

## BEEF IS GREENER THAN YOU THINK!

### Student Learning Objectives

1. Investigate how beef production impacts the environment.
2. Describe how beef production is sustainable.
3. List three ways beef production has become more efficient.

### English Language Arts and Literacy Standards

- 6-8.RST.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

### Time

- 1-50 minute class period
- Extension activities can take additional class periods

### Tools, Equipment and Supplies

- Jigsaw Graphic Organizer (1 per student)
- Jigsaw Fact Sheets (1 set per home group)

### Resources

- Popcorn Reading activity
- Word search

### Introduction:

Beef is not only good for you but good for the environment too! The beef community is continuously improving their management practices so less water is required, water quality is improved, fewer greenhouse gas emissions are produced and less waste is produced. After completing this lesson you will find that beef is greener than you think!

### Summary of Content and Teaching Strategies

#### Interest Approach

Have students list their top three concerns about the environment. After sharing, relate some student concerns about the environment to the topics that will be touched on in this lesson.

### How to use jigsaw

1. Introduce the strategy and the topic to be studied.
2. Assign each student to a “home group” of 5 students who reflect a range of reading abilities.

3. Use the following reading selections and assign one selection to each student.

### Raising beef sustainably

Water Management and Raising Cattle  
Meatless Mondays & The Health of our Planet  
Is grass fed beef better for you?  
Cows & Global warming

4. Create “expert groups” that consist of students across “home groups” who will read the same selection.
5. Give all students the graphic organizer as a guide for organizing the experts’ information.
6. Provide Jigsaw Fact Sheets to help students learn about their topics and become “experts.”
7. Discuss the rules for reconvening into “home groups” and provide guidelines as each “expert” reports the information learned.
8. Remind students that “home group” members are responsible to learn all content from one another.

### Lesson Conclusion

It is evident that cattle ranchers and farmers care about the cattle they raise and the environments they live in. As we close today’s lesson, pull out a sheet of paper and write a summary from what you learned during the Jigsaw reading activity. I will time you for one minute – do your best to write for the entire time! Be prepared to share.

### Extension Activities

1. Popcorn Reading Activity: Cut the phrases into strips of paper. Distribute the strips of paper. You can pass them out or you can tape them under their chairs for a fun variation. After each student has a strip of paper, have students read their slip of paper.
2. Word search & vocabulary practice: complete word search and then define selected words.

## MYTH: RAISING BEEF IS NOT SUSTAINABLE

**The Facts:** The beef industry completed a first-of-its-kind life cycle assessment (LCA) — certified by NSF International — that provides benchmarks on economic, environmental and social contributions in the United States and a roadmap for the journey toward more sustainable beef. After two years of data collection and research, the beef community has proven it's on the right path forward with a 7 percent improvement in environmental and social sustainability from 2005 to 2011.

This research examined the sustainability of the entire beef supply chain from pasture to plate and beyond, also examining the impact of food waste on sustainability. Innovation and enhancements in management and practices have led to some major improvements in sustainability, such as:

- 32 percent reduction in occupational illnesses and accidents
- 10 percent improvement in water quality
- 7 percent reduction in landfill contributions
- 3 percent reduction in water use
- 2 percent reduction in resource consumption and energy use
- 2 percent reduction in greenhouse gas emissions

### Cow-calf Operations, Feedlots and Feed Production

From 2005 to 2011, improvements in crop yields, machinery technology, irrigation techniques, fertilizer management, nutrition and animal performance have resulted in lowering the environmental footprint of the beef production process and improving on-farm sustainability. Increased adoption of Beef Quality Assurance protocols and other industry-led animal handling programs have improved our social sustainability. As greater efficiencies in crop production and animal handling become available, on-farm sustainability will continue to improve.

