



Ultimate Harvesting Machine

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A sequence of lesson plans for teaching about the unique job that cattle perform . . .
turn grass into meat . . . a product that humans can eat!

Target Audience: K - 3rd

Presenter Background Knowledge

Cattle are harvesting machines for grass. Grass naturally grows all over our world. The grass follows a cycle of growing each spring and drying out in the fall. The seeds from the grass are then dropped from the plant and they grow during the next spring season. By using cattle as a harvesting machine, ranchers can utilize a natural renewable resource and produce a food for human consumption. Cattle do not interrupt the grass growth cycle, instead they enrich it. With responsible grazing practices cattle can graze the land and fertilize the next crop of grass. Almost 1/2 of the land in the contiguous 48 states is classified by the government as grazing land. Over 90% of this land is unsuitable to raise crops on. Much of this land is also unsuitable for urban development. Therefore, by using cattle as a harvesting machine, these areas of land can be utilized to produce a useful commodity - beef. Even if we could put tractors and harvesting machines on the hills and harvest the grass what good would it do us. Humans can eat grass, but they receive little to no nutritional value from it. Humans are unable to digest cellulose. Cattle are ruminant animals. They can digest the cellulose in forages (grasses). They then can turn forage cellulose into a nutrient dense food for humans. If humans eat grasses, they pass it through their system giving them little to no nutritional value. Cattle are able to digest the cellulose due to their unique digestive system. They have 4 stomach compartments. Once food is swallowed it travels through each compartment where microorganisms aid in the digestion. During digestion large pieces are returned to the mouth (cud) for further chewing. Cattle not only utilize grass to create beef, but they also recycle other by-products from food production (tomato excess, almond hulls, cull carrots, etc.). All of these food production by-products would otherwise be thrown out into our landfills. This is not the only way that cattle help the environment. The process of grazing is extremely beneficial to reducing fire hazard and promoting healthy plant regrowth. Cattle are able to graze land that is otherwise useless for agriculture and urban uses. By using responsible grazing habits, the natural beauty of the environment is also maintained for future generations.

Materials: 3 paper plates / rinsed grass and hay / beef jerky

Anticipatory Set:

Tell the students that you have a special food treat for them. Explain to them that they will have a choice between two different foods. Take out your two plates that you have prepared - one with grass / weed clippings and one with hay. Ask them to line up behind the plate that they want to try. (Most likely the kids won't line up or will make some "yuck" comments - this is what you want!) As long as you picked your grass / weeds from a natural area and rinsed it, let anyone who wants to try either food. Talk about the fact that we can eat grass and hay. Neither one will hurt us. Ask the question (if someone tasted it) of what the grass and hay tasted like ... was it good ... lots of flavor ... etc. The answers will probably be a resounding no. Now take out your third plate with beef jerky. Tell the students that because of the grass on the hills we have beef products. Ask who would rather eat beef jerky than grass / hay. Let every try a piece of beef jerky.

Lesson #1: Cattle Equation

Materials Needed:

Paper / Crayons / Pencils

Optional Materials:

Glue / Easter grass / Felt / Wallpaper

Ellison cow cutout / small toy cow / cow magazine photo / Package label / grocery store ad photo

Procedure:

- 1) Tell the students that cattle can take the grass growing on the side of the hill and turn it into beef.
- 2) You are going to use this information to create a math equation about cattle, grass, and beef.
- 3) Give the students the materials (paper and crayons)
It is up to you how fancy or simple the poster will be. You might just have the students draw each component and label their pictures or you can use materials to make each component.

Some ideas:

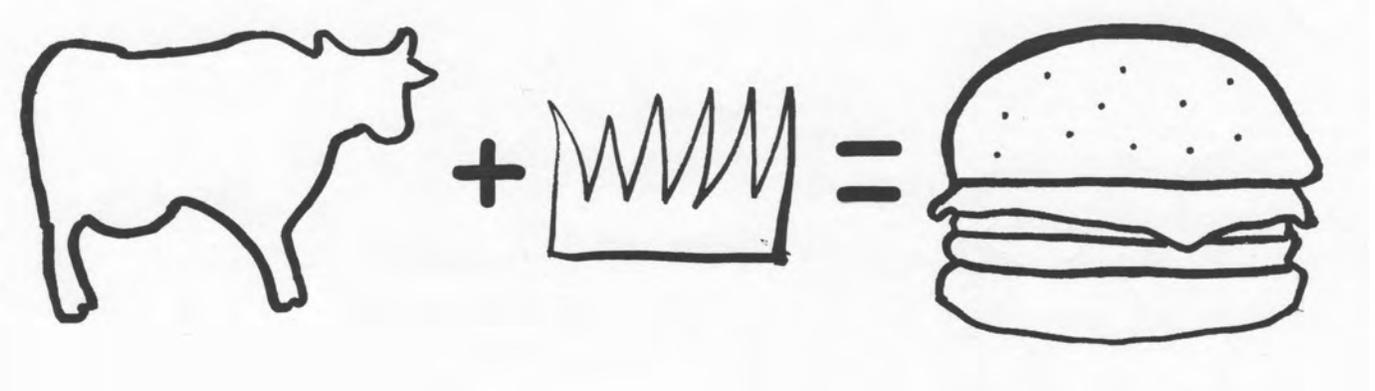
Grass- Easter grass / felt / wallpaper scraps

