


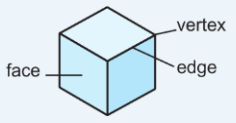
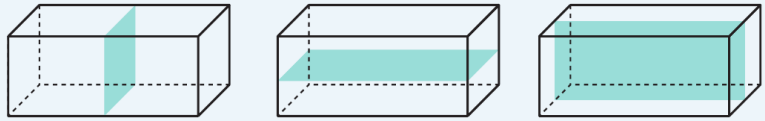
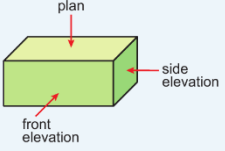




Topic: KS4 Foundation Unit 14 Multiplicative Reasoning Mathswatch Clips: 88, 89, 108, 109, 110, 142, 164, 199		Duration: 9 Lessons	Composite: Unit Test
Key vocabulary:	Powerful knowledge components crucial to commit to long term memory. Declarative knowledge.	Core knowledge components. Procedural and conditional knowledge.	Links to previous and future topics
Percentage Express Growth and Decay Compound Measures Average speed Density Pressure Acceleration Inverse Proportions Compound Interest Simple Interest	<p>I know that:</p> <ul style="list-style-type: none"> The original amount is always 100%. If the amount is <i>increased</i> the new amount will be <i>more</i> than 100%. If the amount is <i>decreased</i> the new amount will be <i>less</i> than 100%. You can calculate a percentage change using the formula $\text{percentage change} = \frac{\text{actual change}}{\text{original amount}} \times 100$ Percentage increase and decrease, profit and loss can be calculated using the formula for percentage change. Banks and building societies pay compound interest. At the end of the first year, interest is paid on the money in the account. The interest is added to the amount in the account. At the end of the second year, interest is paid on the original amount in the account <i>and</i> on the interest earned in the first year, and so on. To calculate $\text{density} = \frac{\text{mass}}{\text{volume}} \quad \text{or} \quad D = \frac{M}{V}$  $\text{pressure} = \frac{\text{force}}{\text{area}} \quad \text{or} \quad P = \frac{F}{A}$  speed = $\frac{\text{distance}}{\text{time}}$ or $S = \frac{D}{T}$ $\text{Average speed} = \frac{\text{total distance}}{\text{total time}}$  You can use the kinematics formulae for calculations with moving objects. <ul style="list-style-type: none"> $v = u + at$ $s = ut + \frac{1}{2}at^2$ $v^2 = u^2 + 2as$ where a is a constant acceleration, u is the initial velocity, v is the final velocity, t is the time taken and s is the displacement from the position when $t = 0$. $y \propto x$ means 'y is proportional to x'. When $y \propto x$, then $y = kx$, where k is the constant of proportionality. $X \propto \frac{1}{Y}$ means X and Y are in inverse proportion. This means that $XY = k$ (constant). 	<p>I know how to:</p> <ul style="list-style-type: none"> Calculate a percentage profit or loss. Express a given number as a percentage of another in more complex situations. Find the original amount given the final amount after a percentage increase or decrease Find an amount after repeated percentage change. Solve problems involving compound measures. Calculate average speed, distance and time. Use formulae to calculate speed and acceleration. <p>I know when to:</p> <ul style="list-style-type: none"> Solve growth and decay problems. Convert between metric speed measures. Use ratio and proportion in measures and conversions. Use inverse proportions. 	<p>This topic builds on prior knowledge:</p> <ul style="list-style-type: none"> Interpret scales on a range of measuring instruments. Convert between metric measures. Understand ratio notation, and be able to write a ratio in its simplest form. <p>This topic will be used in future learning:</p> <ul style="list-style-type: none"> Multiplicative reasoning skills are often incorporated within questions relating to other topics such as graphs and compound measures.

