

Physics Curriculum Overview - Year 12

	Unit	Details	Unit	Details
Autumn One	Particles	<p>Pupils will recap their GCSE knowledge of P4 - Atomic Structure, including the components of the atom, isotopes, ions, radioactive decay, atomic number and mass number. Pupils will explore new particles such as leptons and quarks.</p> <p>Pupils will learn about antiparticles and investigate the fundamental forces of nature, along with their associated exchange particles. Pupils will learn about the conservation laws associated with particles and delve into the study of particle interactions, Feynman diagrams and decay processes.</p>	Materials	<p>Pupils will explore the structure of materials at the atomic and microscopic levels. The topic covers the study of mechanical properties, such as strength, elasticity, and hardness. Pupils will learn about tensile stress and tensile strain, and how these quantities relate to material behaviour under different conditions. They will re-explore concepts like Hooke's Law and Young's modulus, which were introduced in P5 - Forces at GCSE.</p>
Autumn Two	Quantum	<p>Pupils will recap their GCSE knowledge of P4 - Atomic Structure, namely excitation and deexcitation, along with P6 - Waves with a focus on the electromagnetic spectrum. Quantum phenomena such as the photoelectric effect, energy levels and wave-particle duality will be explored in detail.</p>	Mechanics	<p>Pupils will re-explore, from P5 - Forces at GCSE, the concept of motion, studying kinematics, which deals with the description of motion without considering its causes. Scalars, vectors and Newton's Laws of Motion will be consolidated along with contact and non-contact forces, with an introduction to more complex force situations involving trigonometry.</p> <p>The Mechanics topic also covers the study of momentum and energy. Pupils will examine concepts such as linear momentum, conservation of momentum, and impulse.</p>
Spring One	Electricity	<p>Pupils will consolidate P2 - Electricity from GCSE, including electric circuits, series and parallel, current, voltage, and resistance. These will be explored in much greater detail, with I-V characteristics reintroduced along with newer concepts such as EMF, potential dividers and internal resistance. Pupils will learn about the concept of resistivity and its relevance to superconductors, which will have real-life applications explored.</p>		
Spring Two				
Summer One	Waves	<p>Pupils will recap P6 - Waves from GCSE, exploring the properties of transverse and longitudinal waves, along with recapping the wave equation and the electromagnetic spectrum. Pupils will learn about the concept of polarisation, constructive and destructive interference and superposition, with practical skills investigating diffraction.</p>		
Summer Two		<p>The topic further extends to wave phenomena like standing waves, including their applications. Pupils will understand the concept of harmonics and how they relate to the fundamental frequency.</p>		