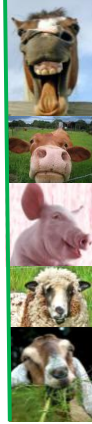


ANIMAL DIGESTION

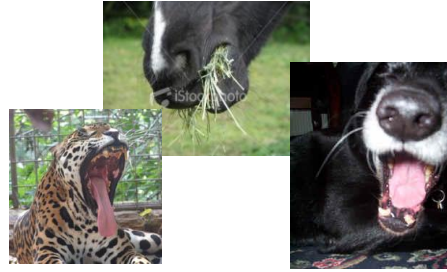
At the completion of this unit students will be able to:

- A. Describe the major parts and functions of the digestive system
- B. Define Monogastric and list characteristics of monogastric animals
 - C. Describe the Ruminant Digestive System
 - D. Describe the Avian Digestive System
- E. Classify animals according to their type of digestion
- F. List Digestive Enzymes and their function



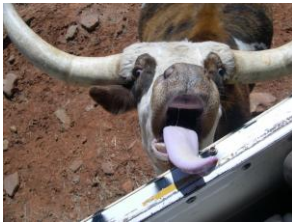
A. Describe the major parts and functions of the digestive system

The **MOUTH** is the starting point that begins the digestive process.



A. Describe the major parts and functions of the digestive system

The **TONGUE** is used for grasping the food, mixing, and swallowing.



A. Describe the major parts and functions of the digestive system

The **TEETH** tear and chew the feed into smaller particles that may be swallowed.

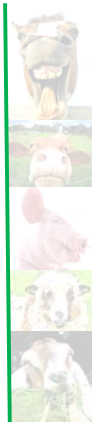


A. Describe the major parts and functions of the digestive system

In the mouth

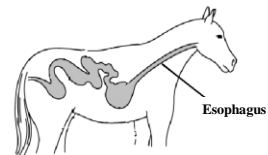
SALIVARY GLANDS: *excrete saliva, which serves many purposes:*

- Water to moisten
- Mucin to lubricate
- Bicarbonates to buffer acids
- Enzyme amylase to breakdown carbs.

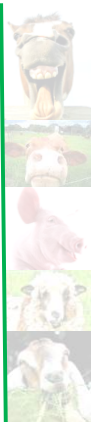


A. Describe the major parts and functions of the digestive system

The **ESOPHAGUS** is the hollow muscular tube that leads from the mouth to the opening of the stomach.

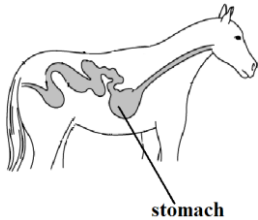


Review: What type of muscle makes up the esophagus?



A. Describe the major parts and functions of the digestive system

The **STOMACH** is a hollow muscle that contracts and relaxes to integrate digestive juices with the food causing it to breakdown

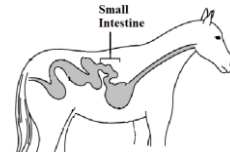


A. Describe the major parts and functions of the digestive system

The **SMALL INTESTINE** is the next organ in the digestive system that is controlled by a **sphincter muscle** that helps move food into and through the tract.

The small intestine is made up of three segments

- 1- Duodenum
- 2- Jejunum
- 3- Ileum



A. Describe the major parts and functions of the digestive system

The Small Intestine cont'd:

DUODENUM

-First segment

-Uses **secretions** from the pancreas and intestinal wall to break down **protein, starch, and fats.**

JEJUNUM & ILIUM:

-where **absorption** takes place

Absorption is the process which nutrients are passed from the intestine to the bloodstream.



A. Describe the major parts and functions of the digestive system

The Small Intestine cont'd:

Walls of the Jejunum & Ileum...

