

Long-term planning

Science - Physics - Year 9

	Autumn term 1	Autumn term 2	Spring term 1	Spring term 2	Summer term 1	Summer term 2
Topic	Physics: Energy and Energy Transfers					
	Energy Stores and Transfers			Thermal Energy		
Year 9 Themes	• The changes in how energy is stored in a changing system. • The law of conservation of energy in straightforward situations. • Examples of closed systems and the changes to energy stores within them. • The action of frictional forces on objects and the associated heating effect. • The equation for work done to calculate distances or size of forces. • The gravitational potential energy store of a system using the mass, gravitational field strength, and height. • The kinetic energy store of an object. • The elastic potential energy store of a stretched spring. • Energy changes to identify useful and less useful energy transfers. • The efficiency of a range of energy transfers. • Ways of reducing unwanted energy transfers. • The energy transfers carried out by electrical devices. • The processes that waste energy in electrical devices. • The power of an appliance.			• The thermal conductivity of materials and the dependence of the rate of cooling of a building on the thermal conductivity and thickness of the materials used. • A fair test to investigate the effectiveness of different insulators. • The rate of emission of infrared radiation is related to the temperature of a body. • How the intensity and wavelength of radiation emitted depends on the temperature of the object. • The heating of objects in terms of the rate of emission and absorption of radiation. • The factors affecting the temperature of the Earth. • How the Earth's temperature is affected by the absorption and emission of radiation. • The definition of specific heat capacity. • How some design features are used to reduce energy dissipation from a home.		
	Vocabulary and the concepts they link to					
	Conduction, Conductor, Dissipated, Insulator, Internal energy store, Radiation, Specific heat capacity, Wasted energy, Convection					
	Assessment					
		End of unit assessment Key piece x2			End of unit assessment Key piece x2	

	Diversity & development of cultural capital	
	1. Highlight diverse contributors to physics, such as James Joule and Émilie du Châtelet, and their role in energy conservation principles. 2. Explore global energy challenges, including renewable energy development in different countries. 3. Examine cultural adaptations to thermal energy transfer, such as traditional housing designs for insulation.	
	Cross-curricular opportunities and enrichment	
	Cross-Curricular Opportunities 1. Geography: Study renewable energy sources and their impact on climate change. 2. Design and Technology: Create models of energy-efficient systems, such as insulated homes or solar-powered devices. 3. Mathematics: Use calculations and graphs to explore energy efficiency and thermal transfer rates.	Enrichment Opportunities 1. Visits and Field Trips: Tour renewable energy plants, science museums, or eco-friendly buildings. 2. Projects and Challenges: Build small-scale models, such as wind turbines or thermal flasks. 3. Competitions: Enter national or regional STEM contests focused on energy or sustainability topics.