

Water · supported focus

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

Scope and prerequisites

Supported HL focus. First assessment 2026; current SL/HL brief acquired. Remaining guide, assessment and practical requirements retain their recorded holds.

Prerequisites: read the stated quantities and units, use arithmetic and the model conditions below. Each lesson develops its own method before independent transfer.

These are original or explicitly fictional teaching examples, not actual measurements or completed assessed learner investigations.

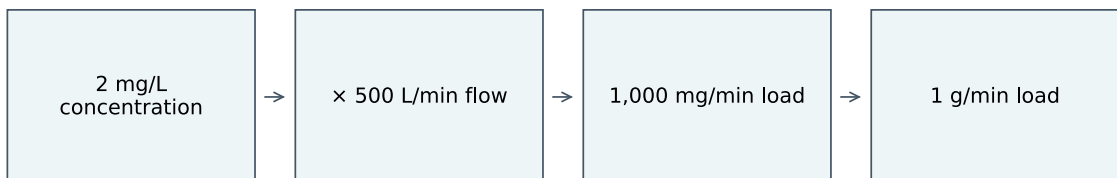
Water, pollution and management trade-offs

■ 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.
- Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

■ 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.



■ 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.
- 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

- State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution.
- 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.

Example:

Concentration is 3 mg/L and flow 200 L/min. Find load in mg/min. Use the same sequence: known quantities $\rightarrow$ model $\rightarrow$ relation $\rightarrow$ substitution $\rightarrow$ unit and interpretation.

■ 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.
- Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Warn:

Clear water is always safe to drink. This claim is false: Clear water is not necessarily safe water. Nutrient enrichment does not directly use up oxygen; the pathway includes biological activity and decomposition.

Key:

Water, pollution and management trade-offs: 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.