



**food and  
nutrition sciences**



beef - it's what's for dinner  
MIDDLE SCHOOL CURRICULUM





---

It is the policy of the Nebraska Department of Education not to discriminate on the basis of sex, disability, race, color, religion, marital status, age, or national origin in its education programs, admission policies, employment, or other agency programs.

This project was funded through the Carl D. Perkins Career and Technical Education Act of 2006, administered through the Nebraska Department of Education. However, the contents do not necessarily represent the policy of the United States Department of Education and you should not assume endorsement by the Federal Government.

This project was supported by Agriculture and Food Research Initiative Grant No. 2012-68003-30155 from the USDA National Institute of Food and Agriculture, Prevention, Detection and Control of Shiga Toxin Producing Escherichia coli (STEC) from Pre-Harvest Through Consumption of Beef Products Program –A4101.

---



## beef - it's what's for dinner

This middle school project previews the Food and Nutritional Science Curriculum. The high school courses include: (1) Food Production, Nutrition, and Health, (2) Food Science, (3) Nutrition Science, and (4) Food and Nutrition Science Research and Development. The semester long courses are project-based and provide students with opportunities to explore careers within Food Science and Nutrition Science.

For more information about the Food and Nutrition Science Curriculum,  
*visit [www.ksu.edu/fns](http://www.ksu.edu/fns).*

# Project Overview

Day 1	Day 2	Day 3	Day 4	Day 5
Students define common <b>food safety issues</b> .	Students discover career options in Food Science.	Students determine the <b>scope/meaning of the project</b> and define <b>bacteria</b>	Students define <b>exponential growth</b> and <b>discuss its impacts with STEC</b>	Students discuss the effects and importance of <b>cleaning</b> as it relates to safe food handling
Day 6	Day 7	Day 8	Day 9	Day 10
Students <b>demonstrate</b> the importance of <b>separation</b> during food preparation	Students <b>analyze</b> the importance of <b>cooking</b> as a step in food preparation	Students <b>understand</b> chilling and <b>evaluate</b> different chilling methods	Students <b>demonstrate safe food handling procedures</b> . Students describe opportunities for <b>STEC contamination</b> . Students <b>describe procedures for minimizing the risk of STEC contamination</b> . ►	
Day 11	Day 12	Day 13		
◀ Students <b>demonstrate safe food handling procedures</b> . Students describe opportunities for <b>STEC contamination</b> . Students <b>describe procedures for minimizing the risk of STEC contamination</b> .	Students <b>present demonstrations</b> of safe food handling procedures.			



## beef - it's what's for dinner



### Essential Question

How do we more effectively and efficiently keep beef products safe?



### Engagement Scenario

Restaurants in our area have experienced recent outbreaks of food-borne illness related to beef. As state food inspector, you have been asked to determine what the risks are and to develop a training program for restaurant employees on how to properly handle and cook beef. Training materials could include brochures, PowerPoints, and a training manual or guide. These materials will be reviewed by professionals in the field.

You will need to research diseases related to the storage, processing, and preparation of beef. Since the bacterium *E. coli* is often related to beef infections, concentrate on *E. coli* and all of its life functions, characteristics, growth requirements, environmental growth inhibitors, and health-related issues. Investigate how restaurant workers generally work with beef and what precautions need to be taken.

How do we effectively and efficiently keep beef products safe? After reading informational text and participating in food safety scenarios on proper restaurant beef handling procedures, develop a training presentation for restaurant employees that details how to properly handle and prepare beef. Support your presentation with evidence from the text. In your presentation, address the credibility and origin of sources in view of your research topic. Identify any gaps or unanswered questions. Include a bibliography. You will study bacterial growth rates and patterns and will investigate bacterial structure and function. All of your work, calculations, data, research notes, etc., will be kept in a research journal.

Your presentation should aim to convince the audience to adopt the procedures you specify, cite references, and outlines any problems/concerns/questions you still have. You will make this presentation to a group of state health/food inspectors and restaurant managers/owners.



## Deliverables

1. Research journal (one per team member)
2. Research report (presentation materials, Team Management Log, Team Evaluation Form)
3. Presentation



## Documentation

1. Journal entries
  - a. Research notes
  - b. Bacterial growth calculations
  - c. Team decisions
  - d. Activities completed in class
  - e. Notes related to bacterial infection & growth, methods of control & prevention, the beef industry, and the food service industry.
2. Presentation with visual aids, written materials, and a hands-on activity.



## Materials

- Highlighters in three colors – enough that each student can have one of each color
- Newspaper/magazine articles about food borne illness
- Internet access
- Index cards
- Access to class kitchen or food preparation areas
- M&Ms
- Small containers
- Large Pots
- Ice Packs
- Refrigerator/Freezer
- M&M Labs
- Pre and post assessments
- Appendix 1 Foodborne Illness Articles
- Appendix 2 Pathogen Chart
- Appendix 3 Cornell Note Taking
- Appendix 4 Research Notes Format
- Appendix 5 M&M Lab
- Appendix 6 Separation Activity
- Appendix 7 Deliverables
- Appendix 8 Project Management Log
- Appendix 9 Team Evaluation Form
- Appendix 10 Project Rubric
- Appendix 11 Beef Background Knowledge
- Appendix 12 Brochure\_Infographic Rubric
- 3 ring binders
- Easel Pad



# beef - it's what's for dinner



## Essential Question

What are the common food safety issues?



### Learning Objectives

As a result of this lesson, students will be able to:

- Describe symptoms of food-borne illnesses
- Identify potential causes of food-borne illnesses
- Define pathogen



### Required Materials for Daily Lesson

- Highlighters – three colors per student
- Newspaper & magazines articles about food safety outbreaks (be sure that some relate to beef and some relate to E. coli!). Samples in Appendices 1
- Internet access
- Pathogen Chart (Appendix 2)



### Estimated Instructional Time:

One 50 minute class period

### Learning Activities



#### Opening - 10 minutes

*Designed to prepare students for learning. Students are prepared for learning by activating an overview of the upcoming learning experience, their prior knowledge, and the necessary vocabulary.*

**Bellwork:** Think of a time that you heard about someone getting sick from food. Describe the situation you remember.

- Students view video <http://www.youtube.com/watch?v=4iaE6wwroe4> , an AP report on a Salmonella outbreak from sushi.
- Think-Pair-Share to develop definitions of food borne illness and outbreak.
- Share definitions with class and have students capture a class definition in their notes.
- "One specific bacteria serotype we will focus on is Shiga Toxin-producing E. coli (STEC for short). Check out [www.ksu.edu/fns](http://www.ksu.edu/fns) for more curriculum and more background information on STEC.

Check out [stecbeefsafety.org](http://stecbeefsafety.org) and [160isgood.com](http://160isgood.com) for more information about E. coli.



## Middle - 35 minutes

*Designed to provide a structure for learning that actively promotes the comprehension and retention of knowledge through the use of engaging strategies that acknowledge the brain's limitations of capacity and processing.*

- Students read/skim newspaper or magazine articles and highlight the names of specific pathogens in color #1. Have all students use the same color.
- Project the blank Pathogen Table on the board and have students type the names of pathogens into column headings. If multiple students find the same pathogen, keep a count of how many different outbreaks/articles related to this pathogen.
- Swap articles among students. Highlight in color #2 the symptoms of food-borne illnesses caused by the pathogens. Have all students use the same color.
- Students fill in the cells for symptoms under the appropriate pathogen heading
- Swap articles again. Students highlight in color #3 the source of the pathogen. Have all students use the same color.
- Complete the projected chart as class as students also fill in the cells of their own.
- Discuss: What causes food-borne illness? What can people (producers, consumers, food service professionals) do to reduce the chances of spreading a food-borne illness? Who is responsible for preventing food-borne illness? How does the media react to food borne illness (Who do they blame? What is the tone?)?
  - o The World Health Organization's definition: Food borne illnesses are defined as diseases, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food. Every person is at risk of food borne illness.
  - o Proper handling and cooking of foods reduces the chances of spreading a food borne illness. Students will elaborate on this throughout the lesson.
  - o Everyone who handles the food product (pre- and post-harvest) is responsible for preventing food borne illness.



## Closing - 5 minutes

*Designed to promote the retention of knowledge through the use of engaging strategies designed to rehearse and practice skills for the purpose of moving knowledge into long-term memory.*

Collect completed pathogen charts and review. Prompt students to place the pathogen charts in their Research Journals when you redistribute them (Journals are formatted on Day 2).

**Summary:** Pose the following question - Now that you have an understanding of food-borne illnesses, whose responsibility is it to ensure a safe food supply? Discuss.

**TIP!** Some possible answers may include farmers, government, and consumers. Consider giving this question as a homework assignment for students to research as we move toward researching food science careers in day 2.



## beef - it's what's for dinner



### Essential Questions

What kind of career options are there in food science?  
What role does food science play in our food supply?



### Learning Objectives

As a result of this lesson, students will be able to:

- Describe food science career options



### Required Materials for Daily Lesson

- Internet access (1 terminal for each pair of students)
- Easel Pad
- Binders
- Loose leaf paper
- Copies of Appendix 4 Research Notes Format
- Copies of Appendix 12 Brochure Rubric



### Estimated Instructional Time:

One 50 minute class period

### Learning Activities



#### Opening

5 minutes

- Hand out binders to students (or have the students take them out if they already have them in their possession). Pass out page dividers (3 dividers per student). Instruct students there will be 3 main sections in their binders: A notes section, a research article section, and a reflection section. Have students label their dividers for each section (notes, research, and reflection) and place them in their binders. Instruct students they will need their Research Journals every day for class. Have students leave paper in the Notes and Reflection sections.
- Hand out 3-4 copies of the Research Notes format and have students place them in the research section of their journals.
- Have students place their pathogen chart and bellwork from Day one in the Notes section of their Journals.

**TIP!** Consider having students add an index page for their journals.



## Middle

40 minutes

- Have pictures of brochures ready to be projected or made visible to students.
- Transition to a group discussion asking the students about brochures with the following questions: What is a brochure? What does it look like? What is its purpose? Distribute Brochure Rubrics (Appendix 12). Modify as needed.
- Place students into groups of 2 or 3, and instruct them that they are going to research and design a brochure for advertising and informing about careers in food science. The brochure should include the following:
  - o A title page with a picture
  - o Information about at least 5 careers in food science.
  - o At least 3 credible sources of information cited on research notes pages in the Research section of their journals.
- The brochure formats can include hand written/drawn paper, printed text/pictures on paper, or electronic brochures created using software.



## Closing

5 minutes

- After students complete their brochures, post them in the classroom at your discretion.
- Exit Slip:** On a scrap piece of paper, have students answer the following question:
  - o What potential career opportunity in food science interests you most, and why?

**TIP!** One to One tech at your school? Consider having students complete group work using Google Docs.

**TIP!** For an alternative to a brochure, consider an infographic. Use this free site to create designs: <https://venngage.com/>

**TIP!** Consider these websites as resources for students to visit:

Bureau of Labor Statistics Student Career Exploration - <http://www.bls.gov/k12/content/students/careers/career-exploration.htm>

WSU Career Page - <http://sfs.wsu.edu/prospective-students/faq/food-science-careers/>



## beef - it's what's for dinner



### Essential Questions

What are bacteria? What roles do different kinds of bacteria play in human health?



### Learning Objectives

As a result of this lesson, students will be able to:

- Examine bacteria and how they impact humans.
- Describe the purpose of the project.



### Required Materials for Daily Lesson

- Internet access (1 terminal for each pair of students) Texts and journal articles about bacteria
- Easel Pad
- Ruler
- Journals (3 ring binders preferred) with loose leaf paper
- Copies of Engagement Scenario (page 7)
- Copies of Appendix 3 Cornell Notes format



### Estimated Instructional Time:

One 50 minute class period

### Learning Activities



#### Opening

10-15 minutes

- Provide students with copies of the engagement scenario, Cornell Notes format, and Reflection format. (Or have them displayed)
- Instruct each student to use an INSERT strategy as they read the three documents. Place an “!” behind each sentence that surprises you; a “?” behind each sentence that you have questions about; an “\*” behind each sentence you think is critical; and a line under each word you do not understand. (Add to or delete INSERTS as desired.)
- Next, have students pair together and share their INSERT marks. Provide time for discussion.
- Lead a discussion of the project as each group shares its questions, surprises, disagreements and needed definitions. All of this should be summarized on the board or projected.

**TIP!** Have an example article that you have already completed the INSERT methods with and project it on the board.



## Middle

30 minutes

- Hand out rulers and have students format two pages of their notes section in their research journals following the Cornell Notes format handout.
- While they are formatting their journal pages, write the following question on the board: What do you know about bacteria?
- Once students have finished formatting, lead a class discussion about the question posed on the board. Capture students' thoughts on the board or easel paper.
- Refer back to project description. Ask students, "what problem are we trying to solve?"
- "How do scientists solve problems?" Walk students through the steps of the scientific method, having them take notes in their journals using the Cornell Notes format( 1. Ask a question, 2. Do background research, 3. Construct hypothesis, 4. Collect data, 5. Analyze data, 6. Draw conclusions, 7. Communicate results).
- "Where are we in this process?" (#2)
  - o "What research must we conduct?"
  - o Place students into teams of 3-4.
  - o Allow 5 minutes for students to work with their team and develop a list of questions they have about bacteria. Instruct each group to capture their questions on an easel pad sheet. Examples: What are bacteria? How are they helpful to humans? How are they harmful to humans? How do we control them? How do they reproduce or grow?
  - o Monitor team progress in listing questions.
  - o Have each team post their sheets of questions at the front of the class, then break teams into pairs and conduct research to discover the answers to the questions they posed in their big group. Research can be conducted online or using texts and articles you provide. Allow approximately 15-20 minutes for research, cut off as soon as students start to wander off-topic.
  - o Have students fill out Research Notes pages in their journals as they collect information about bacteria. Explain this will allow for easy future reference.
- Pairs return to teams, share the information they found, and capture it in their journals on the same Research Notes page.

Groups should add new information to the list you collected on the board at the beginning of the class. They can cross off things they found to be false.



## Closing

5 minutes

- In the Reflection section of their journals, have students answer the following questions. For each Reflection for the rest of the unit, students should format their reflections according to step four (reflect) of the Cornell Note Taking handout.

What did you learn about bacteria today? What surprised you?



## beef - it's what's for dinner



### Essential Question

How quickly do bacterial colonies grow?



### Learning Objectives

As a result of this lesson, students will be able to:

- Explain exponential growth
- Write a formula for exponential growth



### Required Materials for Daily Lesson

- M&Ms divided into one bag or container per group
- M&M lab sheet and chart (Appendix 5)
- Calculators
- Graph paper



### Estimated Instructional Time:

One 50 minute class period

### Learning Activities



#### Opening

5 minutes

Pose the following scenario to the class: Suppose you have \$10. For two weeks (14 days), your rich uncle offers to do one of the following:

- a) Increase what you had the previous day by \$50, or b) Increase what you had the previous day by 50%

Which option will give you more money?

Discuss with students to see if any already know about exponential growth.



## Middle

40 minutes

Walk through the math for the money question:

By \$50 – add \$50 to amount now		By 50% - multiply amount now by 1.5	
Day	Amount	Day	Amount
0	10	0	10
1	60	1	15
2	110	2	22.5
3	160	3	33.75
4	210	4	50.625
5	260	5	75.9375
6	310	6	113.906
7	360	7	170.859
8	410	8	256.289
9	460	9	384.433
10	510	10	576.65
11	560	11	864.976
12	610	12	1,297.463
13	660	13	1,946.195
14	710	14	2,919.293

- Ask students, “why does the addition of 50% each day end with more money?”
  - Keep the discussion going until you get to an explanation that includes multiplication working more quickly than addition.
  - Provide definitions:
    - Linear growth - growth in a population that occurs by addition
    - Exponential growth – growth in a population that occurs by multiplication
  - Have students determine which is linear and which is exponential in our example.
- Have students work with a partner. Distribute M&M labs and give directions.
- Circulate to monitor progress and answer questions.
- Tell students to add their thoughts about Exponential Growth to the board as they work.
- Reconvene the class to review their labs.
- When groups have finished, collect labs. Grade these (decide on how to weight these in the project before you distribute and inform students).

**TIP!** Introduce Shiga Toxin-producing *E. coli* (STEC) as a type of bacteria that is responsible for some food-borne illnesses (same *E. coli* that was referenced in one of the outbreak articles from day 1).

For more info visit [www.ksu.edu/fns](http://www.ksu.edu/fns) or [160isgood.com](http://160isgood.com)

- “Let’s think about all of this in terms of STEC bacteria and how quickly their population would grow. Under ideal conditions, E. coli bacteria have a generation time of 17 minutes. Generation time is the amount of time it takes for a bacterial population to double; thus an E. coli colony doubles every 17 minutes.
  - If you start with two E. coli cells, how many will you have in 85 minutes?
    - ✓ 84 cells
  - 5 hours (300 minutes) =
    - ✓ 410,493.5421 round to 410,494 cells
  - 8.5 hours (510 minutes) =
    - ✓ 2,147,483,648 cells



## Closing

5 minutes

Students write one paragraph in the reflection section of their research journals to answer, “Why do we have to be careful about STEC contamination?” Discuss as a class. Students should add new points raised by classmates as bullet points under their paragraph.



## beef - it's what's for dinner



### Essential Question

How can we ensure Beef is safe to eat?



### Learning Objectives

As a result of this lesson, students will be able to:

- Discuss the importance of cleaning
- List the four USDA recommended steps for ensuring food is safe



### Required Materials for Daily Lesson

- Glo-Germ Kit  
*\*Glo-Germ activities work best with larger black light bulbs, which can be purchased at major home-improvement stores.*
- MyPyramid Food Safety PowerPoint



### Estimated Instructional Time:

One 50 minute class period

### Learning Activities



#### Opening

15 minutes

- Before class begins “infect” certain areas of the classroom with Glo-Germ (ex: Door knobs, tables, or chairs etc.). After students are seated and ready for class, start the following discussion:
  - We are going to conduct an experiment. Who will volunteer to quickly wash their hands in order to participate (accept first 5 volunteers). Have volunteers wash their hands.
  - Once they return, have them insert their hands in the blacklight to show “germs” from the Glo-Germ residue still remaining. Have other students who didn’t wash their hands also come up to show how many germs are commonly on our hands.
  - Use this example to launch a short discussion about the importance of cleaning and hand washing when preparing food.
  - Have students write a reflective entry in their research journal estimating the number of times they wash their hands on average each day.



## Middle

15-20 minutes

- Introduce the four safe food procedures outlined by the USDA and listed in the MyPyramid PowerPoint: Clean, Separate, Cook, and Chill. Instruct students to take their notes for the day in their Research Journals following the Cornell Notes format.
- Using the MyPyramid PowerPoint, discuss slides 14-20 pertaining to Cleaning.



## Closing

10 minutes

- Think-on-it → Students think independently about their environment and formulate an estimate of the food preparation cleaning practices at their home using a 1 to 10 scale, with 1 being very little cleaning to 10 being cleaning very often. They write their number down in the Reflection section of their Research Journals with a 3-4 sentence paragraph of why they assigned that number.



# beef - it's what's for dinner



## Essential Question

How can we ensure Beef is safe to eat?



### Learning Objectives

As a result of this lesson, students will be able to:

- Discuss the importance of separation while preparing food



### Required Materials for Daily Lesson

- Glo-Germ Kit  
*\*Glo-Germ activities work best with larger black light bulbs, which can be purchased at major home-improvement stores.*
- MyPyramid Food Safety PowerPoint
- Food Prep Area
- (4 lbs) Hamburger meat
- (4) heads of lettuce
- Uncut hamburger buns
- Cutting boards
- Knives
- Strainer
- Separation Activity (Appendix 6) Copies



### Estimated Instructional Time:

One 50 minute class period

### Learning Activities



#### Opening

5 minutes

- Have students wash hands and put away their materials for a food lab activity.
- Lead a short class discussion asking if anyone has ever prepared a meal before. Advise them they will get that opportunity today, but they must follow their recipe sheet exactly.
- Assign students to four different groups, instructing each group they will prepare a meal following a given set of instructions (recipes) (see appendix 6)

**TIP!** Make a strong advisory that food used during this activity is NOT FOR CONSUMPTION!

**TIP!** This lesson requires considerable teacher preparation, make sure to read this lesson thoroughly and plan for it a few days in advance!



## Middle

40 minutes

- Distribute the provided directions, with a different set going to each group. Instruct the students they have to follow the given directions exactly as stated.
- Before the students begin the food prep, expose group 1 and 2's lettuce supply with glo-germ powder without informing them. Exposure works best if the head of lettuce is cut in halves with the core removed and the Glo-germ is sprinkled over the cut side. Also expose group 3 and 4's hamburger supply with Glo-Germ without informing them, making sure to work the powder into the ground meat.
- Each group should begin with materials that look similar (each group's meat should be unpackaged before they arrive, and their lettuce should be cut in half), make sure to label the hamburger and lettuce supplies for each group so you can identify which ones are "infected" before the activities begin.
- Groups 1 and 3 have directions that should allow them to prep their meals with minimal bacteria transfer. Group 1's lettuce will still have some bacteria, and group 3's hamburger will still have bacteria.
- Groups 2 and 4 have directions that will cause bacteria transfer from their lettuce to their bread (group 2) and from their hamburger to their lettuce with slight residual amounts on bread (group 4).
- Allow students to complete the food prep, stating clearly the food is not to be eaten; they will have an opportunity to prepare food to be eaten at a later time.
- Once a group is finished with their prep, ask them to sit quietly while other groups finish, but do not clean their stations until instructed to do so.
- Once all groups are finished with their food prep regroup the students back to their original seat (if possible). Go over slides 21-24 of the MyPyramid PowerPoint covering the importance of separation during food preparation, have students take notes in their research journals following the Cornell Notes format.
- Lead a discussion asking groups the following questions:
  - o What are some possible errors in your groups' recipe instructions?
  - o Why is that error so important/what could it cause to happen with other food your group prepared?
- Wrap up discussion and run the black light over the different sets of prepared meals, allowing students to deduce their own reasons of why their group's "bacteria" were spread. Each group should analyze their own black light results and provide reasoning to the rest of the class.

**TIP!** Have students create flow charts to provide a visual of when they think their food was cross contaminated.



## Closing - 5 minutes

- Have students interview a member of another group to determine why/how that group's bacteria did (or did not) spread. Students write answers to questions in the reflection section of their journals.



# beef - it's what's for dinner



## Essential Question

How can we ensure Beef is safe to eat?



### Learning Objectives

As a result of this lesson, students will be able to:

- Discuss the importance of properly cooking beef



### Required Materials for Daily Lesson

- Food die/paint or Glo-Germ powder  
*\*Glo-Germ activities work best with larger black light bulbs, which can be purchased at major home-improvement stores.*
- MyPyramid Food Safety PowerPoint
- Food Prep Area
- (1) boneless steak
- Meat grinder



### Estimated Instructional Time:

One 50 minute class period

### Learning Activities



#### Opening

5 minutes

- Direct a silent thinking question toward the entire class:
  - Do you know anyone who orders their hamburgers rare (red in the middle) or eats pieces of raw hamburger?
- Have students volunteer their responses, lead the discussion towards the commonality of Americans eating undercooked hamburger.



## Middle

40 minutes

- Take out your steak (covered with food coloring or Glo-Germ powder beforehand) and meat grinder.
- Explain the differences between steak and hamburger:
  - o Steak can be ordered rare (red in the middle) and eaten safely because the inside of the muscle (meat) hasn't been exposed to bacteria like E. coli.
  - o Hamburger is basically different cuts of meat (muscles) ground up to increase tenderness and eating satisfaction.
- Explain to the students the paint on the outside of the steak represents bacteria, cut the steak into pieces to demonstrate how the knife transfers the bacteria while cutting. Explain this why steak still has to have the outside cooked to a safe temperature.
- Let students make assumptions or inferences about what will happen when the steak is ran through the meat grinder (steak will become hamburger and the bacteria will be spread throughout the meat)
- Demonstrate running the steak through the grinder. Show the students how the bacteria were spread throughout the meat by the grinding process. Relate that to the importance of cooking hamburger (and all foods) to a safe internal temperature.
- Transition to the MyPyramid PowerPoint and go over slides 25-48 covering safe cooking practices. Instruct students to take notes in their research journals (Cornell Notes format) based on what they feel is important about food safety, i.e. what they need to know to keep their family safe.



## Closing

5 minutes

- Think-pair-share: Students pair up and discuss with their partner what they find to be the two most important pieces of information from the day's lesson. Each group quickly shares their conclusions with the class.

**TIP!** Consider having students write a short summary in the reflection section of their journals.



## beef - it's what's for dinner



### Essential Question

How can we ensure Beef is safe to eat?



### Learning Objectives

As a result of this lesson, students will be able to:

- Discuss the importance of properly chilling food to a safe temperature



### Required Materials for Daily Lesson

- MyPyramid Food Safety PowerPoint
- Food Prep Area
- Freezer
- Refrigerator
- Ice packs (any size)
- Large stew pot



### Estimated Instructional Time:

One 50 minute class period

### Learning Activities



#### Opening

5 minutes

- Lead a quick class discussion by posing the following questions:
  - o What is an appropriate length of time to let food sit out before putting it away?
  - o What might be a reason for storing food in a cold environment (fridge or freezer)?
  - o How do we cool food down once we are done eating it?



## Middle

40 minutes

- Show the MyPyramid PowerPoint, going over slides 49-61 covering the chilling of food.
  - Encourage students to take notes in their research journals, again writing down what they feel to be important information to help keep themselves and their family safe.
- After completing the notes, divide the students into their groups from the day 5 separation activity. Each group will be given a large pot (or any other container, as long as they are approximately the same size) filled with hot tap water (or actual soup if you have it available).
- The group has 15 minutes to lower the temperature of their water (or food) as much as possible, using the resources available to them. Measure the water temp with a thermometer before beginning. Disclose to the teams their resources, this is whatever you have available to use, such as freezers, refrigerators, ice packs, or smaller containers to divide the water in.
- After 15 minutes are up, take the temperature of each group's water and announce the winner. Have each group explain and defend their reasoning for the method they chose. Lead a discussion about why it is important to cool food down quickly. What could happen if we let food sit in the danger zone too long?



## Closing

5 minutes

- Have students formulate their own ideas of 1) how they can achieve the cooling process more efficiently at home and 2) how restaurants achieve the cooling process with large amounts of food and 3) reflect on how what we learned a few days ago (day 4) about exponential growth of bacteria, how does that influence the importance of storing food at safe temperatures?. Have students write their ideas in the reflection section of their research journals.

**TIP!** It is up to you how you want to divide resources. For example, you can limit teams to using one or two of the available cooling sources, or you can allow them to use as many as they want. However, it is important to have variation among the groups and how they attempt to cool their "soup," consider assigning each group one or two methods if you feel it is necessary.

**TIP!** For added data collection and rigor, have students record their temperatures every minute for the 15 minute activity. Afterwards, have students graph their data to show the rate of cooling for their water.



# beef - it's what's for dinner



## Essential Question

What food safety procedures must be followed at each stage of beef handling to keep food free of STEC?



## Learning Objectives

As a result of this lesson, students will be able to:

- Students demonstrate safe food handling procedures.
- Students describe opportunities for STEC contamination.
- Students describe procedures for minimizing the risk of STEC contamination



## Required Materials for Daily Lesson

- MyPyramid Food Safety PowerPoint
- Food Prep Area
- Internet Access
- Team Evaluation Form (Appendix 9)
- Project Management Log (Appendix 8)
- Deliverables Form (Appendix 7)
- Project Rubric (Appendix 10)



## Estimated Instructional Time:

One 50 minute class period

## Learning Activities



### Opening

5 minutes

- List the four processes we have discussed (Clean, Separate, Cook, and Chill) concerning food safety on the board. Assign students to four groups, preferably with no more than four students to each group, if you must have multiple groups complete the same topic that is okay.

**TIP!** Consider asking students to refer back to the engagement scenario to help set the context for the project.



## Middle

40 minutes

Assign (or let the students choose) each group one of the four topics you listed on the board and explain the purpose of the project is for them to develop a 10 minute presentation that is aimed at informing people about their topic of food prep/safety (refer back to the Engagement scenario to help students tie-in their new knowledge. They should develop their presentations as if no one else in the class has any knowledge of that topic except their group.

Distribute the handouts from Appendix 7, 8, 9 and 10 to each team (team evaluation form, deliverables form, project Management log, and project rubric). Go over the four handouts together as a group, explaining:

- The deliverables form details what each group must actually produce and present to the class
- The team evaluation form will be completed by each team member and is to be turned in (completed) on presentation day.
- The Project Management Log is to be completed daily and turned in on presentation day.

Inform students they have three days to build their presentation (Days 8, 9, and 10) and they will be expected to execute their 10 minute presentations on the 4th day. Students must outline group member responsibilities before they begin collecting information and building their presentation. Reinforce the importance of incorporating information they have been capturing in their research journals.



## Closing

5 minutes

- Each team completes a Project Management Log Team Tasks. Visit each team as they complete the form and ask questions about their progress. Answer their questions. Collect and review students' plans. Do not grade but pose questions back to the groups – in writing on their sheets – about things they may have missed.

**Exit Slip:** Students answer the following questions on a scrap piece of paper and turn in before the completion of class:

What is your role on your team? What tasks are you responsible for completing?



# beef - it's what's for dinner



## Essential Question

What food safety procedures must be followed at each stage of beef handling to keep food free of STEC?



## Learning Objectives

As a result of this lesson, students will be able to:

- Students demonstrate safe food handling procedures.
- Students describe opportunities for STEC contamination.
- Students describe procedures for minimizing the risk of STEC contamination



## Required Materials for Daily Lesson

- MyPyramid Food Safety PowerPoint
- Food Prep Area
- Internet Access
- Team Evaluation Form
- Project Management Log
- Deliverables Form



## Estimated Instructional Time:

Two 50 minute class periods

## Learning Activities



### Opening

5 minutes

Students sit with their group and spend 5 minutes developing a list of tasks each group member will complete that day. Circulate among the groups and answer questions



### Middle - 40 minutes

Students work on their presentations. Circulate among the students to answer questions and monitor progress.

**TIP!** Encourage students to be referring to their research journals.



### Closing - 5 minutes

Students re-visit their plan for the day and cross off the tasks they completed. Provide 5 minutes for students to ask their peers (or you) questions to aid their progress tomorrow.

**Exit Slip:** Rank your team's preparedness so far from 1 to 5, 1 being not ready at all and 5 being ready to rock 'n roll. What more can you do to better prepare?

**TIP!** Remind students you will be collecting their Research Journals at the conclusion of the Project.



# beef - it's what's for dinner



## Essential Question

What food safety procedures must be followed at each stage of beef handling to keep food free of STEC?



## Learning Objectives

As a result of this lesson, students will be able to:

- Students demonstrate safe food handling procedures.
- Students describe opportunities for STEC contamination.
- Students describe procedures for minimizing the risk of STEC contamination



## Required Materials for Daily Lesson

- MyPyramid Food Safety PowerPoint
- Food Prep Area
- Internet Access
- Projector connected to a computer



## Estimated Instructional Time:

Two 50 minute class periods

## Learning Activities



### Opening

5 minutes

Provide 5 minutes for the first group to set-up. During this time, share their topic with the other students and have each student write 1-2 questions he or she has about safe food handling and the group's topic.



### Middle

40 minutes

Groups present. When each group finishes, the students ask the questions they prepared before the presentation. While the group cleans up and the next group sets up, students complete the quiz from the group and prepare their questions for the next group. Collect quizzes after each group.



### Closing

5 minutes

Each student writes in their research journal a list of three things he or she will remember to do to keep his/her food safe from STEC. Have students submit their research journals on the last presentation day.



