

Lesson One - Sheep Anatomy

FOCUS: Defining Sheep Anatomy and Physiology

10 minutes

Purpose:

Participants will come away with a better understanding of how anatomy and physiology are defined.

Materials:

- *Sheep Anatomy Student Notes*
- *Sheep Anatomy* slide presentation
- Sheep Model

Facilitation Steps:

1. Begin by displaying the Sheep Model in front of the class. Tell participants to take a close look at it.
2. Ask the following question: What do you know about sheep? Write down participants' answers on a whiteboard.
3. Begin the slide presentation with **Slide 1**, which introduces the lesson on sheep anatomy. Then ask the question on **Slide 2**. As you move to **Slide 3**, compare the initial list of answers that participants shared to the list on the slide. Did the participants know any of these fun facts?
4. Distribute the *Sheep Anatomy Student Notes* to each participant. Participants should complete this, as information is shared during the slide presentation.
5. Share the following information per slide:

Slide 4: Anatomy is the science of the structure of animals. The word is derived from the Greek word, "to cut up."

Slide 5: Physiology is the science that deals with the functions of the living organism and its parts.

Slide 6 and 7: The following terms are used to describe locations on the animal body:

- Dorsal: pertains to the upper surface of the animal
- Ventral: relates to the lower and abdominal surface
- Anterior (cranial): applies to the front or head
- Posterior (caudal): pertains to the tail or rear

Lesson One - Sheep Anatomy and Physiology

LEARN: Sheep Anatomy and Physiology

30 minutes

Purpose:

Participants will take notes and discuss the parts of a sheep's anatomy and its functions.

Materials:

- *Sheep Anatomy* slide presentation
- *Sheep Anatomy Student Notes*
- *Sheep Anatomy Student Notes - Answer Key*
- Sheep Model

Facilitation Steps:

1. Continue with the *Sheep Anatomy* slide presentation (start with Internal Anatomy, **Slide 8**)
2. Go over the presentation slides while the participants complete the *Sheep Anatomy Student Notes*.
3. Share the following information as the following slides are reviewed:

Slide 9: Here are the major internal organs of the sheep. Display the Sheep Model at this point.

Slide 10: The heart is the primary organ that continuously pumps blood through the blood vessels and to various parts of the body in order to meet nutritive requirements. Your heart has 4 chambers. The upper chambers are called the right and left atrium and the lower chambers are called the right and left ventricles.

- The right atrium is the collection chamber for deoxygenated blood from distant parts of the body.
- The right ventricle is the secondary pumping chamber of the heart responsible for pumping oxygen-depleted blood to the lungs.
- The left atrium is the collection chamber for blood high in oxygen from the lungs. It sends this oxygenated blood to the left ventricle.

- The left ventricle is the primary pumping chamber of the heart, responsible for sending oxygen-rich blood to the rest of the body.

Slide 11: There are four stomach compartments of ruminant animals, with the rumen being the largest. In sheep, rumen capacity ranges from 5 to 10 gallons depending on the type of feed. Also known as the 'paunch', it contains many microorganisms that supply enzymes to break down fiber and other food that has been eaten. The conversion of the cellulose of feeds to fatty acids is the result of microbiological activities in the rumen. These fatty acids are absorbed through the rumen wall and provide up to 80% of the total energy requirements of the animal. The rumen also converts components of the feed into essential amino acids, the B-complex vitamins and vitamin K.

Slide 12: Reticulum, Omasum and Abomasum - Reticulum: This is also known as the 'hardware stomach' or 'honeycomb.' It is located just below the entrance of the esophagus into the stomach. The capacity of the reticulum ranges from 1.2 to 2.0 quarts.

Omasum: Also known as "manyplies", it consists of many layers of tissue that grind up and remove some of the water from the feed taken in. The capacity is approximately 0.5 to 1.0 quarts.

Abomasum: This is considered the 'true stomach' of ruminant animals. It contains hydrochloric acid and digestive enzymes that break down food particles before they enter the small intestine. The capacity is approximately one gallon.

