

Integration of body systems · supported focus

International Baccalaureate · IB Diploma · Biology · HL

Scope and prerequisites

Supported HL focus. First assessment 2025; current subject brief acquired; full Biology guide not 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.

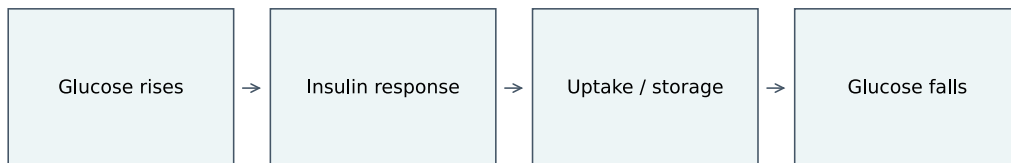
Feedback and internal conditions

■ What would explain this observation?

- Blood glucose rises after a meal, but usually does not keep rising indefinitely. A control system responds to the change in internal conditions.
- Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

■ Build the model

- **Homeostasis** maintains internal conditions within suitable limits. Receptors detect changes, coordination centres process information, and effectors respond. **Negative feedback** opposes the original change.
- homeostasis: Maintenance of suitable internal conditions; negative feedback: A response opposing the original change.



■ Choose evidence that can test it

- When blood glucose is high, insulin helps increase glucose uptake and storage as glycogen. When it is low, glucagon supports release of glucose from stores. These responses are coordinated, not identical effects of two hormones.
- Interpret a time graph by identifying the initial disturbance, the response and the return toward the normal range. Mark the delay before a response. Do not assume a graph shows an instantaneous correction.

■ 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: glucose changes from 5.0 to 7.0 arbitrary concentration units. Increase = final - initial. Increase = $7.0 - 5.0 = 2.0$ units. Percentage increase = $2.0/5.0 \times 100 = 40\%$. The numerical change is evidence of a disturbance, not a diagnosis on its own.

Example:

A value rises from 4.0 to 5.0. Calculate the percentage increase. Use the same sequence: known quantities → model → relation → substitution → unit and interpretation.

■ Check the conclusion and its limits

- Negative feedback does not mean the response is harmful or the measured value becomes negative. Diabetes has different mechanisms; do not treat every case as a failure to make insulin.
- Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Warn:

Negative feedback always makes the measured value negative. This claim is false: Negative feedback does not mean the response is harmful or the measured value becomes negative. Diabetes has different mechanisms; do not treat every case as a failure to make insulin.

Key:

Feedback and internal conditions: When blood glucose is high, insulin helps increase glucose uptake and storage as glycogen. When it is low, glucagon supports release of glucose from stores. These responses are coordinated, not identical effects of two hormones.