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

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| **Year** | **Autumn Term 1** | **Autumn Term 2** | **Spring Term 1** | **Spring Term 2** | **Summer Term 1** | **Summer Term 2** |
| **Year 7****Set 2** | **Number 1 and Calculating****This unit builds upon from KS2*** Know the meaning of a prime number
* Recall prime numbers up to 50
* 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
* Know how to identify the first significant figure in any number
* Approximate by rounding to the first significant figure in any number
* Calculate with negative numbers
* Apply the correct order of operations

**This unit introduces*** Recall prime numbers up to 100
* 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
* Solve worded questions involving hcf and lcm
* Know how to identify any significant figure in any number
* Approximate by rounding to any significant figure in any number
* 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
* Know how to square (or cube) a negative number
* Enter negative numbers into a calculator
* Use a scientific calculator to calculate with fractions, both positive and negative
* Interpret a calculator display when working with negative numbers
* Understand how to use the order of operations including powers
* Understand how to use the order of operations including roots
 | **Algebraic Manipulation 1****This unit builds upon from KS2*** Use symbols (including letters) to represent missing numbers
* Substitute numbers into worded formulae
* Substitute numbers into simple algebraic formulae
* 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)
* Substitute positive numbers into expressions and formulae
* 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*** Add and subtract fractions with different denominators
* Add and subtract mixed numbers with different denominators
* Multiply a proper fraction by a proper fraction
* Divide a proper fraction by a whole number
* Simplify the answer to a calculation when appropriate
* Use non-calculator methods to find a percentage of an amount
* Convert between fractions, decimals and percentages

**This unit introduces*** 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
* Find equivalent fractions and write a fraction in its lowest terms by cancelling common factors
* Identify when a fraction can be scaled to tenths or hundredths
* Convert between FDP
* Convert between mixed numbers and improper fractions

Apply all four operations to fractions and mixed numbers.* Recognise when a fraction (percentage) should be interpreted as a number
* Recognise when a fraction (percentage) should be interpreted as an operator
* Identify the multiplier for a percentage increase or decrease when the percentage is greater than 100%
* Use calculators to increase an amount by a percentage greater than 100%
* Solve problems involving percentage change
* Solve original value problems when working with percentages
* Solve financial problems including simple interest
* Understand the meaning of giving an exact solution

Solve problems that require exact calculation with fractions | **Proportional Reasoning****This unit builds upon from KS2*** Find a relevant multiplier in a situation involving proportion
* Plot the graph of a linear function
* Understand the meaning of a compound unit
* Convert between units of length, capacity, mass and time

**This unit introduces*** Identify ratio in a real-life context
* Write a ratio to describe a situation
* Find equivalent ratios and understand how to simplify a ratio
* Divide an amount by a given ratio
* Understand the connections between ratios and fractions
* Understand the meaning of a compound unit
* Convert between compound units
* Know the connection between speed, distance and time
* Solve problems involving speed

Identify when it is necessary to convert quantities in order to use a sensible unit of measure**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*** 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 1****This unit builds upon** Year 7, Number 1 and Calculating, Algebraic Manipulation 1**This unit introduces*** Know how to write products algebraically
* Use fractions when working in algebraic situations
* Simplify an expression involving terms with combinations of variables (e.g. 3a²b + 4ab2 + 2a2 – a2b)
* Identify common factors (numerical and algebraic) of terms in an expression
* Factorise an expression by taking out common factors
* Simplify an expression involving terms with combinations of variables (e.g. 3a²b + 4ab2 + 2a2 – a2b)
* Know the multiplication, division, power and zero law of indices
* Know the negative and fractions law of indices.
* Understand that negative powers can arise
* Substitute positive and negative numbers into formulae
* Be aware of common scientific 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* 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*** Identify alternate angles and know that they are equal
* Identify corresponding angles and know that they are equal
* Use knowledge of alternate and corresponding angles to calculate missing angles in geometrical diagrams
* Establish the fact that angles in a triangle must total 180° (apply to algebraic problems)
* Solve missing angle problems involving alternate angles
* Solve missing angle problems involving corresponding angles
* Use the fact that angles in a triangle total 180° to work out the total of the angles in any polygon
* Establish the size of an interior angle in a regular polygon
* Know the total of the exterior angles in any polygon
* Establish the size of an exterior angle in a regular polygon

Solve missing angle problems in polygons**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*** 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
* Know how to deal with a change in depth when dealing with plans and elevations
* Construct a shape from its plans and elevations
* Construct the plan and elevations of a given shape
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| **Year 8****Set 1** | **Calculating Space****This unit builds upon** * Calculating the area of simple 2D shapes (from KS2)

