

Year 10: Separate Chemistry	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.					
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key ideas and sequence of learning	Module C3 - Chemical reactions - Formulae of compounds - Formulae of ionic compounds - Conservation of mass - Balancing equations - Half equations and ionic equations (H) - Moles - Concentration and moles	Module 3 - Chemical reactions - Endothermic and exothermic reactions - Reaction profiles - Bond energies (H) - Acid and alkali reactions - pH and neutralisation - reactions of acids - REDOX - Electrolysis reactions	Module 5: Monitoring and controlling chemical reactions. - reversible reactions - equilibrium - choosing reaction conditions Module 6: Global challenges - Extracting metals - Extracting iron - Extracting aluminium - Phytoextraction - Bioleaching	Module 6: Global challenges - Corrosion and prevention - Producing electricity - Alkanes and fractional distillation of crude oil - Cracking - Alcohols - Carboxylic acids	Students sit their EoY exams Students will review their PPE exam papers. Module 6: Global challenges - Alcohols - Carboxylic acids - Condensation polymers - Instrumental analysis - Testing anions and cations	C4- Predicting and Identifying reactants and products - Detecting gases Module 5: Monitoring and controlling chemical reactions. - Theoretical yield - Percentage yield - Atom economy - Making ethanol - Titration procedure - Titration calculations - Gas calculations

						Module C6 – Global Challenges • Haber process • Contact process • Fertilisers • Making fertilisers
Key Questions	1. How do you write the formulae of ionic compounds 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?	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	1. What is equilibrium? 2. How does temperature affect equilibrium position? 3. How does pressure affect equilibrium position? 4. How are metals extracted from ore using carbon? 5. How does electrolysis extract aluminium and what are its advantages and disadvantages? 6. What are the advantages and disadvantages of extracting metals with biological methods?	1. Describe what is Sacrificial protection 2. How is crude oil extracted using fractional distillation? 3. Why is cracking carried out? 4. What are some of the chemical and physical properties of alkanes & alkenes 5. Describe a fuel cell and explain how it generates electricity	1. properties of hydrocarbons and alcohols? 2. Can you draw structures and write equations for the formation of polyester and polyamides? 3. can you name and identify structures of monomers for a given polymer? 4. explain the importance of instrumental methods 5. can you analyse information from infra-red, mass spectrometry and gas	1. How do you calculate theoretical and % yield? 2. How do you calculate atom economy? 3. How must chemists consider yield and atom economy when designing processes? 4. Explain the two methods of producing ethanol – fermentation and hydration of ethene 5. Comparing the two methods of

		dilute and concentrated acids? 8. What is the difference between strong and weak acids? 9. How does the pH relate to the H⁺ concentration?			chromatography data to identify the molecules? 6. Can you describe tests to identify cations and anions	producing ethanol 6. How do you carry out a titration and record results? 7. How do you calculate an unknown concentration from titration results? 8. How do you use $V = 24n$ to calculate moles and volumes of gas? 9. What is the Haber process? 10. Explain the optimum conditions for the Haber process 11. Describe the contact process for making sulfuric acid
Vocabulary	Moles	- Endothermic - Exothermic - Cation & anion	- Equilibrium - Forward reaction - Reverse reaction	- Alkanes - Saturated hydrocarbon	Oxidation of alcohol	- Hydrogen - Carbon dioxide

		• Anode & cathode • Electrolysis • Reduction • Oxidation • Panic • Half equation • Ionic equation • Neutralisation • Dilute • Concentrated • Strong acid • Weak acid • Dissociation • Hydrogen ion • pH	• Reactant • Product • Extraction • Blast furnace • Electrolysis • Ore • Cryolite • Bauxite • Phytoextraction • Bioleaching • Low grade ore	• Unsaturated hydrocarbons • Cracking • Combustion • Homologous series	• Condensation reaction • Polymerisation • Make nylon using condensation reactions • Reactions of carboxylic acids with metal, metal carbonate and alkali	• Oxygen • Chlorine • Yield • Theoretical • Actual • Atom economy • Titration • Concordant • Burette • Pipette • Titre • Equilibrium • Shift • Pressure • Concentration • Fermentation • Hydration • Catalyst • Contact Process • Haber Process • Fuel cell • Anode • Cathode • Redox • Reduction • Oxidation
Practical Skills	• Conservation of mass – making magnesium oxide and calcium carbonate with acid • Detecting gases – hydrogen, oxygen,	• Electrolysis of copper chloride solution • pH of acids	• Making observations and predicting position of equilibrium • Extracting copper from copper carbonate	• Use bromine water test to distinguish between alkanes and alkenes	• when oxidation of alcohols is carried out and when they react with sodium	• Fermentation and distillation of ethanol • Titration – finding unknown

	chlorine and carbon dioxide.	making salts such as copper sulfate and sodium chloride	Make observations for REDOX reaction		- Precipitation reactions of cations and anions - Flame test for identification of cations	conc of solutions - Recording results and calculating suitable mean titres - Making salts, linking to C3 and to titration method
--	------------------------------	---	--	--	---	---