A Level Physics Long Term Plan

Year 12

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Ch 1 Basic Ideas Ch 2 Looking at Forces Ch 10 Wave Motion Ch 11 Reflection and Refraction	Ch 3 Turning Effects of Forces Ch 4 Describing Motion Ch 12 Interference and Diffraction	Ch 5 Newton's Laws and Momentum Ch 23 Electrons and Photons Ch 24 Spectra and Energy Levels	Ch 6 Work, Energy and Power Ch 16 Current and Charge	Ch 13 Materials Ch 17 Electric Circuits	Revision for PPE
Assessment Ch 1 EOT Ch 2 EOT Ch 10 EOT Ch 11 EOT	**Assessment** Ch 3 EOT Ch 4 EOT Ch 12 EOT	**Assessment** Ch 5 EOT Ch 23&24 EOT	**Assessment** Ch 6 EOT Ch 16 EOT	**Assessment** Ch 13 EOT Ch 17 EOT	**Assessment** PPE Paper 1 PPE Paper 2
Builds upon Ch 1: Planning and safely carrying out experiments to collect scientific data. Analysing data and evaluating the validity and reliability of the methods of data collection. Making logical conclusions based on the balance	**Builds upon** Ch 3: Using a stopwatch to measure times. Measuring and calculating the speed of objects. Gravity making things fall down and giving them weight. Measuring forces, calculating resultant forces. The motion of objects as a result of	**Builds upon** Ch 5: Using a stopwatch to measure times. Measuring and calculating the speed of objects. Gravity making things fall down and giving them weight. Measuring forces, calculating resultant forces. The motion of objects as a result of	**Builds upon** Ch 6: Calculating gravitational potential and kinetic energies. Energy transfers and the effects of friction. Calculations of work and power. Speed, distance, displacement, time, velocity, acceleration. Resolving vectors. Newton's laws	**Builds upon** Ch 13: How to calculate resultant forces and their effects. The deforming effects of forces. Free body diagrams. Newton's laws of motion. Weight and the acceleration caused by gravity. Air resistance - its causes and effects.	

of reliable data collected. Communicating scientific methods, conclusions and arguments using technical and mathematical language. Understanding of how scientific ideas change over time and the systems in place to validate these changes. Ch 2: Using a stopwatch to measure times. Measuring and calculating the speed of objects. Gravity making things fall down and giving them weight. Measuring forces, calculating resultant forces. The motion of objects as a result of forces acting on them. Ch 10: Using the terms frequency, wavelength, amplitude and speed to describe waves. Detailed knowledge of the parts of the electromagnetic spectrum - their uses, hazards and properties. Knowledge of sound	forces acting on them. Ch 4: Using a stopwatch to measure times. Measuring and calculating the speed of objects. Gravity making things fall down and giving them weight. Measuring forces, calculating resultant forces. The motion of objects as a result of forces acting on them. Ch 12: Definitions of the properties of waves such as frequency, amplitude, wavelength and speed. The definition of wave phase and its relationship to frequency and time period. The difference between and examples of transverse and longitudinal waves. The transmission of waves and graphical representations of them. Calculations of wave properties.	forces acting on them. Speed, distance, displacement, time, velocity, acceleration. Resolving vectors. Newton's laws of motion and the kinematics equations. How to calculate kinetic energy. Conservation of energy. Ideas about stopping distances of cars and the safety features in vehicles. Calculations of momentum and momentum transfers. Conservation of linear momentum in collisions. Ch 23&24: Diffraction and interference of light. Detailed knowledge of the parts of the electromagnetic spectrum and the frequencies of electromagnetic radiations. Models of waves and wave processes. The existence and properties of the electron. The electronic structure of atoms. Macroscopic emission and absorption of light.	of motion. Kinematics equations. Ch 16: Atomic structure and electrical conduction by electrons. When electrical charges attract or repel. Conservation of electrical charge. What we mean by 'current' and by 'voltage' and how these are measured. The Ohm's law equation. Electrical resistance and its effects. The variation in current with changing potential difference for various components.	Convection, including as a cause of the movement of tectonic plates. Experimental measurements on wires. The idea of general properties of materials rather than properties of specific objects. The testing of materials for use in hockey goalkeeping equipment. Ch 17: Energy transfers in electrical circuits. Calculations of electrical power and energy. Explanations of the movement of charged particles in terms of their material medium. Calculations of current, voltage and resistance. Ohm's law in general and when it is and is not relevant.	

