

# Homeostasis

- Homeostasis describes **the relatively constant internal physical and chemical conditions that organisms maintain despite changes in internal and external environments.**
- Your body's **organ systems** are **working together** constantly to maintain homeostasis
- A **disturbance** in homeostasis results in **death**

# Homeostasis

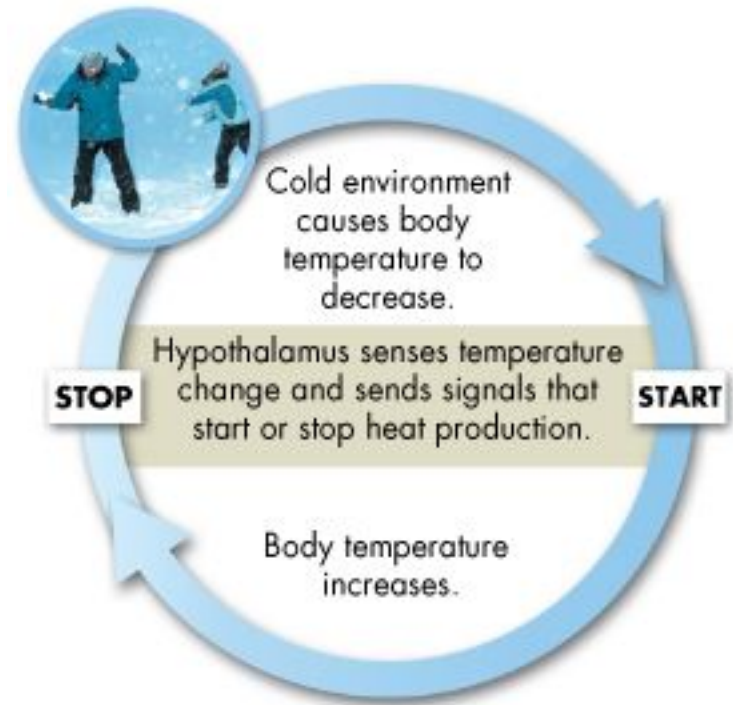
- All homeostatic control systems have at least three components:
  - 1. Receptor: senses a change in the environment (stimuli)**
    - Examples: touch or temperature receptors in skin
  - 2. Control center: analyzes information and determines response**
    - Examples: brain or endocrine system organs
  - 3. Effector: responds according to control center**
    - Examples: muscles or glands

# Types of Feedback Loops

- There are two types of feedback:
  1. **Negative**
  2. **Positive**
- 1. Negative feedback
  - **Counteracts** the stimulus
  - Returns body to starting state
  - Most common type of feedback loop
- 2. Positive feedback
  - **Amplifies** the initial stimulus
  - Takes body further away from starting state
  - Rare in the human body

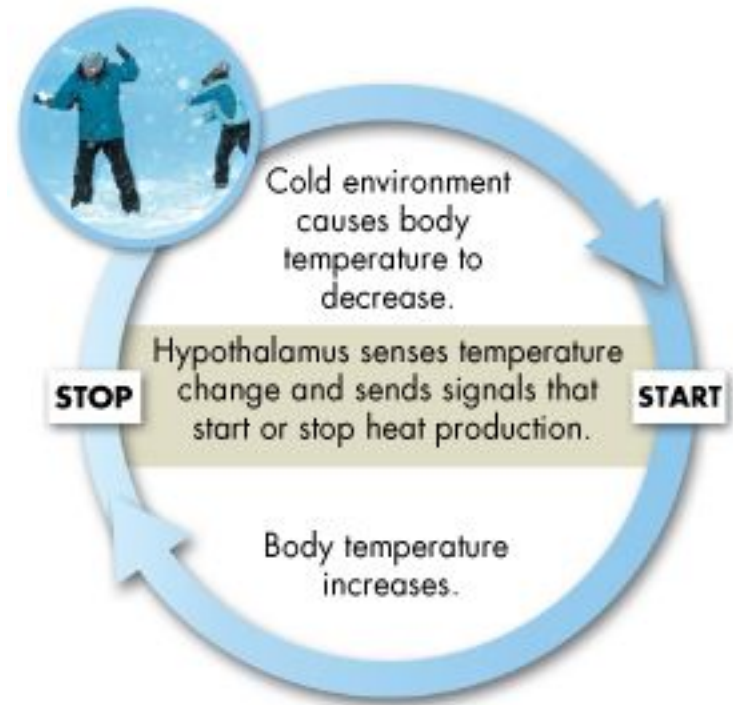
## Negative Feedback Example

- **Body temperature regulation** is an example of negative feedback.
- If you are in a cold environment, **sensory receptors in your skin** detect this stimuli.
- Receptors in the skin **send this information to the hypothalamus**.



