Curriculum Rationale and Overview

Subject: Chemistry **Year group: 11**

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
National Curriculum context	Carbon compounds, both as fuels and feedstock, and the competing demands for limited resources. Fractional distillation of crude oil and cracking to make more useful materials.	Evidence for composition and evolution of the Earth's atmosphere since its formation. Evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change. Potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate. Common atmospheric pollutants: sulphur dioxide, oxides of nitrogen, particulates and their sources.	Life cycle assessment and recycling to assess environmental impacts associated with all the stages of a product's life. The viability of recycling of certain materials. The Earth's water resources and obtaining potable water.			
Scheme of Learning Title:	Organic Chemistry	Chemistry of the Atmosphere	Using Resources			
Content *What will students know?*	What crude oil is. General formula for alkanes and the names of the first 4. What cracking is. The general properties of hydrocarbons. The uses of hydrocarbons. TRIPLE:	The composition of gases in the atmosphere. The names of some greenhouse gases. Some human activities that increase greenhouse gases in the atmosphere.	What resources humans use and what for. The importance of water quality for human life. The difference between potable water and pure water. HT: alternative methods of extracting metals i.e. phytomining and bioleaching. TRIPLE:			

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	The functional groups of alkenes, alcohols, carboxylic acids and esters. How alkenes react with water, hydrogen and halogens. How alcohols react with water, sodium, oxidation and uses. Uses of polymers and their properties.	The effects of climate change. How some actions can reduce carbon footprint.	Ways to prevent corrosion. The names of salts produced when phosphate rocks are treated with nitric, sulphuric and phosphoric acids. What NPK fertilisers are composed of and how they are prepared.	[redacted]
What will students understand?	How crude oil is formed and extracted. How properties change as the length of hydrocarbons change. Why cracking is used. TRIPLE: How alkenes can be used to produce polymers	How the atmosphere has changed over time due to volcanic activity, formation of oceans and algae. How greenhouse gases increase the Earth's temperature. The effects of carbon monoxide, sulphur dioxide and particulates in the atmosphere.	The difference between finite and renewable resources. What sustainable development is and what Chemistry's role is in sustaining agricultural and industrial processes. How to reduce use of raw materials. TRIPLE: The properties and uses of alloys.	
What will students be able to do?	Describe the process of fractional distillation. Predict properties of hydrocarbons. Write balanced equations for combustion of fuels. Write balanced equation for cracking. TRIPLE: Draw structural formulae of alkenes.	Evaluate the idea that human activity causes a rise in temperature resulting in global warming. Predict properties of combustions of fuels.	Describe methods to produce potable water, including desalination. Describe the process of waste water treatment. Carry out and interpret LCAs of materials or products. Analyse and purify water samples including pH, dissolved solids and distillation. TRIPLE: Compare the properties of glass, clay ceramics, polymer and composites.	

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			Compare the properties of thermosoftening and thermosetting polymers. Describe the Haber process and interpret graphs	[redacted]
How will they be formally assessed?	End of Topic Test: Describe the method to extract useful substances from crude oil.	End of Topic Test: Describe the effects of climate change.	End of Topic Test: Describe methods to produce potable water from freshwater, salt water and wastewater.	