

GCSE Combined Science: Trilogy

Worksheet: The proportions of different gases in the atmosphere

TIME 20 min	TOTAL 18 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: The proportions of different gases in the atmosphere

NAME _____	CLASS _____	DATE _____
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

0 1 . 1

 Which gas makes up about four-fifths of the Earth's atmosphere?

Tick (✓) **one** box.

Argon

☐

Carbon dioxide

☐

Nitrogen

☐

Oxygen

☐

[1 mark]

0 1 . 2

 What is the approximate percentage of oxygen in the Earth's atmosphere?

.....

.....

.....

Percentage = %

[1 mark]

0 1 . 3

Name **two** other gases found in small proportions in the atmosphere.

[2 marks]

0 1 . 4

For about how long have the proportions of gases in the atmosphere been much the same as they are today?

[1 mark]

0 2

0 2 . 1

Which gas makes up the smallest proportion of clean, dry air?

Tick (✓) **one** box.

Nitrogen

☐

Oxygen

☐

Argon

☐

Carbon dioxide

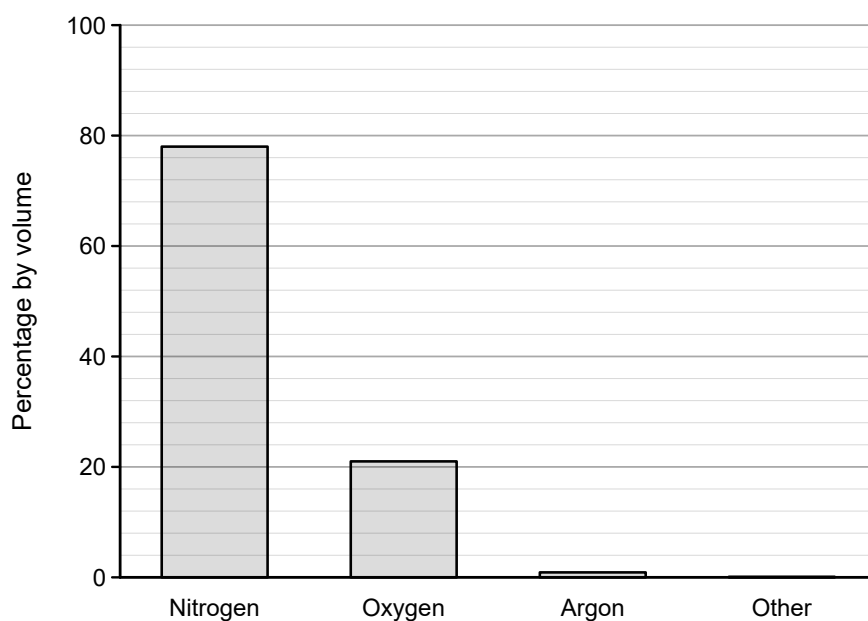
☐

[1 mark]

0 3

Figure 1 shows the approximate percentage of each gas in dry air.

Figure 1



0 3 . 1

Use Figure 1 to estimate the percentage of oxygen in the air.

.....

.....

.....

Percentage = %

[1 mark]

0 3 . 2

Use Figure 1 to name the gas that makes up about four-fifths of dry air.

.....

.....

.....

.....
[1 mark]

0 4

A student places damp iron wool in a test tube. The test tube is inverted over water in a beaker, with the mouth of the tube just below the water surface. After several days, the water level inside the tube rises.

0 4 . 1

Explain why the water level rises.

.....

.....

.....

.....

[2 marks]

0 4 . 2

Air is about one-fifth oxygen.

Predict the percentage of the original volume of air in the tube that the water would replace, once the reaction has finished.

.....

.....

.....

Percentage = %

[1 mark]

0 5

A student claims: 'The percentage of oxygen in the atmosphere has never changed.'

0 5 . 1

Explain why this claim is incorrect, using ideas about the evolution of the Earth's atmosphere.

.....

.....

.....

.....

[2 marks]

0 6

A classroom contains 150 m^3 of air.

0 6 . 1

Calculate the approximate volume of nitrogen in the classroom.

.....

.....

.....

.....

Volume = m^3

[2 marks]

0 6 . 2

Air contains about 0.04% carbon dioxide.
Calculate the volume of carbon dioxide in the classroom.

.....

.....

.....

.....

Volume = m^3

[2 marks]

0 6 . 3

The percentage of carbon dioxide in the classroom air increased during a lesson.
Suggest why.

.....

.....

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: The proportions of different gases in the atmosphere · 18 marks

Question 1 (5 marks)

01.1 [1 mark]

Correct: Nitrogen

01.2 [1 mark]

Answer: 20%

- 20 (%) (1)

Notes: Allow 21%. Allow 'one-fifth'.

01.3 [2 marks]

- carbon dioxide (1)
- water vapour (1)
- argon / (other) noble gases (1)

Any 2 of the points above.

01.4 [1 mark]

- (about) 200 million years (1)
-
-

Question 2 (1 mark)

02.1 [1 mark]

Correct: Carbon dioxide

Question 3 (2 marks)

03.1 [1 mark]

Answer: 21%

- 21 (%) (1)

Notes: Allow 20–22.

03.2 [1 mark]

Answer: nitrogen

- nitrogen (1)
-

Question 4 (3 marks)

04.1 [2 marks]

- the iron (wool) reacts with oxygen in the air inside the tube (rusts), removing oxygen gas from the air (1)
 - this reduces the volume of gas inside the tube, so water is pushed up to take its place (1)
-

04.2 [1 mark]

Answer: 20%

- 20 (%) (1)

Notes: Allow 21.

Question 5 (2 marks)

05.1 [2 marks]

- the percentage of oxygen was very low (or zero) in the Earth's early atmosphere (1)
 - oxygen only increased significantly once algae and plants evolved and produced it by photosynthesis, and levels have been much the same as today only for roughly the last 200 million years (1)
-

Question 6 (5 marks)

06.1 [2 marks]

Answer: 120 m^3

- $80 \div 100 \times 150$ (1)
- $120 \text{ (m}^3\text{)}$ (1)

Notes: Allow use of 78% (117 m^3).

06.2 [2 marks]

Answer: 0.06 m^3

- $0.04 \div 100 \times 150$ (1)
- $0.06 \text{ (m}^3\text{)}$ (1)

Notes: An answer of 0.06 scores 2 marks.

06.3 [1 mark]

- the people in the room breathe out carbon dioxide (produced by respiration) (1)
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