### What is My Role?

Consumers also have opportunities to contribute to more sustainable beef, and together with the beef community, can make continuous improvements of their own. According to a report from the Food and Agriculture Organization of the United Nations (FAO), approximately one-third of all food produced for human consumption in the world is lost or wasted. In addition to food security issues, food waste has environmental impacts as well, contributing to greenhouse gases from solid waste landfills. According to the United States Department of Agriculture (USDA), beef is one of the least wasted commodities, with 20 percent spoiled or not eaten at the consumer level. That still leaves a lot of room for improvement. Consumers can help reduce the environmental fingerprint of the beef industry up to 10 percent by cutting plate waste and spoilage in half and by upgrading to energy-efficient appliances.

# Beef Sustainability



MEETING GROWING GLOBAL DEMAND BY BALANCING ENVIRONMENTAL RESPONSIBILITY, ECONOMIC OPPORTUNITY AND SOCIAL DILIGENCE THROUGHOUT THE SUPPLY CHAIN.



**70%**  
percent more food  
needed to feed a  
growing  
population



The beef industry has improved its sustainability by 5% in just 6 years to help meet those needs.

The Beef Checkoff Program launched a comprehensive lifecycle assessment to quantify and benchmark environmental, social and economic aspects of beef industry sustainability from 2005 - 2011.

Improvements included:



Future opportunities to further increase sustainability:



Source: Beef Industry Sustainability Lifecycle Assessment, funded by the beef checkoff

Committed to a journey of continuous improvement



## **MYTH: PARTICIPATING IN MEATLESS MONDAYS IS A SIMPLE STEP I CAN TAKE TO IMPROVE MY OWN HEALTH AND THE HEALTH OF OUR PLANET.**

With Meatless Mondays conversations swirling in the news, you may wonder if eating vegetarian meals one day a week can actually improve your health and help the environment in the process. But you might be surprised to find out the reported benefits of Meatless Mondays may not live up to the promise.

**The Facts:** Meat, and beef in particular, is good for you AND good for the planet. In fact, eating vegetarian meals isn't a shortcut to saving the planet or eating healthy and may actually do more harm than good. Research shows that the healthiest diets include moderate portions of nutrient-rich meat and poultry. Contrary to Meatless Monday campaign claims, beef is both environmentally and nutritionally efficient – cattle farming requires less land, water and energy than in the past and provides 10 essential nutrients to your diet. Here are some common questions people ask when it comes to Meatless Mondays:

### **Isn't Meatless Mondays good for your health because you're eating more fruits and vegetables?**

- Different food groups are important: All of the food groups offer different but complementary nutrients. Americans should be eating more fruits and vegetables, but the key to healthy eating is to avoid foods with empty calories and instead choose the most nutrient rich foods within a food group.
- Lean beef is nutrient rich: A 3-oz serving of lean beef provides 10 essential nutrients like zinc, iron, protein and B-vitamins for about 150 calories on average. In fact, it takes two to three times more calories to get the same amount of protein from plant-based meat alternatives. Beef is an excellent source of vitamin B12, an essential nutrient that is not naturally available in plant protein sources.
- Meat is an important part of a balanced diet: The 2010 Dietary Guidelines for Americans recommends that we choose a variety of protein foods, including lean meat and poultry.

### **Will Meatless Mondays really help the planet?**

- Miniscule impact: According to Dr. Jude Capper at Washington State University, the environmental impact of every American following Meatless Mondays is miniscule – the impact of one meatless day per week is less than one half of one percent of the U.S. carbon footprint.]
- Sustainable beef: U.S. cattlemen raise 20 percent of the world's beef with 7 percent of the world's cattle, making the United States a leader in raising sustainable beef, according to the USDA National Agricultural Statistics Service (2011).
- Vested interest in the environment: America's cattle ranchers have a vested interest in sustainable environmental practices – after all, the beef community thrives on multi-generational family farms. On average, each cattle farmer has 13 different practices in place to accomplish environmental goals such as nurturing wildlife, preventing erosion and conserving and protecting water.

## **FACT SHEET: GRASS-FINISHED BEEF IS BETTER FOR THE ENVIRONMENT**

Many news articles make the incorrect assumption that grass-fed beef is better for you than grain-fed beef. Below, we address common claims about grass-fed versus grain-fed.

