Chew It Twice

Objective

The student will trace the path a cow's food follows through its body. Students will ask and answer questions to clarify comprehension. Students will listen to and follow directions given by the teacher.

Background

Have you ever noticed, whenever you see a cow, it always seems to be chewing something? That is because the cow has to chew its food twice. What you are watching is the cow "chewing its cud."

A cow is a ruminant animal. Other ruminants include sheep, goats, deer, camels, giraffes, yaks, antelope and llamas. The stomach of a ruminant animal has four compartments—the rumen, the reticulum, the omasum, and the abomasum. Each compartment is designed to perform a different function. By having this four-part stomach, the cow is able to digest and efficiently use foods that humans and non-ruminant animals, such as the pig and chicken, cannot use. Grass and hay are examples of a food that ruminants can eat that humans cannot. These foods are high in cellulose, which is very difficult to digest if you only have one part to your stomach.

After the ruminant takes a bite of grass or hay, the first place the food moves is to the rumen. Here the food is partly digested by the bacteria that live in the rumen. The food is then passed to the reticulum, which is a membrane with ridges like a honeycomb. The ridges break the food down into smaller pieces. Then the cow regurgitates those pieces so it can chew them again.

The partly-digested food that comes back into the ruminant's mouth is the cud. The animal rechews the food with its powerful back teeth to break it down even more. This is what a cow is doing when it "chews its cud." As the ruminant swallows and saliva washes the cud back into the animal's system, the food now flows into the omasum (oh mah' sum), the third section of the stomach. During this process the food breaks down into vitamins and nutrients that the animal's body absorbs to meet its daily nutritional needs.

The fourth division of a ruminant's stomach is the abomasum. The final digestive process takes place here. In the abomasum the animal's system gets all the remaining good value it needs from the food before letting it pass to the intestines. The intestines store the unused food portions and continue to absorb some nutrients from them until there is enough to push out the back side of the cow as waste material, or cow manure.

Some experts think a ruminant's digestive system developed as it did for survival. Since ruminants are hunted animals in the wild, they must eat quickly and eat as much as possible while they have the chance. The grasses the animal eats are stored in the second stomach until it finds a safe place to eat. Then the animal brings up the food, the cud, to chew.

Oklahoma C3 Standards

PREKINDERGARTEN
Oral Language—1.1,2
Small Motor—2.1,2
Life Science—3.1

KINDERGARTEN
Small Motor—1.1
Life Science—2.1
COMMON CORE
Language Arts—K.RIT.1; K.SL.1, 2, 5

GRADE 1
Science Process—4.1
Life Science—2.1
COMMON CORE
Language Arts—1.SL.1c, 2, 3

GRADE 2
Science Process—4.1
COMMON CORE
Language Arts—2.SL.1c, 2, 3

GRADE 3
Science Process—4.1
Life Science—2.2,3
COMMON CORE
Language Arts—3. RI.1,2,3,4,5,6,7,8,9,10; 3.W.2,7,10; 3.SL.1c,2,3

GRADE 4
Science Process—4.1
COMMON CORE
Language Arts—4. RI.1,2,3,4,5,6,7,8,9,10; 4.W.2,7,10; 3.SL.1c,2,3

Materials

green, yellow and blue crayons

Vocabulary

abomasum—the fourth compartment of the ruminant stomach that follows the omasum and has a true digestive function

bovine—any of a group of ruminant mammals including the oxen, bison, and buffalo that have hollow horns and are related to the sheep and goats

cud—food brought up into the mouth by some animals (as a cow) from the rumen to be chewed again

intestine—the part of the alimentary canal that is a long tube composed of the small intestine and the large intestine, that extends from the stomach to the anus, that helps to digest food and absorb nutrients and water, and that carries waste matter to be discharged

manure—material that fertilizes land; especially bodily waste from birds and animals in stables and barnyards

omasum—the third chamber of the ruminant stomach that is situated between the reticulum and the abomasum

reticulum—the second compartment of the stomach of a ruminant in which folds of the mucous membrane form hexagonal cells

rumen—the large first compartment of the stomach of a ruminant in which cellulose is broken down by the action of symbiotic microorganisms

ruminant—a cud-chewing mammal

The cow's ability to digest grass helps humans by providing a food source on lands that are too not suitable for agricultural crops. According to the USDA, that includes about 85 percent of all land in the US. Cattle turn that grass into food for us to eat and double the land area that can be used to produce food.

