

Physics Curriculum Overview - Year 13

| | Unit | Details | Unit | Details |
|------------|------------------------|--|-----------------------------|---|
| Autumn One | Nuclear Physics | <p>Students will consolidate the nature of radioactive decay and the different types of ionising radiation emitted, as seen in P4 - Atomic Structure from GCSE. Half-life will be reintroduced, with a focus on its exponential decay and their problem solving skills will be developed through manipulation of logarithms.</p> <p>Einstein's equation outlining the relationship between mass and energy will be explored. Nuclear fusion and fission will be explored in greater detail. Students will go on to understand how nuclear fission reactors work, along with the various safety measures in place surrounding them.</p> | Further Mechanics | <p>Students will expand on their mechanics knowledge established in Year 12, at a more complex level. The topic extends to the study of simple harmonic motion (SHM). Students will explore the properties of oscillating systems, such as mass-spring systems and pendulums. They will learn more about concepts like amplitude, frequency, and period in these contexts, and study the mathematical description of SHM using equations of motion.</p> |
| Autumn Two | Thermal Physics | <p>Students will recap specific heat capacity and latent heat and the conservation of energy in thermodynamic processes from P3 - Particle model of matter and P1 - Energy. The Thermal Physics topic also delves into the study of ideal gases and the gas laws, such as Boyle's law and Charles's law, and they will learn about the concept of absolute temperature and the Kelvin scale.</p> | | <p>Students will further extend their problem solving capabilities to situations involving circular motion and the principles of uniform circular motion, centripetal force, and angular momentum. Forced vibrations and resonance will also be explored.</p> |
| Spring One | Astro-physics | <p>Expanding on P8 - Space from GCSE, students will delve into the life cycle and evolution of stars. They will explore concepts like stellar classification, luminosity, and the Hertzsprung-Russell (H-R) diagram.</p> <p>Astronomical instruments and techniques, including different types of telescopes and spectroscopy, will be introduced. Students will learn about cosmology, focusing on the origins, structure, and evolution of the universe as a whole. They will also recap the Big Bang theory, cosmic microwave background radiation, and the expansion of the universe.</p> | Gravitational Fields | <p>Following on from P5 - Forces at GCSE, students will study gravitational fields and the behaviour of objects under the influence of gravity. Students will explore concepts like gravitational force, gravitational potential, and the behaviour of planets and satellites.</p> |
| Spring Two | | | Electric Fields | <p>Students will expand on their knowledge from P2 - Electricity in GCSE to study electric fields, including the principles of electric charge, Coulomb's law, and the behaviour of charged particles in electric fields. Students will learn about electric potential, capacitance, and the behaviour of capacitors in electric circuits.</p> |
| Summer One | Magnetic Fields | <p>Students will study magnetic fields and their behaviour, expanding on their knowledge from P7 - Magnetism and electromagnetism in GCSE. Students will learn about magnetic forces, the behaviour of charged particles in magnetic fields, and the applications of magnetic fields in devices like electric motors and transformers. Students will go on to learn about electromagnetic induction, Faraday's and Lenz's laws, and explore applications of electromagnetic induction, such as generators and transformers.</p> | | |