

**Subject:** Maths      **Year** 10      **Ability** Higher

Half Term 6 / weeks	Week 1-2	Week 3-4	Week 5	Week 6	
<b>Topic</b>	Unit 28 – Complex Volume and Surface Area	Unit 29 – Direct Proportion and Ratio	Unit 30 – Vectors	Unit 31 – Tree Diagrams	Reteach and Retention
<b>Topic overview</b> <b>Pupils will learn...</b>	To understand and know how to find the volume and surface area of complex and compound shapes.	To apply earlier ratio and proportion skills in context allowing amounts to be changed given ratios including currencies.	To use and understand vectors including proof for linear and parallel vectors including ratios and midpoints	To draw and use tree diagrams to find and identify probabilities of events	Focus on the process of reteach and retention, knitting together the learning in reaction to the assessments completed
<b>Components</b>	<ul style="list-style-type: none"> <li>To calculate the volume of pyramids and cones.</li> <li>To calculate the surface area of pyramids using Pythagoras.</li> <li>To calculate the curved surface area of a cone.</li> <li>To calculate the volume and surface area of a sphere.</li> <li>To calculate the volume and surface area of frustums.</li> </ul>	<ul style="list-style-type: none"> <li>To simplify ratio</li> <li>To express ration in the form 1:n and n:1.</li> <li>To divide an amount into a given ratio.</li> <li>To use direct proportion to solve problems.</li> <li>To convert currencies.</li> <li>To set up problems involving direct or inverse proportion.</li> <li>To use graphs to solve direct and inverse proportion problems.</li> </ul>	<ul style="list-style-type: none"> <li>To use vector notation.</li> <li>To draw a column vector.</li> <li>To calculate the sum or difference of two vectors.</li> <li>To combine vectors by addition.</li> <li>To be able to find the magnitude of a vector.</li> </ul>	<ul style="list-style-type: none"> <li>To draw a probability tree diagram.</li> <li>To use a tree diagram to calculate conditional probability.</li> <li>To use and draw probability tree diagrams without replacement.</li> </ul>	Staff complete a program of adaptive reteaching on specific topics based on the individual/class needs within their groups. Regular assessments are used to identify gaps in learning. Any gaps found are then addressed in lessons to help support learning and retention. Clear areas for improvement are monitored by individual staff and at a departmental level.
<b>What pupils should already know (prior learning components)</b>	Students should know the names and properties of 3D forms. The concept of perimeter and area by measuring lengths of sides will be familiar to students. Students should be able to substitute numbers into an equation and give answers to an appropriate degree of accuracy. Students should know the various metric units.	Students should have knowledge of writing statements of direct proportion and forming an equation to find values. Students will have had experience of working with proportion, in a numerical setting.	Students should be able to draw linear and quadratic graphs. Students should be able to calculate the gradient of a linear function between two points. Students should recall transformations of trigonometric functions. Students should have knowledge of writing statements of direct proportion and forming an equation to find values.	Students should understand that a probability is a number between 0 and 1, and distinguish between events which are impossible, unlikely, even chance, likely, and certain to occur. Students should be able to mark events and/or probabilities on a probability scale of 0 to 1. Students should know how to add and multiply fractions and decimals. Students should have experience of expressing one number as a fraction of another number.	All the half term content will have been covered by this point. Staff will use departmental tracking documents to analyse the gaps in learning from the most recent assessments and all previous assessments. The ability to structure and breakdown a problem-solving question as exemplified in the TFI questions throughout the course.
<b>Transferrable knowledge (skills)</b>	The topic will build pupils' confidence with basic shape and the use of basic formula.	The handling ratios is revisited throughout KS4 with many multi step questions incorporating this skill. This	Vectors is used as a large part of KS5 applied mathematics with many skills met here being used. The basic	The ability to visualise mathematical options is used throughout KS4 and into KS5. The probability element	This activity should serve to highlight and address areas of weakness in teaching and

	These skills will be used again when asked to complete multistep area and volume questions and in density. The use of exact value of pi continues the use of accuracy in answers that builds on the work including surds.	unit looks at all of these skills cementing this knowledge with a focus on currency at the end of the unit that is a life skill.	vector skills looks to allow visual representations of mathematical ideas to be seen and the use of Pythagoras and trig will be revisited. Proof elements of this unit remind students of what is needed for mathematical proof and how a reasoned response is needed for a rigorous proof	here builds on basic probability and works towards harder questions cover later in KS4 and then in stats at KS5	learning or retention. This early intervention to understand specific key areas for improvement or development. This should help to build confidence and improve students' ability to answer these and directly sequential problems.
<b>Key vocabulary pupil will know and learn</b>	Triangle, rectangle, area, perimeter, formula, length, width, measurement, volume, nets, vertices, edge, face, circle, segment, arc, sector, circumference, radius, diameter, pi, sphere, cone, capacity, hemisphere, segment, frustum, bounds, accuracy, surface area	Reciprocal, linear, functions, direct, indirect, proportion,	Vector, direction, magnitude, scalar, multiple, parallel, collinear, proof, ratio, column vector	Probability, mutually exclusive, conditional, tree diagrams, sample space, outcomes	
<b>Assessment activities</b>	Year 10 Half Term Test 13 Homework 28 – Complex Volume and Surface Area	Year 10 Half Term Test 13 Homework 29 – Direct Proportion and Ratio	Year 10 Half Term Test 13 Homework 30 – Vectors	Year 10 Half Term Test 13 Homework 31 – Tree Diagrams	AFL and adaptive teaching will continue to support staff to assess the address areas.
<b>Resources available</b>	MathsWatch clips: 169, 170, 171, 172	MathsWatch clips: 40, 41, 42, 105, 106, 107, 199	MathsWatch clips: 174, 219	MathsWatch clips: 59, 151, 175	Before any assessments are completed, revision and guidance materials are provided for students to assist in independent study.
<b>Notes</b> <b>Why this topic is important...</b>	The unit starts with the recap of basic areas and volumes before moving to spheres. This should include partial spheres and then into cones. The unit finishes with students recalling similarity to allow students to find the volume of frustums often including the use of Pythagoras and trig. Questions including “melting down” should also be looked at to support density style questions.	Students move through a series of ratio basis skills including simplification and sharing. Students should be able to move forward and back through these differ questions to aloe students to use these skills in later multistep questions. The unit should look at currency and the changing and comparison of “value” when purchasing as a life skill to end the unit.	This unit starts with students understanding the idea of column form for vectors that should have first been seen in transformations. This use if the vector form should be both developed through diagrammatic and calculations to find resultant vectors and the vector comments of magnitude and direction. The unit fishes with vector proof with students requiring to understand vector paths and the implications this has including mathematic proof .	Students should recap probability notation before being introduced to simple tree diagrams with replacement. A clear emphasis of the and or rules should be shared with students ensuring the notation is again stressed before moving to no replaced and conditional probabilities. Discussions of the best way to draw diagrams should be given to allow students to plan out the “end results” before starting the visual problem. An extension into questions that don't require a diagram but should be notation based could be considered to help provide ground work for later units.	This is an important point in the curriculum plan that enables individual teachers to review the gaps in learning for the classes they teach. The half-termly assessments are used to track students' progress and enable teachers to react quickly to any gaps in knowledge and prepare students for the next assessment. The feedback and modelling of the exam answers enables students to pick up exam techniques and the ability to communicate effectively.