' in mathematics by the end of Key Stage Two.

### Number

- use place value in whole numbers up to 1 000 000 to compare and order numbers and are beginning to become confident with numbers up to 10 000 000
- round any whole number to the nearest power of ten
- use negative numbers in practical contexts such as temperature and calculate intervals across zero
- count forwards or backwards in steps of any whole number with one significant figure, e.g. 9, 20, 3000 to generate, describe and complete linear number sequences
- recognise and use multiples, factors, prime numbers less than 20 and square numbers up to 121 show evidence of using mental methods, including jottings where necessary to speed up the process, to add and subtract whole numbers with up to two significant figures (e.g.  $95 + 36$ ,  $5700 - 2900$ )
- add and subtract whole numbers with more than four digits, using formal written methods where appropriate
- Use their understanding of place value to multiply and divide whole numbers and decimals with up to two decimal places by 10 or 100 (e.g.  $1532 \div 100 =$ ,  $XX \div 100 = 6.3$ )
- Multiply and divide whole numbers mentally drawing upon multiplication facts up to  $12 \times 12$  and place value (e.g.  $60 \times 70$ ) and begin to use these facts to work with larger numbers
- Multiply numbers with up to two digits by a two digit number using a formal written method and becoming more confident with multiplication with larger numbers; multiply and divide numbers with up to four digits by a single digit number using the formal written method and becoming more confident with two digit divisors
- Recognise and use equivalent fractions
- Recognise and use the equivalences between simple fractions, decimals and percentages and become more confident with calculating decimal fraction equivalents
- Find simple fractions and percentages of whole numbers and quantities
- Add and subtract fractions with the same denominator, using mixed numbers where appropriate for the context
- Add and subtract fractions with the same denominator and multiples of the same number and become more confident with more complex fraction calculations
- Add and subtract decimal numbers that have the same number of decimal places
- Multiply a one digit decimal number by a single digit number
- Use simple ratio to compare quantities
- Use simple formulae expressed in words (e.g. time needed to cook a chicken: allow 20 minutes plus 40 minutes per kilogram)
- Find possible values in missing number problems involving one or two unknowns (e.g. Ben thinks of two numbers: the sum of the two numbers is 10: multiplied together they make 24: What are Ben's numbers?)

# KS2 Mathematics 2016:

## The expected standard

2016

In preparing for the new statutory assessment arrangements in 2016, the government has identified the bullet points below as the 'expected standard' in mathematics by the end of Key Stage Two.

### Measurement

- Read, write and convert time between analogue (including clock faces using Roman numerals) and digital 12 and 24 hour clocks, using am and pm where necessary
- Calculate the duration of an event using appropriate units of time (e.g. A film starts at 6:45pm and finishes at 8:05pm. How long did it last?)
- Convert between 'adjacent' metric units of measure for length, capacity and mass (e.g. 1.2 kg = 1200 g; how many 200 ml cups can be filled from a 2 litre bottle?; write 605 cm in metres)
- Find the perimeter of compound shapes when all side lengths are known or can be easily determined (e.g. a simple shape made from two identical rectangles joined together to make an L-shape with given dimensions of the rectangle)
- Estimate the area of irregular shapes by counting squares (including half squares and fractions of squares that join with others to make whole squares)
- 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 by counting squares

### Geometry

- Compare and classify 3D and 2D shapes based on their properties (e.g. for 2-D shapes: parallel sides, length of sides, type and size of angles, reflective symmetry, regular / irregular polygons; for 3-D shapes: faces, vertices and edges)
- Recognise, describe simple 3D shapes, including using nets and other 2D representations
- Complete simple shapes using given lengths, such as 7.5cm, (accurate to +/- 2 mm) and acute angles that are multiples of 5° (accurate to +/- 2°)
- Know and use the facts that angles at a point sum to 360°, angles at a point on a straight line sum to 180° and angles in a triangle sum to 180° (e.g. calculate the base angles of an isosceles triangle where the other angle is 110°) and identify other multiples of 90°
- Identify, describe and represent the position of a shape following a reflection or translation
- Describe positions on a 2-D co-ordinate grid using axes with equal scales in the first quadrant (in the context of number or geometry) and use co-ordinates to complete a given rectangle; becoming more confident in all four quadrants

# KS2 Mathematics 2016:

## The expected standard

2016

In preparing for the new statutory assessment arrangements in 2016, the government has identified the bullet points below as the 'expected standard' in mathematics by the end of Key Stage Two.

