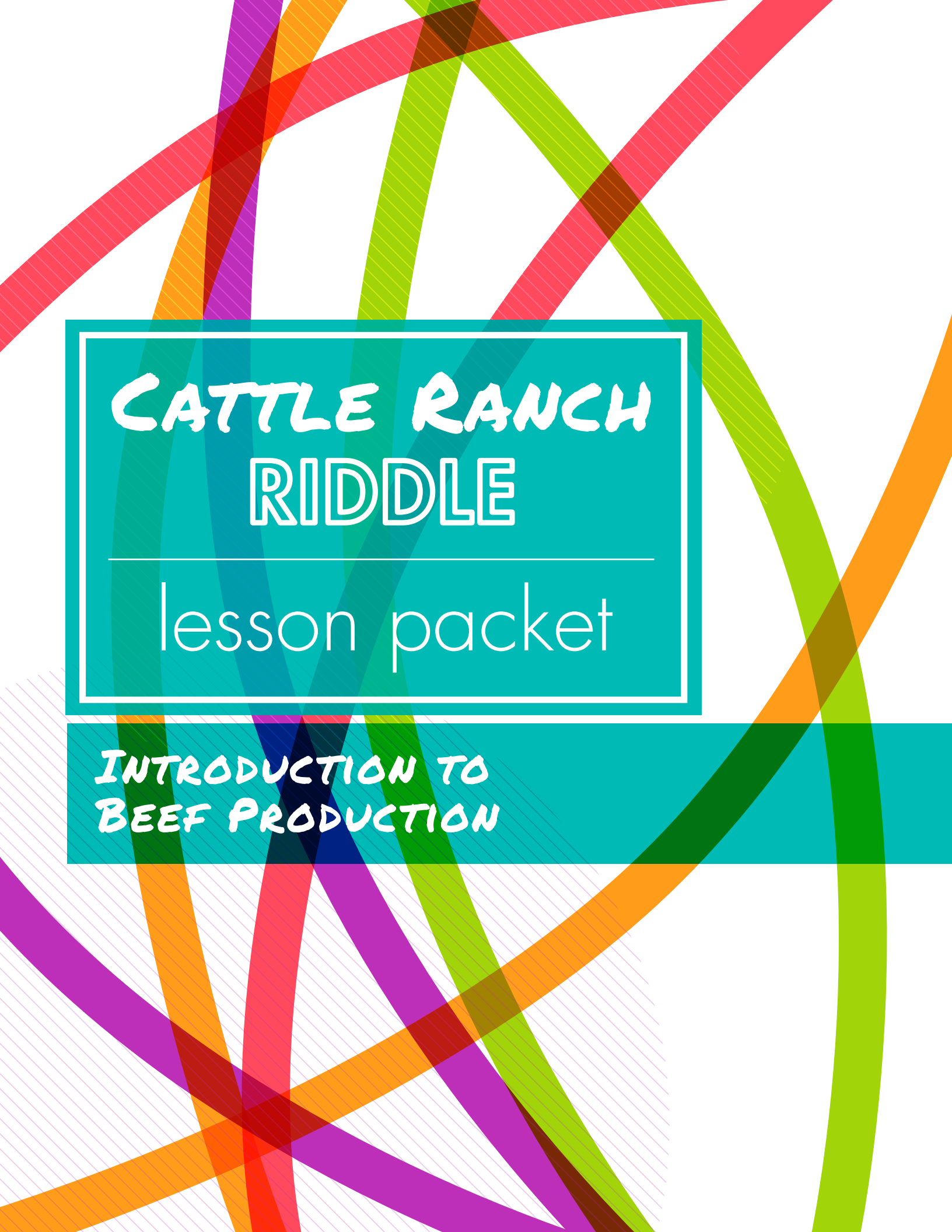




CATTLE RANCH RIDDLE

lesson packet

INTRODUCTION TO
BEEF PRODUCTION



NATIONAL LEARNING STANDARDS:

Middle School:

- **CCSS.ELA-LITERACY.RST.6-8.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
- **CCSS.ELA-LITERACY.RST.6-8.2:** Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

High School:

- **CCSS.ELA-LITERACY.RST.11-12.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
- **CCSS.ELA-LITERACY.RST.11-12.5:** Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

INTRODUCTION TO BEEF PRODUCTION

Lesson Length: 1 hour

Learning Objectives:

1. Students will identify and discuss facts about beef cattle.
2. Students will understand basic terms related to beef cattle.
3. Students will analyze the life cycle of beef cattle.

Key Terms:

- | | |
|-----------|--------------------------|
| 1. Bovine | 9. Yearling |
| 2. Breed | 10. Castration |
| 3. Bull | 11. Tag |
| 4. Calf | 12. Wean |
| 5. Calve | 13. Cow-calf |
| 6. Cow | 14. Feedyard |
| 7. Heifer | 15. Stocker/Backgrounder |
| 8. Steer | |

Background Information:

- National Cattlemen's Beef Association's, interactive map, "The Beef Lifecycle" at <https://www.beef.org/beef-lifecycle/index.html>
- Cattlemen's Beef Board and National Cattlemen's Beef Association's introduction to beef cattle ranches, "Raising Beef" at <https://www.beefitswhatsfordinner.com/raising-beef>

Materials:

- Straw and paper clip hook (one per student)
- Scissors
- Activity Sheet 1 (Cut before class, one per group of two to four students)
- Beef life cycle handouts

Introduction (Anticipatory Set): (10 minutes)

1. Test students' knowledge about beef through a quiz bowl game.^{v,vi}
 - a. *Who remembers what our challenge question is? Who thinks they know the most about beef cattle? Who thinks they know the least about beef cattle? We're going to test your knowledge about beef with a quiz bowl competition to start class.*
 - b. Divide students into groups of five or eight depending on class size. Make sure there are an even number of teams. Two teams will compete against one another at a time.
 - c. Share the rules for the game.
 - i. When a student buzzes in, the other contestants are locked out.
 - ii. The student who buzzes in is required to answer the question immediately without consulting with teammates.
 - iii. If a student rings in before the teacher is through reading the question, the teacher will stop reading the question at that point and the student must answer.
 - iv. The correct answer to a question is worth two points. If the answer is incorrect, the team loses one point. Other teams may buzz in to answer a question if the answering team misses the question.
 - d. Play game.
 - i. **How long ago were cattle domesticated?** 10,000-15,000 years ago
 - ii. **What is the difference between beef cows and milk cows?** Beef cows are used for their meat, milk cows are used for their milk
 - iii. **How many beef cattle are in the United States?** 31.2 million
 - iv. **What US state raises the most cattle?** Texas
 - v. **How many pounds of food do cows consume each day?** 40 pounds
 - vi. **What two countries produce the most beef in the world?** United States and Brazil
 - vii. **What percentage of beef ranches are family owned?** 91%
 - viii. **How much meat is produced in the United States each year?** 25.2 billion pounds
 - ix. **How much meat does one U.S. citizen consume each year?** 55.7 pounds
 - x. **How many quarter pound hamburgers can be provided from one cow?** 2,000 hamburgers

- e. Process the activity.

Let's have three people share what fact they found most interesting. How many of you were unfamiliar with the terms we used? Not to worry, we will go over those terms to make sure we know the basics.

2. Preview: Today we will discover basic terms and facts about beef cattle. Then we'll learn the key steps in the beef lifecycle so that we have a better understanding of how beef gets from pasture to plate.

Input and Modeling: (10 minutes)

1. Students use Activity Sheet 1 to work in small groups to correctly match definitions and terms related to beef cattle.
 - a. *In this activity, we will be given strips of paper with terms and definitions commonly used in reference to beef cattle. We will need to know these terms to move ahead in the lesson. Work in groups to match the definitions and terms.*

Bovine: The scientific name for cattle.

Breed: A group of animals that have the same ancestry and characteristics.

Bull: A mature male who has not been castrated.

Calf: Young animal, either male or female, less than one year old.

Calve: For a cow to give birth to a calf.

Cow: A mature female that has given birth that is usually two or more years of age.

Heifer: A young female cow that has had her first calf.

Steer: A young male calf that has been castrated before reaching sexual maturity. Steers are usually raised for beef.

Yearling: Animals approximately one year old.

Castration: Removing the testicles of male cattle.

Tag: A numbered plastic identification tool that is placed in the animal's ear.

Wean: When a young animal is taken off its mother's milk.

2. Go through the terms and share the correct definitions. Ask for clarifying questions.

Checking Understanding and Guided Practice: (15 minutes)

1. Students will work in groups to familiarize themselves with the beef life cycle process.
 - a. Use the National Cattlemen's Beef Association's interactive "Beef Lifecycle" poster to quickly review the key steps in beef production.

