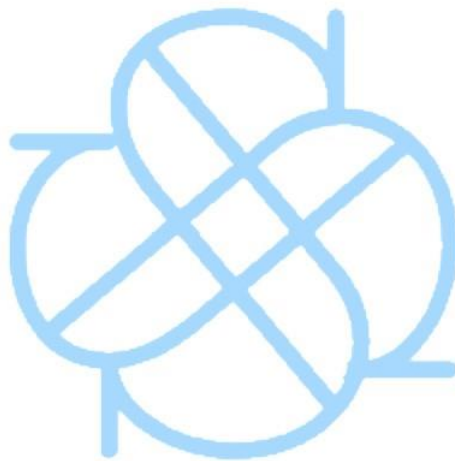


# Principles of Agriculture Food, and Natural Resources Guide

From Simple Studies, <https://simplestudies.edublogs.org> & @simplestudiesinc on Instagram

This study guide is an overview of the things you learn in this class. This class is an introductory course to all agriculture science related classes. I will be going over plant systems, animal systems, soil, agriculture careers and more.

Disclaimer: We do not own all information. Many sentences and graphics come from class notes, Quizlet and other websites.



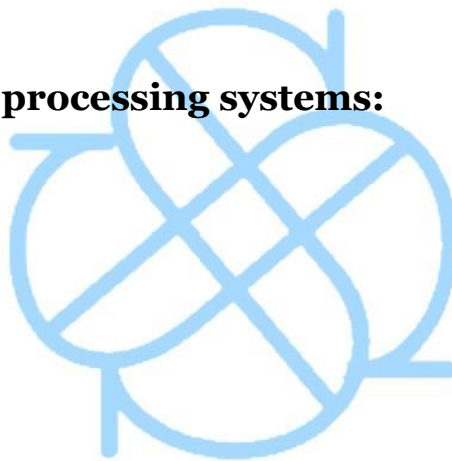
## Careers in Agriculture, Food, & Natural Resources

From Simple Studies, <https://simplestudies.edublogs.org> & @simplestudiesinc on Instagram

- Over 20 million people are employed in the agricultural business.
  - Almost half a million people are needed each year to fill new positions.
- Farming and ranching make up  $\frac{1}{5}$  of all agricultural careers.
- Cattle Rancher (cow /calf operation): A cattle rancher raises, feeds, and breeds cows year-round in order to sell their calves to other farmers and restaurants.
- Diversified crop farmers: Crop farmers plant, cultivate and harvest crops. They raise more than one kind of crop, such as fruits, grains, vegetables, and specialty crops.
- Diversified Livestock Producer: Diversified livestock producers breed and raise multiple types of livestock, such as cattle, pigs, sheep, and goats.
- Farm manager: organizes and analyzes farm resources, finances, and problems.
- Agricultural Lawyer: focuses on the law as it applies to the agricultural industry.

### **Food production & processing systems:**

- Food inspector
- Meat cutter
- Microbiologist



### **Plant systems:**

- Biologist
- Farm manager
- Plant geneticist
- Greenhouse manager
- Groundskeeper

### **Animal systems:**

- Zoologist
- Animal Scientist
- Free salesman

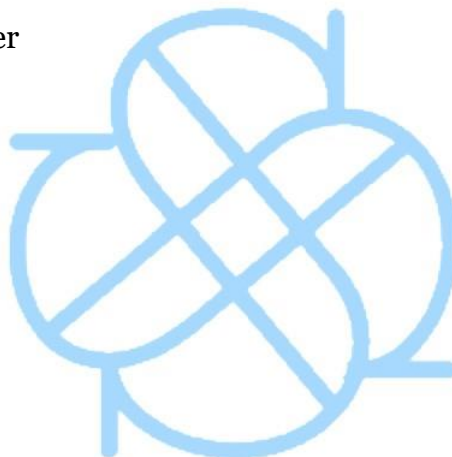
- Wildlife biologist
- Dairy producer
- Veterinarian

### **Power, structural, and technical systems:**

- Diesel Mechanic
- Ag Engineer
- GPS technician

### **Natural Resources systems:**

- Conservation Officer
- Forester
- Ecologist
- Geologist
- Soil technician
- Forest ranger



