

National Ag Day Lessons, Activities and Background Resources

Compiled by Wisconsin Ag in the Classroom- Ag Day 2021

This document contains a variety of resources, links, activities and suggestions for teachers, students and parents to learn more about how food gets from the farm to the plate. This is just a small number of resources but you can find more on our websites (www.wisagclassroom.org), American Farm Bureau Foundation for Agriculture (www.agfoundation.org), National Ag in the Classroom (www.agclassroom.org) or on our commodity partner websites!

Wisconsin Ag in the Classroom: www.wisagclassroom.org

Books about agriculture: <https://www.wisagclassroom.org/product-category/books/>

Commodity and Wisconsin Farm Facts: <https://www.wisagclassroom.org/wisconsin-ag-facts/>

Lesson plans and resources: <https://www.wisagclassroom.org/lessons-resources/>

Free resources: <https://www.wisagclassroom.org/product-category/free-resources/>

Ag Mags: <https://www.wisagclassroom.org/product-category/readers-and-ag-mags/>

American Farm Bureau Foundation for Agriculture:
www.agfoundation.org

Common Questions about Agriculture: <https://www.agfoundation.org/common-questions>

Food and Farm Facts: <https://www.agfoundation.org/resources/food-and-farm-facts-2019>

Please note the copyright rules on using some of these materials!

Free Resources: <https://www.agfoundation.org//free-resources/>

My American Farm: <https://www.agfoundation.org/projects/my-american-farm>

Curriculum Matrix Lessons

A Day Without Agriculture- **<https://www.agclassroom.org/matrix/lesson/104/>**

Grade Levels

K - 2

Purpose

Students learn about the wide scope of agriculture, explore the variety of agricultural products in their daily lives, and discuss the difference between needs and wants.

Estimated Time

45 - 60 minutes

Materials Needed

Activity 1: Agricultural Products

- *A Day Without Agriculture* activity sheet, 1 per student

Activity 2: Wants and Needs

- *Something Good* by Robert Munsch
- *Need and Want Cards*, 1 of each card per student

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

- [A Day Without Agriculture Activity Sheet](#)
- [Need and Want Cards](#)

Vocabulary Words

agriculture: the science or occupation of cultivating the soil, producing crops, and raising livestock

aquaculture: the cultivation of living things (such as fish or shellfish) naturally occurring in water

forestry: the science of caring for or cultivating forests, and the management of growing timber

nursery: an area where plants are grown for transplanting or for sale

Background Agricultural Connections

When you think of **agriculture**, you probably think of people growing crops or raising cows, pigs, sheep, and chickens on a farm. But agriculture includes much more than that. The people who work in factories building tractors and other farm machinery play an important role in agriculture. People in universities who research new agricultural products and new ways to grow food and fiber are involved in agriculture too. The grocer must buy agricultural products to fill the grocery shelves. The restaurant owner must buy agricultural products to prepare and serve his or her customers. The clothes you wear and the furniture on which you sit were probably made from agricultural products.

You may already know that steak and potatoes are agricultural products, but what about fish? Fish farming, or **aquaculture**, is also agriculture.

One of the fastest growing areas of agriculture is growing and selling greenhouse and **nursery** plants. **Forestry** is another area of agriculture. Tree farmers plant, nurture, and harvest trees. Then they sell the trees to companies that make paper products. The people who work in factories where paper is made and the people who sell it in stores are as much a part of agriculture as the farmer who plants the trees.

Think of all the ways in which agriculture touches your life. When you wake up in the morning, you might be lying on cotton sheets. Your pillow could be filled with down feathers from a goose. The frame of your bed is probably made of wood. These are all agricultural products, and you aren't even out of bed yet! When you do get out of bed, you may put your feet onto a rug made from the wool of a sheep or a linoleum floor made from soybean oil. The soap you use in the shower might contain cottonseed oil or lanolin, a kind of oil from sheep's wool. The handle of your hairbrush might be made from the bones and horns of a beef animal, and the bristles might be the bristles, or hair, of a pig. The towel you dry off with and the jeans and T-shirt you put on are made from cotton. Once you get to school you might pick up a crayon made from pig fat.

You've already used dozens of agricultural products, and you haven't even started eating. Just imagine a day without agriculture. Do you think you could survive?

See More...

Interest Approach - Engagement

1. Ask the students to help you make a list on the board of items they *need* every day to survive. Guide their answers to include things such as food, clothing, and shelter.
2. Once the list has been created, ask the students where these items come from.
Transition to *Activity 1* as you explain and describe the meaning of the word *agriculture*.

Procedures

Activity 1: Agricultural Products

1. Discuss the meaning of the word *agriculture*.
2. Share information found in the *Background Agricultural Connections* section of the lesson.
3. Explain to students that they will be playing a list-making game.
4. Hand out copies of the *A Day Without Agriculture* activity sheet. Explain that the students will have eight minutes to list all the agricultural products that touch their lives in a day.
5. After they've finished, go around the room asking students to read one item on their list aloud.
6. List each item on the white board.
7. Ask students who also have that item on their list to cross it off. Explain that the item cannot be used again, and that if a student rereads an item that was previously read, they are out of the competition.
8. Ask the last five students who still have items on their lists that have not been mentioned to come up to the front of the room for a championship round.
9. The last student with an agricultural product left on their list is the winner.

