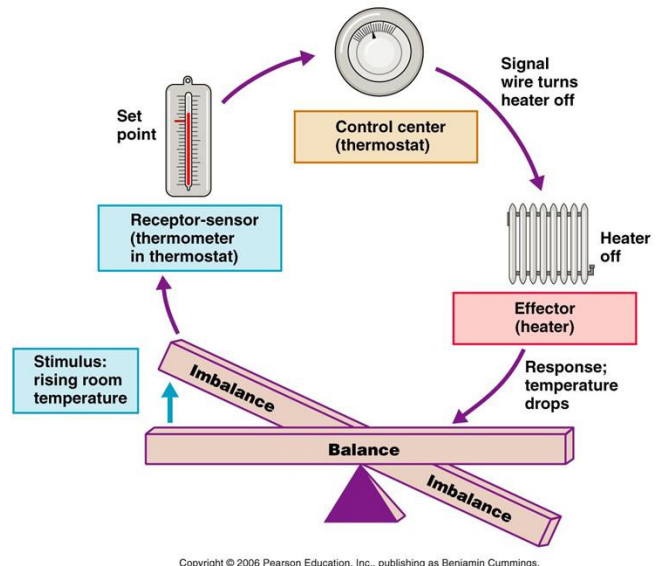


HOMEOSTASIS

All cells and organisms must maintain a constant balance in their internal environment in order to stay alive. **Homeostasis** is the process by which cells maintain a balance. Many organisms use feedback mechanisms to maintain homeostasis. A **feedback mechanism** is a system of checks and balances in which the end product in a series of steps controls the first step in the series. It involves constant communication by various parts of the body.

Thermoregulation is an example of how homeostasis is maintained through a feedback mechanism. In this case, communication takes place between the brain and the skin. The brain monitors body temperature and sends signals to the sweat glands in the skin. If the temperature is too high, the sweat glands will release water. As sweat evaporates, the temperature drops. Once the temperature is back within a normal range, the brain instructs the sweat glands to stop secreting water. This is an example of **negative feedback**, because it shuts off the original stimulus to return the body to normal.



Some homeostatic mechanisms use a positive feedback system. **Positive feedback** is the opposite of negative feedback because it causes a further increase in response. One example is the onset of contractions in childbirth. When a contraction occurs, the hormone oxytocin causes a nerve stimulus, which stimulates the hypothalamus to produce more oxytocin, which increases uterine contractions. This results in contractions increasing in amplitude and frequency. Another example is the process of blood clotting. The loop is initiated when injured tissue releases signal chemicals that activate platelets in the blood. An activated platelet releases chemicals to activate more platelets, causing a rapid cascade and the formation of a blood clot.

PRACTICE

1. Which type of feedback system operates to shut itself off?
2. Compare and contrast negative and positive feedback systems.