

# Mathematics in Y3

## YEAR GROUP EXPECTATIONS



### What the National Curriculum requires in mathematics in Y3

#### NUMBER—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.

# Mathematics in Y3

## YEAR GROUP EXPECTATIONS



### NUMBER—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,  $\frac{7}{5} + \frac{1}{5} = \frac{8}{5}$ ]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

### 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].

### GEOMETRY—PROPERTIES OF SHAPE:

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

### STATISTICS:

- 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.

# Mathematics in Y4

## YEAR GROUP EXPECTATIONS



### What the National Curriculum requires in mathematics in Y4

#### NUMBER—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.

# Mathematics in Y4

## YEAR GROUP EXPECTATIONS



### NUMBER—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.

### 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.

### GEOMETRY—PROPERTIES OF SHAPE:

- 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.

# Mathematics in Y4

## YEAR GROUP EXPECTATIONS



### **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:**

- 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.

# Mathematics in Y5

## YEAR GROUP EXPECTATIONS



### What the National Curriculum requires in mathematics in Y5

#### NUMBER—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 100000
- 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

# Mathematics in Y5

## YEAR GROUP EXPECTATIONS



### 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,  $0.71 = 71/100$ ]
- 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  $1/2$ ,  $1/4$ ,  $1/5$ ,  $2/5$ ,  $4/5$  and those fractions with a denominator of a multiple of 10 or 25.

### 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.

# Mathematics in Y5

## YEAR GROUP EXPECTATIONS



### **GEOMETRY—PROPERTIES OF SHAPE:**

- 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—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

# Mathematics in Y6

## YEAR GROUP EXPECTATIONS



### What the National Curriculum requires in mathematics in Y6

#### NUMBER—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.

# Mathematics in Y6

## YEAR GROUP EXPECTATIONS



### **NUMBER—FRACTIONS INCLUDING DECIMALS AND PERCENTAGES:**

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including 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.

### **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.

### **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.

# Mathematics in Y6

## YEAR GROUP EXPECTATIONS



### 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 ( $\text{cm}^3$ ) and cubic metres ( $\text{m}^3$ ), and extending to other units [for example,  $\text{mm}^3$  and  $\text{km}^3$ ].

### GEOMETRY—PROPERTIES OF SHAPE:

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

### GEOMETRY—POSITION AND DIRECTION:

- 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.

# KS2 Mathematics 2016

## THE EXPECTED STANDARD



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

# KS2 Mathematics 2016

## THE EXPECTED STANDARD



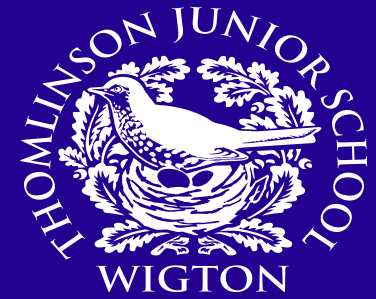
- Add and subtract fractions with the same denominator and multiples of the same number and become more confident with more complex fraction calculations
- Add and subtract decimal numbers that have the same number of decimal places
- Multiply a one digit decimal number by a single digit number
- Use 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?)

### 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

# KS2 Mathematics 2016

## THE EXPECTED STANDARD



### 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

### 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)

# KS2 Mathematics 2016

## THE EXPECTED STANDARD



### 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')

# Being a mathematician

## A YEAR 3 MATHEMATICIAN



### Number, place value, approximation and estimation/rounding

- I can count from 0 in multiples of 4, 8, 50 and 100.
- I can compare and order numbers up to 1,000.
- I can read and write numbers to 1,000 in numerals and words.
- I can find 10 or 100 more or less than a given number.
- I can recognise the place value of each digit in a 3-digit number.
- I can identify, represent and estimate numbers using different representations.
- I can solve number problems and practical problems using above.

### Calculations

- I can add and subtract mentally, including:
  - A 3-digit number and ones
  - A 3-digit number and tens
  - A 3-digit number and hundreds
- I can add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.
- I can estimate the answer to a calculation and use inverse operation to check answers.
- I can solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.
- I can recall and use multiplication and division facts for the 3, 4 and 8x tables.
- I can write and calculate mathematical statements for multiplication and division using the multiplication tables, including for 2-digit numbers, using mental and progressing to formal written methods.
- I can 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.

