Module 2: Our Food System—from Farm to Table

Goals and Objectives:

Students will explore the steps involved in moving food from the farm to the table, as well as the role of money in the process. Students will be introduced to the broader impacts of our food system on human health, the environment, and the economy. During this lesson, students will investigate the relationship between the capital distribution across the food chain and the nutritional value of products by comparing the farmer's share of retail prices for a variety of products and setting up a mock food chain to illustrate where money is allocated along the journey from farm to table.

Time: 1 hour

Optional additional activities: 1 hour

Materials:

- ☐ Module 2 Teacher Print Kit
- ☐ Module 2 Student Handouts
- ☐ Scissors
- ☐ Whiteboard and markers (or large sheet of paper and markers)
- ☐ Post-It Notes

Optional:

- ☐ 4 clear jars (Activity #1)
- ☐ 200 pennies (Activity #1)
- ☐ One set of supplies from the Kitchen Essentials card for each student group from Bonus Card Deck (Optional Activity #4)
    - ☐ Recipe Cards (from Bonus Card Deck) (Optional Activity #4)
    - ☐ Packaging options (Optional Activity #4)
        - ☐ Quart or gallon size zip-lock bags
        - ☐ Pint or Quart size jars
- ☐ Sticky labels (Optional Activity #4)
- ☐ Blank paper (Optional Activity #4)
- ☐ Colored sharpies, markers, crayons, colored pencils (Optional Activity #4)
- ☐ Technology to show YouTube video OR printed Teacher Print Kit (Activity #4)

Teacher Background:

Our food chain is complex. Students may not realize that the majority of each dollar spent on food funds all of the steps that happen between the farm and to their plate. However, of the $1.2 trillion spent on food in the United States in 2017, only 7.8% or $94 billion went to gross income for farmers.[1] From this income, farmers earn a salary, but must also cover expenses related to their land, seeds, inputs, equipment, and more.

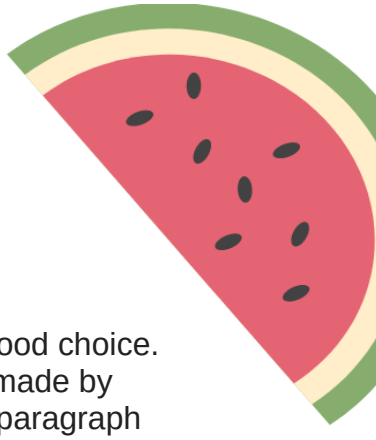
There are benefits to having a complex food system. A system with infrastructure to support food production, processing, transportation, wholesale trade, retail, and food services can offer a wide variety of food choices. In this way, corn can be grown, harvested, and processed into a variety of products, from cereal to soda to fuel, and a banana can be acquired almost everywhere in the United States at any time of the year. Foods can be processed and packaged to increase shelf-life and accessibility.

However, there are major downsides to this complex system as well. As capitalism drives decision-making across the value chain and processing becomes more common, companies are incentivized to sell delicious, convenient, and highly processed foods than whole, fresh, and often perishable foods. Consumers pay the price with diet-related complications. Incentives to market and sell processed foods—from government subsidies to profit trends—outpace those of healthier, whole foods.

Additionally, there are many food monopolies that create strain on local economies and workers. An estimated 93% of soda is produced by just three companies: Coca Cola Company, PepsiCo, and Keurig Dr. Pepper. Moreover, 73% of breakfast cereal is produced by only three companies: General Mills, Kellogg Company, and Post Holdings.[2] These market-dominating companies wield exorbitant power, with the ability to set retail prices, prices for producer's raw ingredients, and even worker wages.

An alternative paradigm involves situations where consumers have a personal relationship with food producers and vendors. By buying directly from local farmers, consumers are able to distribute their dollars in a way that supports the local economy. Buying locally often means buying foods with less packaging, fewer food miles, limited processing, and more nutrients. It can also connect consumers to farmers, communities, and to the environment. It should be noted that local producers often struggle to produce food as cheaply as large companies, posing a barrier for low-income consumers.

