Know and Use Numbers

• 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.

• Given a number, identify one more and one less.

• Count in steps of 2, 3, 5 and 10 from 0 or 1 and in tens from any number, forward and backward.

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

• Read and write numbers initially from 1 to 20 and then to at least 100 in numerals and in words.

• Use the language of: equal to, more than, less than (fewer), most and least.

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

• Recognise the place value of each digit in a two-digit number (tens, ones).

• Use place value and number facts to solve problems.

**Add and Subtract**

• Solve one-step problems with addition and subtraction:

 • Using concrete objects and pictorial representations including those involving numbers, quantities and measures.

• Using the addition (+), subtraction (-) and equals (=) signs.

• Applying their increasing knowledge of mental and written methods.

• Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

• One-digit and two-digit numbers to 20, including zero.

• 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.

• Represent and use number bonds and related subtraction facts within 20.

• Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.

**Multiply and Divide**

• Solve one-step (two-step at greater depth) problems involving multiplication and division.

• Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) 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 mental methods.

• Use known multiplication facts to check the accuracy of calculations.

• Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables.

• Recognise odd and even numbers.

• Use multiplication and division facts to solve problems.

Milestone 1

Year 1 & 2



**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.

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

• Recognise the equivalence of 2/4 and 1/2.

• Write simple fractions for example, 1/2 of 6 = 3.

**Understanding the Properties of Shape**

• Recognise and name common 2D and 3D 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.

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

**Describe Position Movement and Direction**

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

• 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).

**Measures**

• Compare, describe and solve practical problems for lengths and heights, mass/weight, capacity, volume and time.

 • Measure and begin to record:

 •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.

• 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.

• Use standard units to estimate and measure length/height (m/cm); mass (kg/g); temperature (°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.

**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.

**Algebra**

• Solve addition and subtraction problems involving missing numbers.

**Communicate geographically**

• Describe key aspects of:

• **physical geography**, including: rivers, mountains, volcanoes and earthquakes and the water cycle.

• **human geography**, including: settlements and land use.

• Use the eight points of a compass, four-figure grid references, symbols and key to communicate knowledge of the United Kingdom and the wider world.

Know and Use Numbers

• Count in multiples of 2 to 9, 25, 50, 100 and 1000.

• Find 1000 more or less than a given number.

• Count backwards through zero to include negative numbers.

• Identify, represent and estimate numbers using different representations.

• 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.

• Order and compare numbers beyond 1000.

• Recognise the place value of each digit in a four-digit number. (thousands, hundreds, tens, and ones)

• Round any number to the nearest 10, 100 or 1000.

• Solve number and practical problems with increasingly large positive numbers.

**Multiply and Divide**

• Solve problems involving multiplying and dividing, 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).

• Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.

• 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.

• Recognise and use the inverse relationship between multiplication and division and use this to check calculations and solve missing number problems.

• Recall multiplication and division facts for multiplication tables up to 12 × 12.

Milestone 2

Year 3 & 4

**Add and Subtract**

• Solve two-step addition and subtraction problems in contexts, deciding which operations and methods to use and why.

• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.

• Add and subtract numbers mentally, including:

• A three-digit number and ones.

• A three-digit number and tens.

• A three-digit number and hundreds.

• Estimate and use inverse operations to check answers to a calculation.

• Solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction.

**Understanding the 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.

• 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.

**Algebra**

• Solve addition and subtraction, multiplication and division problems that involve missing numbers.



**Measures**

• 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. (£ and p)

• 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 appropriate vocabulary.

• Know the number of seconds in a minute and the number of days in each month, year and leap year.

• Compare durations of events.

• 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.

**Fractions**

• 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.

• 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.

• 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.

• Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.

• Compare and order unit fractions and fractions with the same denominators.

• Recognise and show, using diagrams, families of common equivalent fractions.

• Recognise and write decimal equivalents of any number of tenths or hundredths.

• Recognise and write decimal equivalents to 1/4, 1/2, 3/4.

• Add and subtract fractions with the same denominator within one whole.

• Solve problems involving increasingly harder fractions.

• 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.

• 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.

• Solve simple measure and money problems involving fractions and decimals to two decimal places.

**Describe Position Movement and Direction**

• Recognise angles as a property of shape and as an amount of rotation.

• Identify right angles, recognise that 2 right angles make a half turn and 4 make a whole turn.

• Identify angles that are greater than a right angle.

• 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 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, pictograms and tables.

• 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.

Milestone 3

Year 5 & 6

**Multiply and Divide**

• 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.

• Use knowledge of the order of operations to carry out calculations involving the four operations.

• 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.

• Estimate and use inverse operations and rounding to check answers to a calculation.

• Identify common factors, common multiples and prime numbers.

• Establish whether a number up to 100 is prime and recall prime numbers up to 19.

• 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 knowledge of factors and multiples, squares and cubes.

**Add and Subtract**

• Solve multi-step addition and subtraction problems in contexts, deciding which operations and methods to use and why.

• 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.

• Add and subtract negative integers.

Know and Use Numbers

• Read numbers up to 10 000 000.

• Use negative numbers in context and calculate intervals across zero.

• Write numbers up to 10 000 000

• Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

• Order and compare numbers up to 10 000 000.

• Round any whole number to a required degree of accuracy.

• Determine the value of each digit in any number.

• Solve number and practical problems.





**Fractions**

• Compare and order fractions whose denominators are all multiples of the same number.

• Compare and order fractions, including fractions > 1.

• Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number.

• 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.

• Identify the value of each digit in numbers given to three decimal places.

• Solve problems involving number up to three decimal places.

• Recognise the percent symbol (%) and understand that percent relates to ‘number of parts per hundred’, and write percentages as a fraction with denominator 100, and as a decimal.

• Add and subtract fractions with the same denominator and denominators that are multiples of the same number.

• Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.

• Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.

• Multiply simple pairs of proper fractions, writing the answer in its simplest form.

• 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.

• Divide proper fractions by whole numbers.

• Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.

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 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.

**Measures**

• 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.

• 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 (cm2) and square metres (m2) and estimate the area of irregular shapes.

• Estimate volume and capacity.

• 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.

• 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 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 (cm3) and cubic metres (m3), and extending to other units.

• Use simple formulae.

**Statistics**

• Solve comparison, sum and difference problems using information presented in a line graph.

• Complete, read and interpret information in tables, including timetables.

• Interpret and construct pie charts and line graphs and use these to solve problems.

• Calculate and interpret the mean as an average.

**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.

**Describe Position Movement 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.

• 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.

**Understand the 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 (°).

• Identify:

• Angles at a point and one whole turn (total 360°).

• Angles at a point on a straight line and a turn (total 180°).

• Other multiples of 90°.

• 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.

• 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.

• 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.



**Fractions**

**Understanding the Properties of Shape**

**Describe Position Movement and Direction**

**Measures**

**Statistics**

**Algebra**