



	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	01 Energy Resources	02 Domestic electricity and electrical applications	03 Waves in air, fluids, and solids	04 Particle model of matter and pressure	04 Particle model of matter and pressure (continued) 05 Static electricity (Triple only)	06 Radioactivity
<b>Year 10</b>	<p><b>Energy Resources</b></p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>renewable and non-renewable energy resources, changes in how these are used</li> <li>advantages and disadvantages of different energy resources, including environmental issues</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>appreciating the power and limitations of science and considering ethical issues which may arise</li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3 Models (Energy Model)</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>GCSE Radioactivity; Energy Calculations; Magnetism &amp; electromagnetism</li> <li>A-Level Physics – Mechanics; Nuclear Physics; Astrophysics</li> </ul>	<p><b>Domestic electricity and electrical applications</b></p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>comparing AC and DC; the National Grid; 3-core cable.</li> <li>power as the rate of energy transfer</li> <li>the link between power, current and potential difference</li> <li>the link between power, current and resistance</li> <li>measuring resistance using potential difference and current measurements</li> <li>exploring current, resistance and pd relationships for different circuit elements; including their graphical representations</li> <li>sensing circuits (thermistor and LDR)</li> <li>electrostatic force as a non-contact force (triple science only)</li> <li>electric field line patterns (triple science only)</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>explaining everyday applications of science</li> <li>carrying out experiments appropriately</li> </ul> <p>Math skills:</p> <ul style="list-style-type: none"> <li>change the subject of an equation</li> <li>substitute numerical values into algebraic equations using appropriate units for physical quantities</li> <li>use an appropriate number of significant figures</li> <li>use a scatter diagram to identify a correlation between two variables</li> <li>plot two variables from experimental or other data</li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3 Electricity</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>GCSE Magnetism and Electromagnetism</li> <li>A-Level Physics – Electricity, Fields, Particles and Quantum Phenomena</li> </ul>	<p><b>Waves in air, fluids, and solids</b></p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>transverse and longitudinal waves</li> <li>amplitude, wavelength, frequency, and period of a wave</li> <li>relating wave speed to frequency and wavelength</li> <li>reflection and refraction of waves (triple science only)</li> <li>lenses (triple science only)</li> <li>ultrasound, including medical and industrial uses (triple science only)</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>make and record observations and measurements using a range of apparatus and methods.</li> </ul> <p>Math skills:</p> <ul style="list-style-type: none"> <li>substitute numerical values into algebraic equations using appropriate units for physical quantities</li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3: Waves; Models (Energy Model)</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>GCSE Electromagnetic Waves</li> <li>A-Level Physics – Waves; Further mechanics; Astrophysics</li> </ul>	<p><b>Particle model of matter and pressure</b></p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>relating models of arrangements and motion of the particles in solid, liquid and gas phases to their densities</li> <li>melting, evaporation, and sublimation as reversible changes</li> <li>calculating energy changes involved on heating, using specific heat capacity; and those involved in changes of state, using specific latent heat</li> <li>the link between pressure and temperature of a gas at constant volume</li> <li>pressure in fluids (triple science only)</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>carrying out experiments</li> </ul> <p>Math skills:</p> <ul style="list-style-type: none"> <li>change the subject of an equation</li> <li>substitute numerical values into algebraic equations using appropriate units for physical quantities</li> <li>use SI units and prefixes</li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3 Particle Model of Matter</li> <li>KS3 Models (Energy Model)</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>GCSE Energy Calculations; Electromagnetic waves</li> <li>A-Level Physics – Mechanics, Thermal physics</li> </ul>	<p><b>Static electricity</b></p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>charges and electric fields</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>concept of fields as forces acting at a distance</li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3 Atomic Structure, Models (Model of the Atom)</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>A-Level Physics – Fields</li> </ul>	<p><b>Radioactivity</b></p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>differences in numbers of protons, and neutrons related to masses and identities of nuclei</li> <li>isotopes as atoms of the same element with different numbers of neutrons</li> <li>unstable nuclei and radioactive decay</li> <li>nuclide notation and nuclear equations to represent changes in radioactive decay</li> <li>half-life, including activity/count-rate/number of unstable nuclei decay curves</li> <li>irradiation and contamination</li> <li>nuclear fission and nuclear fusion processes (triple science only)</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>evaluating risks both in practical science and the wider societal context, including perception of risk</li> </ul> <p>Math skills:</p> <ul style="list-style-type: none"> <li>Use ratios, fractions, and percentages</li> <li>Translate information between graphical and numeric form</li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3 Atomic Structure, Models (Model of the Atom)</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>A-Level Physics – Particles and Quantum Phenomena, Nuclear Physics</li> </ul>
