Chemistry Year 10 Curriculum Overview

	Autumn				Spring				
	Learning Cycle 1				Learning Cycle 2				
Topic	Quantitative	Rates	Chemical changes	Analysis Triple only	Energy Changes	Atmosphere	Haber Process Triple Only	Cells and Batteries Triple Only	Earth's
Critical Prior Knowledge	KS3: Atoms and elements, mixtures and solubility, Periodic Table Y9 Atomic structure and formulae	KS 3 particle Model Y9 Bonding Y10 Chemical changes and energy in reaction	KS3 Reactions of metals and acids Y9 Bonding	KS3: Mixtures and solubility,	Y9 Bonding Y10 Chemical changes and energy in reaction	KS3: Environmental Chemistry, Energy and rates	Reversible reactions. Energy in reactions Making salts	Electrolysis Ionic Bonding	KS3: Eart universe environ chemistr material
Overall Intent (Big ideas and key concepts)	The law of conservation of mass. Mole calculations including reacting mass. Calculating yield and atom economy in reactions.	The effect of temperature, concentration, pressure, surface area and catalysts on the rate of reaction. Measuring and interpreting the rate of reaction.	pH, ions and ionic equations, neutralisation, reactions of acids, strong and weak acids. Electrolysis of melts and solutions. Half equations. Oxidation and reduction. Applications of electrolysis.	Pure and impure substances. Formulations and their uses. Chromatography including Rf.	Exothermic and endothermic reactions. Energy level diagrams. Bond energy calculations.	Origin and composition of the Earth's early atmosphere compared with today's atmosphere. Understanding of the processes that led to changes in the composition of the early atmosphere, resulting in the present-day composition. The greenhouse effect and greenhouse gases. Climate change and the	How reaction conditions affect the yield of product in reversible reactions and apply this to the production of ammonia explaining why the idealised conditions are not used but a compromise reached. Explain the uses of ammonia and the production of fertilisers	Chemical reactions can be used to produce electricity, the voltage produced being dependent on several factors. Fuel cells use a chemical reaction to produce a potential difference.	Finite, in natural a synthetic resource water, w purificat waste w treatmer Lifecycle assessm 3R's.

						effects. Human influence and carbon footprint. Pollutants from fossil fuels, sulfur dioxide, carbon dioxide, carbon monoxide, nitrogen oxides and particulates. The impact of these on the environment and minimising their emissions.			
Essential Knowledge milestones (What students must master)	A fundamental part of chemistry to be able to calculate mass of substances required and formed in chemical reactions. Students will be introduced to moles. This will build on understanding of mass of atoms developed in atomic structure.	Students develop their understanding of the various variables that can be manipulated in order to speed up or slow them down chemical reactions. In industry, chemists and chemical engineers determine the effect of different variables on	Knowing about different chemical changes mean that scientists can predict exactly what new substances will be formed and this can be used to develop a range of different materials and processes. Students will build on previous understanding of reactions	Formulations make up many of the products used on daily basis. Understanding of these will be developed alongside and understanding of a range of analytical methods. Forensic scientists and drug control scientists rely on such methods in their work. This work brings together understanding	Energy changes are an important part of chemical reactions. The interaction of particles often involves transfers of energy due to the breaking and formation of bonds. This can produce heating or cooling effects that are used in a range of	Composition of Earth's early and present - day atmosphere. Understanding of the processes behind the evolution of the atmosphere. Students to appreciate the problems caused by increased levels of air pollutants. Understand the mechanics of greenhouse	Explain the raw materials needed to make ammonia and where they come from. Describe the ideal conditions needed to make ammonia and explain why they are not used in practice. Interpret graphs of reaction conditions versus rate.	Describe a simple cell can be made by connecting two different metals in contact with an electrolyte. The voltage produced depends on the type of electrode and electrolyte. A battery is two or more cells connected together in series. Rechargeable cells rely on a reaction	Students appreci industrie Earth's n resource manufac products to opera sustainal chemists minimise limited r use of en waste ar environn impact.

		reaction rate and yield of product.	involving acids and they will be introduced to electrolysis. In electrolysis students will draw on knowledge of ionic compounds developed in Y9.	from numerous previous topics including chromatography introduced in Y7	everyday applications.	effect, building on students understanding of the greenhouse effect and climate change from KS3	Apply principles of dynamic equilibrium to the Haber process. Describe the uses of ammonia to make nitric acid and ammonium slats. Describe the industrial production of NPK fertiliser from phosphate rock and acid.	which can be reversed when an external electric current is applied. Non rechargeable cells are based on a reaction which stops when all the reactant is used up and cannot be reversed. Fuel cell use a fuel which is oxidised within the cell to produce a potential difference. Hydrogen fuel cells produce water as a product.	
Cultural Capital	Moral Capital- Atom economy in industry Communication of Science ideas and concepts	Moral capital- Green chemistry and use of resources Communication of Science ideas and concepts	Moral capital- Green chemistry and use of resources Practical techniques, health and safety, development of fine motor and dexterity skills	Practical techniques, health and safety, development of fine motor and dexterity skills	Practical techniques, health and safety, development of fine motor and dexterity skills	Cultural capital- Causes of global warming and the effects of different countries on global emissions	Haber process and Le Chatalier's principles	Moral capital- Green chemistry and use of resources	Moral ca Green ch and use resource Commur Science i concepts
Assessment Points	Regular Afl embedded into lessons. <u>Knowledge assessments</u> Quantitative Chem, Rates of Reaction, Chemical changes			Regular Afl embedded into lessons. <u>Knowledge assessments</u>	Regular Afl embedded into lessons. <u>Knowledge assessments</u>		Regular Afl embedded into lessons. <u>Knowledge assessments</u> Haber process, Cells and Batteries		Regular A <u>Knowled</u> Earth's r

	Term 1 – Progress Assessment			Quantitative, Analysis Term 1 – Progress Assessment	Energy changes, Earth's atmosphere Term 2– Progress Assessment		Term 2 – Progress Assessment		Term 3 –
ECC Student Characteristics	Through these units we will encourage students to work hard and be **resilient individuals** who **embrace challenge** and through their **creativity** and endeavours become build on these ideas as they are interleaved through other units later in the course.								
Connection to future learning (When is this developed / revisited)?	Further calculations, rates of reaction, industrial processes	Reversible reactions and dynamic equilibrium, The Haber process	Using materials, Chemical cells and fuel cells	Testing for positive and negative ions	Rate of reaction, reversible reactions and equilibrium, the Haber process and use of NPK fertilisers	Earth's resources and water.	Earth's resources	Earth's resources Using materials	