What is digestion?

Digestion is the process of breaking down food into simple substances that can be absorbed by the body.

2. What are the two general types of animal digestive systems?
   A. Ruminant
   B. Non-ruminant

3. Examine the parts of the digestive system in ruminants and non-ruminants.
   Have students label a blank drawing of a simple stomach and a ruminant stomach as they follow along with teacher.

4. Explain the function of the different parts of a ruminant digestive tract and what the purpose of each is.
   A. Mouth and teeth-The mouth of a bovine lacks upper teeth, instead he has a hard pallet. Grass is ripped instead of bitten and is swallowed with little chewing.
   B. Rumen-Approximately 40-gallon capacity contains microbes that are responsible for the breakdown of cellulose into volatile fatty acids, which the bovine uses for energy. During this process, the microbes produce waste products: methane, carbon dioxide, and heat.

1. Rumination- because the bovine has not really chewed, the grass particles in the rumen are large and cannot be worked upon as effectively by the bacteria. The bovine then ruminates, or regurgitates the roughage for further chewing and then swallows again for digestion.

2. Eructation-The waste products of methane and carbon dioxide must be removed from the rumen. Once gas levels have increased to a certain point, the bovine will belch (or eructate) eliminating the gas.

C. Reticulum-Approximately 5 gallon capacity and acts as a sieve preventing large grass particles from entering the omasum.
D. Omasum-Approximately 15-gallon capacity.
E. Abomasum-Approximately 7 gallon capacity-is also known as the true stomach@ because it contains stomach acids similar to humans. Digestion of proteins begins here.
F. Small intestine-Up to 150 ft. in length. Aides in digestion of fats, proteins, carbohydrates, and absorption of volatile fatty acids, glucose, and amino acids.
G. Cecum-3 gallon capacity. Further digestion of roughage by microbes-some absorption of VFA's and AA.
H. Large intestine-33 ft. long. Water conservation-some absorption of VFA=s and AA.

5. Nonruminant Stomach
   A. Gastric juices start flowing when feed enters the stomach. They are secreted by glands in the stomach wall. The gastric juices are made up of 0.2-0.5 percent hydrochloric acid. Gastric juices contain the enzymes; gastric lipase, pepsin, and rennin. The muscles of the stomach walls churn and squeeze the feed. Liquids are then passed into the small intestine.

6. Digestion in Poultry

A. Explain the crop – feed is first taken here for storage. Feed is softened by saliva and crop wall secretions. From the crop, feed goes to the glandular stomach and then to the muscular stomach. The gizzard crushes and mixes feed
B. with digestive juices. Ceca are two blind pouches that store moist feed. The cloaca is where the large intestine comes together with the vent. Feces are passed through the vent along with eggs from the oviduct and urine from the kidneys.

7. Absorption of Feed

A. Most of the absorption on digested feed occurs in the small intestine.
   B. Ruminants – have some absorption in the rumen.
   C. Villi in the small intestines are responsible for absorption.
   D. Some absorption occurs in the large intestine such as water and some nutrients.

8. Metabolism – Defined as the chemical and physical processes that handle nutrients after they have been absorbed during the digestive process.

9. Explain what a non-ruminant can eat in comparison to a ruminant.
A. Ruminants can digest large amounts of grasses and roughage.
B. Non-ruminants can more easily process fats and proteins.

10. Define enzymes.
   A. Organic catalyst that speed up the digestive process.
   B. Examples, salivary amylase and salivary maltase