

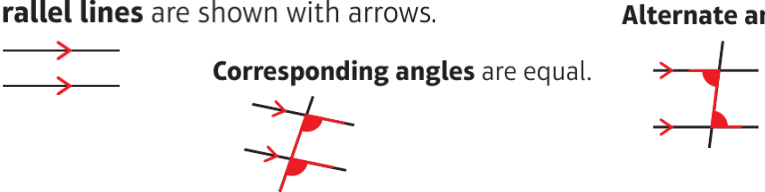
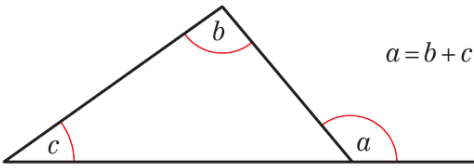
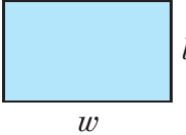
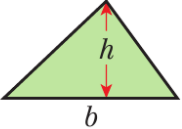
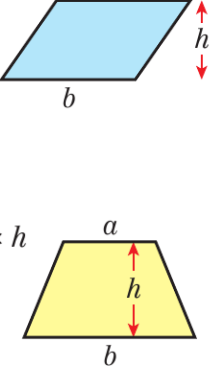
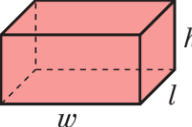


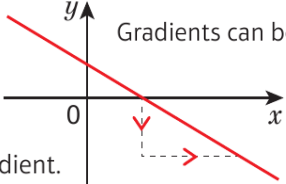
Topic: KS4 Foundation Unit 5 Equations, inequalities, and sequences MathsWatch clip numbers: 21, 37, 95, 100, 102, 135, 136, 137, 138, 139		Duration: 12 Lessons	Composite: Unit Test
Key vocabulary:	Powerful knowledge components crucial to commit to long term memory. Declarative knowledge.	Core knowledge components. Procedural and conditional knowledge.	Links to previous and future topics
Equations Brackets Substitution Formula Expression Integers Inequalities Geometric Sequence Nth Term	<p>I know that:</p> <p>An equation contains an unknown number (a letter) and an '=' sign. In an equation, the expressions on both sides of the = sign have the same value. You can visualise them on balanced scales.</p> <p>The scales stay balanced if you complete the same operation to both sides. You can use this balancing method to solve equations.</p>  <p>In an equation with brackets, expand the brackets first.</p> <p>A formula shows the relationship between two or more variables (letters). You can substitute values to find an unknown value.</p> <p>Inequalities use these symbols: <, >, ≤, ≥ You can show solutions to inequalities on a number line. An empty circle ○ shows the value is <i>not</i> included. A filled circle ● shows the value is included. An arrow ○ → shows that the solution continues towards infinity.</p> <p>You can solve two-sided inequalities using a balancing method.</p> <p>Solve $7 < 2x - 1 < 13$</p> <p>$7 + 1 < 2x - 1 + 1 < 13 + 1$ — Add 1 to all the parts.</p> <p>$8 < 2x < 14$ $\div 2$ $4 < x < 7$ $\div 2$ — Divide by 2.</p> <p>The numbers in a sequence are called terms. The <i>n</i>th term of a sequence tells you how to work out the term at position <i>n</i>.</p>	<p>I know how to:</p> <ul style="list-style-type: none"> Rearrange simple linear equations. Solve simple linear equations, including two-step equations, equations with brackets and equations with unknowns on both sides. Solve simple linear inequalities and two-sided inequalities. Write down whole numbers which satisfy an inequality. Represent inequalities on a number line. Substitute values into formulae and solve equations. Change the subject of a formula. <p>I know when to:</p> <ul style="list-style-type: none"> Use correct notation to show inclusive and exclusive inequalities. Use the <i>n</i>th term to generate terms of a sequence. Find the <i>n</i>th term of an arithmetic sequence. 	<p>This topic builds on prior knowledge:</p> <ul style="list-style-type: none"> Use negative numbers with the four operations, recall and use the hierarchy of operations and understand inverse operations. Deal with decimals and negatives on a calculator. <p>This topic will be used in future learning:</p> <ul style="list-style-type: none"> Using inequality symbols with grouped data. Use formulae to calculate speed and acceleration problems.

