TEENS CAN

COMPREHENSIVE FOOD LITERACY IN **C**OOKING, **A**GRICULTURE, AND **N**UTRITION

Kzs insl Xtzwhjx
UC ANR Competitive Grant #15-3723;
USDA NIFA, SPECA Competitive Grant #2019-38414-30266;
USDA NIFA, National Needs Fellowship #2018-38420-27959;
USDA NIFA, Hatch project 221082;
Barbara Schneeman Research Award;
Henry A. Jastro Research Award;
Social Science Graduate Student Award; and
Kosuna Doctoral Fellowship

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Introduction

Teens CAN: Comprehensive Food Literacy in Cooking, Agriculture, and Nutrition was designed with the intention of improving food literacy of high school-aged adolescents, typically aged 13–18 years.

Food literacy is comprised of overlapping knowledge and skills that are required to maintain a healthy eating pattern. This includes understanding where food comes from and being able to prepare meals that meet nutrition recommendations. Food literacy has been conceptualized for *Teens CAN* into three overarching topic areas: agriculture, nutrition, and cooking. Concepts within these topic areas include the food supply chain, food environments, nutrition recommendations, meal planning, food safety, and cooking techniques. The lessons are geared toward adolescents and are taught in an engaging way.

Implementation

Teens CAN was written to be implemented as a whole, but can also be used as three separate curricula. The modules were written to stand alone and can be used independently if needed. The intended style for implementing the lessons is inquiry, which allows for the facilitator to lead learners through discovery of concepts, opposed to lecture style, for example. This style takes practice and helps learners better retain knowledge gained from each lesson. Prior experience delivering inquiry-based education can aid in achieving lesson fidelity. Lesson fidelity is how well the facilitator delivers the lesson as intended and is very important for learners to achieve the lesson objectives.

Teens CAN is recommended to be accompanied by an agricultural space. While referred to as an "agricultural space" throughout the curriculum, this can range from a small garden to a state-of-the-art greenhouse. Please see the *Building an Agricultural Space* guide provided within the curriculum if assistance is needed for starting an agricultural space. Additionally, the cooking lessons of this curriculum require somewhere to prepare food and access to cooktops. These lessons can be taught in a traditional kitchen or on tabletops using portable stovetops, such as induction hot plates. Please see *Common Cooking Equipment* for a list of suggested cooking equipment to provide for cooking lessons.

Curriculum Organization

Background Information: foundational information for key concepts included in module lessons

Concepts and Vocabulary: definitions for each key concept or vocabulary term

Materials Needed: comprehensive list of materials needed, including those provided as appendices, to facilitate each lesson

Time Required: estimated time required in order to complete each lesson as determined by pilot testing

Suggested Groupings: recommendation for how many learners to include in each group

Getting Ready: detailed instructions for how to prepare lesson materials and organization of the learning space

Opening Questions: opening prompts for the learners to answer within their small groups meant to help the facilitator determine prior relevant knowledge

Procedure (Experiencing): step-by-step instructions for facilitating each lesson

Sharing, Processing, and Generalizing: combination of three steps in experiential learning that allow learners to share their findings with one another, while also processing what they are learning, and how the concepts can apply elsewhere

Concept and Term Discovery/Introduction: concise description of key concepts that should have been discovered or introduced to the learners throughout the lesson

Agriculture Application: agricultural lesson that applies concepts from the first module lesson

Culinary Application: culinary lesson that applies concepts from the first module lesson

Home Application: home lesson that applies concepts from the first module lesson and/or the other application lessons

Pilot Testing

Pilot testing for this curriculum was conducted in multiple rounds and suggested that *Teens CAN* can be implemented in multiple settings, such as after-school programs and clubs or integrated into classroom learning. *Teens CAN* meets several educational standards as outline in the *Educational Standards* table provided within the curriculum. *Teens CAN* has also been utilized in a cross-age teaching model wherein adolescents were educated in food literacy concepts and then trained to facilitate curricula with elementary school-aged youth. For this program, adolescents facilitated *Discovering Healthy Choices* and *Cooking Up Healthy Choices*, which are garden-enhanced nutrition curricula.

Several measurements were assessed during pilot testing, including dietary intake, cooking skills self-efficacy, nutrition knowledge, and academic measures. If you would like more details about assessment tools used for evaluating *Teens CAN* participants, please contact Lyndsey D. Ruiz at ldruiz@ucdavis.edu or Anna M. Jones at anajones@ucdavis.edu.

References

All references can be found in the back of the curriculum.

Building an Agricultural Space

This guide will help in building an agricultural space and provide guidance for its maintenance. It is recommended to make the agricultural space multi-functional, meaning it can used for education and outdoor events in addition to a space for growing food crops and non-edible plants. When making decisions about what to grow, consider the interest of the youth who will be learning and working in the space and the expected longevity of the plants. Involve the youth in planning and building the agricultural space because it is a fun educational opportunity.

Establishing Space

If there is not already a designated agricultural space, such as a pre-existing school or community garden, start by identifying possible areas and gaining any required permission needed for using the space. It is important to identify the space before building so that you are aware of any potential limitations. If working within a school, it is recommended to connect with the school principal or the district superintendent to ensure that any requirements are met prior to building or occupying space. If working in communal space, such as at a community center, it is recommended to connect with the governing agency that oversees the land to ensure that any requirements are met prior to building or occupying space. Additionally, funding for starting and maintaining the agricultural space can be determined and a budget established. While there may be some money for the project, you may want to consider pursuing other opportunities for supplemental funds.

Cooperative Extension: Be sure to check with your local Cooperative Extension programs. Cooperative Extension offices include Master Gardeners that can provide guidance on gardening in your area as well as offer resources and next steps in setting up your agricultural space. You can find your local Master Gardener at *https://mastergardener.extension.org/contact-us/find-a-program/*.

Apply for grants: Several grants are available for starting a school or community garden and can be searched and applied for online. Granting agencies vary from small businesses and private companies to large hardware stores and federal programs. There are a variety of grants available depending on your location and the time of year you are applying. Applications typically require a description of how funds will be used and a detailed budget. Be sure to look closely at the requirements and deadlines.

Donations: Reach out to hardware and other garden supply stores in your area to ask for donations of gardening supplies and other materials needed for your agricultural space to be successful. When asking for donations, be sure to include that the intent of the agricultural space is to provide food literacy education for youth in the community. Knowing this information may provide an added incentive for potential donors.

The amount of room for the agricultural space can be determined based on availability. If there is not a pre-existing agricultural space available, such as a school or community garden, you may need to start your own. This might mean that space is limited, but there are creative ways to provide an area for youth to learn to grow food.

Container gardening: Various containers, such as pots, bins, or planters, can be utilized to start a small garden. Ensure that the container has adequate drainage before filling it with soil. Another container can be placed underneath to catch water drainage. Container gardens can be used in a variety of spaces, including indoors near a window or in a small outdoor area.

- Instructions for creating a simple hydroponic system can be found in the Home Application of *Agriculture Module 3: Innovating Agriculture*.

Vertical gardening: Plants can be grown vertically rather than outward by stacking or tethering to save space.

- **Stacking methods:** A plant shelf or ladder with slanted shelves can be utilized for growing plants vertically. Slanted shelves ensure that each plant is getting adequate sunlight. These systems can be placed almost anywhere, including indoors with sun lamps or near a window, and take up much less space than other options. Plant shelves can be purchased from hardware or garden supply stores, or can be built on-site with relatively inexpensive or recycled materials.
- **Tethering methods:** Plants can be tied to a trellis, stake, A-frame, or cage to encourage them to grow upwards against gravity. This method is commonly used outdoors in a garden bed to reduce space occupied by a plant. However, tethering can also be done indoors with a container garden to save even more space. Examples and more information on how to build tethered systems can be found at *http://www.greeneducationfoundation.org/greenthumbchallengesub/start-up-kit/get-set-build-your-garden/1087-vertical-gardening.html*.

Recommended Supplies

The following list includes recommended supplies for building and maintaining an agricultural space. However, not every space is the same or requires the same equipment. Alter the list as needed to meet the needs of your agricultural space.

- **Shovels, rakes, hoes, and trowels**
- **Seeds or seedlings**
- **Soil mix**
- **Watering cans**
- **Garden gloves**
- **Dedicated supply storage**
- **Garbage bins** - It is recommended to have at least three: one each for recycling, compost, and landfill.
- **Wheelbarrows** - Store upside down to prolong longevity, and to keep water from accumulating and attracting insects.
- **Compost** - Instructions for creating a compost pile can be found in the Agriculture Application of *Nutrition Module 3: Nutrition for All*.
- **Garden beds** (if possible) - Information on how to build garden beds is available at *https://growtestdotorg.files.wordpress.com/2013/02/a10.pdf*

Choosing What to Grow

The USDA developed hardiness zones to help distinguish what crops grow well in an area based on average water availability. The hardiness zones can be used to determine what plants will thrive in your area and can be found at *https://garden.org/nga/zipzone/*. At this site, enter your zip code into the search bar and click go. The next page will display the area's hardiness zone along with a Planting Calendar and other information. Select "View our Planting Calendar for your area" for dates of when and how to plant crops that tend to prosper in your area.

Sow seeds indoors: Seeds should be planted and watered indoors during this time frame.

Transplant seedlings into the garden: Remove seedlings from their containers and plant them in an outdoor agricultural space during this time frame. Seedlings may be grown or purchased.

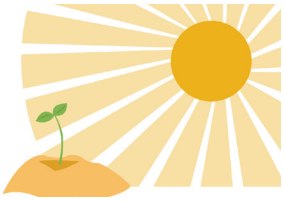
Direct sow seeds: Plant seeds in an outdoor agricultural space during this time frame.

Ground Rules

It is recommended to have a set of rules for the agricultural space. Before entering the agricultural space, share the ground rules with youth. Suggested rules include, 1) keep garden tools below the waist; 2) no running; 3) no killing of any insects; and 4) no stepping inside of garden beds (if present). This list of rules can be expanded and are intended to help ensure the safety of youth while working within the agricultural space. Additionally, these rules promote the health of the space. Stepping in a garden bed would condense the soil and make it more difficult for roots to grow. It is also important for youth to understand that each insect plays an important role in the food chain, which is why we do not want to kill any critters.

Caring for Your Plants

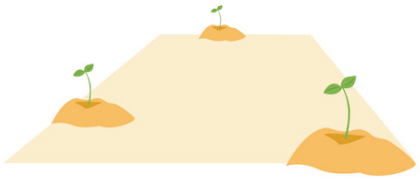
Plants need sunlight, water, space, and nutrients.



Sunlight: Plants require different amounts of sulight, with some preferring full sun and others preferring partial sun or full shade. Clicking on the plant name in the Planting Calendar, described above, will provide information on the amount of sunlight needed.

Water: Some plants need more water than others. To makes it easy, group plants with similar water and sunlight needs together in the agricultural space. Water plants any time the soil becomes dry. It is better to give a long deep soak than to mist the tops of the plants. If you water deep, the roots will be able to grow deeper and become more established.

Space: Overcrowding is an issue that leads to increased competition for resources and can lead to plants getting diseased or dying. To avoid this, allow for adequate space between plants. Clicking on the plant name in the Planting Calendar, described above, will provide information on the amount of space needed.



Nutrients: The three nutrients that plants need most are nitrogen, potassium, and phosphorous. Nitrogen is the most limited nutrient and can be put back in soil by adding compost, fertilizers, or by intermittent planting of legumes. Not only does compost contain nitrogen, it also contains microbes that help aerate the soil. Compost can be purchased from hardware or garden supply stores, or can be made. Instructions for creating a compost pile can be found in the Agriculture Application of Nutrition Module 3: Nutrition for All. The EPA provides additional information about composting, including a list of items that can be composted, at *https://www.epa.gov/recycle/composting-home#home*.

Differentiating a Weed from Your Crops

Sometimes it can be difficult to tell what is your plant and what is a weed that needs to be removed. Below are some tips to help differentiate weeds from your plants.

- Label your plants by writing what you planted and when it was planted on a craft stick or plant marker. This will help you remember where your plants are located and help estimate when to expect growth. Clicking on the plant name in the Planting Calendar, described above, will provide information on approximately how much time is needed before plants are ready to be harvested.
- Create a map of your agricultural space. Draw a schematic to show where each plant is located and state what was planted. You can also write how many seeds or plants were planted and use that information to determine how many plants should be in the space and remove anything else.
- When trying to identify a plant, horticulturalists and botanists, look at the plant's traits like leaves and flowers. If you know what should be planted, you can search online for a picture of it and compare the leaves and flowers to what is growing in your agricultural space. Some plants' mature leaves look different than those of a younger plant so be sure you are comparing to photos of similarly aged plants.

Maintaining Your Agricultural Space

It is best to regularly attend to the agricultural space because it is much easier to pull a couple handfuls of weeds a day than to occasionally go out and pull weeds for several hours. How much maintenance your agricultural space will need is dependent on its size. Additional help may be needed in order to maintain a medium or large agricultural space. In addition to regular help from youth, it is recommended to ask community members, teachers, and parents to volunteer. If possible, reward youth for working in the agricultural space with free produce and credit for community service or volunteer hours.

Common Cooking Equipment

The following is a list of suggested cooking equipment to provide for Teens CAN cooking lessons.

Cooktop

Note: if using portable stovetops, induction is recommended for safety

Cutting board

Colander

Measuring cups

Measuring spoons

Pot holder

Tongs

Slotted spoon

Cooking spoon

4-quart or larger saucepan
Note: if using induction cooktops, be sure to check compatibility

10-inch or larger skillet
Note: if using induction cooktops, be sure to check compatibility

Whisk

Can opener

Vegetable peeler
Note: peelers that come with safety covers are recommended

Kitchen towel

Chef's knife
Note: safety chef's knives designed for children are available online

Educational Standards

Teens CAN: Comprehensive Food Literacy in Cooking, Agriculture, and Nutrition is an innovative curriculum that was developed using Backward Design with Social Cognitive Theory and Constructivism as theoretical frameworks. This curriculum aims to support improving knowledge in a variety of topics relating to food literacy and developing skills to maintain a healthy lifestyle across the lifespan. *Teens CAN* is available for download in both English and Spanish.

How to Use these Standards:

Teens CAN was designed to be implemented sequentially. The lessons are easily modified depending on the target audience and can be implemented in a formal classroom setting or an informal learning environment.

NGSS: If a standard is marked with a filled circle (●), it indicates that at least one of the lessons listed fully fulfills the standard. This includes only lesson activities and not additional activities, which may provide further application for the standard. If a standard is marked with an open circle (○), it means that the lessons could meet the standard with some modification to suit the grade level. Specifically, lessons that contain an open circle typically have additional activities or lesson activities that can meet the standard with minor modifications. If the entire column is marked with a dash (-), it indicates that none of the lessons in the curriculum fulfill the standard.

Common Core: If a standard is marked with a **bolded** grade level (**9**), it indicates that the module listed fully fulfills the standard. This includes only lesson activities and agricultural applications and not additional activities, which may provide further application for the standard. If a standard is marked with an underlined grade level (9), it means that the lessons could meet the standard with some modification to suit the grade level. Specifically, lessons that contain an underline will typically have additional activities or lesson activities that can meet the standard with minor modifications. If the entire column is marked with a dash (-), it indicates that none of the lessons in the curriculum fulfill the standard.

*Only grade levels to which standards apply are listed

Next Generation Science Standards (High School)	Grade Level	Activity Modules											
		A 1	A 2	A 3	A 4	N 1	N 2	N 3	N 4	C 1	C 2	C 3	C 4
LS1: From Molecules to Organisms: Structures and Processes	Ninth-Twelfth		○			○	○	○	○	○			
LS2: Ecosystems: Interactions, Energy and Dynamics	Ninth-Twelfth	○	●	●	○		○	●	○				
LS3: Heredity: Inheritance and Variation of Traits	Ninth-Twelfth	-	-	-	-	-	-	-	-	-	-	-	-
LS4: Biological Evolution: Unity and Diversity	Ninth-Twelfth		○	○					○				
PS1: Matter and its Interactions	Ninth-Twelfth	-	-	-	-	-	-	-	-	-	-	-	-
PS2: Motion and Stability: Forces and Interactions	Ninth-Twelfth	-	-	-	-	-	-	-	-	-	-	-	-
PS3: Energy	Ninth-Twelfth		○										
PS4: Waves and their Applications in Technology for Information Transfer	Ninth-Twelfth	-	-	-	-	-	-	-	-	-	-	-	-
ESS1: Earth's Place in the Universe	Ninth-Twelfth	-	-	-	-	-	-	-	-	-	-	-	-
ESS2: Earth's Systems	Ninth-Twelfth		○	●				●					
ESS3: Earth and Human Activity	Ninth-Twelfth	●	●	●	●		○	●	○	○		○	○
ETS1: Engineering Design	Ninth-Twelfth	○	○	●	●	○		○	○			○	

*Only grade levels to which standards apply are listed

Common Core State Standards in English Language Arts Supported (9-12)												
	A 1	A 2	A 3	A 4	N 1	N 2	N 3	N 4	C 1	C 2	C 3	C 4
Reading Standards for Literature												
Key Ideas and Details	-	-	-	-	-	-	-	-	-	-	-	-
Craft and Structure	-	-	-	-	-	-	-	-	-	-	-	-
Integration of Knowledge and Ideas	-	-	-	-	-	-	-	-	-	-	-	-
Range of Reading and Level of Text Complexity	-	-	-	-	-	-	-	-	-	-	-	-
Reading Standards for Informational Text												
Key Ideas and Details	-	-	-	-	-	-	-	-	-	-	-	-
Craft and Structure	-	-	-	-	-	-	-	-	-	-	-	-
Integration of Knowledge and Ideas		9, 10	9, 10					9, 10, 11, 12				
Range of Reading and Level of Text Complexity	-	-	-	-	-	-	-	-	-	-	-	-
Writing Standards												
Text Types and Purposes	-	-	-	-	-	-	-	-	-	-	-	-
Production and Distribution of Writing	-	-	-	-	-	-	-	-	-	-	-	-
Research to Build and Present Knowledge	-	-	-	-	-	-	-	-	-	-	-	-
Range of Writing	-	-	-	-	-	-	-	-	-	-	-	-
Speaking and Listening Standards												
Comprehension and Collaboration	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**
Presentation of Knowledge and Ideas	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	**9, 10, 11, 12**	9, 10, 11, 12	9, 10, 11, 12	9, 10, 11, 12	9, 10, 11, 12
Language Standards												
Conventions of Standard English	-	-	-	-	-	-	-	-	-	-	-	-
Knowledge of Language	-	-	-	-	-	-	-	-	-	-	-	-
Vocabulary Acquisition and Use	-	-	-	-	-	-	-	-	-	-	-	-

*Only grade levels to which standards apply are listed

Common Core State Standards Supported in History/Social Studies, Science, and Technical Subjects (9-12)												
	A 1	A 2	A 3	A 4	N 1	N 2	N 3	N 4	C 1	C 2	C 3	C 4
Reading Standards for Literacy in History/Social Studies												
Key Ideas and Details		9, 10	**9, 10**, 11, 12									
Craft and Structure		9, 10	**9, 10**	**9, 10**								
Integration of Knowledge and Ideas	-	-	-	-	-	-	-	-	-	-	-	-
Range of Reading and Level of Text Complexity	-	-	-	-	-	-	-	-	-	-	-	-
Reading Standards for Literacy in Science and Technical Subjects												
Key Ideas and Details			9, 10, 11, 12				9, 10, 11, 12					
Craft and Structure	-	-	-	-	-	-	-	-	-	-	-	-
Integration of Knowledge and Ideas	-	-	-	-	-	-	-	-	-	-	-	-
Range of Reading and Level of Text Complexity	-	-	-	-	-	-	-	-	-	-	-	-
Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects												
Text Types and Purposes	-	-	-	-	-	-	-	-	-	-	-	-
Production and Distribution of Writing	-	-	-	-	-	-	-	-	-	-	-	-
Research to Build and Present Knowledge	-	-	-	-	-	-	-	-	-	-	-	-
Range of Writing	-	-	-	-	-	-	-	-	-	-	-	-

*Only grade levels to which standards apply are listed

Common Core Standards in Mathematics (9-12)												
	A 1	A 2	A 3	A 4	N 1	N 2	N 3	N 4	C 1	C 2	C 3	C 4
Number and Quantity	-	-	-	-	-	-	-	-	-	-	-	-
Algebra	-	-	-	-	-	-	-	-	-	-	-	-
Functions	-	-	-	-	-	-	-	-	-	-	-	-
Modeling	-	-	-	-	-	-	-	-	-	-	-	-
Geometry	-	-	-	-	-	-	-	-	-	-	-	-
Statistics and Probability	-	-	-	-	-	-	-	-	-	-	-	-

Teens CAN does not meet the Common Core Standards for Mathematics.

*Only grade levels to which standards apply are listed

Health Standards (9-12)												
	A 1	A 2	A 3	A 4	N 1	N 2	N 3	N 4	C 1	C 2	C 3	C 4
Nutrition and Physical Activity												
Standard 1: Essential Concepts				○	●	●	●	●	●			
Standard 2: Analyzing Influences	●	○	●	●	●	●	●	●				
Standard 3: Accessing Valid Information				●				●				
Standard 4: Interpersonal Communication				○								
Standard 5: Decision Making					●	○	●		●	○	○	○
Standard 6: Goal Setting				●	●	●	●		○	○	○	○
Standard 7: Practicing Health-Enhancing Behaviors	○	○		○	●	●	●					
Standard 8: Health Promotion					○	○	○	○	○	○	○	○
Mental, Emotional, and Social Health												
Standard 1: Essential Concepts				●	○							
Standard 2: Analyzing Influences	-	-	-	-	-	-	-	-	-	-	-	-
Standard 3: Accessing Valid Information	-	-	-	-	-	-	-	-	-	-	-	-
Standard 4: Interpersonal Communication	-	-	-	-	-	-	-	-	-	-	-	-
Standard 5: Decision Making	-	-	-	-	-	-	-	-	-	-	-	-
Standard 6: Goal Setting	-	-	-	-	-	-	-	-	-	-	-	-
Standard 7: Practicing Health-Enhancing Behaviors	-	-	-	-	-	-	-	-	-	-	-	-
Standard 8: Health Promotion	-	-	-	-	-	-	-	-	-	-	-	-

*Only grade levels to which standards apply are listed

Personal and Community Health												
Standard 1: Essential Concepts	○	○	○	○	●	○	●	○	○	○	○	○
Standard 2: Analyzing Influences			○	○	○	●	○					
Standard 3: Accessing Valid Information								○				
Standard 4: Interpersonal Communication	-	-	-	-	-	-	-	-	-	-	-	-
Standard 5: Decision Making					○	○	○					
Standard 6: Goal Setting	-	-	-	-	-	-	-	-	-	-	-	-
Standard 7: Practicing Health-Enhancing Behaviors				●					○		○	○
Standard 8: Health Promotion	○		○	○	○	○	○	○				

Teens CAN does not meet the health standards for the following subsections: *Growth, Development, and Sexual Health*; *Injury Prevention and Safety; Alcohol, Tobacco, and Other Drugs.*

*Only grade levels to which standards apply are listed

Agriculture Module 1: **Farm to Market Marathon**

BACKGROUND INFORMATION

The **food supply chain** describes the process in which food is produced, transported, and distributed throughout the market. This dynamic process includes many steps and involves several moving parts to get products from the **producer** to the **consumer**. Most products, including everything from cotton sweaters to fresh fruits and vegetables, that can be bought at a local store or online originally come from a farm and are developed through **agriculture**. It is vital that a plot of land is properly prepared by plowing and turning the soil, which will allow for crops to grow more easily. As the seed is growing, the land is watered, and weeds are removed in order for the crop to grow properly.