VILLI

- Small **fingerlike projections**
- Increase **surface area** for absorption
- Absorb nutrients through membranes known as **semipermeable membranes.**
- These membranes allow particles to pass through in a process called **diffusion.**

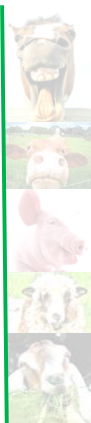
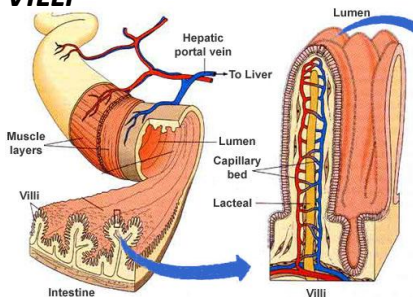


A. Describe the major parts and functions of the digestive system

The Small Intestine cont'd:

Walls of the Jejunum & Ileum...

VILLI

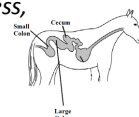


A. Describe the major parts and functions of the digestive system

The **LARGE INTESTINE** is the last organ of the digestive tract.

It contains two segments:

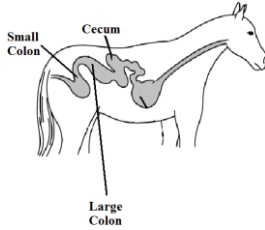
- 1- **Cecum:** is where **fibrous** food such as hay and grass is broken down into **usable** nutrients.
- 2- **Colon:** provides a **storage space** for waste from the digestive process, and is the **largest** part of the large intestine.



A. Describe the major parts and functions of the digestive system

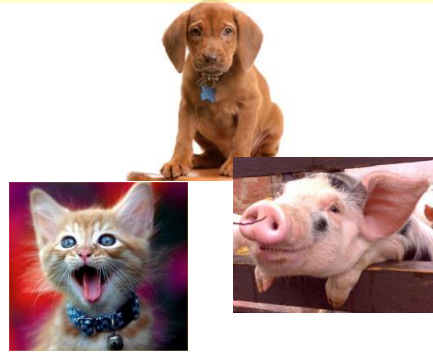
The **LARGE INTESTINE** cont'd

Rectum is the **terminal end** of the large intestine and the entire digestive system.



B. Define Monogastric and list characteristics of monogastric animals

Monogastric= 1 Simple Stomach



B. Define Monogastric and list characteristics of monogastric animals

Characteristics:

TEETH



They have an **UPPER & LOWER set**

B. Define Monogastric and list characteristics of monogastric animals

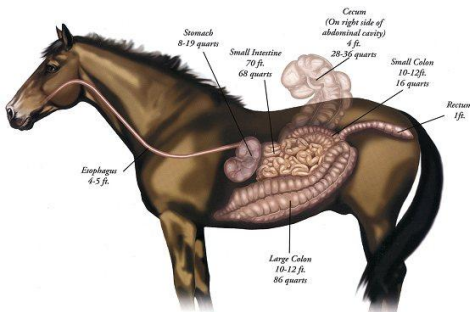
Characteristics:

DO NOT Chew Cud



Factoid: Horses cannot vomit

B. Define Monogastric and list characteristics of monogastric animals



<http://www.youtube.com/watch?v=437FXjcwKvI>

C. Describe the Ruminant Digestive System

Ruminant Systems:

A system with four compartments:

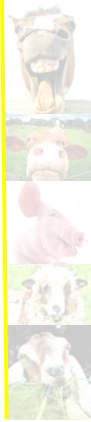
- 1- Rumen** (Paunch)
- 2- Reticulum** (honeycomb)
- 3- Omasum** (Many piles or pages of a book)
- 4- Abomasum** (true or glandular)

These ruminant animals are often called "cud chewers"

C. Describe the Ruminant Digestive System

1- Rumen

- Serves as a storage vat where food is soaked, mixed, and fermented by bacteria.
- It contains *fingerlike projections called papillae* that absorb nutrients through the rumen wall to provide energy.



C. Describe the Ruminant Digestive System



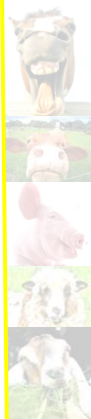
C. Describe the Ruminant Digestive System

2- Reticulum (Honeycomb or Hardware)

- 2nd Compartment
- Contains bacteria & microbes to promote fermentation
- Food is ingested then, Eructated, and chewed & swallowed again

***Eructated means vomit*

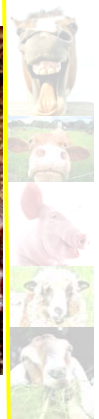
Factoid: Non digestible items that are consumed such as small stones, nails, or wire fall into the reticulum. They usually stay in the reticulum



C. Describe the Ruminant Digestive System



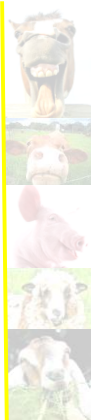
Reticulum: Honeycomb



C. Describe the Ruminant Digestive System



Why is the reticulum often referred to as the “Honeycomb” or “Hardware Stomach”?