### **Incorrect Claim #1: Grass-fed animals take less of a toll on the environment.**

**Fact:** Eating meatless isn't a shortcut to saving the planet or eating healthy. Beef is environmentally and nutritionally efficient. Raising a serving of beef today requires less land, water and energy than it did 30 years ago and beef has an 16 percent smaller carbon footprint. (The environmental impact of beef production in the United States: 1977 compared with 2007. Journal of Animal Science, 2011). A 3-ounce serving of lean beef provides all of the essential amino acids you need in about 150 calories on average. The same effect from plant protein requires 2-3 times more servings and many more calories. You can enjoy lean beef guilt-free, knowing that including it in a healthy, balanced diet is good for you and the planet.

### **Incorrect Claim #2: Perennial grasses are better for soil.**

**Fact:** Cattlemen understand the importance of managing grazing pastures in an environmentally responsible way. Most cattle spend the majority of their lives on grass, whether they are grass-finished or grain-finished. Approximately 85 percent of U.S. grazing land isn't suitable for growing crops according to USDA's Major Uses of Land Report: 2002. Grazing cattle on this land more than doubles the area that can be used to raise food. On average, each cattle farmer and rancher has more than a dozen different practices in place to accomplish environmental goals such as nurturing wildlife, preventing erosion or conserving and protecting water.

### **Incorrect Claim #3: Grass-fed animals are healthier, and their meat is safer for you.**

**Fact:** Cattle can get the nutrients they need from eating a wide range of plants, including a variety of grains and grasses. E. coli O157:H7 is capable of living in the digestive system of all cattle, regardless of what they eat. While some scientific evidence does show that manipulating cattle diets can affect digestive bacteria levels, these studies have not found that a particular feeding regimen can reliably reduce levels of E. coli O157:H7. In addition, researchers have found no difference in the safety of beef from grass-fed cattle versus grain-fed cattle. The beef industry has been credited in part for helping reduce the risk of illness from E. coli, which according to CDC, was cut in half between 2007 and 2010.

### **Incorrect Claim #4: Corn fed to feedlot cattle is fossil-fuel intensive and heavily subsidized.**

**Fact:** This claim, made by Cornell University's Dr. David Pimentel, in a March 31, 2002 New York Times Magazine is outdated given tremendous advancements in how agriculture products are grown and raised. Corn growers today, for example, get a 64 percent better yield per acre than they did in the 1980s. In addition, it takes 30 percent less land, 53 percent less irrigation water and 43 percent less energy to raise a bushel of corn today. This continuous improvement over time has also meant a 67-percent decrease in soil erosion and a 53-percent decrease in greenhouse gas emissions. (Field to Market National Report: Corn).



## MYTH: COWS CAUSE GLOBAL WARMING

Beef and cattle production have been targeted as one of the United States' biggest producers of greenhouse gas emissions. Many of the numbers say that livestock or cattle contribute as much as 18 percent of our overall greenhouse gas emissions.

### The Facts: Beef production and the environment...the truth

Cattle are not the major cause of greenhouse gas emissions in the United States. In fact, their contribution to greenhouse gases is much less than most people think. According to numbers from the Environmental Protection Agency (EPA), cattle production is not a top contributor to greenhouse gas emissions.

According to the Environmental Protection Agency in 2011:

- Agriculture = 6.9% of total U.S. greenhouse gas emissions.
- Livestock = 3.1% of total U.S. greenhouse gas emissions.
- Methane from livestock = 2.8% of total U.S. greenhouse gas emissions.
- Methane from beef cattle = 1.5% of total U.S. greenhouse gas emissions.

To compare with other industries:

- Electricity Generation = 33% of total U.S. greenhouse gas emissions.
- Transportation = 26% of total U.S. greenhouse gas emissions.
- Industrial Use = 11% of total U.S. greenhouse gas emissions.
- Residential and Commercial Use = 8% of total U.S. greenhouse gas emissions.