A common way of consuming goods is through large food production and distribution. After the products are produced at the farm, vehicles, such as trucks, planes, and boats, are used to transport the items. The product is then processed by first line handlers, that sort, store, and package items to create finished food products. These finished products are then transported and sold to warehouses through wholesale. Manufacturers then provide these goods to retail food sectors such as grocery stores, restaurants, and vending machine companies for individual consumers to purchase. The consumer is then the last actor in the food supply chain. How far the food is transported determines the amount of **food miles** needed to get the products from the producer to the consumers' homes.

Once the crop is produced and ready to sell, there are different types of markets a producer can contribute their product to within the food supply chain. If there is a small amount of product produced, farmers sell their crops through **direct marketing**. Food supply chains that use direct marketing are generally shorter and promote purchasing fresh products. In this type of exchange, the farmer delivers their goods directly to individual consumers. A **farmers market** is a designated area in which this process takes place on a local scale. Through direct marketing, the financial gain of the produce may be greater for the local farmers because the consumer is directly paying the producer for their goods with little to no transportation, packaging, or retail store fees included. Another popular direct marketing concept is Community Supported Agriculture (CSA) programs. Local farmers may use a CSA program to generate a more constant source of revenue because consumers subscribe to receiving a weekly or biweekly produce box. Consumers can pick-up their boxes from the farm, at a local drop-off site, or the farmer may even deliver the boxes directly to the consumers' houses.

CONCEPTS AND VOCABULARY

Agriculture: The process of preparing a piece of land to grow and produce crops and other items that can be used for consumer markets such as food, clothes, and fuel

Consumer: An individual or manufacturer that buys products from an entity that creates goods

Direct marketing: The direct purchasing of food from the farmers that produced the food in order to promote local businesses, agriculture, and lessen the amount of transportation required for the good to reach the consumer

Farmers market: A designated area where local farmers vend their products, primarily fruits, vegetables, meats, dairy products, and baked goods to consumers fruits, vegetables, meats, dairy products, and baked goods to consumers

Food miles: The distance required for food to travel from the producer to the consumer

Food supply chain: The process of how food items are produced and distributed from the producer to the consumer in a complex and systematic way

Producer: An individual or manufacturer that creates or grows goods

MATERIALS NEEDED

- Flip chart paper
- Writing utensils
- Tape or glue
- Scissors, two per group
- *Strawberry and Strawberry Jam* (Appendix A1.1), one per group
- *Food Supply Chain* (Appendix A1.2), one per group
- *Food Supply Chain Answer Key* (Appendix A1.3), one per group

Materials provided in curriculum

TIME REQUIRED
45 to 60 minutes

SUGGESTED GROUPINGS
Small groups of 3 to 4

GETTING READY

- ☐ Make copies of *Strawberry and Strawberry Jam* (Appendix A1.1), one for each group.
- ☐ Make copies of *Food Supply Chain* (Appendix A1.2), one for each group. Tape or glue the four sheets together so that page 2 overlaps onto page 1 and page 4 overlaps onto page 3 at the blue line. Reference the complete flow chart using the *Food Supply Chain Answer Key* (Appendix A1.3) if needed.
- ☐ Make double-sided copies of *Food Supply Chain Answer Key* (Appendix A1.3), one for each group.

  Facilitator tip: It is recommended that the Food Supply Chain Answer Key be laminated to allow it to be more easily handled by youth and reused.
- ☐ Organize youth into small groups of 3 – 4 youth.
- ☐ Provide each group with one sheet of flip chart paper and writing utensils to answer opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

- Explain what you know about how food is produced.
- Explain what you know about how food gets from a farm to your plate.

PROCEDURE (EXPERIENCING)

1. Provide each group with *Strawberry and Strawberry Jam*, *Food Supply Chain*, and two pairs of scissors.
2. Explain that *Strawberry and Strawberry Jam* includes the steps, out of order, of how strawberries make it from the strawberry field to the plate as either fresh strawberries or strawberry jam.
3. Ask youth to read the various boxes and cut them out along the bold line.
4. Ask youth to complete the *Food Supply Chain* for fresh strawberries and strawberry jam by placing the pieces they just cut out onto the *Food Supply Chain* in the correct order from producer to consumer. All boxes will be used once in completing the food supply chain and there are two sheets of boxes.
5. Once groups have completed the *Food Supply Chain*, provide each group with a *Food Supply Chain Answer Key* and ask youth to compare the food supply chain they constructed with the one in the *Food Supply Chain Answer Key.*

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *Food Supply Chain* and discuss how they determined the order of the segmented pieces and whether their figure differed from that in the *Food Supply Chain Answer Key*.

Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about the food supply chain. If necessary, ask more targeted questions.

- Explain why some steps in the food supply chain take longer than others (denoted by longer arrows on the *Food Supply Chain*).
- Explain how the steps for the grocery store differ from those of the farmers market.
- Explain how the steps for fresh strawberries differ from those of the strawberry jam.
- Describe how you think technological innovations over time may have helped improve the food chain process.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure youth understand that the **food supply chain** is complex set of interdependent steps that require input and maintenance from several different roles. Youth should also recognize that the steps of the food supply chain can vary depending on the end product, the point of sale location, and a host of other factors. The ultimate goal of the food supply chain is to efficiently get products from the **producer** to the **consumer**. Additionally, make sure that key vocabulary terms are either discovered by the youth or introduced to them: **agriculture**, **direct marketing**, **farmers market**, and **food miles**.

AGRICULTURE APPLICATION

MATERIALS NEEDED

- ☐ *Farm Tour Guide (*Appendix A1.4), one per group
- ☐ Clipboards, one per group (recommended)
- ☐ Writing utensils
- ☐ Transportation to an agricultural system, if applicable
- ☐ Agriculture maintenance equipment

Materials provided in curriculum

TIME REQUIRED

20 to 30 minutes

SUGGESTED GROUPINGS

Small groups of 3 to 4

GETTING READY

- ☐ Coordinate with a local producer to have the youth tour their agricultural system or to have the producer visit your agricultural space.
- ☐ Make copies of *Farm Tour Guide* (Appendix A1.4), one for each group.
- ☐ Supply enough materials to allow each youth to maintain their designated area in the agricultural space.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.

PROCEDURE (EXPERIENCING)

1. Provide each group with *Farm Tour Guide*, writing utensils, and a clipboard (if using).
2. Provide a brief introduction for the producer and explain to the youth that they will be completing the *Farm Tour Guide* while the producer discusses their role in the food supply chain and how their products get to consumers. If applicable, the youth will also be touring the producer's agricultural system.
3. With any time remaining, lead youth in maintaining their designated growing section. This may include discarding weeds, supplying additional nutrients, and watering plants.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their their *Farm Tour Guide* and discuss the operation they learned about from the producer and how it fits into the food supply chain. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about the producer's agricultural system.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *Interview* (Appendix A1.5), one per youth

TIME REQUIRED

5 to 10 minutes

Materials provided in curriculum

GETTING READY

☐ Make copies of *Interview* (Appendix A1.5), one for each youth.

PROCEDURE (EXPERIENCING)

1. Provide each youth with a copy of *Interview*.
2. Ask youth to identify someone they know who has a role in the food supply chain.
3. Ask youth to use *Interview* to ask that person about their role in the food supply chain.

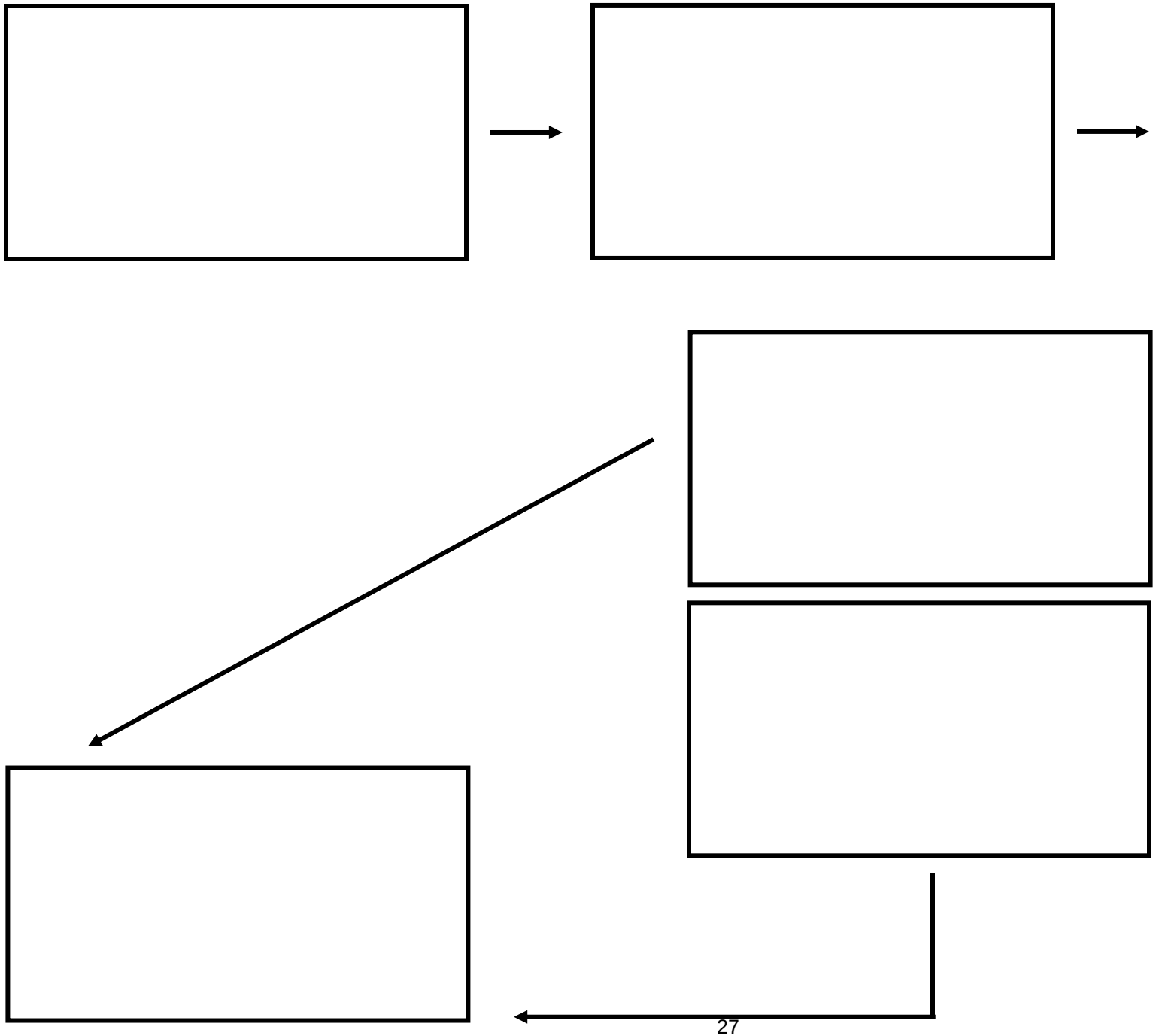
SHARING, PROCESSING, AND GENERALIZING

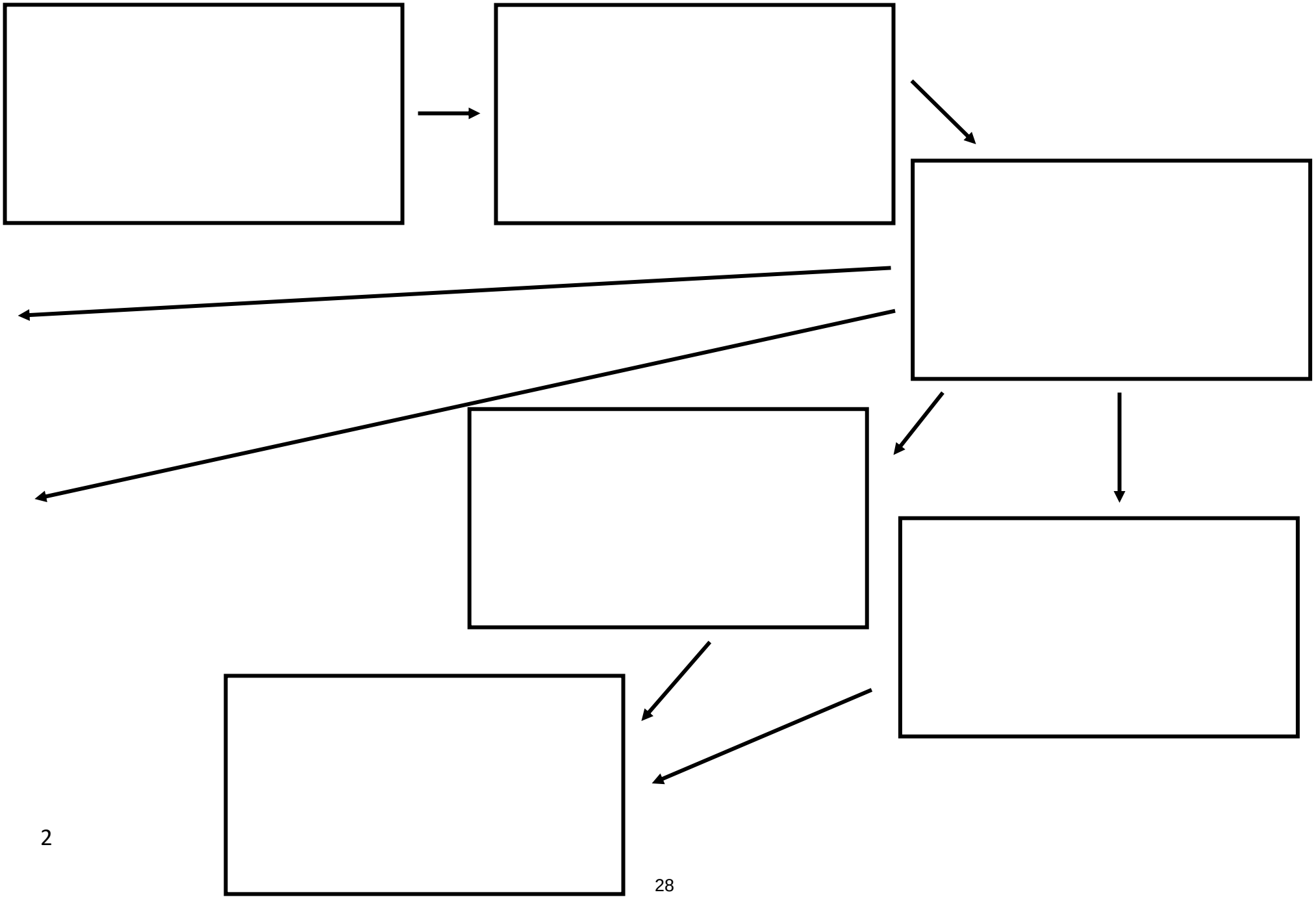
Have the youth share their *Interview* and discuss how the person they interviewed fits into the food supply chain. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about the various roles in the food supply chain.

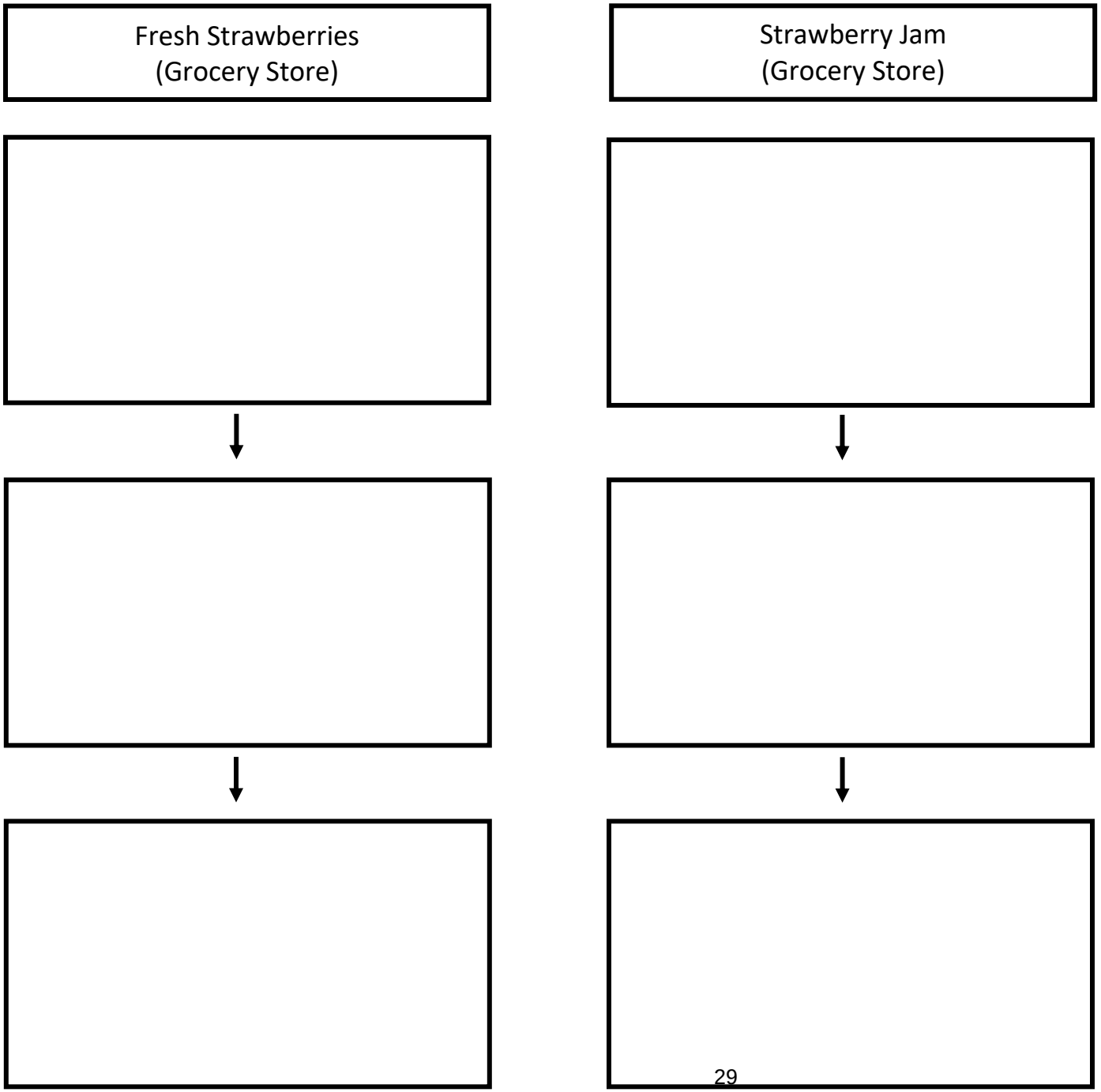
Directions: It is your task to figure out how fresh strawberries make it from the strawberry field to your plate. To do this, cut and paste the following boxes onto the Food Supply Chain worksheet

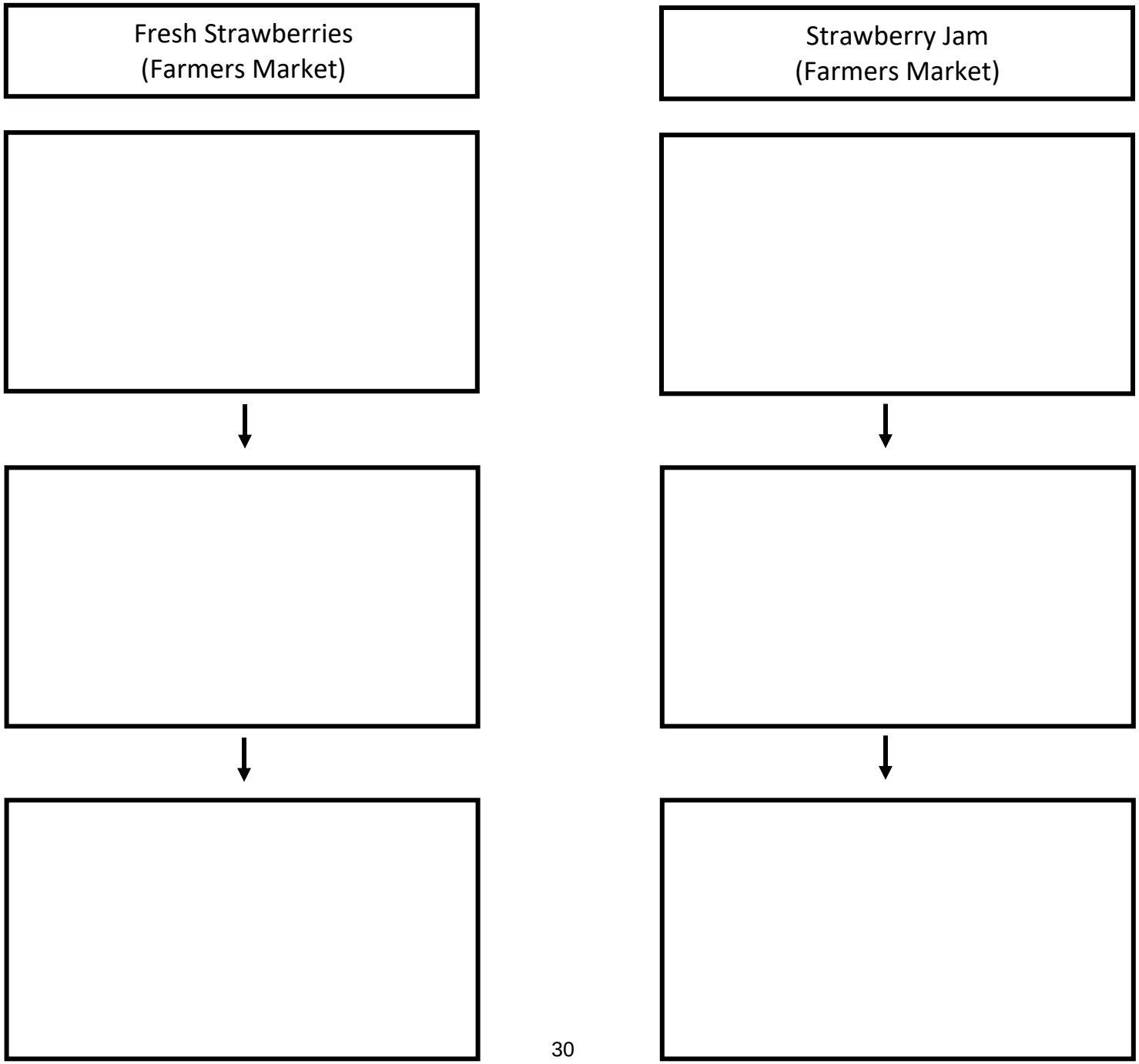
Strawberries are fully ripe	Fresh strawberries are packaged to be sold at the farmers market	After purchasing strawberries, wash them and enjoy!
Strawberry jam is purchased by consumers and taken home to enjoy	Fresh strawberries are transported to the distribution center to be packaged and refrigerated	Ripe fresh strawberries arrive at the grocery store
Fresh strawberries are handpicked, which requires a lot of physical labor	It’s 6am! It’s time for labor workers to go to work to harvest	Strawberry jam is priced, labeled with an expiration date (~6–9 months), recorded into inventory, and stocked
Fresh strawberries and homemade strawberry jam are transported to the farmers market	Fresh strawberries are locally made into jam and packaged for sale	Fresh strawberries and strawberry jam are packed onto a truck and transported to the grocery store

