

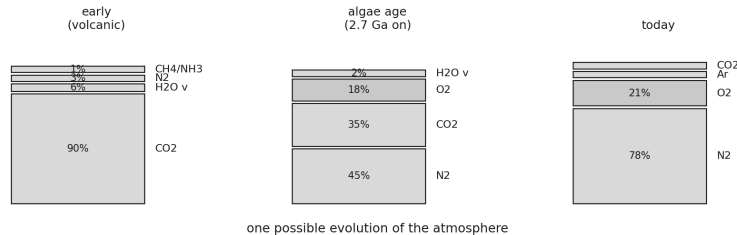
Exercise walk-through

9.2

Greenhouse gases and global climate change (4.9.2.1–4.9.2.3)

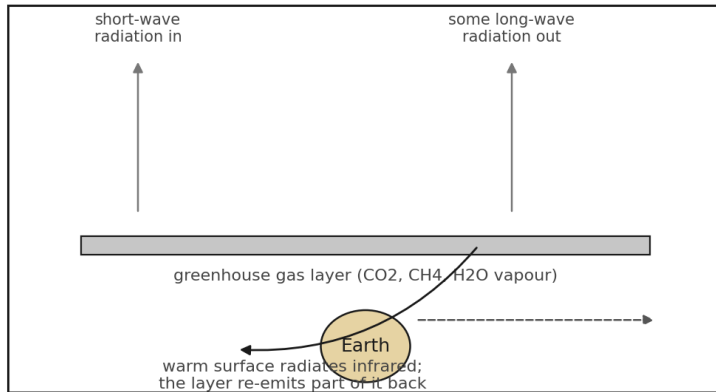
AQA · GCSE · Chemistry

The evolving atmosphere



- Early — CO₂, water vapour, nitrogen, methane; no oxygen.
- Oceans condensed; CO₂ dissolved into carbonate sediments.
- Photosynthesis — oxygen up, carbon buried as fossil fuels.

The greenhouse effect



- CO₂, methane, water vapour — the greenhouse gases.
- In — short-wave; out — long-wave infrared, partly trapped.
- Human causes — fossil fuels, deforestation, cattle, landfill.

Exercises 2.1·2.3

2.1 Name three greenhouse gases.

[3]

2.2 Which radiation do greenhouse gases absorb – short-wave from the Sun or long-wave from the Earth?

[1]

2.3 Give two human activities that raise methane levels.

[2]

Exercises 2.1·2.3

2.1 Name three greenhouse gases. [3]

2.1 Carbon dioxide, methane, water vapour.

2.2 Which radiation do greenhouse gases absorb – short-wave from the Sun or long-wave from the Earth? [1]

2.2 Long-wave infrared radiation from the warm Earth.

2.3 Give two human activities that raise methane levels. [2]

2.3 Cattle farming; rice paddies; landfill decay.

Exercises 3.1·3.2

3.1 Describe the greenhouse effect in terms of the radiation entering and leaving the atmosphere. [4]

3.2 The graph shows CO₂ and temperature rising together. Explain why correlation alone does not prove which causes which, and what scientists do about it. [3]

Exercises 3.1·3.2

3.1 Describe the greenhouse effect in terms of the radiation entering and leaving the atmosphere. [4]

3.1 Short-wavelength radiation from the Sun passes through the atmosphere and warms the surface; the warm surface radiates longer-wavelength infrared back out; greenhouse gases absorb some of this infrared; and re-emit it in all directions, including back to the surface – keeping it warmer than it would otherwise be.

3.2 The graph shows CO₂ and temperature rising together. Explain why correlation alone does not prove which causes which, and what scientists do about it. [3]

3.2 Two variables rising together could share a third cause or coincide by chance; climate scientists test the mechanism – the greenhouse absorption of infrared is measured in laboratories and atmospheres; conclusions rest on systematic peer-reviewed reviews of many studies, not one correlation.

Exercise 3.3

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3.3 Melting ice caps and rising sea levels; more extreme weather – droughts, floods, storms; shifts in habitats and species distribution; uncertainty because the climate system is complex with feedbacks, so models give ranges rather than exact predictions.