|  |  |  |  |
| --- | --- | --- | --- |
| **Curriculum Long Term Planning Overview** | **Key Stage 3** | **Subject Area: Maths** |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Autumn Term 1** | **Autumn Term 2** | **Spring Term 1** | **Spring Term 2** | **Summer Term 1** | **Summer Term 2** |
| **Year 7****Set 3 and UP** | **Number 1 and Calculating****This unit builds upon from KS2*** Know the meaning of a prime number
* Understand the use of notation for powers
* Know how to round to the nearest whole number, 10, 100, 1000 and to decimal places
* Multiply and divide numbers by powers of 10
* Calculate with negative numbers
* Apply the correct order of operations

**This unit introduces*** Recall prime numbers up to 50
* Know how to test if a number up to 150 is prime
* Know the meaning of ‘highest common factor’ and ‘lowest common multiple’
* Recognise when a problem involves using the highest common factor of two numbers
* Recognise when a problem involves using the lowest common multiple of two numbers
* Understand the use of notation for powers
* Know the meaning of the square root symbol (√)
* Use a scientific calculator to calculate powers and roots
* Make the connection between squares and square roots (and cubes and cube roots)
* Use inequality symbols to compare numbers and decimals
* Make correct use of the symbols = and ≠
* Place a set of negative numbers in order
* Place a set of mixed positive and negative numbers in order
* Add or subtract from a negative number
* Add (or subtract) a negative number to (from) a positive number
* Add (or subtract) a negative number to (from) a negative number
* Multiply positive numbers by a negative number
* Multiply negative numbers by a negative number
* Divide positive numbers by a negative number
* Divide negative numbers by a negative number
 | **Algebraic Manipulation 1****This unit builds upon from KS2*** Use symbols (including letters) to represent missing numbers
* Know the order of operations

**This unit introduces*** Know the meaning of expression, term, formula, equation, function
* Know basic algebraic notation (the rules of algebra)
* Use letters to represent variables
* Identify like terms in an expression
* Simplify an expression by collecting like terms
* Know how to multiply a (positive) single term over a bracket (the distributive law)
* Given a function, establish outputs from given inputs
* Given a function, establish inputs from given outputs
* Use a mapping diagram (function machine) to represent a function
* Use an expression to represent a function
* Use the order of operations correctly in algebraic situations
 | **Exploring FDP and Calculating with FDP****This unit builds upon from KS2*** Understand the concept of a fraction

**This unit introduces*** Identify a common denominator that can be used to order a set of fractions
* Order fractions where the denominators are not multiples of each other
* Write one quantity as a fraction of another where the fraction is less than 1
* Write one quantity as a fraction of another where the fraction is greater than 1
* Write a fraction in its lowest terms by cancelling common factors
* Find equivalent fractions
* Identify when a fraction can be scaled to tenths or hundredths
* Convert between mixed numbers and top-heavy fractions
* Apply addition and subtraction to proper fractions, improper fractions and mixed numbers
* Multiply proper, improper fractions and mixed numbers
* Divide a proper fraction by a proper fraction and apply division to improper fractions and mixed numbers
* Identify if a fraction is terminating or recurring
* Recall some decimal and fraction equivalents (e.g. tenths, fifths, eighths)
* Write a decimal as a fraction
* Convert a fraction to a decimal by scaling (when possible)
* Use a calculator to change any fraction to a decimal
* Understand that a percentage means ‘number of parts per hundred’
* Write a percentage as a fraction
* Write a quantity as a percentage of another
* Calculate a percentage of an amount
* Identify the multiplier for a percentage increase or decrease
* Use calculators to increase (decrease) an amount by a percentage using multiplicative methods
* Compare two quantities using percentages
* Write a decimal as a percentage
* Write a fraction as a percentage
 | **Proportional Reasoning****This unit builds upon from KS2*** Understand the meaning of a compound unit
* Convert between units of length, capacity, mass and time

**This unit introduces*** Convert fluently between metric units of length
* Convert fluently between metric units of mass
* Convert fluently between metric units of volume / capacity
* Convert fluently between units of time
* Convert fluently between units of money
* Solve practical problems that involve converting between units
* State conclusions clearly using the units correctly
* Describe a comparison of measurements or objects using the language ‘a to b’
* Describe a comparison of measurements or objects using ratio notation a:b
* Use ratio notation to describe a comparison of more than two measurements or objects
* Convert between different units of measurement
* State a ratio of measurements in the same units
* Simplify a ratio by cancelling common factors
* Identify when a ratio is written in its lowest terms
* Find the value of a ‘unit’ in a division in a ratio problem
* Divide a quantity in two parts in a given part:part ratio
* Divide a quantity in two parts in a given part:whole ratio