Topic: KS4 Foundation Unit 15 Constructions, Loci and Bearings Mathswatch Clips: 11, 13, 43, 44, 51, 124, 145, 146, 147, 165, 166		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
Planes Symmetry Isometric Congruent Construct Locus, Loci Equidistant Regions Perpendicular Bearing Pythagoras Trigonometry Parallel	<p>I know that: The flat surfaces of 3D shapes are called faces, the lines where two faces meet are called edges and the corners at which the edges meet are called vertices (the singular of vertices is vertex).</p>  <p>A plane is a flat (2D) surface. A solid shape has a plane of symmetry when a plane cuts the shape in half so that the part of the shape on one side of the plane is an identical reflection of the part on the other side of the plane. The planes of symmetry for this cuboid are shown in blue.</p>  <p>The plan is the view from above an object. The front elevation is the view of the front of an object. The side elevation is the view of the side of an object.</p>  <p>Constructions are accurate drawings made using a ruler and pair of compasses. Bisect a line means to cut a line exactly in half. A perpendicular bisector cuts a line in half at right angles.</p>  <p>A bearing is an angle measured in degrees clockwise from north. This bearing is 025°. A bearing is always written using three digits.</p>  <p>An ASA triangle has a given Angle, a Side length and another Angle. An SAS triangle is one where you are given two Side lengths and the Angle in between. In an SSS triangle, you are given all three Side lengths but none of the angles.</p> <p>Triangles with a right angle can be referred to as RHS triangles if you are given the Right angle, the Hypotenuse length and another Side length. The hypotenuse is the longest side of a right-angled triangle.</p>	<p>I know how to:</p> <ul style="list-style-type: none"> Describe 3D shapes using the correct mathematical words. Identify and sketch planes of symmetry of 3D shapes. Draw plans and elevations. Sketch 3D shapes based from their plans and elevations. Make accurate drawings of triangles using a ruler, protractor and compasses. Identify SSS, ASA, SAS and RHS triangles as unique from a given description. Identify congruent triangles. Bisect angles and lines using rulers and compasses. Draw loci for the path of points that follow a given rule. Use three-figure bearings. <p>I know when to:</p> <ul style="list-style-type: none"> Use scales on maps and diagrams to work out lengths and distances. Use angles at parallel lines to work out bearings. Solve problems involving bearings and scale diagrams. 	<p>This topic builds on prior knowledge:</p> <ul style="list-style-type: none"> Write a ratio in the form 1 : m and in its simplest form. Know clockwise, anticlockwise. Identify congruent shapes. <p>This topic will be used in future learning:</p> <ul style="list-style-type: none"> Measure lines and angles and using compasses, ruler and protractor, and construct standard constructions, are skill practiced here and also used in congruence, similarity and vectors.

Topic: KS4 Foundation Unit 16 Quadratic Equations and Graphs Mathswatch Clips: 98, 99, 157, 158, 160, 161		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
Quadratic Function Roots Turning Point Intercepts Simplify Binominal Expression Factorise Equation	<p>I know that:</p> <ul style="list-style-type: none"> To expand or multiply double brackets, multiply each term in one bracket by each term in the other bracket. To square a single bracket, multiply it by itself, then expand and simplify. $(x + 1)^2 = (x + 1)(x + 1)$ A quadratic expression always has a squared term (with a power of 2). It cannot have a power higher than 2. It may also have a term with a power of 1 that is the same letter as the squared term. It may also have a constant (number) term. $ax^2 + bx + c$ has a squared term, ax^2, a term with power 1, bx, and a constant term, c A quadratic function has symmetrical U-shaped curve called a parabola. A quadratic function with a $-x^2$ term has a symmetrical \cap-shaped curve. The curve always has a minimum or maximum turning point. To solve the equation $ax^2 + bx + c = 0$ using a graph, read the x-coordinates where the graph crosses the x-axis. These are called roots. To solve the equation $ax^2 + bx + c = \text{'a number'}$ using a graph, read the x-coordinates where the graph crosses the line $y = \text{'a number'}$. To factorise a quadratic equation, $ax^2 + bx + c = 0$, you need to find two numbers whose product is c and whose sum is b. The difference of two squares is a quadratic expression with two squared terms, and one term is subtracted from the other. For example $x^2 - 25$ Solutions to quadratic equations can be found algebraically by factorising as well as from a graph. 	<p>I know how to:</p> <ul style="list-style-type: none"> Multiply double brackets. Recognise quadratic expressions. Square single brackets. Plot graphs of quadratic functions. Recognise a quadratic function. Use quadratic graphs to solve problems. Solve quadratic equations $ax^2 + bx + c = 0$ using a graph. Solve quadratic equations $ax^2 + bx + c = k$ <p>I know when to:</p> <ul style="list-style-type: none"> Factorising quadratic expressions Solving quadratic equations algebraically 	<p>This topic builds on prior knowledge:</p> <ul style="list-style-type: none"> Square negative numbers. Substitute into formulae. Plot points on a coordinate grid. Expand single brackets and collect 'like' terms. <p>This topic will be used in future learning:</p> <ul style="list-style-type: none"> The skills practice in this unit, such as substituting into a formulae, as also used for when substituting into formulae for volume of sphere and cones. Graphs of cubic and reciprocal functions.