Activity 2: Wants and Needs

1. Read the book *Something Good* by Robert Munsch aloud to the class.
2. Ask the students the following questions:

- What did Tyra's dad buy at the grocery store? (*bread, milk, cheese, and spinach*)
 - Do you think they needed bread, eggs, milk, cheese, and spinach? (*Yes, people need healthy food.*)
 - What did Tyra want to buy? (*ice cream, chocolate bars, and ginger ale*)
 - Do you think they needed ice cream, chocolate bars, and ginger ale? (*No, Tyra wanted them, but they didn't need them.*)
3. Discuss the difference between needs and wants. Explain that needs are things that are necessary for people to live and stay safe. Air, food, water, shelter, clothing, and sometimes medicine are needs. Wants are things that people would like to have, but don't need to survive.
 4. Pass out the *Need and Want Cards*. Read through the list of agricultural products from *Activity 1*. Ask the students to decide whether each item is a need or a want and hold up the appropriate card when an item is read. If students seem confused about any of the items, be sure to stop and discuss why the item is a need or a want.

Concept Elaboration and Evaluation

After conducting these activities, review and summarize the following key concepts:

- Agriculture includes farms with animals or crops as well as jobs in factories, schools, and grocery stores.
- Agriculture provides our basic necessities of life.
- There is a difference between items that we *want* and items that we *need*.

We welcome your [feedback](#)! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

- Have students divide the items on their lists into categories (animal products/plant products, things to eat/things to wear). Have them create their own categories.
- Have students bring agricultural products from home and pile them all in one area. Then, invite another class or the principal to view the display, and have students explain the importance of agriculture.

Suggested Companion Resources

- [From Farm to You Coloring Sheet](#)
- [How Many Hats Does a Farmer Wear?](#)
- [Clothing and Jewelry](#)
- [Farm Crops](#)
- [Feast for 10](#)
- [From Start to Finish Series](#)
- [Homes](#)
- [How Did That Get in My Lunchbox?](#)
- [Illustrated Alphabet of Farms](#)
- [On the Farm, at the Market](#)
- [To Market, To Market](#)
- [Where Does Food Come From?](#)
- [Who Grew My Soup?](#)

- [My Farm Web](#)
- [What Is Agriculture?](#)
- [Food Doesn't Grow in the Supermarket!](#)
- [Food and Farm Facts Junior Booklet](#)
- [Jr. Sprout - Communities and Help Wanted](#)

Author

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Organization Affiliation

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Literacy Outcomes

Culture, Society, Economy & Geography

- Identify the people and careers involved from production to consumption of agricultural products (T5.K-2.e)

Food, Health, and Lifestyle

- Recognize that agriculture provides our most basic necessities: food, fiber, energy and shelter (T3.K-2.b)

Education Content Standards

Social Studies - Economics (ECONOMICS)

Economics Standard 1: Scarcity

- *Objective* Identify what they gain and what they give up when they make choices.

Social Studies - History (HISTORY)

NCSS 7: Production, Distribution, and Consumption

- *Objective 2* The difference between needs and wants.

Common Core Connections

Anchor Standards: Language

CCSS.ELA-LITERACY.CCRA.L.6 Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

Grade Levels

3 - 5

Purpose

Students will develop a working vocabulary regarding food, categorize foods by their sources, examine grocery ads, learn about food production, and apply what they learned by analyzing foods they eat at a particular meal.

Estimated Time

Five 45-minute sessions

Materials Needed

Activity 1: Food Classification

- *Food Pictures*, 1 set per group
- *Fun Agriculture Facts* packets, 1 per group
- Large poster board, butcher paper, or construction paper, 1 per group
- Markers
- Old magazines with pictures of food
- Old seed packages (optional)
- Scissors
- Tape or glue

Activity 2: Scavenger Hunt

- *Scavenger Hunt 1* activity sheet, 1 per group
- Grocery ads
- *Sample grocery ads* (optional)
- Scissors
- Tape
- Paper on which to show mathematics work
- Pencil

Activity 3: Food Nutrition

- *I Am What I Eat!* activity sheet, 1 per student
- *Cherry Breakfast Bar Nutrition Facts*
- *Meat Franks Nutrition Facts*

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

- [Scavenger Hunt](#)
- [I Am What I Eat](#)
- [Food Pictures](#)
- [Cherry Breakfast Bar Nutrition Facts](#)
- [Meat Franks Nutrition Facts](#)
- [Sample Grocery Ads \(optional\)](#)
- [Fun Agriculture Facts](#)

Vocabulary Words

RDA: recommended daily allowance

fruit: the sweet and fleshy product of a tree or other plant that contains seeds and can be eaten as food

grain: wheat or any other cultivated cereal crop used as food

meat: the flesh of an animal used as food

tuber: a thickened underground portion of a stem or rhizome which bears buds

vegetable: a plant or part of a plant such as the leaves or stem which is used as food

Did You Know? (Ag Facts)

- The American farmer today provides food for about 165 people in the world.¹
- Not only do soybeans provide cooking oil, livestock feed, edamame, and soy milk but they also can make 82,368 crayons from 1 acre.²
- The average American consumes consumes 646 pounds of dairy products a year.³

Background Agricultural Connections

Since all students eat food and wear clothing, one natural connection between education and the real world is agriculture. Advances in agricultural technology are continually making headlines and are an excellent way for educators to connect current trends and innovations to the lives of every student. Give the questions below some thought. These questions are commonly asked by children when shopping in a grocery store with an adult.

- How much does it cost?
- Where does steak come from?
- Why are there scales in the produce section of the grocery store?
- Is this healthy?
- Is it on sale?
- How much change will I get in return?
- How did this food get to the grocery store?
- Who grew this food?

