

The composition and evolution of Earth's atmosphere – GCSE Chemistry

1. No.9.5

Scientists think that algae may have used gases in Earth's early atmosphere.

Algae need an element to produce the molecule in **Figure 6** which is **not** present in water or carbon dioxide.

Which **two** gases from Earth's early atmosphere could have provided this element?
[2 marks]

_____ and _____

2. No.4

Titan is a moon of the planet Saturn.

Table 2 shows the percentages of some gases in the atmosphere of Titan and in the atmosphere of the Earth.

Table 2

Gas	Percentage of gas in atmosphere (%)	
	Titan	Earth
Nitrogen	98	78
Oxygen	Zero	21
Methane	1.4	0.0002
Argon	0.14	0.9
Carbon dioxide	0.0001	0.04

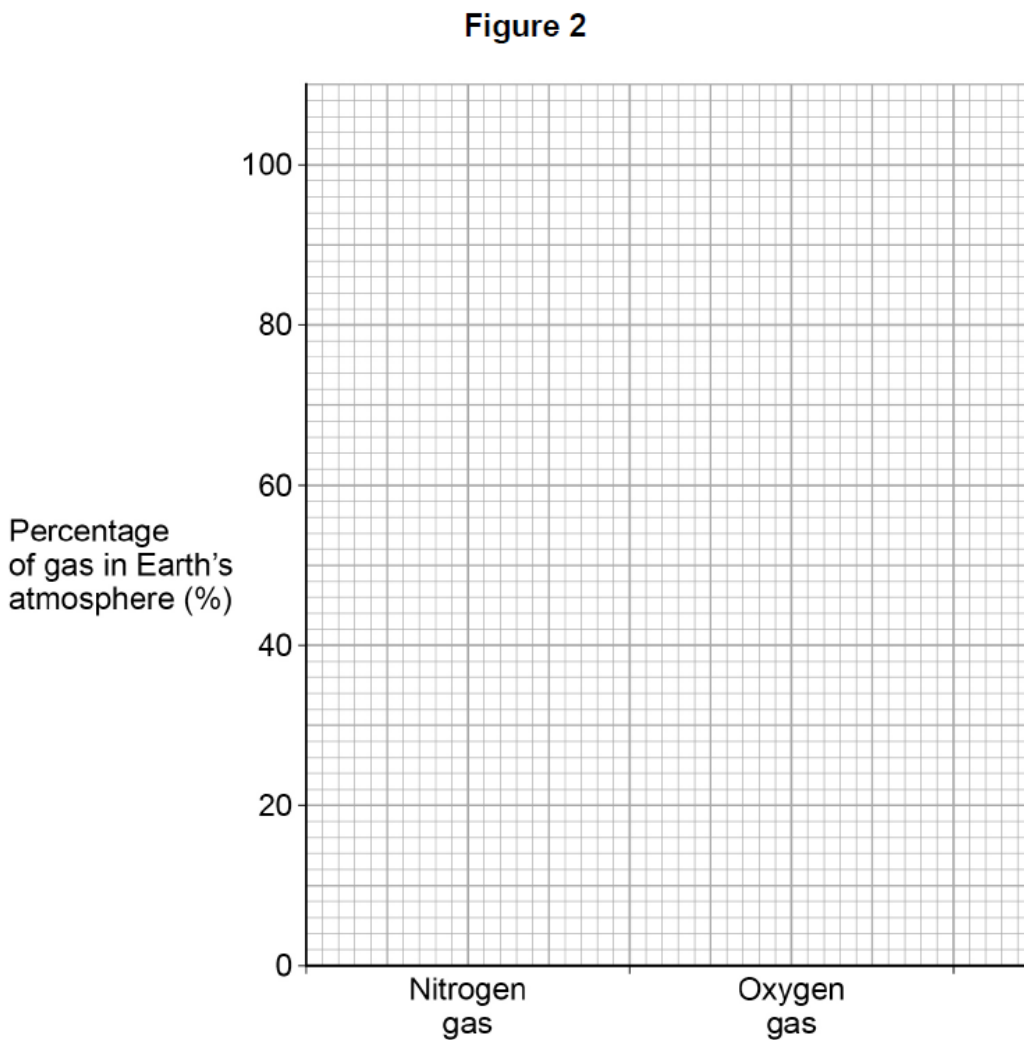
Which **two** gases are present in smaller percentages on the Earth than on Titan?

[1 mark]

_____ and _____

Complete the bar chart in **Figure 2** to show the percentages of nitrogen gas and oxygen gas in the Earth's atmosphere.

[2 marks]



Why are algae less likely to photosynthesise on Titan than Earth?

Use **Table 2**.

[1 mark]

Tick (✓) **one** box.

Titan's atmosphere contains too little argon.

☐

Titan's atmosphere contains too little carbon dioxide.

☐

Titan's atmosphere contains too little methane.

☐

Titan's atmosphere contains too little nitrogen.

☐

Titan is warmer than the other moons of Saturn because of the greenhouse effect.

How do greenhouse gases trap energy from the sun?

[1 mark]

Tick (✓) **one** box.

All wavelengths of radiation are reflected back to the surface of Titan.

☐

Long wavelength radiation is reflected back to the surface of Titan.

☐

Short wavelength radiation is reflected back to the surface of Titan.

☐

As well as methane, the atmosphere of Titan contains small amounts of propene gas. Methane is an alkane and propene is an alkene.

Bromine water is an orange solution used to identify alkenes.

Draw **one** line from each gas to its effect on bromine water.

[2 marks]

Gas	Effect on bromine water
	Forms a blue solution
Methane	Forms a colourless solution
	Forms a green solution
Propene	Forms a white precipitate
	No effect

Propene reacts with water (steam) to make propanol.

The ratio of the masses of propene and water that react is:

propene : water

7 : 3

Calculate the mass of propene that reacts with 21 g water.

[2 marks]

Mass = _____ g