Key Stage 3 Maths - Learning Objectives
To carry out calculations from information given in tables and charts
To understand and use financial language
To use a number line to order positive and negative numbers, including decimals
To understand and use the symbols < (less than) and > (greater than)
To carry out additions and subtractions involving negative numbers
To use a number line to calculate with negative numbers
To carry out subtractions involving negative numbers
To carry out multiplications and divisions involving negative numbers
To be able to multiply and divide decimal numbers by 10, 100, 1000 and 10 000
To be able to order decimal numbers according to size
To round numbers to more than one decimal place (dp)
To round numbers to one or two significant figures (sf)
To estimate calculations in order to spot possible errors.
To round up or down, to one decimal place
To be able to add and subtract with decimal numbers
To be able to multiply decimal numbers
To be able to divide with decimals
To recognise and use square numbers up to 225 (15 x 15) and the corresponding square roots
To use the conventions of BIDMAS to carry out calculations
To use written methods to carry out multiplications involving decimals accurately
To use written methods to carry out divisions involving decimals accurately
To convert between common metric units
To use measurements in calculations
To recognise and use appropriate metric units
To use algebra to write simple expressions and recognise equivalent expressions
To substitute numbers into expressions to work out their value
To learn how to simplify expressions
To use formulae
To write formulae
To simplify algebraic expressions involving the four basic operations
To simplify algebraic expressions by combining like terms
To understand and calculate the mode, median and range of data
To understand and calculate the mean average of data
To be able to read and interpret different statistical diagrams
To create and use a tally chart
To understand continuous data and use grouped frequency
To develop greater understanding of data collection
To use averages and range to compare data
To make sensible decisions by comparing averages and ranges of two sets of data
To carry out a statistical survey
To use charts and diagrams to interpret data and then write a report
To use a scaling method to draw a pie chart
To read and interpret data from pie charts
To work out the sectors in pie charts by their angles at the centre
To use a protractor to measure an angle
To use a protractor to draw an angle

To understand the properties of intersecting and perpendicular lines
To calculate angles around a point
To calculate angles on a straight line
To calculate opposite angles
To know that the sum of the angles in a triangle is 180°
To understand and use the properties of triangles
To make accurate geometric constructions - draw triangles
To calculate angles in parallel lines
To look at the properties of quadrilaterals
To know that the sum of the angles in a quadrilateral is 360° and use this along with quadrilateral
To work out the sum of the interior angles of a polygon
To work out exterior angles of polygons
To work out the exterior angles of a regular polygon
To work out the interior angles of a regular polygon
To work out which regular polygons tessellate
To make accurate geometric constructions
To find equivalent fractions
To write fractions in their simplest form
To compare and order two fractions
To add and subtract fractions with different denominators
To convert mixed numbers to improper fractions
To convert improper fractions to mixed numbers
To add and subtract simple mixed numbers with different denominators
To add and subtract fractions and mixed numbers
To multiply a fraction and an integer
To divide a fraction or a mixed number by an integer
To divide an integer by a unit fraction
To multiply with combinations of large and small numbers mentally
To divide combinations of large and small numbers mentally
To add or subtract any two mixed numbers confidently
To multiply two fractions
To multiply one mixed number by another
To divide one fraction or mixed number by another
To remove brackets from an expression
To manipulate algebraic expressions
To identify equivalent expressions
To write algebraic expressions involving powers
To expand a term with a variable or constant outside brackets
To take out a variable as a factor
To multiply out two brackets
To find Mean, Median, Mode and Range
To create a grouped frequency table from raw data
To calculate averages from grouped frequency tables
To interpret frequency diagrams
To draw a frequency diagram from a grouped frequency table
To use mean and range to compare data from two sources
To understand when each different type of average is most useful

To use a simple formula to work out the perimeter of a rectangle
To use a simple formula to work out the area of a rectangle
To work out the perimeter and the area of a compound shape
To work out the area of a triangle
To work out the area of a parallelogram
To work out the area of a trapezium
To be familiar with the names of 3D shapes and their properties
To use isometric paper to draw shapes made from cubes, including plans and elevations
To work out the surface area of cubes and cuboids
To work out the volume of cubes and cuboids
To find the surface areas of cubes and cuboids
To draw nets of 3D shapes
To construct 3D shapes from nets including more complex shapes
To understand the relationship between faces, edges and vertices for 3D shapes
To solve problems involving 3D shapes
To understand the equivalence between a fraction, a decimal and a percentage
To understand and use percentages greater than 100%
To work out a fraction of a quantity without using a calculator
To write one quantity as a percentage of another
To work out a percentage of a quantity without using a calculator
To use a calculator to work out a percentage of a quantity
To know when it is appropriate to use a calculator
To work out the result of a percentage change
To use a multiplier to calculate a percentage change
To calculate the result of a percentage increase or decrease
To choose the most appropriate method to calculate a percentage change
To work out a change in value as a percentage increase or decrease
To calculate the original value, given the result of a percentage
To understand what simple interest is
To solve problems involving simple interest
To choose the correct calculation to work out a percentage
To read scatter graphs
To understand correlation
To create scatter graphs
To infer a correlation from two related scatter graphs
To use and interpret a variety of time-series graphs
To interpret a variety of two-way tables
To compare two sets of data from statistical tables and diagrams
To plan a statistical investigation
To use function machines to generate inputs and outputs
To use given inputs and outputs to work out a function
To recognise, describe and generate sequences that follow a simple rule
To work out missing terms in a sequence
To work out the nth term
To use the nth term to work out any term in a sequence
To use flow diagrams to generate sequences
To use the nth term of a sequence
To work out the nth term of a sequence