Slide 13: Mature sheep are considered herbivorous ruminant animals. Their digestive tracts include the mouth, esophagus, four stomach compartments, small intestine, cecum and large intestine. Similar animals include cattle, sheep, deer, elk, bison and more. The esophagus is a passage from the mouth to the stomach. It opens into the stomach at the junction

of the rumen and reticulum, helping to transport both gases and cud. The esophagus acts like a tube that moves ingested material from the mouth to the stomach through wavelike contractions.

Slide 14: Spleen and Kidney - The spleen is attached to the side of the rumen and functions to filter blood and manufacture blood cells. It is a large and somewhat flat organ. With a texture similar to the liver, it is dark red and blue in color and has many white specks on the surface. The kidneys are bean-shaped organs that lie in the abdominal cavity and are attached to the dorsal wall on either side of the spine. They have 3 primary functions: excrete waste, control water level, and regulate salt concentration and acid-base balance.

Slide 15: Small Intestine – There are 3 parts to the small intestine: the duodenum, jejunum and ileum. As partially digested feed enters the duodenum, the enzymes further break down feed nutrients into simple compounds. These compounds are absorbed into the bloodstream by a process carried on in the jejunum and ileum (second and third part of the small intestine, respectively). The small intestinal wall is lined with many small fingerlike projections called villi, which increase the absorption area of the small intestine. The capacity of the small intestine is approximately 2.0 to 2.5 gallons.

The small intestine is where nearly all nutrients are absorbed into the blood. When in the small intestine, food particles are exposed to enzymes and bile, which convert the food to even smaller particles capable of being absorbed into the blood. In addition to absorbing food particles, the small intestines also absorb materials such as water, electrolytes and other molecules. The small intestines provide nutrients to the body and play an important role in water and acid-base balance.

Slide 16: Cecum - This simple tube-like compartment (also known as the blind gut), is located at the junction of the small and large intestines. Feed materials entering this organ are digested by inhabiting microorganisms.

Slide 17: Large Intestine - The large intestine is comprised of the colon and rectum. Undigested feed and unabsorbed nutrients leaving the small intestine pass into this organ. Its primary functions include water absorption and further digestion of feed

materials by microorganisms. The capacity ranges from 1.5 to 2.0 quarts. It also stores this waste until it can be passed through the anus.

Slide 18: Reproductive System Female - The mature female sheep is called a 'ewe'. The reproductive tract of the mature ewe consists of several parts:

1. The ovaries are the primary sex organ that produces the ova (eggs) and secretes the female reproductive hormones, which include progesterone and estrogen.
2. The oviducts transport the ova to the uterus which is the site of fertilization.
3. The uterus is the site of implantation and consists of two uterine horns with a uterine body. The fetus grows and develops in the uterus.
4. The uterus is protected by the cervix, which closes if off to the outside.
5. The exterior portion of the female reproductive tract is the vagina, which is where semen is deposited during natural mating.

Slide 19: Reproductive System Male – The mature male sheep is called a 'ram.' The male reproductive tract consists of several primary sex organs:

1. The testes, which produce the male gametes and sex hormones, are located in the scrotum.
2. The scrotum aids in temperature regulation.
3. The epididymis, also located in the scrotum, is where the spermatozoa produced by the testes enters. Sperm matures and is stored here prior to ejaculation.
4. The vas deferens provide the spermatozoa with the fluids that make up the ejaculate (semen).
5. The penis is used to deposit the semen into the female.

Slide 20: Lungs – The lungs are part of the respiratory system. The primary function, called respiration or breathing, is the exchange of gases, oxygen and carbon dioxide. In respiration, oxygen from incoming air enters the blood and carbon dioxide (a waste gas from the metabolism) leaves the blood.

Slide 21: End of presentation

4. Answer any questions using the *Sheep Anatomy Student Notes – Answer Key*.