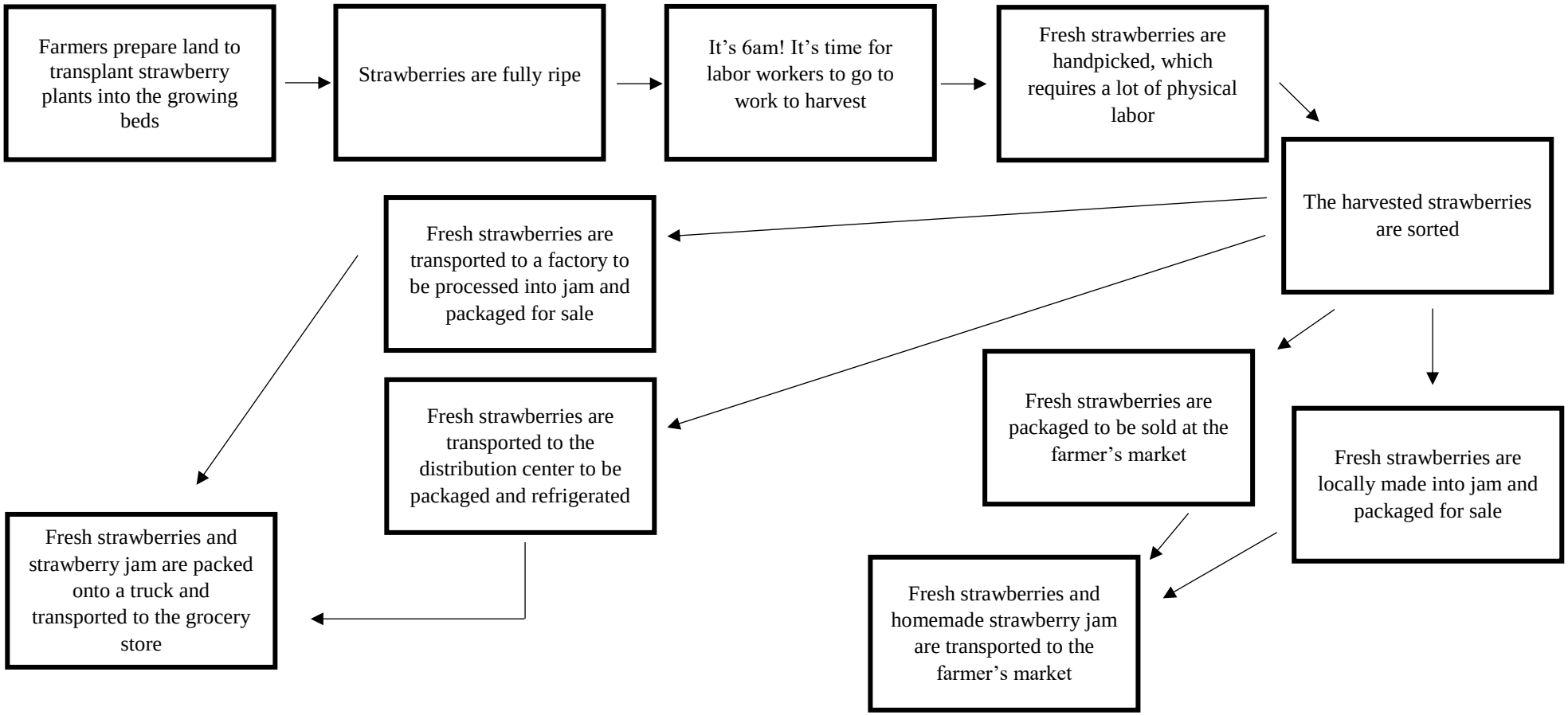
Strawberry jam arrives at the grocery store	Homemade strawberry jam arrives at the farmer's market	Fresh strawberries are transported to a factory to be processed into jam and packaged for sale
Fresh strawberries are displayed and labeled for sale	Fresh strawberries are priced, labeled with an expiration date (~1-week shelf life), recorded into inventory, and stocked	After purchasing strawberries, wash them and enjoy!
Farmers prepare land to transplant strawberry plants into the growing beds	Strawberry jam is purchased by consumers and taken home to enjoy	Strawberry jam is displayed and labeled for sale
The harvested strawberries are sorted	Ripe fresh strawberries arrive at the farmer's market	

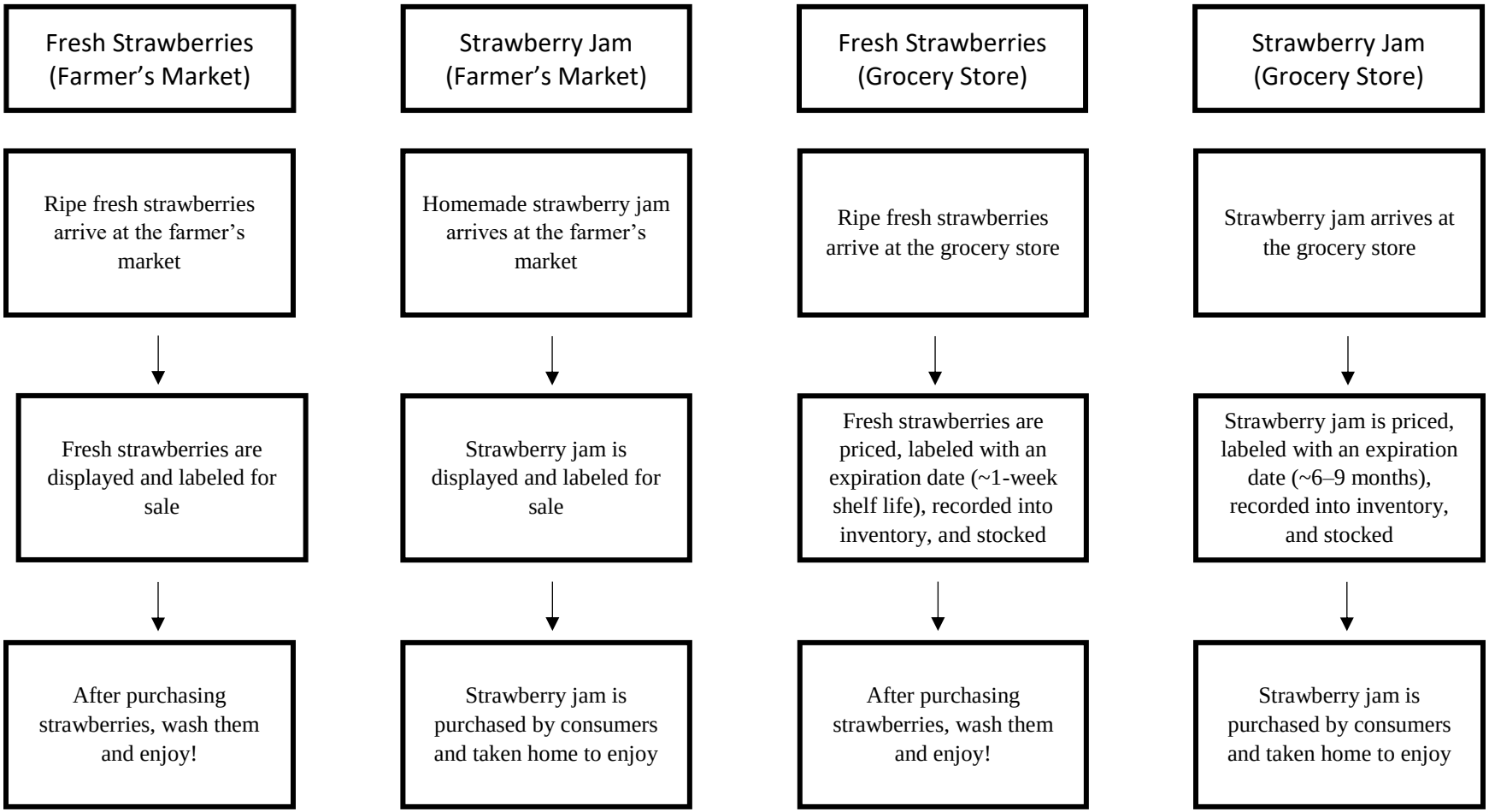





Fresh Strawberries
(Grocery Store)
Strawberry Jam
(Grocery Store)


Fresh Strawberries
(Farmers Market)
Strawberry Jam
(Farmers Market)


Farmers prepare land to transplant strawberry plants into the growing beds
Strawberries are fully ripe
It's 6am! It's time for labor workers to go to work to harvest
Fresh strawberries are handpicked, which requires a lot of physical labor
The harvested strawberries are sorted
Fresh strawberries are transported to a factory to be processed into jam and packaged for sale
Fresh strawberries are transported to the distribution center to be packaged and refrigerated
Fresh strawberries are packaged to be sold at the farmer's market
Fresh strawberries are locally made into jam and packaged for sale
Fresh strawberries and strawberry jam are packed onto a truck and transported to the grocery store
Fresh strawberries and homemade strawberry jam are transported to the farmer's market


Fresh Strawberries (Farmer's Market)
Ripe fresh strawberries arrive at the farmer's market
Fresh strawberries are displayed and labeled for sale
After purchasing strawberries, wash them and enjoy!
Strawberry Jam (Farmer's Market)
Homemade strawberry jam arrives at the farmer's market
Strawberry jam is displayed and labeled for sale
Strawberry jam is purchased by consumers and taken home to enjoy
Fresh Strawberries (Grocery Store)
Ripe fresh strawberries arrive at the grocery store
Fresh strawberries are priced, labeled with an expiration date (~1-week shelf life), recorded into inventory, and stocked
After purchasing strawberries, wash them and enjoy!
Strawberry Jam (Grocery Store)
Strawberry jam arrives at the grocery store
Strawberry jam is priced, labeled with an expiration date (~6–9 months), recorded into inventory, and stocked
Strawberry jam is purchased by consumers and taken home to enjoy

Directions: Complete the following tables for the producer's agricultural system.

Producer name:
Producer occupation:
Site name:
Type of agricultural system:

Products grown:	Steps needed to produce products:
Steps needed to transport products:	Steps needed to distribute products:
Places products are sold:	Uses of products:

Interview Questions

Directions: Identify someone who has a role in the food supply chain. Ask that person the following questions to learn more about their effect on the food supply chain.

1. What is your role in the food supply chain?

2. Why do you think your role in the food supply chain is important?

3. What steps do you think need to happen before your role for the food supply chain to work effectively?

4. What steps do you think need to happen after your role for the food supply chain to work effectively?

Agriculture Module 2: **Exploring Agricultural Systems**

BACKGROUND INFORMATION

The cultivation and production of foods are more varied and complex than one might think. There are many **agricultural systems**, which involve growing crops or livestock for the purposes of food, fuel, fibe , and feed. Different agricultural systems have aspects that make them beneficial for di ferent locations. These aspects can include the resources available that make the different growing methods possible. Each system can also contribute to cultural, environmental, and economic aspects of society.

Aquaponic systems feature a combination of aquaculture with **hydroponics**, allowing for the growing of fish as well as plants in a closed system. The waste from the fish feeds the plants, while the plants provide clean water for the fish. This symbiotic and self-regulated system mimics nature by recycling water and nutrients, making it an example of sustainable agriculture. Aquaponics can be implemented using **vertical farming**. This innovative form of farming is typically set in an urban environment and includes crops and plants being grown inside or on top of a building. With space sometimes being a limited resource, this method is an effective way of farming almost anywhere. Another agricultural system that can be found in an urban setting is **school gardens**. These types of gardens are located on the school campus and are operated by the teachers, students, volunteers, and other school community members. Sometimes the produce grown in this system is included in the school cafeteria offerings or harvested and sold to school community members. School gardens can also be incorporated into the school curriculum and be utilized to educate students about nutrition, science, and the environment among other subjects.

Unlike these more recently developed agricultural systems, the **Hopi tribe** has displayed more traditional farming techniques for centuries. They are a sovereign nation known for their history of respecting the earth with their farming and treatment of natural resources. The Hopi people utilize a technique called “dry farming.” Rather than irrigation systems that add water to a system, this technique relies solely on rain and runoff to cultivate crops, which reflects their tradition of following Masaw (a way of simplicity and humility). Corn is the most significant crop for the Hopi tribe, as it is used for consumption and ceremonial purposes, and is tended to in a sacred manner by blessing, talking, and singing to the seeds and ears. The Hopi tribe methods are just one example of indigenous growing practices, which vary tribe to tribe and largely depend upon the climate of the land. In contrast to the Hopi tribe’s manner of farming corn, **conventional corn farming** is the mass production of corn that utilizes seeds that have typically been genetically altered in order to produce larger quantities with lower production costs. Unlike other systems, conventional corn farms grow most corn to sell as livestock feed or to produce biofuel, instead of for human consumption. Conventional corn produced on a large-scale that does go towards food for humans is typically not the same as the sweet corn that we eat

fresh on the cob. Instead these systems grow “field corn,” which is generally processed into other foods like cereal, oil, or high fructose corn syrup.

These agricultural systems are just a few examples of the vast variety of agricultural systems implemented across the United States. Different agricultural systems benefit society in di ferent ways by providing communities, small and large, food to eat while balancing use of **natural resources**. These natural resources include materials provided by the environment that people are able to use, such as water, oil, wood, wind, iron, coal, and soil. With the vast importance of natural resources for maintaining agricultural systems, **agroclimate** scientists study how climate can affect agriculture. Within this field of stud , researchers are assessing techniques to create agricultural processes that are resilient to climate change. Consequently, by accounting for the climate, these new processes will hopefully benefit the environment and agricultural systems by providing better water quality, fewer greenhouse gas emissions, and less soil erosion.

CONCEPTS AND VOCABULARY

Agricultural systems: Systems that involve the growing of crops or livestock for the purposes of food, fuel, fibe , and feed

Agroclimate: The concept used to describe the relationship between changes in climate and agricultural production

Aquaponics: A sustainable system that involves using fish waste to provide nutrients to plants while the plants provide clean water and food for the fis

Conventional corn farming: Mass production of corn at fast rates to predominantly produce livestock feed or biofuel

Hopi tribe: Sovereign nation known for their history of traditional farming practices and respecting natural resources

Hydroponics: The growing of plants using water instead of soil as the growing medium and source of nutrients

Natural resources: Materials provided by the environment that can be used by humans, including in agriculture

School gardens: Garden at school sites that can be used for educational purposes and also to provide produce for the school

Vertical farming: An innovative form of farming typically set in urban environments in which crops and plants are grown inside or on top of a building

MATERIALS NEEDED

- Flip chart paper
- Writing utensils
- *Ag System Cards* (Appendix A2.1)

Materials provided in curriculum

TIME REQUIRED

45 to 60 minutes

SUGGESTED GROUPINGS

Small groups of 3 to 4

GETTING READY

- ☐ Make one copy of the *Ag System Cards* (Appendix A2.1). Cut the *Ag System Cards* apart and organize them into the appropriate four agriculture systems.

  Facilitator tip: It is recommended that the Ag System Cards be laminated to allow them to be more easily handled by youth and reused.

- ☐ Fold the flip chart paper for each group into a trifold
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.

- ☐ Provide each group with one sheet of folded flip chart paper and writing utensils to answer opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses in the first third of the flip chart paper provided and sharing their ideas verball .

- Explain what you know about different methods of growing produce.
- Explain what you know about the differences between small-scale and large-scale food production.

PROCEDURE (EXPERIENCING)

1. Ask youth to use the middle section of their folded flip chart paper to describe or draw wher they think food originally comes from.
2. Ask each group to share one or two aspects of where they think food originally comes from.
3. Provide each group with one of the four agricultural systems represented on the *Ag System Cards*: Aquaponics, School Garden, Conventional Corn Farm, or Hopi Tribe.
4. Ask the youth to use the remaining section of their folded flip chart paper to create representation of the agricultural system described in their *Ag System Cards*.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their representation of their *Ag System Cards* and discuss how it compares to their original idea of where food originally comes from.

Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about different agricultural systems. If necessary, ask more targeted questions:

- Explain what similarities you noticed between the agricultural systems.
- Explain what differences you noticed between the agricultural systems.
- Explain why you think we have so many different types of agricultural systems.
- Describe the benefits of a large-scale agricultural system
- Describe the benefits of a small-scale agricultural system

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure youth understand the importance of different **agricultural systems** such as **aquaponics, school gardens, conventional corn farming**, and dry framing techniques used by the **Hopi tribe**. Youth should also be able to compare and contrast agricultural systems and methods as well as recognize that agriculture includes a large and diverse range of methods, stakeholders, **natural resources**, and **agroclimatic** conditions. Additionally, youth should understand that the agricultural systems presented in this activity only represent a few of the many agricultural systems implemented around the United States. Make sure that key vocabulary terms are either discovered by the youth or introduced to them: **hydroponics** and **vertical farming**.

AGRICULTURE APPLICATION

MATERIALS NEEDED

- ☐ *Garden Friend or Foe (*Appendix A2.2), one per group
- ☐ *Critter Glossary (*Appendix A2.3), one per group
- ☐ Clipboards, one per group
- ☐ Agricultural maintenance equipment

Materials provided in curriculum

TIME REQUIRED

10 to 15 minutes

GETTING READY

- ☐ Make copies of *Garden Friend or Foe* (Appendix A2.2), one for each group
- ☐ Make double-sided copies of *Critter Glossary* (Appendix A2.3), one for each group

  Facilitator tip: It is recommended that the Critter Glossary be laminated to allow it to be more easily handled by youth and reused.
- ☐ Supply enough materials to allow each youth to maintain their designated area in the agricultural space.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.

PROCEDURE (EXPERIENCING)

1. Explain to youth that agricultural systems are comprised of multiple smaller systems and include animals and insects that make up a complex food web required for the survival of any agricultural system.
2. Provide each group with *Garden Friend or Foe*.
3. Ask the youth to walk around the agricultural space and investigate some of the living elements present in the system. While youth tour the agricultural space, they should record the name of each animal or insect they encounter and whether they think that animal or insect benefits or

harms the system on *Garden Friend or Foe*.

4. Provide each group with the *Critter Glossary* and ask youth to compare their *Garden Friend or Foe* with the information provided in the glossary.
5. With any time remaining, lead youth in maintaining their designating growing section. This may include discarding weeds, supplying additional nutrients, and watering plants.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *Garden Friend or Foe* and discuss the types of animals and insects that were found in the agricultural space. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share the smaller systems they discovered and how they think each animal or insect affects their agricultural space.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *My Critter Card* (Appendix A2.4), one per youth

TIME REQUIRED

5 to 10 minutes

Materials provided in curriculum

GETTING READY

☐ Make copies of *My Critter Card* (Appendix A2.4), one for each youth.

PROCEDURE (EXPERIENCING)

1. Provide each youth with a copy of *My Critter Card.*
2. Ask youth to complete the *My Critter Card* by adding an image and description about an animal or insect found in agricultural systems.
3. Encourage youth to decorate the *My Critter Card* however they would like.

   Facilitator tip: It is recommended that the completed cards be laminated and displayed in the agricultural space by attaching them to craft sticks and putting them in the ground or zip tying the cards to fencing (if present).

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *My Critter Card* and discuss what they learned about the animal or insect of their choosing. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about an animal or insect and whether it is beneficial or harmful to an agricultural system.

Aquaponics – Definition	Aquaponics – Labor	Aquaponics – Plant Crops	Aquaponics – Animals
An aquaponic system combines aquaculture (raising aquatic animals such as fish in tanks) with hydroponics (cultivating plants in water) in an environment where they rely upon each other for necessary nutrients.	If in a commercial setting where products are grown for profit, the growers will be the main laborers. If run for educational purposes, community members may also help.	Crop choices are based on community needs/desires and what may be profitable. Possible crop choices include cabbage, leafy green vegetables, herbs, cucumbers, peppers, onions, and tomatoes.	Fish are incorporated into this system and their waste is used to provide nutrients to plants. Pests and parasites are possible and include worms, leaches, protozoa, copepods, and mollusks. Pesticides should not be used to control insects on aquaponic plant crops because they pose a threat to fish.
Aquaponics – Funding Sources	**Aquaponics – Land**	**Aquaponics – Water**	**Aquaponics – Inputs**
Commercial systems usually combine grants and private investments. Educational systems tend to rely upon grants and private investments.	Soil is not needed, so this system can be done anywhere. Aquaponic systems require open space with at least some covering, such as greenhouses, and a light source, which can be either natural or artificial.	The system requires water to begin the cycling process. Aquaponic systems usually do not need to be replenished as frequently as hydroponic systems and, if everything is functioning normally, do not need to be emptied.	This system needs fish, fish feed, seeds or seedlings, containers for plants and fish, water pumps or wicking systems, energy for pumps, pH monitoring, and growth media.

Aquaponics – Purpose	Aquaponics – Outputs	School Garden – Definition	School Garden – Labor
If running commercially, the system provides food for consumers. If running for educational purposes, the system is used to teach communities about aquaponics.	Community members and other consumers receive or purchase fish and crops. The community may also receive lessons if the system is predominantly run for education.	A school garden is a space on a school site, most often outside, that can be used to feed school members and provide students with hands-on education about many subjects.	School gardens often rely upon the volunteer labor of parents, students, teachers, interns, and other community members.
School Garden – Plant Crops	**School Gardens – Animals**	**School Gardens – Funding Sources**	**School Gardens – Land**
Crops frequently grown include carrots, corn, peas, beans, squash, melons, cucumbers, broccoli, cauliflower, cabbage, tomatoes, peppers, lettuce, kale, chard, potatoes, radishes, and beets.	Small animals such as chickens or bees can be raised if there is space and if school or local policies permit. Butterflies, worms, and lady bugs tend to be in the garden space. Worm castings can be used to fertilize plants and lady bugs provide some pest control. Potential pests include wild animals, aphids, beetles, and slugs.	School gardens often rely on grants. However, funds can also be raised by hosting events, getting support from local businesses, crowdfunding, selling merchandise, hosting plant sales, or selling garden produce in a farm stand or at a farmer's market.	Flat well-drained healthy soil is recommended for gardens. Healthy soil has good texture and structure, adequate beneficial organisms, and a sufficient supply of nutrients. The garden should receive at least six hours of sunlight a day and should also be accessible for all students. School garden land varies depending on what is available at the school.