# Being a mathematician

## A YEAR 3 MATHEMATICIAN



### Fractions, decimals and percentages

- I can count up and down in tenths.
- I recognise that tenths arise from dividing an object into 10 equal parts and in dividing 1-digit numbers or quantities by 10.
- I recognise and can find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.
- I can compare and order unit fractions and fractions with the same denominators.
- I can add and subtract fractions with the same denominator within one whole.
- I can solve problems involving the above.

### Measurement

- I can compare lengths using m, cm & mm.
- I can compare mass using kg & g.
- I can compare volume/capacity using l & ml.
- I can measure lengths using m, cm & mm.
- I can measure mass using kg & g.
- I can measure volume/capacity using l & ml.
- I can add and subtract lengths using m, cm & mm.
- I can add and subtract mass using kg & g.
- I can add and subtract volume/capacity using l & ml.
- I can tell and write the time from an analogue clock (12 hour clock).
- I can tell and write the time from an analogue clock (24 hour clock).
- I can tell and write the time from an analogue clock (Roman numerals).
- I can estimate and read time with increasing accuracy to the nearest minute.
- I can record and compare time in terms of seconds, minutes and hours.
- I can use the following vocabulary: o'clock, am, pm, morning, afternoon, noon & midnight.
- I know the number of seconds in a minute.
- I know the number of days in each month, year and leap year.
- I can compare the duration of events.

# Being a mathematician

## A YEAR 3 MATHEMATICIAN



- I can measure the perimeter of simple 2D shapes.
- I can add and subtract amounts of money to give change, using both £ and p in a practical context.

### Geometry –properties of shapes

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

### Statistics

- I can interpret and present data using bar charts, pictograms and tables.
- I can solve one-step and two-step questions using information presented in scaled bar charts, pictograms and tables.

# Being a mathematician

## A YEAR 4 MATHEMATICIAN



### Number, place value, approximation and estimation/rounding

- I can count in multiples of 6, 7, 9, 25 and 1,000.
- I can order and compare numbers beyond 1,000.
- I can find 1,000 more or less than a given number.
- I recognise the place value of each digit in a 4-digit number.
- I can read Roman numerals to 100 and know that over time the numeral system changed to include the concept of zero and place value.
- I can identify, represent and estimate numbers using different representations.
- I can round any number to the nearest 10, 100 or 1,000.
- I can count backwards through zero to include negative numbers.
- I can solve number and practical problems with the above (involving increasingly large numbers).

### Calculations

- I can add and subtract numbers with up to 4-digits using the formal written methods of columnar addition and subtraction.
- I can estimate and use inverse operations to check answers in a calculation.
- I can solve addition and subtraction 2-step problems in contexts, deciding which operations and methods to use and why.
- I can recall multiplication and division facts up to  $12 \times 12$ .
- I can 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.
- I recognise and use factor pairs and commutativity in mental calculations.
- I can multiply 2-digit numbers by a 1-digit number using formal written layout.
- I can solve problems involving multiplying and adding, including using the distributive law to multiply 2-digit numbers by 1-digit, integer scaling problems and harder correspondence problems such as  $n$  objects are connected to  $m$  objects.

# Being a mathematician

## A YEAR 4 MATHEMATICIAN



### Fractions, decimals and percentages

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

### Measurement

- I can compare different measures, including money in £ and p.
- I can estimate different measures, including money in £ and p.
- I can calculate different measures. Including money in £ and p.
- I can read, write and convert time between analogue and digital 12 hour clocks.
- I can read, write and convert time between analogue and digital 24 hour clocks.
- I can solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.
- I can convert between different units of measurements
- I can measure and calculate the perimeter of a rectilinear figure in cm and m.
- I can find the area of rectilinear shapes by counting squares.
- I can calculate different measures

# Being a mathematician

## A YEAR 4 MATHEMATICIAN



### Geometry –properties of shapes

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

### Geometry –position and direction

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

### Statistics

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

# Being a mathematician

## A YEAR 5 MATHEMATICIAN



### Number, place value, approximation and estimation/rounding

- I can count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000.
- I can read, write, order and compare numbers to at least 1,000,000.
- I can determine the value of each digit in numbers up to 1,000,000.
- I can read Roman numerals to 1,000 (M) and recognise years written in Roman numerals.
- I can round any number up to 1,000,000 to the nearest 10, 100, 1000, 10000 and 100000.
- I can interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.
- I can solve number problems and practical problems with the above.

