

Lesson 2: Farm to Plate

TOTAL TIME REQUIRED: 190 minutes / 3 sessions

Session 1: Getting Started 30 min; **Activity I “The Farm to Plate Game”** 40 min (Science/Social Studies)

Session 2: Activity II “Map the Distance” 60 min (Math)

Session 3: Activity III “Harvest, Prepare, and Taste Dark-Green Leafy Greens!” 30 min (Health); **Reflect** 30 min (English Language Arts)

LESSON OVERVIEW:

In this lesson, students explore the food system and participate in activities that help them understand the route fruits and vegetables take from farms to their plates. Students will discuss what it means for a fruit or vegetable to be locally grown, and the benefits of local foods. They will “dig deeper” into the delicious options among dark-green leafy vegetables by working to identify, taste, and compare items such as kale, spinach, and leaf lettuce, and discover ways to include them at snacks and meals.

ESSENTIAL QUESTIONS: *Where does my food come from? Where does its journey to my plate begin? How far does it travel?*

TEACHING PROCEDURE:

GETTING STARTED (30 minutes)

1. Begin by asking students to write down the name of everything they ate or drank during their last meal (breakfast, lunch, or dinner) in their **Garden Journals**. Tell them to underline the name of the foods that came from a plant (*fruits, vegetables (including beans), grains, nuts, seeds*).
2. Ask students: *Where does your food (fruits and vegetables) come from? Where does its journey to your plate begin? How far does it travel?* Use a bag of spinach as an example. Some students may say the grocery store or supermarket. If so, encourage students to think about how the spinach got to the market. Explain that fruits and vegetables come from a farm, orchard, or garden, where they are grown and harvested. (*Review from Lesson 1.*)
3. Ask: *How many steps would spinach have to travel from the school garden to the cafeteria?* To help students develop an understanding of the distance their food travels from farm to plate, ask students to predict, and then count, the number of steps it takes to get from the garden to the cafeteria. Have students note and map this journey in their **Garden Journals**.
Note: *You could also measure the steps from any other two points in the school for this example.*
4. Ask: *How many miles do they think spinach would travel if it came to them from a farm?* Allow students to think about and discuss their answers. They would have to know which farm it came from. Point out that although it’s impossible to tell where a fruit or vegetable was grown just by looking at it, one can find out by looking at the packaging, signs in the grocery store, or by buying from a farmer directly (for example, at a farmers market). The next activity will allow students to further explore the steps and journey of food from farm to plate.

Key Message:

Add spinach to your sandwich. Make a salad. Eat your greens. They’re nature’s rock stars!

Subject Connections:

Science, Math, Health

Learning Objectives:

Students will be able to...

- Explain the food system and describe how food travels from where it is grown to their plate.
- Describe how plants are connected to the foods people eat.
- Grow (and harvest) a dark-green leafy vegetable and describe its taste.
- Demonstrate and explain the importance of hand washing and properly cleaning fruits and vegetables before eating them.

Supplies:

- Access to sink with warm, running water and soap
- Access to a food-preparation sink (for students to rinse leafy greens)
- Large bowl(s) to rinse leafy greens, paper towels
- Salad spinner, forks, paper plates, small bowls for salad dressing; 2 baking pans, spatula (optional for Crispy Kale Chips recipe p. 24)
- **Garden Journals**
- Teacher handout (p. 66):
1. **The Farm to Plate Game**
- Student handout (pp. 67-68):
2. **Dark-Green Leafy Vegetable Taster**
- **Dig In!** poster – **Leafy Green DJ**

Featured Fruits and Vegetables:

Spinach, green leaf lettuce, and kale*

Provide enough samples for students to observe and taste, either from the garden or purchased from a market. Provide water (and cups) for students to drink as they taste the vegetables. (*Optional: Try offering cooked kale. See recipe on p. 24.)

Additional Foods:

Samples of three salad dressings (for example, olive oil and vinegar, ranch dressing, Russian dressing).



