

Ruminant Model Curriculum



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Curriculum Structure

The *Ruminant Model* curriculum is composed of the following lessons. Approximate lesson times are included.

Lesson	Title	Approximate Time
One	Ruminant Digestive Tract	45 minutes – 1 hour
	Total	45 minutes – 1 hour

Lesson Structure

Each lesson begins with an overview, lesson objectives, and a Lesson at a Glance table which lists the lesson activities, materials required, suggested preparation steps and approximate class time.

Lesson Sections

The actual lesson follows the overview, which will contain some of the sections described below.

FOCUS

Every lesson begins with a FOCUS activity intended to capture participants' attention. This may be in the form of a small or large class discussion, a game, a review of previous lesson information or a demonstration. During this activity, participants are introduced to the topic of the lesson.

LEARN

The LEARN activity in each lesson varies in its presentation mode. It may be a slide presentation, group activity or demonstration.

REVIEW

The majority of lessons end with a REVIEW activity intended to briefly review the lesson's key messages or main points.

Lesson One - Ruminant Digestive Tract

Lesson Overview

This lesson introduces the ruminant digestive tract; the components of the tract, their location, and their function.

Lesson Objectives

After completing this lesson, participants will be able to:

- Name, locate, and describe the functions of the parts of a ruminant digestive system.
- Correctly label the digestion path as it travels through the ruminant system.

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• Whiteboard/Blackboard • Whiteboard Markers/Chalk • White Paper or Student Notebooks	1. Draw the four parts of the Ruminant Digestive Tract on the board. Use slide 2 of the <i>Ruminant Digestive Tract</i> slide presentation for reference	5-10 minutes
LEARN	• <i>Ruminant Digestive Tract</i> slide presentation • <i>Ruminant Digestive Tract Student Notes</i>	1. Prepare to present the <i>Ruminant Digestive Tract</i> slide presentation 2. Print/Photocopy <i>Ruminant Digestive Tract Student Notes</i>	25-35 minutes
REVIEW	• <i>Ruminant Digestive Tract Student Worksheet</i> • Optional: <i>Ruminant Digestive Tract Quiz</i>	1. Print/Photocopy <i>Ruminant Digestive Tract Student Worksheet</i> 2. Print/Photocopy <i>Ruminant Quiz</i> (optional)	15-25 minutes

Lesson One – Ruminant Digestive Tract

FOCUS: Ruminant Overview

5-10 Minutes

Purpose: Participants will learn the four main compartments of the ruminant, allowing for them to gain upfront knowledge of the digestive system.

Materials:

- Whiteboard/Blackboard
- Whiteboard Markers/Chalk
- White Paper or Student Notebooks

Facilitation Steps:

1. Draw the four parts of the Ruminant Digestive Tract on the board. Use slide two of the *Ruminant Digestive Tract* slide presentation for reference.
2. Have students draw the same image.
3. Together write the names of each compartment of the Ruminant.

Lesson One – Ruminant Digestive Tract

LEARN: Ruminant Digestive Tract

25-35 Minutes

Purpose: Participants will get an in-depth look at the complete digestive tract and a deeper understanding of the ruminant.

Materials:

- *Ruminant Digestive Tract* slide presentation
- *Ruminant Digestive Tract Student Notes*

Facilitation Steps:

1. Prepare the *Ruminant Digestive Tract* slide presentation.
2. Present each slide to the class.
3. Have the students complete the *Ruminant Digestive Tract Student Notes* as you do the slide presentation.
4. Use the *Ruminant Digestive Tract Student Notes - Answer Key* for any missing answers.

Ruminant Digestive Tract Student Notes

1. The four compartments of the stomach are the _____, _____, _____ and _____.
2. The rumen:
 - May also be called the _____ or _____.
 - Will hold approximately _____ gallons.
 - Is located on the _____ side of the animal.
 - Finger-like projections called _____ are in the rumen.
 - The rumen environment for bacteria is anaerobic, meaning _____.
 - Constitutes about _____ of the stomach's capacity.
3. The reticulum:
 - Commonly called the _____ or _____ stomach.
 - Holds about _____ gallons or _____ % of the stomach's capacity.
 - Main function is to collect small particles and move them to the _____.
4. The omasum:
 - Is _____ in shape.
 - Constitutes about _____ of the stomach capacity.
 - Is called the _____ because of its many folds.
 - The main functions are to _____ and _____.
5. The abomasum:
 - Is called the _____ because it most closely represents the human stomach.
 - Constitutes about _____ of the stomach capacity.
 - Produce _____ acid to aid in digestion.
6. The small and large intestine will absorb nutrients which make their way into the _____.

