Beef

*Lesson Plan for Grade 4, Science*

*Prepared by NAITC*

*Modified by Mississippi State University, School of Human Sciences*

*for Mississippi Farm Bureau Federation - AITC*

# OVERVIEW & PURPOSE

In this lesson, students will follow the farm to fork process of producing beef, learn how cattle and other ruminants convert grass into nutrient-rich foods such as milk and meat, discover ways cattle recycle food waste, and identify careers in the beef cattle industry.

# EDUCATIONAL STANDARDS

**Mississippi College-and-Career Readiness Standards:**

L.4.2.2 Develop and use models to explain the unique and diverse life cycles of organisms other than humans (e.g., flowering plants, frogs, or butterflies) including commonalities (e.g., birth, growth, reproduction, or death).

ELA-W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information and provide a list of sources.

**NALOs:**

T1.3-5 e Recognize the natural resources used in agricultural practices to produce food, feed, clothing, landscaping plants, and fuel (e.g. soil, water, air, plants, animals, and minerals).

T2.3-5 e Understand the concept of specific ways farmers/ranchers care for soil, water, plants, and animals.

# OBJECTIVES

* Students will compare and discuss the differences between a calf, heifer, and steer
* Students will identify byproducts
* Students will define: conserve, waste, digest, nutrition, and nutrients
* Students will reflect on their previous experiences with cattle and form new questions

# MATERIALS NEEDED

* PowerPoint
* Flip Chart paper or post board for KWL chart.
* Sticky notes for each student or index cards (2 per student)
* Basket or bucket

Essential Files:

* [PowerPoint](https://docs.google.com/presentation/d/1eaO2qLHMTVg2Hn_ZyY3vsPv-XPYuTwQO/edit?usp=sharing&ouid=109918902593538910659&rtpof=true&sd=true)
* Flip Chart paper or post board for KWL chart.
* Energy Transfer Photo Example
* [World Population Clock](https://www.worldometers.info/world-population/)
* [A Cows Digestive System](https://www.youtube.com/watch?v=svw5KA8YlAA)

# Lesson Set Up:

Activity 1:

1. Pull up and display the PowerPoint
2. Create a KWL chart (example provided) on a flipchart paper or poster board or classroom board.
3. Set aside sticky notes or index cards for (2 for each) students to write on.
4. Place the basket or bucket beside the KWL chart.

Activity 2:

1. Prior to class, print 1 copy of the attached *Food Waste Scenarios*.
2. Cut scenarios into individual strips and save until you reach step three.
3. Print 1 copy of the attached *Finding Value in Food Waste* and cut into eight individual strips.
4. Distribute the slips around the room before students arrive. You can leave them visible or hide under chairs, tape to the walls, etc.

# VOCABULARY

**Byproduct:** an incidental or secondary product made in the manufacture or synthesis of something else

**Calf:** the name for baby cattle

**Heifer:** female bovine that has not produced a calf

**Steer:** male bovine that has been castrated

**Livestock:** animals kept or raised for use

**Digest:** to convert (food) into absorbable form

**Nutrition:** the sum of the processes by which an animal or plant takes in and utilizes food substances

**Nutrients:** a substance or ingredient that promotes growth, provides energy, and maintains life

**Convert:** to change from one form or function to another

**Conserve:** to avoid wasteful or destructive use of a natural resource

**Waste:** discarded or useless material

# Ag Facts:

* When beef cattle are harvested, approximately 98% of the animal is used for meat or other byproducts such as leather, glue, soap, insulin, or gelatin.
* Disneyland in California sells over 4 million hamburgers each year.
* The United States and Brazil are the top beef producing countries in the world.
* More than 100 medicines, including insulin come from cattle.

# Background information for teachers:

**Beef From Farm to Fork**

Beef cattle grow from young **calves** to mature **steers** or **heifers** in 14-18 months. Calves can be born any month of the year, but spring is the most common season. After a calf is born it will spend the first few months of its life side-by-side with its mother. The calf receives its nutrition from its mother’s milk. As the calf grows, it will also begin to eat grass, hay, or other **forages**. When the calf reaches six to eight months of age, the calf will be weaned, or separated from its mother. The growing calf will continue to eat grass and other forages as it grows. Beef cattle typically spend the majority of their lives on private or public **rangelands** where their diet consists of grass and other forages. For most beef cattle, their final stage of growth takes place at a **feedlot** where their diet consists mostly of corn and hay which has higher nutrient density than most rangelands. This final stage of growth prepares the animal for harvesting. Once the animal is harvested, it is processed into various meat cuts, such as steak or roast, or processed into hamburger, a form of ground or chopped beef formed into the familiar patty of a hamburger or cheeseburger. The beef is then sold to consumers at a retail outlet, like a grocery store or a restaurant, completing the farm to fork journey.