<b>Assessments</b>	Test: Energy Resources	Test: Domestic electricity and electrical applications	Test: Waves in air, fluid and solids		Exam: Year 10 trial examination Test: Particle model and pressure	Test: Radioactivity (and static electricity)

	Autumn1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	01 Energy calculations and elasticity	02 Forces	03 Electromagnetic waves 04 Space physics (Triple only)	05 Magnetism and electromagnetism	Revision	
	<p><b>Energy calculations</b></p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>energy changes in a system: calculating the stored energies and energy changes involved</li> <li>the link between work done, force, and distance moved</li> <li>the link between kinetic energy, mass, and speed</li> <li>the link between gravitational potential energy, mass, gravitational field strength and change in height</li> <li>elastic and inelastic stretching</li> <li>the link between elastic potential energy, spring constant and extension</li> <li>conservation of energy in a closed system, dissipation</li> <li>useful energy, wasted energy, and efficiency of energy transfers</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>use SI units and prefixes</li> </ul> <p>Math skills:</p> <ul style="list-style-type: none"> <li>change the subject of an equation</li> <li>substitute numerical values into algebraic equations using appropriate units for physical quantities</li> <li>solve simple algebraic equations</li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3 Energy</li> <li>GCSE Models (Energy Model)</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>A-Level Physics – Mechanics, Further Mechanics, Fields</li> </ul>	<p><b>Forces</b></p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>the turning effect of a force as the moment of the force about a pivot</li> <li>acceleration as the rate of change of velocity</li> <li>interpreting velocity-time graphs</li> <li>the link between resultant force, mass, and acceleration</li> <li>stopping distance and factors that affect thinking distance and braking distance</li> <li>momentum and conservation of momentum in collisions and explosions</li> <li>resultant force as the rate of change of momentum (triple science only)</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>making and recording observations and measurements using a range of apparatus and methods</li> <li>assessing safety of everyday devices with physics</li> </ul> <p>Math skills:</p> <ul style="list-style-type: none"> <li>calculate arithmetic mean</li> <li>change the subject of an equation</li> <li>substitute numerical values into algebraic equations using appropriate units for physical quantities</li> <li>solve simple algebraic equations</li> <li>draw and use the slope of a tangent to a curve as a measure of rate of change</li> <li>determine the slope and intercept of a linear graph</li> <li>understand the physical significance of area between a curve and the x-axis and measure it by counting squares as appropriate</li> <li>understand and use the symbols: =, <math>\propto</math>, <math>\sim</math></li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3 Forces</li> <li>KS3 Motion and Forces (Part 1)</li> <li>GCSE Motion and Forces (Part 2)</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>A-Level Physics – Mechanics, Further mechanics</li> </ul>	<p><b>Electromagnetic Waves</b></p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>properties and uses in the radio, microwave, infrared, visible, ultraviolet, X-ray and gamma ray regions</li> <li>velocity in a vacuum and velocities differing between media</li> <li>hazardous effects on body tissues</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>describe and explain examples of the technological applications of science</li> <li>give examples to show that there are hazards associated with science-based technologies which must be considered alongside the benefits.</li> </ul> <p>Math skills:</p> <ul style="list-style-type: none"> <li>substitute numerical values into algebraic equations using appropriate units for physical quantities</li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3 - Energy; Waves</li> <li>GCSE Waves in air, fluids, and solids</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>GCSE Radioactivity</li> <li>A-Level Physics – Particles and Quantum Phenomena, Waves, Further Mechanics, Astrophysics</li> </ul> <p><b>Space physics</b> (Triple Science only)</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>main features of the solar system</li> <li>life cycle of stars</li> <li>redshift as evidence for the Big Bang theory</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>the ways in which scientific methods and theories develop over time</li> </ul> <p>Math skills:</p> <ul style="list-style-type: none"> <li>translate information between graphical and numeric form</li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3 Motion and Forces (Part 1)</li> <li>GCSE Motion and Forces (Part 2)</li> <li>GCSE Waves in air, fluids, and solids</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>A-Level Physics – Astrophysics</li> </ul>	<p><b>Magnetism &amp; Electromagnetism</b></p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> <li>magnetic force of attraction and repulsion</li> <li>magnetic fields of permanent and induced magnets, and Earth's magnetic field</li> <li>magnetic effects of currents, how solenoids enhance the effect and uses of electromagnets</li> <li>how transformers are used in the National Grid and the reasons for their use – the transformer equation (Triple Science only)</li> </ul> <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> <li>planning experiments to make observations, test hypotheses or explore phenomena</li> </ul> <p>Math skills:</p> <ul style="list-style-type: none"> <li>Recognise and use expressions in decimal form</li> <li>Change the subject of an equation</li> <li>Solve simple algebraic equations</li> <li>Use ratios, fractions, and percentages</li> </ul> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> <li>KS3 – Magnetism; Electricity</li> <li>GCSE Energy Resources; Domestic Electricity; Electricity applications</li> </ul> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> <li>A-Level Physics – Fields</li> </ul>		
<b>Assessments</b>	Test: Energy calculations and elasticity	Exam: Year 11 trial exam 1	Test: Forces Test: Space physics (triple only)	Exam: Year 11 trial exam 2	GCSE exams	