waves and earthquake waves. Models of waves and wave processes. Calculations of wave speed. Examples of transverse and longitudinal waves. Uses of ultrasound and some ideas describing the movement of earthquake waves. Ch 11: Definitions of the properties of waves such as frequency, wavelength and speed. Models of waves and wave processes. Calculations of wave speed. The transmission of waves. Some considerations about telescopes used in astronomy.					
Introduces Ch 1: The difference between 'base' and 'derived' units. How to use units to check equations. How to use 'significant figures'. How to deal with vectors. Ch 2: The different types of forces that	**Introduces** Ch 3: How to calculate the turning effect of a force. The conditions needed for an object to be in equilibrium. The meaning and significance of the centre of gravity. Ch 4: How to describe motion in terms of	**Introduces** Ch 5: Newton's three laws of motion. The meanings of inertia, momentum and impulse. How to use Newton's laws and the conservation of momentum to solve problems. Ch 23: Photons -	**Introduces** Ch 6: How to calculate work and power. The equations for kinetic and gravitational potential energy. How to use the work - energy principle to solve problems. Ch 16: Current as the flow of electric charge.	**Introduces** Ch 13: How to calculate the density of materials. How to use Hooke's Law to find extensions and forces. How to find the energy stored in a stretched solid. How to calculate 'stress', 'strain' and the Young modulus.	

exist. What causes these forces. How to draw the forces acting on an object. Ch 10: Wavelength, period and amplitude of a wave. The difference between transverse and longitudinal waves. Phase difference and polarisation. Ch 11: How waves are reflected and refracted. Critical angle and total internal reflection. How images are formed by lenses.	distance, displacement, speed, velocity, acceleration and time. How to use equations that link these quantities. How to draw and interpret graphs representing motion. Ch 12: How waves meet and 'superpose'. How waves diffract through a gap. How waves from multiple sources can 'interfere'.	particles of light. The Photo-electric effect. How electrons can behave as waves Ch 24: How spectra depend on energy jumps.	Potential difference and resistance. The equations for electrical power.	Ch 17: How to analyse series and parallel components. emf and internal resistance. How to use potential dividers.	

Year 13

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Ch 14 Thermodynamics Ch 15 Gases and Kinetic Theory Ch 7 Circular Motion Ch 8 Gravitational Forces and Fields	Ch 25 Radioactivity Ch 26 Nuclear Energy Ch 9 Simple Harmonic Motion Ch 18 Magnetic Fields	Ch 29 Astrophysics Ch 24 Spectra and Energy Levels Ch 19 Electromagnetic Induction Ch 20 Alternating Current Ch 22 Capacitors	Ch 27 Particle Physics Ch 21 Electric Fields	Revision for exams	
Assessment Ch 14 EOT Ch 15 EOT Ch 7 EOT Ch 8 EOT	**Assessment** PPE Paper 1 Ch 25 EOT Ch 26 EOT Ch 9 EOT Ch 18 EOT	**Assessment** Ch 29 EOT Ch 24 EOT Ch 19 EOT Ch 20 EOT Ch 22 EOT	**Assessment** PPE Paper 2 Ch 27 EOT Ch 21 EOT		
Builds upon Ch 14: The pressure on a solid. The kinetic energy equation. Conservation of momentum and energy. Collisions and Newton's laws of motion. Density. The	**Builds upon** Ch 25: The conservation of energy. Ionisation. Photon emission from excited electrons. The structure of an atom. Rutherford's alpha scattering experiment.	**Builds upon** Ch 29: Newton's laws of motion. Conservation of energy. Emission and absorption spectra. Heat and temperature. Gravitational forces. Ch 24: Newton's laws	**Builds upon** Ch 27: Voltage as a measure of energy transferred by charges. Conservation of momentum, energy and charge. Circular motion and centripetal force. The effects of electric		

