

# Homeostasis

"Homeostasis" - ability to maintain relatively stable internal conditions

## Term 'Homeostasis'

- What: The term 'homeostasis' is derived from two Greek words;
  - *Homeo* which means 'unchanging'
  - *Stasis* which means 'standing'
- Why: "Homeostasis" - to maintain relatively stable internal conditions
- How: Feedback loops

*What does the word "feedback" mean? With what do you associate this term?*

•Brainstorm:

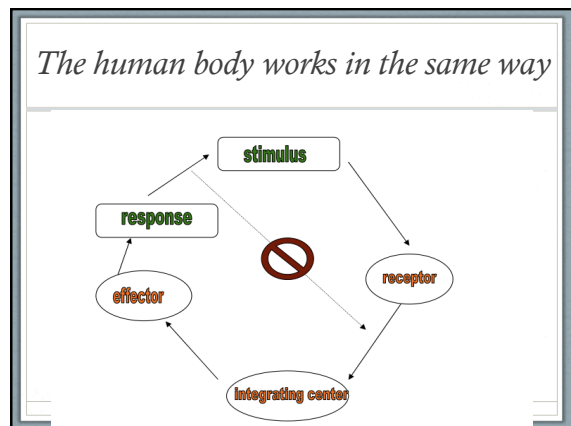
## Feedback Loop

- Example: Progress Report Cards and Grades
  - *Why: for students to gauge their performance in there classes.*

*What would you consider normal or acceptable range for your grades? What happens when you fall outside of (below) that range?*

- Brainstorm:

- *You have to do work and change their behavior in order to get back into that acceptable range.*



*“What things/processes in the human body need to be kept within a particular range?”*

- Body Temperature
- Blood pressure
- Blood pH
- O<sub>2</sub> and CO<sub>2</sub> concentration
- Osmoregulation-Water balance
- Blood glucose

### OVERVIEW:

#### Parts of Body Involved

- kidneys:**
  - regulate water & mineral salts concentration
- skin:**
  - regulate body temperature
- liver & pancreas:**
  - regulate blood glucose level

### Osmoregulation (Water & Mineral salts)

- Regulate water potential in Tissue Fluid
- Organ involved: **KIDNEYS**

### Osmoregulation - Feedback loop

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### Osmoregulation (Water & Mineral salts)

- After having a very salty meal
  - ⇨ produce concentrated urine to remove excess salts in solution form
  - ⇨ extra water is needed to be excreted along with the excess salts
  - ⇨ sensation of thirst (drink more water to compensate for the water loss)

## Thermoregulation (Body Temperature)

- Regulate body temperature
- Organ involved: Skin

## Thermoregulation (Regulation of Body Temperature)

- **Homoiotherms (warm-blooded animals)**
  - keep body temperature constant even in winter by increasing metabolic rate
  - e.g. birds, mammals



## Thermoregulation (Regulation of Body Temperature)

- **Poikilotherms AKA cold-blooded animals**
  - body temperatures vary with that of the environment
  - e.g. reptiles, fish, amphibians



## Mechanisms for Thermoregulation

- Insulation
  - Fur
  - Hair
  - Feathers
  - Fat
  - Blubber
- Evaporative cooling
  - sweating, panting, bathing
- Shivering
- Nonshivering thermogenesis & brown fat
- Circulation adaptations
  - Countercurrent exchange
  - Vasodilatation (cooling)
  - Vasoconstriction (heat conservation)
- Behavioral responses

## Glucoregulation (Sugar)

- Regulate body sugar
- Organ involved: Liver & Pancreas

## Regulation of Blood Glucose Level

- ↳ controlled by **Negative feedback mechanism**
- ↳ controlled by **insulin** secreted from the **pancreas**