Many of the benefits of buying locally are amplified when urban agriculture is put to use. Food miles, a unit of measurement of the fuel used to transport food from producer to consumer, are often further decreased. The constraints of urban farming encourage human power over large, fossil fuel-dependent equipment during production. The greenspaces that farms create also keep cities cooler, facilitate natural rainwater drainage, and attract pollinators. Urban agriculture also offers natural community building and mental health benefits, providing a space where people can connect around growing and sharing food. Urban farms can play a key role in making healthy, culturally desirable, and affordable food available in underserved neighborhoods.[3]



Opening Discussion:

Use the questions below to kickstart this lesson with a conversation about food choice. Push your students to interrogate their own decisions about food, or those made by people who prepare food for them. Then, consider sharing the introduction paragraph below to set the stage for this module.

- *What are the reasons that you might buy a frozen pizza at the store rather than make it yourself?*
    - Plausible responses:
        - Convenience
        - Sometimes cheaper
        - You don't need to buy many different ingredients.
        - You don't need to cook.
- *Can you think of some of the companies and workers you might be paying to produce your frozen pizza for you?*
    - *Is there anyone we've forgotten* (perhaps farm workers, truck drivers, people who stock grocery stores, supply chain managers / logistics experts)?
- *Do you eat any foods that likely were produced and transported by very few people? Which foods might have a lot of people involved?*
    - Consider: frozen, highly processed foods coming from far away versus locally produced, raw or unpackaged foods

There are many people involved in shaping the food we eat. Almost all our food starts out on a farm. Where it goes between the farm and the table, however, depends on what form the food will take on your plate, and where the food comes from. Some foods are simple, with not a lot of steps between the farm and the table, like an ear of fresh sweet corn. Others require a complicated chain of events, such as soda. Both these products come from corn, but the processes they go through along the food chain are very different. These processes have an impact on your health, on our world's wealth distribution, on our planet, and more. Today we are going to start to explore the impact our food chain has on people and our planet.

Activity #1: Fair Share Card Sort

Time: 15 minutes

Materials:

- ☐ Teacher Print Kit
  - ☐ Includes: Food Dollar Infographic (page 1)
  - ☐ Includes: Where Does Your Dollar Go? (page 2)
- ☐ Student Handouts (one copy per group of 3-4 students)
  - ☐ Includes: Fair Share Card Sort (pages 2-3)
- ☐ Scissors
- ☐ White board (or large paper) and markers
- ☐ post-It notes

Optional Materials:
- ☐ 4 clear jars
- ☐ 200 pennies

Prep:

- Cut out Fair Share Cards from the Student Handouts and sort them into decks. You'll need 1 deck for every 3-4 students.

- Study the Food Dollar Infographic on page 1 of the Teacher Print Kit to give yourself a richer background to teach from.

Lesson:

1. Create two timelines by drawing two long horizontal lines on the white board or paper. Write "Carrots above one line and "Soda" above the other. Write "Farm" on one end of the lines, and "Table" on the other. Your chart will look as follows:

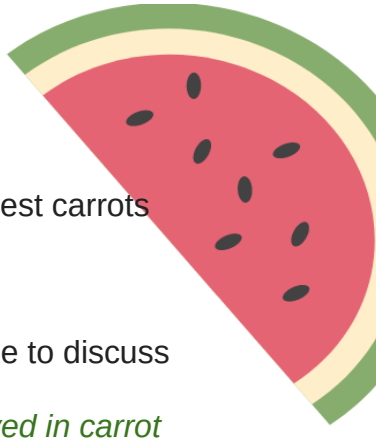
Carrots

Farm ——————————————————— Table

Soda

Farm ——————————————————— Table

2. As a large group, have students brainstorm the steps involved in getting carrots all the way from the seed to the dinner table. Have the students (or the teacher) write ideas on post-it notes and stick them along the carrot timeline on the board.



[For example: Step #1 plant carrot seeds on the farm. Step #2 - harvest carrots from the field and wash them…]
    - Repeat this process for soda.

3. Once your board is nicely populated with sticky notes, take some time to discuss the following:
    - *What steps are involved in soda production that are not involved in carrot production?* Add these steps to the timeline if you'd like.
    - *How much do you think the workers in each of these steps get paid? Do you think each step is valued in the same way?*
    - *Do you think the steps involved after the product leaves the farm impact how much the farmer is ultimately paid for a product? Why?*
    - *If a pound of carrots and a can of soda were each sold for $1, do you think the farmer would get more of that dollar for the carrots or the soda? Why?*
    - *On average, farmers get about 47 cents for every one dollar spent on carrots at the store. Farmers get about 5 cents for every dollar spent on soda at the store.*