### Statistics

- Complete, read and interpret information presented in tables and bar charts (e.g. find the difference between two bars showing temperatures, where one is 20°C and the other is 13°C, on a scale labelled in multiples of 5)
- Interpret line graphs (e.g. beginning to find the difference between two temperatures on a line graph, where one is 20°C and the other is 13°C, on a scale labelled in multiples of 5) and simple pie charts (e.g. a pie chart cut into eight pieces for favourite fruit using whole numbers for each section)
- Calculate the mean as an average for simple sets of discrete data (e.g. find the mean mass of three parcels weighing 5kg, 3kg and 10kg)

### Solving problems and reason mathematically

- Develop their own strategies to solve problems by applying their mathematics to a variety of routine and non-routine problems, in a range of contexts (including money and measures, geometry and statistics) using the content described above
- Begin to reason mathematically making simple generalisations, using mathematical language and searching for solutions by trying out ideas of their own
- Use and interpret mathematical symbols and diagrams, and present information and results in a clear and organised way; for example:
  - derive strategies to solve problems with two or three computational steps using addition, subtraction, multiplication and division and a combination of these (e.g. extract and add prices from a table and calculate change, or solve problems such as 'Jason bought some bags of green apples (6 for 75p) and some bags of red apples (10 for 90p). He spent £4.20. How many bags of each type of apples did he buy?')
  - solve problems involving numbers with up to two decimal places (e.g. find the two numbers which sum to 10 from this list: 0.01, 0.11, 1.01, 9.09, 9.9, 9.99)
  - select appropriate strategies when calculating depending on the numbers involved
  - use rounding and estimation to check their answers and determine, in the context of the problem, appropriate levels of accuracy
  - identify simple patterns and relationships, and make simple generalisations. They can draw their own conclusions and explain their reasoning in simple contexts using mathematical language (e.g. an explanation to satisfy statements such as 'If you add a two-digit number to a two-digit number you cannot get a four-digit number')

# Year 1

Aspect	Autumn	Spring	Summer
<b>Number and Place Value</b>	<ul style="list-style-type: none"> <li>▪ I count to and across 100, forward and backward, beginning with 0 or 1, or from any given number.</li> <li>▪ I count in multiples of 2s, 5s and 10s.</li> <li>▪ I read and write numbers to 100 in numerals</li> </ul>	<ul style="list-style-type: none"> <li>▪ Given a number, I can identify 1 more or 1 less.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I read and write numbers from 1 to 20 in numerals and words</li> </ul>
<b>Addition and Subtraction</b>	<ul style="list-style-type: none"> <li>▪ I read, write and interpret mathematical statements involving + - = signs.</li> <li>▪ I represent and use number bonds and related subtraction facts within 20.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I add and subtract 1-digit and 2-digit numbers to 20, including zero.</li> <li>▪ I solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I add and subtract 1-digit and 2-digit numbers to 20, including zero.</li> </ul>
<b>Multiplication and Division</b>		<ul style="list-style-type: none"> <li>▪ I solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of my teacher.</li> </ul>	
<b>Fractions</b>	<ul style="list-style-type: none"> <li>▪ I recognise, find and name a half as one of two equal parts of an object, shape or quantity.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.</li> </ul>	

## Year 1 (continued)

Aspect	Autumn	Spring	Summer
<b>Measures</b>	<ul style="list-style-type: none"> <li>▪ I compare, describe and solve practical problems for: lengths and heights and mass/weight</li> <li>▪ I compare, describe and solve practical problems for: capacity and volume</li> <li>▪ I recognise and know the value of different denominations of coins and notes.</li> <li>▪ I sequence events in chronological order using language (e.g. before, after, next, first, today, yesterday, tomorrow, morning, afternoon, evening).</li> <li>▪ I recognise and use language relating to dates, including days of the week, weeks, months, years.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I measure and begin to record the following: mass/weight.</li> <li>▪ I measure and begin to record the following: length and heights.</li> <li>▪ I compare, describe and solve practical problems for: time.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I can measure and begin to record the following: capacity and volume.</li> <li>▪ I can tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.</li> </ul>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>▪ I recognise and name common 2D shapes, including circles and triangles.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I identify and describe common 2D shapes, including: rectangles (including squares) circles, triangles.</li> <li>▪ I describe position, direction and movement, including half, quarter and three-quarter turns.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I describe position, direction and movement, including half, quarter and three-quarter turns .</li> <li>▪ I recognise and name common 3D shapes, including: cuboids (including cubes), pyramids, spheres.</li> </ul>

