Year 10 Science: Thermoregulation: how your body controls its temperature

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. What is normal human core body temperature, and which part of the brain controls it?

2. Explain how sweating cools the body.

3. Why do your fingers go pale and cold on a frosty morning?

4. Explain why thermoregulation is called negative feedback.

5. A runner's face turns red in a race. Name the process and explain how it helps.

Fix the mistake

6. Correct this statement: "Sweat cools you down because sweat is cold."

7. Correct this statement: "Shivering warms you up because your muscles rub together and make friction."

8. Correct this statement: "The skin decides when to sweat or shiver."

9. Correct this statement: "Negative feedback means the body's response is bad for it."

Answer key (for parents and tutors)

1. What is normal human core body temperature, and which part of the brain controls it?
   About 37 °C, normally 36.5 to 37.5 °C; the hypothalamus.
2. Explain how sweating cools the body.
   Sweat glands release sweat, and as the water evaporates it takes thermal energy from the skin.
3. Why do your fingers go pale and cold on a frosty morning?
   Vasoconstriction narrows skin blood vessels, so less warm blood reaches the fingers and less heat is lost from them, keeping the core warm.
4. Explain why thermoregulation is called negative feedback.
   A change in temperature triggers responses that act against that change, returning temperature to normal, after which the responses stop.
5. A runner's face turns red in a race. Name the process and explain how it helps.
   Vasodilation: skin blood vessels widen, so more warm blood flows near the surface and more heat is lost to the air.
6. Correct this statement: "Sweat cools you down because sweat is cold."
   Sweat comes out at body temperature; it only cools you as it evaporates, taking thermal energy from the skin, so sweat that drips off does little.
7. Correct this statement: "Shivering warms you up because your muscles rub together and make friction."
   Shivering muscles contract rapidly, and the extra respiration needed for that releases thermal energy.
8. Correct this statement: "The skin decides when to sweat or shiver."
   Skin receptors only send information; the hypothalamus is the control centre, and it also has its own receptors that sense the temperature of the blood.
9. Correct this statement: "Negative feedback means the body's response is bad for it."
   Negative means the response acts against the change, so a rise in temperature triggers cooling and a fall triggers warming, bringing it back to normal.