Interactive version: <https://www.beef.org/beef-lifecycle/index.html>

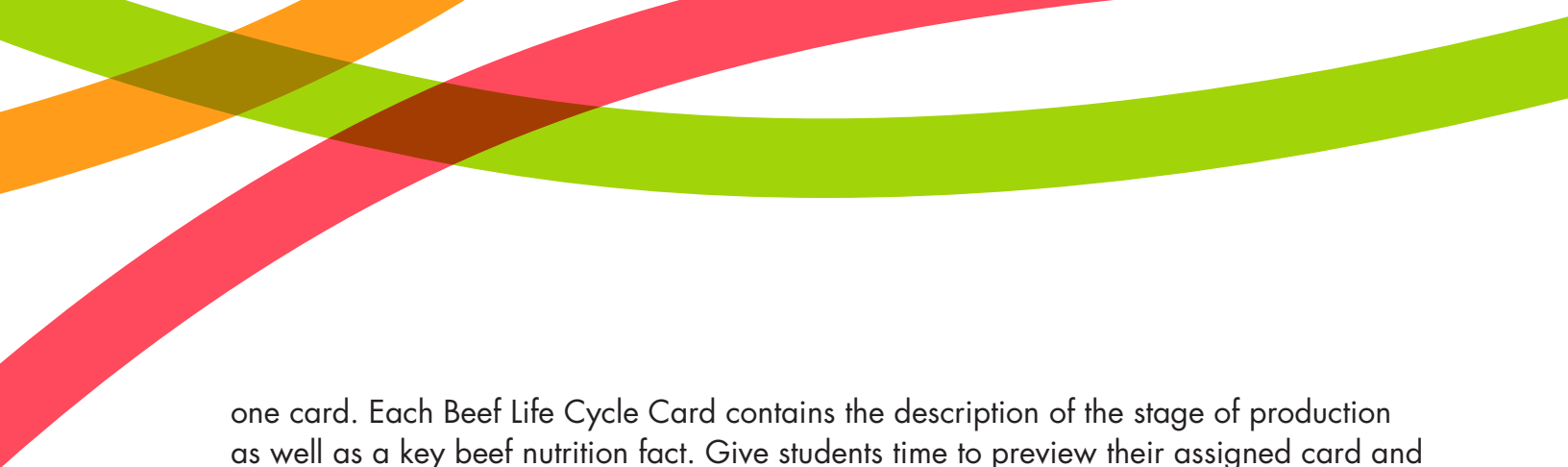
PDF version: <https://www.slideshare.net/BeefFacts/the-beef-lifecycle>

- i. **Cow-Calf:** Cows are bred, and calves are born and raised every year on cow-calf farms and ranches. They spend time grazing on grass pastures within sight of their mothers.

Weaning: Beef calves are weaned away from their mothers between six and eight months of age.
- ii. **Livestock Auction Markets:** Many calves leave the farm or ranch where they were born and are sold at livestock auction markets to stockers and backgrounders between six and twelve months of age.
- iii. **Stockers and Backgrounders:** Between six and twelve months of age, cattle spend time at stocker and backgrounder farms and ranches where they graze on a variety of pastures. Here they gain weight and convert forage and grass into lean protein.
- iv. **Feedyard:** Cattle spend four to six months at a feedyard being fed a scientifically-balanced diet and receiving daily care. Some spend the rest of their lives on a pasture being grass finished.
- v. **Packing Plant:** Cattle are sent to a packer/processing facility to be slaughtered and processed. Then the beef is distributed to supermarket retailers and restaurants.
- vi. **Supermarkets and Restaurants:** Retailers and foodservice operators sell beef in supermarkets and restaurants.

Independent Practice: (20 minutes)

1. Inform students that they will have a chance to familiarize themselves with the process through a team competition that will follow one beef animal through the beef life cycle.
 - b. Break students into teams of six. If need be, pair students up for each role.
 - c. Give each team a stack of Beef Life Cycle Cards. Each person on the team should take



one card. Each Beef Life Cycle Card contains the description of the stage of production as well as a key beef nutrition fact. Give students time to preview their assigned card and ask any clarifying questions.

- d. Give each team five Money Cards. Each team member, except the cow-calf operator, should hold one Money Card.
 - e. Give each team member a straw-paper clip hook. Station team members across the room, by team, in order of the Beef Life Cycle stages. Place an Ear Tag Card on a table or counter next to each cow-calf operator.
 - f. Clarify the challenge: Each team will race to carefully move their beef animal (represented by the Ear Tag Card) from the cow-calf operation through the Beef Lifecycle. Students will move the ear tag by placing the straw in his or her mouth and hooking the ear tag through the hole. At each point in the process, the student will hand off the Ear Tag Card to the next student using only the straw hooks. The person receiving the animal will hand one Money Card to the person delivering the animal. Ask for clarifying questions.
 - g. Begin the challenge and continue until all teams have completed.
2. Process the activity. *What did you observe? What was challenging? How did money play a role? How do you think this is like the actual beef life cycle? How is it different?* Listen for students to reflect on the various points where money was exchanged as well as the safety and care necessary when transporting animals.
 3. Share that for the Cattle Ranch Riddle challenge, students will be creating a cow-calf or stocker/backgrounder cattle ranch.

Wrap-Up (Review, Assess, Challenge): (5 minutes)

1. Students will record three things they learned about beef cattle during today's lesson and turn their paper in as they leave the classroom.
 - a. *Your ticket out the door today is to write down and turn in three things you learned from today's lesson.*
 - b. Have three people share and collect the papers as students walk out the door.

ACTIVITY SHEET 1

Directions: The following is the list of terms and their definitions. Cut each word or phrase on the line, and clip the paper slips together. Students will work in groups (depending on class size) to match the terms and definitions. Each group gets one set of terms and definitions.

Bovine

The scientific name for cattle.

Breed

Bull

For a cow to give birth to a calf.

When a young animal is taken off its mother's milk.

A mature male who has not been castrated.

Calf

Young animal, either male or female, less than one year.

Calve

Cow

Wean

A mature female that has given birth that is usually two or more years of age.

Heifer

A group of animals that have the same ancestry and characteristics.

A young female cow that has had her first calf.

A young male calf that has been castrated before reaching sexual maturity.
Steers are usually raised for beef.

Yearling

Steer

Castration

Tag

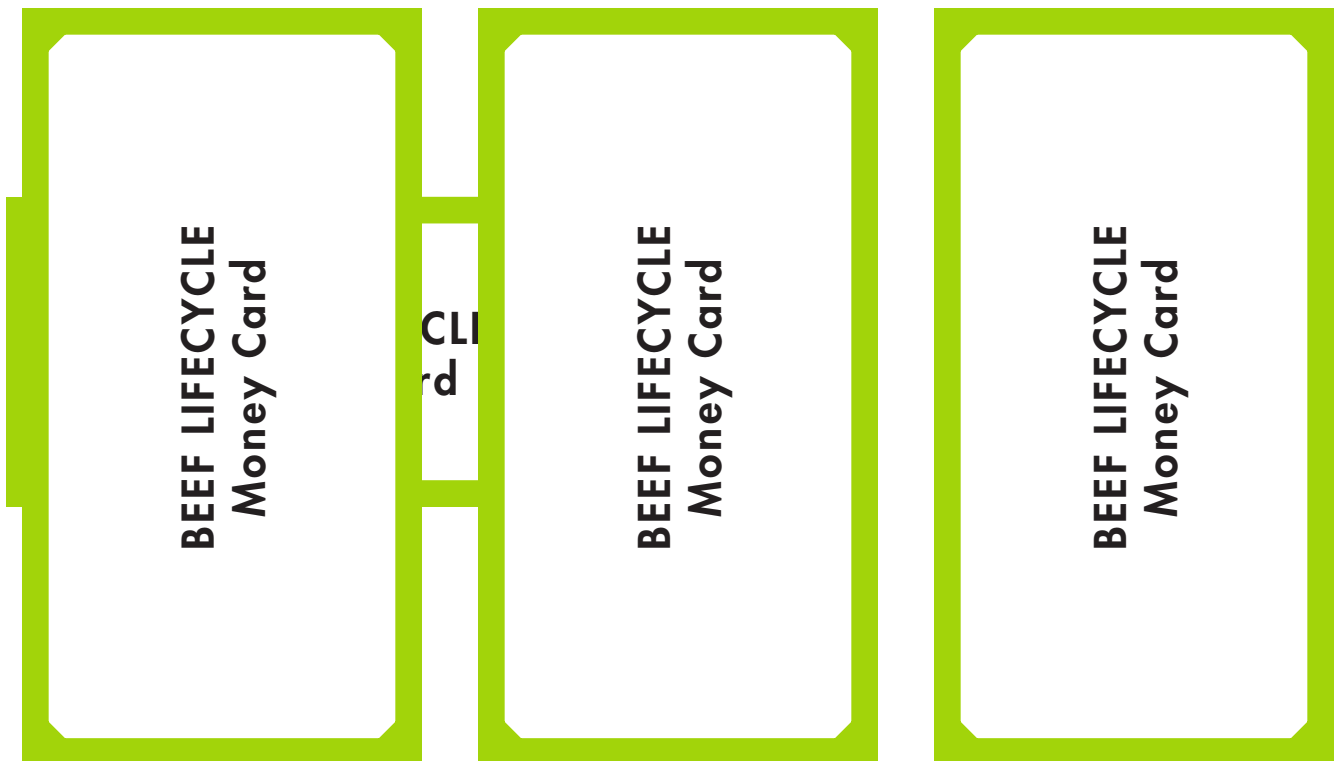
A numbered plastic identification tool that is placed in the animal's ear.

Removing the testicles of male cattle.

Animals approximately 1 year old.



Adapted from *True Beef: Pasture to Plate Educator's Guide*



Adapted from *True Beef: Pasture to Plate Educator's Guide*

Beef Life Cycle Cards¹

Cow-Calf: Cows are bred and calves are born and raised every year on cow-calf farms and ranches. They spend time grazing on grass pastures within the sight of their mothers.

Weaning: Beef calves are weaned away from their mothers between six and eight months of age.

Nutrition Bite: Beef is a powerful protein and an excellent or good source of 10 essential nutrients.

