**Life Cycle of a Beef cow: Farm to fork (No PowerPoint)**

Overall goals:

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.

Learning Objectives:

* Compare and discuss what the differences between a calf, heifer, and steer are.
* Analyze what byproducts are.
* Define: conserve, waste, digest, nutrition, and nutrients.
* Reflect on their previous experiences with cattle and form new questions.
* Discuss the life cycle of a beef cow and how it gets from the farm to our forks.
* Assess where and how livestock live.
* Determine how farmers turn unusable resources into usable resources.
* Discuss as a class what food waste is.
* Apply knowledge of food waste and conservation by creating scenarios on how to prevent food from going to waste.
* Investigate careers in animal science.
* Reflect on why people working in agriculture is important.

Purpose/Rationale:

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).

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.

**Day 1: 45 Minutes**

**Materials:**

**Life Cycle of Beef Cow Vocabulary Sheet**

**Flip Chart paper or post board for KWL chart.**

**Sticky notes for each student or index cards**

**Basket or bucket**

**Lesson set up:**

1. **On board diplay photos of a sun pointing to grass pointing to products from cows shown here: (Can be draw or pulled up on board) **
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 basket or bucket beside the KWL chart.**

**Learning Objectives:**

* **The students will be able to define cattle related vocabulary by the end of class**

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

### Interest Approach – Engagement

1. Ask students, "Can you name something that can convert grass into foods 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. (<https://naitc-api.usu.edu/media/uploads/lp604/sun_grass_beef_and_dairy.png>) and add sunlight to the equation.

Explain: "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. Present Vocabulary Worksheet to class and go through each definition on the board or the way the class normally does vocabulary and explain each.

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 can be written on the board like:

1. Think quietly to yourself and write your answer on the paper provided. There are no wrong answers so do not get an answer from a classmate.
2. Once you have your answer on your paper, quietly place your paper into the bucket or basket located by the chart.
3. Please wait for everybody to turn in their pieces of paper for the teacher to go over.
4. You will do the same thing for the next question.
5. Are there any questions before we begin?

6. Explain the directions to the students 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 have 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 place 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 board or display in the room.

Questions 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: 45 Minutes**

**Materials:**

**Remarkable Ruminant Worksheet**

**Beef Life Cycle Game board**

**Lesson set up:**

1. **Place the days objectives on the board for students.**
2. **Print out each circled copy of the beef life cycle chart or print one large one to work through with students.**
3. **Make copies of the Beef Life Cycle Game Board for each student.**
4. **Make copies of the Remarkable Ruminant worksheet for each student.**

**Learning Objectives:**

* **Students will be able to outline and discuss the life cycle of a beef cattle with classmates.**

### Interest Approach – Engagement

1. Review the lesson from the day before along with the KWL chart.
2. 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. Read through the instructions with the students and go through each stage of the life cycle as students take notes on their game board.
4. 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/) (<https://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) (<https://www.youtube.com/watch?v=svw5KA8YlAA>) (1:35 mines).
6. 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 useable resources. Students will then complete pages 2 and 3 of the worksheet.
7. Review what the students have learned about today.
8. See if any of the questions from the KWL chart have been answered.
9. Preview the next day’s lesson.

**Day 3: 45 minutes**

**Materials:**

**Food Waste Scenarios Sheet**

**Career Cards (From each slide print the photo and career description onto one piece of paper each. Creat career stations around the room for students to visit and take notes on)**

**Finding Value in Food Waste Sheet**

**Reflection Sheet**

**Lesson set up:**

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.
5. Print a reflection sheet for every student.
6. Print Career Cards with pictues of the teacher’s choice from the following list: (Photo examples located in power point attached with lesson)

* Veterinarian - a person qualified to treat diseased or injured animals
* Meat Inspector- A person who works in places where they harvest animals for people to eat. They make sure that all meat is clean and safe to sell so that we can buy it to eat.
* Extension Agent- A person who helps to improve the lives of the farmers and their families by educating them about new technology and finding solutions to their problems on their farms.
* Geneticist- A person who studies the characteristics and traits of livstock, and picks out the best ones to use.
* Farmer- A person who grows and cares for plants or animals for people to use as food.
* Agriculture Teacher - A teacher that teaches students about agriculture, along with other aubjects such as welding, engines, fish and wildlife.
* Agriculture Journalist- A person who writes about agriculture for newspapers, magazines, or news websites or prepares news to be broadcast.
* Poultry Scientist- is the study of all types if birds raised for food and feather, including chickens, turkeys, geese and ducks. They work to improve poultry production and food safety.
* Feed Mill Operator- are responsible for assisting in the management of the mill feed cews, in the process of staring, mixing and delivering of feed for cattle, hogs or poultry

**Learning Objectives:**

* **Students will be able to define what byproducts are and reflect on the importance of knowing what food waste is.**

### Interest Approach – Engagement

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 a 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 contain 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.
5. After each group has shared with the class, use the following questions for reflection:
6. What is the definition of a byproduct?
   * + *An incidental or secondary product made in the manufacture of something else.*

2. 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.*

3. 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 for compartments in their “stomach” allowing them to break down and digest plant products that other animals and humans cannot.*

4. 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.*

**Activity 4: Jobs in animal science**

1. **Instruct the class to visit each career station as the teacher would like.**
2. **Have students take notes accompanied by pictures.**
3. **Have students complete the reflection activity presented below:**

**Instructions:**

Place your name and today’s date on the reflection sheet.

Answer each question on the reflection sheet.

Turn in as the teacher tells you.

*Materials from:* <https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=604>