

	Year 12 – Teacher 1	Year 12 – Teacher 2	Year 13 – Teacher 1	Year 13 – Teacher 2
<p>Autumn half term 1 Sequential knowledge and skills</p>	<p>Module 2: <u>Foundations of physics</u> Quantities and units, derived units</p> <p>Module 3: Links to GCSE: 4.5.1.3 Gravity 4.5.6.1-5 Describing motion</p> <p>Links to A-level: Nothing prior to this content</p> <p><u>Forces and motion</u> Distance and speed. Displacement and velocity. Acceleration. Equations of motion. Car stopping distances. Free fall and g. Projectile motion.</p>	<p>Module 2: Links to GCSE: 4.5.1.1 Sclar and vector quantities 4.5.1.4 Resultant forces</p> <p><u>Foundations of physics</u> Scalar and vector quantities, adding vectors, resolving vectors</p> <p>Module 4: Links to GCSE: 4.2.1 Current, potential difference and resistance 4.2.2 Series and parallel circuits 4.2.3 Domestic uses and safety 4.2.4 Energy transfers in circuits</p> <p>Links to A-level: Nothing prior to this content</p> <p><u>Electrons, waves and photons</u> Current and charge. Moving charges. Kirchhoff's first law. Mean drift velocity. Circuit symbols. Pd and emf. The electron gun. Resistance. I-V characteristics. Diodes. Resistance and resistivity. The thermistor. The LDR. Electrical</p>	<p>Module 5: Links to GCSE: 4.3.3 Particle model and pressure</p> <p>Links to A-level: Module 5: Gravitational fields – Newton's law of gravitation, gravitational potential and energy</p> <p><u>Newtonian world and astrophysics</u> The kinetic theory of gases. Gas laws. Root mean square speed. The Boltzmann constant.</p> <p>Start research project required for PAG 12.</p>	<p>Module 5: Links to GCSE: 4.1.1 Energy changes in a system 4.5.1.3 Gravity 4.5.1.4 Resultant forces 4.5.6 Forces and motion 4.8.1.1 Our Solar system 4.8.1.3 Orbital motion</p> <p>Module 3: Forces and motion – defining key terms e.g. displacement, velocity. Newton's 2nd law. Work done and energy.</p> <p><u>Newtonian world and astrophysics</u> Oscillations and simple harmonic motion. Analysing simple harmonic motion. Simple harmonic motion and energy. Damping and driving. Resonance. Gravitational fields. Newton's law of gravitation. Gravitational field strength. Kepler's laws. Satellites. Gravitational potential and gravitational potential energy.</p>

		energy and power. Paying for electricity.		
Assessment Content and methods used to judge learning	PAGs: 1, 3 2 x 1 hour assessment on topics studied so far. Homework given per lesson.		PAGs: 7, 11, 12 2 x 1 hour assessment on topics studied so far. Homework given per lesson. AS papers given to students to keep Year 12 content familiar.	
Autumn half term 2 Sequential knowledge and skills	<p>Module 3: Links to GCSE 4.5.1 Forces and their interactions 4.5.4 Moments, levers and gears 4.5.5 Pressure and pressure differences in fluids</p> <p>Links to A-level: Module 2: Scalars and vectors</p> <p><u>Forces and motion</u> Forces, mass and weight. Centre of mass. Free-body diagrams. Drag and terminal velocity. Moments and equilibrium. Couples and torques. Triangles of forces. Density and pressure. Archimedes principle and pressure in fluids.</p>	<p>Module 4: Links to GCSE: 4.2.1 Current, potential difference and resistance 4.2.2 Series and parallel circuits 4.2.3 Domestic uses and safety 4.2.4 Energy transfers in circuits</p> <p>Links to A-level: Nothing prior to this content</p> <p><u>Electrons, waves and photons</u> Kirchhoff's laws and circuits. Combining resistors. Analysing circuits. Internal resistance. Potential divider circuits. Sensing circuits.</p>	<p>Module 6: Links to GCSE: Builds upon knowledge gained in the electricity topic studied in Y12</p> <p>Links to A-level: Module 4 – Electrons, waves and photons: Could link with most of the electricity topic and equations, particularly use of $V=W/Q$, $V=IR$, $Q=It$.</p> <p><u>Particles and medical physics</u> Capacitors. Capacitors in circuits. Energy stored in capacitors. Discharging capacitors. Charging capacitors. Uses of capacitors.</p>	<p>Module 5: Links to GCSE: 4.8.1.1 Our Solar System 4.8.1.2 The life cycle of a star 4.8.2 Red-shift 4.4.4.2 Nuclear fusion</p> <p>Links to A-level: Module 4 – Electrons, waves and photons: Diffraction and intensity relationships. Typical wavelengths of electromagnetic waves.</p> <p><u>Newtonian world and astrophysics</u> Objects in the Universe. The life cycle of stars. The Hertzsprung-Russell diagram. Energy levels in atoms. Spectra. Analysing starlight. Stellar luminosity. Astronomical distances. The Doppler effect. Hubble's law. The Big Bang theory. Evolution of the Universe.</p>
Assessment Content and methods used to judge learning	PAGs: 4		PAGs: 8	

