Higher Tier — Separate Science

Full Higher Separate content. ★ = Higher Tier. ◆ = Separate Science only.

Q1. Describe THREE ways the body responds when core temperature rises above 37°C.

[3 marks]

Q2. Describe THREE ways the body responds when core temperature falls below 37°C.

[3 marks]

Q3. State which part of the brain controls thermoregulation and explain how it detects temperature changes.

[2 marks]

★ HIGHER TIER

Q4. ★ Explain why it is important to maintain body temperature at approximately 37°C.

[3 marks]

Total: 11 marks

Thermoregulation

Q1 (3 marks)

Describe THREE ways the body responds when core temperature rises above 37°C.

- Sweating: water evaporates from skin → removes heat [1]
- Vasodilation: blood vessels near skin widen → more blood flows near surface → more heat radiated [1]
- Hairs lie flat: reduces insulating air layer → increases heat loss [1]

Q2 (3 marks)

Describe THREE ways the body responds when core temperature falls below 37°C.

- Shivering: involuntary muscle contractions → generate heat [1]
- Vasoconstriction: blood vessels near skin narrow → less blood near surface → less heat lost [1]
- Hairs stand up: traps warm air layer → increases insulation [1]

Q3 (2 marks)

State which part of the brain controls thermoregulation and explain how it detects tempera…

- Hypothalamus [1]
- Detects temperature of blood flowing through it — monitors core blood temperature directly [1]

Q4 (3 marks) [★ HT]

★ Explain why it is important to maintain body temperature at approximately 37°C.

- Enzymes in body cells have an optimum temperature of approximately 37°C [1]
- At 37°C, enzymes work at maximum efficiency — metabolic reactions proceed at the required rate [1]
- Above 40°C, enzymes begin to denature; below 35°C (hypothermia) — enzyme activity slows critically [1]