## Year 2

Aspect	Autumn	Spring	Summer
<b>Number and Place Value</b>	<ul style="list-style-type: none"> <li>▪ I count in steps of 2 and 5 from 0, and in tens from any number, forward and backward.</li> <li>▪ I read and write numbers to at least 100 in numerals and in words.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I compare and order numbers from 0 up to 100; use <math>&lt;</math> <math>&gt;</math> and <math>=</math> signs.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I recognise the place value of each digit in a 2-digit number.</li> <li>▪ I count in steps of 3 from 0, and in tens from any number, forward and backward.</li> </ul>
<b>Addition and Subtraction</b>	<ul style="list-style-type: none"> <li>▪ I recall and use addition and subtraction facts to 20 fluently and derive and use related facts up to 100.</li> <li>▪ I add and subtract numbers mentally, including: 2-digit numbers and ones; 2-digit numbers and tens; two 2-digit numbers; adding three 1-digit numbers.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I understand that addition of any two numbers can be done in any order (commutative) and subtraction of one number from another cannot.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems.</li> </ul>
<b>Multiplication and Division</b>	<ul style="list-style-type: none"> <li>▪ I recall and use multiplication and division facts for the 2, 5 and 10 tables, including recognising odd and even numbers.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I calculate the mathematical statements for multiplication and division within the multiplication tables and write them using the <math>\times</math> <math>\div</math> and <math>=</math> signs.</li> <li>▪ I understand that multiplication of two numbers can be one in any order (commutative) and division of one number by another cannot.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I recognise that division is the inverse of multiplication and use to check calculations.</li> </ul>
<b>Fractions</b>	<ul style="list-style-type: none"> <li>▪ I recognise, find, name and write fractions <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{2}{4}</math>, <math>\frac{1}{2}</math>, <math>\frac{3}{4}</math> of a length, shape, set of objects, or quantity.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I write simple fractions and recognise the equivalence.</li> </ul>	

## Year 2 (continued)

Aspect	Autumn	Spring	Summer
<b>Measures</b>	<ul style="list-style-type: none"> <li>▪ I compare and order lengths and mass, and record the results using <math>&gt;</math>, <math>&lt;</math> and <math>=</math>.</li> <li>▪ I recognise and use symbols for pounds (£) and pence (p); combine amounts to make particular values.</li> <li>▪ I tell and write the time to quarter past/to the hour and draw the hands on a clock face to show these times.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I compare and order volume/capacity and record the results using <math>&gt;</math>, <math>&lt;</math> and <math>=</math>.</li> <li>▪ I solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.</li> <li>▪ I choose and use appropriate standard units to estimate and measure: length/height in any direction (m/cm); mass (kg/g) to the nearest appropriate unit, using rulers and scales.</li> <li>▪ I 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.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I choose and use appropriate standard units to estimate and measure: temperature (<math>^{\circ}\text{C}</math>); capacity (l/ml) to the nearest appropriate unit, using thermometers and measuring vessels.</li> <li>▪ I compare and sequence intervals of time.</li> <li>▪ I find different combinations of coins that equal the same amounts of money.</li> <li>▪ I solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.</li> </ul>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>▪ I identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line.</li> <li>▪ I identify and describe the properties of 3D shapes, including the number of edges, vertices and faces.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I identify 2D shapes on the surface of 3D shapes.</li> <li>▪ I order and arrange combinations of mathematical objects in patterns and sequences.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I use mathematical vocabulary to describe position, direction and movement, including movement in a straight line distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).</li> <li>▪ I compare and sort common 2D and 3D shapes and everyday objects.</li> </ul>
<b>Statistics</b>	<ul style="list-style-type: none"> <li>▪ I interpret and construct: pictograms; tally charts; block diagrams and simple tables.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity.</li> <li>▪ I ask and answer questions about totalling and compare categorical data.</li> </ul>	