# LEARNING PROCEDURES

Interest Approach:

1. Ask students, **"Can you name something that can convert grass into food that we eat?"**

2. After students have time to think and offer answers, display the following [image](https://naitc-api.usu.edu/media/uploads/lp604/sun_grass_beef_and_dairy.png) located on the second slide of the PowerPoint and add sunlight to the equation.

Ask: **"Energy comes from the sun and produces grass. Humans cannot digest and gain essential nutrition from grass. What *can* convert grass into foods like meat, milk, and other dairy products?"**

Animals like sheep, goats, and cattle that have a unique digestive system allowing them to break down the nutrients in plants.

3. Present objective slides and go over the objectives for this lesson to the class.

4. Go through the PowerPoint slides and explain each vocabulary word in each slide.

5. Create a KWL chart on the board or on a flipchart paper in the room. Have sticky notes or index cards available for students at their desks. Have a tub or a bucket for students to be able to place their cards in after each prompted question. (Explain if and when students will be turning in the worksheet.

Directions and questions 1, 2, and 3 will be on the slides.

6. Explain the directions to the students (which will be on the slide as well) for the KWL chart.

Directions: **“Students, located (on the board or wherever the KWL chart is located in the room) is a KWL chart. Each letter represents a question that I am going to ask you. Once I asked you the question, quietly and to yourself think of an answer, write it down on the (sticky notes or paper provided) and quietly place it in the (tub or bucket or basket) at the (front or back of the room). Once you have placed your answer in the bucket please wait at your desk for the next question. You will repeat these instructions for all three questions. We will go over the last question in a few days.”**

7. The teacher will present the questions verbally and on the slide:

Question 1: What do you know about the life cycle of a cow?

The teacher will place the responses under the “K” part of the KWL chart and go over each answer with the class.

8. The teacher will ask the second questions part “W”:

Question 2: What do you want to know about the life cycle of a cow?

The teacher will repeat the steps of placing the answers under the “W” section and go over each response with the class. (Keep the chart up for the duration of the entire beef lesson, to finish it the last day)

9. Finally, the teacher will explain that the class will be learning about the life cycle of a cow that produces beef (hamburgers, steaks, etc.). The teacher will then explain that as a class and through the next several days throughout the lesson some of their questions will be answered, and those that are not will be researched and answered.

### Day 2:

1. Review the lesson from the day before along with the KWL chart.
2. Flip to the objectives slide (slide 2) and briefly cover the day’s objectives.
3. Start Activity 1.

**Activity 1:**

1. Explain to students that there are many processes in our life that follow a specific cycle from start to finish. Cattle, the source of our beef, go through a variety of steps from start to finish. This brief activity will explain and illustrate what cattle eat and where they live as they grow and mature.
2. Distribute the *Beef Life Cycle Board Game*, one per student.
3. Flip to the 3rd slide of the *Beef Life Cycle* PowerPoint.
4. Read through the instructions with the students and go through the PowerPoint as they take notes on their game board.
5. After finishing the worksheet, have students write a “$2 summary” of the lesson on the back of their game board. Each word is worth 10 cents, and students must write until they reach $2.
   1. This summary activity can be scaffolder by giving students specific words related to the learning that they must include in their summaries. You may also increase to any amount of money to require additional length. Possible words to include in the summary include: beef life cycle, calves, ranch, feed yard, harvest, or supermarket.