Language Arts

1. Students will use online and library resources to research ruminants. Students will find the following in their research:
   —Definition of of ruminant
   —Characteristics of ruminants
   —Examples of ruminants.
2. Read and discuss background and vocabulary. Discuss key points and main ideas.
   —How do ruminants benefit humans?
   —How do ruminants affect our food supply?
   —How do cows use grass and hay, which people cannot eat, in order to feed humans?
3. Students will assist in developing a word bulletin board with the word "Chew." Use words and pictures that represent the word, e.g., bite, grind, eat, manipulate, masticate, bread down into bits, etc.
4. Provide students with copies of the Reading Page and the discussion and writing exercises. Students will read and discuss individually or as a class and complete the writing exercise individually.
5. Students will write a summary of the lesson, concluding with a personal opinion statement. How does all this relate to me?

Science

1. Hand out student worksheets.
   —Students will trace the path of the cow's food with their fingers as you read the background.
   —Read the directions from the student worksheet to your students before allowing them to complete the color work.

Extra Reading

Cronin, Doreen, and Betsy Lewin, *Click, Clack, Moo: Cows That Type,* Little Simon, 2011.

Murphy, Andy, *Out and About at the Dairy Farm,* Picture Window, 2004.

Ray, Hannah, *Cows (Down on the Farm)*, Crabtree, 2008.

Townsend, Una Belle, Bob Artley and Yolanda Powell, *Grady's in the Silo,* Pelican, 2003.

Wolfman, Judy, and David Lorenz Winston, *Life on a Cattle Farm*, Lerner, 2002.

Reading Page

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Have you ever noticed, whenever you see a cow, it always seems to be chewing something? That is because the cow has to chew its food twice. What you are watching is the cow "chewing its cud."

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After the cow takes a bite of grass or hay, the first place the food moves is to the rumen. Here the food is partly digested by the bacteria that live in the rumen. The food is then passed to the reticulum. The reticulum is a membrane with ridges like a honeycomb. The ridges break the food down into smaller pieces. Then the cow regurgitates those pieces so it can chew them again.

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DISCUSSION

A ruminant is a cud-chewing animal. On the Reading Page you learned that goats, sheep, bison, deer, camels and other animals are also_____.

Look at the picture of cattle grazing at right. List three things you notice they are doing.

Some experts think a cow's digestive system developed as it did for survival. Since ruminants are hunted in the wild, they must eat quickly and eat as much as possible. Use an online search engine to find photos of grazing wild ruminants like deer and antelope. Compare them with the photo of these cattle.

WRITE

Some of these cattle seem to be walking as they eat. In your opinion, why are they doing that? Use evidence from the reading.

1. State opinion.

2. Give your reasons.

3. Provide evidence.

4. Restate your opinion.

What word in the following text means "to chew again?"_____

The partly-digested food that comes back into the cow's mouth is called cud. The cow rechews the food with its powerful back teeth to break it down even more. This is what the cow is doing when it "chews its cud."

