Mathematics and Numeracy

Statement of What Matters:

The number system is used to represent and compare relationships between numbers and quantities.

Descriptions of Learning:

Progression Step 1

- I have experienced and explored numbers, including cardinal, ordinal and nominal numbers, in number-rich indoor and outdoor environments.
- I can notice, recognise and write numbers in a range of media, through a multisensory approach, from 0 to 10 and beyond.
- I can use mathematical language to describe quantities, and to make estimates and comparisons such as 'more than', 'less than' and 'equal to'.
- I have experienced the counting sequence of numbers in different ways, reciting forwards and backwards, and starting at different points.
- I can use my experience of the counting sequence of numbers and of one-to-one correspondence to count sets reliably. I can count objects that I can touch, and ones that I cannot.
- I have explored forming a quantity in different ways, using combinations of objects or quantities.
- I can communicate how sets change when objects are added to and taken away from them.
- I have experienced grouping and sharing with objects and quantities, and I can group or share small quantities into equal-sized groups.

- I have used money, and the language of money, in play and real-life situations and I can understand that I need to exchange money for items.

Progression Step 2

- I can read, write and interpret larger numbers, up to at least 1000, using digits and words.
- I can understand that the value of a number can be determined by the position of the digits.
- I have engaged in practical tasks to estimate and round numbers to the nearest 10 and 100.
- I am beginning to estimate and check the accuracy of my answers, using inverse operations when appropriate.
- I can order and sequence numbers, including odd and even numbers, and I can count on and back in step sizes of any whole number and simple unit fractions.
- I am beginning to understand that unit fractions represent equal parts of a whole and are a way of describing quantities and relationships.
- I have experienced fractions in practical situations, using a variety of representations.
- I have explored equivalent fractions and understand equivalent fraction relationships.
- I have explored additive relationships, using a range of representations. I can add and subtract whole numbers, using a variety of written and mental methods.
- I can use my understanding of multiplication to recall some multiplication facts and tables starting with tables 2, 3, 4, 5 and 10 and I can use the term 'multiples'.
- I have explored and can use my understanding of multiplicative relationships to multiply and divide whole numbers, using a range of representations, including sharing, grouping and arrays.

- I can understand the equivalence and value of coins and notes to make appropriate transactions in role play.

Progression Step 3

- I can use a range of representations to develop and secure my understanding that the value of a digit is related to its position. I can read, record and interpret numbers, using figures and words up to at least one million.
- I can use a range of representations to extend my understanding of the number system to include negative values, decimals and fractions. I can accurately place integers, decimals and fractional quantities on a number line. I can apply my understanding of number value to round and approximate appropriately.
- I can demonstrate my understanding that non-integer quantities can be represented using fractions (including fractions greater than 1), decimals and percentages. I can use my knowledge of equivalence to compare the size of simple fractions, decimals and percentages and I can convert between representations.
- I can demonstrate my understanding that a fraction can be used as an operator or to represent division. I can understand the inverse relation between the denominator of a fraction and its value.
- I can verify calculations and statements about number by inverse reasoning and approximation methods.
- I can use the four arithmetic operations confidently, efficiently and accurately with integers and decimals, and I can combine these using distributive, associative and commutative laws where appropriate.
- I have extended my understanding of multiplicative reasoning to include the concept and application of ratio, proportion and scale.
- I can fluently recall multiplication facts up to at least 10 x 10 and use these to derive related facts.

- I have experienced and explored simple multiplicative relationships that allow me to discuss the properties of number, including factors, multiples, prime and square numbers.
- I can demonstrate an understanding of income and expenditure, and I can apply calculations to explore profit and loss.

Progression Step 4

- I can use standard index form to represent large and small numbers, performing calculations in context. I can use appropriate rounding methods, including significant figures, to estimate values.
- I can use my knowledge of the equivalence of fractions, decimals and percentages to understand that numbers or proportions may be represented in different ways.
- I have derived and can apply the rules of indices, using integer exponents.
- I can fluently and accurately apply the four arithmetic operations in the correct order with integers, decimals and fractions, consolidating my understanding of reciprocals when dividing fractions.
- I can apply percentages and ratio to solve problems including simple and compound interest, appreciation and depreciation, calculating budgets, foreign currencies, and basic taxation on goods and services. I have developed my understanding of finance in personal, local and global contexts.

Progression Step 5

- I can use my knowledge that measurements are not always accurate, and are subject to tolerance and margins of error, to solve problems involving upper and lower bounds.
- I can recognise the difference between rational and irrational numbers, and I have derived rules and applied them to simplify and decompose surds. I can extend my knowledge of the equivalence of

fractions, decimals and percentages to understand that recurring decimals may be represented in different ways.

- I have explored the relationship between powers, roots and fractional indices and can use it to solve problems.
- I have used proportional reasoning to compare two quantities, using direct or inverse proportion, and I can solve problems involving repeated and inverse proportional reasoning.
- I have further developed my understanding of finance to include annual equivalent rate (AER) and annual percentage rate (APR) so that I can evaluate and compare financial products.
- I can calculate income tax and understand the implications of taxation including using the Welsh rates of income tax and other taxes devolved to Wales.

