

Exercise walk-through

Thermal Pollution ■ 8.6

eXercise

You must be able to

- define **thermal pollution** 热污染
- explain how warm water lowers **dissolved oxygen** 溶解氧
- give sources and solutions

Method — What it is

Thermal pollution is a harmful rise (or sometimes drop) in water temperature caused by human activity — most often **warm water discharged** from power plants used for cooling.

Method — Warm water holds less oxygen

Warmer water holds less dissolved oxygen. So thermal pollution lowers oxygen just when fish (whose metabolism speeds up in warm water) need more — stressing or killing aquatic life.

Method — Sources

Power plants and factories using water for **cooling**; also runoff from hot pavement.

Method — Solutions

Cooling towers or **cooling ponds** let the water cool before release; releasing water gradually reduces the shock.

Method — A worked link

A power plant discharges hot water into a river → the river warms → dissolved oxygen falls → fish are stressed or die.

Practice 2.1 ■ 1 mark

What is thermal pollution?

Solution 2.1

Worked steps

A harmful change (usually rise) in water temperature from human activity **B1**.

Practice 2.2 ■ 1 mark

How does warm water affect dissolved oxygen?

Solution 2.2

Method: Warm water holds less oxygen

Worked steps

Warm water holds less dissolved oxygen **B1**.

Practice 2.3 ■ 1 mark

Name one source of thermal pollution.

Solution 2.3

Worked steps

Any one: power plant/factory cooling discharge, hot pavement runoff **B1**.

Exam-style 3.1 ■ 1 mark

Warm water harms aquatic life mainly because it

- A** holds more oxygen
- B** holds less dissolved oxygen
- C** adds nutrients
- D** freezes

Solution 3.1

Method: Warm water holds less oxygen

- A holds more oxygen
- B holds less dissolved oxygen** 
- C adds nutrients
- D freezes

Worked steps

B — holds less dissolved oxygen.

Exam-style 3.2 ■ 2 marks

A power plant releases hot cooling water into a lake.

- (a) Explain how this can kill fish.
- (b) Suggest one way to reduce the thermal pollution.

Solution 3.2

Method: What it is

Worked steps

(a) The hot water warms the lake, lowering dissolved oxygen while raising fish metabolism (higher oxygen demand), so fish suffocate **M1 A1**. (b) Use a cooling tower/pond before releasing the water **B1**.

Exam-style 3.3 ■ 2 marks

Explain why the effect is worse in summer.

Solution 3.3

Worked steps

In summer the water is already warm with low oxygen, so extra heat pushes oxygen even lower, more easily killing fish **M1** **A1**.