Subject: Physics

Year 12	Year 13
Skills in Physics: Students learn practical skills including measurements and errors and use of scales (for example with micrometers and verniers). They also learn and apply mathematical skills including data handling, trigonometry, algebra and graphs.	**Further Mechanics and Thermal Physics:** Students study circular motion- on the road and at the fairground. They study simple harmonic motion including principles, oscillations, and applications such as resonance. Students also study thermal physics- internal energy and temperature, specific heat capacity, gas laws and kinetic theory.
Particles and Radiation: Students will learn about the structure of the atom, particle interactions, the particle zoo, quarks and lepton. They will also study quantum phenomena including the photo electric effect, energy levels in atoms and spectra, wave particle duality.	**Fields:** Students study gravitational and electrical fields including field strength, electric and gravitational potential. Students learn and apply Newton's law of gravitation, Coulombs law and draw comparisons. They study capacitors- capacitance, dielectrics, charging and discharging, and well as magnetic fields and electromagnetic induction.
Waves and Optics: Students learn about wave properties, stationary and progressive waves and how to use an oscilloscope. They also study refraction, total internal reflection, double slit interference, diffraction and the diffraction grating.	**Nuclear Physics:** Students learn about radioactivity, types of radiation, decay, dangers and applications. They study nuclear energy, energy and mass, binding energy and nuclear fission and fusion.
Mechanics and Materials: Students learn about vectors and scalars, balanced forces, moments and stability, equilibrium rules and statics calculations. They study motion including speed, velocity and acceleration. Students also explore free fall, motion graphs and projectiles. Students learn and apply Newton's laws of motion, and learn about vehicle safety, forces and momentum. They study work, energy and power. They also learn about materials, density, springs, deformation of solids, stress and strain.	**Astrophysics:** Students learn about the types and applications of telescopes and the different classifications of stars. Students study cosmology including the Doppler effect, Hubble's law, quasars and the detection of exoplanets.