potential divider. Impulse and momentum change. Ch 15: The pressure on a solid. The kinetic energy equation. Conservation of momentum and energy. Collisions and Newton's laws of motion. Density. The potential divider. Impulse and momentum change. Ch 7: The radian. Tension forces. Speed and acceleration. How to add vectors. How to resolve vectors. Newton's laws of motion. Ch 8: Weight and gravity. Newton's laws of motion. Gravitational potential energy. Circular motion.	Particle energies. Ch 26: Kinetic energy. Wave-particle duality, including electron diffraction. The electronvolt. Electric current as the movement of charge. Voltage as a measure of energy transferred by charges. Momentum conservation and elastic collisions. Ch 9: Speed and acceleration. Newton's laws of motion. Conservation of energy and momentum. Elastic and plastic deformation. Basic wave properties. Wave phase. Circular motion and its connection with wave movements. Ch 18: Magnetic field rules for attraction and repulsion. Resolving vectors. Conservation of energy. Electric current as the movement of charge. The centripetal force equation.	of motion. Conservation of energy. Emission and absorption spectra. Heat and temperature. Gravitational forces. Ch 19: Magnetic field rules for attraction and repulsion. Resolving vectors. Conservation of energy. Electric current as the movement of charge. The centripetal force equation. Ch 20: Magnetic field rules for attraction and repulsion. Resolving vectors. Conservation of energy. Electric current as the movement of charge. The centripetal force equation. Ch 22: Electric current as the movement of charge. Voltage as a measure of energy transferred by charges. Series and parallel circuits and their rules for current and voltage. Potential dividers.	fields on the movement of charged particles. Coulomb's law for electrostatic forces. The effects of magnetic fields on the movement of charged particles. Ch 21: Gravitational potential energy. Electric charges and their movement. Potential difference. Electrical energy.		

Introduces Ch 14: Internal energy, heat and work. Absolute zero and temperature changes. Changes of state between solid, liquid and gas. Ch 15: The gas laws and how to use them. The kinetic theory of gases. The Avogadro constant and the Boltzmann constant. Ch 7: Why an object moving in a circle must be accelerating. The equations used to describe circular motion. How to use the equations to analyse horizontal and vertical circles. Ch 8: How to calculate gravitational force. What is meant by a gravitational field and gravitational potential. The motion of satellites in orbit.	**Introduces** Ch 25: The structure of an atom. The properties of ionising radiations. The process of radioactive decay. Ch 26: How to calculate the energy stored in an atomic nucleus. The difference between fission and fusion. How power stations control the release of nuclear energy. Ch 9: How to describe SHM using graphs and equations. The energy transfers in SHM. The effects of damping and resonance. Ch 18: Magnetic field patterns and lines of flux. How to calculate the strength of magnetic fields. The force on a current within a magnetic field.	**Introduces** Ch 29: How stars are classified and how they evolve. How Doppler shift and red-shift are used. Ch 24: The Stefan-Boltzmann Law and Wien's Law. Ch 19: Magnetic flux and flux linkage. Faraday's Law and Lenz's Law. The uses of Electromagnetic induction. Ch 20: How to calculate r.m.s values. Ch 22: How capacitors work in simple circuits. How they are combined in series and parallel. How the charge stored on a capacitor varies with time.	**Introduces** Ch 27: What the building blocks are. What antimatter is and how it is created. The fundamental forces that hold everything in the universe together. Ch 21: How to calculate electric forces. Electric field strength and electric potential. Applications of electric fields.		