# Year 3

Aspect	Autumn	Spring	Summer
<b>Number and Place Value</b>	<ul style="list-style-type: none"> <li>▪ I count from 0 in multiples of 4, 8, 50 and 100.</li> <li>▪ I can find 10 or 100 more, or less, than a given number.</li> <li>▪ I read and write numbers to 1,000 in numerals and words</li> </ul>	<ul style="list-style-type: none"> <li>▪ I compare and order numbers up to 1000.</li> <li>▪ I recognise the place value of each digit in a 3-digit number.</li> </ul>	
<b>Addition and Subtraction</b>		<ul style="list-style-type: none"> <li>▪ I add and subtract numbers mentally, including: 3-digit number and ones; 3-digit numbers and tens; 3-digit numbers and hundreds.</li> <li>▪ I add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I estimate the answer to a calculation and use the inverse operations to check my answers.</li> <li>▪ I count up and down in tenths; recognise that tenths arise from dividing an object into ten equal parts and in dividing numbers or quantities by 10.</li> <li>▪ I add and subtract measures (length, mass and volume) with up to 3 digits, using formal written methods of columnar addition and subtraction.</li> <li>▪ I solve word problems including missing number problems, number facts, place value and more complex addition and subtraction.</li> </ul>
<b>Multiplication and Division</b>	<ul style="list-style-type: none"> <li>▪ I recall and use the multiplication and division facts for the 3, 4 and 8 tables.</li> <li>▪ I write and calculate mathematical statements for multiplication using known multiplication tables, including 2-digit x 1-digit, using mental and progressing to formal written methods.</li> <li>▪ I write and calculate mathematical statements for division using known multiplication tables, including 2-digit x 1-digit, using mental and progressing to formal written methods.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I write and calculate mathematical statements for multiplication and division using known multiplication tables, including use of money and length.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I practise formal methods of multiplication and division, including a high focus on reasoning.</li> </ul>

## Year 3 (continued)

Aspect	Autumn	Spring	Summer
<b>Fractions</b>		<ul style="list-style-type: none"> <li>▪ I recognise and show, using diagrams, equivalent fractions with small denominators.</li> <li>▪ I recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.</li> <li>▪ I compare and order unit fractions, and fractions with the same denominators.</li> <li>▪ I add and subtract fractions with the same denominator within one whole.</li> </ul>	
<b>Measures</b>	<ul style="list-style-type: none"> <li>▪ I measure the perimeter of simple 2D shapes.</li> <li>▪ I estimate and read time with increasing accuracy to the nearest minute; Tell and write the time from an analogue clock, including using Roman numerals from I to XII.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/ capacity (l/ml).</li> <li>▪ I read 12-hour and 24-hour clocks.</li> <li>▪ I record and compare time in terms of seconds, minutes, hours.</li> <li>▪ I use vocabulary such as o'clock, am/pm, morning, afternoon, noon and midnight.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I know the numbers of seconds in a minute and the number of days in each month, year and leap year.</li> <li>▪ I compare durations of events, for example to calculate time taken by particular events or tasks.</li> </ul>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>▪ I make 3D shapes using modelling materials; recognise 3D shapes in different orientations; and describe them.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I draw 2D shapes.</li> <li>▪ I recognise angles are a property of shape or a description of a turn.</li> <li>▪ I identify right angles, recognise that two right angles make a half-turn, three make three quarters and four a complete turn</li> <li>▪ I identify whether angles are greater than or less than a right angle.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I identify horizontal and vertical lines and pairs of perpendicular and parallel lines.</li> </ul>
<b>Statistics</b>	<ul style="list-style-type: none"> <li>▪ I interpret and present data using: bar charts; pictograms and tables.</li> </ul>		<ul style="list-style-type: none"> <li>▪ I solve 1-step and 2-step questions such as 'How many more?' and 'How many fewer?' using information presented in scaled bar charts, pictograms and other graphs.</li> </ul>

