

Chemistry 2		Foundation	
Red 	Amber 	Green 	
<b>8. Rates &amp; Equilibrium</b>	Calculate the rate of a chemical reaction over time, using either the quantity of reactant used or the quantity of product formed, measured in g/s, cm <sup>3</sup> /s or mol/s		
	Draw and interpret graphs showing the quantity of product formed or reactant used up against time and use the tangent to the graph as a measure of the rate of reaction		
	Describe how different factors affect the rate of a chemical reaction, including the concentration, pressure, surface area, temperature and presence of catalysts		
	<i>Required practical: investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced, change in colour or turbidity</i>		
	Use collision theory to explain changes in the rate of reaction, including discussing activation energy		
	Describe the role of a catalyst in a chemical reaction and state that enzymes are catalysts in biological systems		
	Draw and interpret reaction profiles for catalysed reactions		
	Explain what a reversible reaction is, including how the direction can be changed and represent it using symbols: $A + B \rightleftharpoons C + D$		
	Explain that, for reversible reactions, if a reaction is endothermic in one direction, it is exothermic in the other direction		
	Describe the State of dynamic equilibrium of a reaction as the point when the forward and reverse reactions occur at exactly the same rate		
<b>9. Crude Oil &amp; Fuels</b>	Describe what crude oil is and where it comes from, including the basic composition of crude oil and the general chemical formula for the alkanes		
	State the names of the first four members of the alkanes and recognise substances as alkanes from their formulae		
	Describe the process of fractional distillation, state the names and uses of fuels that are produced from crude oil by fractional distillation		
	Describe trends in the properties of hydrocarbons, including boiling point, viscosity and flammability and explain how their properties influence how they are used as fuels		
	Describe and write balanced chemical equations for the complete combustion of hydrocarbon fuels		
	Describe the process of cracking and state that the products of cracking include alkanes and alkenes and describe the test for alkenes		
	Balance chemical equations as examples of cracking when given the formulae of the reactants and products		
	Explain why cracking is useful and why modern life depends on the uses of hydrocarbons		

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12. Chemical Analysis	Define a pure substance and identify pure substances and mixtures from data about melting and boiling points		
	Describe a formulation and identify formulations given appropriate information		
	Describe chromatography, including the terms stationary phase and mobile phase and identify pure substances using paper chromatography		
	Explain what the R <sub>f</sub> value of a compound represents, how the R <sub>f</sub> value differs in different solvents and interpret and determine R <sub>f</sub> values from chromatograms		
	<b>Required practical:</b> investigate how paper chromatography can be used to separate and tell the difference between coloured substances (inc calculation of R <sub>f</sub> values)		
	Explain how to test for the presence of hydrogen, oxygen, carbon dioxide and chlorine		
13. Atmosphere of Earth	Describe the composition of gases in the Earth's atmosphere using percentages, fractions or ratios		
	Describe how early intense volcanic activity may have helped form the early atmosphere and how the oceans formed		
	Explain why the levels of carbon dioxide in the atmosphere changes as the oceans were formed		
	State the approximate time in Earth's history when algae started producing oxygen and describe the effects of a gradually increasing oxygen level		
	Explain the ways that atmospheric carbon dioxide levels decreased		
	Name some greenhouse gases and describe how they cause an increase in Earth's temperature		
	List some human activities that produce greenhouse gases		
	Evaluate arguments for and against the idea that human activities cause a rise in temperature that results in global climate change		
	State some potential side effects of global climate change, including discussing scale, risk and environmental implications		
	Define the term carbon footprint and list some actions that could reduce the carbon footprint		
	Describe the combustion of fuels as a major source of atmospheric pollutants and name the different gases that are released when a fuel is burned		
	Predict the products of combustion of a fuel given appropriate information about the composition of the fuel and the conditions in which it is used		
	Describe the properties and effects of carbon monoxide, sulfur dioxide and particulates in the atmosphere		
	Describe and explain the problems caused by increased amounts of these pollutants in the air		

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<b>14. Earth's Resources</b>	State what humans use Earth's resources for, give some examples of natural resources that they use		
	Define the term finite and distinguish between finite and renewable resources		
	Explain what sustainable development is and discuss the role chemistry plays in sustainable development, including improving agricultural and industrial processes		
	State examples of natural products that are supplemented or replaced by agricultural and synthetic products		
	Discuss the importance of water quality for human life, including defining potable water		
	Describe methods to produce potable water, including desalination of salty water or sea water and the potential problems of desalination		
	<i>Required practical: analysis and purification of water samples from different sources, including pH, dissolved solids and distillation.</i>		
	Describe waste water as a product of urban lifestyles and industrial processes that includes organic matter, harmful microbes and harmful chemicals		
	Describe the process of sewage treatment and compare the ease of obtaining potable water from waste water as opposed to ground or salt water		
	Describe, carry out and interpret a simple comparative life cycle assessment (LCA) of materials or products		
	Discuss the advantages and disadvantages of LCAs		
	Carry out simple comparative LCAs for shopping bags made from plastic and paper		
Discuss how to reduce the consumption of raw resources and explain how reusing and recycling reduces energy use (inc environmental impacts)			