

Science Overview - Physics

Year 9

	Term 1	Term 2	Term 3
Topic	<ul style="list-style-type: none"> · Describing atoms 	<ul style="list-style-type: none"> · Describing Motion · Describing Motion (Acceleration) · Forces and Fields · Pressure 	<ul style="list-style-type: none"> · Heat Energy Transfer · Energy and efficiency (Energy Stores and Transfers) · Energy and efficiency (Efficiency and energy resources) · Waves and the Electromagnetic Spectrum
Key concept	Matter and materials	Forces and fields	Energy
Learning Objectives	<ul style="list-style-type: none"> · Describe the structure of atoms. · State the charge on subatomic particles. · State the relative masses and relative electric charges of protons, neutrons, electrons, and positrons. · State that electrons can move to different orbits by absorbing or emitting electromagnetic radiation. · Describe how our understanding of atomic structure has changed over time. 	<ul style="list-style-type: none"> · State, with examples, the difference between vector and scalar quantities. · Represent motion graphically or by using equations. · Use the equation relating average speed, distance, and time. · Describe how to calculate acceleration. · State that the acceleration due to gravity (g) is 10 m/s² · Calculate gradient to represent acceleration on a velocity time graph. · State that the distance travelled can be calculated using the area under a velocity time graph. · State that forces can cause objects to change size and shape. · Define elastic and plastic deformation. · Link force and extension. · Define the spring constant. · Calculate work done when stretching a spring. 	<ul style="list-style-type: none"> · State the difference between internal energy and temperature. · Describe energy transfers by conduction, convection, and radiation. · State the role of thermal insulation. · Describe how the wall of a building affects cooling. · State that energy is transferred between different stores. · Represent energy transfers in diagrams. · State the theory of conservation of energy. · Explain gravitational potential energy stored in an object. · Explain kinetic energy stored in a moving object. · Calculate efficiency. · Describe how unwanted energy transfers can be reduced using insulation and lubrication. · Describe non-renewable and renewable energy resources. · State that waves transfer energy.

		<ul style="list-style-type: none"> · Describe how atmospheric pressure varies with height above the surface of the Earth. · Use the equation $P=F/A$. · Describe how the pressure in a fluid depends on depth and the density of the fluid. · Use of the equation $P =\rho \times g \times h$. · Explain why objects may float or sink. 	<ul style="list-style-type: none"> · Compare and contrast longitudinal and transverse waves. · Use wave speed = frequency x wavelength. · State how light travels at different speeds in different materials. · State that waves are reflected, refracted, transmitted, and absorbed at material interfaces. · State the law of reflection.
Scaffolding SEND	glossaries, targeted questions, knowledge organisers, recall quizzes	glossaries, targeted questions, knowledge organisers, recall quizzes	glossaries, targeted questions, knowledge organisers, recall quizzes
Key Vocabulary	atom, molecule, nucleus, model, charge, proton, neutron, electron, positron, ion, mass number, atomic number, proton number, mass absorption, emission, ionisation.	distance, momentum, mass, distance, time, speed, energy, weight, average speed, accelerate, displacement, velocity, vector, quantity, scalar, gradient, accelerate, gradient, extension, Hooke's Law, elastic limit, plastic deformation, pressure, force, area, density, depth, weight, volume, float, sink, upthrust, pascal.	conduction, convection, radiation, heating, working, thermometer, temperature, insulation, vacuum, particle, thermal conductivity, elastic, nuclear energy, dissipated, efficiency, lubrication, thermal energy, atomic energy, chemical energy, potential energy, strain energy, gravitational potential energy, joule (J), kinetic energy, law of conservation of energy, Sankey diagram, Nuclear energy, system, climate change, global warming, carbon dioxide, fossil fuel, coal, oil, natural gas, non-renewable, uranium, power station, electricity, renewable, solar power, reflection, ray box, spectrum, frequency, prism, transmission, wavelength, wave speed, refraction, critical angle, electromagnetic wave, absorption, incident ray, reflected ray, refracted ray, signal generator, longitudinal wave, transverse wave
Formative Assessment	Rewind grids	Rewind grids	Rewind grids

Summative Assessment	End of topic test	End of topic test	End of topic test
Careers	forensic scientist, immunologist, lab technician	aeronautical engineer, robotist, sports scientist, forensic scientist, kinesiologist, lab technician, volcanologist, weather forecaster	aeronautical engineer, botanist, conservationist, lab technician, marine biologist, zoologist, neuroscientist, optician, telecoms technician, urologist, x-ray technician.
Links	To build on particle model of matter. To prepare for radioactivity and nuclear physics.	To build on representing forces using arrows. In addition, extension of a spring and pressure. To prepare for forces, work done and momentum. In addition, acceleration as a vector and pressure in gasses.	To build on using the particle model to explain the properties of solids, liquids and gases. In addition, energy stores and transfers and the classification of waves. To prepare for forces and work done. In addition, the electromagnetic spectrum.