

19.3 Nutrient cycles

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS nitrogen cycle • nitrogen fixation • nitrate ions
 • nitrification • ammonium ions

Objective

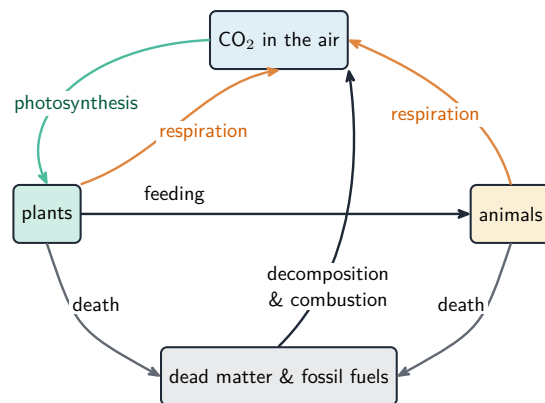
Build the skills to answer exam questions on **nutrient cycles** – the **carbon cycle** and the **nitrogen cycle**.

You must be able to:

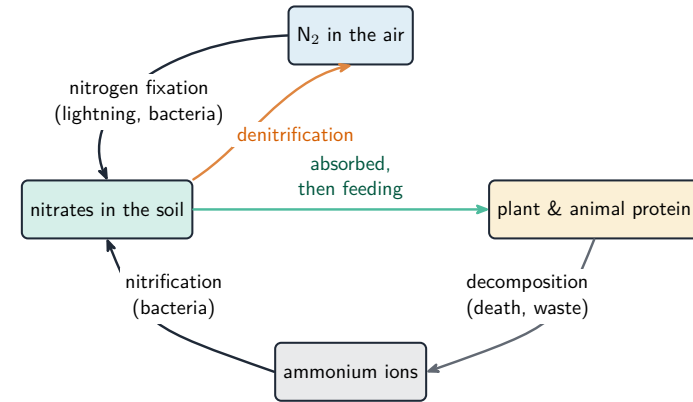
- describe the carbon cycle (photosynthesis, respiration, combustion, decay)
- describe the nitrogen cycle and the roles of microorganisms
- contrast nutrient recycling with one-way energy flow

1 Key knowledge and worked examples

■ Carbon and nitrogen cycles



Photosynthesis removes CO₂; respiration, combustion and decay return it



Microorganisms: decomposition, nitrification, nitrogen fixation, denitrification

2 Practice

2.1 Name the process that removes carbon dioxide from the air, and name one process that returns it. [2]

2.2 Name two processes that return carbon dioxide to the air. [2]

3 Exam-style questions

3.1 In the nitrogen cycle, bacteria that turn ammonium ions into nitrate ions carry out:[1]

- ☐ A nitrogen fixation
☐ B nitrification
☐ C denitrification
☐ D decomposition

3.2 The carbon cycle keeps carbon moving.

(a) Describe how carbon passes from a plant to a consumer. [1]

(b) Explain how burning fossil fuels affects the carbon cycle. [2]

Solutions

Each answer shows the steps, then the **result**.

2.1

- removes CO_2 : **photosynthesis**
- returns it: **respiration**, combustion or decomposition

2.2

- **respiration** and **combustion** (burning)

3.1 B

- ammonium $\rightarrow$ nitrate is **nitrification**
- A is $\text{N}_2 \rightarrow$ ammonium; C is nitrate $\rightarrow \text{N}_2$; D is rotting

3.2

(a)

- carbon passes from plant to consumer when the consumer **eats the plant**

(b)

- burning fossil fuels **releases** CO_2 into the air
- **adding** to the amount in the atmosphere