Always Improving. The beef community agrees that taking care of the environment is very important. Cattlemen and women believe beef and the environment can exist together without damaging it. The beef industry recently completed a first-of-its-kind life cycle assessment (LCA) — certified by NSF International — that provides benchmarks on economic, environmental and social contributions in the United States and a roadmap for the journey toward more sustainable beef. After two years of data collection and research, the beef community has proven it's on the right path forward with a 7 percent improvement in environmental and social sustainability from 2005 to 2011—specifically, greenhouse gas emissions decreased by 2 percent during this time period.

Grass-fed beef isn't better for the environment. Many people claim that grass-fed beef is better for the environment; however this is not the case. According to a Washington State University study, if all cattle stayed on grass instead of going to the feedyard, the industry would produce even more greenhouse gas emissions.

### RESOURCES

- <http://factsaboutbeef.com/2012/07/13/cows-cause-global-warming-incorrect-beef-production-accounts-for-less-emissions-than-you-might-think/>
- <http://factsaboutbeef.com/2012/10/12/are-meatless-mondays-better-for-me-and-the-environment/#more-314>
- <http://factsaboutbeef.com/2012/10/10/is-grass-finished-or-grain-finished-beef-better/#more-303>
- <http://factsaboutbeef.com/2013/09/30/raising-beef-isnt-sustainable-its-more-sustainable-than-you-think/>
- <http://factsaboutbeef.com/2013/04/11/the-reality-of-water-management-raising-cattle/>



## “BEEF IS GREENER THAN YOU THINK!” THOUGHT ORGANIZER

Be prepared to teach your home group about your topic!

Topic	Main Point 1	Main Point 2	Main Point 3
<b>Raising Beef Sustainably</b>			
<i>Summary (use two sentences to sum up your reading):</i>			
<b>Water Management and Raising Cattle</b>			
<i>Summary (use two sentences to sum up your reading):</i>			
<b>Meatless Mondays and the Health of Our Planet</b>			
<i>Summary (use two sentences to sum up your reading):</i>			
<b>Is Grass Fed Beef Better for You?</b>			
<i>Summary (use two sentences to sum up your reading):</i>			
<b>Cows &amp; Global Warming</b>			
<i>Summary (use two sentences to sum up your reading):</i>			



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## POPCORN READING ACTIVITY

**Directions:** Cut the following phrases into strips. Distribute the strips of paper. You can pass them out or you can tape them under their chairs for a fun variation. After each student has a strip of paper, have students read their slip of paper.

### AMERICA'S CATTLE FARMERS AND RANCHERS:

Utilize innovative practices to raise more beef with fewer natural resources.	Partner with state, local and national environmental agencies to monitor land, water and wildlife and make improvements to the environment.
Operate methane digesters, which capture methane from manure and utilize it to generate electricity for the farm.	Allow livestock to graze and consume natural and organic forages that convert to healthy, nutritious beef.
Adopt a "locavore" diet for cattle by using feed grown locally to reduce fuel needed for transportation.	Utilize rotational grazing in which livestock are moved to different pastures every few days to prevent overgrazing.
Participate in university research projects that aim to improve farmer environmental practices.	Protect open spaces from development through programs like conservation easements.
Compost cattle manure into fertilizer products that can be used by golf courses, athletic fields, gardens, etc.	Utilize biofuel additives in gasoline to power beef production operations.
Monitor and document effective practices and regularly solicit input from expert sources to improve resource management.	Recycle materials such as feed bags and plastic containers (mineral tubs), batteries, used motor oil, tires, and scrap metal.
Maintain open space as cattle grazing pastures, allowing land to remain natural, free of trash, debris and invasive weeds and trees.	Fertilize fields with manure from cattle feeding operations to reduce fuel needed to manufacture synthetic fertilizer.
Maintain and introduce habitats as homes for numerous endangered species.	Hold up water on ranchlands for extended periods of time in order to replenish underground aquifers and filter out nutrients and particulate matter.
Use biological controls on invasive pests.	Plant trees for windbreaks, which provide protection for livestock, wildlife and soil.
Maintain proper nutrients in soil by regularly analyzing soil samples to determine which nutrients are needed and in what amounts.	Implement conservation tillage so that soil can be conserved and available moisture used more efficiently.
Fence off streams and wetlands to create a buffer that helps prevent bank erosion and control runoff.	Plant grasses on highly erodible land, thereby conserving soil.
Optimize delivery of feed allowing for fewer trips to the farms.	Reduce fuel consumption by using ATVs that use less fuel than other farm/ranch vehicles.
Recycle corn stalk bales into cattle bedding.	Utilize solar-powered electric fence chargers.
Create retention ponds to protect waterways from excessive runoff.	Use recycled products to build fences and recycled tires to build water tanks.
Recognize those in the industry who have made long-standing contributions to the preservation of the country's natural resources through the Environmental Stewardship Award.	Practice contour farming, in which crops are planted along the natural contours of the land. The rows slow water run-off during rainstorms to prevent soil erosion and allow the water time to soak into the soil.
Plan soil nutrient management systems to control nutrient runoff and to minimize the need for additional nutrients to grow crops.	Incorporate distillers grains (a natural by-product of ethanol and alcohol production) into cattle feed to recycle this resource.
Provide habitat for ground nesting birds.	Improve plant density for a healthier rangeland.
Use wind mills to harvest wind energy into usable mechanical power.	Control weeds and prevent residue build-up on pasture land so it doesn't turn into hot and dangerous fires.
Install irrigation systems that efficiently utilize limited water resources.	Facilitate fish passage at irrigation diversions so migrating fish can continue to spawn in creeks.
Install fish screens in ditches so that fish do not get trapped.	Plant cover crops to increase soil fertility.