Ruminant Digestive Tract Student Notes – Answer Key

1. The four compartments of the stomach are the rumen, reticulum, omasum, and abomasum.
2. The rumen:
 - May also be called the fermentation vat or paunch.
 - Will hold approximately 50 gallons.
 - Is located on the left side of the animal.
 - Finger-like projections called papillae in the rumen.
 - The rumen environment for bacteria is anaerobic, meaning no oxygen.
 - Constitutes about 80% of the stomach's capacity.
3. The reticulum:
 - Commonly called the hardware or honeycomb stomach.
 - Holds about 5 gallons or 5 % of the stomach's capacity.
 - Main function is to collect small particles and move them to the omasum.
4. The omasum:
 - Is spherical in shape.
 - Constitutes about 8% of the stomach capacity.
 - Is called the many plies or Butcher's bible because of its many folds.
 - The main functions are to reduce particle size and absorb water.
5. The abomasum:
 - Is called the true stomach because it most closely represents the human stomach.
 - Constitutes about 8% of the stomach capacity.
 - Produces hydrochloric acid to aid in digestion.
6. The small and large intestine will absorb nutrients which make their way into the blood stream.

Lesson One – Ruminant Digestive Tract

REVIEW: Ruminant Digestive Tract Recap

15-25 Minutes

Purpose: Participants will have a formal assessment on their understanding of the digestive tract, allowing for a good standard on participant understanding.

Materials:

- *Ruminant Digestive Tract Student Worksheet*
- Optional: *Ruminant Digestive Tract Quiz*

Facilitation Steps:

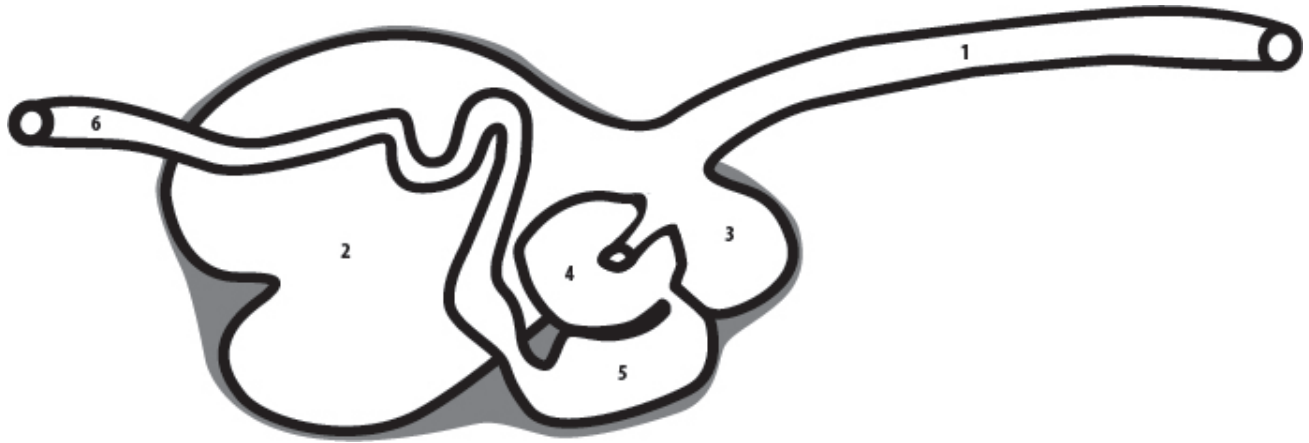
1. Hand out the *Ruminant Digestive Tract Student Worksheet*.
2. Students should complete this worksheet based on what they have from their notes.
3. Either peer grade using answer key as a class or collect worksheets for teacher to grade.

Optional: Have students take *Ruminant Digestive Tract Quiz*

Ruminant Digestive Tract Student Worksheet

Name _____

1 - 6. Label the diagram below:



1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

MATCHING (7-12)

7. _____ Many Plies

8. _____ Functions to absorb water

9. _____ Honeycomb texture

10. _____ "True Stomach"

11. _____ "Fermentation Vat"

