

EMMANUEL COLLEGE

THE SCIENCE DEPARTMENT

Year 7



Year 7	Spring, Half-Term 1	Summer Term
Unit Title	Energy and Electricity	Forces
Key Question(s)?	How does energy transfer and what is electricity?	What are forces?
Threshold Concepts	<p>We can describe how jobs get done using an energy model where energy is transferred from one store at the start to another at the end. When energy is transferred, the total is conserved, but some energy is dissipated, reducing the useful energy.</p> <p>Current is a movement of electrons and is the same everywhere in a series circuit. Current divides between loops in a parallel circuit, combines when the loops meet, lights up bulbs and makes components work.</p>	<p>If the overall, resultant force on an object is unbalanced, its motion changes and it slows down, speeds up or changes direction. One effect of a force is to change an object's form, causing it to be stretched or compressed. In some materials, the change is proportional to the force applied.</p> <p>Pressure acts in a fluid in all directions. It increases with depth due to the increased weight of fluid, and results in an upthrust. Objects sink or float depending on whether the weight of the object is bigger or smaller than the upthrust.</p>
Link to Prior Learning	Students would have worked with circuits in primary school in terms of electrical devices being connected to a power supply, but the ideas of voltage, current and resistance have not been introduced.	Students would know the idea that we cannot see a force, just its effects. A change in the motion or shape of an object indicates that a force is acting on it. This would have been investigated in primary school.
Knowledge and Sequencing Rationale	<p>We begin with core concepts in the three subject areas of science. We look at the nature of matter in Chemistry, multicellular organisms in Biology and electricity and energy transfer in Physics. These are essential concepts that build on ideas from primary school science. We alternate between the three subject areas of science to demonstrate to students the broad areas of study required in secondary science. We spend six weeks on each topic area so as not to hit cognitive overload with younger students. At the end of each six-week topic, a week of study is dedicated to revision, recap and formative feedback. The next sequence of topics (2B, 2C and 2P) build on the concepts introduced in the first sequence. 2C continues to delve deeper into the nature of matter and introduces patterns based on atomic structure, 2B takes the ideas of how multicellular organisms are structured by looking at specific systems such as the digestion and respiratory systems. 2P introduces the concepts of forces giving lots of contextual examples of forces can change the 'form' on an object. Energy features in each of the four physics topics at KS3 and ideas about energy are developed in each of them.</p> <p>Biological processes feature in each of the four biology topics at KS3 and ideas about these processes are developed in each of them. The nature of matter features in each of the four Chemistry topics at KS3 and ideas about how matter changes are developed in each of them.</p>	