Cow- Ellison cow cutout / small toy cow / magazine photo

Meat- Package label / grocery store ad photo

- 4) Guide the students in creating the picture equation:

CATTLE + GRASS = BEEF



Extensions:

- 1) Include by-products of cattle with the meat portion of the equation.
CATTLE + GRASS - BEEF & BY-PRODUCTS
- 2) Extend the equation to be more complicated.
SEEDS + RAIN + SUN = GRASS + CATTLE = BEEF & BY-PRODUCTS
- 3) Continue to Lesson #2 to learn how cattle can digest grass and we can't.

Lesson #2: How do cattle use grass as fuel?

Materials Needed:

Outline of Child & Cow (1/student)
Pencils / Crayons

Optional Materials:

Negative Die Cut of Child & Cow

Procedure:

- 1) Refer back to your opening. Did anyone eat the grass / hay? If they did was it good? Which was better . . . grass or beef jerky? Explain to the students that people can eat grass and even hay. However, there are two key reasons why we don't:
 - a. We can't digest the cellulose in grass. Therefore, it passes through our bodies and does not give us any nutritional value.
 - b. Grass doesn't taste good.

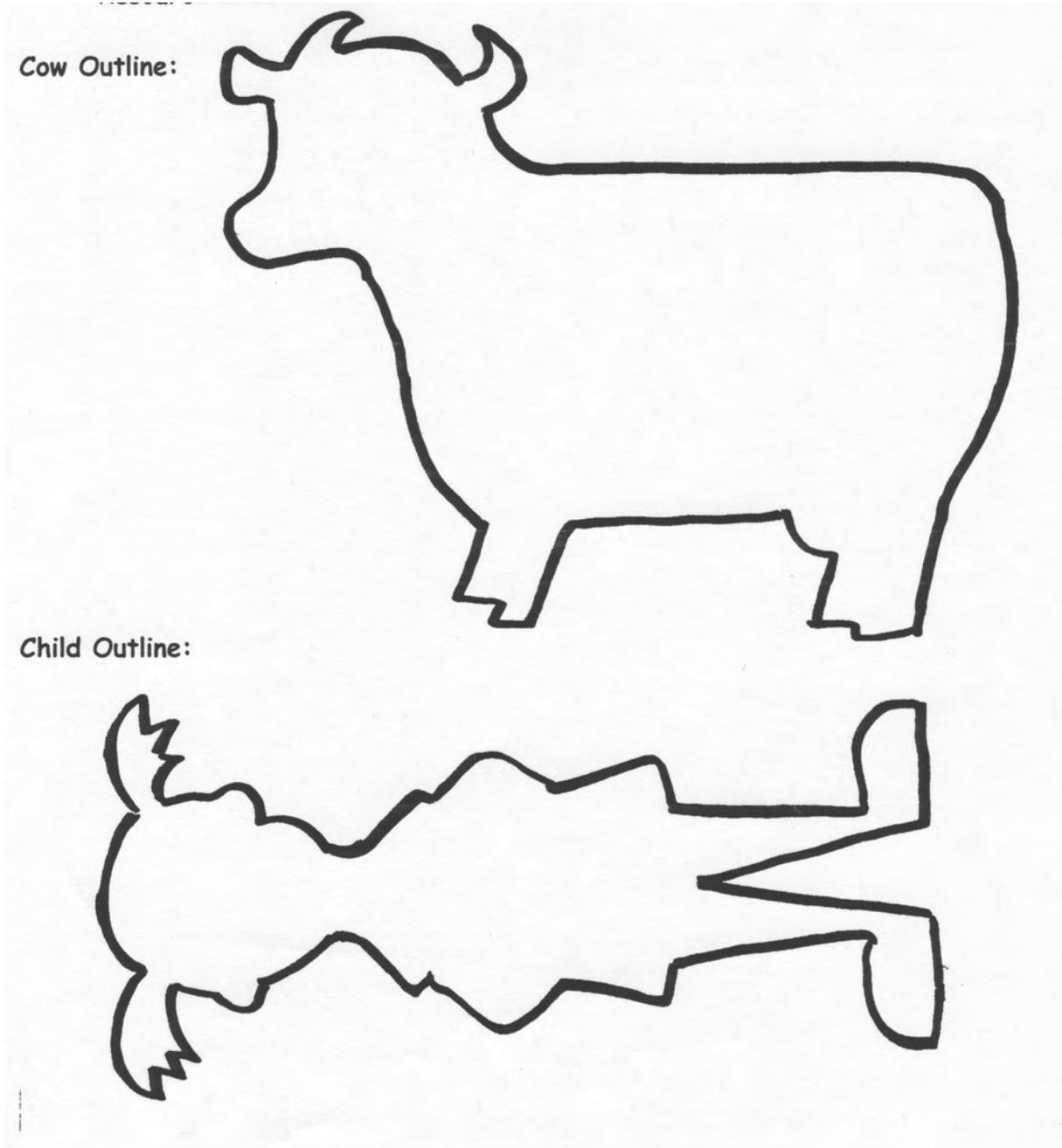
Instead we choose to let cattle graze the land and eat the grass. They can turn the grass into beef. A food packed with vitamins for humans that tastes GREAT!