Grocery shopping provides many opportunities for children to gain knowledge about mathematics, nutrition, and agriculture. *Edible Numbers* provides teachers with lessons that relate experiences in the grocery store to classroom mathematics and nutrition education. For this lesson, student experience shopping in a grocery store would be required for helping them gain an understanding for categorizing foods, identifying where certain foods come from, and analyzing food nutrition.



Food origins, nutrition, and grade-level appropriate mathematics (addition, subtraction, multiplication, division, graphing, problem solving, and statistics) are taught in this lesson. The interdisciplinary approach in *Edible Numbers* makes it suitable for self-contained classrooms, core, and home school settings. Grocery advertisement scavenger hunts are the highlight of this unit. Use them as they are written, or incorporate single lessons from the unit into an already established curriculum.

Food can be classified in a variety of ways. For example, **meat** is the flesh of an animal used as food. A **vegetable** is a plant or plant part, such as leaves from kale or a stem from asparagus, that we eat. Some vegetables, such as potatoes, are classified as tubers. A **tuber** is a thickened underground portion of a stem that bears buds. **Fruits** are the sweet and fleshy product of a tree or plant containing seeds, such as strawberries or oranges.

In this activity, students classify foods according to their origins. There is no set way of classifying food in this manner; however, the following four groupings may be used—food that grows on a tree, food that grows above ground but not on a tree, food that grows underground, and food that comes from an animal. Feel free to have the students form different classification headings. The idea is to practice sorting and to establish a common vocabulary for use in the upcoming scavenger hunt lesson. Examples of food from the various categories are described below:

Grows on Trees	Grows Above Ground But Not on a Tree	Grows Underground	Comes From Animals
apples apricots cinnamon coconuts oranges pears walnuts	beans corn cucumbers grapes kiwifruit lettuce peas pumpkins squash strawberries tomatoes	beets carrots ginger onions peanuts potatoes radishes turnips	beef cheese chicken eggs fish gelatin lamb milk pork turkey

Nutrition fact labels provide information that can be useful when determining the nutritional value of a product. They contain the recommended daily allowance, known as the **RDA** which is the estimated amount of calories per day, determined by the Food and Nutrition Board of the National Research Council and the National Academy of Sciences, necessary for good health. The ingredients are listed in order of quantity. For example, the main ingredient in a cherry

breakfast bar is wheat flour, which is produced by a **grain** that is a cultivated cereal crop used as food. The second ingredient is sugar, and the third ingredient is cherries. If this were a food your students were to record on a chart, they would check three or more boxes—*Grows Above Ground But Not On a Tree* for the wheat, *Grows Underground* for the sugar, *Grows on a Tree* for the cherries, etc.

Students will examine one specific meal and classify it into the categories they used in the introductory activity. If you feel an evening meal is not appropriate for your students to examine, have them analyze their breakfast or lunch meal. The idea is to have students take a closer look at what they are eating so they understand where their food comes from and identify a farmer's role in producing food. At the same time, the students will be asked to think of how they could have altered their meal to make it more nutritious.

See More...

Interest Approach - Engagement

1. As a class, brainstorm different ways food is grown. Some examples include: grows on a tree, grows above ground but not on a tree, grows underground, grows on a plant, comes from a vine, or comes from an animal.
2. As a class, determine the four groups the students will use to categorize the food they eat and write them on the board as category headings. Four possible categories are shown in the chart below.
3. Record at least five responses from the students in each category.
4. While recording their answers, remind the students that farmers are responsible for growing and raising the foods listed in the chart.
5. Keep the chart visible throughout the lesson as a reference.

<i>Grows on a Tree</i>	<i>Grows Above Ground But Not on a Tree</i>	<i>Grows Underground</i>	<i>Comes From an Animal</i>

Procedures

Preparation:

- For student groups of three or four, make copies of the *Food Pictures*.
- Collect magazines, seed packages, catalogs, and grocery advertisements that students can cut up and use for their posters.
- Create *Fun Agriculture Facts* packets for each group. You may duplicate pages and/or use other information you find about agriculture. The information can be placed in manila envelopes and used again for different purposes.

Activity 1: Food Classification

1. Organize students into groups of three or four.
2. Distribute the *Food Pictures*. Have the students sort the pictures into the four class-determined groups. Discuss the results.
3. For each group, distribute the *Fun Agriculture Facts* packets, magazines and pictures of food, markers, poster paper, scissors, glue sticks, and a piece of chart or butcher paper.
4. Have the students divide their poster paper into four sections, and label each section with one of the categories, similar to those used in the *Interest Approach — Engagement* section.
5. In each quadrant, have the students paste at least four pictures that fit the heading. They must label each picture clearly with the name of the food item. Foods that fit in more than one category may not be used.
6. Using the *Fun Agriculture Facts* packets, have the student groups find at least eight interesting facts about the pictures they put on their posters. These facts should be written on a piece of paper and will be used as part of a guessing game during their poster presentation. Challenge the students to record at least one food fact that relates its origin to growing on the farm. An example might be, "There are 200 varieties of this fruit and it can be grown in a farmer's orchard." (*plums*) In order to use this clue, the students would have plums on their poster.



7. Have the students present their posters to the class. As part of the presentation, have a group member read their facts, one at a time, allowing time for classmates to guess which food item they are referring to.
8. Direct a class discussion to clarify and correct student work.
9. Discuss key vocabulary terms that were new to the students.

