The Sutton Academy

Knowledge Rich Curriculum Plan

SCIENCE- Chemistry Year 10

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Prior Knowledge: *In order to know this, students need to already know that…*	Working Scientifically	Tiered Vocabulary and Reading Activity	Support
Lesson: Electrolysis of Molten Compounds	• Students will know that liquids and solutions that are able to conduct electricity are known as electrolytes • Students will know that passing an electric current through electrolytes causes the ions to move to the electrodes • Students will know that positively charged ions move to the negative electrode (the cathode) • Students will know that negatively charged ions move to the positive electrode (the anode). • Students will know that ions are discharged at the electrodes, producing elements. This process is known as electrolysis. • Students will know that carbon is used as electrodes as it can conduct electricity (as graphite) and is chemically inert • Students will know that when molten ionic compounds are electrolysed, the metal is produced at the cathode and the non-metal is produced at the anode. • Students will know how to predict the products of electrolysis of binary ionic compounds in the molten state • Students will know how to represent the electrolysis as ionic half equations Students will know how to identify what has been oxidised or reduced.	• *Students need to already know that an ionic compound is made of ions* • *Students need to already know that ionic compounds can conduct electricity when molten or dissolved in water* *Students need to already know how to write ionic equations*	Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. Understand how scientific methods and theories develop over time.	Tier 2 Molten - melted Tier 3 Electrolysis: The splitting of a compound using electric current	*BBC Bitesize* *Tassomai* *Kay Science* *Knowledge organiser*
Lesson: Electrolysis and Extracting Metals	• Students will know that metals can be extracted from molten compounds using electrolysis • Students will know that electrolysis is used to extract a metal if it is more reactive than carbon. • Students will know that extraction of metals using electrolysis requires a large amount of energy.	• *Students need to already know that the anode is the positive electrode* • *Students need to already know that metals are ranked by their reactivity in the reactivity series* *Students need to already know that some metals can't be extracted by heating with carbon as they are more reactive than carbon.*	Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts.	Tier 2 Tier 3 *Aqueous: when a solid has been dissolved in water* *Molten: liquified by heat*	*BBC Bitesize* *Tassomai* *Kay Science* *Knowledge organiser*

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	• Students will know that aluminium is manufactured by the electrolysis of a molten mixture of aluminium oxide and cryolite. • Students will know that aluminium oxide is mixed with cryolite to reduce the temperature needed to melt the mixture • Students will know that carbon is used as the anode. • Students will know that the positive electrode needs to be replaced as the oxygen that is produced there reacts with the carbon to form carbon dioxide. • Students will know how to explain why a mixture is used as the electrolyte Students will know how to explain why the positive electrode must be continually replaced.		Understand how scientific methods and theories develop over time		
Lesson: Electrolysis of aqueous solutions	• Students will know that when a current is applied across an aqueous solution the water molecules can also be split into its ions (H+ and OH-) • Students will know that when an aqueous solution is electrolysed the ions that are discharged at the electrodes depends on the relative reactivity of the elements involved. • Students will know that if the metal is more reactive than hydrogen, then hydrogen gas is produced at the cathode • Students will know that oxygen is produced at the anode, unless the solution contains halide ions (where the halogen is produced instead) • Students will know how to predict the products of the electrolysis of aqueous solutions • Students will know how to carry out electrolysis of aqueous solutions	• *Students need to already know that aqueous means dissolved in water* • *Students need to already know that reactivity of a metal is linked to its tendency to form ions* *Students need to already know that the cathode is the negative electrode and the anode is the positive electrode*	Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. Understand how scientific methods and theories develop over time	Tier 3 *Aqueous: when a solid has been dissolved in water*	*BBC Bitesize* *Tassomai* *Kay Science* *Knowledge organiser*

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	• Students will know that when hydrogen is released at the cathode, the half equation is: • 2H+ + 2e- --> H2 • This represents reduction as the hydrogen ions are gaining electrons • Students will know that when oxygen is released at the anode (in aqueous solutions), the half equation is: • 4OH- --> O2 + 2H2O + 4e- This represents oxidation as the OH- ion has lost electrons				