

Exercise walk-through

8.15

Pathogens and Infectious Diseases

AP Environmental Science

Pollution and health

Harm depends on **dose**, time, and sensitivity.

- **acute** vs **chronic** effects
- **risk analysis** sets safe limits

Infectious disease spreads by
pathogens; **environmental**
change widens its reach.

dirty water → cholera

air → flu

vectors : mosquito → malaria

Sewage treatment in three stages

primary

physical: solids **settle out** in tanks

secondary

biological: **bacteria** break down the remaining organic matter

tertiary

chemical: removes **nutrients** (N and P) and disinfects, where the discharge needs it

Skip the tertiary stage and the outflow is clean of solids and pathogens but still nutrient-rich – which is how treated sewage still causes **eutrophication**.

Exam tips

- Trace **eutrophication** step by step: nutrient runoff → algal bloom → decay → oxygen depletion → fish die.
- **Bioaccumulation** builds up in one organism; **biomagnification** increases up the food chain, so top predators are hit hardest.
- Read an **LD50**: a **lower** value means **more** toxic; multiply by body mass for a lethal dose.
- Order the waste hierarchy **reduce** > **reuse** > **recycle**, and the stages of sewage treatment.
- Link pathogens to contaminated water and to clean-water/sanitation defences.

Exercises 2.1-2.3

2.1 What causes an infectious disease?

[1]

2.2 Give one example of a waterborne disease.

[1]

2.3 What is a vector?

[1]

Exercises 2.1-2.3

2.1 What causes an infectious disease? [1]

2.1

- A pathogen (bacterium, virus, or parasite)
-

2.2 Give one example of a waterborne disease. [1]

2.2

- Any one: cholera, dysentery, typhoid
-

2.3 What is a vector? [1]

2.3

- An organism that carries and transmits a pathogen

Exercise 3.1

3.1 Malaria is spread by mosquitoes, which act as a

[1]

☐

A pathogen

B vector

C host only

D nutrient

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3.1 B

- a vector

Exercise 3.2 (a)

3.2 A region with poor sanitation has frequent cholera outbreaks.

(a) Explain how cholera spreads there.

[2]

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(a)

- Sewage contaminates the drinking water with the cholera bacterium; people drink the contaminated water and become infected, spreading it further

Exercise 3.2 (b)

3.2 A region with poor sanitation has frequent cholera outbreaks.

(b) State one way to prevent it.

[1]

Exercise 3.2 (b)

3.2 A region with poor sanitation has frequent cholera outbreaks.

(b) State one way to prevent it.

[1]

(b)

- Any one: clean water supply, sewage treatment, sanitation

Exercise 3.3

3.3 Explain how climate change could increase the spread of a vector-borne disease. [2]

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3.3

- Warmer temperatures can expand the range and breeding season of the vector (e.g. mosquitoes), so the disease reaches new areas and more people