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Name_____

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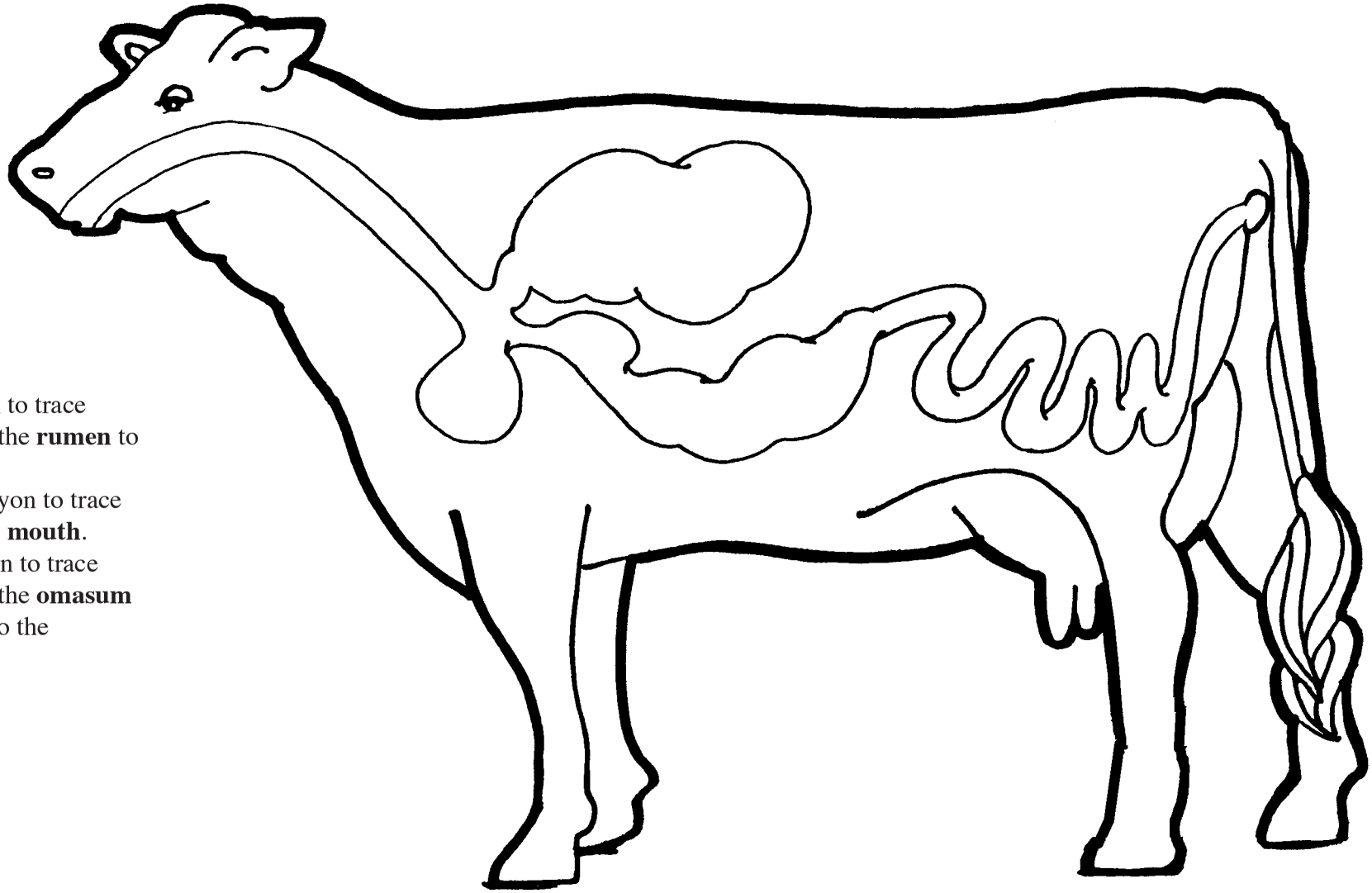

Use a **green** crayon to trace from the **mouth** to the **rumen** to the reticulum.
2. Use a **yellow** crayon to trace the path back to the **mouth**.
3. Use a **blue** crayon to trace from the **mouth** to the **omasum** to the **abomasum** to the **intestine**.

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