# Year 4

Aspect	Autumn	Spring	Summer
<b>Number and Place Value</b>	<ul style="list-style-type: none"> <li>▪ I count backwards through zero to include negative numbers</li> <li>▪ I count in multiples of 6, 7, 9, 25 and 1000.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I read Roman numerals to 100 and understand that over time, the numeral system changes to include the concept of zero and place value.</li> <li>▪ I find 1000 more or less than a given number.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I compare and order numbers beyond 1000.</li> <li>▪ I round any number to the nearest 10, 100 or 1000.</li> </ul>
<b>Addition and Subtraction</b>	<ul style="list-style-type: none"> <li>▪ I add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction, where appropriate.</li> <li>▪ I estimate and use inverse operations to check answers to a calculation.</li> </ul>		<ul style="list-style-type: none"> <li>▪ I solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.</li> </ul>
<b>Multiplication and Division</b>	<ul style="list-style-type: none"> <li>▪ I recall multiplication and division facts for tables up to 12x12.</li> <li>▪ I recognise and use factor pairs and commutativity in mental calculations.</li> <li>▪ I multiply 2-digit and 3-digit numbers by a 1-digit number using formal written layout.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I divide 2-digit and 3-digit numbers by a 1-digit number using formal written layout with no remainder.</li> <li>▪ I use place value, known and derived facts to multiply and divide mentally, including multiplying by 0 and 1; multiplying three numbers together.</li> <li>▪ I find the effect of multiplying a number with up to 2 decimal places by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.</li> </ul>	

## Year 4 (continued)

Aspect	Autumn	Spring	Summer
<b>Fractions</b>		<ul style="list-style-type: none"> <li>▪ I recognise and show, using diagrams, families of common equivalent fractions.</li> <li>▪ I add and subtract fractions with the same denominator.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I find the effect of dividing a 1-digit or 2-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.</li> <li>▪ I count up and down in hundredths; recognise that hundredths arise from dividing an object into one 100 equal parts and in dividing numbers or quantities by 100.</li> <li>▪ I recognise and write decimals equivalents of any number of tenths or hundredths.</li> <li>▪ I recognise and write decimal equivalents to <math>\frac{1}{4}</math>, <math>\frac{1}{2}</math> and <math>\frac{3}{4}</math>.</li> <li>▪ I round decimals with one decimal place to the nearest whole number.</li> <li>▪ I compare numbers with the same number of decimal places up to two decimal places.</li> </ul>
<b>Measures</b>	<ul style="list-style-type: none"> <li>▪ I read, write and convert time between analogue and digital 12- and 24-hour clocks.</li> <li>▪ I measure and calculate the perimeter of a rectilinear figure (including squares) in cm and m.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I find the area of rectilinear shapes by counting squares.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I convert between different units of measure (e.g. km to m; hr to min).</li> </ul>

## Year 4 (continued)

<b>Aspect</b>	<b>Autumn</b>	<b>Spring</b>	<b>Summer</b>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>▪ I compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I describe positions on a 2D grid as coordinates in the first quadrant.</li> <li>▪ I identify lines of symmetry in 2D shapes presented in different orientations.</li> <li>▪ I complete a simple symmetric figure with respect to a specific line of symmetry.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I describe positions on a 2D grid as coordinates in the first quadrant.</li> <li>▪ I describe movements between positions as translations of a given unit to the left/right and up/down.</li> <li>▪ I plot specified points and draw sides to complete a given polygon.</li> <li>▪ I identify acute and obtuse angles, and compare and order angles up to two right angles by size.</li> </ul>
<b>Statistics</b>	<ul style="list-style-type: none"> <li>▪ I interpret and present discrete and continuous data using appropriate graphical methods, including: bar charts and time graphs.</li> </ul>		<ul style="list-style-type: none"> <li>▪ I solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.</li> </ul>

