

## Homeostasis and Negative Feedback

**Homeostasis** is one of the fundamental characteristics of living things. It refers to the maintenance of the internal environment within tolerable limits. All sorts of factors affect the suitability of our body fluids to sustain life; these include properties like temperature, salinity, acidity, and the concentrations of nutrients and wastes. Because these properties affect the chemical reactions that keep us alive, we have built-in physiological mechanisms to maintain them at desirable levels.

When a change occurs in the body, there are two general ways that the body can respond. In **negative feedback**, the body responds in such a way as to reverse the direction of change. Because this tends to keep things constant, it allows us to maintain homeostasis. On the other hand, **positive feedback** is also possible. This means that if a change occurs in some variable, the response is to change that variable even more in the same direction. This has a de-stabilizing effect, so it does not result in homeostasis. Positive feedback is used in certain situations where rapid change is desirable.



To illustrate the components involved in negative feedback, we can use the example of a driver trying to stay near the speed limit. The desired value of a variable is called the *set point*. Here, the *set point* is a speed of 55 mph; in controlling body temperature, the set point would be 37°C. The *control center* is what monitors the variable and compares it with the set point. Here, the control center is the driver; for body temperature, it would be the hypothalamus of the brain. If the variable differs from the set point, the control center uses *effectors* to reverse the change. Here, the effector is the foot on the accelerator pedal; in controlling body temperature, it would include the glands that sweat and the muscles that shiver.

# Homeostasis and Negative Feedback Questions

1. Define homeostasis from the readings.
2. List some factors that homeostasis regulates in your body.
3. Define negative feedback. Explain how this relates to the concept of homeostasis?
4. Define positive feedback. Explain how this relates to the concept of homeostasis?
5. Explain how homeostasis is like driving a car.
6. Describe what the cartoon would be like if it was drawn of positive feedback.
7. Create your own cartoon of a negative feedback system that would occur in the human body. Include and explain all the components of a negative feedback system (a set point, a control center and an effector).