4. **Optional:** Economic Illustration (If you do not have the materials or do not wish to do this illustration, skip to step #4 below):
    - Use 200 pennies, the "Where Does Your Dollar Go?" Teacher Print Kit (page 2), and four jars to illustrate. With post-its or paper laying in front of the jars, label your jars according to the following:
        - Carrots, Farmer, $.47
        - Carrots, Others
        - Soda, Farmer, $.05
        - Soda, Others
    - *Ask the students to calculate how many pennies go into the "Others" Jars as a group. Then discuss:*
        - *Who else gets some of that money? Why might the farmer's share be larger for carrots than it is for soda?*

5. Separate students into groups of 3-5 and pass out a Fair Share Card Sort deck to each group with the *images face up*.
    - Ask students to do their best to order cards from <u>largest farm share</u> (largest percentage of retail value allocated to the farmer) to <u>smallest farm share</u> solely based on the images. Remind students not to look at the back of the cards yet!
    - Discuss: *Look at the card you think will give the smallest share of money to the farmer. Why do you think this will have a small share?*
    - Ask students to flip their cards over in place. They can re-order the cards if they would like. Discuss: *Think about the production chain of these products. Which products have the largest share of money going to the farmer? Which has the smallest? What do the items with the smallest farmer share have in common? What do the items with the largest farmer share have in common?*

Activity #2: The Food Chain

Time: 10 minutes

Materials:

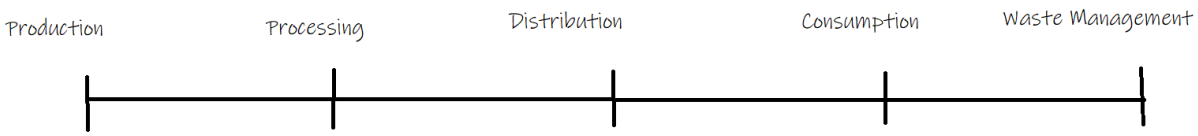
- ☐ White board and markers
- ☐ Completed post-Its from Activity #1
- ☐ Teacher Print Kit
  - ☐ Includes: Food Production Chain Teacher Cards (pages 4-7)
- ☐ Student Handouts (print 1 copy per 2 students)
  - ☐ Includes: Food Chain infographic (page 4)

Optional:
- ☐ Scissors

Prep: Cut out Food Production Chain Teacher Cards (optional)

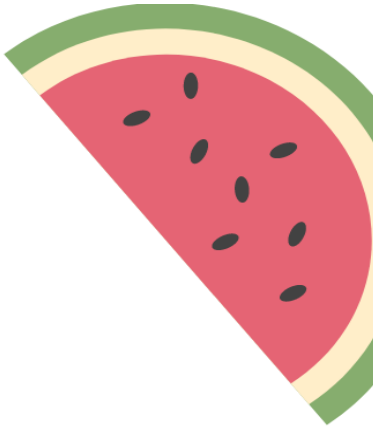
Lesson:

1. Display the food chain infographic (from Teacher Print Kit, page 4). Write a horizontal line on the board and write each of the steps listed in the infographic on the timeline, like so:



2. Use the Food Production Chain Teacher Cards (from Teacher Print Kit, pages 5-8) to define each step of the food chain timeline and give ideas of what each step represents.

3. One by one, move the soda and carrot post-It notes from Activity #1 to the new timeline. Read each Post-it and ask the group where it should be moved to on the new timeline. Discuss:
   - *Can we think of even more steps to the soda and carrot production chain?* You may choose to add these steps to the timeline.
   - *Do they all fit in these categories?* Share with students that many of the steps involved in getting products from farm to table don't fit into neat categories and that's okay.



Activity #3: The Journey

Time: 15 minutes

Materials:

- ☐ Teacher Print Kit
  - ☐ Includes: The Journey Answer Key (page 8)
- ☐ Student Handouts
  - ☐ Includes: The Journey Card Decks (pages 5-10)
- ☐ Scissors

Prep:

- Cut out the Journey Card Decks (print 1 of each deck for every 3 students)
- We suggest printing the three decks on different colored paper, so they don't get mixed up!

