Parkside Academy

Science Department - Physics

Department Overview:

Year 7			
Topic	**Time Allocated**	**Skills**	**End Point**
Energy	8	**The development of scientific thinking** • Understand energy as a quantitative property (measured in kJ) rather than a substance • Recognise that energy is transferred between stores during processes • Explain processes using mechanisms (forces, motion, interactions) instead of simply stating "energy is used"	Compare energy values in foods and fuels, describe how energy is transferred in physical and chemical processes, and explain everyday changes using mechanisms rather than treating energy as a substance.
Electricity	6	**Using scientific terminology and communication** • Use key terminology accurately, including current, series and parallel • Draw and label circuit diagrams using standard symbols	Describe electric current as the flow of charge, measure current in circuits, and explain how current behaves in series and parallel circuits using evidence from observations and data.
Sound	8	**The development of scientific thinking** • Understand that waves transfer energy without transferring matter • Recognise that models of waves help explain motion in materials • Distinguish between transverse and longitudinal waves	Describe waves as energy transfers, distinguish between transverse water waves and longitudinal sound waves, and explain how sound is produced, travels through different media, and behaves (reflection, absorption, echoes) using evidence and models.
Forces	8	**Analysis and evaluation** • Interpret force diagrams with arrows showing the size and direction of forces	Describe forces as interactions between objects, represent and calculate forces in one dimension, and explain

		• Determine whether forces are balanced or unbalanced • Analyse data from stretching experiments to identify linear relationships	the effects of contact and non-contact forces (including stretching and friction) using evidence, measurements, and simple relationships such as Hooke's Law.

Year 8			
Topic	**Time Allocated**	**Skills**	**End Point**
Energy transfers	8	**Analysis and evaluation** • Analyse how temperature differences decrease over time • Compare materials based on insulating effectiveness	Explain how energy is transferred between objects due to temperature differences, describe conduction and radiation, and apply these ideas to explain thermal equilibrium and the use of insulating materials in real-world contexts.
Electricity	8	**Experimental skills and investigations** • Set up simple circuits • Measure current using an ammeter and potential difference using a voltmeter • Take and record readings in different parts of a circuit • Follow safety procedures when working with electrical equipment	Explain how potential difference, current and resistance are related in electrical circuits, measure these quantities, and use evidence to compare conducting and insulating components quantitatively.
Light	6	**Using scientific terminology and communication** • Use key terminology accurately, including reflection and refraction. • Draw and label ray diagrams for mirrors and lenses.	Use the ray model to explain how light forms images in mirrors and lenses, describe how light transfers energy, and apply wave ideas to explain reflection, refraction, colour, and vision in real-world contexts such as the human eye and cameras.

Forces and Motion	10	**Experimental skills and investigations** • Observe and describe changes of state • Investigate how temperature affects particle movement	Use the particle model to explain changes of state, density and internal energy, and apply ideas about pressure in gases and liquids to explain real-world phenomena such as atmospheric pressure, floating, and sinking.

Year 9			
Topic	**Time Allocated**	**Skills**	**End Point**
Energy stores and transfers	10	**Development of scientific thinking** • Identify and describe energy stores and pathways. • Explain energy changes using models rather than everyday language.	Explain energy transfers using the energy stores model, describe energy conservation, and analyse energy changes in a range of systems using diagrams and calculations.
Energy calculations and efficiency	10	**Mathematical application** • Rearrange and apply energy equations. • Convert units where appropriate. • Construct and interpret Sankey diagrams. • Calculate efficiency from data and diagrams.	Calculate energy transfers and efficiency in domestic and industrial systems, interpret efficiency data and evaluate methods of reducing wasted energy.
Wave fundamentals	8	**Analysis and interpretation** • Measure wavelength, frequency and amplitude. • Interpret wave diagrams and graphs. • Apply wave equations.	Describe wave properties, calculate wave speed, and explain how wave behaviour depends on wavelength, frequency and amplitude.
Light and the EM Spectrum	8	**Using scientific terminology and communication** • Use key terms accurately including reflection,	Explain how electromagnetic waves transfer energy, compare properties and uses of EM waves, and apply wave

		refraction, absorption and transmission. • Interpret EM spectrum data.	models to explain reflection and refraction.
Particle model of matter	6	**Experimental skills and investigations** • Investigate density and changes of state. • Analyse heating and cooling data. • Interpret particle model diagrams.	Use the particle model to explain density, pressure and changes of state, interpreting evidence from practical investigations and real-world phenomena.
Energy and Waves Synoptic	6	**Problem solving and evaluation** • Select and apply appropriate models. • Interpret unfamiliar contexts. • Evaluate scientific explanations.	Apply knowledge of energy, waves and particles in unfamiliar contexts, demonstrating secure understanding across multiple topics.

Year 10			
Topic	**Time Allocated**	**Skills**	**End Points**
Forces and Motion	15	**Mathematical application and analysis** • Interpret motion graphs. • Calculate speed, acceleration and stopping distance. • Analyse relationships between forces and motion.	Apply Newton's laws to explain motion, use motion graphs quantitatively, and solve problems involving speed, acceleration and resultant force.
Forces and energy links	15	**Scientific thinking and modelling** • Explain work done and energy transfer. • Calculate kinetic and gravitational potential energy.	Explain how forces transfer energy, calculate work done and energy changes, and apply energy principles to mechanical systems.

		• Interpret force-energy relationships.	
Atomic structure and radioactivity	15	**Analysis and evaluation** • Interpret radiation data. • Compare nuclear models. • Evaluate risks and benefits of radioactive sources.	Describe atomic structure, explain radioactive decay and half-life, and evaluate applications and risks of ionising radiation.
Electricity - circuits and current	15	**Experimental skills and investigations** • Measure current, potential difference and resistance. • Investigate factors affecting resistance. • Analyse I-V characteristics.	Explain relationships between current, potential difference and resistance, apply circuit equations and interpret practical data from electrical investigations.
Triple Physics 1	20		
Space (Triple only)	10	**Using models in science** • Interpret astronomical data. • Evaluate evidence for scientific theories. • Apply scale and distance calculations.	Explain the lifecycle of stars, describe the structure of the universe and evaluate evidence supporting current cosmological models.

Year 11			
Topic	**Time Allocated**	**Skills**	**End Points**
Electricity - energy and power	6	**Mathematical application** • Calculate electrical power and energy transfer. • Interpret appliance data. • Apply efficiency calculations.	Calculate power, energy transfer and electricity costs, and evaluate efficiency in domestic and industrial contexts.
Electromagnetism: motors and generators	8	**Scientific thinking and modelling**	Explain how magnetic fields interact with

		• Interpret magnetic field diagrams. • Explain induction using models. • Analyse practical observations.	currents, describe the operation of motors and generators, and apply electromagnetic principles to real-world technologies.
Thermal energy and changes of state	10	**Experimental skills and analysis** • Interpret heating and cooling curves. • Calculate specific heat capacity and latent heat. • Analyse thermal data.	Explain thermal energy transfers and changes of state using particle theory and apply quantitative relationships in familiar and unfamiliar contexts.
Forces, elasticity and energy calculations	6	**Synoptic problem solving** • Apply multiple equations. • Analyse force-energy interactions. • Evaluate scientific evidence.	Apply force and energy concepts fluently across the specification, selecting appropriate equations and models to solve GCSE-style problems confidently.