

## CHEMISTRY

Learning objectives I can:	I can do this very well	I can do this quite well	I need to do more work on this
<b>5.1</b> Describe hydrocarbons as compounds that contain carbon and hydrogen only			
<b>5.2</b> Describe crude oil as a complex mixture of hydrocarbons			
<b>HSW 13</b> Describe the social, economic and environmental effects of decisions about the uses of science and technology			
<b>5.3</b> Describe the separation of crude oil into simpler, more useful mixtures by the process of fractional distillation (details of fractional distillation are not required)			
<b>5.4</b> Recall the name and uses of the following fractions:			
<b>a</b> gases, used in domestic heating and cooking			
<b>b</b> petrol, used as a fuel for cars			
<b>c</b> kerosene, used as a fuel for aircraft			
<b>d</b> diesel oil, used as fuel for some cars and trains			
<b>e</b> fuel oil, used as fuel for large ships and in some power stations			
<b>f</b> bitumen, used to surface roads and roofs			
<b>5.5</b> Describe that hydrocarbons in different fractions differ from each other in:			
<b>a</b> the number of carbon and hydrogen atoms their molecules contain			
<b>b</b> boiling points			
<b>c</b> ease of ignition			
<b>d</b> viscosity			
<b>HSW 4</b> Identify questions that science cannot currently answer, and explain why these questions cannot be answered			
<b>5.6</b> Describe how the complete combustion of hydrocarbons:			
<b>a</b> involves oxidation of the hydrocarbons			
<b>b</b> produces carbon dioxide and water			
<b>c</b> gives out energy			
<b>5.7</b> Describe the chemical test for carbon dioxide (using limewater)			
<b>HSW 1</b> Explain how scientific data is collected and analysed			
<b>5.8</b> Explain why the incomplete combustion of hydrocarbons can produce carbon and carbon monoxide			
<b>5.9</b> Describe how carbon monoxide behaves as a toxic gas			
<b>5.10</b> Demonstrate an understanding of the problems caused by incomplete combustion producing carbon monoxide and soot in appliances that use carbon compounds as fuels			
<b>HSW 11</b> Present information, develop an argument and draw a conclusion, using scientific, technical and mathematical language, and ICT tools			
<b>5.11</b> Explain why impurities in some hydrocarbon fuels result in the production of sulfur dioxide			
<b>5.12</b> Demonstrate an understanding of some problems associated with acid rain caused when sulfur dioxide dissolves in rain water			

# C1 Topic 5 Revision tracker

<b>HSW 13</b> Explain how and why decisions that raise ethical issues about uses of science and technology are made			
<b>5.13</b> Describe how various gases in the atmosphere, including carbon dioxide, methane and water vapour, trap heat from the Sun and that this keeps the Earth warm			
<b>5.14</b> Demonstrate an understanding that the Earth's temperature varies and that human activity may influence this			
<b>5.15</b> Demonstrate an understanding that the proportion of carbon dioxide in the atmosphere varies, due to human activity, and that chemists are investigating methods to control the amount of the gas in the atmosphere by: a iron seeding of oceans b converting carbon dioxide into hydrocarbons			
<b>5.16</b> Evaluate how far the correlation between global temperature and the proportion of carbon dioxide in the atmosphere provides evidence for climate change			
<b>HSW 14</b> Describe how scientists share data and discuss new ideas, and how over time this process helps to reduce uncertainties and revise scientific theories			
<b>5.17</b> Describe biofuels as being possible alternatives to fossil fuels			
<b>5.18</b> Recall that one example of a biofuel is ethanol obtained by processing sugar cane or sugar beet and that it can be used to reduce the demand for petrol			
<b>5.19</b> Evaluate the advantages and disadvantages of replacing fossil fuels with biofuels, including: a the fact that biofuels are renewable b that growing the crops to make biofuels requires land and may affect the availability of land for growing food c the balance between the carbon dioxide removed from the atmosphere as these crops grow and the carbon dioxide produced when they are transported and burned			
<b>HSW 13</b> Describe the social, economic and environmental effects of decisions about the uses of science and technology			
<b>5.20</b> Demonstrate an understanding of the factors that make a good fuel, including: a how easily it burns b the amount of ash or smoke it produces c the comparative amount of heat energy it produces (calculations involving conversion to joules are not required) d how easy it is to store and transport			
<b>5.21</b> Recall that a simple fuel cell combines hydrogen and oxygen to form water and that this reaction releases energy			
<b>5.22</b> Evaluate the advantages and disadvantages of using hydrogen, rather than petrol, as a fuel in cars			
<b>5.23</b> Describe petrol, kerosene and diesel oil as non-renewable fossil fuels obtained from crude oil and methane as a non-renewable fossil fuel found in natural gas			
<b>HSW 13</b> Explain how and why decisions that raise ethical issues about uses of science and technology are made			
<b>5.24</b> Compare the temperature rise produced when the same volume of water is heated by different fuels			
<b>5.25</b> Recall that alkanes are saturated hydrocarbons, which are present in crude oil			
<b>5.26</b> Recall the formulae of the alkanes methane, ethane and propane, and draw the structures of these molecules to show how the atoms are bonded together (no further knowledge of bonding is required in this unit)			
<b>5.27</b> Recall that alkenes are unsaturated hydrocarbons			
<b>5.28</b> Recall the formulae of the alkenes ethene and propene and draw the structures of their molecules to show how the atoms are bonded together (no further knowledge of bonding is required in this unit)			

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<b>5.29</b> Describe how bromine water is used to distinguish between alkanes and alkenes			
<b>HSW 11</b> Present information using scientific conventions and symbols			
<b>5.30</b> Describe how cracking involves the breaking down of larger saturated hydrocarbon molecules (alkanes) into smaller, more useful ones, some of which are unsaturated (alkenes)			
<b>H 5.31</b> Explain why cracking is necessary, including by using data on the composition of different crude oils and the demand for fractions in crude oil			
<b>5.32</b> Describe the cracking of liquid paraffin in the laboratory			
<b>HSW 3</b> Describe how phenomena are explained using scientific models			
<b>5.33</b> Recall that: <b>a</b> many ethene molecules can combine together in a polymerisation reaction			
<b>b</b> the polymer formed is called poly(ethene) (conditions and mechanisms not required but <b>H</b> equations required)			
<b>5.34</b> Describe how other polymers can be made by combining together other monomer molecules, to include poly(propene), poly(chloroethene) (PVC) and PTFE			
<b>5.35</b> Relate uses of the polymers poly(ethene), poly(propene), poly(chloroethene) (PVC) and PTFE to the properties of the compounds			
<b>HSW 11</b> Presenting information using scientific conventions and symbols			
<b>5.36</b> Recall that most polymers are not biodegradable, persist in landfill sites and that many produce toxic products when burnt			
<b>5.37</b> Explain how some problems associated with the disposal of polymers can be overcome: <b>a</b> by recycling			
<b>b</b> by developing biodegradable polymers			
<b>HSW 13</b> Describe the social, economic and environmental effects of decisions about the uses of science and technology			