

The STEM Beef Lifecycle Unit Plan – For Sixth Grade

Beef Education Resource

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Overview

The goals of this unit plan are to

1. Increase the awareness of a beef animal's life cycle in order to further increase understanding of career options in sustainability, farming, research, culinary arts, etc.
2. Address why beef is an important source of protein and how to properly prepare the end product.
3. Identify the variety of jobs available connected to beef production.
4. Identify how much beef production impacts the lives of non-farmers.

This unit will address the full cycle of beef production. Raising cattle is more than simply allowing cows to graze. Farmers and ranchers manage herd health, sustainability of the land, finances, reproduction, etc. Beyond the farm, beef is a viable food source providing iron, vitamin B, and protein.

Iowa Core Science Standards (6th Grade):

Life Science

MS–LS1–1 Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

MS–LS1–2

Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.

Earth and Space Sciences

MS–ESS2–1

Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

MS-ESS2-2

Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS3-1

Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

MS-ESS3-2

Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

Engineering, Technology, and Applications of Science

MS-ETS1-1

Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-3

Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

MS-ETS1-4

Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Day 1: Growth, Development, and Reproduction of Organisms

- Student Performance Task: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
- Input: "Comparing different cattle breeds? Use the 2016 Across Breed EPD Table" by Beef Magazine <http://www.beefmagazine.com/cattle-genetics/comparing-different-cattle-breeds-use-2016-across-breed-epd-table>

- Guided Practice: Review the data found in the Across Breed EPD Table and identify how the genetics of different breeds manifests itself differently (phenotypically) in these animals.

Day 2: DNA Technology in Beef Cattle

- Student Performance Task: Build on yesterday's research by explaining the use of DNA-profiling in cattle production and demonstrate how it impacts the environment and growth of cattle.
- Input: "DNA Tests for Genetic Improvement of Beef Cattle" by Matthew Spangler and Lauren Schiermiester, University of Nebraska, Lincoln
<http://extensionpublications.unl.edu/assets/pdf/g1856.pdf>
- Guided Practice: Students will review the relevant research, identify key terms and create a short explanation of the use of genomic tests.

Day 3: Ecosystem Interaction

- Student Performance Task: Through research, construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- Input: "The Beef Cattle Lifecycle from Farm to Fork" by Facts About Beef
<https://factsaboutbeef.com/2014/08/27/the-beef-lifecycle-from-farm-to-fork/>
- Guided Practice: Create a model explaining how ecosystems that contribute to beef production are interrelated throughout the entire life cycle of cattle.

Days 4 & 5: Biodiversity on the Farm

- Student Performance Task: Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- Input: "Benefits of Public Lands Grazing in Cattle Ranching" by Facts About Beef
<https://factsaboutbeef.com/2016/04/01/benefits-of-public-lands-grazing-in-cattle-ranching/>
- Experiential Learning: Visit two local farms to compare and contrast differing design solutions and how those solutions impact biodiversity.

Day 6: Beef Processing

- Student Performance Task: Identify the technology used to ensure food safety and efficient processing.
- Experiential Learning: Visit a local butcher or meat processor to learn about beef retail cuts and how various parts of beef are utilized.

Day 7 and 8: Beef Retail

- Student Performance Task: Research various ways beef products are used as part of the food chain.
- Input: “Interactive Butcher Counter” by Beef It’s What’s For Dinner
<http://www.beefitswhatsfordinner.com/butchercounter.aspx#start>
- Independent Practice: Create a brief presentation that includes facts about beef nutrition and beef recipes of interest.

Day 9: Beef Meal Celebration

- Student Performance Task: Demonstrate safe cooking procedures in handling beef products.
- Input: Recipes found on <http://www.beefitswhatsfordinner.com> and <http://vealmadeeasy.com/>.
- Input: “Beef At It’s Best” by Beef It’s What’s For Dinner
<http://www.beefitswhatsfordinner.com/beefsafety.aspx>
- Experiential Learning: Prepare the beef recipes identified in days 9 and 10 prior to class or during class. Celebrate learning with a class taste test or meal using beef products.

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The American Farm Bureau Foundation for Agriculture is a Contractor to the Beef Checkoff. For questions related to this draft resource, please email educationdirector@fb.org.



The Beef Checkoff Program funded development of this educator resource. The Beef Checkoff Program, MyBeefCheckoff.com, was established as part of the 1985 farm bill. The checkoff assesses \$1 per head on the sale of live domestic and imported cattle in addition to a comparable assessment on imported beef and beef products. In states with qualified beef councils, states may retain up to 50 cents of the dollar and forward the other 50 cents per head to the Cattlemen's Beef Promotion and Research Board, which administers the national checkoff program, subject to USDA approval.