C. Describe the Ruminant Digestive System

Factoid:

In young ruminants, there is a structure called a **Reticular groove** or *heavy muscular fold that allows milk from the mother to bypass the rumen and reticulum to go directly to the omasum.*

Why??



C. Describe the Ruminant Digestive System

3-Omasum (Many plies or pages of a book)



C. Describe the Ruminant Digestive System

3-Omasum (Many plies or pages of a book)

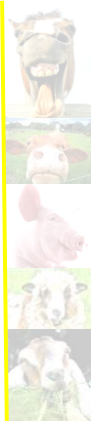
- A round organ with walls that contain many folds or “plies”
- Lined with blunt muscular papillae that grind roughage.



C. Describe the Ruminant Digestive System

4-Abomasum (True or glandular)

- This compartment is the only glandular (true) stomach of the ruminant.
- Secretes gastric juices to digest microbes



C. Describe the Ruminant Digestive System



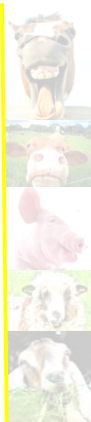
C. Describe the Ruminant Digestive System

Characteristics of ruminants:



Ruminants do not have upper front teeth.

Instead, they have a **dental pad** that works with the **lower front teeth (incisors)** in tearing off feedstuff.



C. Describe the Ruminant Digestive System

Characteristics of ruminants:



Saliva does not contain enzymes

...though they produce large quantities.

Factoid: A full grown steer produces about 50 liters of saliva per day.



C. Describe the Ruminant Digestive System

Characteristics of ruminants:



Saliva does not contain enzymes

...though they produce large quantities.

Factoid: A full grown steer produces about 50 liters of saliva per day.

C. Describe the Ruminant Digestive System

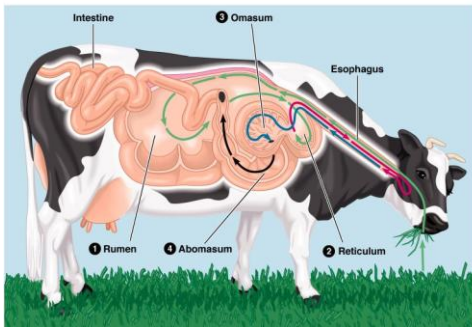
Characteristics of ruminants:



Chew Cud

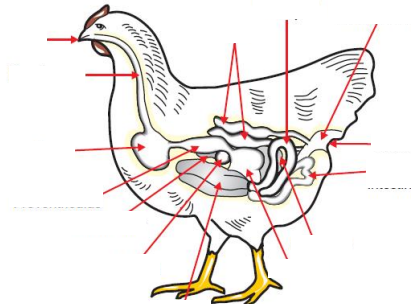
<http://www.youtube.com/watch?v=pbe14aiSLyg>

C. Describe the Ruminant Digestive System



D. Describe the Avian Digestive System

Avian Digestive System



D. Describe the Avian Digestive System

Avian Digestive System

- 1- **Mouth:** No teeth-NO chewing
- 2- **Esophagus**
- 3- **Crop:** Pouch where food is stored and soaked

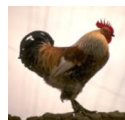


Factoid: an empty crop is what sends hunger signals to the bird's brain.

D. Describe the Avian Digestive System

Avian Digestive System

- 4- **Proventriculus:** true stomach where hydrochloric acid is added (remember no physical breakdown of the feed has begun)

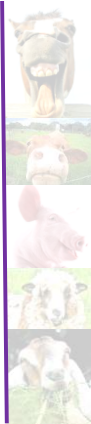


D. Describe the Avian Digestive System

Avian Digestive System

5- Gizzard: Muscular organ with stones or grit to function LIKE teeth to grind food

-Often find small pieces of stones here that the bird ate. They help in the breakdown of feed.