Statement of What Matters:

Algebra uses symbol systems to express the structure of mathematical relationships.

Descriptions of Learning:

Progression Step 1

- I am beginning to recognise, copy, extend and generalise patterns and sequences around me.
- I am beginning to demonstrate, using objects, an understanding of the concepts of 'equal' and 'not equal'.

Progression Step 2

- I have explored patterns of numbers and shape. I can recognise, copy and generate sequences of numbers and visual patterns.

- I can use the equals sign to indicate that both sides of a number sentence have the same value and I can use inequality signs when comparing quantities to indicate 'more than' and 'less than'.
- I have explored commutativity with addition and multiplication and I can recognise when two different numerical expressions describe the same situation but are written in different ways.
- I can find missing numbers when number bonds and multiplication facts are not complete.

Progression Step 3

- I can explore and create patterns of numbers and shapes. I can explain numerical sequences and spatial patterns in words and by generalising them.
- I can use commutativity, distributivity and associativity to explore equality and inequality of expressions.
- I can demonstrate an understanding of the idea of input, application of a rule (including inverse operations) and output, using a function machine or other appropriate methods, and I have applied this idea to solve problems.
- I can model problems, using expressions and equations involving symbols or words to represent unknown values, adopting the conventions of algebra. I can use inverse operations to find unknown values in simple equations.

Progression Step 4

- I can explore, generate, identify and represent both numerical and spatial linear sequences, including finding and using a general term.
- I can demonstrate my understanding of the concept of a variable, using algebraic notation to form linear expressions, equations and inequalities. I can interpret algebraic expressions because I

understand the way symbols are used to represent operations, multiples and powers.

- I can manipulate algebraic expressions fluently by simplifying, expanding, substituting and factorising by extracting a common factor.
- I can explore and use efficient methods of solving equations and inequalities in the first degree, and I can apply this knowledge to rearrange formulae where the subject appears in one term.
- I can use equations and inequalities in the first degree to represent and model real-life situations and solve problems, using a range of representations.
- I can explore linear equations graphically and I can demonstrate an understanding of the effect on the line when the constant or coefficient of x is changed.

Progression Step 5

- I can explore, generate, identify and represent both numerical and spatial patterns, using linear and non-linear sequences.
- I can explore the concepts of equality and identity, connecting geometric, algebraic and graphical representations.
- I can manipulate algebraic expressions fluently by expanding double brackets, factorising quadratic expressions and simplifying algebraic fractions.
- I can explore and use efficient methods of solving simultaneous, quadratic and trigonometric equations, and I can apply this knowledge to rearrange formulae where the subject appears in more than one term.
- I can use equations and inequalities, and relevant graphs, to represent and model real-life situations and solve problems, including those which describe proportion and exponentiation.

- I can investigate a variety of non-linear graphs, including quadratic, cubic and reciprocal, to develop an understanding of the effect of the coefficients and constants on the shape of the graph.
- I can determine or approximate the rate of change at a point on a graph and I can investigate the area under a graph, understanding what these represent in real-life contexts.

Statement of What Matters:

Geometry focuses on relationships involving shape, space and position, and measurement focuses on quantifying phenomena in the physical world.

Descriptions of Learning:

Progression Step 1

- I can understand and apply the language of time in relation to my daily life.
- I have used a variety of objects to measure. I am beginning to understand the need to repeat the same physical unit without any gaps when measuring.
- I can make estimates and comparisons with measures, such as 'shorter than', 'heavier than'.
- I have explored, compared, and used the general language of shapes through investigative play.
- I have explored movements and directions and I am beginning to use mathematical language to describe position.

Progression Step 2

- I am beginning to tell the time using a variety of devices. I have explored and used different ways of showing the passing of time, including calendars, timelines, simple timetables and schedules.
- I have explored measuring, using counting, measuring equipment and calculating, and I can choose the most appropriate method to measure.
- I can estimate and measure, using non-standard units, before progressing onto standard units.

- I can use a variety of measuring devices from different starting points.
- I have explored two-dimensional and three-dimensional shapes and their properties in a range of contexts.
- I have explored reflective symmetry in a range of contexts and I can discuss it as a property of shapes and images.
- I can describe and quantify the position of objects in relation to other objects.
- I have explored the concept of rotation and I am beginning to use simple fractions of a complete rotation to describe turns.

Progression Step 3

- I can read analogue and digital clocks accurately and I can make interpretations and perform calculations involving time.
- I can estimate and measure length, capacity, mass, temperature and time, using appropriate standard units.
- I can convert between standard units, including applying my understanding of place value to convert between metric units.
- I can explore and consolidate my understanding of the properties of two-dimensional shapes to include the number of sides and symmetry.
- I can explore vertices, edges and faces of three-dimensional shapes and I can use these characteristics to describe a three-dimensional shape.
- I can relate a three-dimensional shape to its two-dimensional nets.
- I can use efficient methods for finding the perimeter and area of two-dimensional shapes, understanding how basic formulae are derived.

