Objective 7.02: Understand the digestive process
RUMINANTS
Ruminant Animals

- Animals with complex digestive systems
- Capable of digesting material with a high fiber concentration
- Uses microbial fermentation
  - Cattle
  - Sheep
  - Goats
  - Deer
Ruminants

Ruminant Digestive System
Parts and Functions

- **Mouth**
  - Bites and chews

- **Esophagus**
  - Connection

- **Four Compartment Stomach**
  - Rumen
  - Reticulum
  - Omasum
  - Abomasum

85% of the capacity
Parts and Functions

- Rumen
  - Largest of the four parts “room-in-it”
  - Filled with bacteria
  - Converts large amounts of roughage to amino acids

Fact!!!!

- The average cow rumen can hold over 160 liters (40 gallons)
Ruman

- Gases
- Today's hay
- Grain and yesterday's hay
Ruman Microbe
Ruman Microbe

- The large microbe is a type of protist
- The creature that looks like a tadpole attached to the side of the protist is a fungal spore
- The smaller, rod-shaped organism lining the underside of the protist are bacteria.
Parts and Functions

- **Reticulum**
  - Compartment where liquid goes
  - Honeycomb in structure

- **Omasum**
  - Grinds and squeezes
  - Removes some liquid

- **Abomasum**
  - True stomach
  - Enzymes and acids
Parts and Functions

- Small Intestine
  - Partially digested feed is mixed
    - Bile
    - Pancreatic juice
    - Intestinal juice
  - Most of the food nutrient is absorbed
    - Villi or Papillae
Parts and Functions

- **Cecum**
  - Serves little to no function in most animals
  - Horses, Rabbits, and Guinea Pigs have an enlarged cecum that helps breakdown roughages

- **Large intestine**
  - Main function is to absorbed water
  - Add mucus to undigested feed
  - Feces
NON-RUMINANT
Non-Ruminant

- Simple digestive system
  - (Monogastric)
  - Feed must be high quality concentrates
  - Cannot digest large amounts of fiber

- Human
- Dogs
- Cats
- Rabbits *(COPROPHAGY)*
- Pigs
- Horses???
Non-Ruminant Parts & Functions

- Mouth
- Esophagus
- Stomach
  - Enzymes acts on feed
  - Churns and mixes
- Small intestine
- Cecum
- Large intestine
Non-Ruminant Parts & Functions

- **Accessory system**
  - Liver
    - Produces bile that acts on fat
  - Pancreas
    - Produces insulin
  - Gall Bladder
    - Produces bile that aids in digestion

- **Anus**
  - End of the digestive tract
Monogastric

Simple Digestive System
POULTRY DIGESTIVE SYSTEMS
Poultry

- Chickens
- Turkeys
- Ducks
- Geese
Poultry Digestive System

- Poultry have monogastric digestive systems as well.
- But their digestive system is different enough from the other monogastric animals to discuss separately.
Poultry Digestive Systems

- **Mouth or beak**
  - Can not chew food
- **Esophagus**
  - Connects mouth to crop
- **Crop**
  - Stores feed
Poultry Digestive Systems

★ Gizzard
  – Crushes feed
    ★ Contains grit and gravel
  – Mixes feed with digestive juices
★ Liver
★ Small and Large Intestine
★ Vent
  – Removes solid and liquid waste
Inspecting Animal Digestive Systems

- **Esophagus**
  - Tube like structure

- **Stomach**
  - Pouch with undigested feed

- **Liver**
  - Large brown organ beneath the stomach or crop
Inspecting Animal Digestive Systems

- Small intestine
  - Long tube
  - Gray colored partially digested feed
- Large intestine
  - Large relatively short compartment
  - Contains fecal material
Animal Feeds

Objective 7.01: Classify animal feeds
Nutritional Information

**Nutrient**
- Chemical element or compound that aids in the support of life.

**Ration**
- The amount and kind of feed given to an animal on a daily basis
Nutritional Information

- Roughages
  - High in Fiber
  - Forage Crops
    - Silage
    - Hay
    - Pasture Grass
Nutritional Information

- Concentrates
  - High in Nutrient Value
- Grains
  - Corn
  - Barley
  - Wheat
Nutritional Value

★ Total Digestible Nutrients

Concentrates are high in TDN

Roughages are low in TDN
Nutritional Information

- Smaller producers will use commercially bagged feed ration.
- Larger producers will make their own feed rations.
  - A ration should fit the amounts and kinds of nutrients needed based on the status of the animal.
Functions of a Ration

- Maintenance
- Growth
- Production
- Reproduction
- Fattening
- Work
GROUPS OF NUTRIENTS
Carbohydrates

- Composed of sugar, starches, cellulose, and lignin
- Provide energy and heat
- Make up the largest quantity of livestock feed
  - Carbon
  - Hydrogen
  - Oxygen
Fats and Oils

- 2.25 times the energy value of carbohydrates
- At body temperature fat are solids and oils are liquid
  - Example: cooking lard
- Extra carbohydrates are stored as fats
  - Carbon, hydrogen, oxygen
- Carriers fat-soluble vitamins
Proteins

- Major component of muscles and tissues
- Made up of amino acids
- Continuously needed to replace dying body cells
- Young animals need large amounts for growth
Vitamins

- Needed in small quantities
- Helps regulate body functions
- Designated by letters
  - A, B, C, D, E, K
- Sources:
  - Naturally found in feed
  - Feed additives made from animal by-products
  - Made by the body itself
Minerals

- Needed in small amounts
  - Calcium, phosphorus, sodium, etc.
- Regulates body functions
- Provide growth for:
  - Bone
  - Teeth
  - Tissue

Example: calcium is needed in poultry for eggshell development
Water

- Makes up 40% to 60% of the animals body
- Dissolves other nutrients and helps carry them to parts of the body
Sources of Nutrients

• Carbohydrates
  – Cereal grains
    • corn
    • wheat
    • oats
    • rye
    • barley
    • sorghum
Sources of Nutrients

• Proteins
  – Plant sources
    • Soybean meal
    • Cottonseed meal
    • Alfalfa meal
  – Animal sources
    • Meat meal
    • Fishmeal
    • Dried milk
    • Synthetic nitrogen source called urea
Sources of Nutrients

- Fats and Oils
  - Grains and protein concentrates

- Vitamins and Minerals
  - Most feed ingredients
  - Supplements
    - Pre-mixes
    - Mineral blocks
Sources of Nutrients

ียว  Other sources and exceptions:
  ─ Alfalfa (roughage) can be used to provide energy and fiber
  ─ Molasses
    ✴ Improve taste (palatability)
    ✴ Reduce feed dust