



Queen Elizabeth's Girls' School

Educating Women of the Future

Physics Key Stage 5 Curriculum 2022/23

	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.
	Motion	Students will learn about the motion of objects, to include analysing their displacement, velocity, acceleration & stopping distance. Free fall and gravitational acceleration will be used to describe the trajectories followed by moving objects..
	Forces	Students will learn about forces in action, including moments, equilibrium, centre of mass, torque, Archimedes' principle and centre of mass.
	Work, Energy and Power	Students will learn about work done, conservation of energy, kinetic and gravitational potential energy, power and efficiency.
	Laws of Motion and Momentum	Students will learn Newton's first, second and third laws of motion, and their link to linear momentum. This will be used to analyse collisions between objects.
	Charge and current	Students will learn about current and charge, Kirchhoff's first law and the mean drift velocity of electrons through circuits.
	Energy power and resistance	Students will learn about circuits, potential difference and electromotive force, along with the use of different components to change circuit properties.
	Electrical circuits	Students will learn about Kirchhoff's second law and its application to circuit analysis, including accounting for internal resistance.
	Materials	Students will learn about Hooke's law, Young's modulus and deforming materials.
	Waves	Students will learn about wave properties, behaviour 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.
	Gravitational Fields	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.
	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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Year 13	Stars	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.
	Ideal Gases	Students will learn about the derivation and uses of the ideal gas law.
	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.
	Circular Motion	Students will learn about angular motion and centripetal forces.
	Oscillations	Students will learn about simple harmonic motion, damping, driving and resonance effects.
	Radioactivity	Students will learn about nuclear decay, half life and modelling radioactive decay.
	Nuclear Physics	Students will learn about Einstein's mass-energy equation ($E = mc^2$), nuclear fission and nuclear fusion.
	Capacitors	Students will learn about the use and applications of capacitors for storing energy in electric circuits.
	Particle physics	Students will learn about the alpha particle scattering experiment, antiparticles, hadrons and leptons, quarks and beta decay.
	Electric Fields	Students will learn about Coulomb's law, uniform electric fields and capacitance, electric potential and energy.
	Medical Imaging	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.
	Magnetic Fields	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.