# Year 5

Aspect	Autumn	Spring	Summer
<b>Number and Place Value</b>	<ul style="list-style-type: none"> <li>I count forward or backwards in steps of powers of 10 for any given number up to 1,000,000.</li> <li>I count up and down in thousandths; recognise that thousandths arise from dividing an object into 1000 equal parts and in dividing numbers or quantities by 1000.</li> </ul>	<ul style="list-style-type: none"> <li>I interpret negative numbers in context, count forwards and backwards with positive and negative numbers, including through zero.</li> <li>I read Roman numerals to 1000 and recognise years written in Roman numerals.</li> </ul>	<ul style="list-style-type: none"> <li>I read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit.</li> <li>I round any number up to 1,000,000 to the nearest 10, 100, 1000, 10000 or 100000.</li> </ul>
<b>Addition and Subtraction</b>	<ul style="list-style-type: none"> <li>I add and subtract numbers mentally with increasingly large numbers.</li> <li>I add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).</li> </ul>	<ul style="list-style-type: none"> <li>I use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.</li> </ul>	<ul style="list-style-type: none"> <li>I solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</li> </ul>
<b>Multiplication and Division</b>	<ul style="list-style-type: none"> <li>I identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.</li> <li>I multiply and divide numbers mentally drawing upon known facts.</li> <li>I know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers and establish whether a number up to 100 is prime and recall prime numbers up to 19.</li> <li>I multiply numbers up to 4-digits by a 1-digit or 2-digit number using a formal written method, including long multiplication for 2-digit numbers.</li> </ul>	<ul style="list-style-type: none"> <li>I divide numbers up to 4-digits by a 1-digit number using the formal written method of short division and interpret remainders appropriately for the context.</li> <li>I multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.</li> <li>I solve problems involving multiplication and division using knowledge of factors and multiples, squares and cubes.</li> <li>I solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding of the equals sign.</li> </ul>	<ul style="list-style-type: none"> <li>I recognise and use square numbers and cube numbers, and the notation for squared<sup>2</sup> and cubed<sup>3</sup>.</li> <li>I solve problems involving multiplication and division including scaling by simple fractions and problems involving simple rates.</li> </ul>

## Year 5 (continued)

Aspect	Autumn	Spring	Summer
<b>Fractions</b>	<ul style="list-style-type: none"> <li>I identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.</li> <li>I read and write decimal numbers as fractions, e.g. <math>0.71 = 71/100</math>.</li> </ul>	<ul style="list-style-type: none"> <li>I recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements.</li> </ul>	<ul style="list-style-type: none"> <li>I compare and order fractions whose denominators are all multiples of the same number.</li> <li>I round decimals with two decimal places to the nearest whole number and to one decimal place.</li> <li>I read, write, order and compare numbers with up to three decimal places.</li> <li>I recognise the percent 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.</li> </ul>
<b>Measures</b>	<ul style="list-style-type: none"> <li>I measure and calculate the perimeter of composite rectilinear shapes in cm and m.</li> <li>I calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (<math>\text{cm}^2</math>) and square metres (<math>\text{m}^2</math>) and estimate the area of irregular shapes.</li> </ul>	<ul style="list-style-type: none"> <li>I estimate volume (e.g. using <math>1 \text{ cm}^3</math> blocks to build cuboids, including cubes) and capacity (e.g. using water).</li> <li>I convert between different units of metric measure (e.g. km/m; cm/m; cm/mm; g/kg; l/ml).</li> </ul>	<ul style="list-style-type: none"> <li>I solve problems involving converting between units of time.</li> <li>I understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.</li> </ul>

## Year 5 (continued)

Aspect	Autumn	Spring	Summer
<b>Geometry</b>	<ul style="list-style-type: none"> <li>▪ I know angles are measured in degrees;</li> <li>▪ I estimate and compare acute, obtuse and reflex angles.</li> <li>▪ I identify angles at a point on a straight line and <math>\frac{1}{2}</math> a turn (total <math>180^\circ</math>); and I identify angles at a point and one whole turn (total <math>360^\circ</math>); I identify other multiples of <math>90^\circ</math>;</li> <li>▪ I draw given angles, and measure them in degrees.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I 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.</li> <li>▪ I distinguish between regular and irregular polygons based on reasoning about equal sides and angles.</li> <li>▪ I identify 3D shapes, including cubes and other cuboids, from 2D representations.</li> <li>▪ I use the properties of rectangles to deduce related facts and find missing lengths and angles.</li> </ul>	
<b>Statistics</b>	<ul style="list-style-type: none"> <li>▪ I complete, read and interpret information in: tables, including timetables</li> </ul>	<ul style="list-style-type: none"> <li>▪ I solve comparison, addition and difference problems using information presented in a line graph.</li> </ul>	

