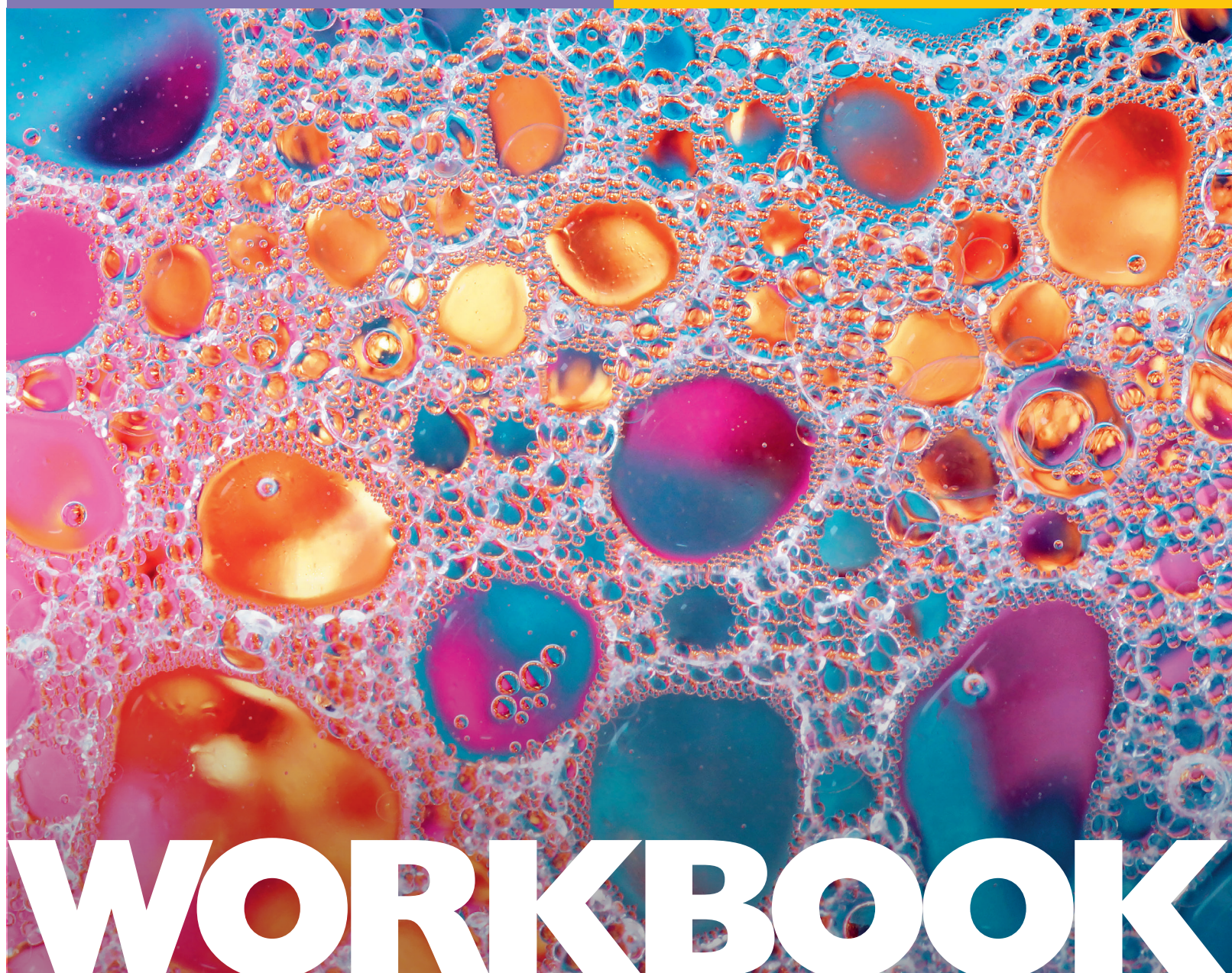


WJEC

GCSE



WORKBOOK

Chemistry

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Higher tier
Suitable for
Chemistry GCSE
and Science (Double
Award) GCSE
Answers online

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1 This workbook will help prepare you for the WJEC GCSE Chemistry and WJEC GCSE Double Award (Chemistry) exams.

