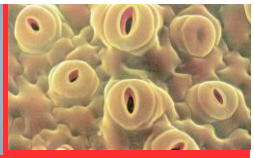
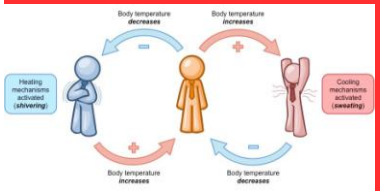
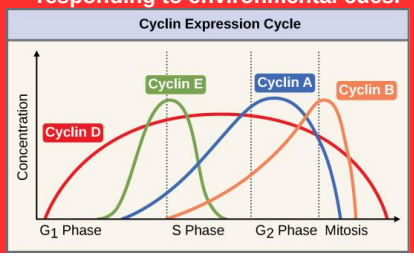


4.5 Feedback



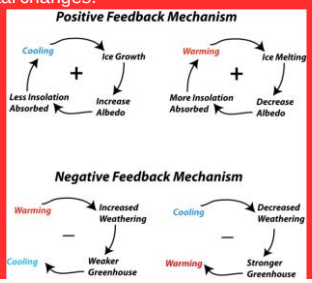
ENDURING UNDERSTANDING

ENE-3 Timing and coordination of biological mechanisms involved in growth, reproduction, and homeostasis depend on organisms responding to environmental cues.



ENE-3.A Describe positive and/or negative feedback mechanisms.

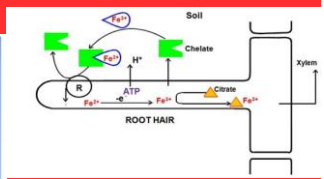
- Organisms use feedback mechanisms to maintain their internal environments and respond to internal and external environmental changes.



Plant Regulation

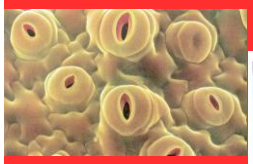
- During dry conditions certain plants drop their leaves to check water loss.
- Certain plants actively pump minerals through their roots, which increases the solute concentration of the cell sap in the root hair helping to increase osmosis.

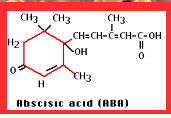
Ocotillo stem, having shed its leaves during a drought and a Ocotillo stem, have leafed out and bloomed following a rain.

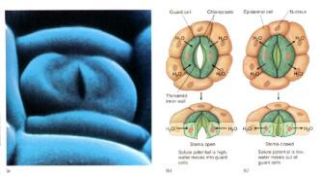


Plant Regulation

- Stomata
  - Hydrostatic pressure keeps stomata open, decrease closes stomata.
  - Abscisic Acid (ABA) closes stomata during stress

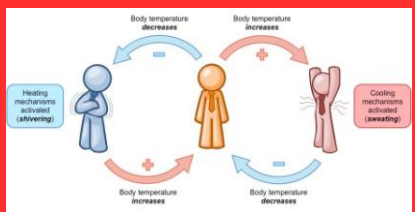






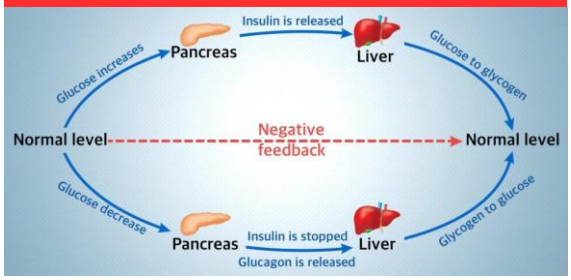
ENE-3.B Explain how negative feedback helps to maintain homeostasis.

- Negative feedback mechanisms maintain homeostasis for a particular condition by regulating physiological processes. If a system is perturbed, negative feedback mechanisms return the system back to its target set point. These processes operate at the molecular and cellular levels.



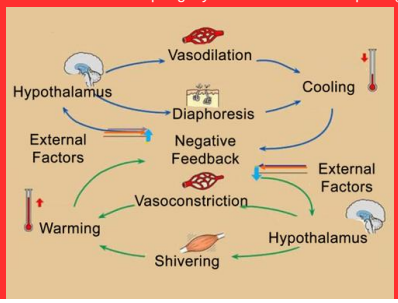
ENE-3.B Explain how negative feedback helps to maintain homeostasis.

- Blood Glucose Levels (- feedback)
  - Regulated by insulin and glucagon



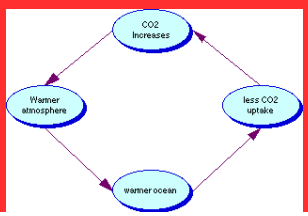
Regulation of Body Temperature

- Normal is 37º C or 98.6º F.
- Hypothalamus (in Brain) is temp. control center.
- Interleukins- Released from phagocytes and raise the set point (fever)

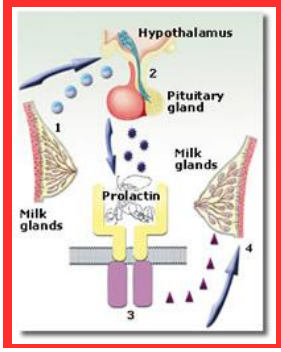


ENE-3.C Explain how positive feedback affects homeostasis

- Positive feedback mechanisms amplify responses and processes in biological organisms. The variable initiating the response is moved farther away from the initial set point. Amplification occurs when the stimulus is further activated, which, in turn, initiates an additional response that produces system change.

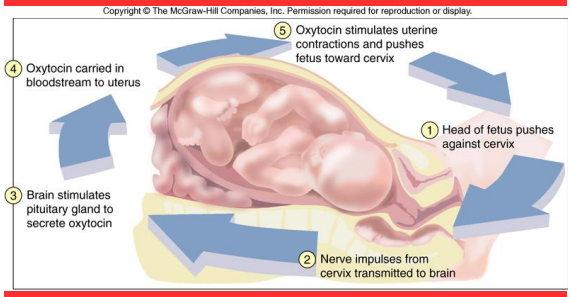


Lactation Response



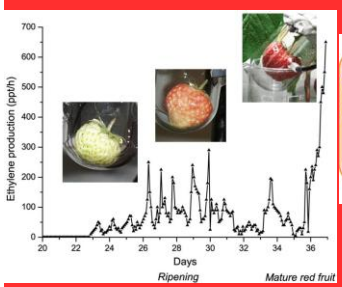
1) When the baby beings to suck, some nerve cells in the mother's breast send a message to the hypothalamus.
2) On receiving the message, the hypothalamus removes the brake from the prolactin.
3-4) In order to begin the production of mother's milk, the prolactin secreted by the pituitary gland stimulates the milk glands in the mother's breast.

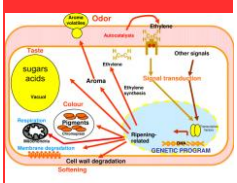
Labor Response



Ripening of Fruit

•Ethylene triggers ripening signal pathway in fruit





Blood Clotting

- Injury attracts platelets which release clotting factor which attract more platelets