School Gardens – Inputs	School Gardens – Water	School Gardens – Purpose	School Gardens – Outputs
School gardens need seeds, fertilizers, hand tools, signage for identifying crops, and water. Additionally, wood for raised beds, transplanting pots, large containers or pots, row covers for pests, compost, wheelbarrows, rakes, shovels, and fencing may also be used.	School gardens usually rely on drip irrigation systems, which are very efficient, but hand watering can be used as a way to get youth involved.	School gardens are primarily run for education, and secondarily run to produce fruits and vegetables. Harvested crops may be sold or given to students and volunteers free of charge.	Along with student education as an output, harvested crops can be sold to community members in a farm stand and also may be used in school lunches, cooking classes, and tastings.

Conventional Corn Farm – Definition	Conventional Corn Farm – Labor	Conventional Corn Farm – Plant Crops	Conventional Corn Farm – Animals
A conventional corn farm grows corn on a large plot of land for commercial production and is used for animal feed, fuel, or human consumption.	This system relies upon farmers and farmworkers. The number of employed farmworkers depends on the size of the farm and level of mechanization.	Corn production mostly uses a monocropping system, meaning that the farm plants and harvests only corn.	Animals are not usually raised in this system, though the corn grown is often used for animal feed.

Conventional Corn Farm – Land	Conventional Corn Farm – Funding Sources	Conventional Corn Farm – Inputs	Conventional Corn Farm – Water
Large-scale commercial corn production requires a large plot of land and healthy soil. Healthy soil is well-drained and has good texture and structure, adequate beneficial organisms, and a sufficient supply of nutrients.	The farmer will usually pay for expenses with their own money, loans from the bank, and subsidies from the government. These subsidies allow farmers to earn a certain price for their corn.	Inputs include corn seeds, large tractors, large trucks, machinery fuel, combined harvesters, water, and synthetic fertilizers, pesticides, and herbicides.	Corn requires large amounts of water. This system relies upon heavy use of irrigation systems, such as overhead sprinklers and rainfall to water the corn.
Conventional Corn Farm – Purpose	**Conventional Corn Farm – Outputs**	**Hopi Tribe Food Ways – Definition**	**Hopi Tribe Food Ways – Labor**
Corn production is almost always for profit when it is a large-scale commercial business. The corn grown is most often used for ethanol-based fuel, livestock feed, and for human consumption.	Corn is the only crop produced. This can go on to become ethanol-based fuel, livestock feed, and produce for human consumption.	The Hopi tribe has a rich history that includes cultural traditions and ceremonies involving agriculture. The Hopi Reservation is located in northeastern Arizona in a semiarid climate.	Work among tribal members is separated by gender. Cultural knowledge is passed from female generation to female generation. Women determine which crops should be grown and men plant the seeds. Overall, it is a shared community effort.

Hopi Tribe Food Ways – Plant Crops	Hopi Tribe Food Ways – Animals	Hopi Tribe Food Ways – Land	Hopi Tribe Food Ways – Funding Sources
Corn is the primary crop produced, but beans, melons, and squash are also grown. Tree crops such as peaches, apples, and apricots are grown as well.	Cattle, sheep, goats, and horses are often raised along with crops. Animal manure can be used to provide nutrients to plants.	Hopi land is often highly elevated with little rainfall. To cultivate crops, the Hopi find areas near flood plains, channels, and natural springs. Most Hopi farms are very small compared to large-scale commercial farms.	The Hopi are allotted money from the US government through laws such as the Navajo/Hopi Land Dispute Settlement Act of 1996. Additionally, most Hopi tribal members rely on nonfarm jobs for income.

Hopi Tribe Food Ways – Inputs	Hopi Tribe Food Ways – Water	Hopi Tribe Food Ways – Purpose	Hopi Tribe Food Ways – Outputs
Traditional hand tools such as the Hopi planting sticks are used along with hand planting. Other inputs include water, seeds, and livestock.	As the area is dry and can face extreme climate fluctuations such as droughts and floods, the Hopi rely on groundwater and have become successful in diverting water to their crops by use of channels, springs, and slopes to naturally capture water.	Crops are grown both for general consumption, as well as to be used in ceremonies, for offerings, in rituals, and for special occasions, such as weddings.	This system allows for the passing of cultural knowledge. It also generates crops and livestock to be used by the community, seeds for future use, and the use of the crops in traditional practices.

Explore the agricultural space and record any animals or insects you come across. Think about how those animals or insects interact with the plants being grown.

Name and/or picture of the critter	**Explain how you think the critter benefits or harms the garden.**

Critter	Description
Bee 	Bees are pollinators. Pollinators help flowers produce more seeds, which causes more flowers to grow. Many plants rely on bees for pollination.
Worm 	Worms increase the quality of the soil by decomposing organic matter and leaving castings. Castings, also known as worm poop, is a beneficial fertilizer that helps plants grow.
Ladybug 	Ladybugs consume other insects that may harm a garden. Ladybugs are commonly introduced into a garden or greenhouse by a farmer to work as a natural pest control.
Butterfly 	Butterflies and moths are pollinators, which help to increase flower and seed production. However, some caterpillars kill plants by consuming the leaves.
Snail 	Snails can be detrimental to the garden because they like to chew on the leaves of the plants.
Grasshopper 	Grasshoppers are herbivores and therefore eat the stems and leaves of plants. Small populations of grasshoppers tend to be harmless, but an infestation can cause the plants to die.

Critter	Description
Earwig 	Earwigs, or pincher bugs, are omnivorous. They prey on small, undesirable insects and help with decomposing. However, some earwigs destroy plants by eating leaves and fruit.
Hummingbird 	Hummingbirds feed on the nectar of flowers. This helps to cross-pollinate the plants and helps the flowers grow. In addition, hummingbirds also eat small insects.
Ant 	Ants dig tunnels under the soil, which helps plant roots get nutrients and water. Ants may also attract insects that are harmful to a farm or garden.
Fly 	Flies appear in the garden when things begin to decay. Certain types of flies, such as white flies, feed on leaves, but most flies are not harmful to plants. Flies are common when a garden has a compost pile.
Squirrel 	Squirrels help to spread and plant seeds by storing them in the soil. Squirrels like to dig holes, which can sometimes destroy the roots of plants.
Chicken 	Chickens act as pest controllers in the garden. Chickens eat insects, such as snails, which normally destroy the garden. Sometimes, chickens can eat the plants, but they prefer insects.

Directions: Learn more about an agricultural system critter of your choosing by visiting https://earthbox.com/bug-chart. Then complete the card below with an image and description of that critter.

Critter Image

Critter Description

Agriculture Module 3: **Innovating Agriculture**

BACKGROUND INFORMATION

There are a series of past inventions that are essential to the development of current agriculture systems. In 1698, the steam engine was invented and was one of the first innovations to greatly impact agriculture. After several innovators refined this invention, it was then implemented in carriages, locomotives for trains, and boats. Another invention that impacted the industry was the iron plow with interchangeable parts, patented in 1819. This improved tool was easier to repair and effective at breaking up rocks and tough soil to enhance farming efficiency. This invention created a solution to the poor **soil health** in many parts of the United States, but had a particular impact on areas with rocky compacted ground. As time progressed, more inventions increased the production of food, which created a concern for food storage. In 1834, the Mason jar was created and patented. Before his invention, food waste was very common because food was often exposed to oxygen for long periods of time and not shelf-stable. Mason's invention consisted of a glass jar, zinc screw on cap, and rubber ring, which provided an air-tight option for storing food. With the Mason jar, food safety was enhanced because all types of produce could be easily preserved for longer periods of time in these glass containers.

Over the next century, agriculture advanced as scientific understanding progressed. For instance, plants rely on nitrogen to grow, and farmers often add additional nitrogen to the soil using different methods. One such method is **nitrogen fixation**, which involves moving nitrogen from the atmosphere into the soil so it can be used by plants. Farmers can help nourish their crops by companion planting and including nitrogen-fixing plants, like beans, alfalfa, and peanuts, into a strategic crop rotation. The scientific process of nitrogen fixation was discovered in 1901, but the method of planting mutually-beneficial crops together has been used for hundreds of years.

Although its history dates back to 600 BC, vertical farming is another alternative method to traditional farming that gained popularity around 1920. Modern vertical farming is a process of growing produce indoors where the light, temperature, and water are all controlled, and the plants are stacked in concentrated rows. In this way of farming, produce can be grown within urban settings, such as cities, to compensate for **urban sprawl**.

As man-made inventions progress, manual labor for certain tasks has become less essential, as represented by the invention of the mechanical tomato harvester in 1959. Instead of having workers pick tomatoes, a tractor-like machine was invented to harvest the entire tomato plant and sort out the tomatoes all at once. Patented in 1952, the automated irrigation system also made agricultural systems more efficient and less reliant on laborers. Through automated irrigation systems, such as drip irrigation and sprinkler systems, sensors measure the amount of moisture in the soil and dispense

water based on the precise amount of water required. By practicing this method, farmers use water more efficiently.

In 1978, the first **Global Positioning System (GPS)** was launched, which made farming more precise and efficient. Using GPS has also been beneficial for locating, suppressing, and extinguishing fires. Using this navigation also allows farmers to accurately measure the land to guide tractors and other equipment while also determining the number of crops needed to enhance their yield. Another way to enhance product yield is through use of **Genetically Modified Organisms (GMOs)**. Although scientists developed GMOs beginning in the 1970s, the United States Department of Agriculture approved the first genetically modified food crop in 1992. GMOs have different features such as **pesticide resistance**, enhanced nutrition, and **drought** tolerance, which increase the viability of a plant. Thus, some farmers choose to plant genetically modified crops to reduce the need to apply inputs like pesticides and to increase yields.

As agriculture continues to evolve to become more environmentally and economically sustainable, a return to more traditional and holistic practices has been observed. For example, **agroecology** is an approach to agriculture that aims to work with nature rather than against it. Agroecological systems may include fruits and vegetables, tree crops, livestock, and humans. It calls upon traditional knowledge and practices as well as modern science to solve problems related to sustainability and social justice in food production methods. Different time periods have contributed to the concept of agroecology through the invention of key innovations and practices that have revolutionized the agricultural industry.

CONCEPTS AND VOCABULARY

Agroecology: An approach to farming that blends agriculture with the natural ecosystem to promote environmental sustainability and social justice

Drought: A condition of water scarcity that can happen due to inadequate rainfall, which may affect the water supply

Genetically Modified Organisms (GMOs): A plant or other organism whose genetics have been scientifically altered, typically to encourage favorable characteristics that may improve production

Global Positioning System (GPS): A digital tool that utilizes satellites to map land and can be used by farmers to produce crops through navigation and field measurement

Nitrogen fixation: A method of increasing the amount of nitrogen in soil to help plants grow

Pesticide: An organic or synthetic substance that is put on plants in order to kill, prevent, or control insects, weeds, mold, rodents, harmful bacteria, and other unwanted organisms that may harm the plant

Pesticide resistance: A genetic tolerance to pesticides built up by a population of pests over time when they are continuously treated with the same pesticides

Soil health: The ability of soil to perform essential functions, such as regulating water, providing nutrients, and giving the plant to have physical stability and support

Urban sprawl: Poorly planned expansion characterized by scattered buildings and the need for cars for transportation

MATERIALS NEEDED

- Flip chart paper, one sheet per group
- Writing utensils
- *Agricultural Innovation Cards* (Appendix A3.1), one per group
- *Timeline* (Appendix A3.2), one per group
- *Elements that Affect Agriculture* (Appendix A3.3), one per group
- Art supplies, such as construction paper, markers, glue, tape, and scissors

Materials provided in curriculum

TIME REQUIRED
45 to 60 minutes

SUGGESTED GROUPINGS
Small groups of 3 to 4

GETTING READY

- ☐ Make copies of *Agricultural Innovation Cards* (Appendix A3.1), one set for each group. Cut the cards out along the dashed line.
- ☐ Make copies of *Timeline* (Appendix A3.2), one for each group.
- ☐ Make one copy of *Elements that Affect Agriculture* (Appendix A3.3). Cut the cards out along the dashed line.

  Facilitator tip: It is recommended that the above appendices be laminated to allow them to be more easily handled by youth and reused.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These are recommended to be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Provide each group with one sheet of flip chart paper and writing utensils to answer opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

• Explain what you know about how technology can be used for growing food.
• Explain what you know about how the environment can affect growing food.

PROCEDURE (EXPERIENCING)

1. Provide each group with a set of *Agricultural Innovation Cards*, ensuring that the innovations are not handed to the groups in chronological order.
2. Ask youth to read about each of the innovations and discuss the main points of each one within their group, using their flip chart paper to take notes if needed.
3. Ask youth to determine the chronological order of the innovations and organize them by placing the *Agricultural Innovation Cards* in the order they were invented.

4. Have the youth share their completed timelines. Ask youth to describe how they chose the chronological order and how the earlier innovations helped develop future innovations seen in the agricultural industry.
5. Provide each group with a *Timeline* and allow groups to revise the order of their *Agricultural Innovation Cards*.
6. Provide each group with one of the *Elements that Affect Agriculture* and art supplies. Each group should have a different element.
7. Explain to the youth that each of the *Elements that Affect Agriculture* can have a negative impact on agriculture and that they have been tasked with creating and selling a new innovation to address their assigned problem.
8. Ask youth to use the art supplies to plan and create a depiction of their modern-day innovation.
9. Ask youth to also come up with a sales pitch for potential investors of their modern-day innovation. Youth should consider how much their innovation would cost, where it would be used, how it will operate, and who would benefit from it.

SHARING, PROCESSING, AND GENERALIZING

Have each group pitch their modern-day innovation and discuss the logistics of making it a reality.

Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share how their innovation can help alleviate their assigned problem. If necessary, ask more targeted questions/prompts:

• Explain how the problem you were assigned can negativity impact agriculture.
• Describe the process you used to create your modern-day innovation.
• Explain how your innovation could help your assigned problem.
• Describe how your modern-day innovation could affect other aspects of agriculture.
• Explain how your modern-day innovation could be implemented in the real-world.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure that the youth understand how key events throughout history have influenced the evolution of **agroecology**. Youth should also understand that agricultural production is a global system that is significantly impacted by and has significant impacts on society and the natural environment. Additionally, make sure that key vocabulary terms are either discovered by the youth or introduced to them: **drought, genetically modified organisms (GMOs), Global Positioning System (GPS), nitrogen fixation, pesticide, pesticide resistance, soil health,** and **urban sprawl.**

AGRICULTURE APPLICATION

MATERIALS NEEDED

- ☐ Seeds or seedlings, at least two per youth
- ☐ Agricultural maintenance equipment
- ☐ Craft sticks, popsicle sticks, or plant markers, at least two per youth
- ☐ Permanent markers

TIME REQUIRED

15 to 20 minutes

GETTING READY

- ☐ Place all materials in a central location.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.

PROCEDURE (EXPERIENCING)

1. Explain to youth that they will be planting one seed or seedling without using any agricultural innovations and one seed or seedling using agricultural innovations.
2. Lead youth in preparing their “no agricultural innovations” area by doing tasks, such as discarding weeds and tilling the soil, to prepare for planting without the assistance of modern agricultural equipment. For example, youth should not use shovels, hoes, hoses, or other equipment.

   Facilitator tip: Youth may need some encouragement to complete their tasks without modern equipment. Lead the way by digging into the soil yourself with your hands. Natural tools, such as sticks or vessels for transporting water, can also be used.
3. Ask youth to select one plant to grow from seed or seedling. Ask youth to work together with their group members to plant their seeds or seedlings by hand without the assistance of any agricultural innovations.
4. Lead youth in preparing their “agricultural innovations” area by doing tasks, such as discarding weeds and tilling the soil, to prepare for planting with the assistance of modern agricultural equipment.
5. Ask youth to select another plant to grow from seed or seedling. This selection can be the same as their “no agricultural innovations” plant or a different one. Ask youth to work together with their group members to plant their seeds or seedlings using the assistance of agricultural innovations.
6. Provide youth with markers and craft sticks to create labels for the seeds or seedlings they just planted.
7. Ask the youth write on the craft sticks their name, what they planted, and either “no” or “yes” to signify whether that plant was planted using agricultural innovations.

8. Explain to the youth that anything marked with a “no” should be maintained over time without agricultural innovations. Anything with a “yes” can be maintained using modern agricultural equipment.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share how the process of planting changed with the inability to use any agricultural innovations in comparison to when they were able to use agricultural innovations. Follow the lines of thinking developed through the youth’s thoughts, observations, and questions as they share what they discovered about agricultural innovations.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *At-Home Ag* (Appendix A3.4), one per youth
- ☐ Funding permitting, materials to build one of the home agricultural systems outlined in *At-Home Ag*, one set per youth

Materials provided in curriculum

TIME REQUIRED

5 to 10 minutes

GETTING READY

- ☐ Make double-sided copies of *At-Home Ag* (Appendix A3.4), one for each youth.
- ☐ If providing, gather materials for the at-home agricultural kits.

PROCEDURE (EXPERIENCING)

1. Provide each youth with a copy of *At-Home Ag*.
2. Ask the youth to follow along with the *At-Home Ag* guide to build their own agricultural system at home. This guide provides an option for germinating seeds that can then be transferred into soil or a hydroponic system. The options for growing produce at home use low cost and household items.

   Facilitator Tip: If providing materials, it is recommended to demonstrate the setup of the provided option from At-Home Ag.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their experience building their at-home agricultural kit and discuss their intended process for maintaining the kit. Follow the lines of thinking developed through the youth’s thoughts, observations, and questions as they share what they experienced when building their at-home agricultural kit.

Steam Engine

Problem: All agriculture was done by hand which took a lot of time and limited the amount of crops that could be produced. In addition, transportation of people and goods to the un-colonized west coast was expensive and took a very long time.

Solution: The steam engine creates energy using pressurized steam to power things, including agricultural machinery and the railway steam locomotive.

Plow with Interchangeable Parts

Problem: The traditional iron plow was expensive, heavy, difficult to repair, and physically hard to use.

Solution: This innovation to the iron plow allows farmers to turn and break up soil, to bury crop residues, and to help control weeds with ease. If a part of the plow breaks, it can be fixed with a simple exchange of the broken piece for a functional one. This saves farmers time, money, and makes the land ready for planting new crops quicker.

Mason Jars

Problem: Fresh food was hard to get in the winter months and food spoiled quickly.

Solution: Mason jars are glass jars with airtight lids; invented to help preserve foods, such as fruits, vegetables, and meats. The airtight lids keep food from spoiling by preventing bacteria from growing. This product helps to reduce foodborne illnesses.

Farmers Using Nitrogen Fixation

Problem: Plants need nitrogen molecules in the soil to grow. The soil did not always provide enough nitrogen for the plants to grow.

Solution: Farmers are able to add nitrogen to the soil using man-made fertilizers. Farmers can easily add nitrogen to the existing land in a powder form or spray large areas using a liquid form. Farmers can also grow nitrogen-fixing crops, like beans. Soil high in nitrogen allows plants to grow faster and produce larger yields.

Modern Vertical Farming

Problem: Farm land was being transformed into homes, apartment complexes, malls, and other urban developments. There was less land to farm and farmers had to still keep up with producing crops for buyers.

Solution: Vertical farming includes rooftop gardening, hydroponics, aquaponics, and other methods that allow farmers to grow upward. This uses much less land and environmental resources.

Mechanical Tomato Harvester

Problem: The process of picking and sorting tomatoes was very expensive and time consuming. It required many workers at once to pick the tomatoes before spoiling.

Solution: The tomato harvester allows farmers to produce and quickly pick massive quantities of tomatoes. This also decreases labor costs.

Automated Irrigation Systems

Problem: Farmers needed to water crops regularly and quickly instead of having to water multiple acres by hand. Farmers were also unable to access water for their crops during droughts.

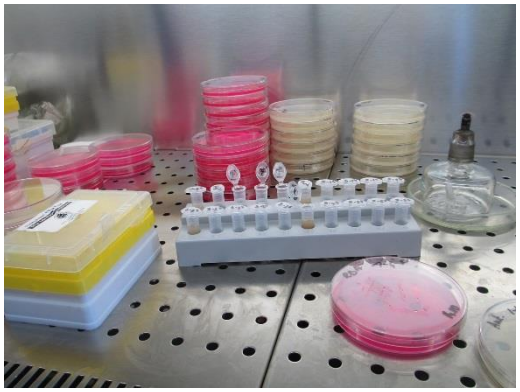
Solution: Automated irrigation systems allow farmers to control the amount of water distributed to their plants. These systems also allow farmers to retrieve water from other locations during droughts or water shortages.

Global Positioning System (GPS)

Problem: Large scale farms were so big that farmers and workers were unable to maintain the area without technical help.

Solution: GPS helps farmers with planning and organizing the farm land, testing the soil, tractor guidance, and even allows farmers to work in low visibility or dangerous weather conditions.

Genetically Modified Organisms (GMO's)



Problem: Food could not be produced fast enough naturally to feed the number of people in the world.

Solution: Genetically modified organisms are plants or animals that have been genetically engineered to improve production, including speeding up the growing process and increasing resistance to chemicals and pests.

Steam Engine
(1698)

Plow with Interchangeable Parts
(1819)

Mason Jars
(1858)

Farmers Using Nitrogen Fixation
(1901)

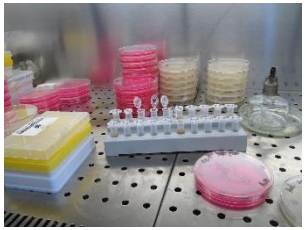
Modern Vertical Farming
(1920)

Mechanical Tomato Harvester
(1951)

Automated Irrigation Systems
(1952)

Global Positioning System
(1978)

Genetically Modified Organisms
(1992)



Water Shortage and Drought

Fires

Pesticide Resistance

Urban Sprawl

Flooding

Food Safety

Food Waste and Imperfect Produce

Poor Soil Health

Germinating Seeds

Supplies needed:

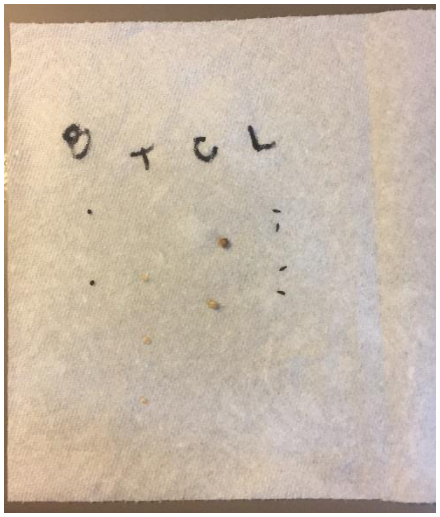
- Paper towel
- Seeds
- Water
- Spray bottle, recommended
- Sealable plastic container (recommended) or bag
- Ruler (recommended)

Directions:

1. Moisten paper towel so that it is damp, but not dripping wet.
2. Put seeds on one half of paper towel about 1 inch apart.
   - ► Optional: You can label the seeds if doing different types, as shown in the image below.
3. Fold other half of paper towel over so that seeds are covered and stay moist.
4. Gently press down on seeds in the paper towel.
5. Put folded paper towel into a plastic container or resealable plastic bag and partially close it, leaving a small space open to allow air to circulate.
   - ► For example, leave about 1 inch of the plastic bag unsealed or one corner of the container lid open.
6. Put container or bag in bright area in indirect sunlight that is about room temperature (on counter top is fine).
7. Occasionally check the container and add moisture if the paper towel begins to dry.