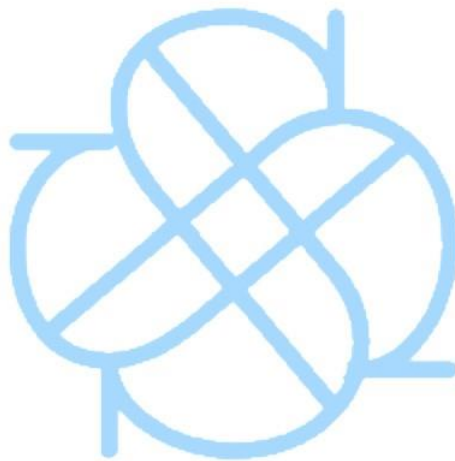
### **Environmental service systems:**

- Recycling Manager
- Toxicologist
- Wastewater manager
- Biological Technician

### **Agribusiness systems:**

- Florist
- Landscaper
- Commodity broker
- Livestock seller
- Salesperson

→ Jobs that are projected to grow significantly are *agricultural and farm managers, biochemists, zoologists, wildlife biologists, environmental scientists, hydrologists, forest and conservation technicians.*



# **Agriculture career Pathways Terms**

**Information up to page 12 is derived from quizlets [1](#), [2](#), [3](#), [4](#), [5](#), [6](#)**

- **Food production & processing systems-** They find ways to process, preserve, package, or store food. They also inspect food processing areas and create new food products based off of that examination.
- **Plant systems-** They use genetic engineering to improve crops and develop more efficient ways to improve seeds.
- **Animal systems-** They establish new ways of producing and processing meat, eggs, poultry, nutrition, reproduction, growth, and development of domesticated farm creatures. They also inspect and grade livestock food items.
- **Power, structural, and technical systems-** They design machinery and equipment, conserve soil and water for farms. They also improve processing of agriculture products.
- **Natural Resources systems-** They catch and trap marine life and work at recreational sites.
- **Environmental service systems-** They conduct hazardous-waste management studies, inspect and evaluate hazards, offer analysis and containment. They also develop rules and regulations to prevent environmental mishaps.

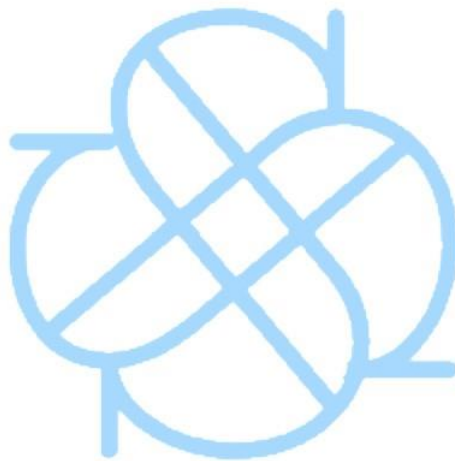
- **Agribusiness systems-** They coordinate and manage activities and procedures for the production, processing, and distribution of agricultural products.

## **Agricultural Organizations**

- **National Farmers Organization (NFO)-** (founded in 1955) A producer movement that wanted relief from the high costs of production and operation. To do so, they negotiated with food processors for higher wages through keeping more of the profit. If processors didn't agree, they would withhold their products. In the mid 1990s, the organization wanted to change its radical roots.
- **United Farm Workers (UFW)-** (originally named the National Farm Workers Organization) A labor union founded by Cesar Chavez in the 1960's. Chavez wanted to help farmers with everyday problems such as food, healthcare, and clothing. These farmers were not treated with respect, so Chaves fought for their rights. Membership declined in the 1990's.
- **United Farm Workers Organizing Committee-** The merging of the NWFA and AWOC into one organization during the 1960's. Organized farm workers formed a union that supported strikes such the Delano Grape Strike.
- **Farm Labor Organizing Committee (FLOC)-** (founded in Ohio in 1967) A labor union representing migrant workers in the Midwest. In 1978, tomato farm workers went on strike. Campbell's Soup Co. forced producers to adopt mechanical tomato pickers rather than negotiating.
- **Farm Bureau -** Started in the early 1900's (1911) with the purpose of improving the business of farming to make it more profitable. In the mid-

1990s, it remained the largest farm organization. Membership totaled more than 4 million.

- **National Black Farmers Association**- Filed \$2 billion class action suit against the USDA in late 1990's (first case filed in 1997). Also had approximately 900 complaints about the USDA by African American farmers since 1983.



# **Important FFA History and basic information**

What is FFA?

FFA is a national organization committed to educating the youth about agriculture.

When did FFA begin? What was it first called?

FFA began in 1917 in the state of Virginia and it was first called Future Farmers.

When was the National Organization formed?

The national organization was formed in 1928 in Kansas City, Missouri.

FFA began as a result of what legislation?

The Smith Hughes Act.

Who wrote the creed? When was it adopted?

The creed was written by E. M. Tiffany and adopted in 1931.

