Progression in Mathematics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Number – number and place value | * count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
* count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
* given a number, identify one more and one less
* identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
* read and write numbers from 1 to 20 in numerals and words.
 | * count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward
* recognise the place value of each digit in a two-digit number (tens, ones)
* identify, represent and estimate numbers using different representations, including the number line
* compare and order numbers from 0 up to 100; use <, > and = signs
* read and write numbers to at least 100 in numerals and in words
* use place value and number facts to solve problems
 | * 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.
 | * 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.
 | * read, write, order and compare numbers to at least 1 000 000 and determine the

value of each digit * count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
* interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
* round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
* solve number problems and practical problems that involve all of the above
* read Roman numerals to 1000 (M) and recognise years written in Roman numerals
 | * 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.
 |

Progression in Mathematics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Addition and subtraction | * read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs.
* represent and use number bonds and related subtraction facts within 20
* add and subtract one-digit and two-digit numbers to 20, including zero
* solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems
 | * solve problems with addition and subtraction:

-using concrete objects and pictorial representations, including those involving numbers, quantities and measures -applying their increasing knowledge of mental and written methods * recall and use addition & subtraction facts to 20 fluently, & derive & use related facts up to 100
* add & subtract numbers using concrete objects, pictorial representations, & mentally, including:

-a two-digit number & ones -a two-digit number & 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
 | * 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
 | * 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.
 | * 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.
 | * perform mental calculations, including with mixed operations and large 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
* use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
 |

Progression in Mathematics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Multiplication and division | * solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
 | * recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
* calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), 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 materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
 | * 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.  | * recall multiplication and division facts for multiplication tables up to 12 × 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.  | * identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
* know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
* establish whether a number up to 100 is prime and recall prime numbers up to 19
* multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
* multiply and divide numbers mentally drawing upon known facts
* divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
* multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
* ♣ recognise and use square numbers and cube numbers, and the notation for squared ( 2 ) and cubed (3 ) ♣ solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes ♣ solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign ♣ solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
 | * 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* use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
 |

Progression in Mathematics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| 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 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity
* write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2
 | * 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* recognise and show, using diagrams, equivalent fractions with small denominators
* add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7]
* compare and order unit fractions, and fractions with the same denominators
* solve problems that involve all of the above.
 | * 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 ¼, ½, ¾
* 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.
 | * 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 [for example, 2/5 + 4/5 = 6/5 = 1 1/5]* 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
 | * 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 [for example, 1/4 x 1/2 = 1/8]
* divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6]
* associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8]
* 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.
 |

Progression in Mathematics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Measurement | * compare, describe and solve practical problems for:

-lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] -mass/weight [for example, heavy/light, heavier than, lighter than] -capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] -time [for example, quicker, slower, earlier, later] * measure and begin to record the following:

-lengths and heights -mass/weight -capacity and volume -time (hours, minutes, seconds) * recognise and know the value of different denominations of coins and notes
* sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
* recognise and use language relating to dates, including days of the week, weeks,

months and years * tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.
 | * 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
* 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 & 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.
 | * 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].  | * 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.
 | * 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 (cm2) and square metres (m2) and estimate the area of irregular shapes
* estimate volume [for example, using 1cm3 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.
 | * 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 (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].
 |

Progression in Mathematics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Geometry – properties of shapes | * recognise and name common 2-D and 3-D shapes, including:

-2-D shapes [for example, rectangles (including squares), circles and triangles] -3-D shapes [for example, cuboids (including cubes), pyramids and spheres].  | * identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line
* identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces
* identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]
* compare and sort common 2-D and 3-D shapes and everyday objects.
 | * 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
 | * identify 3-D shapes, including cubes and other cuboids, from 2-D representations
* know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
* draw given angles, and measure them in degrees (o)
* identify:

-angles at a point and one whole turn (total 360o) -angles at a point on a straight line and ½ a turn (total 180o) -other multiples of 90o* use the properties of rectangles to deduce related facts and find missing lengths and angles
* distinguish between regular and irregular polygons based on reasoning about equal sides and angles.
 | * 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
 |

Progression in Mathematics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Geometry – position and direction  | * describe position, direction and movement, including whole, half, quarter and three-quarter turns
 | * identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line
* identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces
* identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]
* compare and sort common 2-D and 3-D shapes and everyday objects.
* ♣ 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 anticlockwise).
 |  | * 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.
 | * 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.
 |
| 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.
 | * 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.
 | * 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.
 | * 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.
 |

Progression in Mathematics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| 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.
 |