Once you see a root that is at least 1 cm long (about 4 – 7 days depending on the seed), move to soil or hydroponic setup. Carefully remove seedlings so that you do not damage the roots.

Steps 1 – 2



Steps 3 – 4

Steps 5 – 6

Hydroponic Setup

Supplies needed:

- Seedling (leafy greens work well)
- Container, such as a mason jar
- Net pot, or container with holes cut into it (yogurt cups work well)
- Growing media, such as clay pebbles, pellet, or rockwool
- Large pitcher, bowl, or washed milk jug
- Hydroponic plant food, 3-1-2 NPK ratio
- pH meter or litmus paper
- Hydrogen peroxide
- Measuring cups and spoons
- Paper
- Tape

Directions:

1. In a large pitcher, mix together 1 gallon (or 16 cups) room temperature water and 2 tsp. plant food to make the water solution.
2. Check the pH of the water by dipping a pH strip into it. Compare the wet pH strip to the scale immediately after pulling it out of the water. The water should be slightly acidic (pH 5.5 – 6.5, yellow or yellow-orange color*)
   - ► If pH is too high (too basic), add ¼ tsp. hydrogen peroxide and re-test.
   - ► If pH is too low (too acidic), add ¼ cup water and re-test.
3. In a separate medium-sized bowl, soak clay pebbles in water solution for a few minutes.

4. Remove the lid from the mason jar (if it has one) and then replace the metal ring. Place net pot into mason jar.
5. Fill up jar with water solution until water covers the bottom ½ cm of the net pot.
6. If using a pellet seed starter or rockwool, put it directly into the net pot on top of the clay pebbles.
   or
   If using clay pebbles, line the bottom of the net pot with the pre-soaked clay pebbles, carefully place seedling into net pot so that the root is touching the water. Add a few more layers of clay pebbles to the net pot to help support the plant as it grows

7. Wrap paper around the jar and tape in place. This will help prevent algae from growing in the water.
8. Place jar in an area that gets good sunlight for 6-8 hours a day.

You only need to add more water solution if the roots can no longer reach the water.

Step 2

pH Scale*

*Note: Coloring of the pH scale may vary

Steps 4 – 6

Steps 7 – 8

Agriculture Module 4:

Food Desert Overhaul

BACKGROUND INFORMATION

The purchase of healthy food is greatly influenced by **food availability, access**, and **affordability**. Many individuals, especially those with low incomes, may face obstacles to obtaining healthy and affordable food. **Food deserts** are areas usually in impoverished areas of the country that lack access to healthy foods, such as fresh fruits and vegetables. Despite urban areas appearing to have an abundant amount of food options, food deserts can still be present. Commonly found simultaneously with food deserts are **food swamps**. Food swamps are places in which the local food retailers predominantly sell food lacking nutritional value. Examples of food swamps include areas surrounding highway exits where an abundance of fast food establishments are found. Both food deserts and food swamps can lead to the surrounding community having few options for purchasing healthy food.

Another barrier to purchasing healthy food is the price of food. Price influences purchases because individuals with low incomes are more likely to buy cheaper foods, which are frequently less nutritious. In order to assist in the purchase of food, the United States government implemented the Supplemental Nutrition Assistance Program (SNAP). Formerly known as food stamps, SNAP provides benefits on a monthly basis to eligible individuals and families. With the development of the Electronic Benefit Transfer (EBT) system, these benefits come in the form of a card similar to a debit card. Every month, the money on the card is refilled and can be used specifically to purchase foods at various stores and markets. SNAP users are also able to use their money from this program at some local **farmers markets**.

The government has also taken steps to increase healthy food access through **health zoning laws**. These laws allow for land to be allocated for more access to healthy food. This increase can be accomplished through designating land for **community food gardens**, which are fruit and vegetable gardens created and managed by local neighborhood residents, and farmer's markets, limiting the number of fast food retailers, and promoting businesses that sell healthy food. Steps have been taken to assist in making healthier food available, accessible, and affordable to Americans, but food deserts and food swamps are still prevalent and potential remedies will likely require interdisciplinary collaboration.

CONCEPTS AND VOCABULARY

Community food gardens: Fruit and vegetable gardens created and managed by local neighborhood residents

Farmers market: A designated area where local farmers vend their products, primarily fruits, vegetables, meats, dairy products, and baked goods to consumers

Food access: The ability of an individual to reach local food-selling locations through convenient modes of transportation

Food affordability: The price of food which determines whether an individual is able to purchase certain food items

Food availability: The number of food-selling locations in a specific area and the types of foods that are sold or served at the locations

Food deserts: Areas, commonly impoverished, that are lacking access to healthy foods

Food swamps: Areas, typically found in conjunction with food deserts, in which the food retailers predominantly sell food lacking nutritional value

Health zoning laws: Laws that take steps to increase healthy food access through regulating and allocating land for the distribution of healthier foods, limiting the number of fast food retailers, or promoting businesses that sell healthy food

MATERIALS NEEDED

- ☐ Flip chart paper
- ☐ Writing utensils
- ☐ Calculators, one per group (optional)
- ☐ *Neighborhood Pieces* (Appendix A4.1), one set per group
- ☐ *Remedy Pieces* (Appendix A4.2), one set per group
- ☐ *Budget Sheet* (Appendix A4.3), one per group

Materials provided in curriculum

TIME REQUIRED
45 to 60 minutes

SUGGESTED GROUPINGS
Small groups of 3 to 4

GETTING READY

- ☐ Make copies of the *Neighborhood Pieces* (Appendix A4.1), one set for each group, and cut them out along the dashed lines.
- ☐ Make copies of the *Remedy Pieces* (Appendix A4.2), one set for each group, and cut them out along the dashed lines..

  Facilitator tip: It is recommended that the above appendices be laminated to allow them to be more easily handled by youth and reused.
- ☐ Make copies of *Budget Sheet* (Appendix A4.3), one for each group.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Provide each group with one sheet of flip chart paper and writing utensils to answer opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

- Explain what factors influence the kind of food people eat.
- Explain what might limit someone from accessing healthy foods.

PROCEDURE (EXPERIENCING)

1. Ask the youth to flip their flip chart paper over so that they can use the back side for the activity.
2. Provide each group with one set of *Neighborhood Piece*s.
3. Explain to the youth that they will be constructing a neighborhood.
4. Ask the youth to read each of the *Neighborhood Pieces* and create their neighborhood on the flip chart paper.
5. Ask youth to share their neighborhoods and identify some of the issues that surround their pieces.

   Facilitator tip: Youth may need help identifying specific issues within their constructed neighborhoods. If needed, use the following prompts:
   a. *Describe what you notice about the neighborhood.*
   b. *Describe what is missing from the neighborhood.*
   c. *Describe how the characteristics of the neighborhood might affect the health of its residents.*
6. Explain to the youth that they will now have the opportunity to reconstruct their neighborhoods in an effort to improve them.
7. Explain to youth that each group will get a budget of $500,000 to purchase improvements for their neighborhood.
8. Provide each group with a set of *Remedy Pieces*, a *Budget Sheet*, and calculator (if using).
9. Explain to youth that they are responsible for developing a strategy within their group to use the *Remedy Pieces* most effectively while not going over budget.
10. Ask youth to reconstruct their neighborhoods using the *Remedy Pieces*. Youth should track the spending of their $500,000 budget with the *Budget Sheet*.

SHARING, PROCESSING, AND GENERALIZING

Have each group share their reconstructed neighborhood and discuss how they determined which *Remedy Pieces* to use.

Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share the changes they made to their neighborhoods and the logic used in their *Remedy Pieces* selections. If necessary, ask more targeted questions.

- Explain how you decided which *Remedy Pieces* to purchase.
- Explain how your selected *Remedy Pieces* changed your initial neighborhood.
- Explain why you did not use the other *Remedy Pieces*.
- Describe any considerations that had to be made in order to stay within the $500,000 budget.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure youth understand that environmental factors, such as where someone lives, can shape

a person's food decisions and consequently health. Youth should understand what constitutes a **food desert**, and that food deserts are not only scarce in healthy food options, but can also be inundated with nutrient-poor foods, known as **food swamps**. Additionally, youth should understand the critical aspects and challenges of what can be done to help remedy some of these areas, including, but not limited to, **health zoning laws**, retailers accepting Supplemental Nutrition Assistance Program (SNAP) benefits, **community food garden** programs, innovative agriculture, transportation improvements, business outreach, and more. Make sure that key vocabulary terms are either discovered by the youth or introduced to them: **farmers market, food access, food affordability**, and **food availability.**

AGRICULTURE APPLICATION

MATERIALS NEEDED

- ☐ Flip chart paper
- ☐ Writing utensils
- ☐ Sticky notes
- ☐ Agricultural maintenance equipment

TIME REQUIRED

20 to 30 minutes

GETTING READY

- ☐ Coordinate with the necessary administration to determine a date and time to host a family night where youth can share their agricultural space and produce with family and community members.
- ☐ Title pieces of flip chart paper with logistical considerations for the event. For example, supplies, decorations, food, activities, and other.
- ☐ Affix the flip chart papers around the space so that youth can clearly see and access each one.
- ☐ Supply enough materials to allow each youth to maintain their designated area in the agricultural space.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.

PROCEDURE (EXPERIENCING)

1. Orient youth to the flip chart papers around the space and explain that they will be planning a family night and need to determine the specifics of the event.
2. Assign each group to one of the flip chart papers and provide each group with sticky notes and writing utensils.
3. Explain to youth that each group will have 5 minutes to write down their ideas, one idea per sticky note, for their assigned topic. Youth should also affix their ideas to the flip chart paper.
4. After 5 minutes, rotate groups rotate to the next topic and allow them another 5 minutes to

record and affix their ideas to the flip chart paper. Continue with this process until all groups have had a chance to brainstorm ideas for each topic.

5. Lead youth through a review of their ideas and come to a consensus on which ideas are feasible.
6. With any time remaining, lead youth in maintaining their designating growing section. This may include discarding weeds, supplying additional nutrients, and watering plants.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their plan for a family night and discuss next steps for implementing their plan. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share how they plan to move forward with hosting a family night.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *My Neighborhood* (Appendix A4.4), one per youth

TIME REQUIRED

5 to 10 minutes

Materials provided in curriculum

GETTING READY

☐ Make copies of *My Neighborhood* (Appendix A4.4), one for each youth.

PROCEDURE (EXPERIENCING)

1. Provide each youth with a copy of *My Neighborhood*.
2. Explain to youth that they will create a basic map of their neighborhood and the surrounding city.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *My Neighborhood* and discuss the components of their neighborhood depiction. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share their surroundings and what they discovered about the food access in their city.

Dewey's Burgers

Food: Beef burgers on white bread buns, French fries, fried chicken sandwiches on white bread buns, soda, milkshakes, chicken nuggets, chipotle-ranch bacon salad

Average meal cost: $5.00

Workers: Make minimum wage and have no employer-provided health insurance; there are about 1 million workers nationwide

Environmental impact: Their number one product includes beef, which emits 5x more greenhouse gases, uses 28x more land, and 11x more water than other animal-based foods

Nutrition:
Options can be:
- High in – Saturated fat, oils, sugar, salt, refined grains
- Low in – Fiber, potassium, vitamin D

The Sand Witch

Food: Turkey, chicken, and roast beef sandwiches on white bread, chips, juice, soda, milk, chicken noodle soup

Average meal cost: $7.00

Workers: Make minimum wage and have no employer-provided health insurance

Environmental impact: Produce used on the sandwiches travels an average of 750 miles to one of their locations, utilizing lots of fuel and energy along the way

Nutrition:
Options can be:
- High in – Salt, refined grains, sugar
- Low in – Fiber, potassium, vitamin D

Cluckity Cluck

Food: Fried chicken, French fries, BBQ chicken, cheese bread, macaroni and cheese, coleslaw, bacon mashed potatoes, soda

Average meal cost: $6.00

Workers: Make minimum wage and have no employer-provided health insurance; there are about 1 million workers nationwide.

Social impact: Farmers that produce the chicken barely make enough money to run the farm, even though Cluckity Cluck is a large company with thousands of locations

Nutrition:
Options can be:
- High in – Saturated fat, oils, sugar, salt, refined grains
- Low in – Fiber, potassium, vitamin D

Burrito Wiz

Food: Cheesy beef or chicken burritos, beef tacos, quesadillas, bean and cheese burritos, nachos, soda

Average meal cost: $4.00

Workers: Make minimum wage and have no employer-provided health insurance; there are about 1 million workers nationwide

Environmental impact: Their number one product includes beef, which emits 5x more greenhouse gases, uses 28x more land, and 11x more water than other animal-based foods

Nutrition:
Options can be:
- High in – Saturated fat, oils, sugar, salt, refined grains
- Low in – Fiber, potassium, vitamin D

Pizza Shack

Food: Pizza, bread sticks, buffalo wings, soda

Average meal cost: $5.00

Workers: Make minimum wage and have no employer-provided health insurance; there are about 1 million workers nationwide.

Environmental impact: Large-scale cheese production can significantly contribute to greenhouse gas emissions and environmental pollutants

Nutrition:
Options can be:
- High in – Saturated fat, oils, sugar, salt, refined grains
- Low in – Fiber, potassium, vitamin D

High School

Food: Chicken nuggets, pizza, bean and cheese burrito, beef burgers, chips, fruit cups, raisins, chocolate milk, milk, sandwiches

Availability: Limited fresh fruits and vegetables, whole grains, plant-based proteins, dairy alternatives, and variety

Supply: Receives some food products from the distribution center Food Nationals

Space: The school has empty land that is currently unused

Stu's Liquor

Food: Chips, soda, alcohol, ice cream, candy, canned foods, energy drinks

Business: Sells liquor and tobacco to the community; accepts EBT

Supply: Receives food products from the distribution center Food Nationals

Nutrition:
Options can be:
- High in – Saturated fat, oils, sugar, salt, refined grains
- Low in – Fiber, potassium, vitamin D

Celia's Naturals

Food: Organic grocery store with a large selection of fresh, nutrient-dense foods such as seasonal and local (within 200 miles) fruits and vegetables, whole grains, beans, dairy and dairy alternatives, meats, nuts and seeds, and fish.

Prices: Items cost 30% more than Bargain Grocery Mart

Business: Does not accept EBT

Workers: Make 25% more money than other grocery store workers

Location: At least 10 miles away from most residents; it is difficult for residents to get there

Advertisements

Purpose: Promote the price, taste, and convenience of Dewey's Burgers, Burrito Wiz, and Cluckity Cluck

Television: Ads occur during commercial times for family shows

Online: Ads take place on videos popular with teenagers

Billboards: Ads are primarily near schools and at bus stops

Imperfect Bus System

Transportation: Due to a low city budget and several broken buses, the bus system does not allow for dependable transportation

Resident Complaints:

- Buses have hour and a half wait times
- Buses are too crowded
- Buses do not go to Bargain Grocery Mart
- Buses are really old and pollute the air, contributing to breathing problems

Bus Driver Complaints:

- The bus company fails to fix broken buses and invest in zero-emission bus technology
- Bus routes are outdated and do not cover the entire city

*30% of residents do not own a car

Empty Lot #1

Space: Large empty lot owned by the city

Location: Near to the Community Center

Empty Lot #2

Space: Large empty lot owned by the city

Location: Near to Celia's Naturals

Community Center

Programs: Has had programs that aim to improve the health of residents in the past through nutrition education, exercise, gardening, and cooking classes, but all programs have not existed for 2 years due to lack of funding

Health: Residents have a 25% increased risk for diet-related diseases such as heart disease, type 2 diabetes, and high-blood pressure compared other neighborhoods

Residents: 75% are low-income and eligible for SNAP benefits; 50% have SNAP benefits; there are 5,000 residents total

Bargain Grocery Mart

Food: Budget grocery store with a good selection of fresh, nutrient-dense foods such as fruits and vegetables, whole grains, beans, dairy and dairy alternatives, meats, nuts and seeds, and fish.

Prices: Items cost 30% less than Celia's Naturals

Business: Accepts EBT

Location: 10 miles away from most residents; it is difficult for residents to get there

Gas Station

Food: Chips, soda, alcohol, ice cream, candy, canned foods, donuts, hot dogs, energy drinks

Business: Accepts EBT

Supply: Receives food products from the distribution center Food Nationals

Nutrition:
Options can be:
- High in – Saturated fat, oils, sugar, salt, refined grains
- Low in – Fiber, potassium, vitamin D

Advertisements

Purpose: Promote the price, taste, and convenience of Dewey's Burgers, Burrito Wiz, and Cluckity Cluck

Television: Ads occur during commercial times for family shows

Online: Ads take place on videos popular with teenagers

Billboards: Ads are primarily near schools and at bus stops

Imagination Piece

Think: This piece is up to you! Implement any idea you want as long as you can explain how it could be done

Cost: $250,000

Community Garden

Action: Starts construction of a community garden in an empty lot *or* school; place this piece on top of whichever you choose

Benefit: Provides space for community members to grow their own fruits and vegetables

Disadvantage: Rent costs of neighboring houses increase 10% per month

Cost: $100,000 to put in empty lot; need to purchase the private land, get the zoning, and start building

*Must purchase Health Zoning Law as well for this option

or

Cost: $50,000 to set up at the school; the land is not private so there is no additional cost

Farmers Market

Action: Establishes a weekly farmers market for local farmers within 150 miles

Location: Community Center or Community Garden (if you have one)

Benefit: Provides seasonal access to fresh fruits and vegetables at an accessible location

Disadvantage: Rent of neighboring houses increases 10% each month

Cost: $75,000

Health Zoning Law

Action: Works with government to create laws that can promote health based on location of businesses and health services

Benefit: Will establish long-term framework to promote change; companies need to obey laws, which may improve the health of residents

Disadvantage: Can take a long time to put into action; may reduce some jobs in fast food or other large operations

Cost: $50,000

Corner Store Conversion

Action: Redesigns Stu's Liquor to add nutrient-dense food options, which may involve having a small section of fresh fruit and healthy snacks, and increasing signage to promote these options

Benefit: Improves healthy food options at a popular store

Disadvantage: Options cannot change very much because Stu's Liquor does not want to sell less of the other products and is limited on what they have due to distribution

Cost: $75,000

"Produce for Us" Program

Action: Contacts grocery stores and local farms for donations of unsold surplus fruits and vegetables; all food gathered will be given out for free at the Community Center in an effort to promote their programs

Benefit: Gives free produce to members of the community while reducing food, energy, water, and soil waste

Disadvantage: Need to hire staff to coordinate this effort and establish relationships with farmers and stores; people need to go to the Community Center to receive benefits

Cost: $125,000

Improve Food Advertisements

Action: Replaces fast food advertisements near schools and bus stops with public health messages, including information on SNAP eligibility, healthcare, workers' rights, and community resources

Disadvantage: Advertisements on TV and online still exist; unsure if messages will promote change

Cost: $100,000

Community Center Overhaul

Action: Reinstates nutrition education, exercise, gardening, and cooking classes

Benefit: Gives central location for community to access health-improving programs; may reduce disease rates in active participants

Disadvantage: Difficult to recruit people to join programs; participants need to pay a small fee to take classes; continued funding depends on participation

Cost: $150,000

Transportation Makeover

Action: Updates bus system by fixing broken buses, purchasing two zero-emission buses, and updating the route to allow transport to Groce-Save

Benefit: Buses will be more reliable and routes will cover more of the city

Disadvantage: Traffic may increase

Cost: $250,000

Health Insurance

Action: Requires every fast food restaurant to provide health insurance for all employees

Benefit: Employees may address health issues that they otherwise could not by seeing healthcare professionals; may decrease disease rates

Disadvantage: Food prices at fast food restaurants will increase and employees will likely be laid off to balance the cost of health insurance

Cost: $200,000

Fast Plant

Action: Replaces Dewey's Burgers with a predominantly vegetarian fast food restaurant owned by Dewey's Burgers called Fast Plant

Benefit: Fast Plant's most popular product is a black bean burger; beans use much less water, energy, and emit less greenhouse gases during production compared to beef

Workers: Paid 20% higher wages compared to other fast food employees

Disadvantage: Average meal price increases to $7.00; unsure about consumer acceptability of new options

Cost: $100,000

*Must also buy Health Zoning Law to use this piece

Twice as Nice EBT

Action: Enables EBT funds to be worth twice as much when purchasing fruits and vegetables

Benefit: People who receive SNAP benefits can potentially increase fruit and vegetable consumption due to decreased cost; may decrease disease rates

Disadvantage: Only select places will participate: Farmers' Market (if chosen) and Groce-Save

Cost: $100,000

Budget: $500,000

Remedy Piece	Why Chosen	Price
	TOTAL:	

Directions: Create a map of your neighborhood. Include the nearest grocery store, places to eat, places to shop, schools, parks, and anything else that defines your neighborhood.

1 Square = 1 Block

Nutrition Module 1: **Your Plate vs. MyPlate**

BACKGROUND INFORMATION

The United States government provides a guide called **MyPlate** to help individuals eat balanced and nutritious meals. MyPlate includes five **food groups** that are important for a well-rounded **eating pattern: fruits, vegetables, grains, protein foods**, and **dairy**. For fruits, MyPlate suggests eating whole fruits, such as a whole apple instead of apple juice. With vegetables, it is beneficial to consume a variety of vegetables from an array of colors. Consuming mostly whole grains, such as whole grain bread and brown rice, is also greatly encouraged. Similar to vegetables, it is recommended to vary your protein sources by including both plant and lean animal sources. Lastly, the recommendation for dairy is to consume low-fat or fat-free milk or fortified dairy alternatives. Not only are these five food groups important, but it is also beneficial to consume **oils** and **water**. Despite not being a MyPlate food group, oils provide essential nutrients. Water is essential for the body to properly digest and function. Therefore, choosing to drink water as the primary beverage option is ideal. All foods provide some source of nutrition. Although foods are generally categorized into just one of the food groups, many nutrients are found in foods from multiple groups. As a result, it is important to focus on the overall eating pattern.

Individual eating patterns may be influenced by food group recommendations, physical activity levels, and several other factors. The less active someone is, the fewer calories they will need, which in turn decreases their recommendations. Alternatively, the more active an individual is, the more calories their body will require, and thus they will have higher recommendations. **Physical activity intensity level** is typically described as one of three intensities. **Sedentary activity level** describes minimal physical activity and includes long time periods of being in a seated position. **Moderate activity level** typically includes activities beyond those required for daily activities. Examples of moderate physical activities include brisk walking, casual bicycling, casual dancing, practicing sports skills, recreational swimming, and general gardening. **Vigorous activity level** typically includes activities well beyond those required for daily activities and are more laborious than moderate physical activities. Examples of vigorous physical activities include running, hiking, competitive sports, swimming laps, aerobic dancing, and moving very heavy objects.