Livestock Auction Markets: Many calves leave the farm or ranch where they were born and are sold at livestock auction markets to stockers and backgrounders between six and twelve months of age.

Nutrition Bite: Many of Americans' favorite cuts, such as T-bone, sirloin steak, and 93% lean ground beef meet government guidelines for lean.

Stockers and Backgrounders: Between six and twelve months of age, cattle spend time at stocker and backgrounder farms and ranches where they graze on a variety of pastures. Here they gain weight and convert forage and grass into lean protein.

Nutrition Bite: A 3-ounce serving of lean beef is only about 155 calories.

Feedyard: Cattle spend four to six months at a feedyard being fed a scientifically-balanced diet and receiving daily care. Some spend the rest of their lives on a pasture being grass finished.

Nutrition Bite: A 3-ounce serving of beef supplies more than 10% of the recommended daily value for protein, B12, zinc, niacin, B6, phosphorus, choline, and riboflavin.

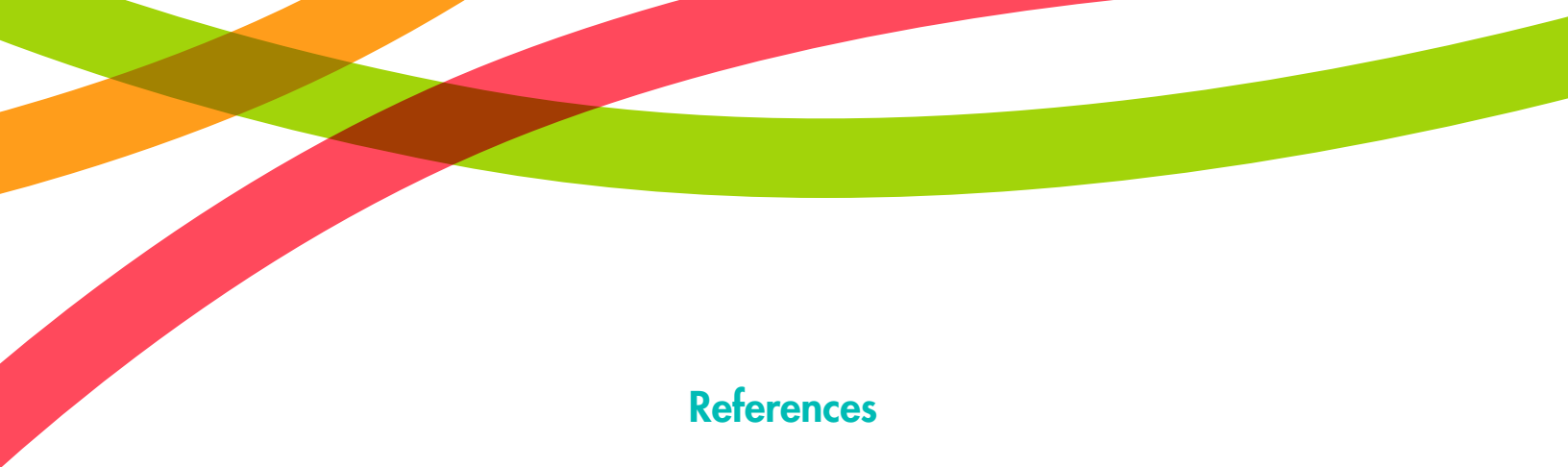
Packing Plant: Cattle are sent to a packer/processing facility to be slaughtered and processed. Then the beef is distributed to supermarket retailers and restaurants.

Nutrition Bite: To choose lean cuts of beef, look for "loin" or "round" in the name.

Supermarkets and Restaurants: Retailers and foodservice operators sell beef in supermarkets and restaurants.

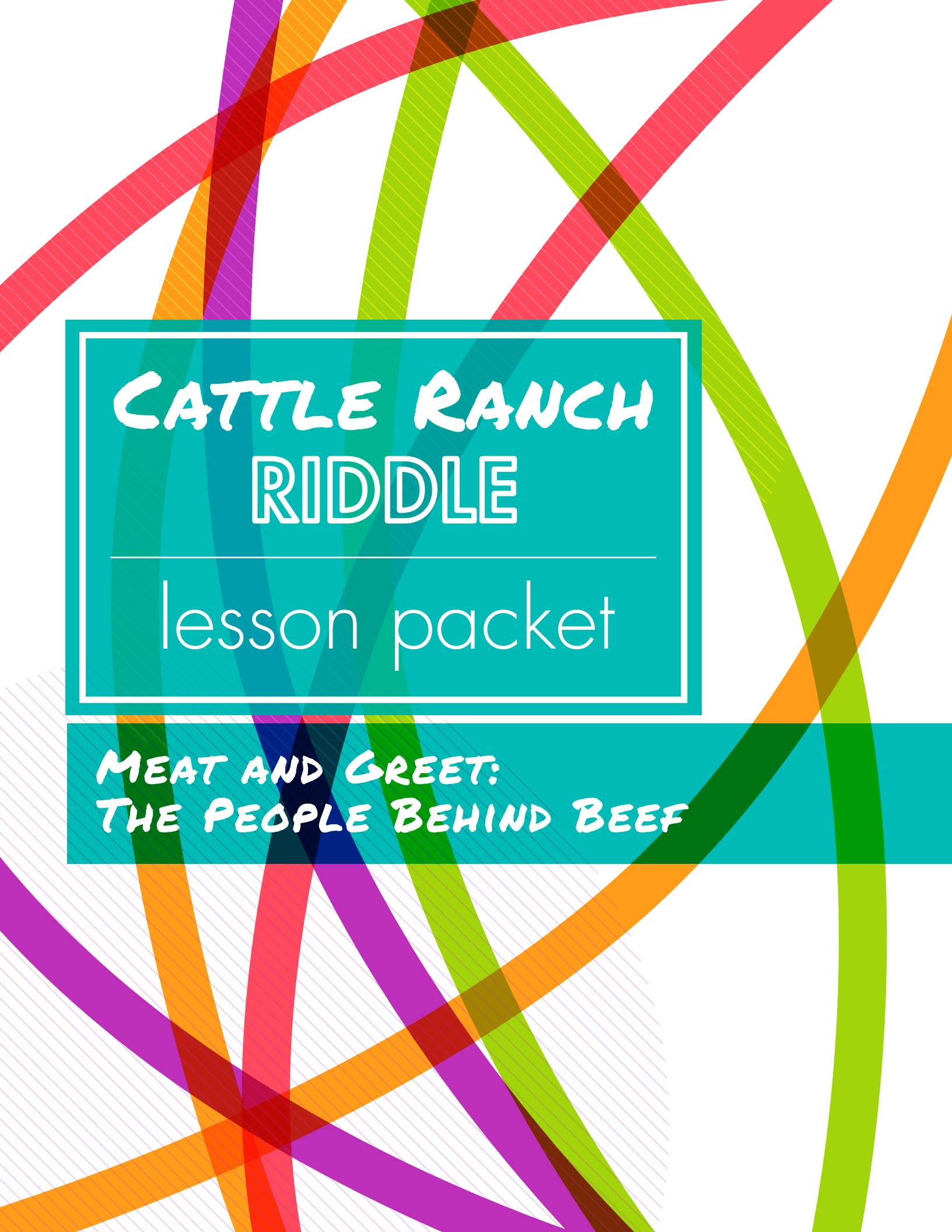
Nutrition Bite: Some cuts of beef are as lean as a 3-ounce skinless chicken thigh!

¹Facts About Beef. (2014). *The beef lifecycle: From farm to fork*. Retrieved from <https://factsaboutbeef.com/2014/08/27/the-beef-lifecycle-from-farm-to-fork/>



References

- i. American Farm Bureau Foundation for Agriculture. (2017). *True beef: Pasture to plate educator's guide*. Retrieved from <http://www.agfoundation.org/files/AFBFA-True-Beef-Lesson-Plan-flow-res.pdf>
- ii. Beef USA. (2016). *Beef industry statistics*. Retrieved from <http://www.beefusa.org/beefindustrystatistics.aspx>
- iii. Cattlemen's Beef Board and National Cattlemen's Beef Association. (2018). *Raising beef*. Retrieved from <https://www.beefitswhatsfordinner.com/raising-beef>
- iv. Cook, R. (2018, July 30). *Cattle prices by year*. FarmCentric. Retrieved from <http://beef2live.com/story-world-beef-production-ranking-countries-0-106885>
- v. Curators of the University of Missouri. *History of the animal science industry*. Retrieved August 8, 2018 from <http://extension.missouri.edu/adair/documents/Livestock/History%20of%20the%20Animal%20Science%20Industry.pdf>
- vi. National Cattlemen's Beef Association. (2016). *Industry statistics*. Retrieved from <http://www.beefusa.org/beefindustrystatistics.aspx>



CATTLE RANCH RIDDLE

lesson packet

MEAT AND GREET:
THE PEOPLE BEHIND BEEF



NATIONAL LEARNING STANDARDS:

Middle School:

- **CCSS.MATH.CONTENT.6.SP.A.1:** Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.
- **CCSS.ELA-LITERACY.W.6-8.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

High School

- **CCSS.MATH.CONTENT.HSS.IC.B.6:** Evaluate reports based on data.
- **CCSS.ELA-LITERACY.W.9-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

LAND MANAGEMENT PRACTICES (PART 1)

Lesson Length: 1 hour

Learning Objectives:

1. Students will interpret demographic data about cattle ranchers.
2. Students will understand the priorities and concerns of cattle ranchers.
3. Students will create a mission statement for a ranching business.

