Animal nutrition and digestion

Digestive System Modeling

Do all animals have similar digestive systems? Can all animals digest the same foods?

Background
Animals (including humans) have adapted to be able to use different food sources over time. What effects do those adaptation have on digestive systems? Typically, in anatomy classes, only human digestion is discussed, but there is diversity among the digestive systems of various animals that can explain why some animals have different feed rations and nutrition requirements. There are four basic types of digestive systems: monogastric (humans, pigs, dogs, cats, horses), avian (chickens and other birds), ruminant (cows and goat), and pseudo-ruminant (camels and alpacas) in animals. However, **digestion**, the break down of food into smaller nutrients for absorption and use by the body, is a similar process across all species. Enzymes and other digestive juices are required to help with digestion.

For an overview of basic digestive enzymes see: https://www.verywellhealth.com/what-are-digestive-enzymes-1945036.

Your assignment is to use materials that are readily available to you to model one of the four digestive systems and describe how each major organ helps to digest food (i.e. what enzymes are secreted within each organ and where is each nutrient absorbed).

Materials (suggestions)
modeling clay
Mpe cleaners/fuzzy sticks
Φarn
PVC pipe (complete or cut in half long ways)
Ctyrofoam
Masta noodles
poster board

Procedure

1. Research your assigned digestive system.
2. In a separate document record each part of your digestion system and a brief description of each part. Include what each part does and what it breaks down or absorbs. Make note of specialized structures that help the digestive system to digest specific types of food.

   Words that you might come across include: alimentary canal, anus, bile, chyme, duodenum, esophagus, gallbladder, gastrovascular cavity, gizzard, ileum, jejunum, large intestine, liver, omnivore, pancreas, peristalsis, proventriculus, rectum, roughage, ruminant, salivary amylase, small intestine, sphincter, stomach, villi, omasum, rumen, abomasum, reticulum, caeca, cloaca, crop.
3. Make a rough sketch of an example of the system within an animal that has your assigned digestive system type.
4. Check with other members of your group. Determine which animal you will use to model your digestive system type and what materials you will use.
5. Make a model of the animal and its digestive system as a group from the materials provided to you, or ones that you provide.
6. Label all the parts of your model. Include your description of the model on a separate piece of paper.
7. Present your information to your larger group of different digestive systems or to your class.

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Rubric for assessment

Digestive model rubric	10 points	8 points	6 points	4 points	2 points
Model	Shows all the major parts of the digestive system	Is missing one major part	Is missing multiple parts	Only has a couple major parts	Does not have recognizable parts
Organ system accuracy	Each organ is placed and labeled correctly	There is one mistake in either labeling or location	There are multiple mistakes on location and labeling	Most parts are located or labeled incorrectly	Is missing most parts and labeling
Description accuracy	Each description is accurate	There is one mistake in the descriptions	There are multiple mistakes in the decryptions	Most descriptions are wrong	Missing most descriptions
Neatness	Model looks very nice and presentable	Model looks a little sloppy	Model looks messy	Model does not seem like much time has been spent on it	Missing most of the model
Presentation	Student was able to verbally explain the assignment	Student was able to mostly explain the assignment	Student missed some key components	Student missed most key components	The student did not present