Homeostasis and coordinated responses

Student activity • observation and reasoning

YEAR 11 / LESSON 73 / BIOLOGY + SCIENCE (DOUBLE AWARD)

The question

How can a coordinated response keep internal conditions suitable?

Use the supplied examples, record your reasoning and correct it using evidence.

Equipment

- Student booklet, paper models, pencil and ruler

Paper, modelling and written reasoning only. No chemicals or biological samples are handled.

Course coverage: Shared Biology / Double Award: 2.80–2.82 and 2.86. Homeostasis and communication.

Plan, model or apparatus sketch

Draw and label the apparatus or biological model; identify one limitation.

Method and reasoning

Read the whole sequence before starting

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1. Define stimulus, receptor and effector using a temperature-change example.

2. Draw a pathway from detection through coordination to a muscle or gland response.

3. Explain homeostasis as maintaining a relatively stable internal environment within limits.

4. Compare nervous impulses with hormones carried in blood, considering speed, target specificity and duration.

5. Explain that hormones act on cells with suitable receptors, not on every cell equally.

6. Evaluate a thermostat analogy and identify that organisms have multiple interacting controls and changing demands.

Cleanup

- Return models and keep the corrected work.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Homeostasis supports conditions needed for cellular processes, including suitable temperature and water balance. Nervous responses are often rapid and targeted; hormonal responses often last longer, although generalisations have exceptions. An effector carries out a response.

Example / trial	Observation / evidence	Explanation / limit
Evidence / comparison		
Explanation		
Limit / correction		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. What is a receptor?

2. What is an effector?

3. Give two regulated conditions.

4. How do hormones travel?

5. Why do only some cells respond to a hormone?

6. Does homeostasis mean no change ever occurs?