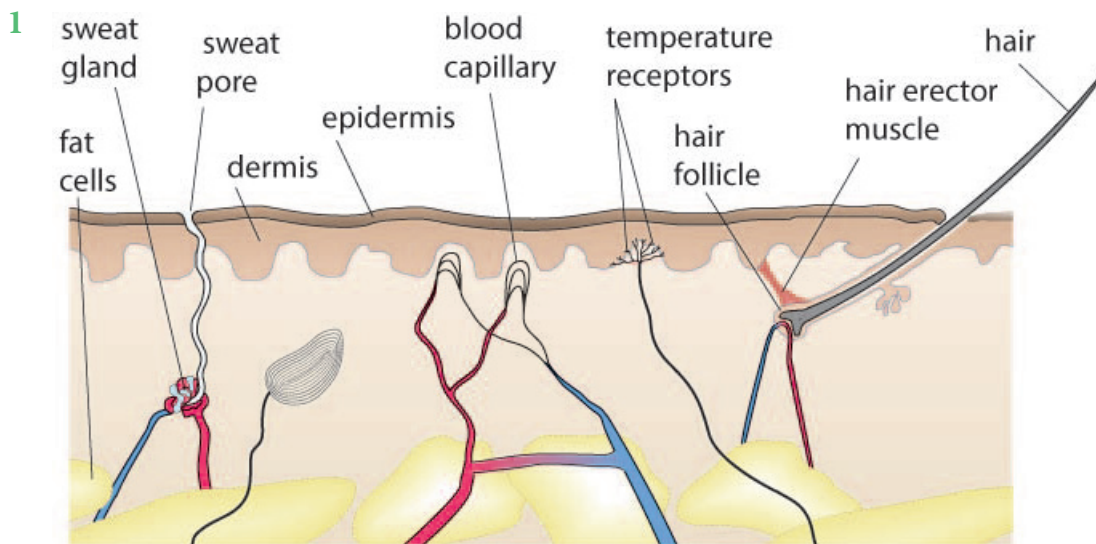


# Answers to Worksheets

## Chapter 14

### Worksheet 14.1 Keeping warm




- 2 a Fat cells provide insulation. They reduce the amount of heat that can be lost from the body by conduction.
- b Arterioles supplying skin capillaries constrict, reducing the amount of blood flowing through them and so reducing the amount of heat lost from the blood by radiation.
- c Muscles generate heat by contracting and relaxing very quickly, called shivering.
- d The hypothalamus constantly monitors the temperature of the blood. When the temperature begins to fall, the hypothalamus sends nerve impulses to the skin and muscles to bring about the actions described in **b** and **c**.

### Worksheet 14.2 Surviving hypothermia

- 1 Between 37 °C and 38 °C.
- 2 A small baby has a higher surface-area-to-volume ratio. Heat is lost from the body surface, so the larger the surface area, the faster heat is lost. It is mostly lost by radiation.

Heat is produced by the body cells; if the body has a small volume, then less heat is produced.

- 3 Homeostasis (*also accept negative feedback*).

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- 4 When the temperature is low, molecules have less kinetic energy and move more slowly. This reduces the frequency of collisions between them – for example, between an enzyme and its substrate. This slows the rate of metabolic reactions.
  - 5 All metabolic reactions, including respiration, would have slowed down. This means that her cells needed less oxygen. So, even though no blood was flowing in her blood system and no oxygen was being transported to her cells, the fact that they were not using much allowed them to survive.