Lesson:

1. Shuffle card decks and pass out a copy of each of the three decks to each student group (3 students per group).
2. Ask each group to order cards for each product: Carrot, soda, and cheese.
3. When students are done ordering the cards, discuss:
   - *What steps are missing from the decks?*
   - *Where does the most work happen for each product? Are the answers different for each product? Why?*
   - *How does the answer to the last question affect who is paid most for this product?*
   - *How does the answer to this question affect the health of the product?*
   - *What foods could you eat that don't involve parts of the food chain we learned about?*

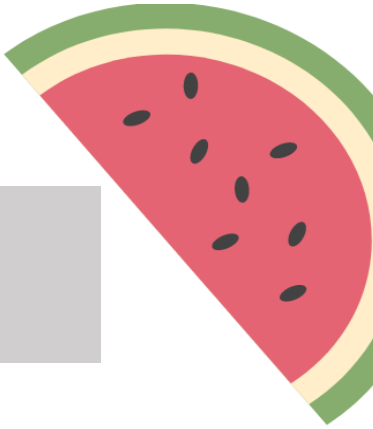
     Ideas:
     - Fresh, unprocessed foods avoid processing.
     - Food made at home avoids food service.
     - Farmers market foods avoid processor, distributor, food service.

Connecting to the Garden

We've explored how the food production and processing steps between farm and table impact what percent of each dollar spent a farmer receives for her work.

One brilliant figure in American history, George Washington Carver, fought against the oppression of black farmers by capturing more of the agricultural dollar from crops they often grew. He developed over 100 value-added products for the sweet potato, and over 300 for the peanut. As such, southern black farmers were better equipped to sell their crops—in new forms— at markets. For example, they could sell peanuts processed as glue or plastic, rather than raw peanuts.

Today in the garden, we will do the same as Carver did. We will look at the raw ingredients in our field and find a new use for them. Through innovation and creative marketing, we will capture more of the food dollar for farmers.



Optional Activity #4: The Food Chain of Justice & George Washington Carver

Time: 1 hour

Materials:

- ☐ Student Handouts
  - ☐ Includes: Food Dollar Infographic (page 11)
  - ☐ Includes: Value Added Product Examples (page 12)
- ☐ Material listed on Kitchen Essentials Card (from Bonus Card Deck)
- ☐ Basic Ingredients (from Bonus Card Deck)
- ☐ Packaging options (at least one of the below available for each group of 3-5)
  - ☐ Quart or gallon size zip-lock bag
  - ☐ Pint or Quart size jar
- ☐ Sticky labels
- ☐ Paper
- ☐ Colored sharpies, markers, crayons, colored pencils
- ☐ White board and markers
- ☐ Technology to show a video, **and/or** printed copy of the Teacher Background: George Washington Carver, A Short Biography (page 10-12 in Teacher Print Kit)

Prep:

Be sure to print 1 copy of the Student Handouts for each group of 3-5 students. This lesson must take place in a garden that has fresh, harvestable produce available. Set out “stations” for each group of 3-5 students. Each station should have:

- Materials listed on Kitchen Essentials and Basic Ingredients cards (from Bonus Card Deck) packing options (jar, Ziplock bags, or both), sticky labels, colored sharpies, and paper.

- **NOTE:** If you do not have a few of these items, it is okay. Just ensure that the groups have at least one container, kitchen equipment, and something to write with.

Lesson:

1. Display or pass out copies of the Food Dollar Infographic from the Student Handouts (page 11).

2. Discuss the following:
    a. *Does anything surprise you?*
    b. *If you were a farmer, what strategies could you use to keep more of the retail value of your produce?* Teacher ideas for discussion:
        - Sell to a great marketer who will get a good price for your product and pass on some of that value to you.
        - Sell direct to consumers at a farmer's market to eliminate the need for many services that are necessary between farm and restaurant or grocery store.
        - Find a way to process your product into something more valuable than the product itself. Example: Instead of selling wheat, sell noodles made of wheat. Buy a share of a noodle factory, or partner with other farmers to create a noodle factory.

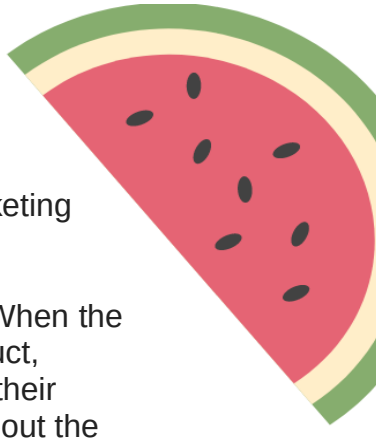
3. Next, introduce the story of George Washington Carver.
    a. Use the YouTube video (link also available on page 10 of Teacher Print Kit) or read/summarize points from pages 11-12 of the Teacher Print Kit. Be sure to emphasize Carver's use of value-added products to bring more money to black farmers. Show students the "Value-Added Product Examples" PDF (Student Handouts, page 12).
    b. Ask students: *What might be the benefits of selling value added products vs. raw materials?*

4. Separate the class into groups of 3-5. Explain to the group that they will oversee profits from farm to retail. Challenge groups to start with a few raw ingredients from the garden and brainstorm how to add value to the product.

