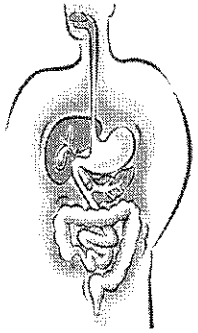
Digestive System

9th grade Biology

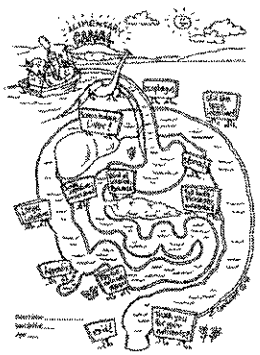
The Digestive System



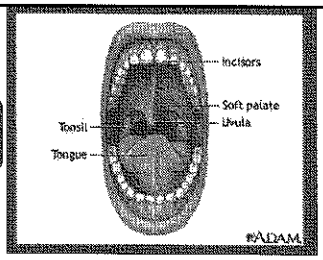
- Digestion is the mechanical and chemical breakdown of food into forms that cells can absorb
  - Mechanical digestion simply breaks pieces down and increases the surface area
  - Chemical digestion changes the composition and chemical makeup to aid absorption

The digestive system consists of:

- ALIMENTARY CANAL
  - from the mouth to the anus.
  - Includes the mouth, pharynx, esophagus, stomach, small intestine, large intestine, and anal canal
- Accessory Organs include salivary glands, liver, gallbladder, and pancreas

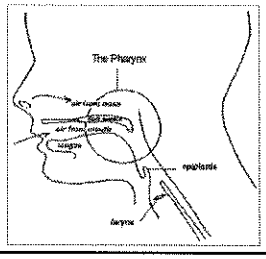


Mouth



- First portion of the alimentary canal
- Mechanical mastication (chewing)
- Chemical digestion begins when saliva mixes with food.
  - Salivary glands secrete saliva that contains the enzyme amylase which breaks starch and glycogen polymers into simpler sugars (dissacharides)

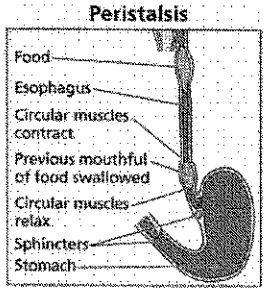
- **Pharynx**: portion of the digestive tube between the mouth and the esophagus
- **Bolus**: mass of food mixture and saliva
- **Esophagus:** tube that connects the pharynx and the stomach

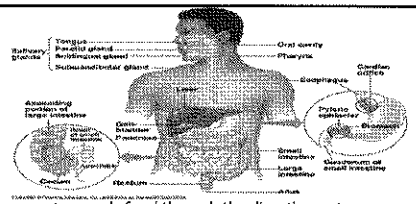


How does the food move through the digestive system?

Propelling movements
- PERISTALSIS: rhythmic movements that cause food to be pushed forward in the tube

Mixing movements
- Smooth muscles contract rhythmically allowing food contents to mix with digestive juices

