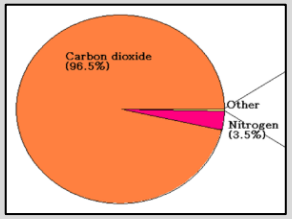
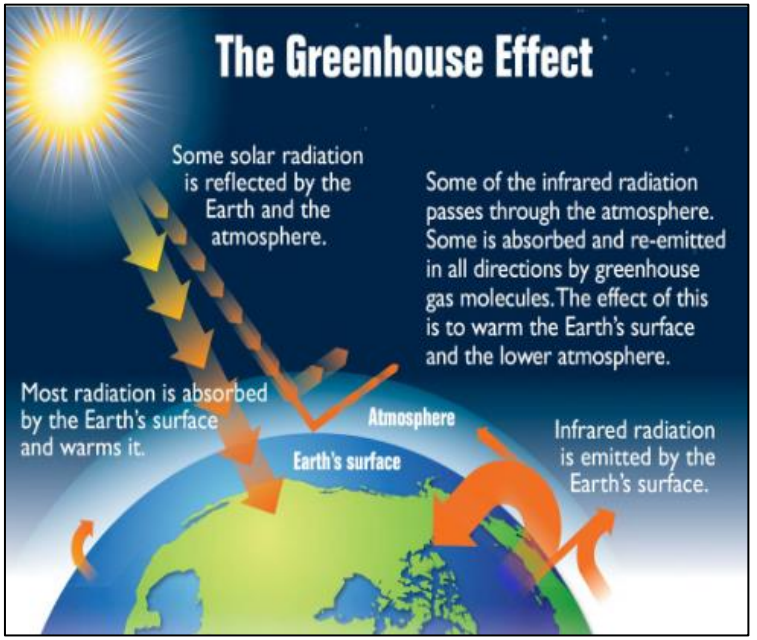
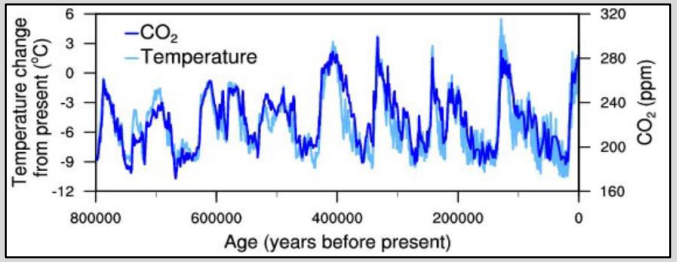
1	The Earths atmosphere today is made up mainly of : —> approx. 78% nitrogen —> approx. 21% oxygen —> with tiny amounts of other gases like carbon dioxide and water vapour
2	The Earth's Early atmosphere (billions of years ago) contained: —> little or no oxygen —> a large amount of carbon dioxide —> water vapour and small amounts of other gases 
3	Evidence for the composition of the Early atmosphere comes from: 1. the mixture of gases released by volcanoes today. 2. The atmospheres of other planets in the solar system which have not been changed by living organisms.
4	The concentration of carbon dioxide in the Early Atmosphere began to decrease when: 1. The Earth cooled, this meant that water vapour in the atmosphere condensed into liquid water and the oceans were formed and carbon dioxide dissolves in the oceans. 2. Marine organisms evolved and used the dissolved carbon dioxide to make calcium carbonate shells. 3. The shells of the dead organisms fall to the sea bed and become part of the sediment. 4. Over millions of years layers of sediment are squashed and form sedimentary rocks.
5	Oxygen levels increased over time in the atmosphere as plant life evolved and oxygen was produced as a product of photosynthesis.

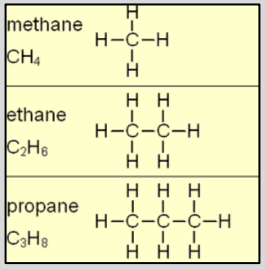
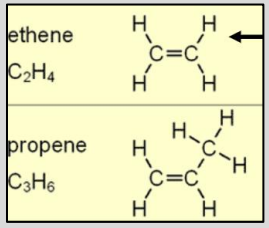
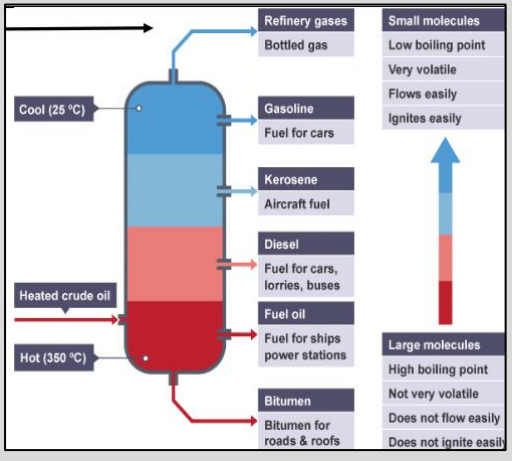
6	Evidence for a lack of oxygen in the early atmosphere comes from rocks. Early specimens do not contain iron oxides whereas later specimens do as they reacted with the oxygen in the atmosphere.
7	The positive test for oxygen is that it relights a glowing splint.
8	The greenhouse effect helps to keep Earth warm enough for living organisms to exist
9	The greenhouse effect occurs when: —>Greenhouse gases in the atmosphere absorb heat radiated from the Earth. —>The greenhouse gases then release energy in all directions.
10	Examples of greenhouse gases: 1. Carbon dioxide (CO_2) - burning fossil fuels 2. Methane (CH_4) - livestock farming, paddy fields 3. Water vapour—evaporation from oceans.



