

Cycles within ecosystems: practice questions

6 questions · 17 marks · mark scheme at the back

For Pearson Edexcel International GCSE Biology 4BI1 and Science (Double Award) 4SD0. **Biology only** is not in the Double Award and is only examined on Paper 2.

Name

Total / 17

1 Which process removes carbon dioxide from the atmosphere? [1 mark]

- A. ☐ Combustion
- B. ☐ Photosynthesis
- C. ☐ Respiration
- D. ☐ Decomposition

2 Dead leaves fall to the ground and are broken down. Describe how the carbon in the leaves is returned to the atmosphere. [3 marks]

3 Describe how carbon dioxide is removed from the atmosphere and how it is returned to the atmosphere in the carbon cycle. [4 marks]

4 **Biology only** [1 mark]

Which bacteria convert ammonium ions in the soil into nitrates?

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

Biology only

Denitrifying bacteria are active in waterlogged soil. Explain how this affects the growth of crops.

Biology only

Describe the roles of bacteria in the nitrogen cycle and explain how nitrogen in the air becomes part of the protein in a cow.

[illegible]

Mark scheme

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

1. [1]

B: photosynthesis uses carbon dioxide to make glucose (1)

2. [3]

- decomposers / bacteria and fungi break down the leaves (1)
- decomposers respire (1)
- releasing carbon dioxide (into the air) (1)
- allow CO₂

3. [4]

- plants / algae take in carbon dioxide (1)
- for photosynthesis (1)
- respiration (by plants, animals and decomposers) returns carbon dioxide (1)
- combustion of fuels / burning releases carbon dioxide (1)
- decomposition / decay releases carbon dioxide (1)
- Max 4

4. [1] **Biology only**

A: nitrifying bacteria carry out nitrification (1)

5. [2] **Biology only**

- denitrifying bacteria convert nitrates into nitrogen gas (1)
- so there are fewer nitrates for the plants to absorb / less protein made so poorer growth (1)

6. [6] **Biology only**

Level 3 5-6	A clear, logical and complete account that covers decomposers, nitrification, nitrogen fixation and denitrification, and links these to uptake of nitrates by plants and feeding by the cow.
Level 2 3-4	Describes at least three of the bacterial processes with some correct links, but the route from air nitrogen to cow protein is incomplete.
Level 1 1-2	Gives one or two isolated points about bacteria, with little or no link to plants or the cow.

Indicative content

- nitrogen-fixing bacteria (in soil or root nodules) convert nitrogen gas into nitrogen compounds / nitrates
- plants absorb nitrates through their roots
- plants use nitrates to make amino acids and proteins
- cow eats plants and digests the protein to amino acids, which it uses to make its own protein
- dead plants, dead animals and waste (urea) broken down by decomposers, releasing ammonia / ammonium ions
- nitrifying bacteria convert ammonium ions into nitrates
- denitrifying bacteria convert nitrates to nitrogen gas, returning it to the air