

EMMANUEL COLLEGE
THE SCIENCE DEPARTMENT

Year 10



Year 10	Autumn, Half-Term 1	Autumn, Half-Term 2 and Spring Half-Term 1	Spring, Half-Term 2
Unit Title	Circuit Electricity	Energy 2	Waves 1
Key Question(s)?	How does electricity flow in a circuit and what factors affect this?	What are some of the ways we can calculate changes in energy involved when a system is changed?	How do we classify waves and what are their properties?
Threshold Concepts	<p>Electric current is a flow of electrical charge. The size of the electric current is the rate of flow of electrical charge.</p> <p>The current (I) through a component depends on both the resistance (R) of the component and the potential difference (V) across the component.</p> <p>There are two ways of joining electrical components, in series and in parallel. Some circuits include both series and parallel parts.</p>	<p>The amount of elastic potential energy stored in a stretched spring can be calculated using the equation:</p> <p>Elastic potential energy = $0.5 \times \text{spring constant} \times \text{extension}^2$</p> <p>$E_e = \frac{1}{2} k e^2$</p> <p>A force does work on an object when the force causes a displacement of the object.</p> <p>Power is defined as the rate at which energy is transferred or the rate at which work is done.</p>	<p>Waves may be either transverse or longitudinal.</p> <p>The ripples on a water surface are an example of a transverse wave.</p> <p>Longitudinal waves show areas of compression and rarefaction.</p> <p>The amplitude of a wave is the maximum displacement of a point on a wave away from its undisturbed position.</p>
Link to Prior Learning	This builds on the energy and electricity topic covered in Year 7 as well as the domestic electricity topic covered in Year 9.		
	Summer Term (Sets 1 + 2 only)	Summer Term	
Unit Title	Waves 2	Forces 2	
Key Question(s)?	How do we classify waves and what are their properties?		
Threshold Concepts	Waves can be reflected at the boundary between two different materials.	The weight of an object may be considered to act at a single point referred to as the object's 'centre of mass'.	

	<p>Waves can be absorbed or transmitted at the boundary between two different materials.</p> <p>Electromagnetic waves form a continuous spectrum and all types of electromagnetic wave travel at the same velocity through a vacuum (space) or air.</p>	<p>Weight is the force acting on an object due to gravity. The force of gravity close to the earth is due to the gravitational field around the Earth.</p> <p>The weight of an object and the mass of an object are directly proportional.</p>	
Link to Prior Learning	This builds on the waves topic covered earlier in Year 10 for all students.	This builds on the previous forces topic covered in Year 9.	
Knowledge and Sequencing Rationale	Year 10 is a spiralled curriculum, revisiting the Year 9 topics and adding a more mathematical and abstract conceptual edge to the real-world applications seen in Year 9. In general, the more challenging material has been left for this year. Waves is also introduced as a new topic. In general, there is time to revisit the Year 9 material in a review lesson, with each of the Year 9 topics being reviewed at least once during Year 10 for combined science students.		