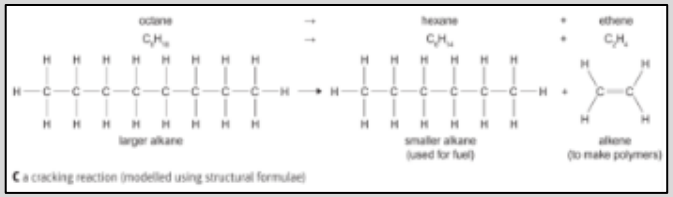
1	Global warming is the increase in the Earths average temperature. It is associated with the increased accumulation of greenhouse gases in the atmosphere due to human activity.
2	Climate change is the long term changes to the Earth's weather patterns. It is associated with global warming. Impact of climate change include : —> melting ice caps and rising sea levels —> an increased number of extreme weather event like droughts, heavy rainfall and flooding and powerful storms —> An increased number of animal extinctions —> coral bleaching in oceans.
3	To limit the impact of global warming and climate change strategies include: 1. Using renewable energy resources Eg. Wind turbines and hydroelectric power 2.help local communities adapt to new conditions. Eg, build flood defences, irrigation systems etc.
4	Correlation—is a term used to describe a link between 2 factors.
5	There is a strong correlation between rising carbon dioxide levels and average global temperatures (see image below) 
6	Causal link— this describes when a cause and effect are linked
7	A correlation does not always mean that there is a causal link that one thing causes the other) scientists must collect evidence and explain how and why the correlation occurs

Knowledge Organiser: Chemistry, Fuels and Earth Science Part C

Jesus grew in wisdom and stature" Luke 2:52

1	Crude oil is a fossil fuel formed over millions of years from the ancient remains of marine organisms. Heat and pressure are 2 conditions needed for it to form.
2	Hydrocarbons are compounds made up of hydrogen atoms and carbon atoms only.
3	Crude oil is made up of a mixture of hydrocarbons and is said to be a finite resource as it is being made extremely slowly and takes millions of years to form.
4	A homologous series is a series of compounds in which: 1. The molecular formulae of neighbouring members differs by CH2 2. That shows a gradual variation in physical properties such as boiling points 3. Have similar chemical properties.
5	The alkanes and alkenes are examples of homologous series
6	The alkanes are saturated hydrocarbons (only contain single C-C bonds). 
7	Alkanes have the general formula CnH2n+2
8	Shorter alkanes are often used as fuels. E.g. methane for cooking
9	The alkenes are unsaturated hydrocarbons (contain a double bond) 
10	Alkenes have the general formula CnH2
11	Alkenes are often used to make polymers (plastics)
12	Fractional distillation is a process used to separate crude oil. It works because different hydrocarbons have different boiling points. The longer the hydrocarbon the higher its boiling point.
13	During fractional distillation: 1. oil is heated to evaporate it 2. vapours rise in the fractionating column 3. the column has a temperature gradient (it is hotter at the bottom and cooler at the top) 4. Each fraction condenses (turns back into a liquid) when it becomes cool enough and is piped out of the column. 5. the gases fraction does not condense and comes leaves at the top. 6. The bitumen fraction does not evaporate and leaves at the bottom. 

15	A fraction is a mixture of hydrocarbons with similar boiling points and similar numbers of carbon atoms. There are trends in the properties of different fractions: —. Short hydrocarbon chains—lower boiling points, most flammable, lest viscous —Long hydrocarbon chains—higher boiling points, least flammable, most viscous.
16	Combustion is another word for burning. There are 2 types of combustion, Complete and Incomplete combustion
17	Complete combustion occurs when there is plentiful supply of oxygen. Energy is given out to the surroundings and the waste products water and carbon dioxide are produced. Eg Methane + Oxygen —> carbon dioxide + water CH4(g) + 2O2(g) —> CO2 (g) + 2H2O (g)
18	Incomplete combustion occurs when there is not enough oxygen present for complete combustion. Less energy is given out and instead of carbon dioxide, carbon monoxide or carbon (soot) may form.
19	Carbon monoxide is toxic gas as it attaches to haemoglobin in the red blood cells preventing oxygen from attaching instead. This reduces the amount of oxygen that can be carried by the blood stream so less gets to respiring cells.
20	Hydrocarbon fuels sometimes contain impurities such as sulphur compounds. When these fuels are burnt sulphur dioxide forms. This dissolves in rainwater to form acid rain.
21	Problems associated with acid rain can be reduced by:: 1.Removing sulphur from petrol and diesel at oil refineries, 2. Preventing sulphur dioxide leaving power station chimneys 'flue gas desulphurisation' 3. Adding calcium hydroxide to fields and lakes to neutralise excess acid from acid rain.
22	Hydrogen can be used as a fuel and its combustion only produce water vapour as a waste product. Word equation : Hydrogen + oxygen —> water.

23	Cracking is the process of breaking down long chain alkanes into smaller, more useful alkanes and alkenes.  a cracking reaction (modelled using structural formulae)
24	Liquid paraffin is an alkane that can be cracked in a lab. 1. The porous pot catalyst is heated strongly 2. 2. The liquid paraffin is heated and evaporates. 3. 3. The paraffin vapour passes over the hot porous pot and the hydrocarbon molecules break down. 4. 4. One of the products is ethene which is a gas and collects in the other tube