Variations

- Instead of group posters, each group can research one category. Combine the efforts of each group to create a class poster.
- Instead of making posters, have each group use a large paper to design a floor game based on food origins.

Activity 2: Scavenger Hunt

1. Gather at least 40 grocery ads for students to use. Many grocery stores and newspaper manufacturers will save ads for use in the classroom. As an alternative, photocopy the *Sample Grocery Ads* included in the lesson, and make them available to students.



2. Review mathematics vocabulary with your students. The terms they should understand include sum, difference, total price, product, place value in decimals, etc. Students will search through grocery advertisements to find a part of an advertisement that satisfies a particular problem on the scavenger hunt.
3. Organize students into pairs. Provide each group with grocery ads, a *Scavenger Hunt* activity sheet, scissors, and tape.
4. Have each team look through the grocery ads and find an ad that satisfies each one of the questions on the *Scavenger Hunt* activity sheet. Have the students cut out the ads (picture and price) and tape it (top part only) on top of the clue they think it satisfies.

5. Have each member of the team show, on his/her own paper, the mathematics required to prove the ads they chose satisfy the clues. Emphasize that neatness and organization is required, so their work can easily be followed.
6. Discuss that many of the problems require a sequence of calculations.
 - Note: The teacher should circulate among the groups as students work on the activity and discuss the mathematics necessary to substantiate the ad being chosen for the clue. Group papers (one *Scavenger Hunt* activity sheet with ads taped to it and individual papers) should be collected and graded for mathematical content.



Variations:

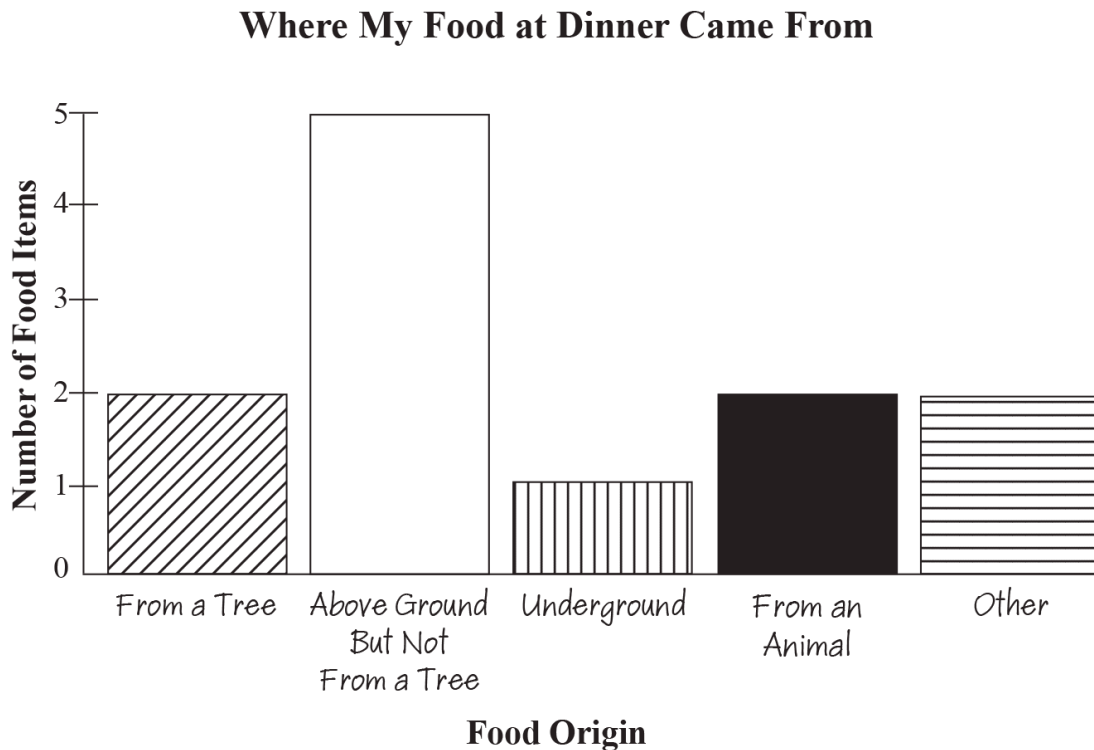
- Complete the activity as a class.
- Have one team correct another team's work.
- Use parent volunteers or "big buddies" to assist with reading clues or finding ads.

Activity 3: Food Nutrition

1. In preparation, review the *I Am What I Eat!* activity sheet. If it will meet your needs, make one copy for each student. Otherwise, create an activity sheet that will be more suitable for your students.
2. Project copies of the *Cherry Breakfast Bar Nutrition Facts* and *Meat Franks Nutrition Facts* on a large screen. Take advantage of the opportunity to talk with students about nutrition as you examine the food label examples.
3. Ask the students to think to themselves about what they ate for breakfast. On a sheet of paper, have them draw a picture of where they think their food came from. For example, if they drank orange juice, they would draw an orange tree. Allow five minutes for quick sketches.
4. Display the *Cherry Bar Nutrition Label*. Have students discuss what they see, where the ingredients for this breakfast bar came from, and how the ingredients were grown.
5. Distribute the *I Am What I Eat!* activity sheet or the activity sheet you created. Ask the students what boxes they would check if they actually ate a cherry breakfast bar. This will lead into a discussion about where food comes from. If appropriate, examine and discuss the amount of fiber, fat, calcium, and protein found in this product.
6. Explain to the students that they will be collecting data on the food they eat for a particular meal. They will need to keep careful track of the foods they eat and drink. As they consume them, they are to write them down on the chart and then check the appropriate boxes. One food item may require several checks. For more clarification,

complete the *I Am What I Eat!* activity sheet with a meal that you ate prior to class and display as a reference for the students.