DIG DEEPER! (SOCIAL STUDIES)

- Ask students to think about what happens to food scraps and empty food containers/packaging. If you throw them away, where do they go? Have students brainstorm and discuss in small groups, then report back. Explore these options in the waste management step of the food system:
 1. Leftover fruit and vegetable scraps may be thrown into the garbage and then transported to a landfill or incinerator.
 2. Or, leftover fruits and vegetables may be added to a compost pile. Compost, a form of recycling, is a collection of once-living things or their products (such as fruit and vegetable scraps, grass, coffee grounds, and nut shells) that have been decomposed by helpful microorganisms. Compost is used by farmers and gardeners to add nutrients back to the soil for new plants.
 3. Food packaging also goes into the garbage or may be recycled. Some communities recycle materials such as paper, cardboard, plastic, aluminum, glass, and tin. During recycling, these products are processed and transformed for another use.
- Students can talk with the School Food Service Director to learn about any existing school composting or recycling programs and efforts to reduce food waste in the cafeteria.
- Assign **Garden Teams** to start and maintain a compost for the school. Add only plant products, such as fresh fruit and vegetable culls from food production (apple and pear cores and vegetable trimmings), to a school compost pile. Other plant material, such as grass clippings, leaves, and twigs may be added to fruit and vegetable clippings. Do not use animal products, animal waste, or any cafeteria waste in a compost pile, as it might contain animal products.
- Students can weigh the amount of plant and vegetable waste before the program and then compare it to the amount of waste after the program. **Note:** Reach out to community gardens or your local Cooperative Extension Office for help and expertise with compost.

LEARNING ACTIVITIES

Activity I. The Farm to Plate Game (40 minutes, Science/Social Studies)

***See “Dig Deeper” in sidebar on left for Social Studies connection.**

Prepare: Print out and cut the cards on **The Farm to Plate Game** handout (p. 66) to use for the game. See instructions for play on p. 25.

1. Explain that many of the fruits and vegetables we eat travel great distances before they reach us. The term “**food system**” is used to describe all the steps, processes, resources, and people involved in getting food from a farm to our plate. Share with students that most fruits and vegetables eaten in America travel hundreds of miles before they reach our plates. In one study, researchers learned that fruits and vegetables traveled on average about 1,500 miles from the farm where they were grown to the Chicago Terminal Market!
2. List the following food system steps on the board and discuss what happens in each:
 - 1) **Production:** Growing and harvesting fruits and vegetables
 - 2) **Processing:** Washing, cutting, mixing, and packaging fruits and vegetables
 - 3) **Distribution:** Transporting, storing, marketing (i.e., advertising), and selling fruits and vegetables
 - 4) **Consumption:** Preparing and eating fruits and vegetables
 - 5) **Composting/Recycling:** Uneaten food scraps are disposed of (either composted to return nutrients to the soil or sent to a landfill).
3. In this next activity, students will play **The Farm to Plate Game** where each student represents a different role within the food system. Hand out one Farm to Plate card (p. 66) to each student, starting with farmer (or producer) and ending with Compost/Waste Manager. Allow students a few minutes to study their cards. (See p. 25 for teacher instructions on how to play the game, definitions of each role, and answer key.)
4. Next, give students 10 minutes to arrange themselves in the order of the steps a fruit or vegetable travels from the farm to a person’s plate. Discuss each role and make corrections. To show the food system in action, pass a vegetable (for example, a spinach leaf or bag of spinach) through the supply chain starting with the producer and ending with the consumer. Have students announce their role when they are handed the vegetable. Ask students to share their understanding of the food system and discuss any thoughts they have about the process and steps.



FIND OUT WHERE IT GROWS

Explore these online resources with your students to find out more about where fruits and vegetables are grown, and where they can be found near you.

U.S. crop charts:

http://www.nass.usda.gov/Charts_and_Maps/Crops_County/index.asp

Find a local farmers market:

<http://search.ams.usda.gov/farmersmarkets/>

School garden information:

<http://healthymeals.nal.usda.gov/resource-library/school-gardens>

Your State Department of Agriculture:

<http://www.rma.usda.gov/other/stateag.html>



Activity II. Map the Distance (40 Minutes, Math/Social Studies)

LESSON 2



Teacher Tip!

Use the food system activity to connect and draw comparisons to other systems and cycles, such as the water cycle or life cycle.

1. Explain that the distance our food travels depends on how many steps in the food system it goes through, and how far away the food was grown. (For example, a vegetable grown in Chile will travel farther to get to your plate than one that is grown in your garden.) Have students further explore the journey from farm to table with the following math challenge. Map the distance between different spinach farms and the students' location.

First, explain that spinach is considered a cool season crop that grows best in 50-60 °F temperatures. California, Arizona, Texas, and New Jersey grow the most fresh spinach in the United States. California's mild climate allows farmers to grow spinach all year long. China is the world's leading producer of spinach; however, most of the spinach that the United States imports comes from Mexico.

