Reasoning

Fluency

Arithmetical Proficency

Mathematical Habits

Mathematical Mindsets

Year 1

- Count to and across 100, forwards and backwards, beginning with 0 or 1,
- Count, read and write numbers to 100 in numerals, count in multiples of twos, fives and tens or from any given number
- Add and subtract one-digit and two-digit numbers to 20, including zero.
- Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
- Given a number, identify one more and one less
- Represent and use number bonds and related subtraction facts within 20
- Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9.
- 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.
- 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.
- Compare, describe and solve practical problems for lengths and heights, mass or weight, capacity/volume, time.
- Measure and begin to record the following; lengths and heights, mass/weight, capacity and volume, time
- 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.
- Describe position, direction and movement, including whole, half, quarter and three-quarter turns
- Recognise and know the value of different denominations of coins and notes.
- Recognise and name common 2D and 3D shapes, including 2D shapes e.g. rectangles (including squares) circles and triangles, and 3D shapes e.g. cuboids, including cubes, pyramids and spheres.
- Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.
- Recognise and use language relating to dates, including days of the week, weeks, months and years.
- Sequence events in chronological order using language e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening.

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Year 2

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)

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

Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.

Identify, represent and estimate numbers using different representations, including the number line

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

Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication, division and equals signs

Compare and order numbers from 0 up to 100; use <, > and = signs

Use place value and number facts to solve problems.

Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.

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.

Read and write numbers to at least 100 in numerals and in words

Recognise, find, name and write fractions 1/3 , 1/4 , 2/4 and 3/4 of a length, shape, set of objects or quantity.

Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels

Interpret and construct simple pictograms, tally charts, block diagrams and simple tables

Write simple fractions e.g. 1/2 of 6 = 3 and recognise the equivalence of two quarters and one half.

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.

Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity

Identify 2-D shapes on the surface of 3-D shapes(for example a circle on a cylinder and a triangle on a pyramid)

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.

Ask and answer questions about totalling and comparing categorical data.

Order and arrange combinations of mathematical objects in patterns and sequences

Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line.

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.

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

Compare and sort common 2-D and 3-D shapes and everyday objects.

Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces.

Know the number of minutes in an hour and the number of hours in a day.

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Year 3

- Count from 0 in multiples of 4, 8, 50 and 100; finding 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)
- Add and subtract numbers mentally, including:
  - a three digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction
- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- Identify, represent and estimate numbers using different representations
- Read and write numbers up to 1000 in numerals and in words
- Estimate the answer to a calculation and use inverse operations to check answers
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental progressing to formal written methods
- Compare and order numbers up to 1000
- Solve number problems and practical problems involving these ideas.
- Add and subtract numbers with up to three digits, using the formal written methods of columnar addition and subtraction
- Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/ capacity (l/ml)
- 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.
- 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 and use fractions as numbers: unit fractions and non-unit fractions with small denominators.
- Measure the perimeter of simple 2-D shapes
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.
- Recognise and show, using diagrams, equivalent fractions with small denominators.
- Add and subtract amounts of money to give change, using both £ and p in practical contexts
- Add and subtract fractions with the same denominator within one whole
- Interpret and present data using bar charts, pictograms and tables.
- Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations; and describe them.
- Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24- hour clocks
- Compare and order unit fractions and fractions with the same denominators.
- Solve one-step and two-step questions using information presented in scaled bar charts and pictograms and tables.
- 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
- Compare durations of events
- 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
- Solve problems that involve all of the above. (Fractions)
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.
- Recognise angles as a property of shape or a description of a turn
- Know the number of seconds in a minute and the number of days in each month, year and leap year.