7. Have students make a bar graph of their individual data. The graph should contain the categories across the bottom on the horizontal axis (x-axis) and the quantity (number of entries in a particular food category) of food eaten on the vertical axis (y-axis).



8. Have a class discussion on their findings. Sample discussion topics may include:
 - In which category does the majority of food you ate belong?
 - In which category does the majority of fruits belong?
 - In which category does your favorite food belong?
 - In which category does a farmer produce the food?
9. In a well-written paragraph, have students write what they learned about where their food comes from. They should check their work for completeness in paragraph development, i.e. include a topic sentence, details to support thoughts, and a concluding sentence. They should also check for proper punctuation, spelling, and capitalization.
10. Students can read aloud their paragraphs for more understanding and discussion.

Variations

- Have students collect data for an entire day (24 hours) rather than for just one meal.
- Make a bar graph to show the results.
- Have students write a report that includes a cover page, data, bar graph(s), and a conclusion.
- Have students compile data and generate graphs using a computer.

Concept Elaboration and Evaluation:

At the conclusion of this activity, review and summarize the following key concepts:

- Farmers grow and raise plants and animals that we eat.
- Agriculture is important to everyone.
- Packaged foods purchased in grocery stores contain nutrition fact labels to help us make good dietary decisions about the foods we eat.

- Without farmers growing the food that we eat and producing the fiber used to make the clothes we wear, these important items would not be easily available.



We welcome your [feedback](#)! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

- Have the students look through magazines or cookbooks to find a recipe or meal that includes food from each of the four categories. Make a class recipe booklet.
- Bring in various foods for the students to see, touch, smell, and taste. Use this opportunity to introduce the students to foods they may have never seen or eaten.
- Have the students compare the bar graphs from *Activity 3* within their group and discuss or write reasons for the differences.
- Have the students write stories or poems about growing food.
- Have the students write thank you notes to local farmers for growing their favorite foods.
- Arrange for a farmer to visit your classroom to speak about his/her occupation.
- Visit a farmers' market and observe the variety of fresh food.
- Play the My American Farm interactive game [Grocery Grab](#).

Sources

1. <http://www.agfoundation.org/resources/food-and-farm-facts-2017>
2. http://www.wisoybean.org/news/soybean_facts.php
3. <https://www.ers.usda.gov/data-products/dairy-data/>

The development of this lesson was funded by the California Beef Council and the California Foundation for Agriculture in the Classroom. To meet the needs of California educators and students, *Edible Numbers* was revised to support the curriculum Content Standards for California Public Schools and updated to include current statistics. Funding from the California Farm Bureau Federation and private donations made this revision possible.

Illustrators: Jack Armstrong, Joanne Borovoy, Karen Holtman, Pat Houk, and Ann Rogers

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Suggested Companion Resources

- [Food Group Puzzle](#)
- [How Did That Get in My Lunchbox?](#)

- [Look Inside Food](#)
- [The Fruits We Eat](#)
- [What is a Fruit? What is a Vegetable? Bulletin Boards](#)
- [Food Doesn't Grow in the Supermarket!](#)
- [Botany on Your Plate: Investigating Plants We Eat](#)
- [Health and Nutrition from the Garden](#)

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Organization Affiliation

California Foundation for Agriculture in the Classroom

Agricultural Literacy Outcomes

Culture, Society, Economy & Geography

- Explain the value of agriculture and how it is important in daily life. (T5.3-5.d)

Food, Health, and Lifestyle

- Identify food sources of required food nutrients (T3.3-5.g)
- Explain the costs associated with producing and purchasing food. (T3.3-5.d)
- Describe the necessary food components of a healthy diet using the current dietary guidelines (T3.3-5.a)

Education Content Standards

Social Studies - Economics (ECONOMICS)

Economics Standard 2: Decision Making

- *Objective* Make effective decisions as consumers, producers, savers, investors, and citizens.

Health/Nutrition (HEALTH)

Health Standard 1: Comprehend concepts related to health promotion and disease prevention to enhance health.

- 1.5.1 Describe the relationship between healthy behaviors and personal health.

Health Standard 3: The ability to access valid information, products, and services to enhance health.

- 3.5.2 Locate resources from home, school, and community that provide valid health information.

Health Standard 5: Demonstrate the ability to use decision-making skills to enhance health.

- 5.5.5 Choose a healthy option when making a decision.

Health Standard 7: Demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

- 7.5.1 Identify responsible personal health behaviors.

Science (SCIENCE)

4-LS1: From Molecules to Organisms: Structures and Processes

- 4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Common Core Connections

Anchor Standards: Reading

CCSS.ELA-LITERACY.CCRA.R.4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

Anchor Standards: Speaking and Listening

CCSS.ELA-LITERACY.CCRA.SL.1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.CCRA.SL.2 Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Anchor Standards: Writing

CCSS.ELA-LITERACY.CCRA.W.2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

CCSS.ELA-LITERACY.CCRA.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Practice Standards: Mathematics

CCSS.MATH.PRACTICE.MP4 Model with mathematics. Students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. Students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions.

CCSS.MATH.PRACTICE.MP6 Attend to precision. Students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context.

