

Foundation

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.

Environmental systems, feedback and perspectives

■ What would explain this observation?

- A lake can respond to the same nutrient input differently depending on its current state. Environmental outcomes depend on **stocks**, **flows** and feedback.

■ Build the model

- A system model has a boundary, stores and flows.
- Negative feedback counteracts change; positive feedback amplifies it.
- An environmental perspective shapes what people value and which management outcomes they prioritize.
- stock : An amount held within a system.
- flow : Transfer of an amount per unit time.



$$\text{Final stock} = \text{initial stock} + \text{inflows} - \text{outflows} = 800 + 120 - 90 = 830$$

■ Choose evidence that can test it

- Separate physical evidence from value judgements.
- A stock is an amount at a time; a flow is an amount per time.
- Sustainability decisions require ecological, social and economic evidence and a stated scale.

In the lab: Draw the system boundary before calculating a budget. Identify inflows, outflows and possible unmeasured terms. Compare stakeholder claims using the same evidence, then explain where values lead to different choices.

■ Work from known quantities

- Known: a reservoir begins with 800 units, receives 120 and loses 90 during a week.
- Change in storage = inflow-outflow = $120 - 90 = 30$.
- Final storage = $800 + 30 = 830$ units.
- The model assumes no omitted flow.

Your turn: A stock starts at 600, receives 80 and loses 110. Find final stock.

■ Check the conclusion and its limits

- A balance that closes mathematically can still omit a real process if terms were estimated to fit.
- Positive feedback does not mean a socially desirable result.

Not true: Positive feedback always produces a socially beneficial outcome. “Positive” in positive feedback means the change is AMPLIFIED, not that the outcome is good. Melting permafrost releasing methane is positive feedback with harmful consequences; desirability is a separate judgement.

Key:

- A system model has a boundary, stores and flows.
- Separate physical evidence from value judgements.
- Watch for: A balance that closes mathematically can still omit a real process if terms were estimated to fit.

■ Write from a final stock of 475

- A store starts at 450 units, receives 60 and loses 35.
- Find the final stock. Positive feedback means a change is amplified, not that the outcome is good.