



Green Career Awareness Module



Plate to Planet ▾

Lesson # and Title	Lesson Four ▾ Where Do We Get Our Protein?
Duration	45 minutes

Lesson Overview

During this lesson, students will learn about the types of animals that meat based protein comes from and investigate statistics about consumption of those animals. They will then learn more about how cattle are raised and the water and land requirements for raising them.

Learning Objectives

By the end of this lesson, students will be able to:

- Identify the animals different meat protein comes from
- Describe the water footprint of raising cattle
- Describe the land used to raise cattle

Content Standard(s)

NGSS ▾

Science and Engineering Practices

- Asking Questions and Defining Problems
- Developing and Using Models
- Analyzing and Interpreting Data
- Using Mathematics and Computational Thinking

CCSS Math ▾

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.

CCSS ELA ▾ LITERACY.RI.6.1/7.1/8.1: Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

CCSS ELA ▾ LITERACY.RI.6.2/7.2/8.2: Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.

CCSS ELA ▾ LITERACY.RI.6.3/7.3/8.3: Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).

CCSS ELA ▾ LITERACY.RI.6.4/7.4/8.4: Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.

CCSS ELA ▾ LITERACY.RI.6.10/7.10/8.10: By the end of the year, read and comprehend literary nonfiction in the grades 6-8 text complexity band proficiently, with scaffolding as needed at the high end of the range.

EP&Cs ▾

Principle 2 - People Influence Natural Systems

The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

Concept A. Direct and indirect changes to natural systems due to the growth of human populations and their consumption rates influence the geographic extent, composition, biological diversity, and viability of natural systems.

CTE Model Curriculum Standards ▾

Provides fundamentals for:

- EEU - Environmental Resources Pathway
 - A3.0 Evaluate regional interactive systems and elements that create harmful environmental effects.
 - A3.1 Describe the sources of, and impacts attributable to, pollution and contamination.
 - A3.2 Recognize the actions that cause resource depletion.
 - A3.5 Identify the sources of, and impacts attributable to, habitat alteration.
- ANR - Agriscience Pathway
 - C2.0 Examine the interrelationship between agriculture and the environment.
 - C2.1 Identify important agricultural environmental impacts on soil, water, and air.

- C2.2 Explain current environmental challenges related to agriculture.
- C2.3 Summarize how natural resources are used in agriculture.
- C4.0 Determine the importance of animals, the domestication of animals, and the role of animals in modern society.
 - C4.3 Compile the modern-day uses of animals and animal by-products.
- C8.0 Understand fundamental animal nutrition and feeding.
 - C8.1 Identify types of nutrients required by farm animals (e.g., proteins, minerals, vitamins, carbohydrates, fats/oils, water).

Equipment, Instructional Resources, and Materials

- Computer, Slides, and way to Project
- Computers for students or printouts of article: [The Water Footprint of Beef](#)
- Computers or paper for students to write their reflection

Key Vocabulary and Terms

1. Per capita meat disappearance/Per capita meat availability: measure of the meat supply divided by the total population
2. Beef cow inventory: Number of cows being raised for meat each year
3. Beef consumption: The amount of beef that is eaten each year
4. Water footprint: How a plant or animal impacts the amount of water in an environment including use and pollution
5. The green water footprint: consumption of rain water)
6. The blue water footprint: consumption of surface and groundwater
7. The grey water footprint: pollution of surface and groundwater
8. Feedlot or concentrated animal feeding operation (CAFO): a large-scale farming operation focused on increasing the size/weight of livestock.
9. Irrigated grains: plants that receive water through man-made methods such as irrigation canals or sprinkler systems.
10. Dead zones: aquatic ecosystems that have pollutants/algal blooms causing a lack of oxygen that leads to the death of animals.
11. Pathogens: things that cause disease such as bacteria, fungi, and viruses.
12. Fallow: inactive or unproductive farmland.

Teacher Preparation

1. Review the slide deck and article
2. Determine if students will read the article on computers or printed
3. Assemble the materials

Lesson Procedure

Slide Deck:  Plate to Planet Lesson 4: Where Do We Get Our Protein?

Segment Title	Activity/Task, Student Grouping, Special Accommodation, Related Career(s), and Assessment	Time (min)
Where does our protein come from	Activity/Task: - Remind students that in the previous lessons they learned that protein is a macronutrient needed in the body for multiple functions including growth, repair, building enzymes, and more. - Remind students that they looked at where the protein came from for the “balanced meal” they created - Tell students that today they will be exploring how that meat came to be on their plates and some of the impacts of this process - Ask the students the following questions and guide them through making estimations/calculations to answer the questions: - How many of us eat meat? - This can be an anonymous survey - How often do you eat meat? - This can be an anonymous survey - How much meat would our class eat in a week? - How much meat would our class eat in a month? - How much meat would our class eat in a year? - How much meat do you think is eaten in the US every year? - How much meat do you think is eaten worldwide every year? - Tell students that even though we often do not think about it because our food comes to us processed and packaged, meat comes from animals. - Show the students the different images and graphs. Discuss what the students notice and wonder. Student Grouping: 	15 mins
Beef's Water Footprint	Activity/Task: Have students individually read the article and then discuss the following	20 mins

	questions with their group: ○ Why does beef use so much water? ○ What are some of the water footprint issues with raising beef cattle? Student Grouping: Individual ▾ Small Group ▾ Special Accommodation(s): For multilingual students, show students how to translate the page into the language they are comfortable with. Provide vocabulary support.	
Beef's Land Use	Activity/Task: ● Show students the map of the united states and discuss the amount of land that is ● Ask students to estimate the amount used for raising cattle ● Go through the land use map and discuss Student Grouping: Whole Group ▾	5 mins
Wrap-up (reflection/assessment)	Activity/Task: ● Have students write their answer to the following question: ○ How do you think the land and water used in raising cattle affects the environment? Student Grouping: Individual ▾	5 mins