



Year Group: **Year 11**

This is the plan for the taught curriculum during achievement period: **One (Sept-Dec)**

Brief summary of the topic/work being covered during this period

In Key Stage 4, Year 11, we continue to work from a linear scheme of work, with differentiated objectives allowing teachers to tailor learning to the abilities of their class, rather than labelling classes as “higher” or “foundation” at this early stage. This section gives a brief overview of work covered, with each point being given support/challenge as required for the particular group.

Substantive knowledge

- Pythagoras Theorem
- Trigonometric ratios and formulae for right-angled and non-right-angled triangles

Disciplinary knowledge

- Find the perimeter and area of basic rectilinear shapes, including compound shapes made up of several shapes that are more basic.
- Find the circumference and area of circles and parts of circles.
- Calculate the volume and surface area of prisms and other specified 3D shapes.
- Understand and use Pythagoras’ Theorem to find missing side lengths in right angled triangles, and within other shapes.
- Understand and use trigonometry for right-angled triangles (developing to non-right angled triangles for higher ability groups).
- Recognise, sketch (using key points) and plot (using a table of values) graphs of polynomial functions, and reciprocals (extend to exponentials, trig functions and circles for higher ability groups).
- Use a pair of compasses and a ruler to produce accurate drawings of triangles, angle and line bisectors, and be able to create loci.
- Identify and draw 2D representations of 3D shapes.

Prior knowledge needed for this unit/topic from previous teaching

Different students will have different starting points, depending on their understanding of mathematics in previous years. However, the list below outlines the basics that all students need to know before starting. Teachers will assess their own classes at the start of each topic to determine the group’s starting point.

- Understand the meaning of perimeter and area and know either formulae or the idea of counting to find these for basic shapes. Know relevant units for length, area, volume, etc.
- Know the parts of a circle and identify the circumference. Know relevant units for length, area, volume, etc.
- Find the volume of cubes and cuboids, either using a formula or by counting. Know relevant units for length, area, volume, etc.
- Be able to find squares and roots, both mentally and using a calculator. Effective use of calculator for multi-step problems.
- Effective use of a calculator. Knowledge of sum of angles in a triangle.
- Complete a table of values and plot coordinates (probably for linear functions).
- Know how to use a compass and how to measure a line accurately with a ruler.
- Know and identify (by name and properties) 3-dimensional shapes.

Rationale for students studying this unit/topic

The most complex topics in Key Stage 4 mathematics are taught in year 11, once students have a good grounding in “the basics” and have the academic maturity to be able to cope with the increased level of demand required. Students will still have plenty of time to regularly review and practise these topics, but will be in a better position to understand them properly than if introduced earlier in their Key Stage 4 education.

For higher ability groups, perimeter and area, in particular of sectors, goes hand-in-hand with non-right angled trigonometry, with these two topics often coming together in problems, hence the close teaching.

Visualising and constructing skills have been placed in this position in the scheme of work for practical reasons – they are skills that students need lots of time for independent practise, and a lot of one-to-one support. Teaching them at a time when there is usually disruption for mock exams, means students not only get this practise over a longer period than would otherwise be allocated for this topic, but also with smaller groups due to students being out at different times for mock exams, so therefore more access to support from their teacher.

Key concepts/ideas that are taught to students in this unit/topic, including any anticipated gaps in knowledge and plan to overcome these

- Students should be taught to apply their skills to open-ended and problem-solving situations to ensure they have fully mastered a skill. This applies to students at all levels, and for all topic areas.
- Students also need to be able to use their calculators effectively – it is widely acknowledged that students do not fully appreciate the functions that calculators have and how to use these efficiently. Students will be encouraged to use non-calculator and calculator methods at all parts of their learning to ensure they are confident in their use of calculators.
- Students often “forget” to add on sides that are not labelled in all levels of perimeter question – examples like this should be practised throughout.
- Students often calculate incorrectly with negative numbers when substituting values to find coordinates for curves (e.g. they think $(-1)^2 = -1$). Again, important to include many examples that include negatives when teaching this to embed understanding.

New key terminology students will be taught during this topic/unit

Tier 3

Sine, Cosine and Tangent will be new terminology for all students. Hypotenuse will be new for most. Correct names of circle parts will be referred to throughout. Terminology involved in constructions (bisector, construct, plan, elevations, etc.) will need to be explicitly used and explained in the context of mathematics.

Plan for Assessment

- Informal assessment is ongoing through class work, contributions to class discussion, teacher assessment during lessons.
- Teachers record homework marks each week on a centrally held department tracker; the homework tasks are detailed on the schemes of work and outlined centrally within the department to ensure consistency across all classes. Teachers will take in and formally mark a written piece of homework once every two weeks. Students will then have time during a subsequent lesson to review their work and make any corrections.
- Formal assessment will take place twice during this achievement period; firstly a baseline assessment at the start of the year, then a paper towards the end of the winter term (usually as part of a series of whole-school mock exams). This will aim to assess students’ progress in mathematics generally and covers questions from all topics that have been covered at any point in the students’ mathematical history (not just this academic year). It provides focus points for future revision, and will allow for tracking of progress during the more regular assessments that will take place in the Spring term.
- Mini start-of-topic tests provide information for teachers regarding prior knowledge and existing misconceptions. Mini end-of-topic tests help students and teachers see the progress that has been made over the course of the teaching of the topic.