

Material cycles: practice questions

6 questions · 17 marks · mark scheme at the back

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 17

- 1** Explain why materials such as carbon and nitrogen need to be cycled in an ecosystem. [2 marks]

- 2** Explain the role of decomposers in the carbon cycle. [3 marks]

- 3** (a) Name the process by which plants lose water vapour from their leaves. (1) (b) Name the process that turns water vapour into liquid water droplets in clouds. (1) [2 marks]

- 4** In areas of drought, desalination of sea water can be used to produce potable water. Explain what is meant by 'potable water' and 'desalination', and give one disadvantage of desalination. [3 marks]

5 Which type of bacteria converts ammonium ions in the soil into nitrates? **[1 mark]**

- A. ☐ Nitrifying bacteria
- B. ☐ Denitrifying bacteria
- C. ☐ Decomposers
- D. ☐ Nitrogen-fixing bacteria in root nodules

6 Explain how nitrates are made available for plants to take up from the soil, including the use of fertilisers and crop rotation. **[6 marks]**

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Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [2]

- the supply of each material is limited (1)
- so they must be returned to the abiotic environment to be used again by new organisms (1)

2. [3]

- they break down dead plants, dead animals and waste (1)
- they respire, releasing carbon dioxide into the air (1)
- so carbon dioxide is available again for photosynthesis (1)

3. [2]

- transpiration (1)
- condensation (1)

4. [3]

- potable water is water that is safe to drink (1)
- desalination removes the dissolved salt from sea water (1)
- needs large amounts of energy / expensive (1)

5. [1]

A nitrifying bacteria (1)

6. [6]

Level 3 5-6	A clear, well-structured explanation covering the roles of several types of bacteria in the nitrogen cycle as well as fertilisers and crop rotation, with correct scientific terms.
Level 2 3-4	An explanation that covers some of the processes or methods, with some correct scientific terms but with gaps in the detail.
Level 1 1-2	Some relevant statements are made but with little explanation.

Indicative content

- decomposers break down proteins and urea in dead material and waste into ammonia / ammonium ions
- nitrifying bacteria convert ammonium ions into nitrates
- nitrogen-fixing bacteria in the soil or root nodules convert nitrogen gas into nitrogen compounds, which become nitrates
- plants absorb nitrates through their roots and use them to make protein
- denitrifying bacteria remove nitrates from the soil by converting them into nitrogen gas
- fertilisers add nitrates to the soil to replace those removed in crops
- crop rotation: growing a legume (such as clover) increases nitrates in the soil because of nitrogen-fixing bacteria in its root nodules, then a crop needing nitrates is grown