A10.2

CHECK YOUR KNOWLEDGE AND UNDERSTANDING (PART 2)

This activity helps you check your knowledge and understanding of the topics that you have covered in Chemical Storylines A4 to A10.

Introduction

The checklist below covers the key points in **Chemical Storylines A4** to **A10**.

The statements listed correspond to learning outcomes in the specification for the AS examinations. They are listed in the order in which they occur in this module. Remember that you will be coming back to many of the ideas in later modules.

You will probably have made summary notes of the main ideas that you have met. Now is a good time to make sure that your notes cover all the points you need. If you feel that you are not yet able to meet the requirements of all of the statements in the list, you should look again at the areas concerned, seek help from your teacher if necessary and develop your notes accordingly.

Most of the points are covered in **Chemical Ideas**, with supporting information in **Chemical Storylines** or the activitites. However, if the main source of information is in a storyline or an activity this is indicated.

What you do

Read and think about each of the statements in the checklist. Put a tick in the column that best represents your current ability to do what is described:

A – I am confident that I can do this
B – I need help to clarify my ideas on this
C – I am not yet able to do this.

You will be sharing this information with your teacher so that you can work together to improve your understanding.

At the end of Chemical Storylines A4 to A10 you should be able to:	A	B	C
• explain the chemical basis of the depletion of ozone in the stratosphere due to halogenoalkanes in simple terms involving the formation of halogen atoms and the catalytic role of these atoms (and other radicals) in ozone destruction • explain the ease of photodissociation of the halogenoalkanes (fluoroalkanes to iodoalkanes) in terms of bond enthalpy			
• discuss and evaluate the evidence that was gathered to support understanding of how ozone depletion in the stratosphere due to halogenoalkanes occurs and how the scientific community validated the results of this and other experiments (given information) **Chemical Storylines A4**			
• explain why some properties of CFCs made them such useful compounds and discuss the relative advantages and disadvantages of replacement compounds for CFCs – hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) and hydrocarbons **Chemical Storylines A4 and A5**			
• recall the way ozone is formed and destroyed in the stratosphere • recall the effects of ozone in the atmosphere, including: – ozone's action as a sunscreen in the stratosphere by absorbing high energy UV (and the effects of such UV, including on human skin) – the polluting effects of ozone in the troposphere causing problems including photochemical smog **Chemical Storylines A3**			
• recall and discuss aspects of the research leading to the discovery of the 'hole' in the ozone layer and how the evidence was at first overlooked **Chemical Storylines A4**			
• recall the following regions of the electromagnetic spectrum in order of increasing frequency – infrared, visible (red–blue), ultraviolet • recall, in terms of these, the principal radiations of the Earth and the Sun			
• recall that: – molecules change in vibrational energy states (bonds vibrate more) when they absorb IR radiation – UV and visible radiation promote electrons to higher energy levels, sometimes causing bond breaking – vibrational and electronic energies of molecules are quantised			

continued

• explain the 'greenhouse effect' in terms of: – solar energy reaches Earth mainly as visible and UV light – the Earth absorbs some of this energy, heats up and radiates IR – greenhouse gases (e.g. carbon dioxide and methane) in the troposphere absorb some of the IR in the 'IR window' – absorption of IR by greenhouse gas molecules increases the vibrational energy of their bonds, the energy is transferred to other molecules by collisions, thus increasing their kinetic energy and raising the temperature – greenhouse gas molecules also re-emit some of the absorbed IR in all directions, some of which heats up the Earth – increased concentrations of greenhouse gases lead to an enhanced greenhouse effect			
• discuss the evidence for the relationship between the increased concentration of gases and global warming **Chemical Storylines A6 and A7**			
• describe examples of giant covalent (network) structures, such as diamond and silicon(IV) oxide • explain differences in the physical properties of CO_2 and SiO_2 in terms of their different structures			
• explain and use the term 'dynamic equilibrium' – rates of forward and back reaction equal, constant concentrations of reactants and products, takes place in a closed system			
• use le Chatelier's principle to describe and predict, in a homogeneous reaction, the qualitative effects on the position of equilibrium of changes in concentration, temperature and pressure			
• recall and discuss different approaches to the control of carbon dioxide emissions: – burning fewer fossil fuels (alternative fuels and economy of use) – increasing photosynthesis, burying or reacting carbon dioxide **Activity A9.3**			