



Year 12 Curriculum Overview: **Physics**



	Topics/ content outline:	Powerful Knowledge (key concepts, skills)	What will you be assessed on?	How can you help at home?
Autumn Term	Mechanics (Statics & Dynamics)	Newton's Laws of Motion. "suvat equations" (kinematic equations), vectors – resolving & combining. Projectiles. Momentum & impulse. Work done in dynamics situations. Moments.	Mechanics Bulk Properties of Solids	- Question students to test their recall of the topics - Encourage students to turn superglossaries into fact cards - Encourage students to use fact cards properly - Encourage students to use practice topic questions, or work on them together Links, topic questions etc are available in the Showbie class "Physics ALL Y12".
	Bulk Properties of Solids	Density. Hooke's law. The Young modulus, strain & stress. Stiffness & ultimate tensile strength.		
	Electricity	Current as a flow of charge, work done by & on charge. Current-PD characteristics. Practical details/issues.		
Spring Term	Progressive & Stationary Waves	Progressive waves. Stationary waves. Polarisation. Longitudinal & transverse waves. Harmonics on a string. Refractive index. Total internal reflection. Fibre optics, pulse broadening, material & modal dispersion. Resistivity. Superconductors. Potential dividers. Electromotive force & internal resistance. Diffraction. Superposition. Interference (single slit, double slit & diffraction gratings). The photoelectric effect. Emission & absorption spectra. Wave particle duality.	Progressive & Stationary Waves Refraction Electricity Interference & Diffraction Quantum Phenomena	- Question students to test their recall of the topics - Encourage students to turn superglossaries into fact cards - Encourage students to use fact cards properly - Encourage students to use practice topic questions, or work on them together Links, topic questions etc are available in the Showbie class "Physics ALL Y12".
	Refraction			
	Electricity			
Summer Term	Interference & Diffraction		Particles	- Question students to test their recall of the topics - Encourage students to turn superglossaries into fact cards - Encourage students to use fact cards properly - Encourage students to use practice topic questions, or work on them together Links, topic questions etc are available in the Showbie class "Physics ALL Y12".
	Quantum Phenomena			
	Particles	Nuclear model. Isotope notation. The strong nuclear force. Alpha, beta-, beta + (antimatter), and gamma decay. Neutrinos, antimatter, annihilation & pair production. Exchange particle model of forces.		
	Circular Motion (part of "Further Dynamics")	Circular Motion. Centripetal acceleration.		
	Electric Fields	Logarithms & their application to data processing, graphical representation of large ranges.		
		(Electrical fields and potential. Orbits of a "classical electrons" in an atom.)		



Year 13 Curriculum Overview: **Physics**



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Autumn Term	Electric Fields	Forces between charges. Electric field strength & potential. Uniform & radial fields.	Electric Fields Circular Motion & Gravity Periodic Motion Capacitors	- Question students to test their recall of the topics - Encourage students to turn superglossaries into fact cards - Encourage students to use fact cards properly - Encourage students to use practice topic questions, or work on them together Links, topic questions etc are available in the Showbie class "Physics ALL Y12".
	Circular Motion & Gravity	Circular motion & centripetal force. Simple harmonic motion. Forced vibrations and resonance.		
	Periodic Motion inc. Simple Harmonic Motion	Gravitational fields and potential. Orbits of planets and satellites. Escape velocity.		
	Capacitors	Parallel plate capacitors. Equations re capacitance, area, PD, electric permittivity.		
	Electromagnetism	Internal energy, specific heat capacity & latent heat capacity. Ideal gases and equations modelling their behaviour. Brownian Motion.		
Spring Term	Thermal Physics		Y12 Topics & Electric Fields Circular Motion & Gravity Periodic Motion Capacitors Electromagnetism Thermal Physics	- Question students to test their recall of the topics - Encourage students to turn superglossaries into fact cards - Encourage students to use fact cards properly - Encourage students to use practice topic questions, or work on them together Links, topic questions etc are available in the Showbie class "Physics ALL Y12".
	Electromagnetism	Magnetic fields. The motor effect. Faraday & Lenz's laws of electromagnetic induction. Alternating currents and transformers.		
	Thermal Physics	Radioactivity, Rutherford scattering, Nuclear radiations. Exponential decay. N-Z plot & how N:Z ratios determine decay paths. Investigating the nuclear structure. Mass-energy equivalence. Nuclear reactors & induced fission.		
	Nuclear Physics			
	Astrophysics			
Summer Term	Astrophysics	Telescopes: Optical & radio telescopes. Classification of stars by luminosity. Absolute magnitude. Black-body radiation. The Hertzsprung-Russell diagram. Supernovae, neutron stars & black holes.	All topics.	- Question students to test their recall of the topics - Encourage students to turn superglossaries into fact cards - Encourage students to use fact cards properly - Encourage students to use practice topic questions, or work on them together Links, topic questions etc are available in the Showbie class "Physics ALL Y12".
	Revision of all Y12 & Y13 topics	Cosmology: Doppler effect and red shift. Hubble's law. Quasars. Detection of exoplanets.		