Chain of Food (6-8th Grade)-

<https://www.agclassroom.org/matrix/lesson/431/>

Grade Levels 6 - 8

Purpose

Students will explore the path food takes along the Farm-to-Table Continuum. They will begin on the farm and investigate food safety issues during processing, transportation, at restaurants and supermarkets, and finally, in their own homes. Teams will identify how food can become contaminated along the continuum and develop and present strategies for preventing contamination at each step.

Estimated Time

45 minutes

Materials Needed

- [Dr. X and the Quest for Food Safety video](#)
- Food Safety Farm-to-Table Illustration
- Cooked hot dog on a bun
- Grated cheese
- Relish
- Banana
- Paper plate
- Poster board
- Markers

Essential File (map, chart, picture, or document)

- [Farm to Table Continuum](#)

Vocabulary Words

E. coli: a bacterium commonly found in the intestines of humans and other animals, where it usually causes no harm; some strains can cause severe food poisoning, especially in old people and children

compost: decayed organic material used as a plant fertilizer

salmonella: a foodborne pathogen sometimes found in the intestines of chickens. It can be passed on in the meat and also inside the chicken's eggs

Background Agricultural Connections

Everyone along the Farm-to-Table Continuum plays a major role in keeping our food safe. If a link in this continuum is broken, the safety and integrity of our nation's food supply can be threatened. There are many places on a farm that can be contaminated by harmful bacteria, so farmers have to make sure that the areas where food is handled are kept clean and at the right temperature. There are many innovations on the farm that help prevent the growth of bacteria — like special areas for washing vegetables, refrigerated storage areas for milk and eggs, and portable sanitation in fields.

Competitive Exclusion



Dr. Theodore Elsasser explains competitive exclusion.



Chickens being sprayed with good bacteria.



Compost fields at the USDA Agricultural Research Service in Beltsville, MD.



Dr. Patricia Millner discusses composting research.

Salmonella is a foodborne pathogen sometimes found in the intestines of chickens. It can be passed on in the meat and also inside the chicken's eggs. The best way to reduce the risk of foodborne illness from eating contaminated chicken is to prevent *Salmonella* from living in the animal in the first place.

Using a process called competitive exclusion, chickens ingest a blend of good bacteria, which ultimately shields them from pathogenic *Salmonella* microbes.

Young mammals are born with undeveloped gastrointestinal tracts. It's fertile ground for both good and bad bacteria. Whichever organisms get introduced to their systems first will take over.

Scientists developed mixtures of beneficial bacteria to prevent bad bacteria like *Salmonella* from colonizing and infecting the chickens. To make it work, scientists use a blend of nonpathogenic bacteria found naturally in the gastrointestinal tract of mature chickens and spray it on day-old chicks. Through the natural interactions of the chickens grooming each other, the bacteria enter their intestinal tracks.

Competitive exclusion results in naturally disease-resistant, mature, healthy birds — making it virtually impossible for *Salmonella* to multiply. It also reduces *Salmonella* in the farm environment overall because there are fewer infected birds to contaminate the farm.

Composting to Kill *E. coli*:

Another way farmers keep down the spread of bacteria is through composting.

Compost is actually made up of the decomposed parts of all the residuals that come from the farm operation — the waste from the animals, leftover food the animals didn't eat, hay/straw, etc. It all gets mixed together and heaped up so that the microbes can eat it and create compost, which the farmers use to fertilize their crops.

The microbes are basically getting a workout from eating all of the organic materials. As the microbes work at digesting the wastes in the compost, the temperature of the compost rises. The heat plays an important role, because *E. coli* O157:H7 can't survive in temperatures above 131° F (55° C).

E. coli may be found in the manure that is used in the compost. So, farmers have to be very careful about cross-contamination when the compost is used on *any* crops — but the risk may be greatest for *low-growing* crops, such as lettuce and strawberries. Scientists are working to develop ways for farmers to assure that their compost reaches high enough temperatures to kill pathogens and make the compost safe for their crops. Note: This is still in the research stage.

Modular Format

The program is divided into the following 5 modules with background, activities and labs related to each module:

- MODULE 1** UNDERSTANDING BACTERIA
- MODULE 2** FARM
- MODULE 3** PROCESSING AND TRANSPORTATION
- MODULE 4** RETAIL AND HOME
- MODULE 5** OUTBREAK AND FUTURE TECHNOLOGY

Science and our Food Supply

This lesson was developed as a portion of an entire unit of lessons focusing on food safety from farm to table. Use the following links to see the remaining lessons:

Module 1: Bacteria

- - [Understanding Bacteria](#)
 - [The 12 Most Unwanted Bacteria](#)

Module 2: Farm

- - Chain of Food

Module 3: Processing and Transportation

- - [Blue's the Clue: Souring Milk for Science](#)
 - [Mystery Juice](#)
 - [Ultra High Pressure Treatment](#)

Module 4: Retail and Home

- - [Supermarket Smarts](#)
 - [Cooking Right: The Science of Cooking a Hamburger](#)
 - [A Chilling Investigation](#)
 - [Crossed Up!](#)
 - [Hands Off, Bacteria](#)

Module 5: Outbreak and Future Technology

- - [Outbreak Alert - Shigella](#)
 - [Beef Blasters](#)

Evaluation: [Lose a Million Bacteria \(The Game\)](#)

See More...

