



Year Group: **Year 10**

This is the plan for the taught curriculum during achievement period: **Two (Jan-Apr)**

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

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

Substantive knowledge

- Use and convert compound units, including key formulae such as speed, density, pressure.
- Know and apply basic index rules and use these to simplify algebraic expressions or calculate the value of numerical expressions. Extend to knowledge of negative and fractional indices.

Disciplinary knowledge

- Simplify expressions involving surds.
- Interpret and order numbers expressed in standard form; convert between standard and ordinary form, and perform calculations with and without a calculator.
- Use knowledge of coordinates in all four quadrants to plot equations of the form $y = mx + c$.
- Find the equation of a line; drawn on a grid, joining two points, given the gradient and another point, etc.
- Understand parallel and perpendicular lines.
- Discuss and interpret linear models of real-life situations.

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.

- An understanding of the key concept of the compound measures being discussed. Ability to substitute in mathematical formulae.
- Some prior manipulation of the most basic index laws; an understanding of the concept of repeated multiplication of the same base number being simplified using an index number.
- A familiarisation with square numbers and their roots.
- An understanding of index numbers and ability to confidently and fluently multiply and divide by 10, 100, 1000, etc.
- Be able to plot coordinates in all four quadrants. Be able to substitute values into mathematical formulae.
- Be able to divide two numbers and work with fractions. Be able to substitute into and rearrange basic formulae.
- Understand the definition of parallel and perpendicular lines and be able to identify them by sight.
- Able to plot graphs of straight line equations.

Rationale for students studying this unit/topic

Students will come across compound measures in their Science (particularly Physics) lessons, and so having this topic area placed fairly early in Key Stage 4 allows them to deepen their understanding during Science lessons, and use one to support the other.

Having mastered basic algebraic manipulation earlier in the year, this is a good time to develop skills working with indices in preparation for more challenging algebraic manipulation later, but also to support learning and understanding of Standard Form, which follows straight on. Standard Form is also a technique students come across in their Science studies, so it is important to cover this earlier in the course.

Students need a good understanding of linear graphs before they can move onto the more challenging curved graphs they will encounter in year 11.

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 prior to moving onto skills that are more complex later. In particular, correctly inputting index numbers and numbers given in Standard Form.
- Students find it difficult to learn and remember the important compound measures formulae; time should be spent supporting students in different ways to learn and remember the formulae; triangles, mnemonics, using the units as a hint, etc.
- The idea of what gradient *is* should be embedded before introducing all the different ways students may be asked to find the equation of a straight line.

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

Tier 3

Speed/Distance/Time, Density/Mass/Volume, Pressure/Force/Area, Compound, Surds, Rational/Irrational, Rationalise, Gradient, Intercept.

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 once during this achievement period; a synoptic paper after February half term. 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). Again, this assessment is in the form of a GCSE paper in order to support students' exam preparation and technique early in the course.
- 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.