19.3 Nutrient cycles

Name: _____ Class: _____ Date: _____ **Total: 8 marks**

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

Objective

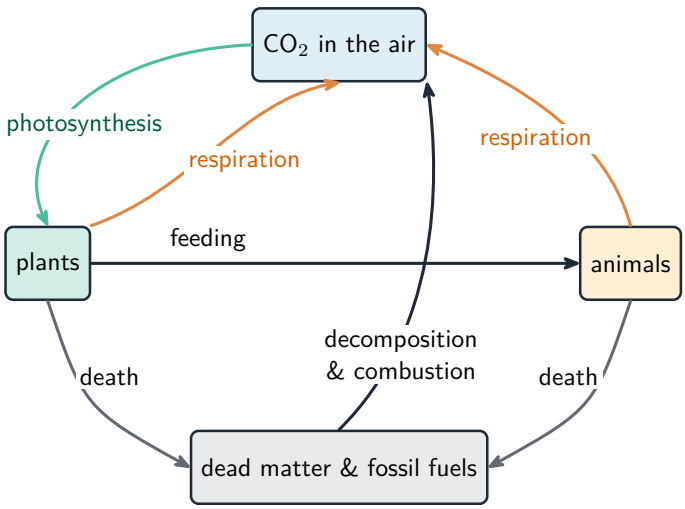
Build the skills to answer exam questions on **nutrient cycles** – the **carbon cycle** and the **nitrogen cycle** .

You must be able to:

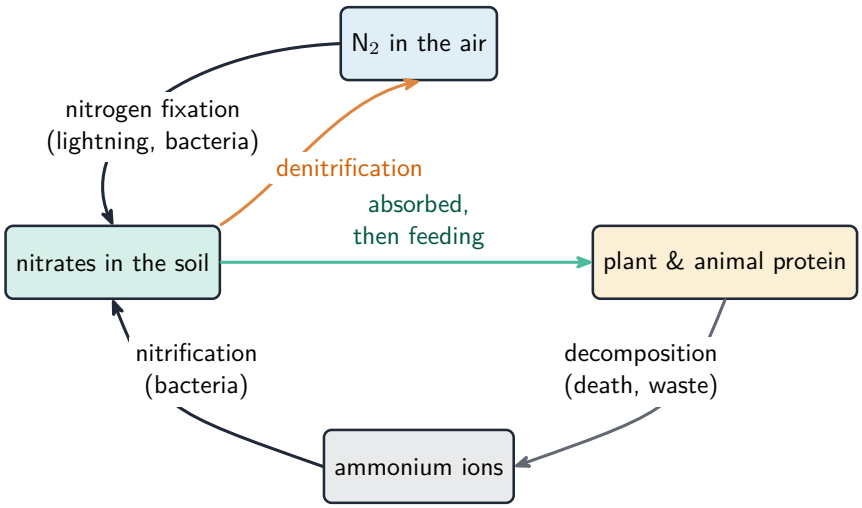
- describe the carbon cycle (photosynthesis, respiration, combustion, decay)
- describe the nitrogen cycle and the roles of microorganisms
- contrast nutrient recycling with one-way energy flow

1 Key knowledge and worked examples

Carbon and nitrogen cycles



Photosynthesis removes CO_2; 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 → nitrate is **nitrification**
- A is N_2 → ammonium; C is nitrate → 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