2. Next, ask students to write down the following locations,* where spinach is grown, in their **Garden Journals**:
 - California (Monterey County)
 - Arizona (Yuma County)
 - Texas (Winter Garden agricultural region southwest of San Antonio)
 - China (Beijing)
 - Mexico (Yucatán Peninsula)
 - Farm near school: _____

***Note:** This is a partial list only.

Using an atlas, world map, or online map, have students first determine how many miles each spinach farm is from their hometown.

3. Next, reveal that there are 5,280 feet in a mile. That works out to approximately 2,640 steps in a mile. Have students multiply the miles from each spinach farm to their school by 2,640 to calculate the steps it would take if they were to walk the distance. Have students plot and map the distance to scale using graph paper. Provide them with a scale to follow (for example, one grid square equals 100 miles).
4. Ask students to draw conclusions about the food system. How can it be simplified and what are some benefits of a simpler supply chain? Ask students to explain how growing or eating food from **local** sources (see sidebar on p. 22 for definition) could benefit themselves, farmers, and their community. (*Knowing where your food comes from and how it's grown, certain fruits and vegetables may be easier to find, freshly picked produce tastes great, buying local supports local farmers.*) What are the disadvantages? (*Fruits and vegetables are only available during the area's growing season, limited variety.*) What are some places in your community where you can buy locally grown fruits and/or vegetables?

DISTANCE REFERENCE

If you don't have access to an online map or atlas, use the following distances as a guide:

These distances are an approximation.

Point out to students that the task is not to get the mileage exactly right, but to give them an idea of the differences between spinach traveling internationally, and spinach traveling regionally and locally to their plate.

Distance from California (Monterey County) to New York, NY: 2,989 miles

Distance from Arizona (Yuma County) to New York, NY: 2,551 miles

Distance from Texas (Winter Garden region) to New York, NY: 1,933 miles

Distance from Beijing, China to New York, NY: 6,830 miles

Distance from Mexico (Yucatán Peninsula) to New York, NY: 3,263 miles



IMPORTANT FOOD SAFETY STEPS!

Please see p. 4 for a reproducible handout to post in a visible location in your classroom. It is important that you follow these steps to keep yourself, your students, and any parents or volunteers safe and healthy.

Hand Washing:

All persons participating in the food preparation activity (teachers, students, volunteers, parents) should wash hands before and after preparing, handling, or sampling foods.

WHAT IS "LOCAL"?

The terms "local" or "regional" are used a lot these days in reference to food. Both words imply close geographic proximity, but what a school or community considers "close" often depends on the unique geography and climate of where it is located, and on the number of agricultural producers in the area. (For example, a rural school surrounded by agriculture might define local as within the county, while an urban school far from farm lands might define local as within the State or within 200 miles.)

Activity III. Harvest, Prepare, and Taste Dark-Green Leafy Greens! (30 minutes, Health/Garden)

Prepare: If you have a school garden and have planted dark-green leafy vegetables, such as spinach or leaf lettuce, you can do this activity when they are ready for harvest. (🌿 p. 104)

Otherwise, use purchased samples of dark-green leafy vegetables, such as spinach and leaf lettuce. You'll need access to sinks for hand washing and rinsing of the greens. You will also want to supply plates, napkins, and forks for each student. Pour samples of the salad dressings into small bowls.

Note: The activity is written for two raw samples, but you may want to add a cooked one to compare. (For example, **Crispy Kale Chips Recipe** (p. 24).) You may want to ask your school district's Food Service Director or a local chef for assistance with this activity.

1. In this activity, explain that students will harvest (if growing in the garden), prepare, and taste a variety of **dark-green leafy vegetables**. Whether harvesting or purchasing, show and observe spinach leaves with students. Pass leaves around for students to look at, smell, and touch (but not eat!) Explain that spinach, for example, is a green, leafy plant that grows close to the ground. The stems grow straight up from the ground in clusters, and leaves usually grow 6-8 inches long. How can one pick good spinach leaves? Look for green, crisp leaves with a fresh, sweet fragrance, and a springy texture. Avoid limp, discolored, or damaged leaves.
2. Distribute the **Dark-Green Leafy Vegetable Taster** handout (pp. 67-68). First, have students try to match the pictures of some dark-green leafy vegetables with their names (for example, spinach, bok choy, collard greens, leaf lettuce, kale, and romaine lettuce).
3. Explain that broccoli and dark-green leafy vegetables, such as spinach, belong to a subgroup within the Vegetables Food Group called the **Dark-Green Vegetables Subgroup**. Vegetables in this subgroup all provide the same kinds of nutrients. Eating vegetables from this subgroup each week helps you play hard and be healthy. (Learn more about nutrients and the vegetable subgroups in Lesson 3 on p. 26.)