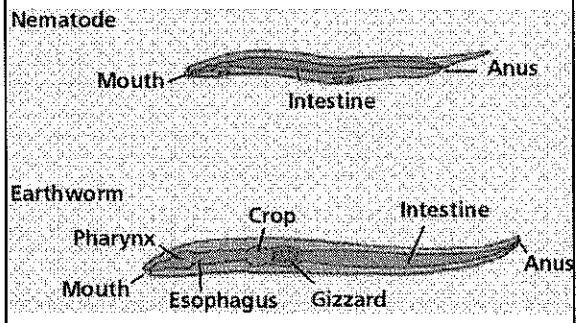




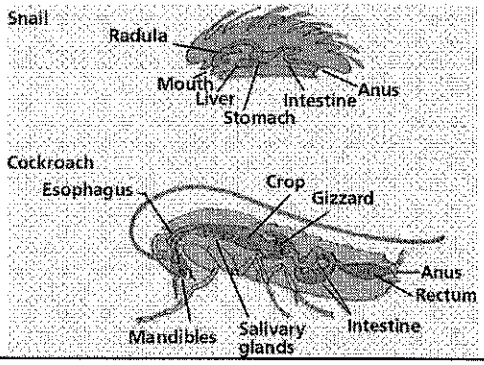
- **Movement:** propels food through the digestive system
- **Secretion:** release of digestive juices in response to a specific stimulus
- **Digestion:** breakdown of food into molecular components small enough to cross the plasma membrane
- **Absorption:** passage of the molecules into the body's interior and their passage throughout the body
- **Elimination:** removal of undigested food and wastes

Stages of Digestion

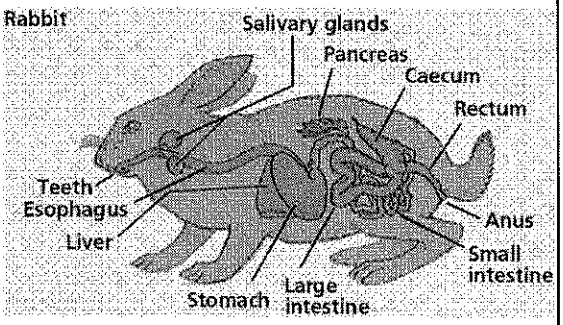
Digestion Systems in Animals



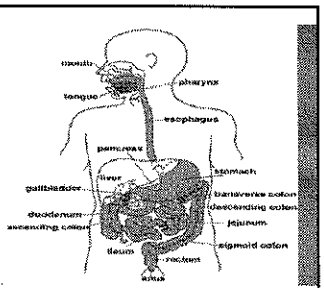
Digestion Systems in Animals



Digestion System in Animals

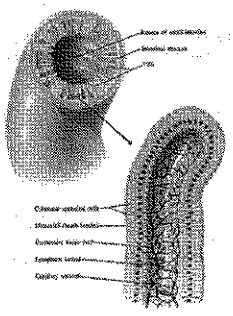


- **Mouth:** chewing (mechanical breakdown of food)
- **Pharynx:** releases salivary amylase (chemical breakdown of food)
- **Esophagus:** connects mouth to stomach; muscle movement called peristalsis
- **Stomach:** Stores & breaks down food (with gastric juices) then releases into small intestines
  - Pepsin:an enzyme produced in the stomach that splits proteins into peptones



- Small intestines: final digestion – breaks down food with help of…
  - **Pancreas:** release digestive juices (lipase) that break down fats and proteins
  - **Liver:** release bile – helps absorb fats; also filters out wastes
  - **Gall bladder:** stores bile
- Large intestines: water, salts, & vitamins are absorbed (includes colon – last chance to absorb water)
- Rectum: storage for solid wastes

Importance of the villi..



- Villus= fingerlike extension of the lining of the small intestine
  - Nutrients diffuse into capillaries in the villi and reach body cells by means of circulating blood
  - Increase the surface area of the small intestine
  - Give the small intestine approx the same surface area as a tennis court

List of enzymes involved in digestion:

- Salivary amylase (ptaylin) produced in your mouth by your salivary glands breaks down starchs into sugars.
- Pepsin is secreted by the gastric glands. It is made in the [illegible] (the main digestive gland), it breaks down proteins into peptides.
- Amylase which is made by the pancreas also breaks down [illegible] sugars.
- Lipase which is made by the pancreas breaks down lipids [illegible] eids, breaks down fats found in most dairy products, nuts, oils, and meat
- Trypsin is made by the pancreas breaks down peptides into amino acids.
- Sucrase that is made by ileum breaks down sucrose (table sugar) into glucose and fructose. The enzymes in your [illegible] to break down food, and the enzymes that get secreted in the stomach are called gastric enzymes.

Time for digestion

- Mouth 5-30 s
- Esophagus 10s
- Stomach 2-24 h
- Small intestine 3-4 h
- Large intestine 18h-2days