## WORD SEARCH

	S	X	S	H	C	C	M	U	K	G	Z	S	N	Q	R	J	L	A	R	S
METHANE	T	X	O	D	B	N	U	J	H	L	L	E	K	J	O	W	Q	X	A	R
DIGESTERS	N	B	I	O	L	O	G	I	C	A	L	C	O	N	T	R	O	L	S	E
BIOFUEL	E	V	L	D	R	G	O	T	Y	L	O	I	E	K	A	B	X	Z	A	T
CONSERVATION	M	N	E	C	T	E	S	C	S	R	W	T	H	H	T	Y	M	F	Y	S
WINDBREAKS	E	D	R	Z	O	U	C	L	D	I	B	C	T	Z	I	G	W	G	Y	E
COVERCROPS	S	L	O	O	A	N	L	Y	N	H	U	A	Q	W	O	U	N	H	P	G
EASEMENTS	A	R	S	U	X	I	S	D	C	T	T	R	J	B	N	Z	D	W	Q	I
INNOVATIVE	E	G	I	N	M	K	B	E	C	L	U	P	L	L	A	Y	R	Y	V	D
PRACTICES	L	M	O	D	O	R	B	V	R	I	E	E	I	A	L	I	Y	H	R	E
BIOLOGICAL	V	H	N	C	E	F	P	A	W	V	I	V	J	R	G	I	V	L	U	N
CONTROLS	F	I	N	A	J	I	A	E	P	K	A	I	S	W	R	Q	F	X	R	A
NATURAL	W	C	K	G	K	J	M	V	S	P	S	T	R	W	A	E	G	Z	T	H
RESOURCES	N	S	P	O	R	C	R	E	V	O	C	A	I	I	Z	L	J	U	N	T
RECYCLE	B	I	O	F	U	E	L	Z	M	R	N	V	E	O	I	N	X	B	J	E
ROTATIONAL	U	Q	F	W	U	P	Y	H	V	T	W	O	L	Z	N	A	G	A	E	M
GRAZING	P	G	D	R	W	N	N	O	M	V	F	N	V	T	G	E	U	H	C	E
CONTOUR	F	F	Y	F	P	S	U	Q	Q	X	O	N	M	T	V	F	V	H	W	K
FARMING	C	O	N	T	O	U	R	F	A	R	M	I	N	G	I	U	P	T	Y	Y
SOIL EROSION	S	E	C	R	U	O	S	E	R	L	A	R	U	T	A	N	J	D	A	I
WINDMILLS																				

**Part 2:** Select three words from the list to define. After defining the words, explain how they relate to the lesson on cattle ranchers and farmers taking care of the environment.