Mathematics Learning Intentions

Mathematics Curriculum

Year 1

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.

Add and Subtract

- 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.

Multiplication

- 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.

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.

Measure

- Compare, describe & solve practical problems for: lengths/heights (long/short/tall, half/double); mass/weight (heavier/lighter); capacity/volume (full/empty, more/less); time (quicker/slower/later).
- Measure and begin to record the following: lengths/heights; mass/weight; capacity/volume; time (hours, minutes, seconds).
- Recognise and know the value of different denominations of coins and notes.
- Sequence events in chronological order using language such as: 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.

Geometry

- Recognise and name common 2-D shapes (e.g. rectangles, circles and triangles) and 3-D shapes (e.g. cuboids (including cubes), pyramids and spheres).
- Describe position, directions and movements, including whole, half, quarter and three-quarter turns.

Mathematics Learning Intentions

Year 2

Place Value

- Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward.
- Recognise the place value of each digit in a two-digit number (tens, ones).
- Identify, represent and estimate numbers using different representations, inc. 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.

Add and Subtract

- Solve problems with addition and subtraction: using concrete objects and pictorial representations; applying their increasing knowledge of mental and written methods.
- Recall and use add and subtract facts to 20 fluently, and derive and use related facts up to 100.
- Add and sub nos using concrete objects, pictorial representations, and mentally, including: a 2-digit no and 1s or 10s; two 2-digit numbers; adding three 1-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 missing number problems.

Multiplication

- 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.

Fractions

- Recognise, find, name & write fractions 1/3, 1/4, 2/4, 3/4 of a length, shape, set of objects or quantity.
- Write simple fractions e.g. 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2.

Measure

- Choose/use appropriate stand units to estimate/measure length/height (m/cm); mass (kg/g); temp (°C); cap (litres/ml) to nearest 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.

Geometry

- Identify and describe the properties of 2-D shapes, including the number of sides and 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 & arrange combinations of mathematical objects in patterns & sequences.
- Use math vocab to describe position, direction & movement inc movement in a straight line and distinguishing rotation as a turn & in terms of right angles for ¼, ½, & ¾ turns (clock/anti-clockwise).

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.

Year 3

Place Value

- 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 nos up to 1000. Read and write nos up to 1000 in numerals and in words.
- Identify, represent and estimate numbers using different representations.
- Solve number problems and practical problems involving these ideas.

Add and Subtract

- Add and subtract numbers mentally, including: a 3-digit no and 1s, 10s, 100s.
- Add and subtract numbers with up to 3 digits, using formal written methods of columnar add and subtract.
- 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 add/sub.

Multiplication/Division

- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
- Write & calculate math statements for x & ÷ using the tables they know, including 2 digit numbers times 1-digit numbers, using mental & formal written methods.
- Solve problems & missing number problems, involving x & ÷, including integer scaling problems & correspondence problems in which n objects are connected to m objects.

Mathematics Learning Intentions

Fractions

- Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts & 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 sub fractions with the same denominator within one whole (e.g. $^5/_7 + {}^1/_7 = {}^6/_7$).
- Compare and order unit fractions, and fractions with the same denominators.

Measure

- 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/write the time from an analogue clock, inc Roman numerals from I to XII, and 12-hr/24-hr clocks.
- Est. & read time with increasing acc. to nearest min; record/compare time in secs, mins, hrs. Use vocab such as o'clock, a.m/p.m, morn, aft, noon & midnight
- Know the no of seconds in a minute and the number of days in each month, year and leap year.

Geometry

- Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them.
- Recognise that angles are a property of shape or a description of a turn.
- Identify right angles, recognising that 2 right angles make a 1/2 turn, 3 make 3/4 of a turn & 4 a complete turn. Identify whether angles are greater or less than a right angle.
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

Statistics

- Interpret and present data using bar charts, pictograms and tables.
- Solve one-step and two-step questions such as 'How many more?' and 'How many fewer?' using info presented in scaled bar charts & pictograms & tables.