Key Terms:

1. Animal welfare: The well-being of animals.
2. Conservation: The preservation, protection, or restoration of the natural environment, natural ecosystems, vegetation, and wildlife.
3. Beef sustainability: The production of safe, nutritious beef while balancing environmental stewardship, social responsibility, and economic viability.

Background Information:

Cattle ranching, cowboys, and cattle drives are deeply rooted in American culture and tradition. But the beef industry of yesterday is remarkably different today—it's a whole different rodeo. So, who are the people behind the beef? Today's ranchers are stewards of our earth, and more focused on sustainability, the environment, and ethical beef production than ever before. According to the USDA, the clear majority of cattle ranches are family operations, often going back generations. Ranchers today know that they must discover ways to be more sustainable and reduce environmental impacts, or that legacy won't continue.

Materials:

- White board and markers
- Meat and Greet task card set (cut apart, one set for entire class)
- Meat and Greet Data Interpretation student handout (one per student)
- Meat and Greet Mission Statement student handout (one per student)

Introduction (Anticipatory Set): (5 minutes)

1. Ask students to describe a modern-day rancher. Use the following questions to prompt responses and write their responses on the board. (Note: If technology is available, create a live poll for students to respond to using tablets or cell phones.)
 - a. How old are most ranchers?
 - b. What gender are most ranchers?
 - c. How much formal education do ranchers have?
 - d. How much income do ranchers generate?
 - e. What goals are important to ranchers?
2. Summarize student responses.
3. Preview: *In today's lesson you will investigate and interpret demographics about cattle ranchers, and determine if their perceptions are accurate.*

Input and Modeling: (20 minutes)

1. Group students in pairs. Explain that each pair will receive a task card showing data about cattle ranching. The data was collected voluntarily from genuine ranchers.
2. Instruct students to summarize the data into one concise statement and record that statement on their Meat and Greet Data Interpretation student handout. They will have 90 seconds to examine their card and write a statement, before being prompted to pass the card to the next student pair.
3. Determine a passing route that will work for your classroom configuration. Distribute the Meat and Greet task cards and student handouts. Remind students to hold their card until they are instructed to pass it. Clarify any remaining questions.
4. Tell students to begin. After 90 seconds, say "Pass!" and circulate the room to make sure cards are being passed to the next pair. This activity will take approximately 20 minutes.

Checking Understanding and Guided Practice: (15 minutes)

1. Review the summarizing statements students wrote about the data. Discuss the following questions:
 - a. Which statistics surprised you?
 - b. Did the data support your previous perceptions? In what ways?
 - c. What were the overarching themes you discovered?

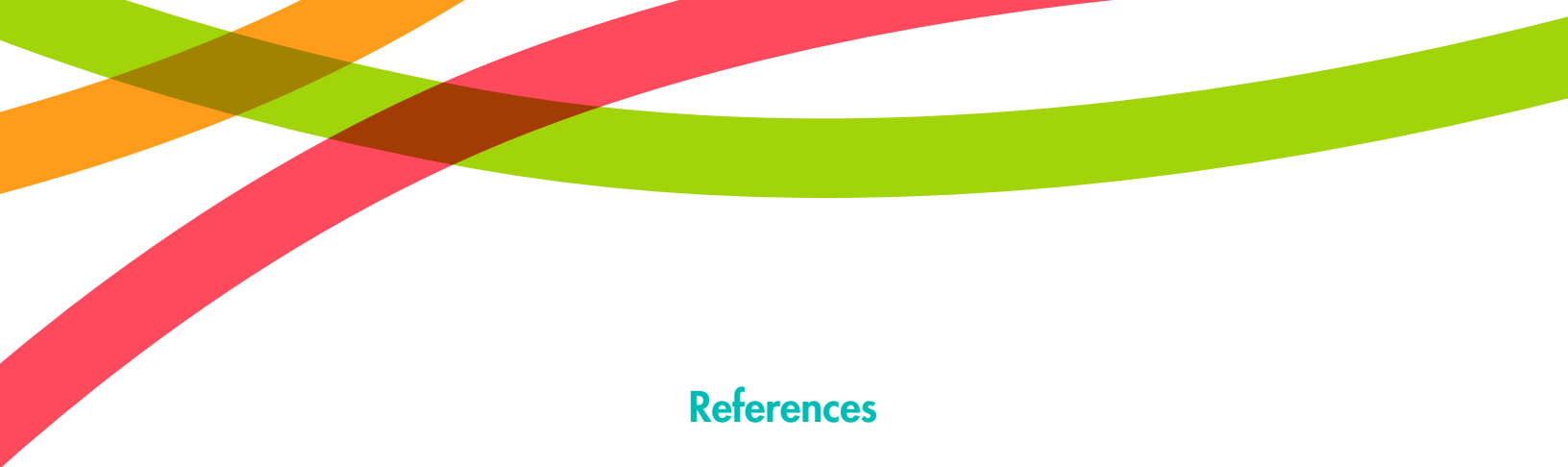
- 
- d. Where there any particularly unpopular responses, or any outliers?
 2. *We know more about who cattle ranchers are and now we are going to look even closer at these overarching themes that reveal their concerns and priorities.*

Independent Practice: (15 minutes)

1. Explain to students that a good mission statement is useful tool for any well-run business, including a cattle operation.
2. Distribute the Meat and Greet Mission Statement student handout. Direct students to read the instructions carefully before crafting a mission statement for a cattle operation. It is essential that their mission statement reflect the overarching themes identified in the previous activity.
3. Allow 15 minutes for students to complete the activity independently.

Wrap-Up (Review, Assess, Challenge): (5 minutes)

1. Encourage students to stand and share their mission statement for a cattle ranch. Provide positive feedback and celebrate students who are willing to share.
2. Explain that to many ranchers, their cattle operation is much more than a job. It's even more than a source of revenue. It's a way of life and a legacy they are building for the next generation. Challenge students to think more often about the people behind beef.



References

- i. Cheatum, M., Casey, F., Alvarez, P., & Parkhurst, B. (2011). *Payments for Ecosystem Services: A California Rancher Perspective. Conservation Economics White Paper. Conservation Economics and Finance Program* (pp. 1-74, Tech.). Washington, DC: Defenders of Wildlife.
- ii. United States Department of Agriculture National Agricultural Statistics Service. (2015). *Census of Agriculture Highlights: Cattle Industry* (pp. 1-4, Rep. No. ACH12-20). Washington, DC: UDSA-NASS.
- iii. Vanden Eng, J., Marcus, R., Hadler, J., Imhoff, B., Vugia, D., Cieslak, P., Zell, E., Deneen, V., Gibbs McCombs, K., Zansky, S., Hawkins, M., Besser, R., (2003). *Consumer Attitudes and Use of Antibiotics* (Vol. 9 Iss. 9). Emerging Infectious Diseases.

MEAT AND GREET DATA INTERPRETATION

1. What gender are America's ranchers?

Male  89%
Female  11%

2. How old are America's ranchers?

Under 45 years  17%
45 to 64 years  50%
65 years and older  33%

3. What is the primary occupation of America's ranchers?

Ranching  44%
Other  56%

4. What percent of a rancher's annual household income comes from a cattle operation?

<25%  78%
25% to 49%  8%
50% to 74%  7%
75% to 99%  4%
100%  3%

5. Do ranchers agree with this statement?

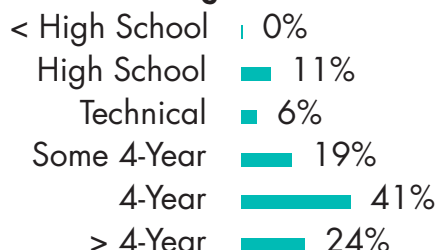
Low beef prices are more important than the well-being of cattle.

Strongly agree  2%
Agree  2%
Neutral  10%
Disagree  24%
Strongly disagree  48%
Don't know  3%

6. What percent of America's beef farms and ranches are family-owned or individually operated?

Family-owned or individually operated  91%

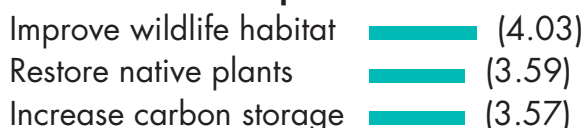
7. **What is the highest level of education obtained by America's ranchers?**



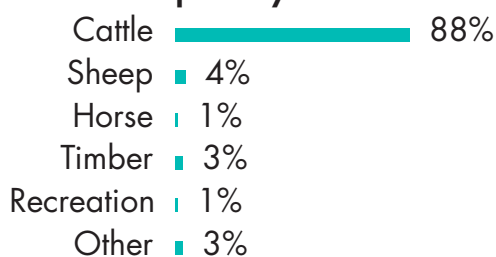
8. **Do ranchers expect the youngest generation in the family to continue ranching?**



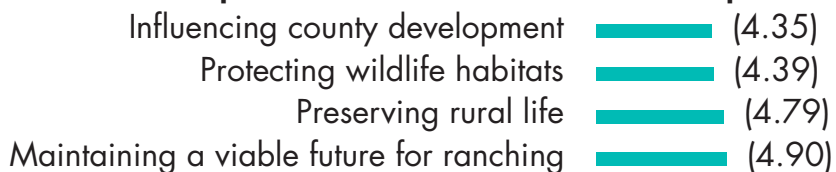
9. **What conservation practices are ranchers most interested in implementing?**



10. **What is the primary use of a rancher's land?**



11. **What land use priorities do ranchers see as most important?**



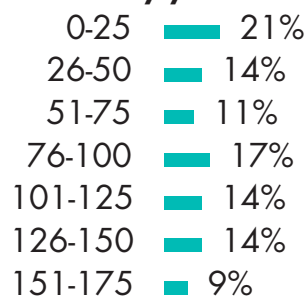
12. **How frequently do ranchers consult with the following sources about land management decisions?**



13. **How much land do America's ranchers own?**

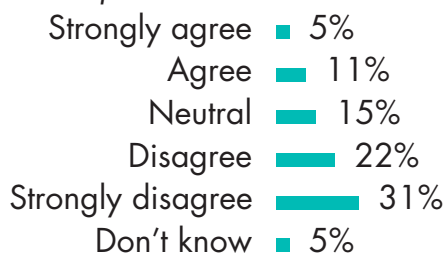


14. **How many years has the American rancher's family managed ranchland?**



15. **Do ranchers agree with this statement?**

Cattle producers face a trade-off between profit and animal welfare.



