

Curriculum Plans: Year 13 Physics Teacher A

Topic	Knowledge: By the end of the unit students will know:	Skills: What skills will students have developed by the end of this unit?	Key terms: What new key terms and vocabulary will be learnt in this unit?	Summative Assessment: How will pupils be assessed in this unit?
Fields and their consequences	<p>By the end of this unit, students will know:</p> <ul style="list-style-type: none"> Field concepts: They will understand gravitational, electric, and magnetic fields as regions where objects experience forces without direct contact, with gravitational fields as always attractive and fields due to electric charges as either attractive or repulsive. Forces and interactions: Key insights into Newton's Law of Gravitation, Coulomb's Law, and the behavior of charged particles in electric and magnetic fields, including calculations involving field strength, potential energy, and force. Capacitance and Energy Storage: Students will study the role of capacitors in storing electric energy, understanding how capacitance varies with 	<p>By the end of this unit, students will have developed the following skills:</p> <ul style="list-style-type: none"> Problem-solving and mathematical application: Proficiency in handling vector and scalar quantities, working through complex calculations for electric, magnetic, and gravitational fields, and solving differential equations associated with physical systems. Experimentation and Practical Application: Skills in setting up and conducting experiments related to field strength, energy storage in capacitors, measurement of forces on charges in fields, and analyzing oscillations and resonance, with attention to safe lab practices. Graphical and Model Interpretation: Competence in interpreting and drawing field lines, equipotential lines, and translating physical scenarios into mathematical and graphical models (e.g., electric potential graphs). Use of 	<p>Students will learn key vocabulary and terms, including:</p> <ul style="list-style-type: none"> Fields and Forces: Gravitational field strength, electric field strength, magnetic flux density, equipotential lines, Coulomb force, inverse-square law. Electromagnetic Concepts: Terms like capacitance, dielectric constant, electromotive force (emf), potential difference, resistance, current-voltage characteristics. Wave and Quantum Physics: Diffraction, interference, coherence, photon, wave-particle duality, photoelectric effect, de Broglie wavelength, Heisenberg's uncertainty principle. Thermal and Kinetic Theory Terms: Specific heat capacity, latent heat, Boltzmann constant, 	

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	<p>physical parameters like plate area and separation, dielectric materials, and how energy is stored in electric fields.</p> <p>Nuclear Physics: Concepts of nuclear stability, radioactivity, alpha, beta, and gamma decay processes, and the interactions between particles and forces at the atomic scale. They'll learn about nuclear fission and fusion processes, including binding energy and mass-energy equivalence.</p>	<p>Apparatus and Techniques: Hands-on experience with laboratory equipment like voltmeters, ammeters, oscilloscopes, and capacitors to measure field effects, energy storage, and particle behaviors.</p> <p>(AQA 7408 Specification)(AQA 7408 Specification)</p>	<p>root mean square (rms) velocity, Brownian motion.</p> <p>Nuclear Physics and Particles: Proton, neutron, electron, alpha/beta/gamma decay, half-life, binding energy, mass defect, isotope, fission, fusion, quark, lepton.</p>	
Thermal Physics	<p>Thermal and Ideal Gases: Thermal properties, heat capacity, internal energy, and the kinetic theory of gases, covering equations like $pV=nRT$ for ideal gases, and temperature's relationship to molecular motion.</p> <p>Wave Behavior and Duality: Understanding wave-particle duality in quantum physics, diffraction patterns, photoelectric effect, and the behavior of photons in energy transfer.</p> <p>(AQA 7408 Specification)</p>	<p>Scientific inquiry and data analysis: Ability to identify patterns, analyze data sets, and interpret results with accuracy, applying statistical tools to handle experimental uncertainties and error bars in graphical data</p>	<p>Mathematical Terms: Gradient, intercept, vector components, angular speed, radians, integration, logarithmic relationships in decay curves.</p> <p>(AQA 7408 Specification)(AQA 7408 Specification)</p>	

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	Specification)(AQA Specification)	7408			