Progression Map Maths

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| **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. |