MEAT AND GREET DATA INTERPRETATION

Name _____

Instructions: You will receive a task card showing graphical data about cattle ranchers. At the top of the card will be a statistical question. Read the question carefully, and interpret the quantitative data below. Summarize the data into one concise statement and write it next to the correlating task card number.

All statements should answer the question, "What does the data tell me about American ranchers?"

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

MEAT AND GREET MISSION STATEMENT

Name _____

Instructions: A mission statement is a formal summary of the aims and values of a company, organization, or individual. A good mission statement is useful tool for any well-run business. Developing a company's mission statement is an opportunity to define the company's goals, ethics, culture, and norms for decision-making. Keeping in mind the priorities of cattle ranchers, follow the steps below to craft a mission statement for a fictional cattle ranch.

1. Define what your business does for its customers.

Start your mission statement with the good you do. State what makes your business special for your target customer.

"Our vision is to create a better everyday life for people. We make this possible by offering a wide range of well-designed, functional home-furnishing products at prices so low that as many people as possible will be able to afford them." - Ikea

2. Define what your business does for its employees.

Good businesses are good for their employees too or they don't last. A mission statement can define what your business offers its employee.

"We have a mission to be the world's most respected service brand. To do this, we have established a culture that supports our team members, so they can provide exceptional service to our customers." - American Express

3. Define what your business does for its owners.

Some businesses exist to enhance the financial position of its owners, while other businesses might pursue a nobler cause.

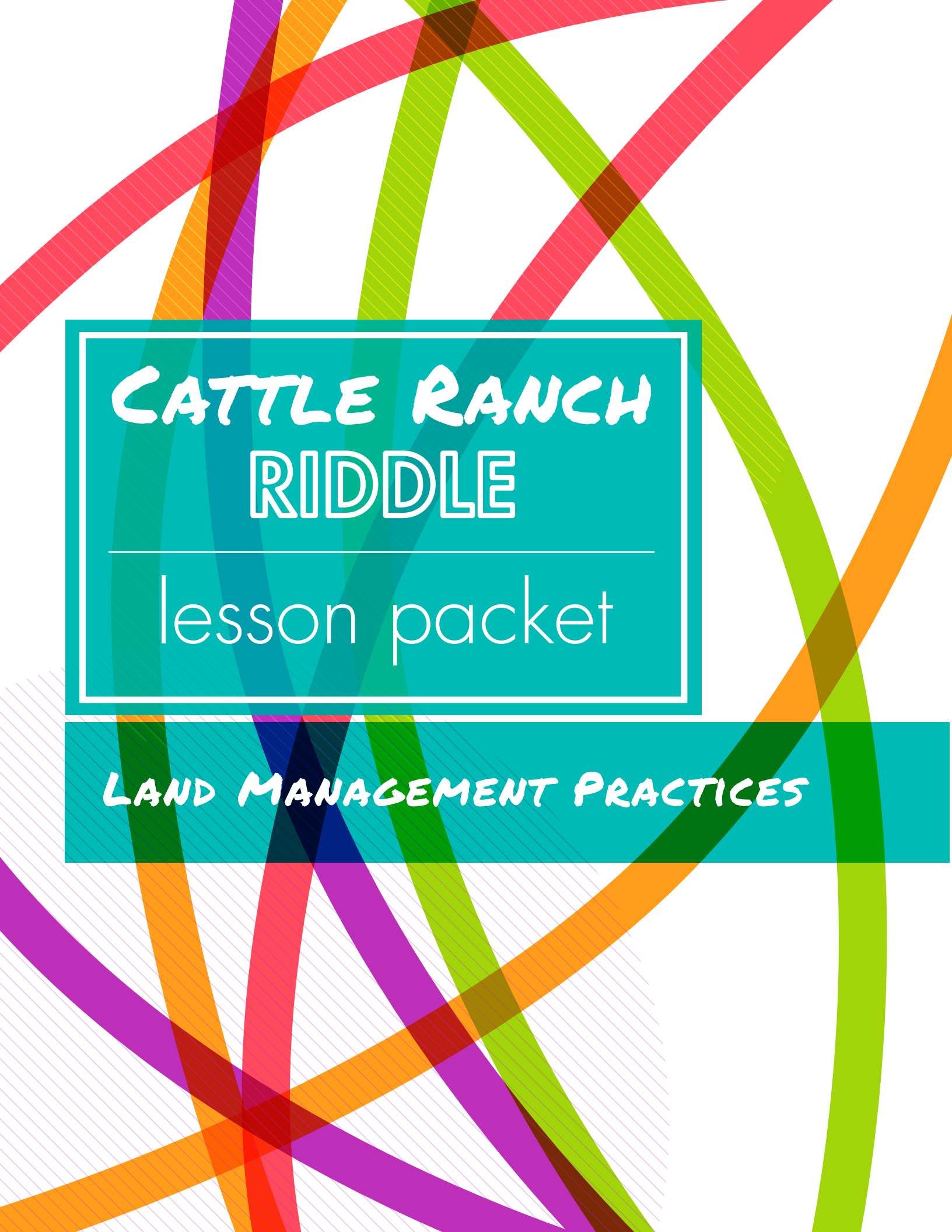
"Warby Parker was founded with a rebellious spirit and a lofty objective: to offer designer eyewear at a revolutionary price, while leading the way for socially-conscious business." - Warby Parker

My Mission Statement



References

- i. Cheatum, M., F. Casey, P. Alvarez and B. Parkhurst. (2011). *Payments for ecosystem services: A California rancher perspective*. Retrieved from http://www.carangeland.org/images/payments_for_ecosystem_services_a_california_rancher_perspective.pdf
- ii. U.S. Department of Agriculture, National Agricultural Statistics Service. (2015). *Census of agriculture highlights: Cattle industry (Rep. No. ACH12-20)*. Washington, DC: UDSA-NASS.
- iii. Vanden Eng, J., Marcus, R., Hadler, J. L., Imhoff, B., Vugia, D. J., Cieslak, P. R....Besser, R. E. (2003). Consumer attitudes and use of antibiotics. *Emerging Infectious Diseases*, 9(9), 1128-1135. <https://dx.doi.org/10.3201/eid0909.020591>.



CATTLE RANCH RIDDLE

lesson packet

LAND MANAGEMENT PRACTICES



NATIONAL LEARNING STANDARDS:

Middle School:

- **CCSS.ELA-LITERACY.RST.6-8.8:** Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
- **CCSS.ELA-LITERACY.RST.6-8.9:** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
- **MS-LS1-4:** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively

High School

- **HS-ESS3-2:** Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
- **HS-LS2-7:** Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

LAND MANAGEMENT PRACTICES

Lesson Length: 50 minutes

Learning Objectives:

1. Students will understand common land management best practices
2. Students will discover rangeland management with rotational grazing (PBL application: Use Pasture Map to choose land and define grazing plots)

Key Terms:

1. Land management
2. Overgrazing
3. Rotational grazing
4. Fence
5. Regrowth
6. Graze

Background Information:

- The Pasture Project has information on different grazing systems and their trade-offs with the land, livestock, and a cattle rancher's lifestyle: <http://pastureproject.org/pasture-management/rotational-grazing-systems/>
- In this article, Raylene Nickel discusses six practices to sustain pasture growth: https://www.agriculture.com/livestock/cattle/grazing/6-practices-to-sustain-pasture-growth_279-ar46712

Materials:

- Activity Sheet 1 handout (one per student)
- Activity Sheet 2 handout (one per student)
- Three posters
- Sticky notes
- Video link

Introduction (Anticipatory Set): (5 minutes)

1. Introduce cattle grazing by referencing buffets
 - a. *Turn to a partner and discuss this question: What would eat first at a buffet restaurant?*
 - b. *Elicit responses then facilitate to point. Remember when we discussed cow-calf operations? What happens in this stage of beef cattle's lives? How about stockers and backgrounders? What happens at this stage? These are all times of a calf's life when they are eating grass and grazing in large fields.*
 - a. *Preview: Today we will learn how cattle are managed and moved to properly utilize land.*

Input and Modeling: (10 minutes)

1. Introduce land management by showing a video
 - a. *When an animal walks into a field, there are a lot of different kinds of plants to eat. When we go to a buffet what do we do? We eat only the food we like, right? Cattle do the same thing! Managing cattle on a grassland is very important. Let's learn more from Darin and Jessica Michalski, cattle ranchers who live in South Dakota. Video: <https://bit.ly/2Axql4c>*
2. Lead discussion about the video using Activity Sheet 1.
 - a. *What did we find interesting about that video? Let's complete Activity Sheet 1 as a group, then you will answer the last question with a partner.*

Checking Understanding and Guided Practice: (15 minutes)

1. Understand various factors affecting land management practices
 - a. *What factors do you think cattle ranchers like Darin need to consider in order to keep their animals healthy and properly manage their land?*
 - b. *There are three posters around the room, let's decide as a group what three factors need to go on those posters. (Posters should have the following factors: food, water, shelter)*
 - c. *When Darin is deciding where to put his cattle, he needs to make sure they have three things right? On three sticky notes, one for each factor, let's record our answer to the questions on the screen. Once we have our answers recorded, post them to their corresponding poster.*
2. Lead discussion about the food, water and shelter that beef cattle need.