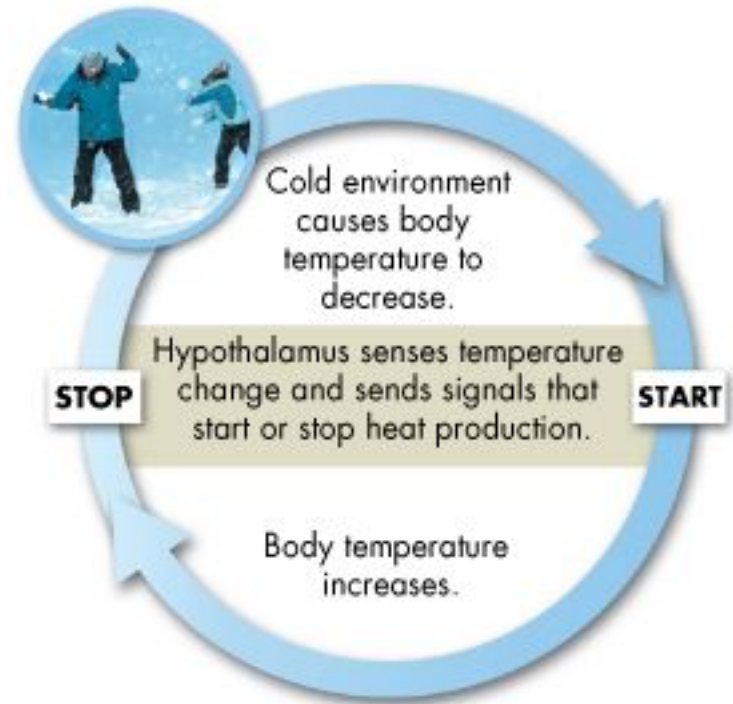
## Negative Feedback Example

- The **hypothalamus releases chemicals** that signal muscles just below the skin to contract involuntarily or “shiver”
- These **muscle contractions release heat**, which helps the body temperature to rise toward the normal range.



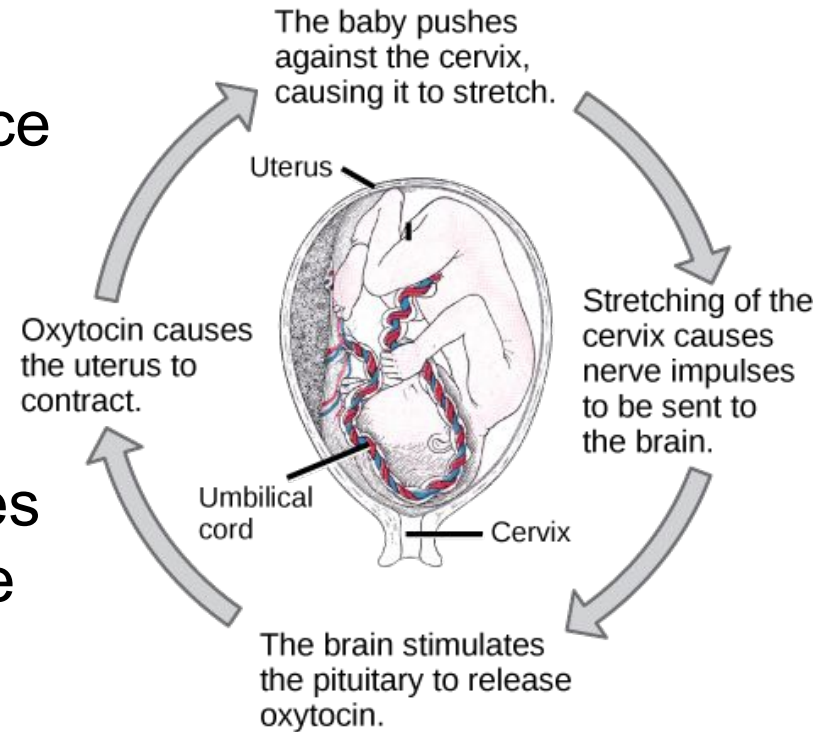
## Negative Feedback Example

- Stimulus: **Decreased body temperature due to cold environment**
- Receptor: **Temperature receptors in skin**
- Control Center: **Brain**
- Effector: **Involuntary muscle contractions (shivering)**
- Response: **Body temperature increases, returning to normal**



