

## 8.5 Eutrophication

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Total: 10 marks**

**KEY WORDS** eutrophication 富营养化 • hypoxia 缺氧 • algal blooms 藻华  
• sewage treatment 污水处理

### Objective

Build the skills to answer exam questions on **eutrophication**.

**You must be able to:**

- explain the **eutrophication** 富营养化 sequence
- link nutrients to algal blooms and oxygen loss
- describe **hypoxia** 缺氧 / dead zones

### 1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

#### ■ The eutrophication sequence

1. **Excess nutrients** (nitrogen, phosphorus) enter water — usually from fertilizer runoff or sewage.
2. **Algal bloom** — algae grow explosively, covering the surface.
3. Algae **die** and **decompose**.
4. **Decomposers use up oxygen**, causing **hypoxia** (low oxygen).
5. Fish and other organisms **suffocate** — a **dead zone**.

#### ■ The key cause

The nutrients that normally **limit** algal growth (especially phosphorus) become abundant, so algae grow out of control.

#### ■ A worked link

Fertilizer runs off a farm into a lake → algal bloom → algae die → decomposers deplete oxygen → fish die.

#### ■ Dead zones

Large **dead zones** (e.g. the Gulf of Mexico) form where big rivers deliver farm nutrients to the sea.

## 2 Practice

Now apply the methods above.

**2.1** What nutrients cause eutrophication? [1]

**2.2** What happens to oxygen levels during eutrophication? [1]

**2.3** What is a dead zone? [1]

## 3 Exam-style questions

**3.1** Fish die during eutrophication because decomposition of algae [1]

- **A** adds oxygen
- **B** uses up the oxygen (causing hypoxia)
- **C** removes nutrients
- **D** cools the water

**3.2** Fertilizer runs off farmland into a lake.

(a) Describe the sequence that leads to fish deaths. [3]

(b) State one way to prevent this. [1]

**3.3** Explain why adding phosphorus in particular can trigger a bloom. [2]

## Solutions

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**2.1** Nitrogen and phosphorus.

**2.2** Oxygen is depleted (hypoxia).

**2.3** An area of water with too little oxygen to support most life.

**3.1 B** — uses up the oxygen (causing hypoxia).

**3.2** (a) Excess nutrients cause an algal bloom; the algae die and decompose; decomposers use up the oxygen, so fish suffocate. (b) Any one: buffer strips, reduced fertilizer, better sewage treatment.

**3.3** Phosphorus is usually the limiting nutrient, so adding it removes the limit and lets algae grow explosively.