CONCEPTS AND VOCABULARY

Dairy: A food group consisting of fluid milk, products made from fluid milk, and dairy alternatives

Eating pattern: The combination of foods and beverages that a person consumes

Food groups: Groupings of similar foods based on nutritional composition and dietary benefits, including dairy, fruits, grains, protein foods, and vegetables

Fruits: A food group consisting of any fruit whether frozen, dried, canned, or fresh and 100% fruit juice

Grains: A food group consisting of food made from wheat, rice, oats, cornmeal, or barley

Moderate activity level: An amount of physical activity beyond what is required for activities of daily living

MyPlate: The nutrition guidance provided by the USDA that displays the five food groups that are recommended to be included in a healthy eating pattern

Oils: Fats that are liquid at room temperature and provide the body with energy and essential nutrients

Physical activity intensity level: The classification for the activity of an individual

Protein foods: A food group consisting of meat, poultry, seafood, eggs, nuts, and beans

Sedentary activity level: A minimal amount of physical activity, such as only those required for activities of daily living

Vegetables: A food group consisting of any vegetable whether frozen, dried, canned, or fresh

Vigorous activity level: An amount of physical activity more laborious than moderate physical activities and well beyond those required for activities of daily living

MATERIALS NEEDED

- ☐ Flip chart paper
- ☐ Writing utensils
- ☐ *Food Cards* (Appendix N1.1), one set per group
- ☐ *MyPlate* (Appendix N1.2), one per group
- ☐ *Characters* (Appendix N1.3)
- ☐ *Recommendations* (Appendix N1.4), one per group
- ☐ *Food Group Tracker* (Appendix N1.5), one per group
- ☐ Calculators, one per group

Materials provided in curriculum

TIME REQUIRED

45 to 60 minutes

SUGGESTED GROUPINGS

Small groups of 3 to 4

GETTING READY

- ☐ Make copies of *Food Cards* (Appendix N1.1), one set of cards for each group. Cut the cards out along the dashed line and then fold them along the solid line.
- ☐ Make copies of the *MyPlate* (Appendix N1.2), one for each group.
- ☐ Make one copy of *Characters* (Appendix N1.3), one character for each group, and cut them out along the dashed lines.
- ☐ Make copies of *Recommendations* (Appendix N1.4), one for each group.
  Facilitator tip: It is recommended that the above appendices be laminated to allow them to be more easily handled by youth and reused.
- ☐ Make copies of the *Food Group Tracker* (Appendix N1.5), one for each group.

- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These are recommended to be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Provide each group with one sheet of flip chart paper and writing utensils to answer opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

• Explain what you know about what is included in a well-balanced meal.
• Explain why you think people may need to eat different amounts of food.

PROCEDURE (EXPERIENCING)

1. Provide each group with a set of *Food Cards*, asking them to keep the cards so that the food images are facing up, and a *MyPlate*.
2. Explain to youth that *MyPlate* is a visual representation of approximately how much of each food group someone should eat throughout the day.
3. Ask the youth to look through the *Food Cards* and then sort the *Food Cards* into which food groups they think each belongs to on *MyPlate*.
4. Ask youth to write down which food group they decided to sort each card into on the flip chart paper.
5. Inform youth that the back side of each of the *Food Cards* provides food group information for each food. Ask the youth to read through this information and resort their *Food Cards* into the correct food groups on *MyPlate*.
6. Provide each group with one of the *Characters* and ask youth to read through the character description and that character's typical weekday eating pattern within their groups.
7. Provide each group with *Recommendations*, *Food Group Tracker*, and a calculator.
8. Give youth a brief demonstration of how to use the *Recommendations*.
9. Ask youth to use the *Recommendations* and their character's information to determine the character's daily food group recommendations. Ask youth to record this information on the *Food Group Tracker*.
10. Ask youth to complete the rest of the *Food Group Tracker* using their character's information. They should also determine whether the character met their recommendations.

SHARING, PROCESSING, AND GENERALIZING

Have each group share their character and their *Food Group Tracker*. Ask youth to discuss the food groups that their character consumed and whether the character met their recommendations.

Follow the of lines thinking developed through the youth's thoughts, observations, and questions as they share their character's eating pattern. If necessary, ask more targeted questions.

• Explain how you went about determining whether your character met their recommendations.
• Explain how activity level affected your character's recommendations.

• Discuss any food group recommendations your character had difficulty meeting.
• Explain how your character could incorporate more foods from food groups that are already not included enough in their eating pattern.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure youth understand the importance meeting recommendations by consuming food from all five **food groups** outlined in **MyPlate**. Youth should also recognize that the healthiest **eating patterns** include a variety of food groups. Furthermore, youth should understand that health cannot simply be determined through physical attributes and that people of all body types can be healthy. Additionally, make sure that the key vocabulary terms are either discovered by the youth or introduced to them: **dairy, fruits, grains, moderate activity level, oils, physical activity intensity level, protein foods, sedentary activity level, vegetables,** and **vigorous activity level.**

AGRICULTURE APPLICATION

MATERIALS NEEDED

- ☐ *Food Cards* (Appendix N1.1), one set per group
- ☐ *Ag Snack Plan* (Appendix N1.6), one per group
- ☐ Agriculture maintenance equipment

Materials provided in curriculum

TIME REQUIRED

15 to 20 minutes

GETTING READY

- ☐ *Gather Food Cards* (Appendix N1.1) from the previous activity, one for each group.
- ☐ Make copies of *Ag Snack Plan* (Appendix N1.6), one for each group.
- ☐ Supply enough materials to allow each youth to maintain their designated area in the agricultural space.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.

PROCEDURE (EXPERIENCING)

1. Provide each group with an *Ag Snack Plan* and set of *Food Cards*.
2. Ask youth to use the *Ag Snack Plan* to plan a snack using the produce growing in the agricultural space. Their snack should mainly incorporate products from the agricultural space, but may also be supplemented with items that would need to be purchased.
3. Ask youth to complete the rest of the *Ag Snack Plan* by determining the contribution of their snack to someone's food group recommendations using the *Food Cards.*
4. With any time remaining, lead youth in maintaining their designated growing section. This may include discarding weeds, supplying additional nutrients, and watering plants.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *Ag Snack Plan* and discuss how their snack could help someone meet their food group recommendations. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share their plan for a snack incorporating agricultural space produce.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *Recommendations* (Appendix N1.4), one per youth
- ☐ *Your Meal Plan* (Appendix N1.7), one per youth

Materials provided in curriculum

TIME REQUIRED

5 to 10 minutes

GETTING READY

- ☐ Make copies of *Recommendations* (Appendix N1.4), one for each youth.
- ☐ Make copies of the *Your Meal Plan* (Appendix N1.7), one for each youth.

PROCEDURE (EXPERIENCING)

1. Provide each youth with a copy of *Recommendations* and *Your Meal Plan*.
2. Explain to the youth that they will first need to identify their needs using the *Recommendations*. Then they can use that information to plan meals to meet their recommendations.
3. Ask the youth to record their meal plans on *Your Meal Plan*.

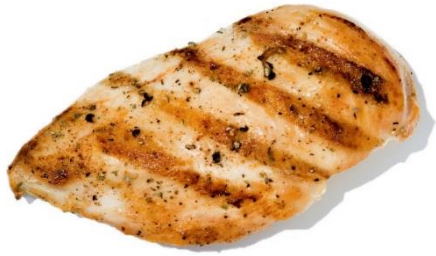
SHARING, PROCESSING, AND GENERALIZING

If they are comfortable sharing, have youth share their *Your Meal Plan* and discuss whether their recommendations were met. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share their meal plans.

Vegetable 1 cup cubed avocado = 1 cup vegetables ½ medium avocado = ½ cup vegetables Also: ½ medium avocado = 15 grams oil	**Vegetable** 1 cup chopped or sliced tomato = 1 cup vegetables 1 medium tomato = ¾ cup vegetables	**Oil** 1 ounce (about ¼ cup) whole almonds = 15 grams oil Also: 1 ounce (about ¼ cup) of whole almonds = 2 ounces protein foods
Avocado 	Tomato 	Almonds 

Fruit 1 small apple = 1 cup fruit ½ large apple = 1 cup fruit 1 cup sliced apple = 1 cup fruit	**Vegetable** 1½ cup broccoli florets = 1 cup vegetables 1 cup cut broccoli stalks = 1 cup vegetables	**Dairy** 6 ounces container low-fat vanilla yogurt = ¾ cup dairy 1 cup low-fat vanilla yogurt = 1 cup dairy
Apple 	Broccoli 	Yogurt 

Protein Food 2 medium slices roasted white meat turkey with skin = 2 ounces protein foods	**Grain** 1 (8 inches across) flour tortilla = 2 ounces grains 1 (12 inches across) flour tortilla = 5 ounces grains	**Fruit** 1 large (8 to 9 inches long) banana = 1 cup fruit 1 small (less than 6 inches long) banana = ½ cup fruit
Turkey 	Flour Tortilla 	Banana 

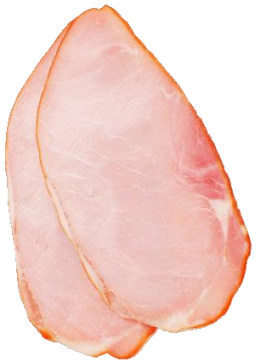
Vegetable 1 cup carrots = 1 cup vegetables 2 medium carrots = 1 cup vegetables 12 baby carrots = 1 cup vegetables	**Protein Food** 1 large hardboiled egg = 1 ounce protein foods 1 large egg = 1 ounce protein foods	**Protein Food** 1 medium baked skinless chicken breast = 3 ounces protein foods
Carrots 	Egg 	Chicken 

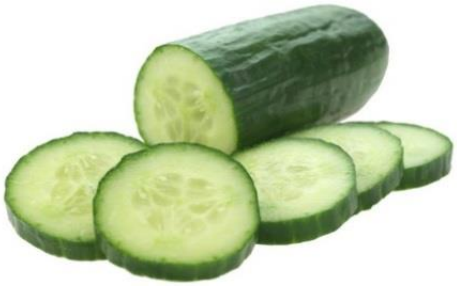
Protein Food 2 tablespoons peanut butter = 2 ounces protein foods Also: 2 tablespoons peanut butter = 16 grams oil	**Grain** 1 cup cooked brown rice = 2½ ounces grains	**Grain** 2 slices 100% whole wheat bread = 2 ounces grains
Peanut Butter 	Brown Rice 	Whole Wheat Bread 

Dairy 1 cup reduced-fat <u>milk</u> (2%) = 1 cup dairy	**Dairy** 1 cup calcium-fortified <u>soymilk</u> = 1 cup dairy	**Dairy** 1 slice <u>cheddar cheese</u> = ¾ cup of dairy ½ cup shredded <u>cheddar cheese</u> = 1¼ cup dairy
Milk 	Soymilk 	Cheddar Cheese 

Fruit	**Oil**	**Protein Food**
1 cup <u>blueberries</u> = 1 cup fruit	1 tablespoon <u>margarine</u> = 11 grams oil	1 small <u>hamburger patty</u> = 3 ounces protein foods
Blueberries 	Margarine 	Hamburger Patty 

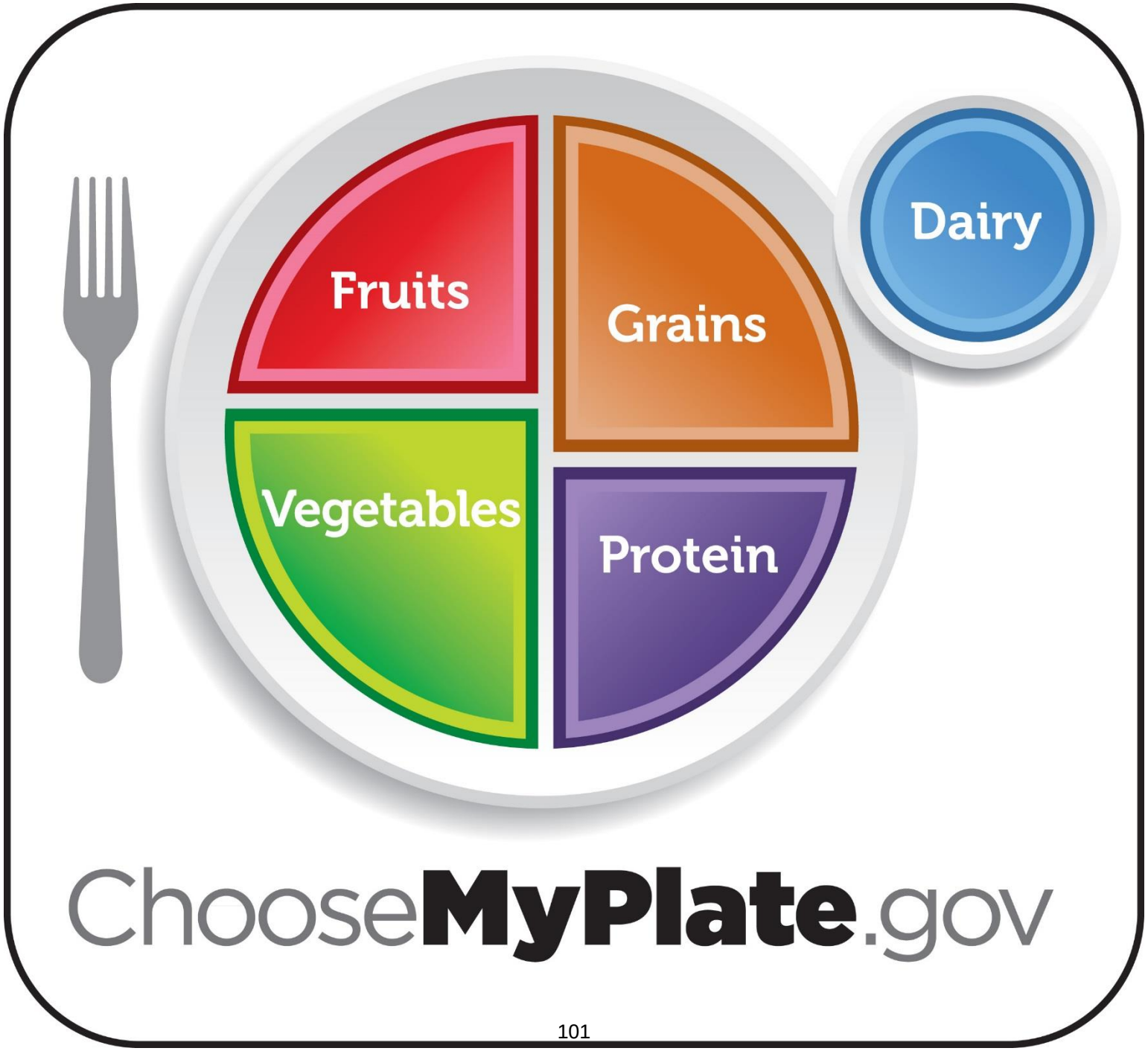
Fruit 1 small slice (about 1 inch thick) watermelon = 1 cup fruit 1 cup diced watermelon = 1 cup fruit	**Oil** 2 tablespoons vinaigrette = 8 grams oil	**Grain** 1 hamburger bun = 2½ ounces grains
Watermelon 	Vinaigrette 	Hamburger Bun 

Oil 1 tablespoon mayonnaise = 11 grams oil	**Vegetable** 1 cup chopped or sliced celery = 1 cup vegetables 2 large celery stalks (11 to 12 inches long) = 1 cup vegetables	**Protein Food** 3 thin slices ham = 2 ounces protein foods
Mayonnaise 	Celery 	Ham 

Fruit 1 cup of 100% orange juice = 1 cup fruit	**Vegetable** 1 cup sliced or chopped cucumber = 1 cup vegetables ½ large cucumber = 1 cup vegetables	**Grain** 1 cup of sweet cereal = 1 ounce grains
Orange Juice 	Cucumber 	Sweet Cereal 

Protein Food 1 cup cooked pinto beans = 4 ounces protein foods Also: 1 cup cooked pinto beans = 1 cup vegetables	**Grain** 7 square or round crackers = 1 ounce grains	**Vegetable** 1 cup of romaine lettuce = ½ cup vegetables
Pinto Beans 	Crackers 	Romaine Lettuce 

Protein Food 6 small fish sticks = 4 ounces protein foods	**Vegetable** 1 cup French fries = 1 cup vegetables About 12 fast food style French fries = 1 cup vegetables	**Fruit** 1 cup whole or cut-up grapes = 1 cup fruit About 32 seedless grapes = 1 cup fruit
Fish Sticks 	French Fries 	Grapes 


Fruits
Grains
Dairy
Vegetables
Protein
ChooseMyPlate.gov

Neel

Age: 16 Height: 6'2" Weight: 215 lbs.
Physical Activity Level: Vigorous

Neel is the quarterback for his high school football team and has practice every day. Although he is very happy with his performance, Neel is looking to gain more muscle to be even better. When Neel goes to the doctor for a check-up, he is told that he is generally healthy, but overweight.

Typical Weekday

Breakfast
- 1 cup of yogurt with ½ cup blueberries and ¼ cup almonds
- 2 slices whole wheat toast with 2 tablespoons margarine

Lunch
- 2 hamburger patties on a bun with 2 slices cheddar cheese and 1 tablespoon mayonnaise
- Salad with 1 cup lettuce, 1 medium chicken breast, ½ cup tomato, ½ medium avocado, and 2 tablespoons vinaigrette dressing

Snack
- A hardboiled egg, a large banana, and 12 baby carrots

Dinner
- 2 turkey wraps: 2, 12-inch tortilla, 2 slices of turkey, ½ medium avocado, and ½ cup lettuce
- 1 large apple
- 1 cup 2% milk

Luz

Age: 14 Height: 5'10" Weight: 160 lbs.
Physical Activity Level: Vigorous

Luz is a volleyball player. Her best friends are also on the team, so Luz loves going to volleyball practice. Luz gets an upset stomach whenever she drinks milk or consumes anything with dairy. Because of this, Luz avoids milk and other dairy products.

Typical Weekday

Breakfast
- 2 large scrambled eggs with 3 thin slices of ham
- 1 cup orange juice
- 1 slice whole wheat toast with 1 tablespoon margarine

Lunch
- Turkey sandwich with 2 slices whole wheat bread, 1 slice of turkey, 1 tablespoon mayonnaise, and ½ cup lettuce
- 1 cup diced watermelon
- 1 cup soymilk

Snack
- 2 large stalks celery
- 1 small apple
- 2 tablespoons peanut butter

Dinner
- Rice bowl: 1 medium chicken breast, 1 cup brown rice, ½ cup broccoli, ½ cup carrots, and ¼ cup almonds
- 1 cup soymilk

Naomi

Age: 15 Height: 5'5" Weight: 105 lbs.
Physical Activity Level: Sedentary

Naomi went in for her annual check-up and was told that she is underweight and should gain weight to be healthier. However, Naomi recently began eating just like her favorite celebrity. On her new diet, Naomi can only eat plain salads and is really hungry throughout the day. She wants to start running 1 mile every day to try to make the track team next year but is often too tired to run.

Typical Weekday

Breakfast
- Nothing

Lunch
- Plain salad: 1 cup lettuce, ½ cup carrots, ½ cup cucumber, and ½ cup tomato

Snack
- Nothing

Dinner
- Plain salad: 1 cup lettuce, ½ cup carrots, ½ cup cucumber, and ½ cup tomato

Alex

Age: 17 Height: 5'8" Weight: 150 lbs.
Physical Activity Level: Moderate

Alex walks to school every morning. After school every day, Alex works at a local grocery store as a courtesy clerk. His job requires him to move a lot, which is how Alex gets exercise. He also plays ultimate frisbee on the weekends. Alex does not have a lot of time to prepare meals and usually eats food that is quick and easy to make.

Typical Weekday

Breakfast
- 1 cup sweet cereal with 1 cup 2% milk

Lunch
- 2 bean and cheese burritos: 2, 12-inch tortilla, ½ cup cheddar cheese, and 1 cup pinto beans
- 1 small apple

Snack
- 14 crackers
- 2 tablespoons peanut butter
- 1 cup grapes

Dinner
- 12 fish sticks with about 24 French fries

Directions:
Use age, sex, and physical activity level to determine estimated daily calorie need.

	Males			Females		
	Physical Activity Level			Physical Activity Level		
Age	Sedentary	Moderate	Vigorous	Sedentary	Moderate	Vigorous
13	2,000	2,200	2,600	1,600	2,000	2,200
14	2,000	2,400	2,800	1,800	2,000	2,400
15	2,200	2,600	3,000	1,800	2,000	2,400
16	2,400	2,800	3,200	1,800	2,000	2,400
17	2,400	2,800	3,200	1,800	2,000	2,400
18	2,400	2,800	3,200	1,800	2,000	2,400
	Estimated Daily Calorie Need			Estimated Daily Calorie Need		

Directions:
Now that you know estimated daily calorie need, use that value to determine daily recommended intake for each food group.

		Estimated Daily Calorie Need								
		1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Food Group	Vegetables	2 cups	2½ cups	2½ cups	3 cups	3 cups	3½ cups	3½ cups	4 cups	4 cups
	Fruits	1½ cups	1½ cups	2 cups	2 cups	2 cups	2 cups	2½ cups	2½ cups	2½ cups
	Grains	5 ounces	6 ounces	6 ounces	7 ounces	8 ounces	9 ounces	10 ounces	10 ounces	10 ounces
	Dairy	3 cups	3 cups	3 cups	3 cups	3 cups	3 cups	3 cups	3 cups	3 cups
	Protein Foods	5 ounces	5 ounces	5½ ounces	6 ounces	6½ ounces	6½ ounces	7 ounces	7 ounces	7 ounces
	Oils	22 grams	24 grams	27 grams	29 grams	31 grams	34 grams	36 grams	44 grams	51 grams
		Daily Recommended Intake of Each Food Group								

Note: Vegetables, Fruits, Grains, Dairy, and Protein Foods are measured in equivalents

Character's Information

Name: _____ Age: _____ Male / Female (circle one)

Physical Activity Level: Sedentary / Moderate / Vigorous (circle one)

Character's Daily Food Group Recommendations

Grains:	Vegetables:
Dairy:	Protein Foods:
Fruits:	Oils:

Character's Eating Pattern

Meal #1	Grains:
	Protein Foods:
	Vegetables:
	Fruits:
	Dairy:
	Oils:
Meal #2	Grains:
	Protein Foods:
	Vegetables:
	Fruits:
	Dairy:
	Oils:

Meal #3	Grains:
	Protein Foods:
	Vegetables:
	Fruits:
	Dairy:
	Oils:
Other	Grains:
	Protein Foods:
	Vegetables:
	Fruits:
	Dairy:
	Oils:

Character's Total Consumption

Food Group Total	Recommendation Met?	
Grains:	☐ Yes	☐ No
Protein Foods:	☐ Yes	☐ No
Vegetables:	☐ Yes	☐ No
Fruits:	☐ Yes	☐ No
Dairy:	☐ Yes	☐ No
Oils:	☐ Yes	☐ No

Snack name:

Ingredient	From Agricultural Space or Need to Buy?	Amount Needed	Food Group	Equivalent for Recommendations
Example: lettuce	Ag space	1 cup	Vegetables	½ cup vegetables

Instructions to prepare your snack:

Directions: Plan three meals for **yourself** that meet **your** daily recommendations for each food group.

Name: _____ Age: ____ Male / Female (circle one)

Physical Activity Level: Sedentary / Moderate / Vigorous (circle one)

Your Daily Recommended Amounts – Food Groups		
Grains:	Vegetables:	Dairy:
Protein Foods:	Fruits:	Oils:

	Foods	Amount
Meal #1		Grains:
		Protein Foods:
		Vegetables:
		Fruits:
		Dairy:
		Oils:
Meal #2		Grains:
		Protein Foods:
		Vegetables:
		Fruits:
		Dairy:
		Oils:
Meal #3		Grains:
		Protein Foods:
		Vegetables:
		Fruits:
		Dairy:
		Oils:

Total Amount	Recommendation Met?	
Grains:	Yes □	No □
Protein Foods:	Yes □	No □
Vegetables:	Yes □	No □
Fruits:	Yes □	No □
Dairy:	Yes □	No □
Oils:	Yes □	No □

Nutrition Module 2: **Read It to Eat It**

BACKGROUND INFORMATION

Nutrients have very important roles in the function of our bodies. We obtain nutrients from the variety of foods that we eat. Nutrients include **macronutrients** (**carbohydrates, fats**, and **protein**) and **micronutrients** (**vitamins** and **minerals**). Macronutrients are required in large amounts by the body to carry out normal processes, while micronutrients are required in relatively small amounts.

Carbohydrates include sugars, starches, and fibers and are the main source of energy for the body. There are two types of carbohydrates: simple and complex. Simple carbohydrates provide energy for the body relatively quickly. Complex carbohydrates take more time to digest, providing energy for the body over a longer time period compared to simple carbohydrates. Food sources of complex carbohydrates include beans, whole wheat bread, and vegetables. Another type of complex carbohydrate is **dietary fiber**, which is found in the edible parts of plants. Fiber has an important role in aiding digestion and heart health. Foods rich in fiber include whole grains, fruits, and vegetables.

Fats also provide energy for the body and are important for the absorption of vitamins A, D, E, and K. There are two types of fats: **saturated** and **unsaturated**. Saturated fats are solid at room temperature and usually come from animal sources, such as butter, meat, and cheese. However, some plants also contain saturated fats, such as coconut and palm oil. These types of fats are recommended to be consumed in lower amounts because they raise LDL cholesterol, commonly known as “bad cholesterol” in the body. The increase in this type of cholesterol has shown a strong correlation to cardiovascular disease. Unsaturated fats are liquid at room temperature and usually come from plant sources, such as avocado oil, vegetable oil, and flaxseed. Replacing saturated fats with unsaturated fats tends to raise levels of HDL cholesterol, commonly known as “good cholesterol,” which decreases the risk of chronic diseases.

Proteins also provide energy for the body and have many other important functions, such as providing structure in our bodies and helping our muscles move. Protein can be found in animal sources, such as chicken, fish, and red meats. Protein can also be found in smaller amounts in plant sources, such as beans and vegetables.

Vitamins and minerals both aid in the growth, development, and sometimes the structure of our bodies. Vitamins include vitamins A, C, D, K, and several B vitamins. Minerals needed by our bodies include calcium, iron, potassium, and many more. Both vitamins and minerals are found naturally in foods, but they can also be **fortified** into foods to help people reach recommendations. In the United States, juices, milk, cereals, bread products, among others are commonly fortified with micronutrients, such as vitamin A, vitamin D, iron, folic acid (one of the B vitamins), and calcium.

Packaged foods include **Nutrition Facts Labels** that list some of the nutrients in that particular food. The Nutrition Facts

Label also includes the amount of each listed nutrient in the food and the **Percent Daily Value** that it contributes to the recommendations for someone consuming about 2000 calories per day. The **serving size** that is listed on the Nutrition Facts Label is the measured amount of that food that reflects the amount of nutrients listed on the label. Although fruits and vegetables do not come with a Nutrition Facts Label, they are also packed with nutrients.

CONCEPTS AND VOCABULARY

Carbohydrate: A macronutrient that when consumed provides energy for the body and includes fruits, vegetables, and bread products

Dietary fiber: A type of carbohydrate found in plants that when consumed aids in digestion

Fat: A macronutrient that when consumed provides energy for the body and includes meat, cheese, and oils

Fortification: The process of adding certain vitamins and minerals into foods in an effort to help people meet recommendations

Macronutrient: A classification for nutrients needed in relatively large amounts for the body to function properly, including fats, carbohydrates, and protein

Micronutrient: A classification for nutrients needed in relatively small amounts for the body to function properly, including vitamins and minerals

Minerals: Micronutrients found in soil that are needed to allow the human body to grow and function properly

Nutrient: A compound that when consumed provides nourishment essential for growth and maintenance of the body

Nutrition Facts Label: The label on the side of packaged foods that lists the number of calories and selected nutrients found within a given serving size of that food

Percent Daily Value: A generalized percentage of the recommended amount of a nutrient provided in one serving of a food

Protein: A macronutrient that when consumed provides energy for the body in addition to building and maintaining muscles and includes meat, fish, chicken, and beans

Servings size: A measured amount of food or drink that is included on Nutrition Facts Labels to help when calculating the amount of a nutrient in a food item

Vitamins: Micronutrients made by living things that are needed to allow the human body to grow and function properly

MATERIALS NEEDED

- ☐ Flip chart paper
- ☐ Writing utensils
- ☐ *Nutrient Cards* (Appendix N2.1)), one of each nutrient type (macronutrient, vitamin, and mineral) per group
- ☐ *Food Cards* (Appendix N2.2), one set per group
- ☐ *Good Sources Worksheet* (Appendix N2.3), one per group
- ☐ Calculators, one per group

Materials provided in curriculum

TIME REQUIRED
45 to 60 minutes

SUGGESTED GROUPINGS
Small groups of 3 to 4

GETTING READY

- ☐ Make copies of the *Nutrient Cards* (Appendix N2.1), one of each nutrient type (macronutrient, vitamin, and mineral) for each group, and cut them out along the line.
- ☐ Make copies of the *Food Cards* (Appendix N2.2), one set for each group. Cut the cards out along the dashed line and then fold them along the solid line.

  Facilitator tip: It is recommended that the above appendices be laminated to allow them to be more easily handled by youth and reused.
- ☐ Make copies of *Good Sources Worksheet* (Appendix N2.3), one for each group.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Provide each group with one sheet of flip chart paper and writing utensils to answer opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

• Explain what you know about the nutrients found in food.
• Describe how you would determine if a food is a good source of different nutrients.

PROCEDURE (EXPERIENCING)

1. Provide each group with three *Nutrient Cards*, making sure to give each group a macronutrient, vitamin, and mineral. Be sure youth know that the micronutrients in this activity are just a selection of many.
2. Ask the youth to read the information on the three cards within their groups.
3. Provide each group with *Food Cards*, asking them to place the cards so that the food images

are facing up.

4. Ask the youth to look through the *Food Cards* and pick one food that they think is a "good source" for each of their given nutrients. They should identify one food for their specific macronutrient, one food for their vitamin, and one food for their mineral.
5. Ask youth to share their assigned nutrients and the foods they think are a good source of each nutrient. Ask youth to also describe how they selected each food.
6. Tell youth that there is a *Nutrition Facts Label* on the back of the *Food Cards* and that it provides nutrition information for each food, including the serving size, macronutrient content, and some micronutrient content.
7. Provide each group with a *Good Sources Worksheet* and calculator.
8. Explain to the youth that they will be using the *Food Cards* and *Good Sources Worksheet* to create a meal that they believe is a "good source" of each of their assigned nutrients. Youth should include the serving size for each of the foods when creating their meal. Ask youth to also calculate the amount of their assigned nutrients in their meal.

   Facilitator tip: The group with the Carbohydrates Card may need help discovering that they should be looking for Dietary Fiber on the Nutrition Facts Label.
9. Inform youth that a food is considered a "good source" of a particular nutrient if it includes at least 10% of the *Percent Daily Value* for that nutrient.
10. With this information, ask youth to edit their meal if needed to make it a good source of each of their nutrients.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their meals and their answers to the *Good Sources Worksheet*.

Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share their meals and the amount of their assigned nutrients in those meals. If necessary, ask more targeted questions.

- Explain how you went about creating a meal that was a good source of your nutrients.
- Explain what you noticed about the foods that tended to be good sources of the different nutrients.
- Describe any challenges you had when creating your meals.
- Explain the ways you can use the information you learned from this activity in your everyday life.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure that the youth understand the importance of using **Nutrition Facts Labels** for identifying the **macronutrient** and **micronutrient** content of foods. Also make sure that youth discover that fruits and vegetables tend to be good sources of essential micronutrients and **dietary fiber**. Additionally, make sure that key vocabulary terms are either discovered by the youth or introduced to them: **carbohydrates, fats, minerals, Percent Daily Value, protein, serving size**, and **vitamins**.

AGRICULTURE APPLICATION

MATERIALS NEEDED

- ☐ Small paper clips, six per group
- ☐ Scissors
- ☐ At least two different types of soil (can be purchased or collected from the agricultural space)
- ☐ Distilled water
- ☐ Stopwatch, one per group
- ☐ Permanent markers, one per group
- ☐ Litmus paper, a few sheets per group
- ☐ Agricultural maintenance equipment

TIME REQUIRED

15 to 20 minutes

GETTING READY

- ☐ Using scissors or another sharp object, carefully punch a hole about ½ cm in diameter in the bottom of paper cups, two for each group.
- ☐ Place soil, if purchasing, and the distilled water in a central location.
- ☐ Supply enough materials to allow each youth to maintain their designated area in the agricultural space.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.

PROCEDURE (EXPERIENCING)

1. Orient youth to the supplies and explain that they will be testing the soil quality of the agricultural space.
2. Provide each group with two prepared with holes paper cups, four regular paper cups, a permanent marker, and a stopwatch.
3. Ask youth to identify the two soil types they would like to test and make observations of the soil using their sight and touch.
4. Ask youth to fill each of the cups with holes about ¾ full with the different types of soil.
5. Ask youth to filled two of the regular cups with distilled water and mark the level of the water using the permanent marker.
6. Ask youth to time how fast the distilled water travels through the soil as they pour the water over the soil. Youth should catch the water with their remaining empty cups underneath and time the number of seconds it takes before the water stops dripping.

7. Ask youth to record the number of seconds it takes for the water to pass through the soil. Youth should also mark the water level on the cup used to catch the water using the permanent marker.
8. Provide each group with some litmus paper and explain to the youth that they will now be measuring the pH of the soil using the litmus paper.
9. Ask the youth to pour the water back through the soil and insert the litmus paper into the soil for 2-3 seconds. They should then remove the litmus paper from the soil and record the color and approximate pH (red = acidic, green = neutral, purple = alkaline) on the side of the cup using the permanent marker.
10. With any time remaining, lead youth in maintaining their designated growing section. This may include discarding weeds, supplying additional nutrients, and watering plants.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their observations about the soil texture, moisture retention, drainage, and pH. Youth should discuss the components of good soil and how the soil quality may affect plant growth. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about soil quality.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *Nutrition Facts Labels at Home* (Appendix N2.4), one per youth

TIME REQUIRED

5 to 10 minutes

Materials provided in curriculum

GETTING READY

☐ Make copies of *Nutrition Facts Labels at Home* (Appendix N2.4), one for each youth.

PROCEDURE (EXPERIENCING)

1. Provide each youth with a *Nutrition Facts Labels at Home.*
2. Explain to the youth that they will look for a Nutrition Facts Label on packaged food they already have in their home or at a local grocery store.
3. Ask youth to complete the *Nutrition Facts Labels at Home* using their selected food to determine the amount of some of the nutrients found in that food and whether that food is a good source of the selected nutrients.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *Nutrition Facts Labels at Home* and discuss whether the food they selected was a good source of any of the selected nutrients. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about the nutrients found in their selected food.

Macronutrients

Carbohydrates (including Dietary Fiber)

Carbohydrates are an important source of energy for our body. There are two types of carbohydrates: simple and complex. Simple carbohydrates, like table sugar, are used more quickly by the body, which gives us energy for a short period of time. Complex carbohydrates are digested more slowly, which gives our bodies energy for a longer period of time.

Dietary fiber is a special type of complex carbohydrate found in the edible parts of plants. Dietary fiber is very important to eat because it helps your digestive system function normally. A lot of people do not eat enough dietary fiber every day, so it is important to focus on including foods in meals that are good sources of dietary fiber.

Fats

Fats are a major source of energy for the body. They contribute to the structure of cells and help our body absorb and use vitamins A, D, E, and K. There are two main types of fats: saturated and unsaturated. Saturated fats are solid at room temperature and usually come from animal sources. Unsaturated fats are liquid at room temperature and usually come from plant sources. It is generally recommended to consume more unsaturated fat than saturated fat.

Protein

Protein provides energy for the body, but its main function is in providing structure for cells in the body. It also has important roles in the function of our muscles, in the repair and production of new cells, and in the general growth and development of our bodies. Protein can be found in both animal and plant sources.

Vitamins

Vitamin A

Vitamin A is most commonly found in two forms in food. One of the forms is common in fruits and vegetables and the other can be found in animal products. Vitamin A has many functions, including maintaining the health of eyes, skin, and teeth.

Vitamin C

Vitamin C is important for the growth and repair of tissues. It aids in wound healing, formation of teeth, bones, cartilage, skin, tendons, ligaments, and blood vessels. Vitamin C also helps our bodies use iron. Vitamin C can be found in a variety of fruits and vegetables.

Vitamin D

Vitamin D has an important role in the formation of bones and helps our bodies use calcium. Although vitamin D is not commonly found in nature, it has been added into some foods through a process called fortification. Our bodies can also produce vitamin D by being under sunlight.

Minerals

Calcium

Calcium has an important role in the formation of strong teeth and bones. It also aids in sending nerve signals, moving muscles, regulating heartbeat, and releasing hormones. Calcium is commonly found in a variety of foods and can also be added to certain foods through a process called fortification.

Potassium

Potassium aids in contracting muscles, regulating heartbeat, and moving nutrients across and between cells. Potassium is commonly found in a variety of foods in small amounts.

Iron

Iron has many functions in our bodies, but its main function involves transporting oxygen in the blood. Iron is also part of many important proteins and enzymes. Iron is in a variety of foods naturally and can also be added to certain foods through a process called fortification.

Avocado

Banana

Blueberries

Avocado

Nutrition Facts

Serving size	1/2 medium avocado (68g)
Amount Per Serving	
Calories	**50**
	% Daily Value*
Total Fat 11g	**14%**
Saturated Fat 1.5g	**8%**
Trans Fat 0g	
Polyunsaturated Fat 1g	
Monounsaturated Fat 7g	
Cholesterol 0mg	**0%**
Sodium 5mg	**0%**
Total Carbohydrate 6g	**2%**
Dietary Fiber 5g	**18%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 1g	**2%**
Vitamin D 0mcg	0%
Calcium 6mg	0%
Iron 0.5mg	2%
Potassium 345mg	8%
Vitamin A 43mcg	0%
Vitamin C 6mg	6%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Banana

Nutrition Facts

Serving size	1/2 medium banana (118g)
Amount Per Serving	
Calories	**50**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 0mg	**0%**
Total Carbohydrate 27g	**10%**
Dietary Fiber 3g	**11%**
Total Sugars 14g	
Includes 0g Added Sugars	**0%**
Protein 1g	**2%**
Vitamin D 0mcg	0%
Calcium 6mg	0%
Iron 0mg	0%
Potassium 422mg	8%
Vitamin A 30mcg	0%
Vitamin C 10mg	10%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Blueberries

Nutrition Facts

Serving size	1/2 cup (74g)
Amount Per Serving	
Calories	**40**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 0mg	**0%**
Total Carbohydrate 11g	**4%**
Dietary Fiber 2g	**7%**
Total Sugars 7g	
Includes 0g Added Sugars	**0%**
Protein 1g	**2%**
Vitamin D 0mcg	0%
Calcium 4mg	0%
Iron 0mg	0%
Potassium 57mg	2%
Vitamin A 22mcg	0%
Vitamin C 7mg	8%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Flour Tortilla

Flour Tortilla

Nutrition Facts

Serving size	**1 tortilla (46g)**
Amount Per Serving	
Calories	**140**
	% Daily Value*
Total Fat 3.5g	**4%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 1g	
Monounsaturated Fat 2g	
Cholesterol 0mg	**0%**
Sodium 300mg	**13%**
Total Carbohydrate 24g	**9%**
Dietary Fiber 1g	**4%**
Total Sugars 1g	
Includes 0g Added Sugars	**0%**
Protein 4g	**8%**
Vitamin D 0mcg	0%
Calcium 60mg	4%
Iron 1.5mg	8%
Potassium 70mg	2%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Broccoli

Broccoli

Nutrition Facts

Serving size	**1/2 cup (46g)**
Amount Per Serving	
Calories	**20**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 15mg	**1%**
Total Carbohydrate 3g	**1%**
Dietary Fiber 1g	**4%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 1g	**2%**
Vitamin D 0mcg	0%
Calcium 21mg	2%
Iron 0mg	0%
Potassium 144mg	4%
Vitamin A 159mcg	2%
Vitamin C 41mg	45%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Brown Rice

Brown Rice, cooked

Nutrition Facts

Serving size	**1 cup (195g)**
Amount Per Serving	
Calories	**220**
	% Daily Value*
Total Fat 1.5g	**2%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0.5g	
Monounsaturated Fat 0.5g	
Cholesterol 0mg	**0%**
Sodium 0mg	**0%**
Total Carbohydrate 46g	**17%**
Dietary Fiber 4g	**14%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 5g	**10%**
Vitamin D 0mcg	0%
Calcium 20mg	2%
Iron 1mg	6%
Potassium 150mg	4%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

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Orange Juice

Orange Juice, calcium and vitamin D fortified

Nutrition Facts

Serving size	**1 cup (249g)**
Amount Per Serving	
Calories	**120**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 5mg	**0%**
Total Carbohydrate 28g	**10%**
Dietary Fiber < 1g	**2%**
Total Sugars 21g	
Includes 6g Added Sugars	**12%**
Protein 2g	**4%**
Vitamin D 2.5mcg	10%
Calcium 350mg	25%
Iron 0.5mg	2%
Potassium 440mg	10%
Vitamin A 0mcg	0%
Vitamin C 82mg	90%

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Strawberries

Strawberries

Nutrition Facts

Serving size	**1/2 cup (72g)**
Amount Per Serving	
Calories	**25**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 0mg	**0%**
Total Carbohydrate 6g	**2%**
Dietary Fiber 1g	**4%**
Total Sugars 4g	
Includes 0g Added Sugars	**0%**
Protein 1g	**2%**
Vitamin D 0mcg	0%
Calcium 12mg	0%
Iron 0mg	0%
Potassium 110mg	2%
Vitamin A 5mcg	0%
Vitamin C 42mg	45%

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Red Bell Pepper

Red Bell Pepper

Nutrition Facts

Serving size	**1/2 cup (46g)**
Amount Per Serving	
Calories	**15**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 40mg	**2%**
Total Carbohydrate 3g	**1%**
Dietary Fiber 1g	**4%**
Total Sugars 2g	
Includes 0g Added Sugars	**0%**
Protein 0g	**0%**
Vitamin D 0mcg	0%
Calcium 3mg	0%
Iron 0mg	0%
Potassium 95mg	2%
Vitamin A 750mcg	80%
Vitamin C 59mg	70%

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Potato Chips

Potato Chips

Nutrition Facts

Serving size	1 oz (About 15 chips) (28g)
Amount Per Serving	
Calories	**150**
	% Daily Value*
Total Fat 10g	**13%**
Saturated Fat 3g	**15%**
Trans Fat 0g	
Polyunsaturated Fat 3g	
Monounsaturated Fat 3g	
Cholesterol 0mg	**0%**
Sodium 150mg	**7%**
Total Carbohydrate 14g	**5%**
Dietary Fiber 1g	**4%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 2g	**4%**
Vitamin D 0mcg	0%
Calcium 7mg	0%
Iron 0.5mg	2%
Potassium 460mg	10%
Vitamin A 0mcg	0%
Vitamin C 5mg	6%

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Sweet Cereal

Sweet Cereal

Nutrition Facts

Serving size	1 cup (28g)
Amount Per Serving	
Calories	**100**
	% Daily Value*
Total Fat 1g	**1%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 120mg	**5%**
Total Carbohydrate 25g	**9%**
Dietary Fiber 2g	**7%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**
Protein 1g	**2%**
Vitamin D 1mcg	4%
Calcium 24mg	2%
Iron 4mg	20%
Potassium 30mg	0%
Vitamin A 9mcg	0%
Vitamin C 14mg	15%

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Green Beans

Green Beans

Nutrition Facts

Serving size	1/2 cup (55g)
Amount Per Serving	
Calories	**20**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 0mg	**0%**
Total Carbohydrate 4g	**1%**
Dietary Fiber 2g	**7%**
Total Sugars 1g	
Includes 0g Added Sugars	**0%**
Protein 1g	**2%**
Vitamin D 0mcg	0%
Calcium 20mg	2%
Iron 0.5mg	2%
Potassium 115mg	2%
Vitamin A 208mcg	2%
Vitamin C 9mg	10%

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White Bread

Write Bread

Nutrition Facts

Serving size	**1 slice (25g)**
Amount Per Serving	
Calories	**70**
	% Daily Value*
Total Fat 1g	**1%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 170mg	**7%**
Total Carbohydrate 13g	**5%**
Dietary Fiber < 1g	**2%**
Total Sugars 1g	
Includes 0g Added Sugars	**0%**
Protein 2g	**4%**
Vitamin D 0mcg	0%
Calcium 40mg	4%
Iron 1mg	6%
Potassium 25mg	0%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

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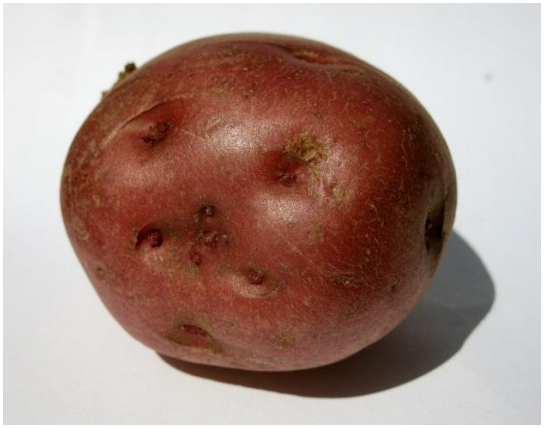
Red Potatoes



Red Potatoes

Nutrition Facts

Serving size	**1 medium potato (173g)**
Amount Per Serving	
Calories	**150**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 20mg	**1%**
Total Carbohydrate 34g	**12%**
Dietary Fiber 3g	**11%**
Total Sugars 2g	
Includes 0g Added Sugars	**0%**
Protein 4g	**8%**
Vitamin D 0mcg	0%
Calcium 15mg	2%
Iron 1mg	6%
Potassium 950mg	20%
Vitamin A 10mcg	0%
Vitamin C 22mg	25%

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Spinach

Spinach

Nutrition Facts

Serving size	**1 cup (30g)**
Amount Per Serving	
Calories	**5**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 25mg	**1%**
Total Carbohydrate 1g	**0%**
Dietary Fiber 1g	**4%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 1g	**2%**
Vitamin D 0mcg	0%
Calcium 30mg	2%
Iron 1mg	6%
Potassium 170mg	4%
Vitamin A 1690mcg	15%
Vitamin C 8mg	8%