12. _____ Hardware Compartment

A. Abomasum

B. Omasum

C. Reticulum

D. Rumen

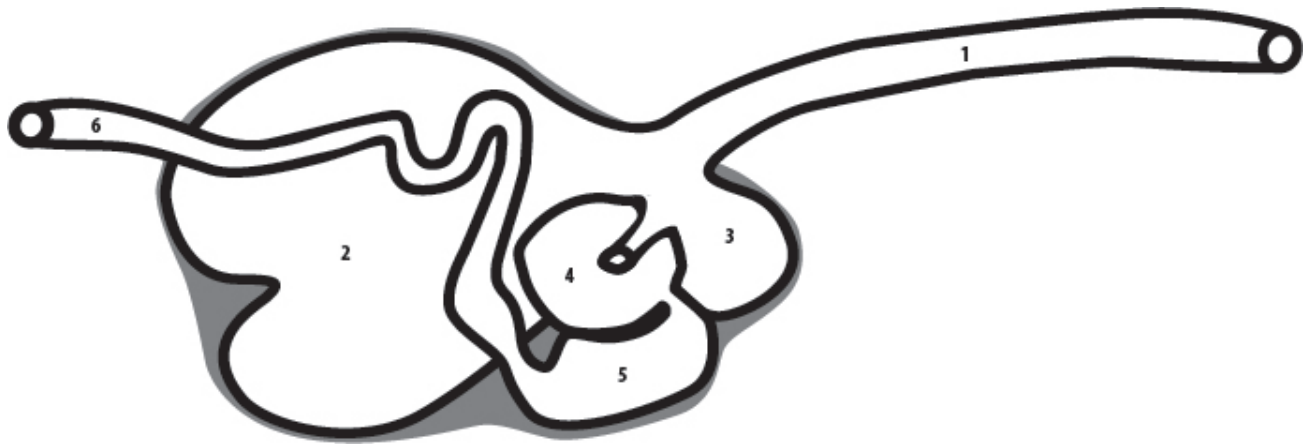
13. Which compartment has an anaerobic environment for bacteria? _____

14. Where are the most nutrients absorbed into the body? _____

Ruminant Digestive Tract Student Worksheet – Answer Key

Name (KEY)

1 - 6. Label the diagram below:



1. Esophagus
2. Ruman
3. Reticulum

4. Omasum
5. Abomasum
6. Small Intestine

MATCHING (7-12)

7. B Many Plies
8. B Functions to absorb water
9. C Honeycomb texture
10. A "True Stomach"
11. D "Fermentation Vat"
12. C Hardware Compartment

- A. Abomasum
- B. Omasum
- C. Reticulum
- D. Rumen

13. Which compartment has an anaerobic environment for bacteria? Rumen
14. Where are the most nutrients absorbed into the body? Small Intestine

Ruminant Digestive Tract Quiz

Name _____

1. List the correct number of each compartment of the ruminant stomach that best answers the statement.

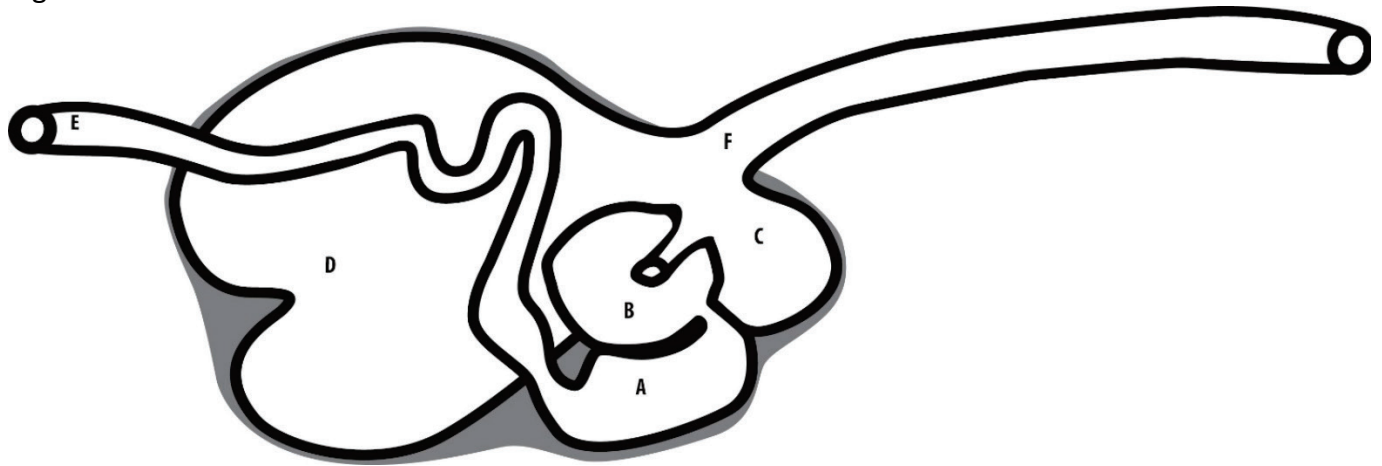
- | | |
|-------------|--------------|
| 1. Abomasum | 3. Reticulum |
| 2. Omasum | 4. Rumen |