### Calculations

- I can add and subtract numbers mentally with increasingly large numbers.
- I can add and subtract whole numbers with more than 4 digits, including using formal written methods.
- I can use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- I can solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- I can identify multiples and factors, including finding all factor pairs or a number and common factor pairs of two numbers.
- I use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.
- I can establish whether a number up to 100 is prime and recall prime numbers up to 19.
- I recognise and use square numbers and cube numbers, and the notation for squared and cubed.
- I can multiply and divide numbers mentally drawing on known facts.
- I can multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
- I can 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.
- I can 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.
- I can solve problems involving multiplication and division including using knowledge of factors and multiples, squares and cubes.
- I can solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.
- I can solve problems involving multiplication and division including scaling by simple fractions and problems involving simple rates.

# Being a mathematician

## A YEAR 5 MATHEMATICIAN



### Number, place value, approximation and estimation/rounding

- I can count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000.
- I can read, write, order and compare numbers to at least 1,000,000.
- I can determine the value of each digit in numbers up to 1,000,000.
- I can read Roman numerals to 1,000 (M) and recognise years written in Roman numerals.
- I can round any number up to 1,000,000 to the nearest 10, 100, 1000, 10000 and 100000.
- I can interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.
- I can solve number problems and practical problems with the above.

### Calculations

- I can add and subtract numbers mentally with increasingly large numbers.
- I can add and subtract whole numbers with more than 4 digits, including using formal written methods.
- I can use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- I can solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- I can identify multiples and factors, including finding all factor pairs or a number and common factor pairs of two numbers.
- I use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.
- I can establish whether a number up to 100 is prime and recall prime numbers up to 19.
- I recognise and use square numbers and cube numbers, and the notation for squared and cubed.
- I can multiply and divide numbers mentally drawing on known facts.
- I can multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
- I can 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.
- I can 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.
- I can solve problems involving multiplication and division including using knowledge of factors and multiples, squares and cubes.
- I can solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.
- I can solve problems involving multiplication and division including scaling by simple fractions and problems involving simple rates.

# Being a mathematician

## A YEAR 5 MATHEMATICIAN



### Fractions, decimals and percentages

- I can recognise mixed numbers and improper fractions and convert from one form to the other.
- I can write mathematical statements  $>1$  as a mixed number.
- I can identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.
- I can compare and order fractions whose denominators are multiples of the same number.
- I can add and subtract fractions with the same denominator and denominators that are multiples of the same number.
- I can multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.
- I can read and write decimal numbers as fractions.
- I recognise and can use thousandths and relate them to tenths, hundredths and decimal equivalents.
- I can round decimals with 2 decimal places to the nearest whole number and 1 decimal place.
- I can read, write, order and compare numbers with up to 3 decimal places.
- I can solve problems involving numbers up to 3 decimal places.
- I recognise the percent symbol and understand that percent relates to 'number parts per hundred'.
- I can write percentages as a fraction with denominator hundred, and as a decimal.
- I can 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 or a multiple of 10 or 25.

### Measurement

- I can solve problems involving converting between units of time.
- I can convert between different units of metric measure.
- I understand and use approximate equivalences between metric units and common imperial units, such as inches, pounds and pints.
- I can measure and calculate the perimeter of composite rectilinear shapes in cm and m.
- I can calculate and compare the area of rectangles (including squares), and including using standard units ( $\text{cm}^2$  and  $\text{cm}^3$ ) to estimate the area of irregular shapes.
- I can estimate volume and capacity.
- I can use all four operations to solve problems involving money using decimal notation, including scaling.