Express correctly the solution to a division in a ratio problem**Sequences 1****This unit builds upon from KS2*** Use a term-to-term rule to generate a sequence
* Find the term-to-term rule for a sequence
* Describe a sequence using the term-to-term rule

**This unit introduces*** Identify the first 10 triangular numbers
* Recall the first 15 square numbers
* Recall the first 5 cube numbers
* Use linear number patterns to solve problems Use a term-to-term rule to generate a linear sequence
* Use a term-to-term rule to generate a non-linear sequence
* Find the term-to-term rule for a sequence
* Describe a number sequence
* Solve problems involving the term-to-term rule for a sequence
* Solve problems involving the term-to-term rule for a non-numerical sequence
 | **Algebraic Manipulation 2, Formulae and Solving Equations I****This unit builds upon** Year 7, Number 1 and Calculating, Algebraic Manipulation 1**This unit introduces*** now how to write products algebraically
* Simplify an expression involving terms with combinations of variables (e.g. 3a²b + 4ab2 + 2a2 – a2b)
* Recognise a simple formula written in words
* Interpret the information given in a written formula
* Substitute positive numbers into formulae
* Interpret the information that results from substituting into a formula
* Create a one-step formula from given information
* Create a two-step formula from given information
* Use symbols to represent variables in a formula
* Building equations
* Choose the required inverse operation when solving an equation
* Identify the correct order of undoing the operations in an equation
* Solve one-step equations when the solution is a whole number (fraction)
* Solve two-step equations (including the use of brackets) when the solution is a whole number
* Solve two-step equations (including the use of brackets) when the solution is a fraction
* Solve three-step equations (including the use of brackets) when the solution is a whole number
* Solve three-step equations (including the use of brackets) when the solution is a fraction
* Check the solution to an equation by substitution
 | **Investigating angles****This unit builds upon from KS2*** Use angles at a point, angles at a point on a line and vertically opposite angles to calculate missing angles in geometrical diagrams
* Know that the angles in a triangle total 180°

**This unit introduces*** Use a ruler and protractor to measure angles
* Use a ruler and protractor to draw angles
* Identify fluently angles at a point, angles at a point on a line and vertically opposite angles
* Identify known angle facts in more complex geometrical diagrams
* Use knowledge of angles to calculate missing angles in geometrical diagrams
* Know that angles in a triangles total 180°
* Find missing angles in triangles
* Find missing angles in isosceles triangles
* Know that angles in a quadrilateral total 360°
* Find missing angles in quadrilaterals
* Explain reasoning using vocabulary of angles

Use knowledge of all angle facts to calculate missing angles in geometric diagrams linking to algebra **Constructions 1****This unit builds upon from KS2*** Measure distances to the nearest millimetre
* Create and interpret scale diagrams
* Use compasses to draw circles
* Interpret plan and elevations

**This unit introduces*** Know the meaning of faces, edges and vertices
* Apply the meaning of faces, edges and vertices to describe 3D shapes
* Use notation for parallel lines
* Know the meaning of ‘perpendicular’ and identify perpendicular lines
* Know the meaning of ‘regular’ polygons
* Identify line and rotational symmetry in polygons
* Use AB notation for describing lengths

Use ∠ABC notation for describing angles* Visualise a 3D shape from its net
* Recall the names and shapes of special triangles and quadrilaterals
* Know the meaning of a diagonal of a polygon
* Know the properties of the special quadrilaterals (including diagonals)
 |
| Open book end of topic assessment | Closed book end of term test | Open book end of topic assessment | Open book end of topic assessment | Open book end of topic assessment | Closed book end of term test |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Autumn Term 1** | **Autumn Term 2** | **Spring Term 1** | **Spring Term 2** | **Summer Term 1** | **Summer Term 2** |
| **Year 8****Set 3 and UP** | **Calculating Space****This unit builds upon** * Calculating the area of simple 2D shapes (from KS2)
* Year 7, Exploring Fraction, Decimal, Percentages