2 Your exams will include a range of short, structured questions and longer questions including QER (quality of extended response) questions testing both your knowledge of chemistry and the quality of your written communication. You need to be able to answer questions assessing knowledge and understanding, to solve chemistry problems using mathematical skills and analyse and to evaluate data. This workbook will help you develop the skills to answer all these question types. All questions are suitable for Higher Tier students. **For both types of questions, those relating to the Science Double Award are shown in the paler tint and those for only Chemistry in the darker tint (the latter also applies to some parts of questions, which are also coloured in the darker tint).**

3 Included are:

- stimulus materials, including key terms and concepts
- short and longer exam-style questions
- space for you to write your answers.

You still need to read your textbook and refer to your revision guides and lesson notes.

Timings are given for the exam-style questions to make your practice as realistic as possible.

Marks available are indicated for all questions so that you can gauge the level of detail required in your answers.

Answers are available at:
www.hoddereducation.co.uk/workbookanswers

- b** Explain why the temperature scale on a solubility graph ranges from 0°C to 100°C.

2 marks

- c** Using the earlier graphs, answer the questions below.

- i** Give the temperature at which the solubility is the same for both ammonium bromide and potassium dichromate.

1 mark

Temperature = °C

- ii** Give the difference between the solubilities of ammonium bromide and potassium dichromate at 20°C.

2 marks

Difference = g per 100 g water

- iii** A solution of ammonium bromide at 80°C containing 500g of ammonium bromide in 500g of water is cooled and 80g of solid ammonium bromide was formed. Calculate the temperature to which the solution was cooled.

3 marks

Temperature = °C

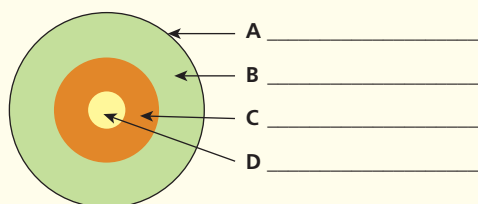
1.4 The ever-changing Earth

The Earth has a layered structure moving from the solid iron core to the molten iron outer core to the mantle to the outer crust. The **lithosphere** (crust and rigid upper part of the mantle) is broken into seven or eight major and many minor tectonic plates that move. **Wegener** suggested the **theory of continental drift**, which stated that all the continents were once joined and they have drifted apart. A later theory suggested that **convection currents** in the mantle caused the movement. There are three types of plate boundary.

	Boundary		
	Constructive	Destructive	Conservative
Plate movement	Plates move apart at a mid-ocean ridge and igneous rock forms due to volcanic activity	One plate is pushed down into the mantle and melts forming magma and explosive volcanoes	Plates slide past each other and sudden jerks cause earthquakes
Activity	Volcanoes and earthquakes	Volcanoes and earthquakes	Earthquakes occur

The Earth's early atmosphere was due to the release of gases from volcanoes and contained **nitrogen, carbon dioxide, ammonia, methane** and **water vapour**, which condensed to form the oceans. The percentage of carbon dioxide decreased over time due to photosynthesis and the formation of sedimentary rocks and fossil fuels. Ammonia decomposed on reaction with oxygen forming nitrogen. **Today's atmosphere** contains 78% nitrogen, 21% oxygen, 0.04% carbon dioxide and 0.9% argon and other noble gases. Greenhouse gases maintain temperatures on Earth high enough to support life. Burning fossil fuels causes acid rain and also increases the amount of carbon dioxide in the atmosphere leading to **enhanced global warming** and causing climate change, melting ice caps and rising sea levels.

1 The diagram shows the structure of the Earth.



a Label parts A, B, C and D.

4 marks

b Describe what is meant by the 'lithosphere'.

2 marks

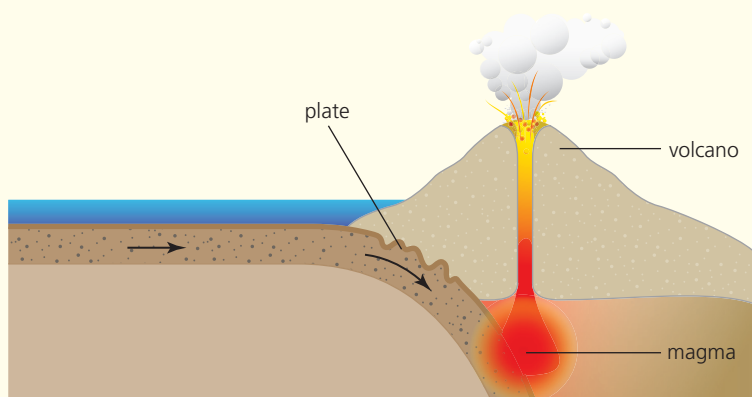
c Name the element that D is made up of.

