



## Physics Key Stage 5 Curriculum

	Topic/Big Question	Focus
Year 12	Foundations of physics	Students will learn how to resolve and add vector and scalar quantities in physics. They will go on to learn about the units in which these are measured including how they are derived.
	Dynamics	Students will learn about the motion of objects, to include analysing & explaining their displacement, velocity, acceleration & momentum by studying the resultant force on them. Free fall and gravitational acceleration will be used to describe the trajectories followed by moving objects. Newton's first, second and third laws of motion will be used to analyse collisions between objects.
	Statics	Students will learn about the behaviour of objects in equilibrium, covering moments, centre of mass, torque, Archimedes' principle and deformation of materials.
	Particle & Nuclear Physics	Students will study the fundamental building blocks of our Universe and how they combine to form nuclei & atoms, Einstein's mass-energy equation ( $E = mc^2$ ), nuclear fission and nuclear fusion.
	Electricity	Students will learn about the transfer of energy through components in electric circuits and how to analyse the behaviour of these circuits.
	Waves	Students will learn about the behaviour and uses of waves and the electromagnetic spectrum, superposition and interference of waves and the Young double-slit experiment.
	Quantum Physics	Students will learn about photons, the photoelectric effect and wave-particle duality.
	Radioactivity	Students will learn about nuclear decay, half life and modelling radioactive decay.
	Electric Fields	Students will learn about the interactions between charged particles.
	Capacitors	Students will learn about the structure, function and behaviour of capacitors.
Thermodynamics	Students will learn about thermal physics including the structure of matter internal energy, specific heat capacity and specific latent heat.	

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<b>Year 13</b>	Thermodynamics	Students will learn how to quantitatively analyse the behaviour of the three states of matter.
	Further Dynamics	Students will learn about circular and oscillatory motion, damping, driving and resonance effects.
	Gravity	Students will learn about gravitational fields around objects, calculating their strength and potential energy, and will use Kepler's laws to determine the orbits of planets, moons & satellites.
	Astrophysics	Students will learn about the life cycle and evolution of stars as displayed on the Hertzsprung-Russell diagram and discover how this picture was constructed by analysing starlight and investigating the energy levels in atoms.
	Cosmology	Students will learn about measuring astronomical distances, using the Doppler effect to explore the motion of stars and galaxies and the evolution of the universe.
	Electromagnetism	Students will learn about the behaviour of magnetic fields and their interaction with charged particles. Students will also learn about electromagnetic induction, Faraday's law and Lenz's law.
	Medical Physics	Students will learn about the formation of X-rays, their interaction with matter and their uses in CAT scans. Other imaging techniques explored include PET scans, ultrasound and the gamma camera.