- 2) So how do cattle do it? Pass out the cow/child outline worksheet. Depending upon the level of your class, you can decide how much information to teach.
 - a. BASICS
 - i. Talk about what happens to food when we eat it. It goes in our mouths down through our throats and into our stomach. Our body gets all the nutrients or "good stuff" out of it and then it leaves our body.
 1. Draw the path on the child outline.
 - a. Mouth / throat / stomach
 - ii. Now tell the students that cattle are different in one main way. We have 1 stomach and they have 4! They have 4 stomach compartments and because of this they can "unlock" more nutrients or "good stuff" from the grass. Cows put grass in their mouth and it goes down through their throats. Then it goes to each part of their 4 compartment stomachs. In the first stomach compartment there are even "little animals" or microorganisms that help a cow to break down the grass and get all the nutrients. After the grass goes through all 4 stomach compartments then it leaves their body.
 1. Draw the path on the cow outline.
 - a. Mouth / throat / stomach 1 with microorganisms / stomach 2 / stomach 3 / stomach 4

MORE COMPLEX

- i. You may want to include a more complex version of human digestion if that is part of your science standards. Otherwise use the basic information.
- ii. Now tell the students that cattle are different in one main way. Their digestive system makes them a ruminant animal. Ruminant animals have a digestive system that allows them to digest food that other animals can not.
 1. Cattle chew their food with their teeth.
 2. It then travels down the esophagus to the first stomach compartment, the rumen. In this stomach compartment microorganisms assist the cow in breaking down the food. This makes the food softer.
 3. The food then travel to the second stomach compartment, the reticulum. Here the food is digested further. Large pieces of food are sent back to the mouth for further chewing (cud - this is where the saying about "chewing their cud" comes from).
 4. Once the food is soft it travels to the third stomach compartment, the omasum. In this stomach compartment the water is removed from the food.
 5. The food then travels to the fourth stomach compartment, the abomasum. Here stomach juices continue the digestive process.

6. The food then travels through the duodenum and the intestines (small and large). This is where nutrients are absorbed into the blood.
 7. Finally the waste products are excreted through the rectum as manure.
- iii. Draw and label the path on the cow outline.
1. Mouth & Teeth / Esophagus / Rumen / Reticulum / Omasum / Abomasum / Duodenum / Small and Large Intestines / Rectum



Extensions:

- 1) Extend your discussion to include a comparison of human and cattle teeth. Discuss herbivores, carnivores, and omnivores.
- 2) Use the lesson plan "What we can learn from a cow and a worm" available from the National Cattlemen's Beef Association, (see teachfree.org website)
- 3) Use the lesson plan "From Sun to Steak" available from CFAITC Beef Resource Sheet

One lesson from "What we can learn from a cow and a worm". Order the complete set and poster from teachfree.org.

ACTIVITY SHEET 1

THINGS WE CAN LEARN FROM A COW AND A WORM

NAME _____

RUMINANTS RECYCLE AND CONSERVE

Cattle and other ruminants are nature's models for food energy conservation. Ruminants have unique stomachs with four cavities that allow them to eat products that other animals find inedible.

Directions

Read the information in the next column and then follow the path of food as it moves through the ruminant stomach by writing the step numbers in the boxes on the diagram below. Some of the numbers will be used more than once.

Ruminant Stomach

1. Teeth tear and chew food in mouth
2. Food travels down esophagus (ē sāf' ə gəs)
3. Cud (swallowed food) mixes and softens in stomachs 1 and 2
4. Cud returns to mouth for more chewing by rear molars
5. Cud passes through stomachs 1, 2, 3 and 4 as it is digested and nutrients absorbed
6. Waste materials pass through intestines and exit body as manure

Find Out

1. What other animals are ruminants?

