Skin and temperature regulation

Student activity • observation and reasoning

YEAR 11 / LESSON 78 / BIOLOGY + SCIENCE (DOUBLE AWARD)

The question

How can skin responses change heat transfer?

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

Equipment

- Student booklet, pencil and ruler
- Skin cross-section reference and unlabelled diagrams

Paper, modelling and written reasoning only. No chemicals or biological samples are handled. No deliberate overheating or cold exposure.

Course coverage: Shared Biology / Double Award: 2.93. Sweating and skin blood flow.

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. Draw skin with sweat glands and superficial blood vessels.

2. Explain how evaporation of sweat transfers energy from the skin; sweating without evaporation provides less cooling.

3. Show vasodilation increasing blood flow near the surface and generally increasing heat transfer when the surroundings are cooler.

4. Show vasoconstriction reducing superficial blood flow and limiting heat loss.

5. Explain that vessels change diameter rather than moving up and down in the skin.

6. Evaluate why humidity, airflow and environmental temperature can change the effectiveness of these responses.

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

Temperature regulation involves heat production and heat transfer. Sweat cools through evaporation, not simply because liquid appears. Vasodilation and vasoconstriction alter flow to superficial vessels. This is a model lesson; no deliberate overheating or cold exposure is used.

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 process makes sweat cooling effective?

2. How can high humidity limit cooling?

3. What is vasodilation?

4. What is vasoconstriction?

5. Do vessels move nearer the surface?

6. Why does environmental temperature matter?