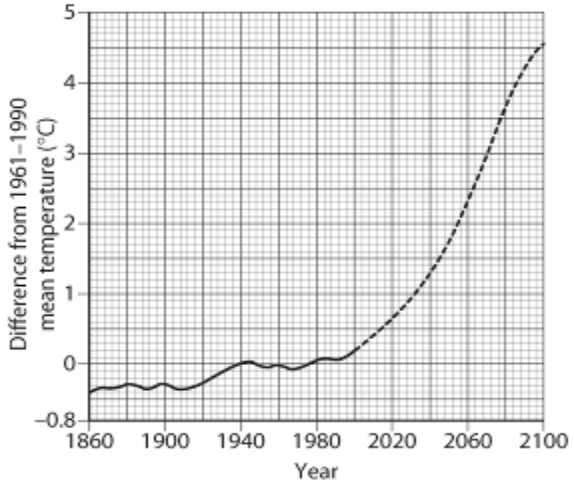
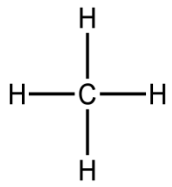
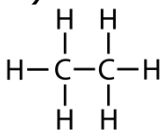
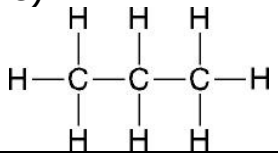
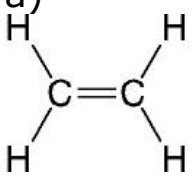
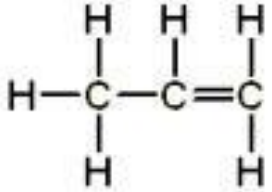
5.1 5.2 5.3	a) Give a definition for a hydrocarbon (2) b) Describe what crude oil is made up of (it's composition) (1) a) Name the process used to separate crude oil into useful chemicals (1) b) Explain how fractional distillation works (3)	a) **Compound** (1) made from hydrogen and carbon **atoms** only (1) b) **Mixture** of **hydrocarbon molecules** a) **Fractional distillation (1)** b) Heat crude oil to **evaporate** the oil(1), then cool to **condense** (1) separating chemicals depending on their **boiling points** (1)
5.4	a) Name the 6 main fractions of crude oil and say what they are used for (6)	1. **Gases**, used in domestic heating and cooking (1) 2. **Petrol**, used as fuel for cars (1) 3. **Kerosene**, used as fuel for aircraft (1) 4. **Diesel oil**, used as fuel for some cars and trains (1) 5. **Fuel oil**, used as fuel for large ships and in some power stations 6. **Bitumen**, used to surface roads and roofs (1)
5.5	Describe how hydrocarbon molecule size effects the: a) boiling point (1) b) ease of ignition (1) c) viscosity (1)	a) Larger molecules have higher **boiling points** (1) b) Smaller molecules are more **flammable** (burn more easily) (1 c) Larger molecules are more **viscous** (sticky/ hard to pour)
5.6	a) Name the two products formed in the complete combustion of a hydrocarbon. (2) b) Explain why combustion is an example of an oxidation reaction(1) c) Why are combustion reactions useful? (1)	a) **Carbon dioxide** (1) & **water** (1) b) hydrogen and carbon <u>gain oxygen</u> (1) c) They release heat energy (1
5.7 5.8	• Describe the chemical test for carbon dioxide a) Name two products formed in the incomplete combustion of hydrocarbons b) Explain why carbon monoxide and carbon are formed in the incomplete combustion of hydrocarbons	• Bubble the gas through **lime water** (1)/ it goes cloudy (1) **a) carbon monoxide** (1)/ carbon (1) b) Lack of **oxygen** (1) **hydrocarbon** can't be fully **oxidised**