- _____ A. Third compartment
- _____ B. Hardware is usually trapped here
- _____ C. The true stomach
- _____ D. Papilla are found in the lining of this compartment
- _____ E. The honeycomb stomach
- _____ F. Oblong and twisted compartment
- _____ G. Water is removed here
- _____ H. Fermentation vat
- _____ I. Color of stomach wall is determined by diet
- _____ J. Contains many folds or layers called "plies"
- _____ K. Enzymes are produced here
- _____ L. Most closely resembles your stomach
- _____ M. Largest compartment of the stomach

2. Which of the following is the primary site of digestion and absorption?

- a) Rumen
- b) Reticulum
- c) Large Intestine
- d) Small Intestine

3. Label the four compartments of the stomach, along with the entry and exit organs, to the digestive tract below:



- A. _____
- B. _____
- C. _____
- D. _____
- E. _____
- F. _____

4. On the diagram above draw the flow of a piece of corn from the ground through the entire digestive process as it travels through the digestive tract.

Ruminant Digestive Tract Quiz – Answer Key

Name _____ **KEY** _____

1. List the correct number of each compartment of the ruminant stomach that best answers the statement.

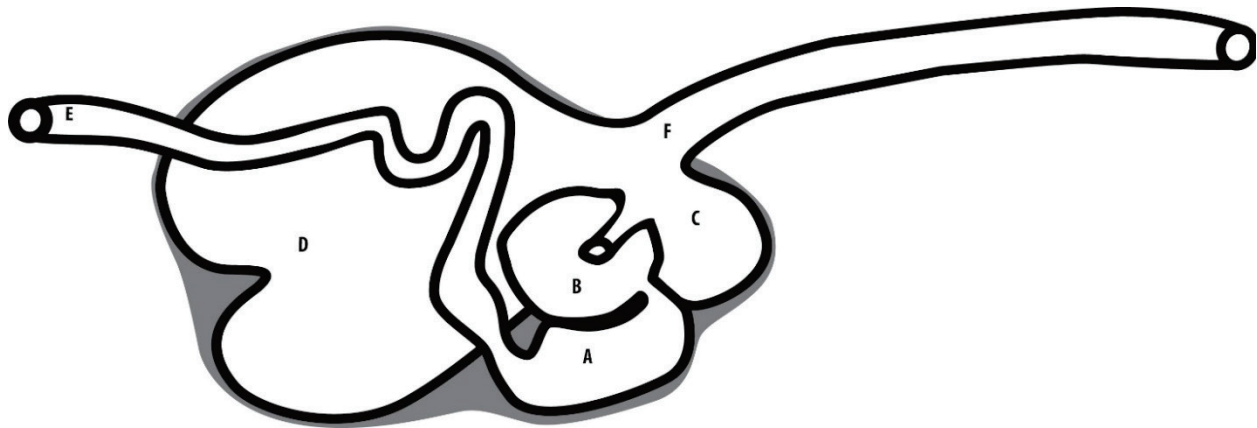
- | | |
|-------------|--------------|
| 1. Abomasum | 3. Reticulum |
| 2. Omasum | 4. Rumen |

- 2 A. Third compartment
- 3 B. Hardware is usually trapped here
- 1 C. The true stomach
- 4 D. Papilla are found in the lining of this compartment
- 3 E. The honeycomb stomach
- 1 F. Oblong and twisted compartment
- 2 G. Water is removed here
- 4 H. Fermentation vat
- 4 I. Color of stomach wall is determined by diet
- 2 J. Contains many folds or layers called “plies”
- 1 K. Enzymes are produced here
- 1 L. Most closely resembles the human stomach
- 4 M. Largest compartment of the stomach

2. Which of the following is the primary site of digestion and absorption?

- a) Rumen
- b) Reticulum
- c) Large Intestine
- d) Small Intestine**

3. Label the four compartments of the stomach, along with the entry and exit organs, to the digestive tract below:



- A. Abomasum
- B. Omasum
- C. Reticulum
- D. Rumen
- E. Small Intestine (Intestine)
- F. Esophagus

4. On the diagram above draw the flow of a piece of corn from the ground through the entire digestive process as it travels through the digestive tract.

