

(The Earth's early atmosphere and its evolution)

Q1.a)(2018)

The Earth's early atmosphere was different to Earth's atmosphere today.

Scientists think that the Earth's early atmosphere was like the atmosphere found on Venus today.

Table 7 shows the amounts of carbon dioxide and oxygen in the atmospheres of Venus and Earth today.

Table 7

Gas	Percentage (%) in Venus' atmosphere today	Percentage (%) in Earth's atmosphere today
Carbon dioxide	96.50	0.04
Oxygen	0.00	20.95

The percentages of carbon dioxide and oxygen have changed from Earth's early atmosphere to Earth's atmosphere today.

Explain the processes that led to these changes.

[6 marks]

Q1.b)(2018)

Why are scientists **not** certain about the percentage of each gas in the Earth's early atmosphere?

[1 mark]

Q2.(2021)

This question is about the Earth's atmosphere.

How long ago was the Earth formed?

[1 mark]

Tick (✓) **one** box.

4.6 billion years ago

☐

4.6 million years ago

☐

4.6 thousand years ago

☐

Q3.a)(2021)

Table 1 shows the percentages of gases in the atmospheres of Mars and Earth today.

Table 1

Gas	Percentage of gas in atmosphere (%)	
	Mars	Earth
Carbon dioxide	95.97	0.04
Nitrogen	1.89	78.09
Oxygen	0.15	20.95
Other gases	1.99	X

Calculate the percentage **X** of other gases in the Earth's atmosphere.

Use **Table 1**.

[1 mark]

X = _____ %

Q3.b)(2021)

The atmosphere of the early Earth is thought to have been similar to the atmosphere of Mars today.

The percentages of nitrogen and of oxygen in the Earth's atmosphere today have changed from the percentages in the Earth's early atmosphere.

Draw **one** line from each gas to the change in the percentage of that gas.

Use **Table 1**.

[2 marks]

Gas	Change in percentage of gas
Nitrogen	Increased by about 4 times
	Increased by about 21%
Oxygen	Increased by about 40 times
	Increased by about 96%

Q3.c)(2021)

The percentage of carbon dioxide in the Earth's early atmosphere decreased.

Which **two** processes caused this decrease?

[2 marks]

Tick (✓) **two** boxes.

Carbon dioxide dissolving in sea water

☐

Combustion of fossil fuels

☐

Farming of animals

☐

Formation of sedimentary rocks

☐

Volcanoes releasing carbon dioxide

☐

Q4.(2021)

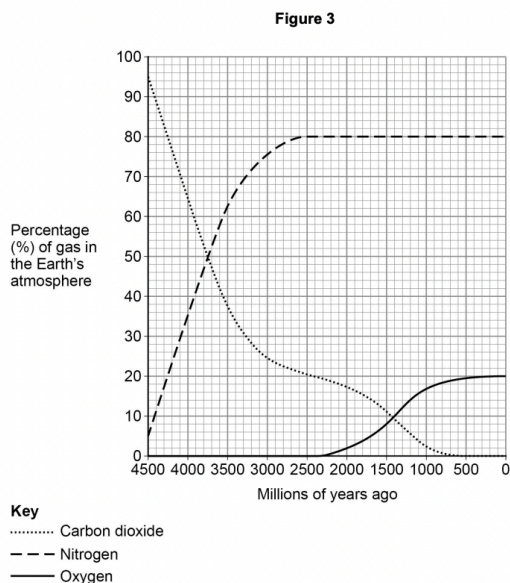
Complete the sentence.

[1 mark]

Scientists are not certain about the percentages of gases in the Earth's early atmosphere because there is a lack of _____.

Q5.a)(2022)

Figure 3 shows how the percentages of gases in the Earth's atmosphere may have changed since the atmosphere was formed.



When was the percentage of oxygen in the Earth's atmosphere 8%?

Use **Figure 3**.

[1 mark]

_____ millions of years ago

Q5.b)(2022)

When did the percentage of nitrogen in the Earth's atmosphere become constant?