When were Blue corduroy jackets chosen as the official dress?

In 1933 at the national convention.

When were Blacks allowed in FFA? When were females allowed?

Blacks were allowed in 1965. Women were allowed in 1969.

When did the FFA name change?



It changed from Future Farmers of America to the National FFA Organization in 1988.

What do the letters of the FFA stand for?

The FFA letters still stand for “Future Farmers of America”.

The FFA Motto is?

Learning to Do

Doing to Learn

Earning to Live

Living to Serve

What is the FFA Mission Statement?

FFA makes a positive difference in the lives of students by developing their potential for premier leadership, personal growth, and career success through agriculture education.

What are the official FFA colors?

National Blue and Corn Gold

On the FFA emblem what does the word Agricultural Education Symbolize?

This tells us that FFA is an important part of agriculture and agribusiness programs.

On the FFA emblem what does the owl symbolize?

It stands for knowledge and wisdom.

On the FFA emblem what does the eagle symbolize?

This is symbolic of the national scope of the FFA.

On the FFA emblem what does the rising sun symbolize?

It symbolizes progress in agriculture and the confidence that FFA members have in the future.

On the FFA emblem what does the plow symbolize?

It is a symbol of labor and tillage of the soil.

On the FFA emblem what does the cross section of corn symbolize?

it symbolizes our common agricultural interests, is native to America, and is grown in every state.

Official dress for males:

Black slacks, white shirt, FFA tie, Black shoes, Black socks, White shirt, FFA tie, Black shoes, Black socks, and a FFA jacket zipped to the top.

Official dress for females:

Black skirt, white shirt, FFA blue scarf, Black shoes, Black nylons, FFA jacket-- zipped to the top.

## **Agriculture, Food & Natural Resources** **Vocabulary**

- ❖ **Natural resources-** materials or substances such as minerals, forests, water, and fertile land that occur in nature and can be used for economic gain.

From Simple Studies, <https://simplestudies.edublogs.org> & @simplestudiesinc on Instagram

- ❖ **Horticulture**- the art/science of cultivating gardens
- ❖ **USDA**- United States Department of Agriculture
- ❖ **FDA**- Food and Drug Administration
- ❖ **Agriculture**- the industry in the production of plants and animals for food and fiber, the provision of agricultural supplies and services, and the processing, marketing, and distribution of agricultural products.
- ❖ **Agriculturalist**- an expert in agriculture.
- ❖ **Agricultural engineer**- an engineer who solves problems that affect the quantity and quality of food.
- ❖ **Biologist**- a person who studies living organisms
- ❖ **Ecology**- the pattern of the interrelationships of organisms and their environment, and the science that is concerned with that relationship.
- ❖ **Food science**- the study of the nature of foods and the changes that occur in them naturally and as result of handling and processing
- ❖ **Economics**- the science that deals with the production, distribution, and consumption of goods and services, or the material welfare of humankind.
- ❖ **Food Science**- the study of the nature of foods and the changes that occur in them naturally and as result of handling and processing.
- ❖ **Inspector**- an official who examines for compliance with regulations, standards, etc.
- ❖ **Nutrients**- providing nourishment or nutriment.
- ❖ **Geologist**- a person who specializes in geologic research and study.
- ❖ **Non-renewable resources**- resources of economic value that cannot be readily replaced by natural means on a level equal to its consumption.
- ❖ **Energy conservation**- the reduction of energy through using less of an energy service.

