

Nutrient cycles: practice questions

6 questions • 18 marks • mark scheme at the back

For Cambridge IGCSE Biology 0610 (and 0970, which has the same content). **Supplement** is Extended content, only examined on Papers 2 and 4.

Name

Total / 18

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

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

2 Describe how carbon in the bodies of dead plants returns to the air as carbon dioxide, [4 marks]
and how carbon in dead organisms that are buried for millions of years may later return to the air.

3 A student states that the amount of carbon dioxide in the air stays roughly constant in a natural ecosystem. (a) Name the process that removes carbon dioxide from the air. [1] (b) Name two processes that add carbon dioxide to the air. [2] [3 marks]

4 **Supplement** [1 mark]

- Which process changes nitrate ions in the soil into nitrogen gas?
- A. ☐ Nitrification
 - B. ☐ Denitrification
 - C. ☐ Nitrogen fixation
 - D. ☐ Deamination

5

Supplement

[4 marks]

Describe the roles of microorganisms in the nitrogen cycle by stating what each of the following does. (a) decomposers [1] (b) nitrifying bacteria [1] (c) nitrogen-fixing bacteria [1] (d) denitrifying bacteria [1]

6

Supplement

[5 marks]

Explain how nitrogen in the air becomes part of the protein in a cow that eats grass.

Mark scheme

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

1. [1]

C C (1)

2. [4]

- decomposers / bacteria and fungi break down the dead plants (1)
- decomposers respire (1)
- releasing carbon dioxide (into the air) (1)
- buried organisms form fossil fuels / coal, oil, gas (1)
- burning / combustion of the fossil fuel releases carbon dioxide (1)
- Max 4

3. [3]

- (a) photosynthesis (1)
- (b) any two from: respiration; combustion / burning; decomposition / decay (2)
- ignore breathing

4. [1] **Supplement**

B B (1)

5. [4] **Supplement**

- (a) break down proteins in dead material / waste to ammonium ions (1) allow ammonia
- (b) change ammonium ions into nitrate ions (1) allow via nitrite ions
- (c) change nitrogen gas into nitrogen compounds (1) allow ammonium ions / nitrates
- (d) change nitrate ions into nitrogen gas (1)

6. [5] **Supplement**

- nitrogen fixation / nitrogen gas is changed into nitrogen compounds (1)
- by lightning or by nitrogen-fixing bacteria (1)
- nitrifying bacteria change ammonium ions to nitrate ions (1)
- grass absorbs nitrate ions through its roots (1)
- grass makes amino acids and then proteins (1)
- cow eats / feeds on the grass (1)
- cow digests the protein to amino acids and uses them to make its own protein (1)
- Max 5