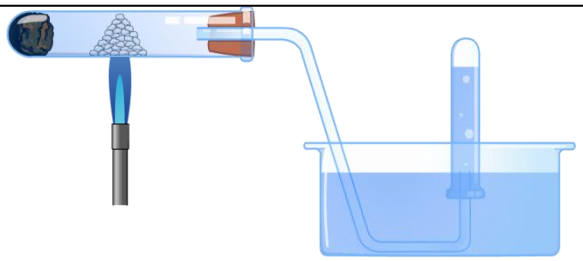
5.9 5.10	• Name a problem caused by carbon monoxide gas (1) • I can describe two problems caused by incomplete combustion of hydrocarbons in appliances (2)	• **Toxic**/ takes place of oxygen in your blood/ can kill you (1) • **Carbon monoxide** is a poison (1)/ Carbon or soot makes buildings dirty and causes **global dimming** (1)
5.11 5.12	a) I can name the impurity in hydrocarbon fuels that causes acid rain (1) b) I can name the main gas that causes acid rain (1) *Bonus write a word equation* • I can describe some of the effects of acid rain (1)	a) Sulfur (1) b) **Sulfur dioxide** (1) *sulphur* *+ → sulphur dioxide* *oxygen* • Destroys trees, kills fish and **corrodes** buildings
5.13 5.14	a) Name 3 gases that cause global warming (3) b) I can explain how theses gases cause global warming c) I can describe how human activities cause gases in the Earths atmosphere to vary	a) **Carbon dioxide/ Methane/ water vapour** (3) b) **Green house** gases trap suns energy in the **atmosphere**/ keeping Earth warmer • Burning **fossil fuels** / cutting down trees
5.15 5.16	• Name two methods scientists are using to try and reduce the level carbon dioxide in the atmosphere today • Use the graph below to help evaluate how far the correlation between global temperature and the proportion of carbon dioxide in the atmosphere provides evidence for climate change  	• Iron seeding of oceans (1)/ converting **carbon dioxide** into **hydrocarbons** (1) *(Iron increases photosynthesis in plants in the oceans, taking in carbon dioxide)* • **Carbon dioxide** levels have increased in the last 100 years, so has the average temperature on Earth. There is a **correlation** between increased carbon dioxide levels and increased temperature

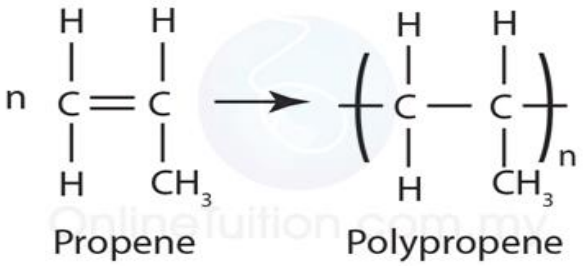
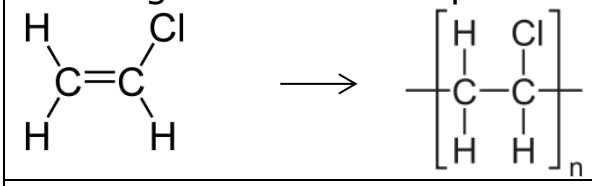
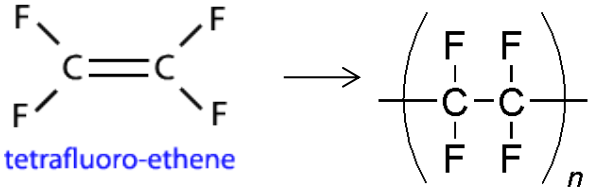
5.17 5.18	• Name some possible alternatives to fossil fuels a) Describe how the ethanol is made b) Explain why alternative biofuels are important	• **ethanol/ biodiesel** / **hydrogen** (1) a) From **fermentation** of sugar beet. (1) b) Reduces demand for petrol
5.19	• Evaluate the advantages and disadvantages of replacing fossil fuels with biofuels. (4)	a) Advantages: **Biofuels** are **renewable** (1)/ plants take in **carbon dioxide** when grown, this is released when fuel burned (1) (**carbon neutral**). Disadvantages: Growing crops takes up land(1) so less land for growing food, food prices could increase (1)
5.20	• Explain the properties that make a good fuel (4)	a) How **flammable**- The more easily it burns the better. (1) b) Amount of smoke produced- less smoke is better (1) c) Heat energy released- more heat make a better (1) d) How easy it is to transport- the easier the better. Liquids are better for cars (1)
5.21 5.22	a) Write the word equation to show the reaction that takes place in a hydrogen fuel cell. b) Bonus mark write the balanced symbol equation a) I can identify advantages of using the hydrogen fuel cell in cars instead of petrol. b) I can identify disadvantages of using the hydrogen fuel cell in cars instead of petrol.	a) Hydrogen + Oxygen → water (1) b) $2H_2 + O_2 \rightarrow 2H_2O$ (1) a) Only waste product is water/ Can be made from **renewable** water using **electrolysis** b) Difficult to store gases as they take more space/ can be made from **non-renewable** oil this releases **carbon dioxide**
5.23	a) Name 3 non-renewable fossil fuels found in crude oil (3) b) Name a non-renewable fossil fuel found in natural gas (1)	a) petrol (1) kerosene (1) and diesel oil (1) b) Methane (1)

<table>
<tr>
<td>5.24</td>
<td>a) Identify variables to control when carrying out a test to compare the heat released by burning different fuels
b) Interpret the results below showing temperature from this experiment to identify the best fuel. Explain how you know (2)
<table>
<tr><td>Fuel</td><td>Temperature rise °C</td></tr>
<tr><td>A</td><td>22</td></tr>
<tr><td>B</td><td>34</td></tr>
<tr><td>C</td><td>12</td></tr>
<tr><td>D</td><td>55</td></tr>
</table>
</td>
<td>a) Same volume of water to be heated/ same mass of fuel/ fuel is same distance from the water/ water is heated in the same size tube or beaker
b) Fuel D is the best fuel (1) Biggest temperature increase(1)</td>
</tr>
<tr>
<td>5.25