## **Plant Structures & System**

**Information up until page 17 is derived from quizlets** [7](#), [8](#), [9](#), [10](#), [11](#)

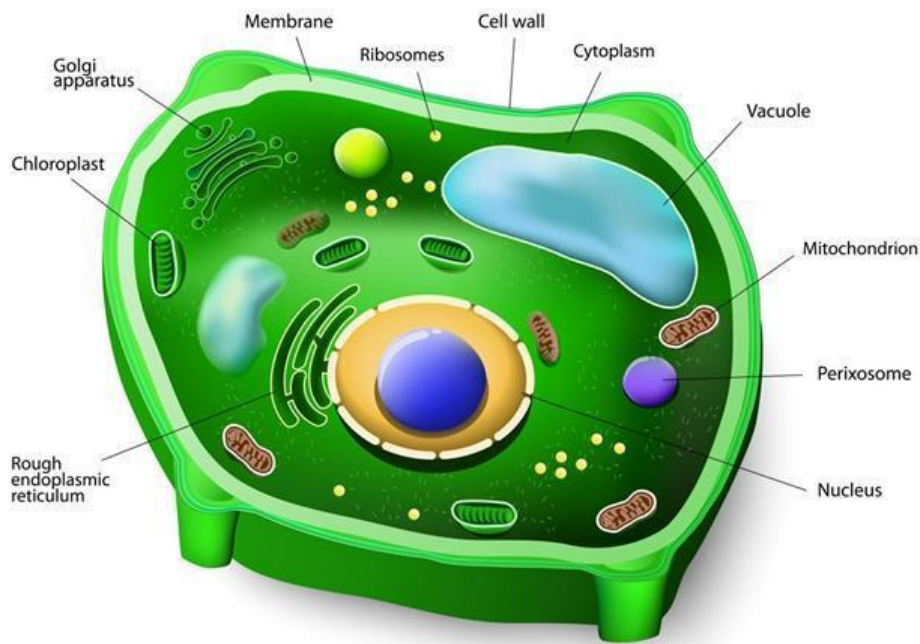


Image Source: <https://biologywise.com/plant-cell-parts>

## Plant Cell Vocabulary

- **Cell Wall** - the outer layer of a plant cell that is made from cellulose and makes plant cells rigid, gives structure and support.
- **Cell Membrane** - thin, flexible barrier around a cell; regulates what enters and leaves the cell, found inside the cell wall.
- **Cytoplasm** - a jellylike fluid inside the cell in which the organelles are suspended.
- **Mitochondria** - Changes food energy into high-energy compounds called ATP that cells can use.
- **Nucleus** - control center of the cell, contains the RNA and DNA.
- **Chloroplast** - An organelle containing chlorophyll for photosynthesis.
- **Ribosome** - small particles in the cell on which proteins are assembled; made of RNA and protein, many attach to the Endoplasmic Reticulum.
- **Endoplasmic Reticulum** - internal transport system of the cell, lets materials move between the nucleus and the rest of the cell.

- **Golgi Bodies** - a structure in a cell that receives proteins and other newly formed materials from the endoplasmic reticulum, packages them, and distributes them to other parts of the cell.
- **Vacuole** - Used for storage (water, oil), maintains osmotic balance and cell shape.

## **Plant Structure & Functions**

**Roots** - Absorb Water and Anchor the plant. Store food (glucose)

**Stems** - transport water, minerals, and food (glucose). Support the leaves and position them so they can receive the most sunlight as possible.

**Leaves** - Produce Food (glucose). Collect sunlight with chlorophyll and use it to make food (glucose). Do the process of photosynthesis.

**Flowers** – Reproduction

**Cones** - Reproduction and scales on cones hold seed and aid in seed in dispersal.

**Dermal** - protect leaf and prevent water loss

**Vascular** - transport water minerals and nutrients

**Ground** - photosynthesis and support

**Epidermis** - Protect the leaf prevent water loss

1. The organs of a plant including roots, stems, leaves, flowers, fruits, and cones are made of a bunch of what working together?

**Tissue**

2. List the tissues that work together to form the organs of the roots, stems, leaves, flowers, fruits, and cones.

**Dermal, ground, vascular**

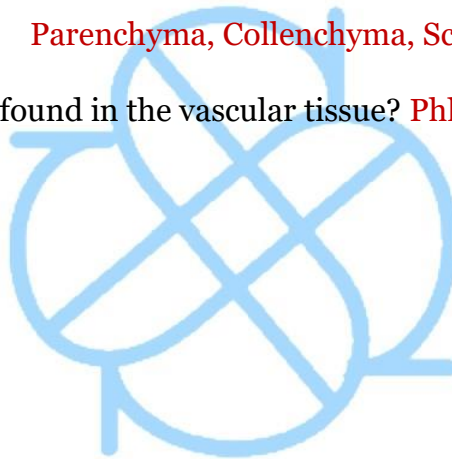
3. What is found in the dermal tissue?