HOW TO RINSE LEAFY GREENS

Fresh leafy greens can have a lot of dirt trapped in the folds and crevices of the leaves. It is important to rinse them well before eating. Here's how:

1. Fill a large clean bowl with very cold water.
2. Add the greens to the water and gently submerge them. Carefully swish the greens around in the water with your hands.
3. Remove the greens and pour out the used water.
4. Rinse out the bowl to remove any leftover dirt.
5. Refill the bowl with cold water, put the greens back in, and repeat this process until the greens are clean. (You'll know the greens are clean when there is no dirt left in the water.)

ABOUT THE DARK-GREEN VEGETABLE SUBGROUP

It's not enough to be dark green.

Some vegetables, like zucchini and cucumbers, are not in the **Dark-Green Vegetables Subgroup**. Zucchini and cucumbers are white inside, not green, and only have a green outer skin/peel. Some "green" vegetables, such as green beans, don't have the same kinds, or amounts of, certain nutrients as those in the **Dark-Green Vegetable Subgroup**.

It's not enough to be a leaf.

While most dark-green leafy vegetables are in the **Dark-Green Vegetable Subgroup**, there are other lighter colored leafy veggies that are not. (For example, cabbage, iceberg lettuce, and Brussels sprouts.) They do not have the same kinds and amounts of nutrients as dark-green leafy vegetables.

4. Go over the **Spinach Fun Facts** on the handout. Have students wash their hands carefully, before and again after harvesting, and go over the proper steps found on p. 5. Next, help students harvest greens (if they are growing in the garden) and prepare them for tasting by rinsing them carefully in water, following the appropriate food safety steps (see p. 4). Explain that it is important to follow these food safety steps any time food is being handled or eaten to remove dirt and germs that could make you sick. **Note:** *If you do not have access to an appropriate and clean sink for food preparation, or your school policy does not allow children in the kitchen, ask for help from your school's food service staff to rinse the greens.*
5. Now it's time to taste! Remind students of the **Tasting Etiquette Guidelines** (created in Lesson 1). Have students first taste each of the dark-green leafy vegetable samples without any dressing and describe it in the designated spaces on their handout noting any differences in taste, texture, color, and appearance.
6. Next, have them taste the greens with a little of each of the dressings provided. They should note their observations on their **Dark-Green Leafy Vegetable Taster** handouts.
7. Invite students to describe what they tasted, which they preferred, and to explain why. Ask students to consider the pros and cons of using salad dressings. (*A little salad dressing made with vegetable oils can add flavor to a salad. Too much salad dressing can make your salad soggy, hide the colorful salad ingredients, and make your salad less healthy by adding too many calories.*)
8. Have students finish the activity by answering the questions on their handout in their **Garden Journals**. Ask them to share ideas of how to add dark-green leafy vegetables to their meals.



DARK-GREEN LEAFY VEGETABLES? RAW OR COOKED?

Many dark-green leafy vegetables, such as spinach and leaf lettuce, are eaten raw in salads or on sandwiches. Some leafy greens, such as mustard greens, kale, and collards, are often cooked before eating. Cooking mellows the somewhat bitter flavor of these greens and provides a softer texture than the raw leaves. Ask your school's food service staff or a local chef to demonstrate and offer cooked samples of greens such as kale or mustard greens. (For example, try offering kale chips, sautéed mustard greens, or a soup with kale for students to taste.)



DIG DEEPER! ROCK ON!



Have students create original fruit and veggie songs promoting healthy messages. Students can perform them in the cafeteria, at an assembly, over the morning announcements, or on the local radio station.

Recipe

Crispy Kale Chips

Preparation Time: 15 minutes

Serves: 12

Serving Size: ½ cup



Note: Check p. 2 for Important Food Safety Steps and Allergy Reminders.

Supplies:

- 2 baking pans
- spatula

Ingredients:

- 1 lb kale (1-2 bunches), rinsed and dried
- 2 Tbsp olive oil or vegetable oil
- 2 tsp salt

Directions:

1. Preheat the oven to 375 °F.
2. Remove the tough stem from the kale leaves, and cut the leaves into 4- to 5-inch pieces.
3. Toss the kale leaves with oil until they barely glisten. Sprinkle the leaves with salt.
4. Spread the leaves onto a rimmed baking sheet in a single layer. Do not overlap the leaves or they will not get crispy. Bake for 5 minutes. Take the baking pan out of the oven, turn the leaves with spatula, and put the pan back into the oven. Bake for 5-10 more minutes.
5. Check the leaves often. Leaves should be crispy but not burnt. Let chips cool on pan. Enjoy!