1 mark

d Which layer A, B, C or D is thought to be in a liquid state?

1 mark

e The diagram shows how a volcano can occur at a plate boundary.



i Name this type of plate boundary.

1 mark

ii Describe how the volcano is formed.

2 marks

2 Describe and explain the processes taking place:

a at a constructive plate boundary

2 marks

b at a conservative plate boundary

2 marks

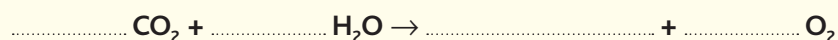
- 3** There is less carbon dioxide in the Earth's atmosphere now than there was in the Earth's early atmosphere.

The amount of carbon dioxide in the Earth's early atmosphere decreased because plants and algae used it for photosynthesis, and it became locked up in sedimentary rocks.

- a** Photosynthesis can be represented by the equation shown below.

Complete it by writing the formula of the other product and balancing it correctly.

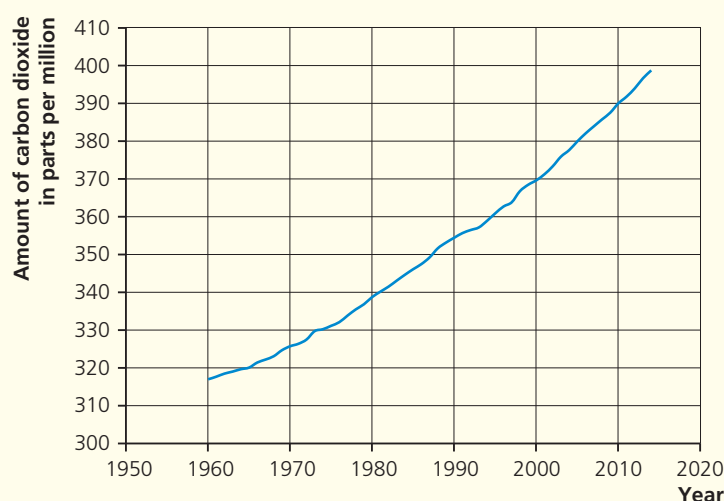
2 marks



- b** Explain what is meant by 'locked up carbon dioxide'.

2 marks

- c** The graph shows how the amount of carbon dioxide in the atmosphere has changed in recent years.



- i** Describe how the amount of carbon dioxide has changed between 1960 and 2010.

1 mark

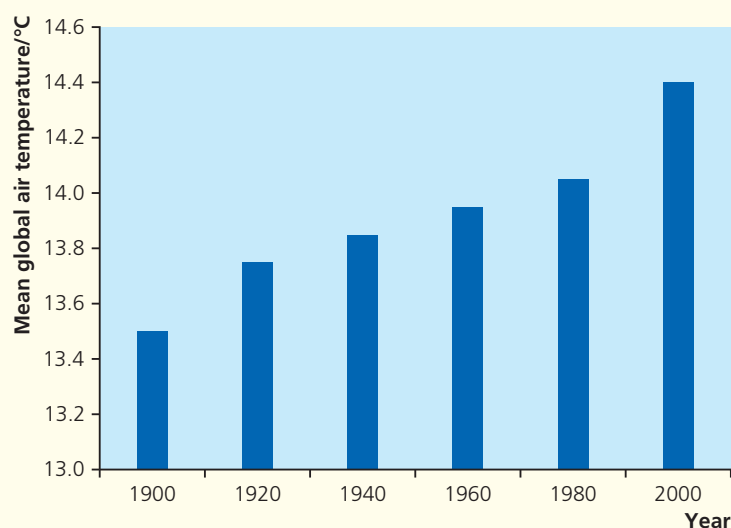
- ii** What is the percentage change in carbon dioxide levels between 2000 and 2010?

2 marks

- iii** Give two reasons why the amount of carbon dioxide has changed.

2 marks

- 4 The bar chart shows the Earth's mean global air temperature from 1900 to 2000.



- a What was the increase in global air temperature from 1900 to 2000?

1 mark

- b The increase in mean global temperature is a major cause of climate change.

Describe two potential effects of global climate change.

2 marks

- c Describe how 'global warming' is different to the 'greenhouse effect'.

2 marks

- 5 When a fuel is burned gases are released into the atmosphere that may cause atmospheric pollution.

- a Complete the table below.