To know and understand the square and triangular number sequences, the Fibonacci sequence and
To know and understand the Fibonacci sequence
To recognise shapes that have reflective symmetry and draw their lines of symmetry
To recognise shapes that have rotational symmetry and find the order of rotational symmetry
To understand how to reflect a shape
To use coordinates to reflect shapes in all four quadrants
To understand how to rotate a shape
To understand how to rotate a shape
To understand how to translate a shape
To understand how to tessellate shapes
To construct the mid-point and the perpendicular bisector of a line
To construct an angle bisector
To construct a perpendicular to a line from or at a given point
To construct a right-angled triangle
To recognise congruent shapes
To enlarge a 2D shape by a scale factor
To use ratio to compare lengths, areas and volumes of 2D and 3D shapes
To understand and use scale drawings
To know how to use map ratios
To use ratio notation
To use ratio to compare quantities
To write a ratio as simply as possible with whole numbers
To write ratios in the form 1 : x where x could be a decimal.
To use ratios to find totals or missing quantities
To write ratios to compare more than two items
To understand the connections between fractions and ratios
To understand how ratios can be useful in everyday life
To understand the meaning of direct proportion
To find missing values in problems involving proportion
To represent direct proportion graphically and algebraically
To understand what inverse proportion is. To use graphical and algebraic representations of inverse
To recognise direct and inverse proportion and work out missing values
To understand and use coordinates to locate points in all four quadrants
To draw a graph for a simple relationship
To understand the connection between pairs of coordinates and the relationship shown in an
To recognise and draw line graphs with fixed values of x and y
To recognise and draw graphs of y = x and y = –x
To recognise and draw graphs of the form x + y = a
To learn how graphs can be used to represent real-life situations
To draw and use real-life graphs
To recognise and draw the graph of a linear equation
To work out the gradient in a graph from a linear equation
To work out an equation of the form y = mx + c from the graph
To recognise and draw the graph from a simple quadratic equation
To draw graphs from real-life situations to illustrate the relationship between two variables
To know the definition of a circle and the names of its parts
To work out the relationship between the circumference and diameter of a circle
To calculate the circumference of a circle

To calculate the area of a circle
To apply formulae for area and circumference in context
To find the area of compound shapes involving circle parts
To carry out multiplications and divisions involving negative
To understand and use highest common factors
To understand and use lowest common multiples
To understand and use powers and roots
To find the prime numbers of an integer
To multiply and divide by powers of 10
To understand and work with both positive and negative powers of ten
To round large numbers
To round to one or more significant figures
To write a large number in standard form
To multiply with numbers in standard form
To understand and work with standard form, using both positive and negative powers of ten
To round numbers, where necessary, to an appropriate or suitable degree of accuracy
To learn and understand some routines that can help in mental arithmetic
To solve real-life problems involving multiplication or division
To find missing numbers in simple calculations
To understand what an equation is
To solve equations involving one operation
To solve equations involving two operations
To use algebra to set up and solve equations
To solve equations involving brackets
To multiply out brackets
To solve equations with the variable on both sides
To solve equations with fractional coefficients.
To solve equations with brackets and fractions
To factorise expressions
To solve equations with one or more sets of brackets
To solve equations involving fractions
To change the subject of a formula
To convert from one metric unit to another
To calculate the volume of a prism
To calculate the surface area of a prism
To calculate the volume of a cylinder
To calculate the curved surface area of a cylinder
To calculate the total surface area of a cylinder
To learn and use the correct words about probability
To use sample space diagrams to work out the probability of a combined event
To understand experimental probability
To understand the difference between theoretical probability and experimental probability
To calculate probabilities from experiments
To recognise mutually exclusive events
To interpret step graphs
To interpret and draw time graphs
To interpret and draw exponential growth graphs
To understand and use measures of speed

To understand and use density and other compound units
To understand and use unit pricing
To understand Pythagoras' theorem
To calculate the length of the hypotenuse in a right-angled triangle
To calculate the length of a shorter side in a right-angled triangle
To show that a triangle is right-angled
To use Pythagoras' theorem to solve problems
To understand what trigonometric ratios are
To understand what the trigonometric ratios sine, cosine and tangent are
To find the angle identified from a trigonometric ratio
To find an unknown length of a right-angled triangle given one side and another angle
To solve problems requiring trig and Pythagoras' Theorem
To draw any linear graph from any linear equation
To solve a linear equation from a graph
To draw graphs from quadratic equations
To solve a quadratic equation by drawing a graph
To solve a pair of simultaneous equations