Year 7, Exploring Fraction, Decimal, Percentages**This unit introduces*** Calculate the area of a trapezium
* Know the vocabulary of circles
* Know that the number π (pi) = 3.1415926535…
* Recall π to two decimal places
* Know the formula circumference of a circle = 2πr = πd
* Calculate the circumference of a circle when radius (diameter) is given
* Calculate the radius (diameter) of a circle when the circumference is known
* Calculate the perimeter of composite shapes that include sections of a circle
* Know the formula area of a circle = πr²
* Calculate the area of a circle when radius (diameter) is given
* Calculate the radius (diameter) of a circle when the area is known
* Calculate the area of composite shapes that include sections of a circle
* Know the formula for finding the volume of a right prism (cylinder)
* Calculate the volume of a right prism

Calculate the volume of a cylinder**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 (x ± y = c, ax ± by = 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
* Find the gradient of a straight line on a unit grid
* Find the y-intercept of a straight line
* Sketch a linear graph
* Distinguish between a linear and quadratic graph
* Plot graphs of quadratic functions of the form y = x2 ± c
* Sketch a simple quadratic 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 cont’d****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 (x ± y = c, ax ± by = 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
* Find the gradient of a straight line on a unit grid
* Find the y-intercept of a straight line
* Sketch a linear graph
* Distinguish between a linear and quadratic graph
* Plot graphs of quadratic functions of the form y = x2 ± c
* Sketch a simple quadratic graph
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* 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 fraction
* 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*** Translate a shape given a vector
* Reflect shapes in the x and y axis
* Rotate a shape about a point, given an angle and direction
* 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
* Find and describe a single transformation given two congruent 2D shapes
* Solve problems involving similarity
 | **Algebraic Manipulation 3****This unit builds upon**Year 7, Algebra Manipulation 1 & 2, including Solving equations**This unit introduces*** Understand the meaning of an identity
* Multiply two linear expressions of the form (x + a)(x + b)
* Multiply two linear expressions of the form (x ± a)(x ± b)
* Expand the expression (x ± a)2
* Simplify an expression involving ‘x2’ by collecting like terms
* Identify when it is necessary to remove factors to factorise a quadratic expression
* Identify when it is necessary to find two linear expressions to factorise a quadratic expression
* Factorise a quadratic expression of the form x² + bx + c
 | **Presentation of Data****This unit introduces*** Construct and interpret pie charts
* Construct graphs of time series
* Interpret graphs of time series
* Construct and interpret compound bar charts
* Interpret a wider range of non-standard graphs and charts
* Understand that correlation does not indicate causation
* Interpret a scatter diagram using understanding of correlation
* Construct a line of best fit on a scatter diagram
* Use a line of best fit to estimate values
* Know when it is appropriate to use a line of best fit to estimate values

**Number 2****This unit builds upon**Year 7, Number 1**This unit introduces*** Calculate with positive indices (roots) using written methods
* Calculate with negative indices in the context of standard form
* Use a calculator to evaluate numerical expressions involving powers (roots)
* Interpret a number written in standard form
* Add (subtract) numbers written in standard form
* Multiply (divide) numbers written in standard form
* Convert a ‘near miss’ into standard form; e.g. 23 × 107
* Enter a calculation written in standard form into a scientific calculator
* Interpret the standard form display of a scientific calculator
* Understand the difference between truncating and rounding
* Identify the minimum and maximum values of an amount that has been rounded (to nearest x, x d.p., x s.f.)
* Use inequalities to describe the range of values for a rounded value
* Solve problems involving the maximum and minimum values of an amount that has been rounded
 | **Triangles****This unit builds upon**Year 7, Number 1, Algebra Manipulation 1 & 2, including Solving equations**This unit introduces*** Know Pythagoras’ theorem
* Identify the hypotenuse in a right-angled triangle
* Know when to apply Pythagoras’ theorem
* Calculate the hypotenuse of a right-angled triangle using Pythagoras’ theorem

Calculate one of the shorter sides in a right-angled triangle using Pythagoras’ theorem**Sequences 2****This unit builds upon**Year 7, Sequences 1**This unit introduces*** 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
* 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 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*** Find the modal class of set of grouped data
* Find the class containing the median of a set of data
* Calculate an estimate of the mean from a grouped frequency table
* Estimate the range from a grouped frequency table
* Analyse and compare sets of data, appreciating the limitations of different statistics (mean, median, mode, range)

Choose appropriate statistics to describe a set of data**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
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