**Epidermis, cuticle, guard cells, stomata**

4. What is found in the ground tissue?

**Parenchyma, Collenchyma, Sclerenchyma**

5. What is found in the vascular tissue? **Phloem and Xylem**



# Plant Systems Vocabulary

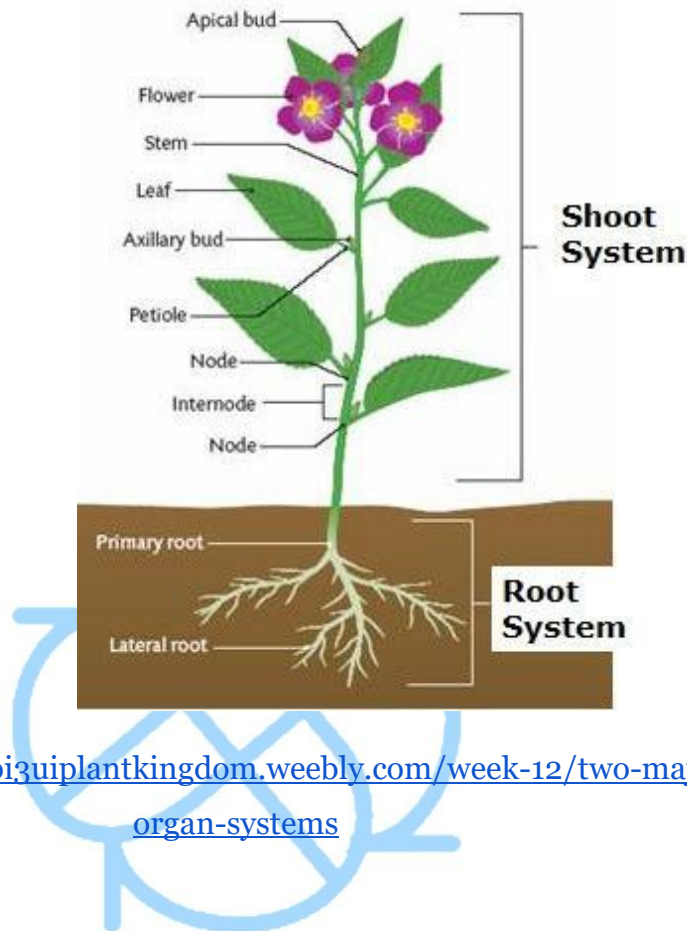
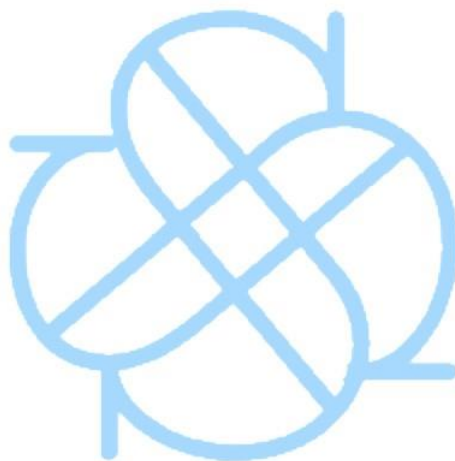


Image Source: <https://sbi3uiplantkingdom.weebly.com/week-12/two-major-plant-organ-systems>

- **Shoot System** - above-ground organs (leaves, stems, flowers)
- **Root System** - below-ground organs (roots)
- **Primary Growth** - extends the length of a plant both above ground and below ground
- **Secondary Growth** - extends the width of the plant; plant grows outward
- **Dermal Tissue** - type of plant tissue that is the outer covering of the plant and serves as a protective barrier.
- **Ground Tissue** - type of plant tissue responsible for carrying out most of the plant's metabolic functions, such as photosynthesis.
- **Vascular Tissue** - type of plant tissue specialized to transport needed substances throughout the plant, such as food and water.
- **3 Basic Plant Organs** – Root, Stem, Leaf

- **Roots** - function for absorption of water and minerals, anchorage, some food storage, and some reproduction
- **Stems** - function to translocate water and minerals to the leaves; transport food (sap) downward from the leaves to the roots
- **Leaves** - function as the major photosynthetic (food making & gas exchange) organ of a plant.
- **Xylem** - layers of dead cells that make up bundles of tissue that transport water and minerals from the roots, through the stems, and to the leaves of a plant. (UP)
- **Phloem** - a tissue composed of living cells that make up bundles of tubes that transport food to all parts of the plant. (UP & DOWN)





# **Terms & Terminology**

**Information on pages 17-18 is derived from quizlets [12](#), [13](#), [14](#)**

## **Horses**

- Equine: scientific name for horses
- Stallion: intact male
- Mare: sexually mature female
- Gelding: castrated male
- Colt: sexually immature male
- Filly: sexually immature female
- Herd: a grouping of horses
- 336 days: length of gestation for horse
- Foaling: horse giving birth

## **Sheep**

- Ovine: scientific name for sheep
- Ram: intact male; also known as a buck
- Ewe: female
- Lamb: sexually immature sheep; offspring of a ram and ewe
- Wether: castrated male