# Being a mathematician

## A YEAR 5 MATHEMATICIAN



### Geometry –properties of shapes

- I can use the properties of rectangles to deduce related facts and find missing lengths and angles.
- I can distinguish between regular and irregular polygons based on reasoning about equal sides and angles.
- I can identify 3D shapes, including cubes and other cuboids, from 2D representations.
- I know angles are measured in degrees.
- I can estimate and compare acute, obtuse and reflex angles.
- I can identify angles at a point and one whole turn.
- I can identify angles at a point on a straight line and  $\frac{1}{2}$  a turn.
- I can identify other multiples of  $90^\circ$ .
- I can draw given angles and measure them in degrees.

### Geometry –position and direction

- I can 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

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

# Being a mathematician

## A YEAR 6 MATHEMATICIAN



### Number, place value, approximation and estimation/rounding

- I can read, write, order and compare numbers up to 10,000,000.
- I can determine the value of each digit in numbers up to 10,000,000.
- I can round any whole number to a required degree of accuracy.
- I can use negative numbers in context, and calculate intervals across zero.
- I can solve number problems and practical problems with the above.

### Calculations

- I can use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
- I can solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- I can identify common factors, common multiples and prime numbers.
- I can perform mental calculations, including with mixed operations and large numbers.
- I can multiply multi-digit numbers up to 4 digits by a 2 digit whole number using the formal written method of long multiplication.
- I can 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.
- I can divide numbers up to 4 digits by a 2 digit number using the formal written method of short division where appropriate.
- I can solve problems involving addition, subtraction, multiplication and division.
- I can use my knowledge of the order of operations to carry out calculations involving the four operations.

# Being a mathematician

## A YEAR 6 MATHEMATICIAN



### Fractions, decimals and percentages

- I can use common factors to simplify fractions and use common multiples to express fractions in the same denomination.
- I can compare and order fractions, including fractions  $>1$ .
- I can add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.
- I can multiply simple pairs of proper fractions, writing the answer in the simplest form.
- I can divide proper fractions by whole numbers.
- I can associate a fraction with division to calculate decimal fractions equivalents for a simple fraction.
- I can identify the value of each digit to 3 decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to 3 decimal places.
- I can multiply 1-digit numbers with up to 2 decimal places by whole numbers.
- I can use written division methods in cases where the answer has up to 2 decimal places.
- I can solve problems which require answers to be rounded to specified degrees of accuracy.
- I can recall and use equivalences between simple fractions, decimals and percentages, including in different contexts

### Ratio and proportion

- I can solve problems involving the relative sizes of two quantities, where missing values can be found using integer multiplication and division facts.
- I can solve problems involving the calculation of percentages and the use of percentage comparisons.
- I can solve problems involving similar shapes where the scale factor is known or can be found.
- I can solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

### Algebra

- I can express missing number problems algebraically.
- I can use a simple formulae.
- I can generate and describe linear number sequences.
- I can find pairs of numbers that satisfy an equation with two unknowns.
- I can enumerate possibilities of combinations of two variables.

# Being a mathematician

## A YEAR 6 MATHEMATICIAN



### Measurement

- I can 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 of up to 3 decimal places.
- I can convert between miles and kilometres.
- I recognise that shapes with the same areas can have different perimeters and vice versa.
- I can calculate the area of parallelograms and triangles.
- I recognise when it is possible to use the formulae for the area of shapes.
- I can calculate, estimate and compare volume of cubes and cuboids, using standard units.
- I recognise when it is possible to use the formulae for the volume of shapes.
- I can solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate.

### Geometry –properties of shapes

- I can compare and classify geometric shapes based on the properties and sizes.
- I can describe simple 3D shapes.
- I can draw 2D shapes given dimensions and angles.
- I recognise and build simple 3D shapes, including making nets.
- I can find unknown angles in any triangles, quadrilaterals and regular polygons.
- I recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
- I can illustrate and name parts of circles, including radius, diameter and circumference.
- I know the diameter is twice the radius.

### Geometry –position and direction

- I can draw and translate simple shapes on the co-ordinate plane, and reflect them in the axes.
- I can describe positions on the full co-ordinate grid (all four quadrants).

### Statistics

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