**This unit introduces*** Recognise that the value of the perimeter can equal the value of area
* Use standard formulae for area and volume
* Find missing lengths in 2D shapes when the area is known
* Know that the area of a trapezium is given by the formula area = ½ × (a + b) × h = $\left(\frac{a+b}{2}\right)h$ = $\frac{\left(a+b\right)h}{2}$
* Calculate the area of a trapezium
* Know the vocabulary of circles
* Know that the number π (pi) = 3.1415926535…
* Know the formula circumference of a circle = 2πr = πd
* Calculate the circumference of a circle when radius (diameter) is given
* Know the formula area of a circle = πr²
* Calculate the area of a circle when radius (diameter) is given
* Understand the meaning of surface area
* Find the surface area of cuboids (including cubes) when lengths are known
* Calculate the volume of cubiods (including cubes) when lengths are known

Find missing lengths in 3D shapes when the volume or surface area is known**Straight Line Graphs****This unit builds upon**Year 7, Algebra Manipulation 1 & 2, including Solving equations**This unit introduces*** Know that graphs of functions of the form y = mx + c, x ± y = c and ax ± by = c are linear
* Plot graphs of functions of the form y = mx + c
* Plot graphs of functions of the form ax ± by = c
* Draw and recognise the graphs of y = c and x = c
* Understand the concept of the gradient of a straight line
* Write the equation of a line parallel to the x-axis or the y-axis
* Draw a line parallel to the x-axis or the y-axis given its equation
* Identify the lines y = x and y = -x
* Draw the lines y = x and y = -x
* Find the gradient of a straight line on a unit grid
* Find the y-intercept of a straight line
* Sketch a linear graph
* Plot and interpret graphs of piece-wise linear functions in real contexts
* Plot and interpret distance-time graphs (speed-time graphs)
* Find approximate solutions to kinematic problems involving distance and speed
 | **Straight Line Graphs*** Know that graphs of functions of the form y = mx + c, x ± y = c and ax ± by = c are linear
* Plot graphs of functions of the form y = mx + c
* Plot graphs of functions of the form ax ± by = c
* Draw and recognise the graphs of y = c and x = c
* Understand the concept of the gradient of a straight line
* Write the equation of a line parallel to the x-axis or the y-axis
* Draw a line parallel to the x-axis or the y-axis given its equation
* Identify the lines y = x and y = -x
* Draw the lines y = x and y = -x
* Find the gradient of a straight line on a unit grid
* Find the y-intercept of a straight line
* Sketch a linear graph
* Plot and interpret graphs of piece-wise linear functions in real contexts
* Plot and interpret distance-time graphs (speed-time graphs)

Find approximate solutions to kinematic problems involving distance and speed**Solving Equations 2****This unit builds upon**Year 7, Algebra Manipulation 1 & 2, including Solving equations**This unit introduces*** Solve linear equations with the unknown on both sides when the solution is a whole number
* Solve linear equations with the unknown on both sides when the solution is a negative number
* Solve linear equations with the unknown on both sides when the equation involves brackets
* Recognise that the point of intersection of two graphs corresponds to the solution of a connected equation

Check the solution to an equation by substitution**Transformations****This unit builds upon**Year 7, Exploring FDP, Plotting coordinates (KS2)**This unit introduces*** Carry out a reflection in a diagonal mirror line (45° from horizontal)
* Reflect shapes in the x and y axis
* Find and name the equation of the mirror line for a given reflection
* Describe a translation as a 2D vector
* Understand the concept and language of rotations
* Carry out a rotation using a given angle, direction and centre of rotation
* Describe a rotation using mathematical language
* Use the centre and scale factor to carry out an enlargement of a 2D shape with a fractional scale factor
* Find the scale factor of an enlargement with fractional scale factor
* Find the centre of an enlargement with fractional scale factor
* Perform a sequence of transformations on a 2D shape
 | **Algebra Manipulation 3****This unit builds upon**Year 7, Algebra Manipulation 1 & 2, including Solving equations**This unit introduces*** Expand and simplify an expression (e.g. 3(x+2) +4(x+5))
* Identify common factors (numerical and algebraic) of terms in an expression
* Factorise an expression by taking out common factors
* Be aware of common scientific formulae
* Substitute negative numbers into formulae
* Know the meaning of the ‘subject’ of a formula
* Change the subject of a formula when one step is required

Change the subject of a formula when a two steps are required | **Presentation of Data****This unit introduces*** Know the meaning of categorical data
* Know the meaning of discrete data
* Interpret and construct frequency tables
* Construct and interpret pictograms (bar charts, tables) and know their appropriate use
* Construct and interpret comparative bar charts
* Interpret pie charts and know their appropriate use
* Construct pie charts when the total frequency is not a factor of 360
* Choose appropriate graphs or charts to represent data