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Year 4

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- Count in multiples of 6, 7, 9, 25 and 1000.
- Find 1000 more or less than a given number.
- Order and compare numbers beyond 1000.
- Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.
- Recall multiplication and division facts for multiplication tables up to 12 × 12.
- Count backwards through zero to include negative numbers.
- Identify, represent and estimate numbers using different representations.
- Estimate and use inverse operations to check answers to a calculation.
- 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.
- 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.
- Recognise the place value of each digit in a four-digit number.
- Round any number to the nearest 10, 100 or 1000.
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.
- Recognise and use factor pairs and commutativity in mental calculations.
- Convert between different units of measure (e.g. kilometre to metre; hour to minute).
- Solve number and practical problems that involve all of the above and with increasingly large positive numbers.
- Recognise and show, using diagrams, families of common equivalent fractions.
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.
- Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres.
- Find the area of rectilinear shapes by counting squares.
- Read Roman numerals to 100 and know that, over time, the numeral system changed to include the concept of zero and place value.
- Count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten.
- Recognise and write decimal equivalents of any number of tenths or hundredths.
- Read, write and covert 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.
- 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.
- Recognise and write decimal equivalents to $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$
- Plot specified points and draw sides to complete a given polygon.
- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.
- Add and subtract fractions with the same denominator.
- 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.
- Interpret and present discrete and continuous data using appropriate graphical methods including bar charts and time graphs.
- Describe movements between positions as translations of a given unit to the left/ right and up/ down.
- Identify lines of symmetry in 2-D shapes presented in different orientations.
- Identify acute and obtuse angles and compare and order angles up to two right angles by size.
- 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.
- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.
- Describe positions on a 2-D grid as coordinates in the first quadrant.
- Complete a simple symmetric figure with respect to a specific line of symmetry.

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Year 5

- 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
- Add and subtract whole numbers with more than 4 digits, including using formal written methods
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers factor pairs of a number, and common factors of two numbers.
- 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.
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- 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.
- 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.
- Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- Read Roman numerals to 1000 and recognise years written in Roman numerals.
- Compare and order fractions whose denominators are all multiples of the same number
- Multiply and divide numbers mentally drawing upon known facts.
- 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 and cubed
- Solve number problems and practical problems that involve all of the above
- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- 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
- 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 using their knowledge of factors and multiples, squares and cubes.
- Read and write decimal numbers as fractions
- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.
- Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as mixed numbers
- Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
- Convert between different units of metric measure
- Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.
- 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.
- Add and subtract fractions with the same denominator and denominators that are multiples of the same number.
- Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.
- Read, write, order and compare numbers with up to three decimal places.
- Solve problems involving number up to three decimal places.
- Use the properties of a rectangle to deduce related facts and find missing lengths and angles.
- Calculate and compare the area of rectangles (including squares) and including using standard units, square centimetres(cm^2) and square metres (m^2) and estimate the area of irregular shapes.
- Recognise the per cent symbol and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator hundred, and as a decimal.
- 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.
- Identify angles at a point and one whole turn, angles at a point on a straight line and ½ a turn, other multiples of 90°
- Solve problems involving converting between units of time.
- 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.
- Solve comparison, sum and difference problems using information presented in a line graph.
- Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.
- Know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles
- Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation, including scaling.
- Estimate volume (e.g. using 1 cm^3 blocks to build cuboids (including cubes)) and capacity
- Complete, read and interpret information in tables, including timetables.
- Draw given angles and measure them in degrees.
- Identify 3-D shapes, including cubes and other cuboids, from 2-D representations

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Year 6

- 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
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Use their knowledge of the order of operations to carry out calculations involving the four operations
- Use simple formulae
- Enumerate possibilities of combinations of two variables.
- Use negative numbers in context, and calculate intervals across zero
- 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.
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Express missing number problems algebraically.
- Find pairs of numbers that satisfy an equation with two unknowns
- Solve number problems and practical problems that involve all of the above.
- 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.
- Generate and describe linear number sequences
- Solve problems involving calculation of percentages and the use of percentages for comparison.
- 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.
- Compare and order fractions, including fractions >1
- Identify common factors, common multiples and prime numbers.
- Solve problems involving addition, subtraction, multiplication and division
- Solve problems involving similar shapes where the scale factor is known or can be found.
- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate.
- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Solve problems involving unequal sharing and grouping, using knowledge of fractions and multiples.
- Solve problems involving the relative sizes of two quantities, where missing values can be found by using integer multiplication and division facts.
- Convert between miles and kilometres.
- Multiply one-digit numbers with up to two decimal places by whole numbers.
- 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
- Divide proper fractions by whole numbers
- 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.
- 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.
- Multiply simple pairs of proper fractions, writing the answer in its simplest form
- Calculate the area of parallelograms and triangles.
- Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction
- Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.
- Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
- Draw 2-D shapes using given dimensions and angles.
- Calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed and cubic metres and extending to other units
- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
- Interpret and construct pie charts and line graphs and use these to solve problems.
- Describe positions on the full coordinate grid (all four quadrants).
- Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- Recognise, describe and build simple 3-D shapes, including making nets.
- Calculate and interpret the mean as an average.
- Illustrate and name parts of circles, including radius, diameter and circumference, and know that the diameter is twice the radius

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