Interest Approach - Engagement



SCIENCE
AND
OUR FOOD SUPPLY

1. Before class, put the grated cheese and relish on top of the cooked hot dog in the bun. Place the hot dog and the banana on a paper plate and set the plate where the students will see it when they enter the room.
2. As students enter the classroom, they'll likely notice the food you've set out. Look surprised when someone mentions the hot dog or banana. Then go over, pick up the hot dog and banana, and ask, "Does anyone know where these foods came from?" Let the students speculate for a few minutes. Then comment, "I confess, I put them there, but let's look at who else played a part in getting the hot dog, bun, cheese, relish, and banana to us." Allow the students to review the *Farm-to-Table Continuum* steps (farm, processing, transportation, retail, and home) which can be taught from the attached document and/or the preparatory lesson, *Understanding Bacteria*.

3. Tell the students, "You will be learning about people you never dreamed had a role in getting this food to you."
4. Ask, "What does science have to do with the farm?" Give the students time to make a few suggestions.
5. Then ask, "What do you think could happen to food along the *Farm-to-Table Continuum* that could affect the safety of our food supply?" List their answers on the board.
6. Explain, "Food doesn't start at the supermarket or restaurant. Today, we'll trace the path of food along the Farm-to-Table Continuum and discover some of the ways it can become contaminated. Then we'll develop and present strategies for preventing

TIP

Use food specific to your region or to the tastes of your students. Just make sure that a variety of food groups and types are represented — meat, dairy, fruits or vegetables, fresh, processed, cooked, local products, imported foods, etc.

contamination at each step."

Procedures

1. Let's tune in to the first step on the *Farm-to-Table Continuum*. While watching this module, keep these questions in mind:
 - Would you feed a baby chick bacteria? Why or why not?
 - What's compost all about, and how is it relevant to food safety on the farm?
 - Tune in, and take notes. Show video [Module 2 — Farm](#) (Time: 4 minutes).
2. Divide the class into 5 groups. Assign a food to each group (hot dog, bun, cheese, relish, and banana).
3. Have students begin researching their assigned food. Using poster board, let each team trace their food from the farm to the table. This will serve as the "first draft" of their food journey chart. Remind students that some foods are imported from other countries, so be sure to trace them from their origin. (Students can find out where a variety of foods come from by visiting the [Economic Research Service site](#).)
4. Post the charts around the classroom, and keep them up throughout the lesson. As the teams learn more about the continuum, they can add to or change the information.
5. Challenge the students to include all the people involved at each step (e.g., farmers, produce pickers, milkers, truckers, grocery workers, shelf stockers, restaurant workers, etc.). Create a competition that focuses on which team can identify the most people.
6. For each person the team identifies, they must include what that person does to help control the spread of bacteria. Students should label all the places where contamination of their food may occur, then write a strategy for preventing that particular contamination. Encourage them to use the 4 Cs (as taught in [Understanding Bacteria](#)) to help develop the strategy. For example, in the video they learned about the potential contamination of crops at the farm — the compost must reach at least 131° F (55° C) to ensure that the compost doesn't contaminate the crops. One suggestion could be to develop ways for compost to reach high enough temperatures to kill pathogenic bacteria and to make the compost safe.
7. At the end of this lesson or the entire food safety unit, have each team share its food journey chart with the class. The team that traces the banana should also address the global issue. Ask students, "What do these foods have in common? Where do the similarities and differences occur along the Farm-to-Table Continuum?"
8. Have each team add up the number of people they identified. Which food had the most people involved in the Farm-to-Table Continuum? Why?

Concept Elaboration and Evaluation

1. Why did Dr. Elsasser feed a baby chick bacteria? (*Good bacteria are fed to baby chicks, so there is no room left for the bad bacteria to grow.*)
2. What did you find interesting about Dr. Elsasser's job?
3. We also met Dr. Patricia Millner, another scientist who conducts research for keeping our food safe on the farm. What did she say about compost, and how is it relevant to food safety on the farm? (*It's heat again. If enough heat can be generated from the compost, it will kill harmful bacteria, especially E. coli O157:H7. The compost is then safe to use on crops that we will eat.*)
4. How does Dr. Millner's research benefit us? (*It will help keep our food safe.*)

Everyone along the Farm-to-Table Continuum plays a role in keeping our food safe from harmful bacteria. If a link in this continuum is broken, the safety of our nation's food supply is at risk. There are food safety precautions, including the 4 Cs of Food Safety, that help prevent contamination of food at each step.



We welcome your [feedback](#)! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

- Using the [Economic Research Service website](#), look on a map and calculate how many miles your favorite food traveled from one of the countries to your state. For example, how many miles did the banana travel from where it was grown to your state?
- Visit the [Economic Research Service website](#), find your favorite food, and see how many different countries it comes from. Or, select a country and see how many foods we get from that country.

Sources

The [Science and Our Food Supply Curriculum](#) was brought to you by the Food and Drug Administration Center for Food Safety and Applied Nutrition and the National Science Teachers Association.

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Suggested Companion Resources

- [Beef Blasters](#)
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- [Eat Happy Project video series](#)
- [How Safe is Your Salad?](#)
- [The Future of Farming & Agriculture video](#)

- [Virtual Food Safety Labs](#)
- [Antimicrobial Wash for Fresh Produce](#)
- [Fight Bac! Food Safety Education](#)
- [Food Safety A to Z Reference Guide](#)
- [What's In My Food?](#)

Author

FDA and NSTA

Organization Affiliation

FDA and NSTA

Agricultural Literacy Outcomes

Agriculture and the Environment

- Discuss the comparative environmental pros and cons of populations relying on their local and regional resources versus tapping into a global marketplace (T1.6-8.e)

Food, Health, and Lifestyle

- Identify forms and sources of food contamination relative to personal health and safety (T3.6-8.h)

Education Content Standards

Career & Technical Education (CAREER)

Food Products and Processing Systems Career Pathway

- *FPP.01.01* Analyze and manage operational and safety procedures in food products and processing facilities.
- *FPP.01.02* Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.
- *FPP.01.03* Apply food safety procedures when storing food products to ensure food quality.

