

# Long Term Plan: Physics Year 9

**“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	Energy	Stores, Pathways and energy transfers.  Kinetic, Gravitational and Elastic energy calculations.  Heat transfer and insulation  Renewable and non-renewable resources.	Changing the subject of simple equations with three terms.  Evaluation of an equation involving multiplication, division, squares and square roots  Record accurate results in an appropriate format  Present and interpret data in tabular and graphical form.	Students often speak of “types” of energy. This is fundamentally incorrect. Students must talk about energy in the context of stores and pathways Students often frame renewable and non-renewable in terms of “able to be used again” rather than in terms of the finite or infinite pool of resources.	This unit builds directly from year seven study of energy stores and pathways.	This unit builds directly onto the Energy topic that forms 25% of Paper One.	Students could be asked to consider more complex energy transfers involving more than two stores.  Students could be asked to use data on efficiency and cost to evaluate appliances  Changing the subject of energy equations to calculate theoretical maximum speed
<b>SMSC &amp; British Values</b>	The impact of non-sustainable resources and the everyday changes that can be made to promote the use of more sustainable resources						
<b>Cultural Capital</b>	The ubiquity of energy means that problems can be framed in a variety of familiar and unfamiliar contexts						

<b>Career Link</b>	The study of energy opens doors to a wide range of STEM field careers; particularly those in engineering, architecture, and mechanical sciences							The study of energy op
Two	The Particulate Model of Matter	Density of solids and liquids (with the required practical)  The properties of solids, liquids and gases; as explained by their structure  Specific heat capacity and specific latent heat.  Gas pressure, and the impact of temperature on gas pressure.	Record accurate experimental data  Present and interpret data in tabular and graphical form.  Extended writing  Change the subject of an equation, and evaluate an equation with three or four terms.	That particles change in their properties when they change states, rather than change arrangement and movements.  Expansion of a solid occurs due to particles getting bigger, rather than them moving apart.	During the KS2 programme of study, students will have looked at the simple properties of solids, liquids and gases, and will have explore simple changes of state	This unit leads into the structure of matter topic at AS level	Extended writing, linking properties to structure Multi-step calculations involving energy and temperature change	
<b>SMSC &amp; British Values</b>	Link to scuba diving Opportunity to discuss semi-solids & plasma – relating to Earth structure <i>et al</i>							
<b>Cultural Capital</b>	The ubiquity of the three states of matter means that problems can be framed in a variety of familiar and unfamiliar contexts Historical concepts such as Archimedes & density							
<b>Career Link</b>	The study of particles opens doors to a wide range of STEM field careers; particularly those in engineering, architecture, and mechanical sciences							
Three	Atomic Structure & Radiation	The development of the atom  Alpha, Beta and Gamma radiation; how these alter the nucleus and the properties of these types of radiation  Activity and half life  (Triple Only) Nuclear fusion and fission	Record accurate experimental data  Present and interpret data in tabular and graphical form.  Extended writing  Calculating the gradient of a graph	That Alpha radiation does not cause damage to cells.  That gamma decay affects changes in the nucleus.	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.	The standard model and interaction between subatomic particles are studied in the first year of A-Level Physics	Construction of decay equations.  Calculation of half-life using standard form	
<b>SMSC &amp; British Values</b>	The impact of radiation and how we can stay safe while using it. The ethics of nuclear power							

<b>Cultural Capital</b>	The use of radioactivity and nuclear power globally; including the approach of the UK and other nations Links to current energy crisis
<b>Career Link</b>	Radiology Radiograph technician Nuclear technician A wide range of careers in nuclear research

