



# Feedback Loops Activity

By Karyn Coulon

## Objective

Using examples from the human body, students identify the elements of a feedback system, and create a flowchart to model the feedback system.

## Background

Teachers are constantly giving students feedback. But what do we really mean by that word *feedback*? Feedback gives information to an organism about maintaining **homeostasis** (stability).

One example of a feedback system is a thermostat connected to a furnace. The thermostat compares the temperature of the air in the room to a pre-determined setting. If the temperature in the room is below that ideal setting, the thermostat signals the furnace to send warmer air into the room. When the air in the room becomes warmer than the desired temperature, the thermostat stops signaling the furnace. The furnace switches off. If the air in the room grows cool again, the furnace switches on. The cycle repeats indefinitely, as information about the system's status is constantly *fed back* into the system. Because of their cyclical nature, feedback systems are often referred to as **feedback loops**.

Humans, like all mammals, have numerous feedback loops to maintain homeostasis.

Our physiological feedback systems have three key features:

1. A **receptor** that can evaluate the **stimulus** (change in environment) and sends a message to...
2. An **integrating center** (Brain) that processes the information and sends a message to...
3. An **effector** that acts on the stimulus and causes a **response** (reaction) in the organism.



## Group Activity

Your group will be assigned one of the following mechanisms for maintaining stability/homeostasis below. The choices are temperature, blood pressure, or carbon dioxide.

1. Read the example of the homeostatic mechanism.
2. Identify the following in the example you are given and list the structures they are associated with.

**Stimulus**

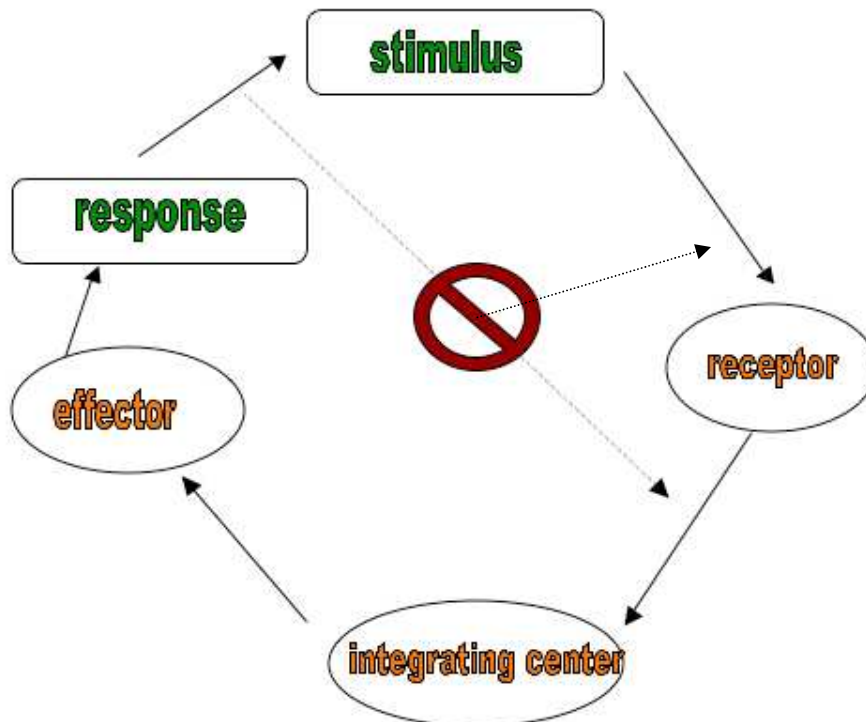
**Receptor**

**Integrating center**

**Effector**

**Response**

3. Create a flow chart similar to the one below using the structures that you have identified in your given mechanism.





## Homeostasis of Temperature (cold)

Our bodies try to maintain a constant temperature close to 98.6 F or 37 C. If the environment gets cold we often shiver to get warm. This is an automatic response to maintaining temperature.

## Homeostasis of Temperature (hot)

If the environment gets hot we often sweat to keep from getting too hot. Shivering and sweating are homeostatic mechanisms of maintaining a constant temperature.

## Blood Pressure

In the example of blood pressure increasing, receptors in the carotid arteries detect the change in blood pressure and send a message to the brain. The brain will cause the heart to beat slower and thus decrease the blood pressure. Decreasing heart rate has a negative effect on blood pressure.



## Carbon Dioxide

When we exercise our muscles give off carbon dioxide as a waste product. This increase in the level of carbon dioxide in the blood. Receptors in the carotid arteries sense the change in carbon dioxide and send a message to the brain. The brain will stimulate the lungs to increase respiration. This will lower the amount of carbon dioxide in the blood.