**A Level Physics Curriculum Overview**

| | Y12 | Y13 |
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| **Half Term 1** | Module 1 - Working as a physicist<br><br>➔ Base and derived quantities and their SI units<br>➔ Errors and uncertainty<br>➔ Practical & Investigative skills<br><br>Module 4 - Materials<br><br>➔ Determining the density of an object.<br>➔ Understanding upthrust and weight of object displaced<br>➔ Viscous drag - stokes law.<br>➔ Core practical 4 using a falling ball to determine the viscosity of a liquid<br>➔ Using Hooke's Law to determine the spring constant / stiffness of a spring.<br>➔ Tensile stress and strain<br>➔ Compressive stress and strain<br>➔ Young modulus of a material<br>➔ Core practical 5 - Determine the Young modulus of a material.<br>➔ Force extension, force compression graphs<br>➔ Limit of proportionality, elastic limit, yield point, elastic deformation and plastic deformation.<br>➔ Interpret tensile stress and strain graphs.<br>➔ Calculating the elastic strain energy in a deformed | Further Mechanics<br><br>Nuclear and particle physics |

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| | material using equation and graphs.<br>➔ Free body diagrams.<br>➔ F=ma<br>➔ w=mg<br>➔ Core Practical 1 - Determine the acceleration of a free falling object<br><br>Module 2 - Mechanics<br><br>➔ Motion graphs<br>➔ Vector and scalar quantities<br>➔ Resolving vectors at right angles by drawing and calculation<br>➔ Resolving Coplanar vectors at any angle by drawing and calculation.<br>➔ Vertical and horizontal components of motion and projectiles.<br>➔ Newton's third<br>➔ Momentum<br>➔ Conservation of momentum<br>➔ Centre of gravity<br>➔ W=Fs<br>➔ Kinetic energy<br>➔ Gravitational Potential Energy<br>➔ Principle of conservation of energy<br>➔ Work, energy and power<br>➔ Efficiency | |

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| **Half Term 2** | ➔ SUVAT equations.<br>➔<br><br>Module 3 - Electric Circuits.<br><br>➔ Q=IT<br>➔ W=VQ<br>➔ V=IR and Ohms law for fixed resistors.<br>➔ Conservation of charge<br>➔ Derivation of resistances in parallel and series.<br>➔ Power P=VI, W=VIt $P=I^2R$ and $V^2=PR$<br>➔ IV Characteristics for a Diode, ohmic conductor, filament bulb, & Thermistor.<br>➔ Resistivity<br>➔ CPAC - Determine the electrical resistivity of a material.<br>➔ I=nqvA<br>➔ How length of wire affects resistance<br><br>Module 5 - Waves & the Particle Nature of Light.<br><br>➔ Amplitude, frequency, period, speed and wavelength.<br>➔ Wave speed equation<br>➔ Longitudinal waves and pressure variations<br>➔ Transverse waves<br>➔ Interpreting graphs representing transverse and longitudinal waves to include standing waves<br>➔ CPAC 2 determining the speed of sound.<br>➔ Wavefronts, coherence, path difference, superposition, interference and phase.<br>➔ Phase difference and path difference | Thermodynamics<br><br>Electric and magnetic Fields |

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| | ➔ Standing / stationary waves, nodes and antinodes.<br>➔ Finding the speed of a wave of a transverse wave on a string.<br>➔ CPAC investigating tension, length, and mass per unit length on the frequency of a vibrating string or wire.<br>➔ | |
| **Half Term 3** | Module 3 - Electricity<br><br>➔ Potential Dividers<br>➔ Analysis of potential divider circuits with Thermistors and LDRs<br>➔ Emf, internal resistance and terminal potential resistance<br>➔ How temperature affects resistance in metals and negative coefficient thermistors<br><br>Module 5 - Waves & the Particle Nature of Light.<br><br>➔ Intensity of radiation - inverse square law<br>➔ Refractive index<br>➔ Critical angle<br>➔ Total internal reflection<br>➔ Measuring refractive index of solid material.<br>➔ Focal length and converging and diverging lenses.<br>➔ Ray diagrams to locate the position of an image<br>➔ Power of lens<br>➔ Real and virtual images<br>➔ Magnification equation | Nuclear Radiation<br>Gravitational Fields |

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| | ➔ Plane polarisation<br>➔ Diffraction & huygens construction<br>➔ Diffraction gratings<br>➔ CPAC - determining wavelength from a laser using diffraction gratings.<br>➔ Diffraction gratings and evidence for the wave nature of electrons | |
| **Half Term 4** | Module 5 - waves and the particle nature of light<br><br>➔ De Broglie equation<br>➔ Transmission and reflection<br>➔ Pulse echo technique<br>➔ Photon model of EM radiation<br>➔ E=hf<br>➔ Absorption of a photon can result in the emission of a photoelectron<br>➔ Threshold frequency and work function<br>➔ Use of the electron volt.<br>➔ Photoelectric effect and evidence for the particle nature of light.<br>➔ Emission and absorption spectra | Space<br>Oscillations |
| **Half Term 5** | Mock Examinations and DIRT | |

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| **Half Term 6** | Particle Physics | |