

Water

International Baccalaureate · IB Diploma · Environmental Systems and Societies · HL

Scope and prerequisites

This handout covers selected HL topics for the course first assessed in 2026; it is not the whole syllabus.

Prerequisites: read the stated quantities and units, and use arithmetic and the model conditions below.

The examples are original and fictional: they are not real measurements or real student investigations.

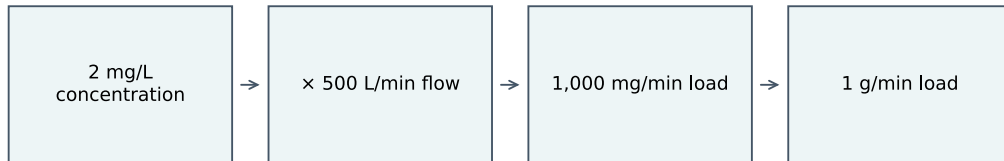
Water, pollution and management trade-offs

■ What would explain this observation?

- A downstream sample has less dissolved oxygen after a nutrient input. The explanation must connect biological processes with the water-system evidence.

■ Build the model

- **Eutrophication** can begin with nutrient enrichment, followed by greater producer growth and increased decomposition after organisms die.
- Decomposer respiration can lower dissolved oxygen.
- Water availability depends on quantity, quality and access.
- eutrophication: Nutrient enrichment with ecological consequences.
- **pollutant load** : Mass of pollutant transferred per time.



$$\text{Load} = \text{concentration} \times \text{flow} = 2 \text{ mg/L} \times 500 \text{ L/min} = 1,000 \text{ mg/min} = 1 \text{ g/min}$$

■ Choose evidence that can test it

- Distinguish concentration from total pollutant load.
- Dilution can reduce concentration without removing the pollutant mass.
- A management plan should consider upstream causes, users and effects on other parts of the catchment.

In the lab: Collect approved water-quality observations at matched sites and times. Use calibrated instruments and consistent sampling depth. Avoid contact with contaminated water and do not infer potability from clarity.

■ Work from known quantities

- Known: concentration is 2 mg per litre and flow is 500 litres per minute.
- Load = concentration $\times$ flow = $2 \times 500 = 1,000$ mg per minute = 1 g per minute.
- A lower concentration during high flow can still produce a high total load.

Your turn: Concentration is 3 mg/L and flow 200 L/min. Find load in mg/min.

■ Check the conclusion and its limits

- Clear water is not necessarily safe water.
- Nutrient enrichment does not directly use up oxygen; the pathway includes biological activity and decomposition.

Not true: Clear water is always safe to drink. Clarity shows only that little is suspended. Dissolved metals, pathogens and many chemicals are invisible; safety requires testing against standards, not looking at the water.

Key:

- Eutrophication can begin with nutrient enrichment, followed by greater producer growth and increased decomposition after organisms die.
- Distinguish concentration from total pollutant load.
- Watch for: clear water is not necessarily safe water.

■ Write from a load of 400 mg per minute

- Concentration is 5 mg per litre and flow is 80 litres per minute.
- Find the load. Clear water is not evidence that the water is safe to drink.