- I have developed an understanding of the ways in which co-ordinates are used to solve problems involving position, length and shape.
- I can demonstrate my understanding of angle as a measure of rotation and I can recognise, name and describe types of angles.

Progression Step 4

- I can represent and use compound measures, using standard units, and I can demonstrate an understanding of the relationship between a formula representing a measurement and the units used.
- I can use a variety of approaches to investigate, predict and demonstrate the effect of transformations on two-dimensional shapes.
- I can explore and calculate the areas and perimeters of simple and compound two-dimensional shapes, including circles, and I have demonstrated an understanding of pi (π) as the ratio of the circumference of a circle to its diameter. I can apply my understanding of area to be able to calculate the surface area of simple prisms.
- I can derive and apply the formulae for the volume of simple prisms.
- I can apply my understanding of area to demonstrate and use the relationship between right-angled triangles and squares in the context of Pythagoras' theorem.
- I can use angle and shape facts to deduce further features and relationships of triangles and quadrilaterals.
- I can explore and calculate angles formed by parallel lines and by a transversal. I have applied my understanding of angles to model and solve problems involving bearings.

Progression Step 5

- I can apply my understanding of the effect of transformations on the properties of shapes in order to explain why they are similar, congruent or neither.
- I can explore and demonstrate an understanding of the effect of scale when comparing measurements of similar shapes in all three dimensions.
- I can use my knowledge of scale and ratio to calculate the lengths and areas of fractions of shapes, including arcs and segments of circles.
- I can use my knowledge of measurement to calculate the perimeter, area (or surface area) and volume of compound two-dimensional and three-dimensional shapes.
- I can explore trigonometric ratios in right-angled triangles and I can use my knowledge of them to solve problems involving lengths, angles and area of any triangle.
- I can locate and describe the locus of points defined by a range of different criteria.
- I can use logical arguments and my knowledge of polygons, intersecting lines, angle and the circle theorems to deduce and calculate the size of angles and length of lines.

Statement of What Matters:

Statistics represent data, probability models chance, and both support informed inferences and decisions.

Descriptions of Learning:

Progression Step 1

- I can investigate, collect and record data found in my environment.

- I can group sets into categories and I am beginning to communicate the rule(s) I have used.
- I am beginning to represent and interpret data, using a range of methods.

Progression Step 2

- I can collect and organise data to ask and answer questions in relevant situations.
- I can sort and classify using more than one criterion, including the use of Venn diagrams and Carroll diagrams.
- I am beginning to record and represent data in a variety of ways, including the use of tally charts, frequency tables and block graphs, when appropriate axes and scales are provided.
- I am beginning to interpret and analyse simple graphs, charts and data.
- I can explain my findings and I am beginning to evaluate how well my method worked.

Progression Step 3

- I can collect different types of data to answer a variety of questions that have been posed, demonstrating an understanding of the importance of collecting relevant data.
- I can represent information by creating a variety of appropriate charts of increasing complexity, including tally charts, frequency tables, bar graphs and line graphs.
- I can use different scales to extract and interpret information from a range of diagrams, tables and graphs, including pie charts with simple fractions and proportions. I can recognise any trends that are seen.

- I can find and use the mean of a simple set of data to explain how the statistics do, or do not, support an argument. I can recognise how anomalies affect the mean.
- I can explore outcomes and chance, using appropriate language, and I am beginning to use numerical values to represent probability.

Progression Step 4

- I can choose a sensible hypothesis to investigate. I have explored the relationship between the type of data I have collected (including qualitative and quantitative) and how this can be manipulated and represented.
- I can make informed choices about how to organise and represent data, using a wide range of graphs and charts, including pie charts, frequency diagrams and frequency polygons.
- I can understand that different averages can be used to compare data, including grouped data, recognising the advantages and disadvantages of each average.
- I can explore trends and anomalies in data sets, investigating correlation between two variables.
- I can use data to draw conclusions about hypotheses and I have communicated my findings clearly. I can critique my own methods and findings
- I can systematically explore all the possible mutually exclusive outcomes of successive and combined events.

Progression Step 5

- I can explore different sampling methods, including systematic and stratified sampling, understanding the need to select appropriate sampling methods when collecting data.

- I can extend my methods for representing data, including cumulative frequency, box and whisker, and histograms, to interpret measures of central tendency and measures of spread.
- I can critically analyse statistics, considering how data is represented, its reliability, and whether and how the data has been manipulated to tell a particular story. I can make informed decisions based on statistical evidence, identifying bias and anomalies.
- I can use modelling to solve problems involving probabilities of mutually exclusive, independent and dependent events.
- I have explored the relationship between relative frequency and theoretical probability, and
- I can make judgements on the outcomes of experimental data.
- I can use probabilistic arguments, drawing on theory, information, research and experimentation, to make informed decisions.