5. Write on the board or paper:
    a. Production
    b. Processing
    c. Packaging
    d. Advertising

6. Explain that each group will work together to harvest their raw ingredients, process the ingredients into a value-added product, package their ingredients in an attractive way, and create an advertisement to maximize profits. Give students a time limit to create their project (40-60 minutes). Encourage them to divide and conquer within their group after they come up with a plan.

7. **Optional:** Put out the Recipe Cards, Nutrition Basics, and Food Facts cards (from Bonus Card deck) to give students ideas on how to add value to items in the garden. (For example, they could process tomatoes into Pico de Gallo, etc.)



Encourage students to use the information on the cards in their marketing campaigns.

8. Give students a 10-minute and 5-minute warning before time is up. When the time is up, have each group present their project, including the product, packaging, and marketing campaign. Have each group explain how their strategies will increase profit. Allow other groups to ask questions about the strategies used.

9. Finally, as a group discuss the following:
    a. *If you were to create a project in your community to increase the wealth that stays with the people in your community, what might you create? Consider: What do people in your community need? Convenience? Health?*
    b. *What products do your community members buy a lot of, but most or all the wealth from that product goes to people outside of your community? Could you create that product locally? Why or why not? Is there an alternative product that people might eat if it was produced locally?*
    c. *What raw materials are locally available in abundance? What value added products can be made from these materials?*
    d. *Today, you had limited resources to advertise your product. How might your packaging and advertising change if you had a larger budget?*
        - *How might the marketing and advertising resources of larger companies affect the competitiveness of smaller, local food companies?*
        - *How can communities work together to make sure local companies have a share of the food market?*

Activity #5: The Food Web

Time: 20 minutes

Materials:

- ☐ Ball of string
- ☐ Student Handouts
  - ☐ Includes: Food Web Card Set (pages 13-16)
- ☐ Scissors

Prep: Cut out Food Web cards. We recommend printing the cards double-sided.

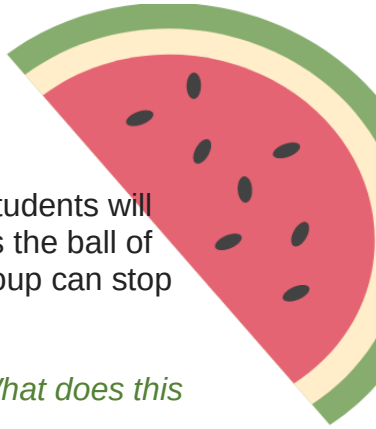
Lesson:

1. Ask all students to sit in a circle, handing out the Food Web cards one by one to each student. Read the word and definition on the back of the card to the group before handing it to each student. Pass out all the cards. Students can have more than 1 card, but not more than 3.

2. Have students place their cards with the picture side up on the ground in front of them for everyone to see.

3. Give one student the ball of string. Ask that student to read one of their cards, then, while keeping hold of the end of the string, toss the ball of string to another student. Ask the second student to read one of their cards as well.

    - Now, work with the group to come up with one way (or more) that these two cards are connected. Note: *All cards are connected!* Encourage students to be creative and think of connections that aren't obvious.
        - Example: Fish are connected to fertilizers because it is harder for fish to live in areas where fertilizer has seeped into rivers/waterways. (This is because excess nutrients in water from agricultural runoff can cause eutrophication and reduce oxygen in the water, killing fish and other organisms.)
        - Example: Chickens are connected to pathogens because chickens can be killed off by disease.
        - Example: Pathogens are connected to supermarkets because if pathogens are present in foods that make it on to supermarket shelves, consumers might get sick.



4. Repeat step 4 until all CARDS held by all students are connected. Students will create a web by holding on to a portion of the string before they pass the ball of string to the next student. Once all cards are part of the web, the group can stop or continue to make connections based on time available.

