

<p>Year 10: Separate Chemistry</p>	<ul style="list-style-type: none"> Curriculum Intent: Year 10 Chemistry tackles more complex ideas and concepts in the subject. It builds on the key knowledge from years 7,8 and 9 to link together all the areas of the subject. The key areas of particles, reactions, monitoring reactions and earth and environmental science are developed through more challenging topics such as mole calculations and electrolysis. Knowledge of key industrial chemical processes is also developed. Procedural knowledge and practical skills are developed further, building on experience with making salts, neutralisation, redox and displacement reaction. The curriculum in year 10 aims to bring everything together so that students have a complete understanding of the Chemistry aspect of the Separate Science course. 					
	<p>Autumn 1</p>	<p>Autumn 2</p>	<p>Spring 1</p>	<p>Spring 2</p>	<p>Summer 1</p>	<p>Summer 2</p>
<p>Key ideas and sequence of learning</p>	<p>Module C3 - Chemical reactions</p> <ul style="list-style-type: none"> Formulae of compounds Formulae of ionic compounds Conservation of mass Balancing equations Half equations and ionic equations (H) Detecting gases Moles Concentration and moles 	<p>Module 3 - Chemical reactions</p> <ul style="list-style-type: none"> Endothermic and exothermic reactions Reaction profiles Bond energies (H) Acid and alkali reactions pH and neutralisation reactions of acids REDOX Electrolysis reactions 	<p>Module 5: Monitoring and controlling chemical reactions.</p> <ul style="list-style-type: none"> Rates of reactions Calculating the rate of reactions from graphs and data Calculating average rate Calculating instantaneous rate reversible reactions equilibrium choosing reaction conditions 	<p>Module 6: Global challenges</p> <ul style="list-style-type: none"> Extracting metals Extracting iron Extracting aluminium Phytoextraction Bioleaching 	<p>Students sit their EoY exams Students will review their PPE exam papers.</p> <p>Module 6: Global challenges</p> <ul style="list-style-type: none"> Alkanes and fractional distillation of crude oil Cracking Alcohols Carboxylic acids 	<p>Module 6: Global challenges</p> <ul style="list-style-type: none"> Condensation polymers <p>C4- Monitoring and Predicting chemical reactions</p> <ul style="list-style-type: none"> Instrumental analysis Testing anions and cations <p>Module 6: Global challenges</p> <ul style="list-style-type: none"> Choosing and recycling materials Formation of atmosphere Pollution and atmosphere

						<ul style="list-style-type: none"> • Climate change • Water for drinking
Key Questions	<ol style="list-style-type: none"> 1. How do you write the formulae of ionics given its ions? 2. How do you balance a chemical equation? 3. What are the 4 state symbols? 4. What is a mole? 5. How do you calculate moles? 6. How do you use mole ratios to find reacting masses? 	<ol style="list-style-type: none"> 1. When does hydrogen and oxygen form during electrolysis? 2. Can you write half equations to describe electrolysis? 3. Can you define reduction and oxidation in terms of electrons? 4. Can you write ionic and half equations to describe redox reactions? 5. Can you use bond energies to calculate if a reaction is endothermic or exothermic? 6. What is a neutralisation reaction? 7. What is the difference between dilute and concentrated acids? 8. What is the difference between strong and weak acids? 	<ol style="list-style-type: none"> 1. Can you calculate the average rate of reaction from data or a graph? 2. Can you calculate the instantaneous rate of reaction from a graph? 3. What is equilibrium? 4. How does temperature affect equilibrium position? 5. How does pressure affect equilibrium position? 	<ol style="list-style-type: none"> 1. How are metals extracted from ore using carbon? 2. How does electrolysis extract aluminium and what are its advantages and disadvantages? 3. What are the advantages and disadvantages of extracting metals with biological methods? 	<ol style="list-style-type: none"> 1. How is crude oil extracted using fractional distillation? 2. Why is cracking carried out? 3. What are some of the chemical and physical properties of hydrocarbons and alcohols? 4. Can you draw structures and write equations for the formation of polyester and polyamides? 5. can you name and identify structures of monomers for a given polymer? 6. 	<p>Separate Chemistry:</p> <ol style="list-style-type: none"> 1. Explain the importance of carrying out physical, chemical and biological purification to make potable water. 2. How are materials recycled? 3. Choosing materials by analysing the properties 4. How was our atmosphere formed and how has it evolved? 5. Cause, effect and controlling pollutants 7. Impact of carbon emission on

		9. How does the pH relate to the H ⁺ concentration?				climate change 8. explain the importance of instrumental methods 9. can you analyse information from infra red, mass spec and gas chromatography data to identify the molecules? 10. Can you describe tests to identify cations and anions
Vocabulary	<ul style="list-style-type: none"> Hydrogen Carbon dioxide Oxygen Chlorine Moles 	<ul style="list-style-type: none"> Endothermic Exothermic Cation & anion Anode & cathode Electrolysis Reduction Oxidation Panic Half equation Ionic equation Neutralisation Dilute Concentrated 	<ul style="list-style-type: none"> Equilibrium Forward reaction Reverse reaction Average rate Instantaneous rate Tangent Gradient Reactant Product 	<ul style="list-style-type: none"> Extraction Blast furnace Electrolysis Ore Cryolite Bauxite Phytoextraction Bioleaching Low grade ore 	<ul style="list-style-type: none"> Effervescence Precipitate Alkanes Saturated hydrocarbon Unsaturated hydrocarbons Cracking Combustion Homologous series Oxidation 	<ul style="list-style-type: none"> Polymerization Make nylon using condensation reactions Reactions of carboxylic acids with metal, metal carbonate and alkali Potable water

		<ul style="list-style-type: none"> • Strong acid • Weak acid • Dissociation • Hydrogen ion • pH 			Condensation reaction	<ul style="list-style-type: none"> • Life cycle assessment • Green house gases • Climate change • Pollutants
Practical Skills	<ul style="list-style-type: none"> • Conservation of mass – making magnesium oxide and calcium carbonate with acid • Detecting gases – hydrogen, oxygen, chlorine and carbon dioxide. 	<ul style="list-style-type: none"> • Electrolysis of copper chloride solution • pH of acids • making salts such as copper sulfate and sodium chloride 	<ul style="list-style-type: none"> • Monitoring rates of reaction to investigate the effect to temperature, catalyst, concentration and surface area on the rate of reaction 	<ul style="list-style-type: none"> • Extracting copper from copper carbonate • Make observations 	<ul style="list-style-type: none"> • Use bromine water test to distinguish between alkanes and alkenes • when oxidation of alcohols is carried out and when they react with sodium 	<ul style="list-style-type: none"> • Precipitation reactions of cations and anions • Flame test for identification of cations