Key Stage 4 Curriculum Map - Physics

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 10	Key Learning Objectives: Energy 1. Students should be able to calculate the amount of energy associated with a moving object, a stretched spring and an object raised above ground level. 2. Students should be able to recall and apply the equations for : K.E, G.P.E, E.PE. 3. The amount of energy stored in or released from a system as its temperature changes can be calculated using the equation: change in thermal energy = mass × s peci f ic heat ca pacity × tem perature change. Complete the following required practical: An investigation to determine the specific heat capacity of one or more materials. The investigation will involve linking the decrease of one	Key Learning Objectives: Energy 1. Power is defined as the rate at which energy is transferred or the rate at which work is done. 2. Students should be able to recall and apply both equations for calculating power. 3. Students should be able to describe, with examples, how in all system changes energy is dissipated, so that it is stored in less useful ways. This energy is often described as being 'wasted'. 4. Students should be able to explain ways of reducing unwanted energy transfers, for example through lubrication and the use of thermal insulation.	Key Learning Objectives: Waves 1. Students should be able to describe the difference between longitudinal and transverse waves. 2. Students should be able to describe evidence that, for both ripples on a water surface and sound waves in air, it is the wave and not the water or air itself that travels. 3. Students should be able to describe wave motion in terms of their amplitude, wavelength, frequency and period. 4. Complete the required practical: Making observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and	Key Learning Objectives: Waves 1. Students should be able to give examples that illustrate the transfer of energy by electromagnetic waves. 2. Students should be able to recall the properties of electromagnetic waves. 3. Students should be able to use wave front diagrams to explain refraction in terms of the change of speed that happens when a wave travels from one medium to a different medium. 4. Ultraviolet waves, X-rays and gamma rays can have hazardous effects on human body tissue. The effects depend on the type of radiation and the size of the dose. Radiation dose (in sieverts) is a measure of the risk	Key Learning Objectives: Atomic structure 1. The basic structure of an atom is a positively charged nucleus composed of both protons and neutrons surrounded by negatively charged electrons. 2. Students should be able to relate differences between isotopes to differences in conventional representations of their identities, charges and masses. 3. To describe why the new evidence from the scattering experiment led to a change in the atomic model 4. To describe the difference between the plum pudding model of the atom and the nuclear model of the atom. 5. To be able to use nuclear equations	Key Learning Objectives: Electricity 1. Students should be able to draw and interpret circuit diagrams. 2. To understand that electric current is a flow of electrical charge. The size of the electric current is the rate of flow of electrical charge. Charge flow, current and time are linked by the equation: charge f low = current × time 3. To understand that current, potential difference or resistance can be calculated using the equation: potential di f f erence = current × resistance. 4.

	energy store (or work done) to the increase in temperature and subsequent increase in thermal energy stored.		waves in a solid and take appropriate measurements.	of harm resulting from an exposure of the body to the radiation. 5. Students should be able to give brief explanations why each type of electromagnetic wave is suitable for the practical application.	to represent radioactive decay.	
	Key Assessment: Practical: Written: TBC	Key Assessment: Practical: Written: TBC	Key Assessment: Practical: Written: TBC	Key Assessment: Practical: Written: TBC	Key Assessment: Practical: Written:	Key Assessment: Practical: Written:
Year 11	Key Learning Objectives: Electricity 1. There are two ways of joining electrical components, in series and in parallel. Some circuits include both series and parallel parts. 2. To understand that for components	Key Learning Objectives: Magnetism 1. The region around a magnet where a force acts on another magnet or on a magnetic material (iron, steel, cobalt and nickel) is called the magnetic field.	Key Learning Objectives: Forces 1. To understand that: Distance is how far an object moves. Distance does not involve direction. Distance is a scalar quantity. 2. Students should be able to make	Key Learning Objectives: Forces 1. Students should be able to apply Newton's First Law to explain the motion of objects moving with a uniform velocity and objects where the speed and/or direction changes.	Key Learning Objectives:	Key Learning Objectives:

	connected in series: • there is the same current through each component • the total potential difference of the power supply is shared between the components • the total resistance of two components is the sum of the resistance of each component. 3. To understand that for components connected in parallel: • the potential difference across each component is the same • the total current through the whole circuit is the sum of the currents through the separate components • the total resistance of two resistors is less than the resistance of the smallest individual resistor. 4. Students should be able to explain: • that a live wire may be dangerous even when a switch in the mains circuit is open • the dangers of providing any connection between the live wire and earth.	2. To describe how the magnetic effect of a current can be demonstrated • draw the magnetic field pattern for a straight wire carrying a current and for a solenoid (showing the direction of the field) • explain how a solenoid arrangement can increase the magnetic effect of the current. 3. Students should be able to show that Fleming's left-hand rule represents the relative orientation of the force, the current in the conductor and the magnetic field.	measurements of distance and time and then calculate speeds of objects. 3. Students should be able to draw distance–time graphs from measurements and extract and interpret lines and slopes of distance–time graphs, translating information between graphical and numerical form. 4. To be able calculate the average acceleration of an object. 5. TThe acceleration of an object can be calculated from the gradient of a velocity–time graph.	2. Students should be able to apply Newton's second law. The acceleration of an object is proportional to the resultant force acting on the object, and inversely proportional to the mass of the object. 3. Students should be able to apply Newton's Third Law to examples of equilibrium situations. 4. Students should be able to: • explain the factors which affect the distance required for road transport vehicles to come to rest in emergencies, and the implications for safety 5. To understand that: Momentum is defined by the equation: momentum = mass × velocity 6. Students should be able to use the concept of momentum as a model to describe and explain examples of momentum in an		

	5. Students should be able to explain how the power transfer in any circuit device is related to the potential difference across it and the current through it, and to the energy changes over time: power = potential di f f erence × current			event, such as a collision.		

	Key Assessment: Practical: Written:	Key Assessment: Practical: Written:	Key Assessment: Practical: Written:	Key Assessment: Practical: Written:	Key Assessment: Practical: Written:	Key Assessment: Practical: Written: