



## National Agriculture in the Classroom

Relevancy and Engagement: [agclassroom.org](http://agclassroom.org)

# Beef: A Healthy Option

## Grade Level(s)

6 - 8

## Estimated Time

Two 50-minute sessions

## Purpose

Students will learn about the nutritional content of beef and use role playing and research to describe why zinc, iron, protein, and vitamin B12 are important to healthy living.

## Materials

- *Beef: A Healthy Option* student handout
- Internet access

## Essential Files (maps, charts, pictures, or documents)

- Individual Loaded Nachos  
[<http://naitc-api.usu.edu/media/uploads/2015/09/22/IndividualLoadedNachos.pdf>]
- Beef: A Healthy Option worksheet  
[[http://naitc-api.usu.edu/media/uploads/2015/09/22/Beef\\_a\\_Healthy\\_Option\\_worksheet.pdf](http://naitc-api.usu.edu/media/uploads/2015/09/22/Beef_a_Healthy_Option_worksheet.pdf)]

## Vocabulary

**ZIP:** an acronym used in nutrition representing the nutrients zinc, iron and potassium

**zinc:** a micronutrient required in our diet required for a healthy immune system and normal growth and development

**iron:** a mineral used to form hemoglobin, a protein in blood cells

**protein:** a nutrient which builds and repairs muscle tissue

**vitamin B12:** a vitamin important to the formation of red blood cells and healthy nerve tissues

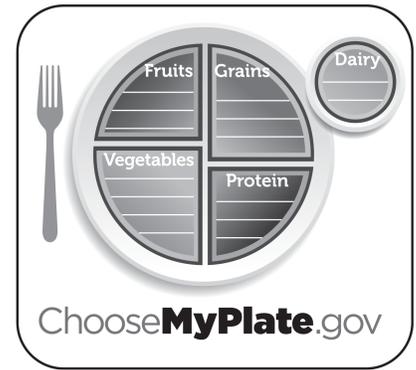
**MyPlate:** the nutrition guideline published by the United States Department of Agriculture depicting a place setting that is divided into the five food groups

## Interest Approach or Motivator

1. Use the MyPlate graphic to start a class discussion about the five different food groups and examples of each. As students share their ideas about each food group, list them on the board. For instance, when asked to provide examples of the vegetable food group, students may think of carrots, peas, and zucchini.
2. Explain that this lesson will highlight beef as a source of lean protein for the protein food group. Beef is a good source of several important nutrients that the students will be researching.

## Did you know? (Ag Facts)

- There are more than 29 cuts of beef that meet government guidelines for lean, including the tenderloin, T-bone, and 95% lean ground beef.<sup>2</sup>
- Beef has 8 times more vitamin B12, 6 times more zinc, and 2.5 times more iron than a skinless chicken breast.<sup>2</sup>
- Memorial Day, the Fourth of July, and Labor Day are the most popular beef-eating days of the year.<sup>3</sup>
- The first hamburger debuted at the 1904 World's Fair in St. Louis.<sup>3</sup>



## Background - Agricultural Connections

This lesson will reference **MyPlate** for making important food choices to meet nutrient requirements for a healthy diet. Students will explore the dietary functions of zinc, iron, protein, and vitamin B12, as well as the symptoms of deficiencies in these nutrients. The lesson focuses on lean beef as a source of these important nutrients.

### Zinc:

Zinc helps you think! It is important for normal growth and development, building muscle, healing wounds, attention span and learning, and maintaining a healthy immune system to fight off disease and ailments such as the common cold. Zinc also plays a role in our sense of smell and taste. Beef provides an excellent source of zinc. Other sources of zinc include oysters, poultry, beans, nuts, dairy, and some fortified cereals.

Symptoms of zinc deficiencies may include stunted growth, loss of appetite, taste abnormalities, struggling to maintain focus and comprehend information, getting sick often with colds and flu, and cuts that don't heal.

### Iron:

Iron is an important mineral needed to form hemoglobin, a protein in blood cells that helps to produce energy by carrying oxygen from the lungs to cells and tissue throughout the body. Without iron, your muscles won't work. Iron also strengthens the immune system and is important in the brain development of children, teens, and young adults. Research has shown that academic performance can drop with even mild cases of iron deficiency.<sup>1</sup>

There are two types of iron in food, "heme" iron and "nonheme" iron. Animal protein, such as beef, contains heme iron, which is easier for the body to absorb than nonheme iron, which is found in vegetables. Eating meat with vegetables helps the body absorb more nonheme iron from the vegetables. Using MyPlate as a guide for building balanced meals is an easy way to get the most nutritional value out of the food you eat. Iron is often the nutrient that is lacking in diets of women, young children, and athletes.

### Protein:

Protein is required to build and repair muscle tissue and may help the body recover after a workout. Protein is a good source of energy and it helps move vitamins and minerals throughout the body while supporting a healthy immune system, and healthy skin and hair.

Proteins are made up of approximately 20 different amino acids. Our bodies can produce eleven of these amino acids, and the other nine, which are often referred to as "essential amino acids", must be consumed in the food we eat. Beef is considered a complete source of protein because it contains all nine essential amino acids. A lack of protein in the diet can result in feeling tired and weak. Wounds may heal slowly and the body may take longer to recover from exercise.

### Vitamin B12:

Vitamin B12 helps keep nerve and blood cells healthy and helps make DNA, the genetic material in our cells. It prevents a type of anemia that makes people feel tired and weak. Animal protein such as beef is a good source of vitamin B12, however unless they are fortified, plant foods do not contain vitamin B12.

Symptoms of vitamin B12 deficiency include feeling tired and weak, having trouble understanding concepts, poor memory, feeling depressed, loss of appetite, constipation, poor balance, and numbness in hands and feet.

### General Suggestions for a Balanced Diet:

Eat a variety of nutrient rich foods. No single food provides all the nutrition needed for daily activities. Eat colorful fruits and vegetables and high quality proteins such as lean beef. Choose whole grain bread, pasta, and rice when possible.

Recommended daily intake of calories and nutrients vary depending upon a person's age, level of physical activity, and gender. Use MyPlate guidelines to determine your individual needs. [www.ChooseMyPlate.gov](http://www.ChooseMyPlate.gov)

## Procedures

### Activity 1: Research

1. Provide the *Beef: A Healthy Option* worksheet for each student.
2. Point out the chart section of the student worksheet. Explain how students should use the chart to complete the following information:
  - Why are zinc, iron, protein, and vitamin B12 important in our diets?
  - What are the symptoms of deficiencies in these nutrients?
3. Divide students into pairs to research the information. Review an example of how you would like students to cite their sources. An example for citing websites is shown below. Instruct students to use reputable sources such as MyPlate.gov, National Institutes of Health, MayoClinic.org, and university websites. If internet research is not possible, have students read the lesson background information that has been provided for the teacher.
  - Citing Websites in MLA Format
    - Last name, First name. "Article Title." Website Title. Publisher of Website, Day Month Year article was published. Web. Day Month Year article was accessed. <URL>.
    - Example: Smith, Joan. "The Yellow Squash." The Gardener. The Association of Vegetable Gardeners, 20 June 2014. Web. 27 June. 2014. [www.thegardener/yellowsquash.com](http://www.thegardener/yellowsquash.com)