## **Swine (all pigs)**

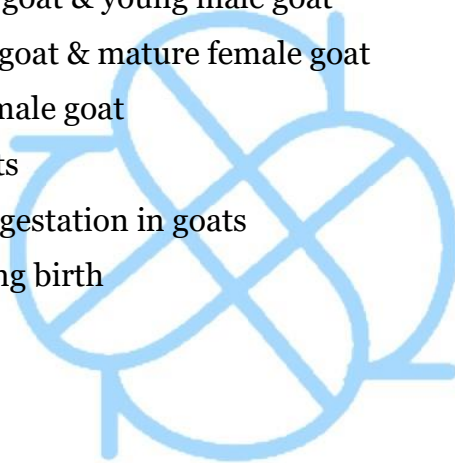
- Porcine: scientific name for swine
- Swine: refers to pigs
- Boar: intact male
- Sow: female which has produced offspring
- Gilt: female which has NOT produced offspring
- Barrow: castrated male
- Swine gestation: 114 days
- Farrowing: swine giving birth
- Herd: group of swine
- Litter: group of young swine

## **Chicken**

- Cockerel: young male chicken
- Cock: mature male chicken
- Capon: castrated male chicken
- Pullet: young female chicken
- Hen: mature female chicken
- Flock: a group of chickens
- Hatching: birth of a chicken
- 21 days: length of incubation of a chicken egg
- Every 29 hours: chicken ovulation

## **Goat**

- Buck: mature male goat & young male goat
- Doe: young female goat & mature female goat
- Wether: castrated male goat
- Herd: group of goats
- 150 days: length of gestation in goats
- Kidding: goats giving birth
- Kids: young goats



# Different types of Digestive systems

**Information on pages 19-20 is derived from quizlets** [15](#), [16](#), [17](#)

1. **Monogastric:** have only one compartment in their stomach (pigs, dogs, cats, horses)

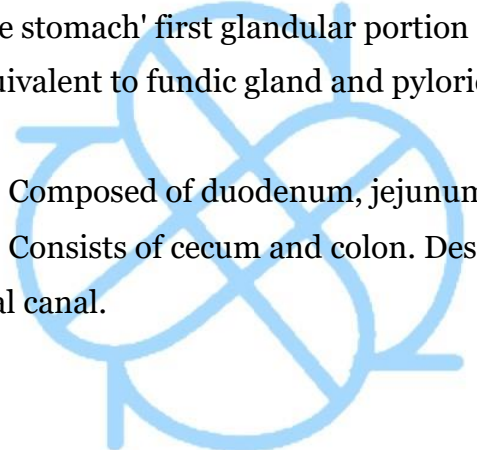
Digests grains easily using amylase.

## **What do each of these organs do?**

- **Mouth** – A body opening where an animal takes in food. Mechanical and Chemical digestion start here.
- **Teeth** - Hard structures in the mouth used for Mechanical Digestion: cutting, biting, and chewing food.
- **Saliva** - The liquid produced in the mouth that aids Chemical Digestion.
- **Esophagus** - The tube connecting the mouth to the stomach. Food is moved through a process called Peristalsis.
- **Stomach** - The organ where food is reduced to liquid Chyme by Chemical (acid) and Mechanical (muscle activity) digestion.
- **Small Intestine** - The part of the digestive system between the stomach and large intestine that absorbs nutrients from digested food using the Villi.
- **Large Intestine** - The part of the digestive system between the small intestine and the rectum where water is removed from the solid waste. Also called the Colon.

2. **Ruminant** – four compartments in its stomach, swallows unchewed, regurgitates it, chews it and swallows it again.

### What do each of these organs do?

- **Mouth** - Used primarily for holding, grinding, and mixing food
  - **Pharynx** - Common passage for food and air, lined by mucous membranes and surrounded by muscles
  - **Esophagus** - Muscular tube extending from the pharynx to the stomach
  - **Reticulum** - Honeycomb shape due to mucosa in intersecting ridges; located immediately caudal to diaphragm. Foreign objects driven into pleural and pericardial spaces
  - **Rumen** - Divided from reticulum by thick muscular ruminoreticular fold. Almost entire left side of abdominal cavity
  - **Abomasum** - 'true stomach' first glandular portion of ruminant stomach. Smooth lining. Equivalent to fundic gland and pyloric gland region in monogastric.
  - **Small intestine** - Composed of duodenum, jejunum, and ileum
  - **Large intestine** - Consists of cecum and colon. Descending parts end up as the rectum and anal canal.
- 

## Female Reproduction

Information on pages 21-25 is derived from quizlets [18](#), [19](#)