Use **Figure 3**.

[1 mark]

_____ millions of years ago

Q5.c)(2022)

Crude oil was formed from an ancient biomass as the Earth's atmosphere evolved.

What did this ancient biomass mainly consist of?

[1 mark]

Tick (✓) **one** box.

Limestone

☐

Plankton

☐

Sand

☐

Q5.d)(2022)

Most of the percentages of the gases in **Figure 3** are estimated values.

Why have scientists used estimated values for the percentages of the gases in **Figure 3**?

[1 mark]

Q6.(2023)

This question is about oxygen.

Scientists think that there was little or no oxygen in the Earth's early atmosphere.

Which planet today has an atmosphere that is similar to the Earth's early atmosphere?

[1 mark]

Tick (✓) **one** box.

Jupiter

☐

Mars

☐

Neptune

☐

Saturn

☐

Q7.(2023)

0 1 4 Some scientists think that 1100 million years ago the Earth's atmosphere contained:

- 16% oxygen
- 4% carbon dioxide.

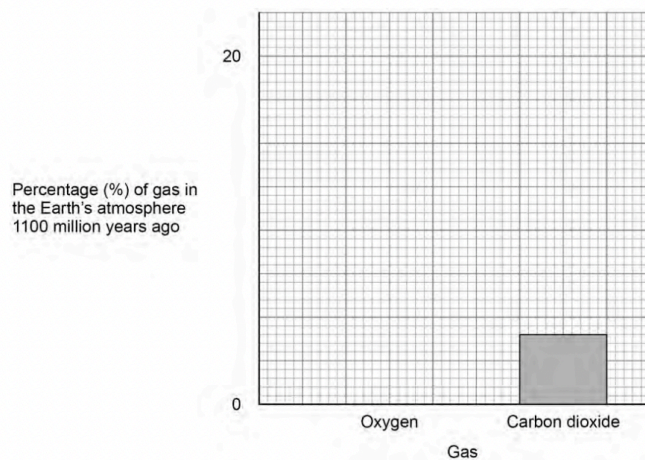
Complete **Figure 1**.

You should:

- complete the y-axis scale
- plot the percentage of oxygen in the Earth's atmosphere 1100 million years ago.

[2 marks]

Figure 1

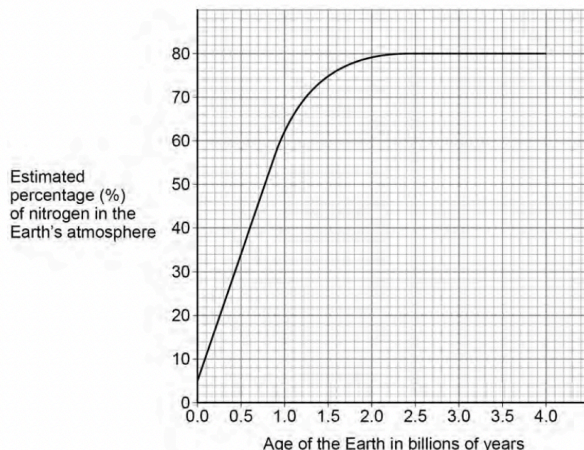


Q8.a)(2024)

This question is about the Earth's atmosphere and naturally occurring polymers.

Figure 5 shows how the estimated percentage of nitrogen in the Earth's atmosphere has changed since the Earth was formed.

Figure 5



Describe the trends shown by the graph.

Use data from **Figure 5**.

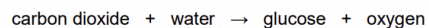
[3 marks]

Q8.b)(2024)

The percentage of oxygen in the Earth's atmosphere has increased since the Earth was formed.

This is because of photosynthesis.

The word equation for the photosynthesis reaction is:



What happened to the percentage of carbon dioxide in the atmosphere when photosynthesis began?

[1 mark]

Tick (✓) **one** box.

The percentage of carbon dioxide decreased.

☐

The percentage of carbon dioxide stayed the same.

☐

The percentage of carbon dioxide increased.

☐