Homeostasis

EQ: How does homeostasis manage our internal environment?
How do organisms work?

- Organisms must carry out many chemical reactions to grow, obtain energy, and reproduce.
- Many organisms also move, breathe, produce heat, and do other tasks.
- All of these activities require a relatively stable internal environment.
How does the environment impact organisms?

– The external environment around an organism is constantly changing.

– These environmental changes threaten the stability of an organism’s internal environment.

– Failure to respond to change can result in an organism’s death.
What is Homeostasis?

– The process by which organisms maintain a relatively stable internal environment
– Conditions within the body must remain within a narrow range – like your body temperature
– Important Variables:
  – blood sugar
  – fluid balance
  – blood pressure
  – body temperature
  – oxygen levels
  -- pH
How do human handle homeostasis?

– Humans are constantly subjected to environmental stresses that threaten to upset the delicate balance that exists within our cells and tissues.

– Humans require multiple systems for digestion, respiration, reproduction, circulation, movement, coordination, and immunity.

– Our organ systems interact to maintain homeostasis.
Questions:

1. Write a short explanation of how you think a thermostat on a furnace helps to keep the room temperature at a comfortable level.

2. How does the human body act like a thermostat?
To help understand homeostasis, let's think about how a thermostat works:

- Increase room temperature
- Thermostat senses temperature change and switches off heating system
- Decrease room temperature
- Thermostat senses temperature change and switches on heating system
How does your body manage change?

- Your body has a variety of feedback mechanisms that detect changes in the body’s internal environment and make corrections.
- A feedback mechanism is a mechanism in which the last step in a series of events controls the first step.
- Our bodies have both negative and positive feedback.
What is negative feedback?

- Negative feedback is necessary for homeostasis
- every time the body is too high or too low from normal level a signal tells the body to make changes that will bring body back
- Examples:
  - body temperature
  - control of blood sugar
Body temperature increases

Hypothalamus sends a message to blood vessels

Skin blood vessels dilate

Body temperature decreases

Normal body temperature
Negative Feedback Loop Example:

Holding breath, CO₂ levels rise

Control system forces exhale, inhale

O₂/CO₂ level returns to normal
What is positive feedback?

- Positive feedback increases the change (brings the body further from homeostasis)
- Example: Blood Clotting