4 marks

Gases released on burning a fuel	Origin	Effect
	Carbon in the fuel compound	Global warming
	Carbon in the fuel compound	Toxic gas
	Sulfur impurity in fuel	

- b The carbon dioxide and sulfur dioxide released on burning a fuel are passed into a suspension of calcium carbonate in water. Suggest how this may decrease the environmental effects of carbon dioxide and sulfur dioxide.

1 mark

- 6 To test if a gas is carbon dioxide, it is bubbled into limewater. Which is the correct formula of limewater? Tick (✓) one box

1 mark

☐ CaOH

☐ Ca(OH)₂

☐ NaOH

☐ CaH₂O

35

Exam-style questions

- 1** Theories about how the atmosphere formed and developed over time have been developed by scientists. The statements below explain how scientists think that today's atmosphere was formed.
1. Today's atmosphere consists of nitrogen, oxygen and small amounts of other gases including carbon dioxide, water vapour and noble gases.
 2. Nitrogen, water vapour, methane and carbon dioxide were produced by volcanoes.
 3. Plants evolved and produced oxygen during photosynthesis.
 4. As the Earth cooled down, water vapour condensed forming the oceans.

What is the correct order for these events? Tick (✓) the correct answer. (AO1)

1 mark

☐ 4, 3, 1, 2

☐ 2, 4, 3, 1

☐ 2, 3, 4, 1

☐ 4, 2, 3, 1

- 2** Which one of the following processes removes carbon dioxide from the atmosphere? Tick (✓) the correct answer) (AO1)

1 mark

☐ burning fossil fuels

☐ deforestation

☐ sulfur scrubbing

☐ photosynthesis

- 3** Petrol is obtained from crude oil, a fossil fuel. It is a hydrocarbon fuel that contains a small amount of sulfur impurity.

- a i** Name **two** compounds produced when petrol is burned that have an impact on the environment. State the impact each product has. (AO1)

4 marks

.....

.....

- b** Hydrogen can be used as a fuel in cars, instead of petrol.

Write a balanced symbol equation for the combustion of hydrogen in air and suggest why it is preferred as a fuel. (AO2)

2 marks

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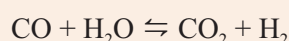
- c** State **two other** energy sources that are more responsible alternatives to using fossil fuels. (AO1)

2 marks

.....

.....

- 4 a** Carbon dioxide and water vapour can be produced industrially by the water–gas reaction. The equation is:



Name the **two** gases produced and describe tests that could be used to identify each of the gases. (AO1)

6 marks

.....

.....

.....

b Other gases can be produced from the air.

i Name **two** of these gases. (AO1)

1 mark

ii State why it is possible to obtain these gases from the air. (AO1)

1 mark

5 A company has decided to reduce the amount of sulfur dioxide from the waste gases it emits from its factories. Which one of the following substances in solution would most effectively remove the sulfur dioxide from the waste gases? Tick (✓) **one** box. (AO2)

1 mark

☐ calcium chloride ☐ calcium hydroxide ☐ sodium chloride ☐ sulfuric acid

6 Mars is often called the red planet due to the presence of haematite (iron(III) oxide) on its surface. A recent study of the Huygens Crater on Mars has also shown the presence of iron(III) hydroxide and calcium carbonate.

a i Calcium carbonate and iron(III) hydroxide undergo thermal decomposition. Suggest what is meant by the term 'thermal decomposition'. (AO2)

1 mark

ii Write a balanced symbol equation for the thermal decomposition of iron(III) hydroxide into iron(III) oxide and water. (AO2)

3 marks

b 'Atmosphere' is the term used to describe the collection of gases that surround a planet. The suggested composition of the atmosphere of Mars is shown in the table below.

Gas	Carbon dioxide	Nitrogen	Noble gases	Oxygen	Methane
Composition (%)	95.0	3.0	1.6	trace	trace

c Compare the composition of the Earth's atmosphere today with that of the planet Mars. (AO1/AO3)

4 marks

7 Tick (✓) **one** box to complete this sentence. (AO1)

1 mark

Earthquakes are generated, but there is no volcanic activity at

☐ a conservative plate boundary

☐ a constructive plate boundary

☐ a destructive plate boundary

☐ the centre of a tectonic plate

8 In 1912, a scientist proposed the theory the continents were once joined together in one supercontinent, and that they have since moved apart.

a Name:

i the scientist who proposed this theory

ii the supercontinent

iii the theory (AO1) 3 marks