Independent Practice: (15 minutes)

1. Demonstrate knowledge of land management by prescribing management practices based on land characteristics: Students will read and analyze land areas, identify the important characteristics on an area and recommend management practices. Students will utilize Activity Sheet 2.
 - a. *Now that we have a better idea of the resources that beef cattle need to live and grow. Let's take the next step and make some management decisions for ourselves! We will be given pictures of different landscapes, it is our job to determine the management practices that should be used on those areas. We will work independently on this assignment.*

Wrap-Up (Review, Assess, Challenge): (5 minutes)

1. Connect student learning to challenge question. *How does land management effect the larger life cycle and industry of beef cattle? What have we learned today that can be applied to our challenge question?*



Activity Sheet 1

LAND MANAGEMENT PRACTICES

(Teacher Copy)

What did the Michalski Ranch teach us?

1. **Why is proper land management important?**
 - a. It enables ranchers to raise healthy beef cattle.
 - b. It improves the sustainability of the land.
2. **What is one management practice that Darin uses?**
 - a. He fences cattle in certain areas of land and moves the cattle based on how much grass they have eaten.
3. **Why does Darin move the cattle off certain land after the cattle have eaten the grass?**
 - a. Moving cattle off land that they have grazed allows the grass and roots to regrow. It also allows other, new plants to start growing.
4. **What is native grass?**
 - a. It grows naturally on the land and wasn't planted there.
5. **What is over-grazing and how can it be prevented?**

Definition of "overgraze": it is a transitive verb that means to allow animals to graze an area (such as a pasture) to the point of damaging vegetational cover.

Overgrazing happens when land experiences one, or both of the following forces:

1. Too many animals grazing an area
2. Any number of animals grazing an area for too long

To prevent overgrazing, cattle should be moved out of the area they have grazed, before they are able to re-graze plants that have new growth on them.

Activity Sheet 1

LAND MANAGEMENT PRACTICES

(Student Copy)

What did the Michalski Ranch teach us...

1. **Why is proper land management important?**
2. **What is one management practice that Darin uses?**
3. **Why does Darin move the cattle off certain land after the cattle have eaten the grass?**
4. **What is native grass?**

Investigate the answer the following question. Use books or websites to find the answer.

***Make sure to write down the source of your information**

5. **What is overgrazing and how can it be prevented?**

ACTIVITY SHEET 2

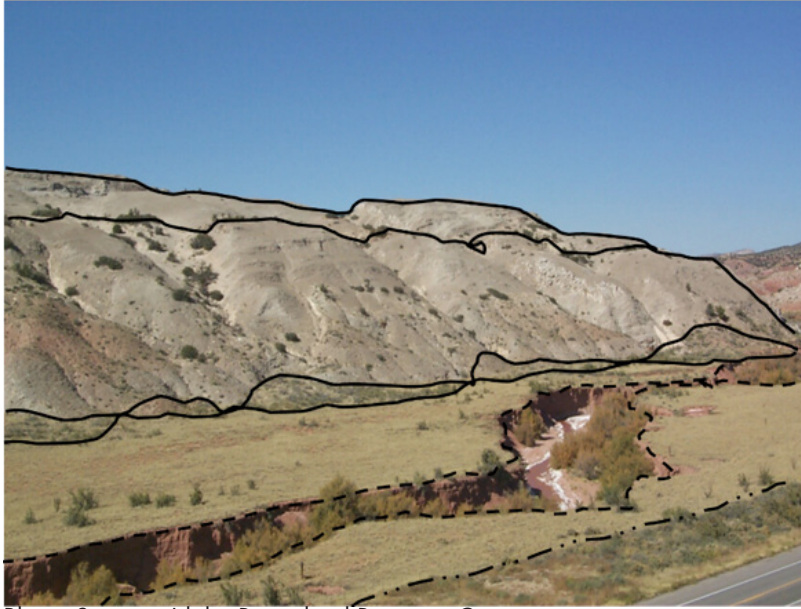


Photo Source: Idaho Rangeland Resource Commission

Example 1: This area is similar to a place where cattle would graze during the summer or fall. Answer the following questions using this picture.

Does this area provide cattle with the factors they need to live and grow? Why or why not?

What areas do you think the cattle will graze the most?

How would you try to improve this area of land?

ACTIVITY SHEET 2



Photo Source: Idaho Rangeland Resource Commission

Example 2: This area is similar to a place where cattle would graze during the summer or fall. Answer the following questions using this picture.

Does this area provide cattle with the factors they need to live and grow? Why or why not?

What are the positive and negative aspects of this area of land?

What will ranchers need to do to make sure this land stays healthy?

ACTIVITY SHEET 2



Photo Source: Idaho Rangeland Resource Commission

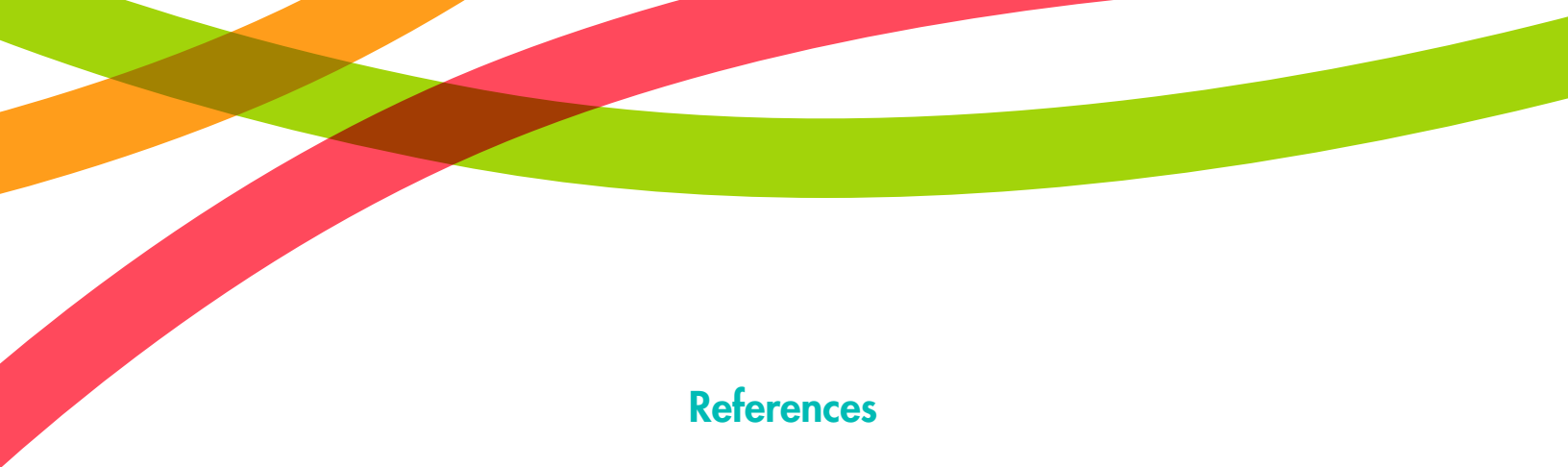
Example 3: This area is similar to a place where cattle would graze during the summer or fall. Answer the following questions using this picture.

Does this area provide cattle with the factors they need to live and grow? Why or why not?

What can ranchers do to make sure this land helps cattle live and grow?