D. Describe the Avian Digestive System

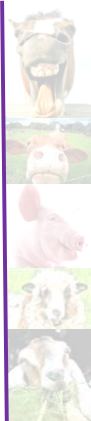
Avian Digestive System

- 6- Small Intestine**
 - 7- Ceca**
 - 8- Large Intestine**
 - 9- Cloaca:** Digestive system waste AND wastes from the renal (urinary) system exit here.
- } Same as other animals



D. Describe the Avian Digestive System

Avian Digestive System Dissection



E. Classify animals according to their type of digestion

...Pull it all together...

Name 4 types of animal digestion

- 1- Monogastric
- 2- Ruminant
- 3- Avian
- 4- ???



E. Classify animals according to their type of digestion

Curve Ball...

Pseudo Ruminant

Animals that:

- Eat large amounts of roughage (like a ruminant)
- Have a single compartment stomach (like a monogastric)
- Have a large Cecum to digest large amounts of roughage



E. Classify animals according to their type of digestion

Ruminant:

Multi compartment stomach & eats a lot of roughage

Pseudo Ruminant:

Eats a lot of roughage BUT does NOT have a multi compartment stomach

Monogastric

Single compartment stomach and eats more concentrates (grain) than roughage

Avian

Birds, Has Crop & Gizzard in place of teeth



E. Classify animals according to their type of digestion

... What do they eat?

Mostly Roughage with some concentrates

...How many stomach compartments?

4



... What type of digestive system?

Ruminant



E. Classify animals according to their type of digestion

... What do they eat?

Mostly Roughage with some concentrates

...How many stomach compartments?

1



... What type of digestive system?

Pseudo Ruminant



E. Classify animals according to their type of digestion

... What do they eat?

Mostly Roughage with some concentrates

...How many stomach compartments?

4



... What type of digestive system?

Ruminant



E. Classify animals according to their type of digestion

... What do they eat?

Mostly Roughage with some concentrates

...How many stomach compartments?

1



... What type of digestive system?

Pseudo Ruminant



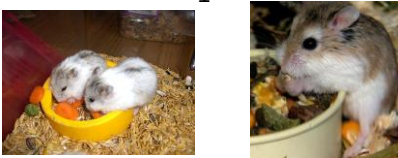
E. Classify animals according to their type of digestion

... What do they eat?

Mostly Roughage with some concentrates

...How many stomach compartments?

1



... What type of digestive system?

Pseudo Ruminant



E. Classify animals according to their type of digestion

... What do they eat?

Concentrates

...How many stomach compartments?

1



... What type of digestive system?

Avian



E. Classify animals according to their type of digestion

... What do they eat?

Roughage

...How many stomach compartments?

1



... What type of digestive system?

Pseudo Ruminant



E. Classify animals according to their type of digestion

... What do they eat?

Mostly Roughage with some concentrates

...How many stomach compartments?

4



... What type of digestive system?

Ruminant



E. Classify animals according to their type of digestion

... What do they eat?

Concentrates

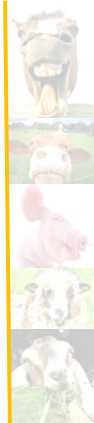
...How many stomach compartments?

1



... What type of digestive system?

Monogastric



E. Classify animals according to their type of digestion

... What do they eat?

Concentrates

...How many stomach compartments?

1



... What type of digestive system?

Avian



F. List Digestive Enzymes and their function

Enzyme: A protein that chemically breaks down food

In the mouth:

Saliva: begins breakdown of carbs

In the stomach:

• **Gastric Juice:**

–0.2- 0.5% hydrochloric acid

–Produced by stomach/abomasum

• **Pepsin:**

–Breaks down proteins



F. List Digestive Enzymes and their function

In the small intestine:

• **Chyme**

–An Acid

• **Pancreatic Juices**

–**Trypsin:** breaks down protein

–**Pancreatic Amylase:** changes starch to a simple sugar

• **Bile:** Green liquid produced in the liver and stored in gall bladder.

Digests fat