9. The teacher may instruct students to turn their worksheet in or go by the normal classroom worksheet protocol.

10. Start Activity 2.

Activity 2:

1. Ask students, "How many people currently live on the earth?" Accept an answer of approximately 7 billion or go to the [World Population Clock](http://www.worldometers.info/world-population/) for a more precise answer. Follow up by asking students if the world population is expected to increase or decrease in coming years. *(increase)*
2. Conclude with students that it is, and will become increasingly important to use our land wisely to provide homes, food, space, and resources for a growing population.
3. Ask, "Can we use ALL of our open space to grow crops for food?" Display the following [images](https://naitc-api.usu.edu/media/uploads/lp604/range.png) for illustration. (Located in the PowerPoint).
4. Ask students:
   * Is some land too dry or too wet for crop growth?
   * Is some soil too rocky or sandy to grow crops?
   * Could steep inclines or cold climates prohibit a farmer from growing crops successfully?
5. Ask students to think back to what they have learned so far. Could the land that is unsuitable for crop farming be used by cattle (or sheep) to produce food? (Yes!) Tell students that this is possible due to a unique digestive system. Show the video clip, [A Cow's Digestive System](https://www.youtube.com/watch?v=svw5KA8YlAA) . Distribute the *Remarkable Ruminant* handout to students. Instruct students to read the article on page 1 and highlight each example they find of ways cattle convert otherwise unusable resources into usable resources. Students will then complete pages 2 and 3 of the worksheet.
6. Review what the students have learned about today.
7. See if any of the questions from the KWL chart have been answered.
8. Preview the next day’s lesson.

Activity 3:

1. Ask students to brainstorm all of the places where food goes to waste. Students will likely think of uneaten food at their home, school cafeteria, or restaurants. Once students have exhausted their own ideas, provide a prompt. Ask, "When you are preparing food at home is there any portion of the food that you throw away?" Provide examples such as:
   * Do you ever peel a fruit or vegetable and throw away the peel?
   * Do you ever throw away the core of an apple or the rind of watermelon?
   * Do you always eat the heel/crust of a loaf of bread?
2. Point out that on a house-by-house basis, the amount of food waste may be relatively small (though potentially impactful). Ask students to think about the waste from a large food processing facility. Ask, "Are there food processing facilities that could produce truckloads of waste?"
3. Start Activity 3.

**Activity 3: How Cattle Recycle**

1. Divide the class into eight groups. Give each group one *Food Waste Scenario* slip. Allow groups to read and discuss their assigned scenario and come up with a potential solution.
2. Next, introduce the concept of cattle being able to digest food and receive nutritional value from foods that humans either do not choose to eat or cannot eat because it provides little/no nutritional value to our bodies.
3. Inform students that they will find strips of paper around the room that contains the nutritional value of the food product represented in their scenarios. Instruct students to search for the papers to find the information they need to determine if the food waste from their scenario could be used in another way.
4. Once students have found the slip of paper to match their scenario, have them come up with another solution for the food waste based upon what they learn. Have each group share their scenario and solution with the class.

**Concept Elaboration and Evaluation**

* In the day 3 slide show, flip to the next slide that is labeled animal science. Go over each slide and explain each job to the students. Then review the following questions as a class discussion:

**What is the definition of a byproduct?**

* *An incidental or secondary product made in the manufacture of something else.*

**What are some things farmers/ranchers face in feeding their cattle byproduct feeds?**

*- Some byproduct feeds are not grown everywhere. For example, citrus fruits are only grown in a few states.*

**What makes cattle different from humans and allows them to digest food waste products like the ones we discussed today?**

* *Cattle are ruminants which means they have four compartments in their “stomach” allowing them to break down and digest plant products that other animals and humans cannot.*

**So what? Why does this matter or why is this important?**

* *The world population is growing exponentially which places a greater demand than ever before for food. Using alternative food sources that would otherwise go to waste, and feeding them to ruminants like cattle, allows farmers to efficiently and economically produce food for this growing population.*

# Additional Learning Procedures

To help students review and elaborate more about beef, try using the [“Think Pair Share”](https://drive.google.com/file/d/1lpKFWQj-ONdLkb3LNQs-9FWYhIoZaDtv/view?usp=sharing) method to allow students to think deeper and make new connections.

Additional Texts to Include:

[Can-Do Cowkids](https://www.agfoundation.org/recommended-pubs/can-do-cowkids)

[Beef Ag Mag](https://www.agfoundation.org/recommended-pubs/beef-ag-mag)

[After School Resource Kit: Beef Education](https://www.agfoundation.org/recommended-pubs/after-school-resource-kit-beef-education)



Source: <https://www.agclassroom.org/teacher/matrix/>

*For more information and additional lessons visit*

*https://msfb.org/ag-in-the-classroom/lesson-plans/.*