### Activity 2: Role Play

1. Once students have completed the chart section of the worksheet, instruct each pair of students to use their knowledge about the nutrients in a role play as a Registered Dietician and a client who isn't feeling well. Students will take turns playing each role. Model how you would like students to play the role of the client and the Registered Dietician before groups begin the activity on their own. For Example:
  - Registered Dietician – "You haven't been feeling well. Can you describe your symptoms?"
  - Client – "I have been tired and haven't felt like exercising. I've also had trouble focusing in class."
  - Registered Dietician – "Let's write down the things that you eat and drink throughout a typical day to see if we can identify any nutritional gaps. I would also like to know how many hours of sleep you are averaging each night."
2. Have each client use their nutrient chart to choose symptoms of one or two nutrient deficiencies. They will then describe these symptoms to their partner who is playing the role of the Registered Dietician. Registered Dieticians should jot down notes about their client's symptoms and should use their nutrient chart to determine which nutrient or nutrients their client may be lacking. Have partners switch roles after one round.
  - Note: A Registered Dietician Nutritionist (RDN) is a food and nutrition expert who has been trained in applying the science of nutrition into solutions for healthy living. RDNs are able to develop personalized nutrition plans for individuals based on their needs.
3. Food Recommendation: Next have students research lean protein sources that would remedy nutrient deficiencies over time when incorporated into meals. Recommended websites include [choosemyplate.gov](http://choosemyplate.gov), [beefnutrition.org](http://beefnutrition.org), and [nutrition.gov](http://nutrition.gov).
4. Ask students if there are any foods that provide all of the nutrients they learned about: protein, zinc, vitamin B12, and iron. (Answer: lean beef)
5. Instruct each Registered Dietician to write a few sentences summarizing the symptoms described to them by their client. Next, those playing the role of the Registered Dietician will write an explanation of the nutrient or nutrients the client may be lacking and should back it up with evidence from research. Registered Dieticians should make a recommendation for the client to incorporate certain foods into daily meals in order to address the nutrient deficiency and symptoms. Since students switched roles, every student will write up a menu recommendation. These can be shared in the class discussion.

6. Class Discussion: Engage students in a class discussion about the nutrition information gained during the lesson. Note that this lesson provides some symptoms that may be related to nutrient deficiencies, however there are many other factors that can also lead to some of the same symptoms. It is always best to seek the care of a doctor when symptoms of illness do not go away.
7. Show a video of a student preparing healthy nachos that include lean beef and vegetables to provide a good source of the nutrients that were featured in the lesson: Zinc, Iron, Protein, and vitamin B12. [Bon a la Beef- Individual Loaded Nachos with Tri-Tip Beef](#).

### Concept Elaboration and Evaluation

After conducting these activities, review and summarize the following key points

- Beef provides zinc, iron, protein, and vitamin B12 to our diet.
- Beef is produced by cattle.
- A Dietician helps educate individuals on how they can improve their health through their diet. Dietitians have a career in science and agriculture.

### Enriching Activities

- Provide the Beef Fact and Activity Sheet for students to read. Choose one or more lesson ideas to enrich student's knowledge of a cow's ruminant digestive system, cattle history, and beef byproducts. [www.learnaboutag.org/factsheets/pdf/Beef.pdf](http://www.learnaboutag.org/factsheets/pdf/Beef.pdf)
- Have students create a healthy recipe that includes sources of zinc, iron, protein, and vitamin B12 to serve to their family.
- Have students plan out one day of balanced meals using MyPlate as their guideline.

### Suggested Companion Resources

- The Healthy Hop 'n Shop (Activity)  
[<http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=271>]
- Portion Size Comparison (Activity)  
[<http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=238>]
- Food Group Puzzle (Activity)  
[<http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=239>]
- Beef Cattle in the Story of Agriculture (Book)  
[<http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=263>]
- Bon a la Beef Videos (Multimedia)  
[<http://www.agclassroom.org/teacher/matrix/resources.cfm?rid=265>]

### Sources/Credits

California Foundation for Agriculture in the Classroom partnered with California Beef Council to create this lesson plan along with four professional video clips featuring elementary through high school students preparing recipes to educate students, teachers, and the public about beef, its nutritional value, and its proper handling and preparation.

Background information collaborated from [U.S. National Library of Medicine](#), [Nutrition.gov](#), [Choose MyPlate](#), and [Mayo Clinic](#).

Sources:

1. Pollit E. Iron deficiency and cognitive function. *Annu Rev Nutr* 1993; 13: 521/37.
2. <http://www.explorebeef.org/nutrition.aspx>
3. <http://www.blisstree.com/2009/06/13/food/fun-beef-facts-and-trivia/>

### Author(s)

CFAITC and California Beef Council

## Organization Affiliation

California Foundation for Agriculture in the Classroom

Curriculum Matrix: [agclassroom.org/teacher/matrix](http://agclassroom.org/teacher/matrix)