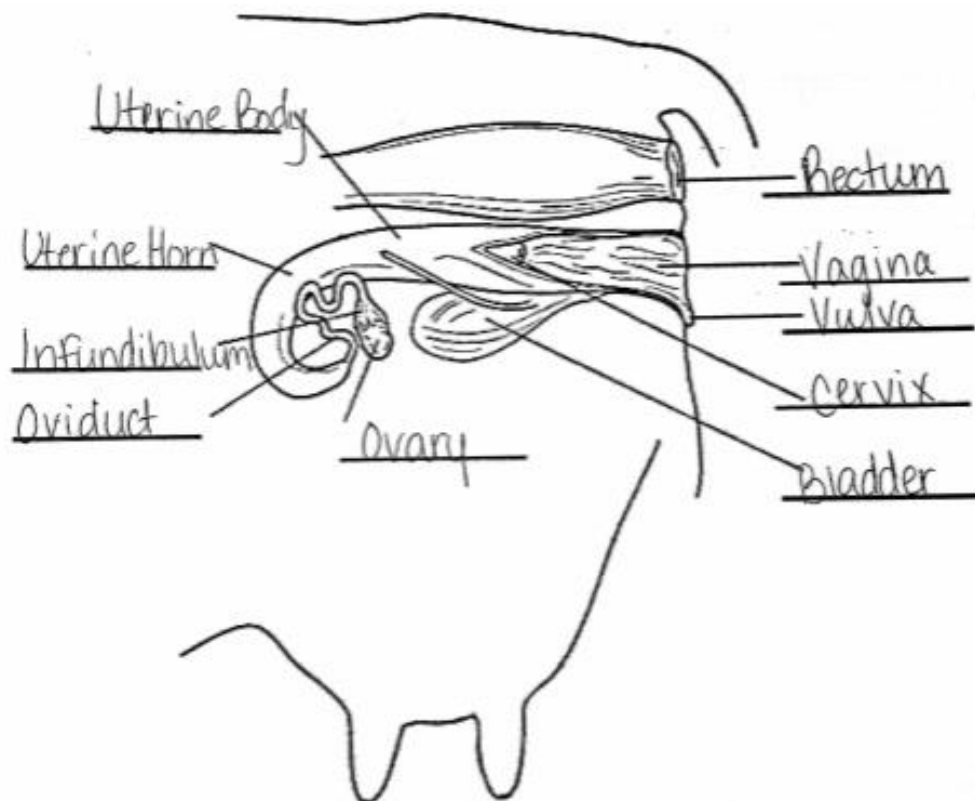


Image Source: Quizlet

- Produce a fertile egg
- Produce hormones
- Transport the egg and sperm
- House fetus, birthing

### **Vulva & Vagina**

- **Vagina:** Female organ of copulation at mating, birth canal at parturition
- **Location:** connects to the cervix to external genitalia
- **Vulva:** keeps bacteria and directs it out. Female external genitalia display physical signs during heat.

## **Cervix**

- Connects the uterus to the vagina, keeps the cervical canal closed during pregnancy, provides a barrier to microorganisms, facilitates delivery of a fetus during parturition.

## **Ovary**

- Location: connected to the oviduct
- Function: storage site of the immature follicles and produce hormones.
- Ovarian Fossa

## **Follicle**

- **Ovulation:** occurs when the egg is released from the follicle to be fertilized.
- Each follicle contains 1 egg.
- The follicle produces estrogen

## **Oviduct**

- Location: in between the ovary and uterine horn.
- Function: transports of the ovulated egg and sperm
- Fertilization
- Infundibulum: funnel-shaped, serves as a “catcher’s mitt” catches ovum as it is released from the ovary during ovulation.

## **Uterus**

- Location: Between the oviduct and the cervix
- Function: nourish the developing fetus before it is born
- Sperm transport
- House and grow the embryo
- Expulsion of the fetus
- Consists of a body and two uterine horns