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Equations Brackets Substitution Formula Expression Integers Inequalities Geometric Sequence Nth Term	<p>I know that:</p> <p>An equation contains an unknown number (a letter) and an '=' sign. In an equation, the expressions on both sides of the = sign have the same value. You can visualise them on balanced scales.</p>  <p>The scales stay balanced if you complete the same operation to both sides. You can use this balancing method to solve equations.</p> <p>In an equation with brackets, expand the brackets first.</p> <p>A formula shows the relationship between two or more variables (letters). You can substitute values to find an unknown value.</p> <p>Inequalities use these symbols: <, >, ≤, ≥ You can show solutions to inequalities on a number line. An empty circle ○ shows the value is <i>not</i> included. A filled circle ● shows the value is included. An arrow ○ → shows that the solution continues towards infinity.</p> <p>You can solve two-sided inequalities using a balancing method. Solve $7 < 2x - 1 < 13$</p> <p>$7 + 1 < 2x - 1 + 1 < 13 + 1$ — Add 1 to all the parts.</p> <p>$8 < 2x < 14$ $\div 2$ $4 < x < 7$ — Divide by 2.</p> <p>The numbers in a sequence are called terms. The <i>n</i>th term of a sequence tells you how to work out the term at position <i>n</i>.</p>	<p>I know how to:</p> <ul style="list-style-type: none"> Rearrange simple linear equations. Solve simple linear equations, including two-step equations, equations with brackets and equations with unknowns on both sides. Solve simple linear inequalities and two-sided inequalities. Write down whole numbers which satisfy an inequality. Represent inequalities on a number line. Substitute values into formulae and solve equations. Change the subject of a formula. <p>I know when to:</p> <ul style="list-style-type: none"> Use correct notation to show inclusive and exclusive inequalities. Use the <i>n</i>th term to generate terms of a sequence. Find the <i>n</i>th term of an arithmetic sequence. 	<p>This topic builds on prior knowledge:</p> <ul style="list-style-type: none"> Use negative numbers with the four operations, recall and use the hierarchy of operations and understand inverse operations. Deal with decimals and negatives on a calculator. <p>This topic will be used in future learning:</p> <ul style="list-style-type: none"> Using inequality symbols with grouped data. Use formulae to calculate speed and acceleration problems.

Topic: KS4 Foundation Unit 6 Angles MathsWatch clip numbers: 120, 121, 122, 123, 137		Duration: 10 Lessons	Composite: Unit Test
Key vocabulary:	Powerful knowledge components crucial to commit to long term memory. Declarative knowledge.	Core knowledge components. Procedural and conditional knowledge.	Links to previous and future topics
Parallel Lines Perpendicular Polygons Geometrical Quadrilaterals Interior and Exterior Angles.	<p>I know that:</p> <p>Two shapes are congruent when they are exactly the same shape <i>and</i> size. Two shapes are similar when they are the same shape. Similar shapes may be different sizes.</p> <p>Parallel lines are shown with arrows. Alternate angles are equal.</p> <p>Corresponding angles are equal.</p>  <p>The angles in a triangle always add up to 180°</p> <p>An exterior angle of a triangle equals the sum of the two interior angles on the opposite side of the triangle.</p>  <p>A regular polygon has all equal sides and all equal interior angles.</p> <p>An irregular polygon has unequal sides and unequal interior angles.</p> <p>The exterior angles of any polygon always add up to 360°.</p> <p>The exterior angle of a regular polygon = $\frac{360^\circ}{\text{number of sides}}$.</p> <p>Any pair of interior and exterior angles always add up to 180°.</p> <p>The sum of the interior angles of any n-sided polygon is $(n - 2) \times 180^\circ$.</p>	<p>I know how to:</p> <ul style="list-style-type: none"> Solve geometric problems using side and angle properties of quadrilaterals. Identify congruent shapes. Find missing angles using corresponding and alternate angles. Solve angle problems in triangles. Calculate the interior and exterior angles of regular polygons. <p>I know when to:</p> <ul style="list-style-type: none"> Explain why some polygons fit together and some others do not. Solve angle problems using equations. 	<p>This topic builds on prior knowledge:</p> <ul style="list-style-type: none"> Name angles and distinguish between acute, obtuse, reflex and right angles. Know the properties of special triangles and quadrilaterals. <p>This topic will be used in future learning:</p> <ul style="list-style-type: none"> Use angles at parallel lines to work out bearings.

