

Exercise walk-through

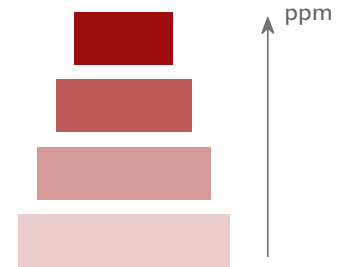
8.6

Thermal Pollution

AP Environmental Science

What we will cover

- 1 Point and nonpoint sources
- 2 Eutrophication
- 3 Persistent toxins
- 4 Waste and sewage
- 5 Toxicology
- 6 Pollution and health



Point and nonpoint sources

Pollution is sorted by whether we can trace it:

- **point source** : one clear pipe or stack
- **nonpoint source** : many spread-out places

Nonpoint (farm run-off) is far harder to control – no single pipe to plug.



Mangroves

Pollutants that do not go away

Persistent organic pollutants

Persistent organic pollutants resist breakdown, dissolve in fat and so bioaccumulate – DDT, PCBs, dioxins.

Biomagnification

Each trophic level concentrates what it eats, so top predators carry the highest burden.

Algal blooms

Algal blooms follow nutrient runoff; when the algae die, decomposition strips the oxygen and the fish suffocate.

Disease and water

Contaminated water spreads cholera and dysentery; crowding spreads **tuberculosis (TB)** – both are pollution problems as much as medical ones.

Persistence, solubility in fat, and trophic position. Those three predict where a toxin ends up.

Exercises 2.1-2.3

2.1 What is thermal pollution?

[1]

2.2 How does warm water affect dissolved oxygen?

[1]

2.3 Name one source of thermal pollution.

[1]

Exercises 2.1-2.3

2.1 What is thermal pollution? [1]

2.1

- A harmful change (usually rise) in water temperature from human activity
-

2.2 How does warm water affect dissolved oxygen? [1]

2.2

- Warm water holds less dissolved oxygen
-

2.3 Name one source of thermal pollution. [1]

2.3

- Any one: power plant/factory cooling discharge, hot pavement runoff

Exercise 3.1

3.1 Warm water harms aquatic life mainly because it

[1]

☐

A holds more oxygen

B holds less dissolved oxygen

C adds nutrients

D freezes

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3.1 Warm water harms aquatic life mainly because it

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3.1 B

- holds less dissolved oxygen

Exercise 3.2 (a)

3.2 A power plant releases hot cooling water into a lake.

(a) Explain how this can kill fish.

[2]

Exercise 3.2 (a)

3.2 A power plant releases hot cooling water into a lake.

(a) Explain how this can kill fish.

[2]

(a)

- The hot water warms the lake, lowering dissolved oxygen while raising fish metabolism (higher oxygen demand), so fish suffocate

Exercise 3.2 (b)

3.2 A power plant releases hot cooling water into a lake.

(b) Suggest one way to reduce the thermal pollution.

[1]

Exercise 3.2 (b)

3.2 A power plant releases hot cooling water into a lake.

(b) Suggest one way to reduce the thermal pollution.

[1]

(b)

- Use a cooling tower/pond before releasing the water

Exercise 3.3

3.3 Explain why the effect is worse in summer.

[2]

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[2]

3.3

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