5. Next, ask the students to reflect on what they see in front of them. *What does this "web" of connected cards look like? What does it remind you of?*

6. Now, present the students with scenarios. For each scenario, have students pull on the string if they think one of their cards will be impacted by the scenario. Ask a few volunteers to explain why they are pulling on the string for each scenario.
    - Scenario Ideas for Teachers (Note: Feel free to make up your own, have students come up with scenarios as well!)
        - A series of extremely dry seasons leads to drought across North America, India, and Africa.
        - Economic changes lead to a dramatic decrease in the price of major crops.
        - A conflict between two countries causes a major shortage in fertilizer available globally.
        - Many truck drivers quit their jobs at the same time.
        - Due to very high unemployment, wages for farm workers and food service positions decrease.
        - There is a large worker strike at a packing plant.
        - Gas and oil prices go up dramatically in a short period of time.
        - An unforeseen plant disease decreases soybean crop across the globe.
        - New regulation states that fruit and vegetable quantities required by law in all public-school lunches will double in the next year.
        - A local well is polluted by excess manure and synthetic fertilizers spread on nearby fields and becomes undrinkable (unsafe)
        - A massive oil spill leads to a "dead zone" in the ocean near California.

    - Students should feel the string being pulled during most or all scenarios, even if their card(s) are not directly impacted by the scenario. This is a great opportunity to reflect on how interconnected our food system is. If students did not feel the string being pulled, discuss as a group to find connections they may not have thought of.

Closing Discussion:

There are numerous steps required to move food from the farm to our plates. These steps allow us to eat foods that we wouldn't otherwise have access to throughout the year. Whether we are eating foods out of season, buying products shipped in from faraway places, or consuming ready-to-eat meals that we wouldn't have time to make ourselves, the modern food system makes this possible. With more convenient choices available and easy access to highly processed, cheap foods, many people are susceptible to poor diets.

By supporting the current food system and value chain as it stands, physical health and the health of our economy can suffer if we aren't careful. When choosing value-added foods, it is important to consider how the food will drive your health and contribute to your community's wealth. If strategic, we can use the power of the food chain to benefit our well-being.

End with a discussion of the following:

- *If you were to open a food business, what part of the food chain would you most like to engage in? If your goal was to maximize your personal profits, would this change? How might you work with friends or other community members to optimize and streamline your work across the food chain?*
- *Do you think that the way money is distributed in our food system is usually fair? Why or why not?*
- *What foods would you eat to ensure your money is going where you want it to go? Why? Where would you shop?*

References:

Teacher Background:

1. Canning, P. 2021. Where Do Americans' Food Dollars Go?. USDA. Food Economics Division, Economic Research Service (ERS) in Research and Science.
2. Lakhana, N., Uteuova, A., and Chang, A. 2021. Revealed: the true extent of America's food monopolies and who pays the price. The Guardian.
3. Dewey, S. 2021. The Power of Urban Agriculture in Transforming a Community. Conservation Law Foundation Blog.

Activity 1:

Information taken from the National Farmers' Union (2022). Title: The Farmer's Share.

Activity 2:

Infographic taken from the Centers for Disease Control and Prevention (2013). Image Title: The Food Production Chain - How Food Gets Contaminated.

Food chain steps taken from Center for Integrated Agricultural Systems at the University of Wisconsin-Madison *Toward a Sustainable Agriculture* curriculum: Module I Section B: The Big Picture, Systems.

Activity 3:

Adapted from Lesson 1: *Activity: Supply Chain Journey* from the *Foodspan* curriculum created by the John Hopkins Center for a Livable Future (2020)

Optional Activity 4:

Carver biography information taken from:

- Britannica online. George Washington Carver.
- Missouri Encyclopedia online. Georgo Washington Carver (1865–1943).
- Biography.com video. George Washington Carver "The Plant Doctor" Revolutionized Farming Industry | Biography

Value added information taken from:

- Lakhana, N., Uteuova, A., and Chang, A. 2021. Revealed: the true extent of America's food monopolies and who pays the price. The Guardian.
- Canning, P. 2021. Where Do Americans' Food Dollars Go?. USDA. Food Economics Division, Economic Research Service (ERS) in Research and Science.

Activity 5:

Adapted from Lesson 1: *Activity: Exploring Connections* from the *Foodspan* curriculum created by the John Hopkins Center for a Livable Future (2020)