



Topic name	Term	Skills developed	Link to NC subject content and beyond	Prior learning	Next link in curriculum
9.1 Magnets and electromagnets	Autumn	Use a diagram to explain how an electromagnet can be made and how to change its strength. Explain the choice of electromagnets or permanent magnets for a device in terms of their properties.	This unit explores magnetism, including magnetic poles, fields, and Earth's magnetism, along with the principles of electromagnets and DC motors. It focuses on conducting precise scientific enquiries and identifying variables and emphasises accuracy, repeatability, and reproducibility. Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction. The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences. An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid. Includes lessons on - • Magnetic poles • The magnetic field of a bar magnet • Electromagnets • Current through electromagnets • Using electromagnets	Links from prior topics: This unit builds on pupils' prior learning from Series circuits, where they explored electrical components and how current flows in a simple loop. It deepens their understanding by examining the properties of magnets and electromagnets, focusing on magnetic fields and the interaction between electricity and magnetism.	Links to future topics: This prepares pupils for the next unit, Electromagnetism, where they will apply their knowledge to understand the principles behind electric motors and other electromagnetic devices, enhancing their grasp of how electricity and magnetism work together in practical applications.
9.2 Hidden Forces	Autumn / Spring	Use diagrams to explain observations of fluids in terms of unequal pressure. Explain why objects either sink or float depending upon their weight and the upthrust acting on them. Explain observations where the effects of forces are different because of differences in the area over which they apply. Given unfamiliar situations, use the formula to calculate fluid pressure or stress on a surface.	This unit explores forces, deformation, Hooke's Law, moments, and work done. It covers pressure in liquids, atmospheric pressure, upthrust, and equilibrium, as well as simple machines and force-extension relationships, highlighting how forces affect motion, friction, and object deformation. Includes lessons on - • Gravitational force and weight • Stretching springs	This unit builds on pupils' prior learning from Forces, where they explored the basics of contact and non-contact forces and how they affect motion. It deepens their understanding by examining hidden forces, such as turning	This prepares pupils for the GCSE unit looking at particle explanations of density and pressure, where they will apply their knowledge to understand how particle behaviour influences density, pressure, and the forces exerted by fluids.



			• Hooke's law • Stretching rubber • Levers • Turning forces • Floating, mass and shape • Pressure	forces, forces that hold objects on surfaces, and buoyancy, highlighting how these forces interact in everyday situations.	
9.3 Waves	Spring / Summer	Describe the properties of different longitudinal and transverse waves. Use the wave model to explain observations of the reflection, absorption and transmission of a wave.	This unit explores the nature of sound and water waves, including transverse and longitudinal motion, wave reflection, superposition, and the speed of sound in various media. It covers sound production, detection, and auditory ranges, emphasising data interpretation, and basic calculations. Includes lessons on - • Water waves • Sound waves • Speed of sound • Hearing sound • Ultrasound	This unit builds on pupils' prior learning from Making images, where they explored how light interacts with materials through reflection, refraction, and the use of lenses to form images. It deepens their understanding by examining the broader properties of waves, including sound and light, and their behaviours.	This prepares pupils for the GCSE unit on waves where they will apply their knowledge to quantify wave properties such as amplitude, wavelength, and frequency, enhancing their understanding of wave dynamics in various contexts.
9.4 Resistance	Summer	Draw a circuit diagram to show how voltage can be measured in a simple circuit. Use the idea of energy to explain how voltage and resistance affect the way components work. Given a table of voltage against current. Use the ratio of voltage to current to determine the resistance. Use an analogy like water in pipes to explain why part of a circuit has higher resistance.	This unit covers electrical circuits, compares appliance power ratings, and understands domestic fuel use and costs. It explores electric current, potential difference, resistance, and the differences between conductors and insulators, focusing on calculations and applications in circuits. Includes lessons on - • Electrical resistance • Thickness and length of wires • Making parallel circuits • Measuring current and voltage in parallel circuits • Comparing series and parallel circuits	This unit builds on pupils' prior learning from Series circuits, where they explored current, voltage, and resistance in simple electrical loops. It deepens their understanding by examining resistance and parallel circuits, focusing on how electrical components	This prepares pupils for the GCSE unit on electricity where they will apply their knowledge to explore electric fields, complex circuit behaviours, and the calculations needed to predict circuit performance, enhancing their understanding of electrical systems.



			Mains electricity	behave differently when arranged in parallel.	
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