<u>Year 4</u>

Place Value

- Count in multiples of 6, 7, 9, 25 and 1000.
- Find 1000 more or less than a given number. Round any number to the nearest 10, 100 or 1000.
- Count backwards through zero to include negative numbers.
- Recognise the place value of each digit in a 4-digit number (thousands, hundreds, tens, and ones). Order and compare numbers beyond 1000.
- 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.

Mathematics Learning Intentions

Add and Subtract

- 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.

Multiplication/Division

- Recall multiplication and division facts for multiplication tables up to 12 × 12.
- 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 x and +, including using the distributive law to multiply 2 digit nos by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Fractions

- 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 a hundred and dividing tenths by ten.
- Add and subtract fractions with the same denominator.
- Recognise and write decimal equivalents of any number of tenths or hundredths; and the decimal equivalents to ¼, ½ and three quarters.
- 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. Solve simple measure and money problems involving fractions and decimals to 2 decimal places.

Measure

- Convert between different units of measure (e.g. kilometre to metre). Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days).
- 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.

Geometry

- 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.
- 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 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

Place Value

- Read, write, order & 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. Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero
- Read Roman numerals to 1000 (M) and recognise years written in Roman numerals

Add and Subtract

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

Multiplication/Division

- 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 1- or 2-digit number using a formal written method. Divide numbers up to 4 digits by a 1-digit number using the formal written method of short division
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- Recognise and use square numbers and cube numbers, and the notation for squared and cubed

Fractions

- Compare and order fractions whose denominators are all multiples of the same number. Add and subtract fractions with the same denominator and 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
- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- 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

- Solve problems which require knowing percentage and decimal equivalents of ½, ¼, ⅕, ⅖, ⅘ and those with a denominator of a multiple of 10 or 25.

Measure

- Convert between different units of metric measure (e.g. km & m; cm & m; cm & mm; g & kg; l & ml). Use approx. equivalences between metric and imperial units (e.g. inches, pounds & pints).
- Measure & calculate the perimeter of composite rectilinear shapes in cm/m. Calculate the area of squares/rectangles using standard units, square cm/m and estimate the area of irregular shapes
- Estimate volume (e.g. using 1 cm blocks to build cubes/cuboids) and capacity (e.g. using water)
- Solve problems involving converting between units of time. Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.

Geometry

- 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^o); angles at a point on a straight line and ½ a turn (total 180^o); other multiples of 90^o.
- Use the properties of rectangles to deduce related facts and find missing lengths and angles
- 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.

Statistics

- Solve comparison, sum and difference problems using information presented in a line graph
- Complete, read and interpret information in tables, including timetables

<u>Year 6</u>

Place Value

- 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.

Add/Subtract/Multiplication/Division

- Multiply and divide numbers up to 4 digits by a 2-digit whole number using the formal written methods and interpret remainders as whole number remainders, fractions, or by rounding. Use of estimation to check answers to calculations
- 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

Mathematics Learning Intentions

Fractions

- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- Multiply simple proper fractions and simplify the answer (e.g. ¼, ½, ⅛). Divide proper fractions by whole numbers (e.g. ⅓ ÷ 2 = ⅙)
- Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are 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
- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

R & P

- Solve problems involving the calculation of percentages (e.g. of measures) 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

- Express missing number problems algebraically. Use simple formulae expressed in words
- Generate and describe linear number sequences
- Find pairs of numbers that satisfy number sentences involving two unknowns. Enumerate all possibilities of combinations of two variables.

Measure

- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. Convert between miles and km.
- Use, read, write & convert between standard units of measure, converting length, mass, volume & time from smaller to larger units, and vice versa, using decimal notation to up to 3 dec places
- Recognise that shapes with the same areas can have different perimeters and vice versa
- Calculate the area of parallelograms and triangles. Recognise when it is possible to use formulae for area and volume of shapes
- Calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units

Geometry

- 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.

Mathematics Learning Intentions

P & D

- 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 pie charts and line graphs and use these to solve problems
- Calculate and interpret the mean as an average.