|  |  |  |  |
| --- | --- | --- | --- |
| **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 = = * 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 |