# 7.5 Temperature control

## Science understanding

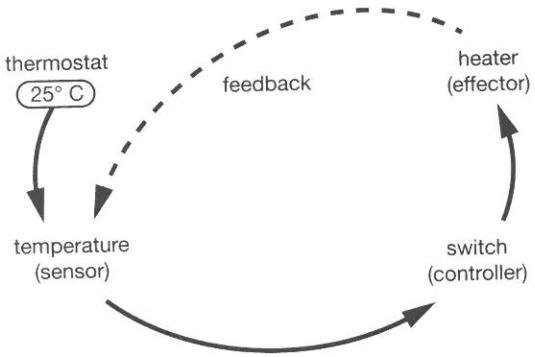
Visual/spatial Verbal/linguistic

### Feedback systems

The control of temperature is a feedback system. There are three main parts to a feedback system: sensor, controller and effector.

Automatic heating and cooling of a building depends on a feedback system. Once the thermostat has been set at a particular temperature, the thermometer (the sensor) detects (senses) the temperature. If the temperature is below the set temperature, the switch (controller) is activated and the heater (effector) starts working to raise the temperature. The rise in temperature feeds back to the thermometer (the sensor). When the set temperature is reached, the switch turns the heater off.

This information can be summarised in a simple diagram.




1 Imagine the thermostat is still set at 25°C. **Construct** the feedback system that would cool the room if the sensor detected that the room was too warm (35°C).

## Temperature control in the body

The temperature control system of the body is more complex.

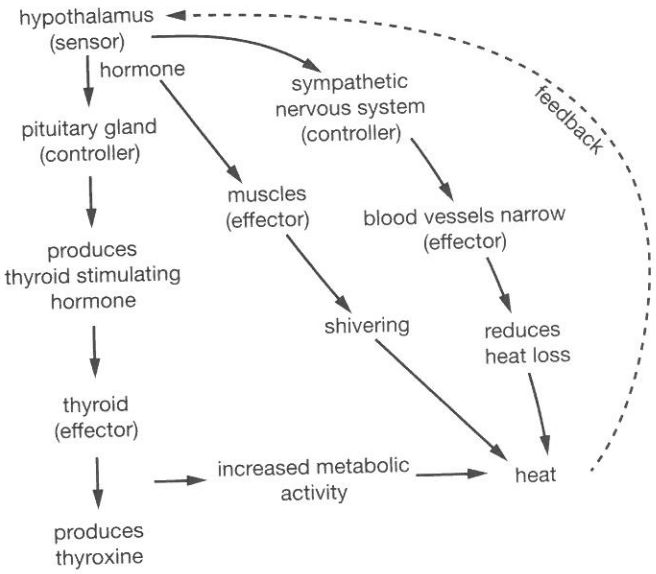



**Figure 7.5.1** The body's feedback system when the core temperature falls

**2** To the right of Figure 7.5.1, **construct** a similar diagram showing the body's feedback system when the core temperature (the temperature within the body) starts to rise.

Your skin also has temperature sensors. These temperature sensors send nerve impulses to the brain. The brain 'tells' the body to react in the same ways as a stimulus from the hypothalamus. The brain also causes the hypothalamus to become more sensitive to changes in core temperature.

**3** **Discuss** the advantages of having two types of temperature sensors—the hypothalamus and receptors in the skin.