

EMMANUEL COLLEGE
THE SCIENCE DEPARTMENT

Year 10



Year 10	Autumn, Half-Term 1	Autumn, Half-Term 2	Spring Term
Unit Title	Quantitative Chemistry	Metals Reactivity and Acids	Electrolysis
Key Question(s)?	How do we work out the mass of reactants needed or products made in a chemical reaction?	How do metals react and what are the properties and reactions of acids/bases?	How can electricity be used to break down a chemical compound?
Threshold Concepts	<p>The law of conservation of mass states that no atoms are lost or made during a chemical reaction, so the mass of the products equals the mass of the reactants.</p> <p>Chemical amounts are measured in moles. The symbol for the unit mole is mol. The mass of one mole of a substance in grams is numerically equal to its relative formula mass.</p>	<p>Metals react with oxygen to produce metal oxides. The reactions are oxidation reactions because the metals gain oxygen.</p> <p>A more reactive metal can displace a less reactive metal from a compound.</p> <p>Acids are neutralised by alkalis (e.g. soluble metal hydroxides) and bases (e.g. insoluble metal hydroxides and metal oxides) to produce salts and water, and by metal carbonates to produce salts, water and carbon dioxide.</p>	<p>When an ionic compound is melted or dissolved in water, the ions are free to move about within the liquid or solution.</p> <p>These liquids and solutions are able to conduct electricity and are called electrolytes.</p> <p>Metals can be extracted from molten compounds using electrolysis.</p> <p>Electrolysis is used if the metal is too reactive to be extracted by reduction with carbon or if the metal reacts with carbon.</p>
Link to Prior Learning	Conservation of mass was covered qualitatively in a Year 8 chemistry topic.	Students have already been introduced to metal and acid reactions in Year 7 and Year 8.	This builds on the atomic structure and bonding units studied in Year 9.
	Summer Term		
Unit Title	Organic Chemistry		
Key Question(s)?	How are carbon compounds made and what are they used for?		
Threshold Concepts	<p>The chemistry of carbon compounds is so important that it forms a separate branch of chemistry.</p> <p>A great variety of carbon compounds is possible because carbon atoms can</p>		

	<p>form chains and rings linked by C-C bonds. This branch of chemistry gets its name from the fact that the main sources of organic compounds are living, or once-living materials from plants and animals.</p> <p>These sources include fossil fuels which are a major source of feedstock for the petrochemical industry.</p>		
Link to Prior Learning	This builds on the atomic structure and bonding units studied in Year 9.		
Knowledge and Sequencing Rationale	<p>Year 10 continues with units that build into each other, as per the GCSE specification. However, we also ensure that interleaved practice is a key part of our delivery. So, we revisit C1 and C2 during the year as well as reviewing C3 and C4 again at the end of the year. In Year 10 we do not quite follow the order of the specification. This is because we see the importance of introducing types of chemical reactions from C4 before looking at the calculations involved in chemical reactions in C3. This allows us to teach C3 with more experimental context rather than basing it on purely theoretical ideas which would be difficult for students of middle-/low-ability. In Year 10, the triple award students follow similar topics to the combined science students, but each topic has more content, so they are not in sync with each other from the start of Autumn 2. This means that setting for triple award has to be finalised by Autumn 2. We ensure that there is appropriate assessment and feedback at the end of each unit, which is why we split the large C4 unit into two parts to enable more bespoke assessment and review.</p>		