Progression Model – Year 10 Chemistry (Foundation Tier)

Module Title: Quantitative chemistry and chemical changes	**Module Title:** Electrolysis	**Module Title:** Energy changes and rate of reaction
Learning Intent for this module: This module presents a quantitative approach to chemical masses as students deepen their understanding of atomic structure by acquiring knowledge and understanding of isotopes and relative atomic mass. Students will then develop their mathematical skills further by looking at key concepts such as the importance of mass conservation and calculating uncertainty and concentration. Students will then move on to build upon previous knowledge of reactions including the reactivity of metals. Neutralisation reactions of acids with metals, oxides, hydroxides, and carbonates are introduced. • Isotopes • Relative atomic mass • Conservation of mass • Uncertainty • Concentration • Reactivity series • Reactions of metals and acids • Neutralisation reactions	**Learning Intent for this module:** Students are introduced to this module by preparing making a pure, dry salt in required practical 1. This links to the concept of ionic substances that they first learned about in year 9. In this module, students are introduced to the fact that ionic substances can be electrolytes. They will learn about electrolysis using molten ionic substances and ionic substances dissolved in aqueous solutions. Students will discover a practical application of electrolysis as the basis for aluminium extraction. • Required practical (preparation of a pure, dry salt) • Electrolytes • Electrolysis of molten substances • Electrolysis of substances dissolved in aqueous solution • Required practical (electrolysis)	**Learning Intent for this Module:** After learning about endothermic and exothermic reactions in KS3, this module establishes students' understanding of energy changes in the context of a model of a reaction where bonds are broken in the reactants and formed in the products. Students are then introduced to how the rate of reaction is determined by the frequency of collisions and energy of the reactant particles. Finally, students will learn about reversible reactions and the concept of equilibrium. • Endothermic and exothermic reactions • Energy rection profiles • Required practical (temperature changes) • Calculating rate of reaction • Using graphs to calculate rate • Collision theory • Reversible reactions • Equilibrium • Required practical (rates of reaction)

Key Content to be learned: Building on their understanding of atomic structure, students will learn about isotopes. They will then go onto develop their numerical skills by learning how to calculate relative atomic mass, uncertainty and concentration. Law of conservation of mass is introduced as students will learn about the importance of balancing equations. Students will then go onto revisit and expand on knowledge of reactions of metals and the reactivity series. They will then learn about neutralisation reactions and how reactions of metals, metal oxides, hydroxides and carbonates can lead to the production of soluble salts.	**Key content to be learned:** Students will learn about the concept of electrolysis and how electrolytes are ionic substances. They will learn about the two types of electrolysis which involve molten electrolytes and electrolytes dissolved in an aqueous solution. Students will be able to predict products of electrolysis.	**Key Content to be learned:** In this module students will recall and build upon previous knowledge of exothermic and endothermic reactions. They will deepen their understanding by learning about reaction profiles and how these link to chemical reactions. Students will then move on to learn about rates of reaction and the ways rate can be calculated. They will learn about the theory of collision theory and how it underpins chemical reactions before moving on to the concept of reversible reactions and equilibrium.
Prior knowledge: • A simple model of the atom consisting of the nucleus and electrons • The modern Periodic Table, showing elements arranged in order of atomic number • Chemical reactions as the rearrangement of atoms • Representing chemical reactions using formulae and using equations • Defining acids and alkalis in terms of neutralisation reactions • The pH scale for measuring acidity/alkalinity; and indicators • Reactions of acids with metals to produce a salt plus hydrogen • Reactions of acids with alkalis to produce a salt plus water	**Prior knowledge:** • Simple techniques for separating mixtures • Types of chemical bonding: ionic, covalent, and metallic • Bulk properties of materials related to bonding and intermolecular forces	**Prior knowledge:** • Exothermic and endothermic chemical reactions • What catalysts do

Key tasks for this module: • Quantitative chemistry • Neutralisation	Key tasks for this module: • Preparation of a pure, dry salt. • Electrolysis	Key tasks for this module: • Energy changes • End of year assessment