Key Stage 4 – Year 10 – Combined Science (Physics)
Curriculum Map for Students

	Year 10 (Physics)				
Topic Overview	**CP2 – Motion and Forces** (Paper 1)	**CP3 – Conservation of Energy** (Paper 1)	**CP4 – Waves** (Paper 1)	**CP5 – Light and the Electromagnetic Spectrum** (Paper 1)	**CP6 – Radioactivity** (Paper 1)
Focus	Students will study and understand concepts including: - Vector and scalar quantities - Force diagrams - Calculating resultant forces - Newton's First law - Circular Motion - Mass and Weight - Terminal Velocity - Newton's Second Law - Newton's Third Law - Momentum calculations - Conservation of Momentum calculations - Factors affecting stopping distances - Reaction times - Braking distances - Hazards due to crashes - Force calculations from momentum	Students will study and understand concepts including: - Energy stores and transfers - Law of conservation of energy - Efficiency calculations - Energy transfers through heating - Thermal conductivity - Gravitational potential energy calculations - Kinetic energy calculations - Sources of non-renewable energy - Reasons for changes of uses of non-renewable energy sources. - Renewable energy sources - Reasons for changes of renewable energy sources.	Students will study and understand concepts including: - Different types of waves - Identifying types of waves - Using correct terminology to describe wave types. - Calculating wave speeds, through distance and time. - Calculating wave speeds, through frequency and wavelength. - Refraction of light through different materials. - Measurement of angles of refraction. - Explanation of the process of refraction.	Students will study and understand concepts including: - Discovery of Infrared - Order of the electromagnetic spectrum (frequency and wavelength) - Different parts of the electromagnetic spectrum. - Uses of long wavelengths. - Formation and detection of radio waves - Uses of short wavelengths. - Dangers of electromagnetic waves. - Methods of protection for different electromagnetic waves.	Students will study and understand concepts including: - Atomic models. - Discovery of the nucleus. - Structure of the nucleus. - Definition of isotopes. - Electronic structure in atoms. - How electronic structure can change through electromagnetic excitation. - Emission and Absorption spectra. - Ionisation of atoms. - Sources of background radiation. - Use of Geiger tubes to measure radioactivity. - Types of radiation. - Nuclear decay equations. - Half-life calculations. - Dangers of radioactivity.
Key Equations Learnt	$W = m \times g$ $F = m \times a$ $F = \dfrac{mv - mu}{t}$	$\Delta GPE = m \times g \times \Delta h$ $KE = \frac{1}{2} \times m \times v^2$	$v = \dfrac{x}{t}$ $v = f \times \lambda$		
Assessment	End of topic assessment (50 marks, 10 marks recall, 10 marks previous topic spaced learning)				
	Summer Year 10 Mock (Paper 1)				

Key Stage 4 – Year 11 – Combined Science
Curriculum Map for Students

	Year 11 (Physics)			
Topic Overview	**CP7 – Energy – Forces Doing Work** **CP8 – Forces and their effects** **(Paper 2)**	**CP9 – Electricity and Circuits** (Paper 2)	**CP10 – Magnetism and the Motor Effect** **CP11 – Electromagnetic Induction** **(Paper 2)**	**CP12 – Particle Model** **CP13 – Forces and Matter** **(Paper 2)**
Focus	Students will study and understand concepts including: • Calculation of work done on an object that is moving. • Calculation of the power applied to an object through work done. • Contact and non-contact forces. • Vector diagrams of forces. • Free-body force diagrams. • Scale force diagrams.	Students will study and understand concepts including: • Structure of electrical circuits • Series and Parallel circuits • Current and method of measurement in a circuit. • Potential difference and method of measurement in a circuit. • Calculation of charge within a circuit. • Calculation of energy transferred through a charge. • Resistance of components in circuits. • Resistance in series and parallel circuits. • Measurement of resistance through calculation. • VI graphs for resistor, filament lamp, diode, thermistor. • Calculating energy transferred through a component. • Reducing resistance in a wire (simple model). • Calculation of electrical power through a component. • Alternating and Direct current in circuits. • Electrical safety methods in mains electricity.	Students will study and understand concepts including: • Permanent and temporary magnets. • Drawing magnetic fields around bar magnets. • Describing uniform magnetic fields. • Evidence of the Earth's magnetic field. • Formation of electromagnetism. • Right-hand corkscrew rule to determine the direction of the magnetic field. • Application of magnetic forces. • Use of Fleming's Left-hand Rule. • Calculation of forces in a current carrying wire in a magnetic field. • Uses of transformers. • Description of transformers. • Calculation of unknown values of transformers. • Definition of the national grid. • Electromagnetic induction through a magnet forming a current in a conductor.	Students will study and understand concepts including: • Particle model for different states of matter. • Calculation of density. • Energy used to change states of matter. • Calculation of Specific Heat Capacity • Calculation of Specific Latent Heat. • Relationship between gas pressure and temperature. • Definition of absolute zero. • Relationship between forces and extension of elastic objects. • Calculation of force applied to elastic object for an extension. • Calculation of elastic potential energy.
Key Equations Learnt	$E = F \times d$ $P = \dfrac{E}{t}$	$Q = I \times t$ $E = Q \times V$ $V = I \times R$ $E = V \times I \times t$ $P = I \times V$ $P = I^2 \times R$	$F = B \times I \times l$ $V_P \times I_P = V_S \times I_S$	$\rho = \dfrac{m}{V}$ $\Delta Q = m \times c \times \Delta\theta$ $Q = m \times L$ $F = k \times x$ $E = \frac{1}{2} \times k \times x^2$
Assessment	End of topic assessment (50 marks, 10 marks recall, 10 marks previous topic spaced learning)			
	Winter Year 11 Mock (Paper 1)			
	Spring Year 11 Mock (Paper 2)			