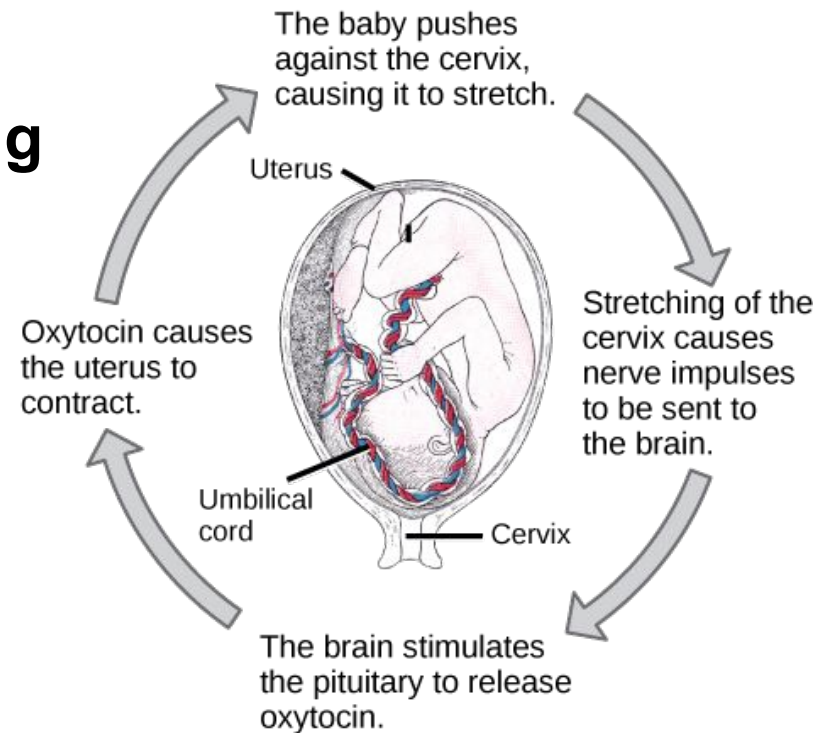
# Positive Feedback Example

- Childbirth is an example of **positive feedback**.
- A **baby's growth** takes up space in the uterus. The baby pushes against the cervix, causing it to stretch.
- **Stretching of the cervix** causes nerve impulses to be sent to the **brain**.



## Positive Feedback Example

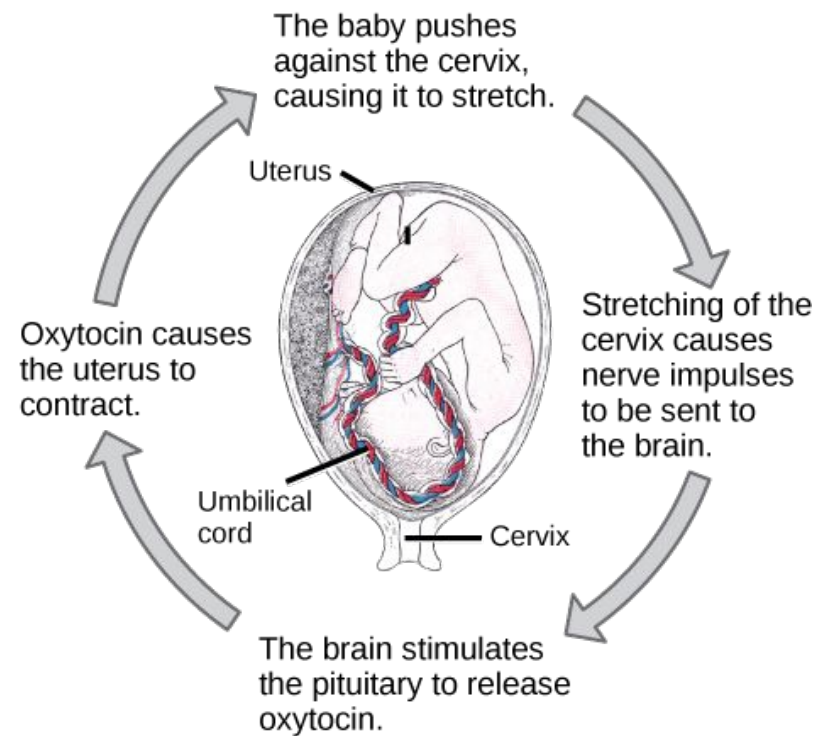
- The brain stimulates the **pituitary gland to release oxytocin.**
- Oxytocin causes the uterus to **contract, increasing stretching of the cervix.**
- Contractions get stronger and stronger until the baby is delivered.





## Positive Feedback Example

- Stimulus: **Baby's growth**
- Receptor: **Stretch receptors in cervix**
- Control Center: **Brain**
- Effector: **Pituitary gland releases oxytocin**
- Response: **Contractions (stretching of cervix)**



# Whiteboard Examples

- Draw a diagram to illustrate the feedback loops discussed in the notes. Make sure you include the stimulus, the response, and the 3 components of homeostatic control systems.
1. Low body temperature
  2. Childbirth