

CC16: **Fuels** (Paper 2)CC17: **Earth and Atmospheric Science** (Paper 2)

Lesson	Objectives Tracker Sheet	Date covered	I know this well	I need to do more work on this
CC16a Hydrocarbons in crude oil and natural gas	C8.1 Recall that hydrocarbons are compounds that contain carbon and hydrogen only.			
	C8.2 Describe crude oil as: a complex mixture of hydrocarbons containing molecules in which carbon atoms are in chains or rings (names, formulae and structures of specific ring molecules not required) an important source of useful substances (fuels and feedstock for the petrochemical industry) a finite resource.			
	C8.15 Recall that petrol, kerosene and diesel oil are non-renewable fossil fuels obtained from crude oil and methane is a non-renewable fossil fuel found in natural gas.			
CC16b Fractional distillation of crude oil	C8.3 Describe and explain the separation of crude oil into simpler, more useful mixtures by the process of fractional distillation.			
	C8.4 Recall the names and uses of the following fractions: gases, used in domestic heating and cooking petrol, used as fuel for cars kerosene, used as fuel for aircraft diesel oil, used as fuel for some cars and trains fuel oil, used as fuel for large ships and in some power stations bitumen, used to surface roads and roofs.			
	C8.5 Explain how hydrocarbons in different fractions differ from each other in: the number of carbon and hydrogen atoms their molecules contain boiling points ease of ignition viscosity			
CC16c The alkane homologous series	C8.5 Explain how hydrocarbons in different fractions [...] are mostly members of the alkane homologous series.			
	C8.6 Explain an homologous series as a series of compounds which: have the same general formula			

	differ by CH ₂ in molecular formulae from neighbouring compounds show a gradual variation in physical properties, as exemplified by their boiling points have similar chemical properties.			
CC16d Complete and incomplete combustion	C8.7 Describe the complete combustion of hydrocarbon fuels as a reaction in which: carbon dioxide and water are produced energy is given out.			
	C8.8 Explain why the incomplete combustion of hydrocarbons can produce carbon and carbon monoxide.			
	C8.9 Explain how carbon monoxide behaves as a toxic gas.			
	C8.10 Describe the problems caused by incomplete combustion producing carbon monoxide and soot in appliances that use carbon compounds as fuels.			
CC16e Combustible fuels and pollution	C8.11 Explain how impurities in some hydrocarbon fuels result in the production of sulfur dioxide.			
	C8.12 Explain some problems associated with acid rain caused when sulfur dioxide dissolves in rain water.			
	C8.13 Explain why, when fuels are burned in engines, oxygen and nitrogen can react together at high temperatures to produce oxides of nitrogen, which are pollutants.			
CC16f Breaking down hydrocarbons	C8.14 Evaluate the advantages and disadvantages of using hydrogen, rather than petrol, as a fuel in cars.			
	C8.16 Explain how cracking involves the breaking down of larger, saturated hydrocarbon molecules (alkanes) into smaller, more useful ones, some of which are unsaturated (alkenes).			
	C8.17 Explain why cracking is necessary.			
CC17a The early atmosphere	C8.18 Recall that the gases produced by volcanic activity formed the Earth's early atmosphere.			
	C8.19 Describe that the Earth's early atmosphere was thought to contain: little or no oxygen			

	a large amount of carbon dioxide water vapour small amounts of other gases and interpret evidence relating to this.			
	C8.20 Explain how condensation of water vapour formed oceans.			
CC17b The changing atmosphere	C8.21 Explain how the amount of carbon dioxide in the atmosphere was decreased when carbon dioxide dissolved as the oceans formed.			
	C8.22 Explain how the growth of primitive plants used carbon dioxide and released oxygen by photosynthesis and consequently the amount of oxygen in the atmosphere gradually increased.			
	C8.23 Describe the chemical test for oxygen.			
CC17c The atmosphere today	C8.24 Describe how various gases in the atmosphere, including carbon dioxide, methane and water vapour, absorb heat radiated from the Earth, subsequently releasing energy which keeps the Earth warm: this is known as the greenhouse effect.			
	C8.25 Evaluate the evidence for human activity causing climate change, considering: the correlation between the change in atmospheric carbon dioxide concentration, the consumption of fossil fuels and temperature change the uncertainties caused by the location where these measurements are taken and historical accuracy			
CC17d Climate change	C8.26 Describe: the potential effects on the climate of increased levels of carbon dioxide and methane generated by human activity, including burning fossil fuels and livestock farming that these effects may be mitigated: consider scale, risk and environmental implications.			