# Year 6

Aspect	Autumn	Spring	Summer
<b>Number and Place Value</b>	<ul style="list-style-type: none"> <li>I read, write, order and compare numbers up to 10,000,000 and determine the value of each digit.</li> </ul>	<ul style="list-style-type: none"> <li>I use negative numbers in context and calculate intervals across zero.</li> </ul>	<ul style="list-style-type: none"> <li>I round any whole number to the required degree of accuracy.</li> <li>I solve number and practical problems that involve all other number and place value objectives.</li> </ul>
<b>Addition and Subtraction</b>	<ul style="list-style-type: none"> <li>I perform mental calculations, including with mixed operations and large numbers.</li> <li>I use knowledge of the order of operations to carry our calculations involving the four operations.</li> <li>I use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.</li> </ul>	<ul style="list-style-type: none"> <li>I use knowledge of the order of operations to carry our calculations involving the four operations.</li> </ul>	<ul style="list-style-type: none"> <li>I solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</li> <li>I solve problems involving addition, subtraction, multiplication and division.</li> </ul>
<b>Multiplication and Division</b>	<ul style="list-style-type: none"> <li>I identify common factors, common multiples and prime numbers.</li> <li>I perform mental calculations, including with mixed numbers and large numbers.</li> </ul>	<ul style="list-style-type: none"> <li>I multiply multi-digit numbers up to 4-digits by a 2-digit whole number using the formal written method of long multiplication.</li> <li>I divide numbers up to 4-digits by a 2-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.</li> <li>I divide numbers up to 4-digits by a 2-digit number using the formal written method of short division, where appropriate, interpreting remainders according to the context.</li> </ul>	<ul style="list-style-type: none"> <li>I solve multiplication and division multi-step problems in contexts, deciding which operations and methods to use and why.</li> </ul>

## Year 6 (continued)

Aspect	Autumn	Spring	Summer
<b>Fraction</b>	<ul style="list-style-type: none"> <li>▪ I compare and order fractions, including fractions.</li> <li>▪ I use common factors to simplify fractions; use common multiples to express fractions in the same denomination.</li> <li>▪ I recall and use equivalences between simple fractions, decimals and percentages, including different contexts.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I multiply simple pairs of proper fractions, writing the answer in the simplest form.</li> <li>▪ I divide proper fractions by whole numbers.</li> <li>▪ I associate a fraction with division to calculate decimal fraction equivalents, for simple fractions.</li> </ul>
<b>Measures</b>	<ul style="list-style-type: none"> <li>▪ I calculate, estimate and compare volume of cubes and cuboids using standard units, including <math>\text{cm}^3</math> and <math>\text{m}^3</math>, and extending to other units such as <math>\text{mm}^3</math> and <math>\text{km}^3</math>.</li> <li>▪ I convert between miles and km.</li> <li>▪ I 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 three decimal places.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate.</li> <li>▪ I recognise when it is possible to use formulae for area and volume of shapes.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I recognise that shapes with the same areas can have different perimeters and vice versa.</li> <li>▪ I calculate the area of parallelograms and triangles.</li> </ul>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>▪ I compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.</li> <li>▪ I draw 2D shapes using given dimensions and angles.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I describe positions on the full coordinate grid, (all four quadrants).</li> <li>▪ I draw and translate simple shapes on the coordinate plane, and reflect them in the axes.</li> <li>▪ I recognise, describe and build simple 3D shapes, including making nets.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.</li> <li>▪ I illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.</li> </ul>

## Year 6 (continued)

Aspect	Autumn	Spring	Summer
<b>Statistics</b>		<ul style="list-style-type: none"> <li>▪ I interpret and construct: pie charts and line graphs and use these to solve problems.</li> </ul>	<ul style="list-style-type: none"> <li>▪ I calculate and interpret the mean as an average</li> </ul>
<b>Ratio and Proportion</b>		<ul style="list-style-type: none"> <li>▪ I solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.</li> <li>▪ I solve problems involving the calculation of percentages of whole numbers or measures such as 15% of 360 and the use of percentages for comparison.</li> </ul>	
<b>Algebra</b>			<ul style="list-style-type: none"> <li>▪ I express missing number problems algebraically and use simple formulae.</li> <li>▪ I find pairs of numbers that satisfy number sentences with two unknowns.</li> </ul>