



Curriculum Map for Science Physics Year 13

YEAR 13	Autumn 1	Autumn 2
Topics	Thermal Physics Ideal Gases Circular Motion	Capacitance Electric Fields Magnetic Fields
Substantive Knowledge – The Knowledge and Content Taught By The Teacher	<ul style="list-style-type: none">• In Thermal Physics, students will learn about the links between heat and energy and relate this to the microscopic motion of particles. They will learn how you can use this to form an absolute temperature scale. They will then learn what happens when you heat, cool or change the phase of a system, ultimately learning how energy flows in and out of systems.• In Ideal Gases, students will learn how the motion and interactions of the particles (molecules or atoms) in a gas can explain the pressure exerted by a gas and give an understanding of what is meant by temperature.<ul style="list-style-type: none">- In Circular Motion, students will learn about circular motion and carry out calculations on rotating systems.	<ul style="list-style-type: none">• In Capacitance, students will learn about charge storage by capacitors, and how they function in circuits for charging and discharging. They will learn to use a number of equations including logarithmic treatment of the charge stored, current and potential difference.• In Electric Fields, students learn about electric fields, their shapes and causes and their effects on other charged particles.• In Magnetic Fields students build on prior knowledge of basic magnetic field interactions and learn about the details in the generation of electricity using magnetic fields.
Disciplinary Knowledge – The Knowledge Scientists Need So They Can Collect, Understand and Evaluate Scientific Evidence	<ul style="list-style-type: none">• Theory development of internal energy and specific heat capacity.• Kinetic theory and gas laws.• Centripetal forces development.	<ul style="list-style-type: none">• Coulombs law development.• Faraday's law development.• Lenz's law development.
Skills	<ul style="list-style-type: none">• Student will use theories, models and ideas to develop scientific explanations.• Students will use knowledge and understanding to pose scientific questions, define scientific problems, present scientific arguments and scientific ideas.• Students will use appropriate methodology, including ICT to answer scientific questions and solve scientific problems.	<ul style="list-style-type: none">• Students will know that scientific knowledge and understanding develops over time.• Students will communicate information and ideas in appropriate ways using appropriate terminology.• Students will consider applications and implications of science and evaluate their associated benefits and risks.• Students will evaluate the role of the scientific community in validating new knowledge and ensuring integrity.

Links To Prior Learning	<ul style="list-style-type: none"> GCSE Physics - particle model, forces, pressure and acceleration. 	<ul style="list-style-type: none"> GCSE Physics - electricity and electromagnetism.
Literacy/ Numeracy	<ul style="list-style-type: none"> Literacy - formulating long answer questions and articulating practical write ups in a coherent way using the scientific method. Numeracy - reciprocal, quadratic, trigonometric and exponential curve sketching. Surface area and volumes. 	<ul style="list-style-type: none"> Literacy - development of key scientific terminology based around the electrical fields' topic. Numeracy - Pythagoras's Theorem, trigonometry and small angle approximations.
Cross Curricular	<ul style="list-style-type: none"> PSHE - Water Safety Geography - Using Forces to Determine Pressure Changes, Weather etc Food - Changes of State and Temperature Design & Technology - Hydraulic Presses 	<ul style="list-style-type: none"> Geography - Saving the Planet and Global Warming, Compass Work Design & Technology - Circuits and Labelling, Magnetism PSHE - Staying Safe with Electricity Using Maglev trains Over Coal Fired
Assessment	<ul style="list-style-type: none"> Thermal Physics Assessment Ideal Gases Assessment Circular Motion Assessment 	<ul style="list-style-type: none"> Capacitance Assessment Electric Fields Assessment Magnetic Fields Assessment

YEAR 13	Spring 1	Spring 2 Summer 1
Topics	<p align="center">Oscillations Gravitational Fields</p>	<p align="center">Radioactivity Nuclear Physics</p>
Substantive Knowledge – The Knowledge and Content Taught By The Teacher	<ul style="list-style-type: none"> In Oscillations, students will learn about simple harmonic motion and use it to describe and calculate the motion of common situations. <ul style="list-style-type: none"> In Gravitational Fields, students will develop their understanding of the effects of gravitational forces and learn how it is essential for all space travel. 	<ul style="list-style-type: none"> In Radioactivity, students will learn how old archeological artifacts are aged using nuclear decay, half life and radioactive dating. In Nuclear Physics, students follow on from radioactivity and look at nuclear fusion and fission in more detail.
Disciplinary Knowledge – The Knowledge Scientists Need So They Can Collect, Understand and Evaluate Scientific Evidence	<ul style="list-style-type: none"> Newton's Law - its discovery and development. Keplaw's Law development. Hertzsprung Russell diagram. 	<ul style="list-style-type: none"> Einstein's Mass - energy equation. Development of nuclear fusion and fission on earth. Radioactive dating and its development.
Skills	<ul style="list-style-type: none"> Students will use appropriate methodology to answer scientific questions and solve scientific problems. Students will carry out experimental and investigative activities, including appropriate risk management, in a range 	<ul style="list-style-type: none"> Students will consider ethical issues in the treatment of humans, other organisms and the environment. Students will evaluate the role of the scientific community in validating new knowledge and ensuring integrity.

	<p>of contexts.</p> <ul style="list-style-type: none"> Students will evaluate methodology, evidence and data, and resolve conflicting evidence. 	<ul style="list-style-type: none"> Students will evaluate the ways in which society uses science to inform decision making.
Links To Prior Learning	<ul style="list-style-type: none"> GCSE Physics - Energy and Space 	<ul style="list-style-type: none"> GCSE Physics - Radioactivity
Literacy/ Numeracy	<ul style="list-style-type: none"> Literacy - practical write ups with a key focus on background research and presentation of references. Numeracy - analyse and interpret data to provide evidence, recognising correlations and causal relationships. 	<ul style="list-style-type: none"> Literacy - constructing ethical arguments based around using radioactivity in electricity production. Numeracy - substitution into and rearrangement of formulae.
Cross Curricular	<ul style="list-style-type: none"> Philosophy & Ethics - The Big Bang Art - Nebulas 	<ul style="list-style-type: none"> History - Incidents Involving Nuclear Energy Geography - The Impact of Nuclear Energy on the Environment
Assessment	<ul style="list-style-type: none"> Oscillations Assessment Gravitational Fields Assessment 	<ul style="list-style-type: none"> Radioactivity Assessment Nuclear Physics Assessment