Topic: KS4 Foundation Unit 7 Averages and range MathsWatch clip numbers: 62, 128, 130, 176		Duration: 9 Lessons	Composite: Unit Test
Key vocabulary:	Powerful knowledge components crucial to commit to long term memory. Declarative knowledge.	Core knowledge components. Procedural and conditional knowledge.	Links to previous and future topics
Frequency Mode Median Mean Outliers Modal Class Grouped Data Sampling Bias Fair	<p>I know that:</p> <p>To work out the mean of some values:</p> <ul style="list-style-type: none"> ○ add the values together ○ divide your answer by the number of values. <p>To calculate the mean from a frequency table, use $\text{mean} = \frac{\sum f \times x}{\sum x}$ where f is the frequency, x is the variable and \sum means 'the sum of'.</p> <p>To compare two sets of data, compare an average (mean, mode or median) and the range.</p> <p>The median is the middle value when the data is written in order. The median is in the $\frac{n+1}{2}$ th position. . .</p> <p>An outlier is an extreme value that doesn't fit the overall pattern.</p> <p>Estimate the range of grouped data using maximum possible value – minimum possible value.</p> <p>The modal class is the class with the highest frequency.</p> <p>When the data is grouped, you can calculate an estimate for the mean using the midpoints of the classes as estimates for data values.</p> <p>In a survey, a sample is taken to represent the population. The sample must be chosen carefully to avoid bias.</p> <p>When considering sample size, you need to balance the need for accuracy with the costs and time involved in taking a large sample.</p> <p>In a random sample, every member of the population has an equal chance of being included. .</p>	<p>I know how to:</p> <ul style="list-style-type: none"> • Calculate the mean from a list and from a frequency table. • Find the mode, median and range from a stem and leaf diagram. • Estimate the range from a grouped frequency table. • Find the modal class. • Find the median from a frequency table. • Estimate the mean of grouped data. <p>I know when to:</p> <ul style="list-style-type: none"> • Identify outliers. • Compare sets of data using the mean and range. 	<p>This topic builds on prior knowledge:</p> <ul style="list-style-type: none"> • Calculate the midpoint of two numbers. • Use inequality notation. <p>This topic will be used in future learning:</p> <ul style="list-style-type: none"> • Apply average calculations within other topics, such as speed calculations and averages questions incorporated within probability questions.