## **Male Reproduction**

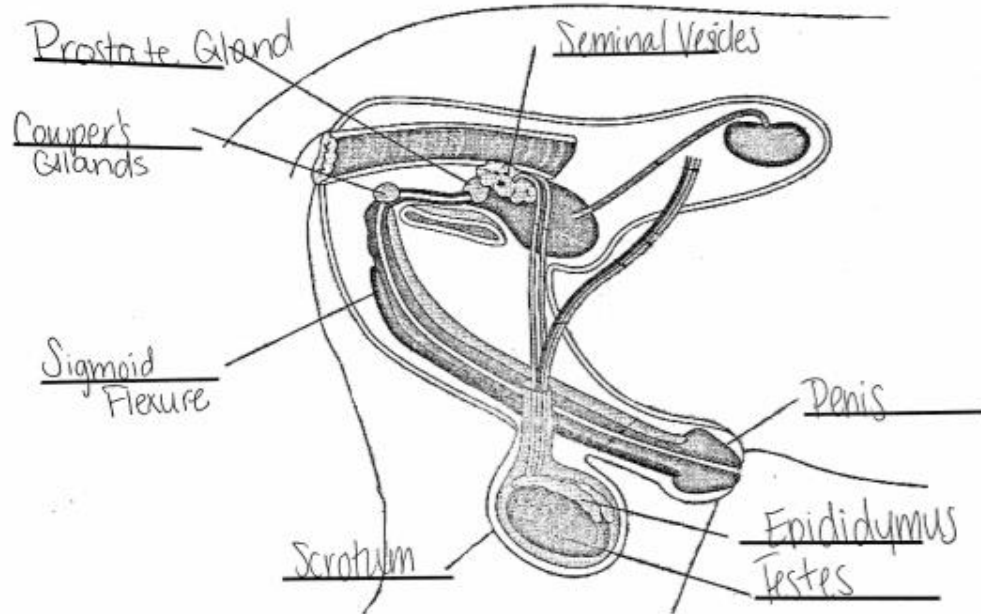


Image Source: Quizlet

## Penis

- the dual function of passing urine from the body and depositing semen in the female reproductive system

## Testicles

- Produce sperm
- Spermatozoa
- Produce a hormone called testosterone
- 

## Accessory Glands

- groups of male reproductive glands that include the seminal vesicle, prostate gland, and the Cowper's gland.

## **Epididymis**

- long coiled tube that is connected around each testicle, and is where the sperm mature

## **Scrotum**

- a sac or pouch that holds the two oval-shaped male reproductive organs, regulates temp for sperm production

## **Other parts**

- **Vas Deferens** - transports mature sperm to the urethra
- **Urethra** – muscular canal extending from the urinary bladder.
- **Accessory Sex Glands** - produce seminal fluid and clean/lubricate the urethra

## **Continued**

- **Seminal vesicles** - produce a fluid that protects & transports the sperm
- **Prostate gland** – produces fluid that is mixed with the seminal fluid.
- **Cowper's gland** - produces thick clear mucus prior to ejaculation

# **Basic Animal Reproduction**

## **Poultry Anatomy**

- Vary compared to other domestic animal species.

### **Male**

- Testes are located within the abdominal cavity

### **Female**

- Mature female poultry have only one functional ovary and oviduct.
- Developed into egg yolks

# **Dairy Management**



**The following information is derived from quizlet [20](#)**

- How many days is the average cow milked for? **305 days**
- How many days is average for a cow to be dried off and not milked? This is a rest period for her body. **60 days**
- How old must a heifer be when she calves for the first time? **2 years old**
- How long is the gestation period of a cow? **9 months**
- What is the umbilical cord dipped in to prevent infection? **Iodine**
- AI is known as what? **Artificial Insemination**
- The AI gun or instrument is made of this material to prevent rusting?

**Stainless steel**

- How many times, on average, per day is a cow milked? **2**
- How many breeds of dairy cattle are there? **6**
- What are the two common grades of milk? **Grade A, Grade B**
- What percentage of milk is made up of water? **85%**
- How many gallons of milk does the average dairy cow produce per day? **7**
- From the time the dairy cow is milked on the farm until it reaches the grocery, how many days does it take? **1-2 days**
- What state produces the most dairy in the United States? **California**

**Quizlets Referenced (you can use these for additional practice):**

1. [FFA Missions and Strategies Flashcards](#)
2. [FFA Flashcards.](#)
3. [FFA History Flashcards](#)
4. [FFA History Flashcards](#)
5. [Agricultural Organizations \(1955 to 2010\) Flashcards](#)
6. [AFNR Lesson 1.1 Vocabulary Flashcards](#)
7. [Chapter 16 Vocab Biology Flashcards](#)
8. [Stems 12B Flashcards](#)
9. [Biology Flashcards](#)
10. [Plant structure and functions Flashcards](#)
11. [Plant Systems Flashcards](#)
12. [The Dairy Industry Questions-Terminology Flashcards](#)
13. [Best Agriculture Flashcards](#)
14. [live stocked terms Flashcards - Questions and Answers](#)
15. [Digestive System: Structure and Function Flashcards](#)
16. [Digestion in animals Flashcards](#)
17. [Ruminant Digestive System Flashcards](#)
18. [Male Animal Reproductive System Flashcards](#)
19. [Basic Animal Reproduction Packet Flashcards](#)
20. [Animal Related Systems Final Flashcards](#)