	2 x 1 hour assessment on topics studied so far. Year 12 mock after Christmas (90 minute assessment). Homework given per lesson.	2 x 1 hour assessment on topics studied so far. Year 13 mock after Christmas (2 x 90 minute assessment on all content from Y12 and 13). Homework given per lesson. AS papers given to students to keep Year 12 content familiar.		
Spring half term 3 Sequential knowledge and skills	<p>Module 3: Links to GCSE 4.5.2 Work done and energy transfers 4.5.3 Forces and elasticity</p> <p>Links to A-level: Nothing prior to this content</p> <p><u>Forces and motion</u> Work done and conservation of energy. Kinetic energy and gravitational potential energy. Power and efficiency. Springs and Hooke's law. Elastic potential energy. Deforming materials. Stress-strain, and the Young modulus.</p>	<p>Module 4: Links to GCSE 4.6.1 Waves in air, fluids and solids 4.6.2 Electromagnetic waves</p> <p>Links to A-level: Nothing prior to this content</p> <p><u>Electrons, waves and photons</u> Progressive waves. Wave properties. Reflection and refraction. Diffraction and polarisation. Intensity. Electromagnetic waves. Polarisation of electromagnetic waves. Refractive index. Total internal reflection.</p>	<p>Module 6: Links to GCSE: 4.7.1 Permanent and induced magnetism 4.7.2 The motor effect 4.7.3 Induced potential, transformers and the National Grid</p> <p>Links to A-level: Module 4 – Electrons, waves and photons: Charge of particles. Conventional current. Potential difference. Module 6 – Particles and medical physics: Properties of particles regarding charge and mass.</p> <p><u>Particles and medical physics</u> Electric fields. Coulomb's law. Uniform electric fields. Capacitance. Charged particles in electric fields. Electric potential energy. Magnetic fields. Understanding magnetic fields. Charged particles in magnetic fields. Electromagnetic induction. Faraday's law and Lenz's law. Transformers.</p>	<p>Module 6: Links to GCSE: 4.4.1 Atoms and isotopes 4.4.2 Atoms and nuclear radiation</p> <p>Links to A-level: Module 4 – Electrons, waves and photons: Charge of particles.</p> <p><u>Particles and medical physics</u> Alpha scattering experiment. The nucleus. Antiparticles, hadrons and leptons. Quarks. Beta decay. Radioactivity. nuclear decay equations. Half-life. Radioactive decay equations. Radioactive dating.</p>
Assessment Content and methods used to judge learning	PAGs: 3, 5 2 x 1 hour assessment on topics studied so far. Homework given per lesson. Exam papers start to be given for homework.	PAGs: Catch-up and recap. 2 x 1 hour assessment on topics studied so far. Homework given per lesson. Exam papers start to be given for homework which can now include A2 work as enough content has been covered.		
	Module 4:	Module 4:	Module 6:	Module 6:

<p>Spring half term 4 Sequential knowledge and skills</p>	<p>Links to GCSE: 4.6.1.2 Properties of waves</p> <p>Links to A-level: Module 4: Waves – Diffraction and interference</p> <p><u>Electrons, waves and photons</u> The photon model. The photoelectric effect. Einstein’s photoelectric effect equation. Wave-particle duality.</p>	<p>Links to GCSE: 4.6.1.2 Properties of waves 4.6.1.4 Sound waves 4.6.2 Electromagnetic waves</p> <p>Links to A-level: Module 4: Waves – Diffraction and wave properties</p> <p><u>Electrons, waves and photons</u> Superposition of waves. Interference. The Yong double slit experiment. Stationary waves. Harmonics. Stationary waves in air columns.</p>	<p>Links to GCSE: 4.4.2 Atoms and nuclear radiation 4.4.3 Hazards and uses of radioactive emissions 4.6.2 Electromagnetic waves</p> <p>Links to A-level: Modules 4 – Electrons, waves and photons: Wavelength and frequency.</p> <p>Module 5 – Newtonian world and astrophysics: Redshift</p> <p>Module 6 – Particles and medical physics: Einstein’s equation, annihilation, properties of nuclear radiation.</p> <p><u>Particles and medical physics</u> X-rays. CAT scans. The gamma camera. PET scans. Ultrasound. Acoustic impedance. Doppler imaging.</p> <p>Revision</p>	<p>Links to GCSE: 4.4.1 Atoms and isotopes 4.4.2 Atoms and nuclear radiation</p> <p><u>Particles and medical physics</u> Einstein’s mass-energy equation. Binding energy. Nuclear fission. Nuclear fusion.</p> <p>Revision</p>
<p>Assessment Content and methods used to judge learning</p>	<p>PAGs: 5, 6</p> <p>2 x 1 hour assessment on topics studied so far.</p> <p>Homework given per lesson. Exam papers given for homework.</p>			
<p>Summer half term 5 Sequential knowledge and skills</p>	<p>Preparation for AS exams. Exam technique, revision of key topics. Recap of the required practicals (PAGs)</p>	<p>Preparation for AS exams. Exam technique, revision of key topics. Recap of the required practicals (PAGs)</p>	<p><u>Revision</u></p>	
<p>Assessment Content and methods used to judge learning</p>	<p>PAGs: Recap and catch-up</p>		<p>A-level exams</p>	

	2 x 1 hour assessment on topics studied so far. AS external exam if entered or AS mock exam internally. 2 x 1 hour 30 exams.		
	Homework given per lesson.		
Summer half term 6 Sequential knowledge and skills	<p>Module 5: Links to GCSE: 4.3.1 Changes of state and the particle model 4.3.2 Internal energy and energy transfers</p> <p>Links to A-level: Module 3: Forces and motion – Pressure in fluids, work done</p> <p><u>Newtonian world and astrophysics</u> Temperature. Solids, liquids and gases. Internal energy. Specific heat capacity. Specific latent heat.</p>	<p>Module 5: Links to A-level: Module 3: Forces and motion – Distance, displacement, speed, velocity and acceleration</p> <p><u>Newtonian world and astrophysics</u> Angular velocity and the radian. Centripetal acceleration. Exploring centripetal forces. Centripetal forces on inclines.</p>	
Assessment Content and methods used to judge learning Assessment	PAGs: 9 2 x 1 hour assessment on topics studied so far. Homework given per lesson.		