Topic: KS4 Foundation Unit 8 Perimeter, area and volume 1 MathsWatch clip numbers: 52, 53, 54, 55, 56, 112, 114, 115, 119		Duration: 10 Lessons	Composite: Unit Test
Key vocabulary:	Powerful knowledge components crucial to commit to long term memory. Declarative knowledge.	Core knowledge components. Procedural and conditional knowledge.	Links to previous and future topics
Perimeter Rectangle Parallelogram Triangle Trapezia Area Volume Perimeter Hectares Cuboid Prism Surface Area Convert	<p>I know that:</p> <p>The perimeter of a 2D shape is the total distance all around the outside.</p> <p>The area of a 2D shape is the amount of space inside a shape.</p> <p>Area of rectangle = length \times width $= l \times w$</p>  <p>Area of a parallelogram = base \times vertical height $= b \times h$</p> <p>Area of triangle = $\frac{1}{2} \times$ base \times vertical height $= \frac{1}{2} \times b \times h$</p>  <p>Area of trapezium = $\frac{1}{2} \times (a + b) \times h$</p>  <p>To find the surface area of a 3D solid, work out the area of each face. Add to find the total surface area.</p> <p>The volume of a 3D solid is the amount of space it takes up. Volume is measured in mm³, cm³ or m³.</p> <p>Volume of a cuboid = length \times width \times height $= l \times w \times h$</p> 	<p>I know how to:</p> <ul style="list-style-type: none"> Calculate the perimeter and area of rectangles, parallelograms, triangles, and trapezia. Find the height of a trapezium given its area. Calculate the perimeter and area of shapes made from triangles and rectangles. Calculate the surface and volume area of a prism. Solve problems involving surface area and volume. Convert between measures of volume. <p>I know when to:</p> <ul style="list-style-type: none"> Convert between area measures. Calculate a missing length, given the area. Estimate lengths, areas and costs. 	<p>This topic builds on prior knowledge:</p> <ul style="list-style-type: none"> Recall the names of 2D shapes. Identify and name common 3D solids: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres. Convert metric units to metric units. <p>This topic will be used in future learning:</p> <ul style="list-style-type: none"> Solve problems involving geometry and multiplicative reasoning problems. Find area and perimeter of enlarged shapes.

Topic: KS4 Foundation Unit 9 Graphs MathsWatch clip numbers: 96, 97, 133, 143, 159		Duration: 10 Lessons	Composite: Unit Test
Key vocabulary:	Powerful knowledge components crucial to commit to long term memory. Declarative knowledge.	Core knowledge components. Procedural and conditional knowledge.	Links to previous and future topics
Segment Midpoint Axes Coordinates Parallel Equation Interpret Scatter Graph Distance-time Graph Predictions	<p>I know that:</p> <p>The equation $y = 1$ means the y-coordinate is always 1. The line is parallel to the x-axis.</p> <p>The equation $x = 3$ means the x-coordinate is always 3. The line is parallel to the y-axis.</p> <p>The midpoint of a line segment is the point exactly in the middle. To find the coordinates of the midpoint, add the x-coordinates of the end points and divide by 2, and add the y-coordinates of the endpoints and divide by 2.</p> <p>The steepness of a graph is called the gradient. You can find the gradient using: $\frac{\text{units up or down}}{\text{units across}}$ Gradients can be positive (/) or (\) negative.</p>  <p>To find the gradient work out how many units the graph goes up or down for each unit it goes across.</p> <p>Parallel lines have the same gradient.</p> <p>A linear equation produces a straight-line graph. The equation of a straight line is</p> $y = mx + c$ <p>gradient \nearrow \nwarrow y-intercept</p> <p>You can use the y-intercept and gradient to write the equation of a line of best fit and other real-life graphs, and use this equation to make predictions.</p> <p>Average speed = $\frac{\text{distance travelled}}{\text{time taken}}$</p> <p>On a distance–time graph, the gradient represents the speed of the journey.</p> <p>On a velocity–time graph the gradient represents the acceleration.</p>	<p>I know how to:</p> <ul style="list-style-type: none"> Find the midpoint of a line segment. Recognise, name and plot straight-line graphs parallel to the axes. Generate and plot coordinates from a rule and from tables of values. Find the gradient of a line. Find the equations of straight-line graphs. Sketch graphs given the values of m and c. Draw and interpret graphs from real data. Use distance–time graphs to solve problems. Draw distance–time graphs. <p>I know when to:</p> <ul style="list-style-type: none"> Draw graphs to represent relationships. Identify and interpret the gradient from an equation. Interpret rate of change graphs. Draw and interpret a range of graphs. 	<p>This topic builds on prior knowledge:</p> <ul style="list-style-type: none"> Plot coordinates and read scales Substitute into a formula. Understand that parallel lines will never meet. <p>This topic will be used in future learning:</p> <ul style="list-style-type: none"> Ratio and proportion problems that include reading from a graph Proportion and graphs questions requiring students to recognise and use direct proportion on a graph. Understand the link between the unit ratio and the gradient.