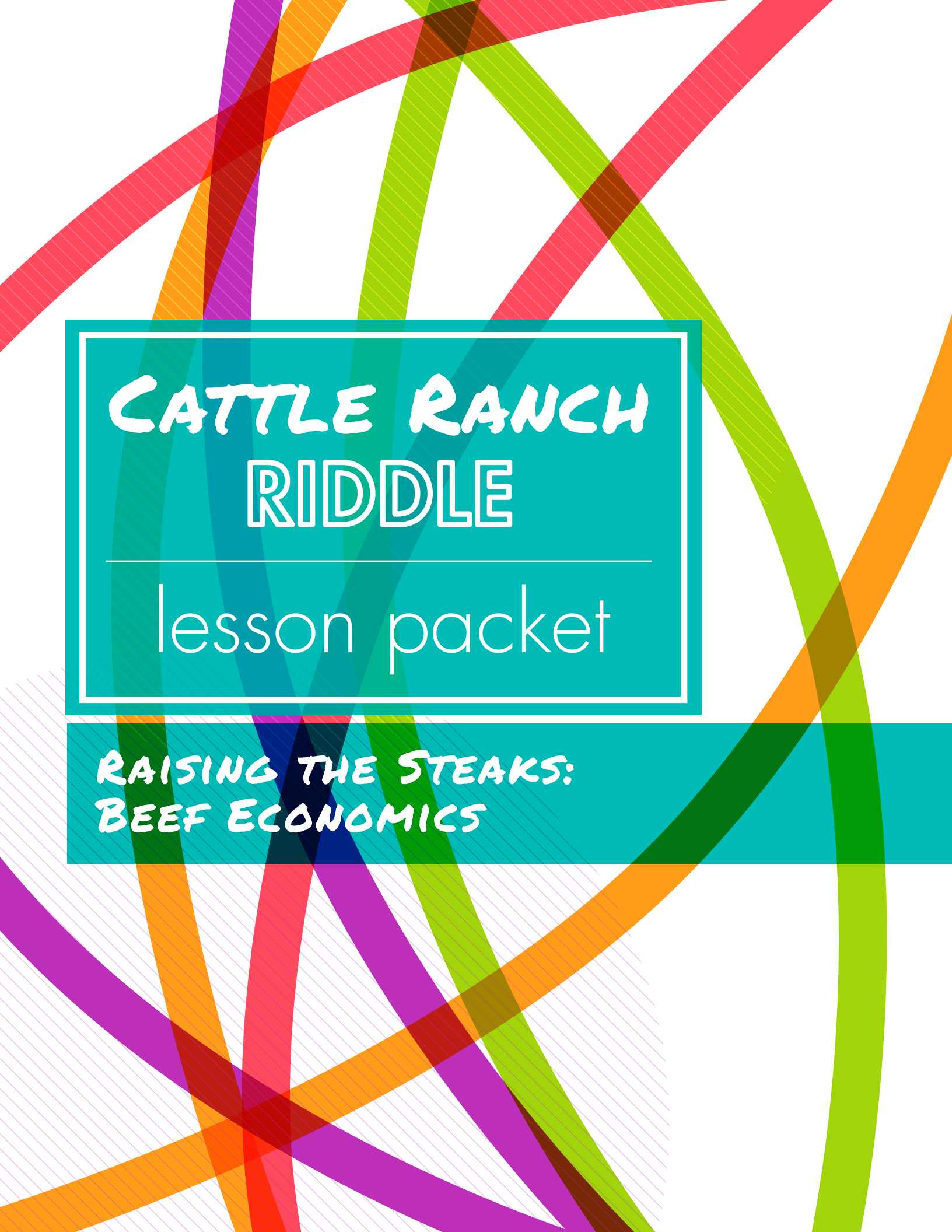
How many cattle do you think this land would support? What factors would need to be considered in deciding how many cattle should graze this land?

Compare and contrast all three land areas. Which one do you think is best suited to support beef cattle?



References

- i. Idaho Rangeland Resources Commission. (n.d.). *Rancher Resources*. Retrieved August 9, 2018 from <https://idrange.org/ranchers/resources/>
- ii. Price, D. (1999, May 1). What is overgrazing? *Beef Magazine*. Retrieved from http://www.beefmagazine.com/mag/beef_overgrazing



CATTLE RANCH RIDDLE

lesson packet

**RAISING THE STEAKS:
BEEF ECONOMICS**



NATIONAL LEARNING STANDARDS:

Middle School:

- **CCSS.MATH.CONTENT.6.NS.C.5:** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
- **CCSS.MATH.CONTENT.7.RP.A.3:** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

High School

- **CCSS.MATH.CONTENT.HSN.Q.A.1:** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

PURE PERFORMANCE: BEEF CATTLE GENETICS

Lesson Length: 1 hour

Learning Objectives:

1. Students will understand income and expense.
2. Students will know the expenses associated with beef cattle production.
3. Students will modify an income statement to calculate profit.

Key Terms:

1. Revenue: Revenue is money received from selling goods and providing services to customers.
2. Expense: Expenses are costs incurred in running and maintaining a business.
3. Profit: A financial gain, especially the difference between revenue and expenses associated with producing something.
4. Income Statement: A financial report used to measure net income or profit for the business in a fiscal year.

Background Information:

Our nation's cattle industry has undergone dramatic changes in the last few decades. Ranchers have experienced increasing costs of production with a lack of corresponding increase in revenue. Issues such as international competition, and opportunities, new regulatory requirements, increasing feed costs, changing consumer demand, economies of scale, and competing land uses all affect the economics of ranching.

Present-day farm operations are becoming more and more business-oriented. Being a good producer is no longer enough to remain in business. The key to becoming a successful farmer is being a good producer as well as a good financial manager. The first step in being a successful farm manager is keeping accurate records and establishing a reliable record-keeping system.

Many ranchers struggle to balance the escalating costs of raising livestock while providing affordable food to the consumer. A record-keeping system makes this balance possible, helping ranchers make management decisions that increase profit. Records can help ranchers plan and implement farm business arrangements, determine where efficiencies and inefficiencies exist in their operations, and prepare for the future.

Materials:

- Document camera or overhead projector
- White board and markers
- Raising the Steaks definition cards (one per group of students)
- Raising the Steaks matching sheet (one per group of students)
- Scissors (one per group of students)
- Glue sticks (one per group of students)
- Raising the Steaks problem sets (one per student)

Introduction (Anticipatory Set): (5 minutes)

1. Before the lesson, write the words “revenue” and “expenses” across the board.
2. Ask students to consider sources of revenue in their own lives. Answers may include allowance, pet or babysitting, garage sales, lemonade stands, etc. If a student suggests receiving gifts from others, write “gifts” to the side and come back to it later. After students are done brainstorming, ask them to define the word “revenue” using the examples from the brainstormed list. Help them craft their definition so that it reads: “Revenue is money received from selling goods and providing services to customers.”
3. Ask students why gifts don’t fit this definition. Students should realize that gifts are not revenue because goods and services are not sold in exchange for a gift. Allowance may or may not also fit under this category.
4. Ask students to consider personal expenses in their own lives. Answers may include eating out, buying clothes, purchasing electronics, etc. After students are done brainstorming, ask them to define the word “expenses” using the examples from the brainstormed list. Help them craft their definition so that it reads, “Expenses are costs incurred in running and maintaining a business.”
5. Explain to students that the key to becoming a successful rancher is being a good producer as well as a good financial manager. Ranchers keep track of revenue and expenses in an income statement. For viable business to continue, ranchers must be able to make a profit. Profit is the result of revenue being greater than expenses.

Input and Modeling: (15 minutes)

1. Display the Raising the Steaks Income Statement. Describe how an income statement is simply a summary of income and expenses. Demonstrate how an income statement is used to measure revenue, expenses, and profit for the business each year. Ask students the following questions:
 - a. Where do revenues come from? Listen for, "Revenues are from the normal operations of the business, typically selling a good or service."
 - b. Why is an income statement important? Listen for, "The income statement gives an important perspective on the health of a business, its profitability."
 - c. How is profit determined? Listen for, "Profit is the difference between revenue and all expenses (operating, interest, capital recovery costs)."
2. Express to students how hard it is to imagine all sources revenue and expenses a cattle rancher might incur. To become more familiar with life as a cattle rancher, we're going to complete a matching activity.
3. Distribute the Raising the Steaks matching sheet. Tell students that the revenue and expenses from the income statement are listed on the sheet. Distribute the Raising the Steaks definition cards. Instruct students to cut apart the definition cards and glue them next to the related revenue or expense. Encourage students to place all the cards first, before gluing them to the matching sheet.
4. Allow students ten minutes to complete the matching activity. Review the matches as a class, and clarify any remaining questions about revenue and expenses on a cattle operation.
5. Now that students have a greater understanding of revenue and expenses, explain how they will use their knowledge to calculate revenue, expenses, and profit.

Checking Understanding and Guided Practice: (15 minutes)

1. Distribute *Raising the Steaks* income statement and problem sets, one per student. Tell students they will work together to complete the income statement.
2. Demonstrate how to add the sources of revenue to determine gross revenue. Record the sum.
3. Demonstrate how to add the expenses to determine total operating expenses. Record the sum.

4. Ask students to suggest methods for finding the net income from operations.

Guide students to the following equation:

$$\text{Gross revenue} - \text{total operating expenses} - \text{interest expense} = \text{net income from operations}$$

Instruct students to calculate the net income from operations, and have a student model the process they used to calculate the sum correctly.

5. Ask students to suggest methods for finding the total net income.

Guide student to the following equation:

$$\text{Net income from operations} - \text{capital recovery costs} = \text{total net income}$$

Instruct students to calculate the total net income, and have a student model the process they used to calculate the sum correctly.

6. Remind students that total net income represents the profit (or loss) a cattle operation receives for a year of work. Congratulate students for successfully calculating an income statement. Explain to them the next challenge will be to determine what would happen if the income or expenses change.

Independent Practice: (15 minutes)

1. Distribute the Raising the Steaks problem sets and tell students to complete the problem sets. They will complete the computations using paper and pencil, and should show all their work. Independent practice may be assigned as homework.

Wrap-Up (Review, Assess, Challenge): (10 minutes)

1. Discuss the following questions:
 - a. *What are potential sources of revenue for a rancher?*
 - b. *What expenses are associated with ranching?*
 - c. *Do you think most ranchers make a profit each year? Explain.*
2. Review the problem sets together or assess independently.
3. Explain that many ranchers struggle to balance the escalating costs of raising livestock while providing affordable food to the consumer. Next time you visit the supermarket and observe the price tag on different cuts of beef, consider the numerous expenses associated with producing a quality product.

RAISING THE STEAKS MATCHING SHEET

Name _____

Instructions: Discover the revenue and expenses of a beef cattle operation. Cut apart the definition cards on the following page and glue them next to the matching revenue or expense.