Construct and interpret vertical line charts**Number 2****This unit builds upon**Year 7, Number 1**This unit introduces*** Multiply and divide a number positive integer by a power of 10
* Multiply and divide a decimal by a power of 10
* Use knowledge of place value to multiply with decimals
* Use knowledge of place value to divide a decimal
* Use knowledge of place value to divide by a decimal
* Use knowledge of inverse operations when dividing with decimals
* Be fluent at multiplying a three-digit or a two-digit number by a two-digit number
* Be fluent when using the method of short division
* Know the order of operations for the four operations
* Use brackets in problem involving the order of operations
* Understand and apply the fact that addition and subtraction have equal priority
* Understand and apply the fact that multiplication and division have equal priority
* Approximate by rounding to any number of decimal places
* Know how to identify the first significant figure in any number
* Approximate by rounding to the first significant figure in any number
* Understand estimating as the process of finding a rough value of an answer or calculation
* Use estimation to predict the order of magnitude of the solution to a (decimal) calculation
* Estimate calculations by rounding numbers to one significant figure
* Use cancellation to simplify calculations

Use inverse operations to check solutions to calculations* Understand the meaning of prime factor
* Write a number as a product of its prime factors
* Use a Venn diagram to sort information
* Use prime factorisations to find the highest common factor of two numbers
* Use prime factorisations to find the lowest common multiple of two numbers
* Know how to identify any significant figure in any number
* Approximate by rounding to any significant figure in any number
* Write a large (small) number in standard form
* Interpret a large (small) number written in standard form
 | **Sequences 2****This unit builds upon**Year 7, Sequences 1**This unit introduces*** Generate a sequence from a term-to-term rule
* Understand the meaning of a position-to-term rule
* Use a position-to-term rule to generate a sequence
* Find the position-to-term rule for a given sequence (nth term)
* Use algebra to describe the position-to-term rule of a linear sequence (the nth term)

Use the nth term of a sequence to deduce if a given number is in a sequence**Constructions 2****This unit builds upon**Year 7, Constructions 1**This unit introduces*** Use compasses to construct clean arcs
* Use ruler and compasses to construct an equilateral triangle
* Use ruler and compasses to construct an isosceles triangle
* Use ruler and compasses to construct a right angled triangle
* Use ruler and compasses to construct the perpendicular bisector of a line segment
* Use ruler and compasses to bisect an angle
* Use a ruler and compasses to construct a perpendicular to a line from a point (at a point)
* Understand the meaning of locus (loci)
* Know how to construct the locus of points a fixed distance from a point (from a line)
* Identify when to use the locus of points a fixed distance from a point (from a line)
* Identify when a perpendicular bisector is needed to solve a loci problem

Identify when an angle bisector is needed to solve a loci problem | **Measuring Data****This unit introduces*** Understand the mode and median as measures of typicality (or location)
* Find the mode of set of data
* Find the median of a set of data
* Find the median of a set of data when there are an even number of numbers in the data set
* Use the mean to find a missing number in a set of data
* Calculate the mean from a frequency table
* Find the mode from a frequency table
* Find the median from a frequency table
* Understand the range as a measure of spread (or consistency)
* Calculate the range of a set of data
* Analyse and compare sets of data

Appreciate the limitations of different statistics (mean, median, mode, range)**Probability****This unit builds upon**Year 7, Exploring FDP 1, Understanding simple ideas of probability (KS2)**This unit introduces*** Know that probability is a way of measuring likeliness
* Know and use the vocabulary of probability
* Understand the use of the 0-1 scale to measure probability
* Assess likeliness and place events on a probability scale
* List all the outcomes for an experiment
* Identify equally likely outcomes
* Work out theoretical probabilities for events with equally likely outcomes
* Know how to represent a probability
* Recognise when it is not possible to work out a theoretical probability for an event
* Know that the sum of probabilities for all outcomes is 1
* Apply the fact that the sum of probabilities for all outcomes is 1
* List all elements in a combination of sets using a Venn diagram
* List outcomes of an event systematically
* Use a table to list all outcomes of an event
* List outcomes of an event using a grid (two-way table)
* Calculate probabilities using a possibility space
* Use theoretical probability to calculate expected outcomes
* Use experimental probability to calculate expected outcomes
 |
| Open book end of topic assessment | Closed book end of term test | Open book end of topic assessment | Open book end of topic assessment | Open book end of topic assessment | Closed book end of term test |