5.27

5.29</td>
<td>• I can described why alk<u>a</u>nes are described as saturated hydrocarbons
• I can described why alk<u>e</u>nes are described as unsaturated hydrocarbons
• I can describe a test to tell if a chemical is an alkane or an alkene</td>
<td>• Molecules made from hydrogen and carbon atoms that only contain single bonds between atoms
• Molecules made from hydrogen and carbon atoms that contain a double bond between two carbon atoms (the bonds between atoms in hydrocarbon molecules are covalent bonds)
• Add brown bromine water/ alk<u>e</u>nes decolourise the water. (In alk<u>a</u>nes the bromine water stays brown)</td>
</tr>
<tr>
<td>5.26</td>
<td>Draw diagrams to represent the alkanes:
a) Methane CH_4
b) Ethane C_2H_6
c) Propane C_3H_8
d) Recall the general formula for an alkane</td>
<td>a)
 
b)
 
c)
 
d) C_nH_{2n+2}</td>
</tr>
<tr>
<td>5.28</td>
<td>Draw diagrams to represent the alkenes:
a) Ethene C_2H_4
b) Propene C_3H_6
c) Recall the general formula for an alkene</td>
<td>a)
 
b)
 
C_nH_{2n}</td>
</tr>
</table>

5.30 5.31	• What happens to hydrocarbons during cracking? (2) • Explain why cracking is necessary, refer to demand for different hydrocarbons and their uses(4)	• Large **hydrocarbons** are broken into smaller **alkanes** (1) and **alkenes** (1) • **Large hydrocarbon alkanes** are poor **fuels** (1)/ and are in less demand (1)/ **Smaller hydrocarbon alkanes** are in high demand (1)/ as they are better fuels (1)/ **Alkenes** are used to make plastics (1)
5.32	• Describe how to crack liquid paraffin in the laboratory. Draw a diagram if it helps (2)	Liquid paraffin is heated so it **evaporates** (1) & breaks into smaller **molecules** that are gases. Gases are collected under water. (1) 
5.33	a) What is a monomer? (1) b) What is a polymer? (1) c) What happens in a polymerisation reaction? (3) d) Name the polymer formed from the monomer ethene (1	a) An **alkene/ unsaturated hydrocarbon** b) A long chain molecule made from a repeating structure c) The **double bond** in the **monomer** opens up (1) and many **monomer molecules** join together (1)to from a large **polymer molecule** (1 **d) Poly(ethene)**
5.35	a) I can recall a use for poly(ethene) and name properties that make it suitable for the job b) I can recall a use for poly(chloroethene) or PVC and name properties that make it suitable for the job c) I can recall a use for PTFE and name properties that make it suitable for the job	a) Plastic bags/ plastics bottles/ cling film/ insulation for electrical wires (1) Flexible/cheap / good insulator (1) b) Window frames/ pipes/ insulation for electrical wires (1) Tough/ cheap/ good insulator (1) c) Non stick coatings/ Containers for **corrosive** chemicals (1) Tough/ slippery/ **resistant to corrosion** (1)
5.36	a) I can define the term **biodegradable** (1) b) I can recall three ways of disposing of plastics (2)	a) Material breaks down overtime (1) b) Burry in land fill (1) burn (1) recycle (1)

5.34	a) Name the polymer formed from propene (1) and draw the repeat unit after seeing the starting molecule (1) b) Name the polymer formed from chloroethene (1) and draw the repeat unit after seeing the starting molecule (1) c) Name the polymer formed from tetrafluoroethene (1) after seeing the starting molecule (1)	a) Poly(propene) Starting molecule Repeat unit  Propene Polypropene b) Poly(chloroethene) Starting molecule Repeat unit  c) Poly(tetrafluoroethene) or PTFE Starting molecule Repeat unit  tetrafluoro-ethene
5.37	a) Identify and evaluate the advantages and disadvantages of recycling plastic b) Identify and evaluate the advantages and disadvantages of burning plastic c) Identify and evaluate the advantages and disadvantages of making biodegradable plastic	a) Advantages: Less waste goes to land fill/ Conserves raw materials/ less energy is used/ Less carbon dioxide gas given off Disadvantages: Expensive to sort out plastics from other waste b) Advantages: Less waste goes to land fill/ Releases heat energy (1)/ used to generate electricity (1) Disadvantage: Could release harmful gases c) Advantage: Breaks down into harmless chemicals in the ground/ reduces waste going to landfill Disadvantages: More expensive to make