Progression Map Maths

|  |
| --- |
| **Number – number and place value**  |
| **EYFS****ELG: Number**Pupils at expected level of development will:* have a deep understanding of number to 10; including the composition of each number.
* subitise up to 5.
* automatically recall number bonds to 5 (including subtraction facts) and some number bonds to 10, including double facts.

**ELG: Numerical Patterns**Pupils at expected level of development will:* verbally count beyond 20, recognising the pattern of the counting system.
* compare quantities up to 10 in different contexts; recognising when one quantity is greater than, less than or the same as the other quantity.
* explore and represent patterns within numbers up to 10; including evens and odds, double facts and how quantities can be distributed equally.
 | **Year 1**Pupils should be taught to: * 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.
 | **Year 2**Pupils should be taught to: * 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.
 | **Year 3**Pupils should be taught to: * 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.
 | **Year 4**Pupils should be taught to: * 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.
 | **Year 5**Pupils should be taught to: * 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.
 | **Year 6**Pupils should be taught to: * 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 and subtraction**  |
| **EYFS**.  | **Year 1**Pupils should be taught to: * 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 such as 7 = ? – 9.
 | **Year 2**Pupils should be taught to: ▪ solve problems with addition and subtraction:  - using concrete objects and pictorial representations, including those involving numbers, quantities and measures. - applying their increasing knowledge of mental and written methods ▪ recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. ▪ add and subtract numbers using concrete objects, pictorial representations, and mentally, including: * a two-digit number and ones
* a two-digit number and tens
* two two-digit numbers
* adding three one-digit numbers.
* show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.
* recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
 | **Year 3**Pupils should be taught to: * 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. | **Year 4**Pupils should be taught to: * 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.
 | **Year 5**Pupils should be taught to: * 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.
 | **Year 6**Pupils should be taught to: ▪ 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.
 |
| **Number – multiplication and division**  |
| **EYFS** | **Year 1**Pupils should be taught to:* 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.
 | **Year 2**Pupils should be taught to: * 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.
 | **Year 3**Pupils should be taught to: * 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.
 | **Year 4**Pupils should be taught to: * 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.
 | **Year 5**Pupils should be taught to: * identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
* know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.
* establish whether a number up to 100 is prime and recall prime numbers up to 19.
* multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.
* multiply and divide numbers mentally drawing upon known facts.
* divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.
* multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
* recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3).
* solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.
* solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.
* solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
 |
| **Number – fractions (including decimals and percentages)** |
| **EYFS** | **Year 1**Pupils should be taught to: * 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.
 | **Year 2**Pupils should be taught to: ▪ 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.  | **Year 3**Pupils should be taught to: * 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, 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.
 | **Year 4**Pupils should be taught to: ▪ 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 1/4, 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.  | **Year 5**Pupils should be taught to: * 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 and 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 percent symbol (%) and understand that per cent relates to ‘number of parts per hundred’, and write percentages as a fraction with denominator 100, and as a decimal.
* solve problems which require knowing percentage and decimal equivalents of 1/2, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25.
 | **Year 6**Pupils should be taught to: * 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 × 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.
 |
| **Ratio and Proportion** |
| **EYFS** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6**Pupils should be taught to: * 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** |
| **EYFS** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6**Pupils should be taught to: * 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.
 |
| **Measurement** |
| **EYFS** | **Year 1** Pupils should be taught to: * 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  | **Year 2**Pupils should be taught to: ▪ 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 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.  | **Year 3**Pupils should be taught to: ▪ 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]. | **Year 4**Pupils should be taught to: * 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.
 | **Year 5**Pupils should be taught to: * 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 1 cm3 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.
 | **Year 6**Pupils should be taught to: * 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].
 |
| **Geometry – properties of shapes**  |
| **EYFS** | **Year 1**Pupils should be taught to: * 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]. | **Year 2**Pupils should be taught to: * 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.
 | **Year 3**Pupils should be taught to: * 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.
 | **Year 4**Pupils should be taught to: * 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.
 | **Year 5**Pupils should be taught to: * 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 1/2 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.
 | **Year 6**Pupils should be taught to: * 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**  |
|  **EYFS** | **Year 1**Pupils should be taught to:* describe position, direction and movement, including whole, half, quarter and three-quarter turns.
 | **Year 2**Pupils should be taught to: * 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).
 | **Year 2** | **Year 4**Pupils should be taught to: * 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.
 | **Year 5**Pupils should be taught to: * 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.
 | **Year 6**Pupils should be taught to: * 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**  |
| **EYFS** | **Year 1** | **Year 2**Pupils should be taught to: * 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.
 | **Year 3**Pupils should be taught to: * 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.
 | **Year 4**Pupils should be taught to: * 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.
 | **Year 5**Pupils should be taught to: * solve comparison, sum and difference problems using information presented in a line graph.
* complete, read and interpret information in tables, including timetables.
 | **Year 6**Pupils should be taught to: * interpret and construct pie charts and line graphs and use these to solve problems.
* calculate and interpret the mean as an average.
 |