Health/Nutrition (HEALTH)

Health Standard 7: Demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

- 7.8.3 Demonstrate behaviors to avoid or reduce health risks to self and others.

Common Core Connections

Anchor Standards: Language

CCSS.ELA-LITERACY.CCRA.L.3 Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

Anchor Standards: Speaking and Listening

CCSS.ELA-LITERACY.CCRA.SL.1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

Chain of Food (9-12th Grade)-

<https://www.agclassroom.org/matrix/lesson/472/>

Grade Levels

9 - 12

Purpose

Students will explore the path food takes along the Farm-to-Table Continuum. They will begin on the farm and investigate food safety issues during processing, transportation, at restaurants and supermarkets, and finally, in their own homes. Teams will identify how food can become contaminated along the continuum and develop and present strategies for preventing contamination at each step.

Estimated Time

45 minutes

Materials Needed

- [Dr. X and the Quest for Food Safety video](#)
- [Food Safety Farm-to-Table Illustration](#)
- Cooked hot dog on a bun
- Grated cheese
- Relish
- Banana
- Paper plate
- Poster board
- Markers

Essential File (map, chart, picture, or document)

- [Farm-to-Table Continuum](#)

Vocabulary Words

E. coli: a bacterium commonly found in the intestines of humans and other animals, where it usually causes no harm; some strains can cause severe food poisoning, especially in old people and children

compost: decayed organic material used as a plant fertilizer

salmonella: a foodborne pathogen sometimes found in the intestines of chickens. It can be passed on in the meat and also inside the chicken's eggs

Background Agricultural Connections

Everyone along the Farm-to-Table Continuum plays a major role in keeping our food safe. If a link in this continuum is broken, the safety and integrity of our nation's food supply can be threatened. There are many places on a farm that can be contaminated by harmful bacteria, so farmers have to make sure that the areas where food is handled are kept clean and at the right temperature. There are many innovations on the farm that help prevent the growth of bacteria — like special areas for washing vegetables, refrigerated storage areas for milk and eggs, and portable sanitation in fields.

Competitive Exclusion



Dr. Theodore Elsasser explains competitive exclusion.



Chickens being sprayed with good bacteria.



Compost fields at the USDA Agricultural Research Service in Beltsville, MD.



Dr. Patricia Millner discusses composting research.

Salmonella is a foodborne pathogen sometimes found in the intestines of chickens. It can be passed on in the meat and also inside the chicken's eggs. The best way to reduce the risk of foodborne illness from eating contaminated chicken is to prevent *Salmonella* from living in the animal in the first place.

Using a process called competitive exclusion, chickens ingest a blend of good bacteria, which ultimately shields them from pathogenic *Salmonella* microbes.

Young mammals are born with undeveloped gastrointestinal tracts. It's fertile ground for both good and bad bacteria. Whichever organisms get introduced to their systems first will take over. Scientists developed mixtures of beneficial bacteria to prevent bad bacteria like *Salmonella* from colonizing and infecting the chickens. To make it work, scientists use a blend of nonpathogenic bacteria found naturally in the gastrointestinal tract of mature chickens and spray it on day-old chicks. Through the natural interactions of the chickens grooming each other, the bacteria enter their intestinal tracks.

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The microbes are basically getting a workout from eating all of the organic materials. As the microbes work at digesting the wastes in the compost, the temperature of the compost rises. The heat plays an important role, because *E. coli* O157:H7 can't survive in temperatures above 131° F (55° C).

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 - [Mystery Juice](#)
 - [Irradiation Web Quest](#)
 - [Ultra High Pressure Treatment](#)

Module 4: Retail and Home

- - [Fast-Food Footwork](#)
 - [Cooking Right: The Science of Cooking a Hamburger](#)
 - [Coliform Counts](#)

Module 5: Outbreak and Future Technology

- - [Outbreak Investigation- Salmonella Muenchen](#)
 - [Beef Blasters](#)

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See More...

Interest Approach - Engagement



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Author

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Agricultural Literacy Outcomes

Food, Health, and Lifestyle

- Provide examples of foodborne contaminants, points of contamination, and the policies/agencies responsible for protecting the consumer (T3.9-12.h)

Education Content Standards

Career & Technical Education (CAREER)

Food Products and Processing Systems Career Pathway

- *FPP.01.01* Analyze and manage operational and safety procedures in food products and processing facilities.
- *FPP.01.02* Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.
- *FPP.01.03* Apply food safety procedures when storing food products to ensure food quality.
- *FPP.03.01* Implement selection, evaluation and inspection techniques to ensure safe and quality food products.
- *FPP.03.02* Design and apply techniques of food processing, preservation, packaging and presentation for distribution and consumption of food products.
- *FPP.04.03* Identify and explain the purpose of industry organizations, groups and regulatory agencies that influence the local and global food systems.

Health/Nutrition (HEALTH)

Health Standard 1: Comprehend concepts related to health promotion and disease prevention to enhance health.

- 1.12.3 Analyze how environment and personal health are interrelated.

Common Core Connections

Anchor Standards: Language

CCSS.ELA-LITERACY.CCRA.L.3 Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

Anchor Standards: Speaking and Listening

CCSS.ELA-LITERACY.CCRA.SL.1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.