

Long Term Plan: Physics Year 10

“Science is simply the word we use to describe a method of organising our curiosity.”

The programme for years 7 – 11 has staff teaching a single class, with rotating topics/subjects. There is varied order of topics for classes to allow for the rotation of practical equipment. Students will complete a biology, chemistry and then physics topic followed by an assessment. This process will then repeat again.

Staff are to use the [Curriculum Road Map](#) in the Science Drive to ensure that they rotate at the appropriate times.

Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
One	Mains electricity	Mains supply V battery supply of current Safety in the form of fuses, circuit breakers and safety plugs Electricity use in the home, and calculations of appliance power Supplying electricity through the national grid (Triple only – Static electricity & electric fields)	Practice the wiring of plugs Extended writing Change the subject of an equation and evaluate an equation with three or four terms.	Transformers are robots in disguise and not devices for altering the potential difference within a circuit	In upper Key Stage two students will have studied simple circuits and how the number of cells affects the brightness of bulbs. They will also have studied simple component symbols	This unit builds directly onto the electricity unit at AS Level.	Multistep calculations, involving two or more electricity equations
SMSC & British Values	Working safely in a lab and respecting each other's workspace Economic and safety reasons for using the National Grid system						
Cultural Capital	The ubiquity of electricity means that problems can be framed in a variety of familiar and unfamiliar context The safety aspects of electricity use in the home In the current climate the production of sufficient electricity, across the globe, to meet customer demand						
Career Link	Studying electricity, and the use of electricity in the home, opens doors to a wide range of STEM field careers; particularly those in engineering, architecture, and mechanical sciences						

Two	Atomic Structure & Radiation	<p>The development of the atom</p> <p>Alpha, Beta and Gamma radiation; how these alter the nucleus and the properties of these types of radiation</p> <p>Activity and half life</p> <p>(Triple Only) Nuclear fusion and fission</p>	<p>Record accurate experimental data</p> <p>Present and interpret data in tabular and graphical form.</p> <p>Extended writing</p> <p>Calculating the gradient of a graph</p>	<p>That Alpha radiation does not cause damage to cells.</p> <p>That gamma decay affects changes in the nucleus.</p>	<p>This will be the first-time students have studied radiation, but the history of the atom as studied in Year 9 chemistry builds up into this unit.</p>	<p>The standard model and interaction between subatomic particles are studied in the first year of A-Level Physics</p>	<p>Construction of decay equations.</p> <p>Calculation of half-life using standard form</p>
SMSC & British Values	The impact of radiation and how we can stay safe while using it. The ethics of nuclear power						
Cultural Capital	The use of radioactivity and nuclear power globally; including the approach of the UK and other nations Links to current energy crisis						
Career Link	Radiology Radiograph technician Nuclear technician A wide range of careers in nuclear research						
Three	Forces and their effects	<p>Scalar and vector quantities</p> <p>Newton's first and third laws</p> <p>(Triple Only) Turning forces</p> <p>(Higher Only) Resolving forces</p> <p>(Triple Only) Gears and levers</p> <p>Hooke's Law</p>	<p>Changing the subject of simple equations with three terms.</p> <p>Simple multiplication and division</p> <p>Record accurate results in an appropriate format</p> <p>Present and interpret data in tabular and graphical form.</p> <p>Calculate the gradient of a line</p>	<p>Students often state that an object will be still if there is no force acting upon it, so it is important to stress that if it is moving it will remain moving.</p>	<p>This unit builds directly from the study of forces and motion at key stage three; extending students' knowledge to look at more quantitative analysis and the affect of forces in more complex</p>	<p>Forces and mechanics forms a unit at A-Level, where the same concepts will be covered in more depth</p>	<p>Resolving forces in situations where they are not parallel or perpendicular</p>
SMSC & British Values	Working safely in a lab and respecting each other's workspace						
Cultural Capital	The ubiquity of forces means that problems can be framed in a variety of familiar and unfamiliar contexts						

Career Link	This programme opens doors to a wide range of STEM field careers; particularly those in engineering, architecture, and mechanical sciences						
Four	Forces & Motion	Motion-Time graphs Newton's second law Acceleration Terminal velocity and stopping distance (HT Only) Momentum	Changing the subject of equations Record accurate results in an appropriate format Present and interpret data in tabular and graphical form. Calculate the gradient of a line Draw tangents to a line	Students often state that an object will be still if there is no force acting upon it, so it is important to stress that if it is moving it will remain moving.	This unit builds directly from the study of forces and motion at key stage three; extending students knowledge to look at more quantitative analysis and the affect of forces in more complex	Forces and mechanics forms a unit at A-Level, where the same concepts will be covered in more depth	Multi-Step momentum calculations
SMSC & British Values	Working safely in a lab and respecting each other's workspace						
Cultural Capital	The ubiquity of forces means that problems can be framed in a variety of familiar and unfamiliar contexts						
Career Link	This programme opens doors to a wide range of STEM field careers; particularly those in engineering, architecture and mechanical sciences						
Five	<p>Students have end of year exams and 2 weeks of work experience in this final section of the academic year.</p> <p>Revision and preparation for GCSE exams (& Consolidation of this part of the KS4 programme of study)</p> <p>Revisit to subject knowledge from across the course & use of PLC to ensure that students have a good grasp of all aspects of the specification Use of retrieval quizzes and activities to identify gaps in SK and misconceptions Support students in developing summary notes, flash cards etc to aid retrieval of key facts Ensure that students have the necessary skills for effective revision Focus on past exam questions and papers – command words and application of knowledge Practice the application of knowledge that draws upon the practical aspects of the course Timed completion of questions to support with pace through the exam paper Extensive SLOP style activities to ensure that all are prepared for the aspects of maths that will be present on the exam papers</p>						