Steer Calves		Freight	
Heifer Calves		Auctions	
Yearling Calves		Yearling Bulls	
Cull cows		Pickup Truck	
Cull bulls		Stock Trailer	
Supplements		ATV	
Alfalfa Hay		Fencing Materials	
Leased Pasture		Equipment Repair	
Vaccines		Insurance	
Veterinary Services		Office Expenses	
Brand Inspection		Interest Expense	
Beef Checkoff		Capital Recovery Costs	

RAISING THE STEAKS DEFINITION CARDS

A young neutered male beef animal	Sales in which cattle are sold to the highest bidder	A beef animal approximately one year old
A vehicle with an enclosed cab and open cargo area	Breeding bulls eliminated from the stock	A small vehicle with three or four wheels that can travel over very rough ground
A highly nutritious legume that has been cut and dried for animal fodder	The process of fixing or maintaining machinery and materials	Takes a single payment and spreads it out over a specific period.
Substances used to provide immunity against diseases	A mandatory marketing and research program for beef producers	Represents money owed on any borrowed money
Land rented for grazing cattle	A process to determine whether the owner is in lawful possession of cattle	Prevention, diagnosis and treatment of disease, disorder, and injury
Includes electronics, furniture, and general supplies	Protein, energy, vitamins, and minerals that are added to an animal's diet	Provides financial security in the case of theft, natural disaster, or tragedy
A towed vehicle designed for carrying livestock	Breeding cows eliminated from the stock	Breeding bulls added to the herd to improve genetics
A young female beef animal	Posts, wire, wood, and poles used for creating barriers.	Long distance transportation of cattle

RAISING THE STEAKS INCOME STATEMENT

Name _____

GROSS REVENUE

Steer calves	\$133,743
Heifer calves	\$60,499
Yearling calves	\$26,306
Cull cows	\$28,611
Cull bulls	\$5,772

Gross Revenue

EXPENSES

Supplements	\$8,190
Alfalfa hay	\$9,600
Leased Pasture	\$123,936
Vaccines	\$3,386
Veterinary Services	\$1,636
Brand Inspection	\$334
Beef Checkoff	\$267
Freight	\$6,000
Auctions	\$9,345
Yearling Bulls	\$24,000
Pickup Truck	\$8,961
Stock Trailer	\$1,340
ATV	\$821
Fencing Materials	\$5,000
Equipment Repair	\$2,000
Insurance	\$2,680
Office Expenses	\$2,680

Total Operating Expense

Interest Expense	\$4,691
------------------	---------

Net Income from Operations

Capital Recovery Costs	\$45,234
------------------------	----------

NET INCOME

RAISING THE STEAKS PROBLEM SETS

Introduction: In this activity, you will take on the role of a cattle rancher. Using the previous year's income statement, you will make calculations to determine how changes in revenue and expenses will affect your cattle operation. Use each fictional scenario to adjust your income statement to predict profit. Round to the nearest dollar.

1. Extreme drought conditions that contributed to wildfires has delayed the growth of grass in your leased pastures. You can find more land to lease temporarily, but your expense will increase by 20 percent.
 - Calculate the anticipated cost for leased land with the increased cost.
 - Calculate the total operating expense.
 - Determine the profit (or loss) you will earn.
2. With the rising popularity of chicken and pork, beef consumption has decreased in foreign markets. U.S. beef exports have fallen 13 percent for steers, and your revenue has fallen. You find a cooperative you can join that lets you sell your cows at a higher price, earning you back 1.5% more on your steers.
 - Calculate the anticipated gross revenue if steer revenue decreases 13 percent.
 - Calculate the total operating expense if you join the cooperative.
 - Determine the profit (or loss) you will earn.
3. You make a few changes, hoping to increase the profitability of your operation. First, you change suppliers for your alfalfa hay, which reduces the cost by 5 percent. Next, you reduce the protein and energy supplements you provide, saving 8 percent. Unfortunately, these changes affect your animals' growth. Your calves grow at a slower rate, decreasing the revenue for steer and heifer calves by 7 percent.
 - Calculate the adjusted gross revenue.
 - Calculate the adjusted operating expense.
 - Determine the profit (or loss) you will earn.
 - In your effort to reduce costs, were you able to increase profitability?

RAISING THE STEAKS MATCHING SHEET ANSWER KEY

Name _____

Instructions: Discover the revenue and expenses of a beef cattle operation. Cut apart the definition cards on the following page and glue them next to the matching revenue or expense.

Steer Calves	A young neutered male beef animal	Freight	Long distance transportation of cattle
Heifer Calves	A young female beef animal	Auctions	Sales in which cattle are sold to the highest bidder
Yearling Calves	A beef animal approximately one year old	Yearling Bulls	Breeding bulls added to the herd to improve genetics
Cull cows	Breeding cows eliminated from the stock	Pickup Truck	A vehicle with an enclosed cab and open cargo area
Cull bulls	Breeding bulls eliminated from the stock	Stock Trailer	A towed vehicle designed for carrying livestock
Supplements	Protein, energy, vitamins, and minerals that are added to an animal's diet	ATV	A small vehicle with three or four wheels that can travel over very rough ground
Alfalfa Hay	A highly nutritious legume that has been cut and dried for animal fodder	Fencing Materials	Posts, wire, wood, and poles used for creating barriers.
Leased Pasture	Land rented for grazing cattle	Equipment Repair	The process of fixing or maintaining machinery and materials
Vaccines	Substances used to provide immunity against diseases	Insurance	Provides financial security in the case of theft, natural disaster, or tragedy
Veterinary Services	Prevention, diagnosis and treatment of disease, disorder, and injury	Office Expenses	Includes electronics, furniture, and general supplies
Brand Inspection	A process to determine whether the owner is in lawful possession of cattle	Interest Expense	Represents money owed on any borrowed money
Beef Checkoff	A mandatory marketing and research program for beef producers	Capital Recovery Costs	Takes a single payment and spreads it out over a specific period.

RAISING THE STEAKS INCOME STATEMENT ANSWER KEY

Name _____

GROSS REVENUE

Steer calves	\$133,743
Heifer calves	\$60,499
Yearling calves	\$26,306
Cull cows	\$28,611
Cull bulls	\$5,772
Gross Revenue	\$254,931

EXPENSES

Supplements	\$8,190
Alfalfa hay	\$9,600
Leased Pasture	\$99,002
Vaccines	\$3,386
Veterinary Services	\$1,636
Brand Inspection	\$334
Beef Checkoff	\$267
Freight	\$6,000
Auctions	\$9,345
Yearling Bulls	\$24,000
Pickup Truck	\$8,961
Stock Trailer	\$1,340
ATV	\$821
Fencing Materials	\$5,000
Equipment Repair	\$2,000
Insurance	\$2,680
Office Expenses	\$2,680
Total Operating Expense	\$185,242
Interest Expense	\$4,691
Net Income from Operations	\$64,998
Capital Recovery Costs	\$45,234
NET INCOME	+\$19,764

RAISING THE STEAKS PROBLEM SETS

Introduction: In this activity, you will take on the role of a cattle rancher. Using the previous year's income statement, you will make calculations to determine how changes in revenue and expenses will affect your cattle operation. Use each fictional scenario to adjust your income statement to predict profit. Round to the nearest dollar.

1. Extreme drought conditions that contributed to wildfires has delayed the growth of grass in your leased pastures. You can find more land to lease temporarily, but your expense will increase by 20 percent.
 - Calculate the anticipated cost for leased land with the increased cost. **\$118,802**
 - Calculate the total operating expense. **\$205,042**
 - Determine the profit (or loss) you will earn. **-\$36**
2. With the rising popularity of chicken and pork, beef consumption has decreased in foreign markets. U.S. beef exports have fallen 13 percent for steers, and your revenue has fallen. You find a cooperative you can join that lets you sell your cows at a higher price, earning you back 1.5% more on your steers.
 - Calculate the anticipated gross revenue if steer revenue decreases 13 percent. **\$237,544**
 - Calculate the total operating expense if you join the cooperative. **\$185,242**
 - Determine the profit (or loss) you will earn. **+\$4,384**
3. You make a few changes, hoping to increase the profitability of your operation. First, you change suppliers for your alfalfa hay, which reduces the cost by 5 percent. Next, you reduce the protein and energy supplements you provide, saving 8 percent. Unfortunately, these changes affect your animals' growth. Your calves grow at a slower rate, decreasing the revenue for steer and heifer calves by 7 percent.
 - Calculate the adjusted gross revenue. **\$241,334**
 - Calculate the adjusted operating expense. **\$184,107**
 - Determine the profit (or loss) you will earn. **+\$7,302**
 - In your effort to reduce costs, were you able to increase profitability? **No. While I did still make a profit, I was less profitable than if I had made no changes. There were unintended consequences of reducing my expenses.**



References

- i. Forero, L. C., Ingram, R., Nader, G. A., Stewart, D., & Sumner, D. A. (2017). *Beef cattle cow-calf operation csts & returns study*. Retrieved from https://coststudyfiles.ucdavis.edu/uploads/cs_public/de/53/de53ea90-7d03-4df0-9d02-11cdeb024a00/2017beefcowcalfsacvalleyfinaldraft63017.pdf

**THIS RESOURCE IS
BROUGHT TO YOU BY**



AMERICAN FARM BUREAU
FOUNDATION FOR AGRICULTURE®

**THANKS TO GENEROUS
SUPPORT FROM**