REFLECT (30 minutes, English Language Arts)

1. Display the **Dig In! poster (Leafy Green DJ)** where students can see it. Have students reflect in their **Garden Journals** on the following questions. *What was the most interesting discovery you made about where your food comes from? What new dark-green leafy vegetable did you taste? What different ways can you include dark-green leafy vegetables in your meals? What dark-green leafy vegetables can you identify in the poster?*

(Need help? A list of all vegetables pictured in the poster can be found at: http://teammnutrition.usda.gov/Resources/dig_in.html)

2. As a final assessment, have students write a creative story called "**My (Fruit or Vegetable) Travel Journal.**" They will write about the journey from a farm to their plate, from the point of view of a fruit or vegetable. The story should describe their understanding of the food system. Ask: *What does the food experience as it travels from the farm to your table?*

EXTENSIONS

Share Food Travels. Have students take their original stories (from reflection) about a food's travels from the farm to their table, illustrate it fully, and then read their stories to a younger class (grades K-2) to teach them about the food system.



Local. Invite your school district's Food Service Director to talk to the class about how foods for school meals are purchased, and what food, if any, is purchased from local producers.

Farm Visit. Identify local agricultural sources (farm, farmers market, food co-op, or community garden). Take a field trip to discover and identify the variety of fruits and vegetables grown at one of these sources. Have students work in small groups to prepare interview questions for farmers, market managers, or garden caretakers before the trip. If your class is unable to take a trip, invite a local farmer to visit your classroom.

THE FARM TO PLATE GAME!

Teacher Instructions:

This game can be played by the whole class or by individual students as an independent activity. There are nine cards (see p. 66), each with a different role* in the food system. Assign a student or group of students to each role. Print out the sheet of cards and cut along the dotted lines. **Tip!** To make them more durable, you may want to print on card stock or laminate.

***Note:** This is not a complete food system list, and some roles may fit in at multiple stages of the system. (For example, there may be several “Food Transporters” which can fit in different stages of the system.) The important thing is to understand that there are stages of the food supply system and what each role fulfills. You may add to the list of roles after researching more details and steps of the food system with your students.

How to Play:

Objective: To arrange the cards, or students holding the cards, in the correct order to show how food moves from farm to plate.

Independent Play: Shuffle the cards and place them face down on the table. Start a stopwatch/timer and then turn the cards over quickly. Arrange the cards in order, showing how food moves from the farm to the table. When finished, stop the stopwatch and record the elapsed time. Check the order of the cards with the answer key. If an error was made, try the game again. Have students try to improve the time it takes to correctly arrange the cards.

Class Play: Designate one student as **The Educated Consumer** to arbitrate all disputes. Shuffle the cards, and then hand a card, face down, to each student or group of students. Start a timer and then have each student turn over his or her card. Students work cooperatively to arrange themselves in a line, showing the correct order in which food moves from the farm to the table. In case of a dispute, students will ask for aid from **The Educated Consumer** to resolve the dispute. When the students are finished, stop the stopwatch and record the elapsed time. Check the order of the cards with the answer key at right. If an error was made, have students try the game again and attempt to improve their time.

ANSWER KEY AND ROLE DEFINITIONS

Order of the Farm to Plate Cards:

- 1) Farmer (Producer)**
A person/company who grows and harvests food on a farm
- 2) Food Inspector**
A person/company who visits farms or processing centers to ensure that foods are grown and processed safely
- 3) Food Processor**
A person/company who washes, cuts, mixes, and packages food from the farm
- 4) Food Transporter**
A person/company who moves food from one location to another, such as by truck, train, ship, or airplane
- 5) Food Distributor**
A person/company who decides which stores receive the food
- 6) Advertiser**
A person/company who designs the advertisements that promote food to consumers
- 7) Grocer/Food Retailer**
A person/company who sells food to consumers (such as through a grocery store or supermarket)
- 8) Consumer**
A person who buys the food that has been grown or prepared
- 9) Compost/Waste Manager**
A person/company who disposes of leftover food scraps by either composting or throwing food away (sending to a landfill)