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Tomato

Tomato

Nutrition Facts

Serving size	1 medium tomato (123g)
Amount Per Serving	
Calories	**20**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 5mg	**0%**
Total Carbohydrate 5g	**2%**
Dietary Fiber 2g	**7%**
Total Sugars 3g	
Includes 0g Added Sugars	**0%**
Protein 1g	**2%**
Vitamin D 0mcg	0%
Calcium 10mg	0%
Iron 0.5mg	2%
Potassium 290mg	6%
Vitamin A 550mcg	6%
Vitamin C 16mg	20%

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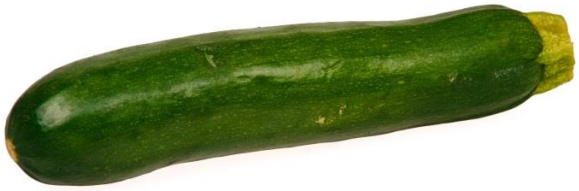
Zucchini



Zucchini

Nutrition Facts

Serving size	1/2 cup (62g)
Amount Per Serving	
Calories	**10**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 5mg	**0%**
Total Carbohydrate 2g	**1%**
Dietary Fiber 1g	**4%**
Total Sugars 1g	
Includes 0g Added Sugars	**0%**
Protein 1g	**2%**
Vitamin D 0mcg	0%
Calcium 9mg	0%
Iron 0mg	0%
Potassium 163mg	4%
Vitamin A 75mcg	0%
Vitamin C 10mg	10%

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Oatmeal

Oatmeal, cooked

Nutrition Facts

Serving size	1 cup, cooked (234g)
Amount Per Serving	
Calories	**160**
	% Daily Value*
Total Fat 3g	**4%**
Saturated Fat 0.5g	**3%**
Trans Fat 0g	
Polyunsaturated Fat 1g	
Monounsaturated Fat 1g	
Cholesterol 0mg	**0%**
Sodium 115mg	**5%**
Total Carbohydrate 29g	**11%**
Dietary Fiber 4g	**14%**
Total Sugars 1g	
Includes 0g Added Sugars	**0%**
Protein 6g	**12%**
Vitamin D 0mcg	0%
Calcium 187mg	15%
Iron 14mg	80%
Potassium 140mg	2%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

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Soda

Whole Wheat Bread

Whole Wheat Pasta

Soda

Nutrition Facts

Serving size	12 fl oz (1 can) (355g)
Amount Per Serving	
Calories	**150**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 30mg	**1%**
Total Carbohydrate 41g	**15%**
Dietary Fiber 0g	**0%**
Total Sugars 41g	
Includes 41g Added Sugars	**82%**
Protein 0g	**0%**
Vitamin D 0mcg	0%
Calcium 0mg	0%
Iron 0mg	0%
Potassium 0mg	0%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

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Whole Wheat Bread

Nutrition Facts

Serving size	1 slice (28g)
Amount Per Serving	
Calories	**70**
	% Daily Value*
Total Fat 1g	**1%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 130mg	**6%**
Total Carbohydrate 12g	**4%**
Dietary Fiber 2g	**7%**
Total Sugars 2g	
Includes 0g Added Sugars	**0%**
Protein 4g	**8%**
Vitamin D 0mcg	0%
Calcium 30mg	2%
Iron 0.5mg	2%
Potassium 70mg	2%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

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Whole Wheat Pasta

Nutrition Facts

Serving size	1 cup (85g)
Amount Per Serving	
Calories	**320**
	% Daily Value*
Total Fat 2g	**3%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 1g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 0mg	**0%**
Total Carbohydrate 65g	**24%**
Dietary Fiber 8g	**29%**
Total Sugars 3g	
Includes 0g Added Sugars	**0%**
Protein 11g	**22%**
Vitamin D 0mcg	0%
Calcium 30mg	2%
Iron 3mg	15%
Potassium 300mg	6%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

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Cheddar Cheese

Cheddar Cheese

Nutrition Facts

Serving size	**1 slice (28g)**
Amount Per Serving	
Calories	**110**
	% Daily Value*
Total Fat 9g	**12%**
Saturated Fat 6g	**30%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 3g	
Cholesterol 30mg	**10%**
Sodium 180mg	**8%**
Total Carbohydrate 0g	**0%**
Dietary Fiber 0g	**0%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 7g	**14%**
Vitamin D 0mcg	0%
Calcium 200mg	15%
Iron 0mg	0%
Potassium 25mg	0%
Vitamin A 75mcg	8%
Vitamin C 0mg	0%

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Yogurt

Yogurt, low-fat, plain

Nutrition Facts

Serving size	**1/2 cup (113g)**
Amount Per Serving	
Calories	**70**
	% Daily Value*
Total Fat 2g	**3%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0.5g	
Cholesterol 5mg	**2%**
Sodium 80mg	**3%**
Total Carbohydrate 8g	**3%**
Dietary Fiber 0g	**0%**
Total Sugars 8g	
Includes 0g Added Sugars	**0%**
Protein 6g	**12%**
Vitamin D 0mcg	0%
Calcium 207mg	15%
Iron 0mg	0%
Potassium 264mg	6%
Vitamin A 2mcg	0%
Vitamin C 1mg	2%

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Bacon

Bacon

Nutrition Facts

Serving size	**1 slice (8g)**
Amount Per Serving	
Calories	**40**
	% Daily Value*
Total Fat 3g	**4%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Polyunsaturated Fat 0.5g	
Monounsaturated Fat 1.5g	
Cholesterol 10mg	**3%**
Sodium 180mg	**8%**
Total Carbohydrate 0g	**0%**
Dietary Fiber 0g	**0%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 13g	**26%**
Vitamin D 0mcg	0%
Calcium 1mg	0%
Iron 0mg	0%
Potassium 45mg	0%
Vitamin A 1mcg	0%
Vitamin C 0mg	0%

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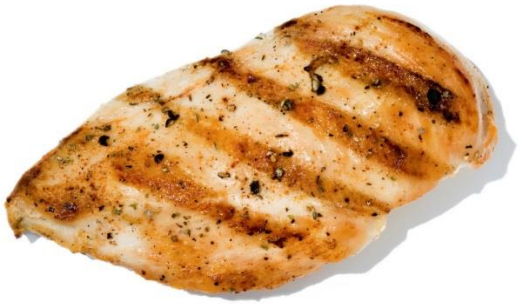
Chicken Breast



Chicken Breast

Nutrition Facts

Serving size	1/2 breast, boneless, skinless (86g)
Amount Per Serving	
Calories	**140**
	% Daily Value*
Total Fat 3g	**4%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Polyunsaturated Fat 1g	
Monounsaturated Fat 1g	
Cholesterol 75mg	**25%**
Sodium 65mg	**3%**
Total Carbohydrate 0g	**0%**
Dietary Fiber 0g	**0%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 27g	**54%**
Vitamin D 0mcg	0%
Calcium 13mg	0%
Iron 1mg	6%
Potassium 220mg	4%
Vitamin A 5mcg	0%
Vitamin C 0mg	0%

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Salmon

Salmon, cooked

Nutrition Facts

Serving size	1/2 fillet (85g)
Amount Per Serving	
Calories	**180**
	% Daily Value*
Total Fat 10g	**13%**
Saturated Fat 2g	**10%**
Trans Fat 0g	
Polyunsaturated Fat 4g	
Monounsaturated Fat 4g	
Cholesterol 55mg	**18%**
Sodium 50mg	**2%**
Total Carbohydrate 0g	**0%**
Dietary Fiber 0g	**0%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 19g	**38%**
Vitamin D 0mcg	0%
Calcium 13mg	0%
Iron 0.5mg	2%
Potassium 330mg	8%
Vitamin A 11mcg	2%
Vitamin C 3mg	4%

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Egg

Egg

Nutrition Facts

Serving size	1 large egg (80g)
Amount Per Serving	
Calories	**80**
	% Daily Value*
Total Fat 5g	**6%**
Saturated Fat 1.5g	**8%**
Trans Fat 0g	
Polyunsaturated Fat 0.5g	
Monounsaturated Fat 2g	
Cholesterol 210mg	**70%**
Sodium 65mg	**3%**
Total Carbohydrate < 1g	**0%**
Dietary Fiber 0g	**0%**
Total Sugars < 1g	
Includes 0g Added Sugars	**0%**
Protein 6g	**12%**
Vitamin D 0mcg	0%
Calcium 25mg	2%
Iron 0.5mg	2%
Potassium 60mg	2%
Vitamin A 85mcg	10%
Vitamin C 0mg	0%

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Tofu

Tofu, firm

Nutrition Facts

Serving size	3 oz (about 1/3 cup) (85g)
Amount Per Serving	
Calories	**70**
	% Daily Value*
Total Fat 3.5g	**4%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 2g	
Monounsaturated Fat 1g	
Cholesterol 0mg	**0%**
Sodium 15mg	**1%**
Total Carbohydrate 2g	**1%**
Dietary Fiber 1g	**4%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 8g	**16%**
Vitamin D 0mcg	0%
Calcium 100mg	8%
Iron 1mg	6%
Potassium 300mg	6%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

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Almonds

Almonds

Nutrition Facts

Serving size	1 oz (about 23 almonds) (28g)
Amount Per Serving	
Calories	**160**
	% Daily Value*
Total Fat 14g	**18%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Polyunsaturated Fat 3g	
Monounsaturated Fat 9g	
Cholesterol 0mg	**0%**
Sodium 0mg	**0%**
Total Carbohydrate 6g	**2%**
Dietary Fiber 3g	**11%**
Total Sugars 1g	
Includes 0g Added Sugars	**0%**
Protein 6g	**12%**
Vitamin D 0mcg	0%
Calcium 75mg	6%
Iron 1mg	6%
Potassium 200mg	4%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

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Tomato Sauce

Tomato Sauce, canned

Nutrition Facts

Serving size	1/2 cup (122g)
Amount Per Serving	
Calories	**30**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 640mg	**28%**
Total Carbohydrate 7g	**3%**
Dietary Fiber 2g	**7%**
Total Sugars 5g	
Includes 0g Added Sugars	**0%**
Protein 2g	**4%**
Vitamin D 0mcg	0%
Calcium 16mg	2%
Iron 1mg	6%
Potassium 405mg	8%
Vitamin A 317mcg	2%
Vitamin C 9mg	10%

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Strawberry Jam

Strawberry Jam

Nutrition Facts

Serving size	**1 tbsp (20g)**
Amount Per Serving	
Calories	**60**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 5mg	**0%**
Total Carbohydrate 14g	**5%**
Dietary Fiber 0g	**0%**
Total Sugars 10g	
Includes 5g Added Sugars	**10%**
Protein 0g	**0%**
Vitamin D 0mcg	0%
Calcium 4mg	0%
Iron 0mg	0%
Potassium 15mg	0%
Vitamin A 0mcg	0%
Vitamin C 2mg	2%

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Peanut Butter

Peanut Butter

Nutrition Facts

Serving size	**2 tbsp (32g)**
Amount Per Serving	
Calories	**190**
	% Daily Value*
Total Fat 16g	**21%**
Saturated Fat 3g	**15%**
Trans Fat 0g	
Polyunsaturated Fat 4g	
Monounsaturated Fat 8g	
Cholesterol 0mg	**0%**
Sodium 135mg	**6%**
Total Carbohydrate 7g	**3%**
Dietary Fiber 2g	**7%**
Total Sugars 3g	
Includes 3g Added Sugars	**6%**
Protein 7g	**14%**
Vitamin D 0mcg	0%
Calcium 15mg	2%
Iron 0.5mg	2%
Potassium 180mg	4%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Milk

Milk, reduced-fat (2%), vitamin D fortified

Nutrition Facts

Serving size	**1 cup (244g)**
Amount Per Serving	
Calories	**120**
	% Daily Value*
Total Fat 5g	**6%**
Saturated Fat 3g	**15%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 1.5g	
Cholesterol 20mg	**7%**
Sodium 100mg	**4%**
Total Carbohydrate 12g	**4%**
Dietary Fiber 0g	**0%**
Total Sugars 12g	
Includes 0g Added Sugars	**0%**
Protein 8g	**16%**
Vitamin D 3mcg	15%
Calcium 285mg	20%
Iron 0mg	0%
Potassium 369mg	8%
Vitamin A 135mcg	15%
Vitamin C 0.5mg	0%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Chocolate Chip Cookie

Chocolate Chip Cookie

Nutrition Facts

Serving size	1 cookie, large (40g)
Amount Per Serving	
Calories	**190**
	% Daily Value*
Total Fat 9g	**12%**
Saturated Fat 4g	**20%**
Trans Fat 0g	
Polyunsaturated Fat 1g	
Monounsaturated Fat 3g	
Cholesterol 0mg	**0%**
Sodium 120mg	**5%**
Total Carbohydrate 26g	**9%**
Dietary Fiber 1g	**4%**
Total Sugars 14g	
Includes 14g Added Sugars	**28%**
Protein 2g	**4%**
Vitamin D 0mcg	0%
Calcium 10mg	0%
Iron 1mg	6%
Potassium 60mg	2%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Black Beans

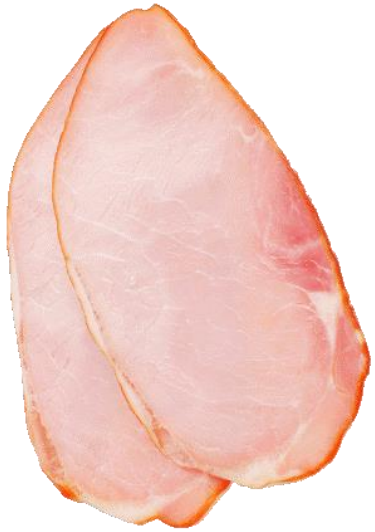
Black Beans

Nutrition Facts

Serving size	1/2 cup (86g)
Amount Per Serving	
Calories	**110**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	**0%**
Sodium 130mg	**6%**
Total Carbohydrate 20g	**7%**
Dietary Fiber 8g	**29%**
Total Sugars 1g	
Includes 0g Added Sugars	**0%**
Protein 7g	**14%**
Vitamin D 0mcg	0%
Calcium 51mg	4%
Iron 2mg	10%
Potassium 488mg	10%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Ham



Ham, sliced

Nutrition Facts

Serving size	1 slice (28g)
Amount Per Serving	
Calories	**45**
	% Daily Value*
Total Fat 2.5g	**3%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 1g	
Cholesterol 15mg	**5%**
Sodium 360mg	**16%**
Total Carbohydrate 1g	**0%**
Dietary Fiber 0g	**0%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 5g	**10%**
Vitamin D 0mcg	0%
Calcium 7mg	0%
Iron 0mg	0%
Potassium 80mg	2%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Assigned Macronutrient (Carbohydrate *or* Fat *or* Protein):	
Assigned Vitamin (Vitamin A *or* Vitamin C *or* Vitamin D):	
Assigned Mineral (Calcium *or* Potassium *or* Iron):	

Create a meal that you think is a good source of each of your assigned nutrients.

Food	Serving Size

Macronutrient (Carbohydrate *or* Fat *or* Protein)	
Total amount of the macronutrient in the meal (g):	
What is the total Daily Value of this macronutrient in the meal? (%)	

Vitamin (Vitamin A *or* Vitamin C *or* Vitamin D)	
Total amount of the vitamin in the meal (mg/mcg):	
What is the total Daily Value of this vitamin in the meal? (%)	

Mineral (Calcium *or* Potassium *or* Iron)	
Total amount of the mineral in the meal (mg/mcg):	
What is the total Daily Value of this mineral in the meal? (%)	

Directions: Choose a food in your home or grocery store that has a Nutrition Facts Label included on the packaging. Complete the following table to discover the amount of each nutrient in the food and whether it is a good source of that nutrient. As a reminder, a food is considered a good source if it provides at least 10% of the Percent Daily Value for that nutrient.

Food:	
Serving size of food:	

Protein	Total amount of protein in a serving (g)	
	What is the total Percent Daily Value of protein in a serving? (%)	
	Is a serving of the food a good source of protein?	
Dietary Fiber	Total amount of dietary fiber in a serving (g)	
	What is the total Percent Daily Value of dietary fiber in a serving? (%)	
	Is a serving of the food a good source of dietary fiber?	
Vitamin D	Total amount of vitamin D in a serving (g)	
	What is the total Percent Daily Value of vitamin D in a serving? (%)	
	Is a serving of the food a good source of vitamin D?	
Calcium	Total amount of calcium in a serving (g)	
	What is the total Percent Daily Value of calcium in a serving? (%)	
	Is a serving of the food a good source of calcium?	
Iron	Total amount of iron in a serving (g)	
	What is the total Percent Daily Value of iron in a serving? (%)	
	Is a serving of the food a good source of iron?	
Potassium	Total amount of potassium in a serving (g)	
	What is the total Percent Daily Value of potassium in a serving? (%)	
	Is a serving of the food a good source of potassium?	

Nutrition Module 3:
Nutrition for All

BACKGROUND INFORMATION

Our **metabolism** helps regulate the process of breaking down food for energy. This allows us to perform simple everyday tasks, such as sitting, along with more arduous activities, such as exercising. Foods that we eat provide **nutrients** necessary to keep our metabolism functioning properly. However, not all foods have the same **nutrient composition**. Therefore, designing a **nutrient-dense** eating pattern requires not only consideration of the amount of food being consumed, but also the variety. The Food and Nutrition Board of the Institute of Medicine, National Academy of Sciences established the **Dietary Reference Intakes (DRIs)** to provide guidance on the recommended amount of **macronutrients** and **micronutrients** to consume each day. The DRIs suggested consumption amounts for each nutrient vary by sex, age, and physical activity level.

There are some nutrients in the United States that are being overconsumed, and others that are commonly under-consumed, known as **nutrients of concern**. For adolescents, nutrients that are commonly under-consumed include **calcium, potassium, iron, vitamin D,** and **dietary fiber**. In an effort to prevent deficiencies and certain diseases, food **fortification** has been implemented in the United States, which involves adding certain vitamins and minerals into select foods.

Calcium is a mineral that is stored in the bones and can be found in foods like certain leafy green vegetables, dairy products, and fortified foods, commonly cereals and juices. Calcium is important because it helps build and maintain strong bones and also helps muscles function. Vitamin D helps the body absorb calcium and thus is also important for bone health. Although vitamin D can be synthesized by the body upon skin exposure to the sun's ultraviolet rays, individuals are still encouraged to consume foods that naturally contain or are **fortified** with vitamin D. Vitamin D can be found in egg yolks and fortified into dairy products, cereals, and juices. Dietary fiber plays a major role in body function as well, aiding in digestion and blood sugar regulation. Foods that are good sources of dietary fiber include whole grains, fruits, vegetables, and beans. These foods can also be good sources of potassium, which is important for a variety of functions in the body, including blood pressure regulation, nerve signaling, and muscle movement.

Iron is also an important nutrient because it helps red blood cells transport oxygen throughout the body. Some foods high in iron include red meats, beans, and certain leafy green vegetables. If the recommended amount of iron is not consumed, an individual could become deficient and even develop a disease called anemia. With iron deficiency anemia, red blood cells are not able to transport oxygen efficiently, which causes fatigue, weakness, and potentially fainting. Individuals at risk for iron deficiency anemia are usually encouraged to consume an iron **supplement**. Supplements are available in capsules or powders and typically

contain high amounts of one or more nutrients. Nutrients in supplements are usually not the same as nutrients found in food and can be dangerous if consumed in excess. Therefore, it is always recommended that supplements not be consumed unless recommended by a medical professional.

CONCEPTS AND VOCABULARY

Calcium: A mineral essential for proper bone growth and maintenance

Dietary fiber: A type of carbohydrate found in plants that when consumed aids in digestion

Dietary Reference Intakes (DRIs): Reference values that are used to plan and assess nutrient intakes of healthy people

Fortification: The process of adding certain vitamins and minerals into foods in an effort to help people meet recommendations

Iron: A mineral that helps red blood cells transport oxygen throughout the body

Macronutrient: A classification for nutrients needed in relatively large amounts for the body to function properly, including fats, carbohydrates, and protein

Metabolism: The biological process of converting food into energy for the body

Micronutrient: A classification for nutrients needed in relatively small amounts for the body to function properly, including vitamins and minerals

Nutrient: A compound that when consumed provides nourishment essential for growth and maintenance of the body

Nutrient composition: The distribution of nutrients that make up a food

Nutrient-dense: Foods that contain relatively high proportions of vitamins or minerals compared to the number of calories

Nutrient of concern: Nutrients found to be underconsumed or overconsumed by a particular population

Potassium: A mineral and electrolyte that is important for nerve and organ function

Supplement: Capsule or powder that contains high amounts of one or more nutrients

Vitamin D: A vitamin that promotes the absorption of calcium and aids in bone health

MATERIALS NEEDED

- Flip chart paper
- Writing utensils
- *Food Cards* (Appendix N2.2 from prior activity), one set per group
- *Character Cards* (Appendix N3.1)
- *Meal Plan* (Appendix N3.2), one per group
- *Recommendations* (Appendix N3.3), one per group

Materials provided in curriculum

TIME REQUIRED

45 to 60 minutes

SUGGESTED GROUPINGS

Small groups of 3 to 4

GETTING READY

- ☐ Gather the previous lesson's *Food Cards* (Appendix N2.2), one set for each group.
- ☐ Make copies of the *Character Cards* (Appendix N3.1), one card for each group. Cut the cards out along the dashed line and then fold them along the solid line.
- ☐ Make copies of *Recommendations* (Appendix N3.3), one for each group.

  Facilitator tip: It is recommended that the above appendices be laminated to allow them to be more easily handled by youth and reused.
- ☐ Make copies of *Meal Plan* (Appendix N3.2), one for each group
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Provide each group with one sheet of flip chart paper and markers to answer the opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

• Explain what you think it means for a food to be considered nutritious.
• Explain what you know about why people should eat a variety of different foods.

PROCEDURE (EXPERIENCING)

1. Provide each group with a set of *Food Cards, a Character Card*, and a *Meal Plan*.
2. Ask youth to read the description on their assigned *Character Card*.
3. Explain to the youth that each group will choose ingredients from their set of *Food Cards* to create a day's worth of meals for their character based on their description. Youth should record their meal on the *Meal Plan*.
4. Once plans have been finalized, provide each group with the *Recommendations* and ask youth to use the *Recommendations* to identify the nutrient recommendations for their character.
5. Ask the youth to turn their *Character Card* over to the other side. Explain to the youth that this side of the card indicates a nutrient of concern for teenagers.
6. Ask youth to use the Nutrition Facts Labels on the back of the *Food Cards* to determine whether their planned meal meets their character's recommendation for their assigned nutrient of concern. Encourage youth to use their flip chart paper for calculating the total amount of the nutrient of concern in their meal.
7. If the meal each group created does not meet their character's recommendation, encourage youth to modify their meal plan to meet the recommendation.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *Character Cards and Meal Plan*. Ask them to describe the foods they chose and whether their character's nutrient of concern recommendation was met by their plan.

Follow the lines of thinking developed through the youth's thoughts, observations, and

questions as they share their meal plans. If necessary, ask more targeted questions.

- Explain how you went about choosing foods for your character's meal.
- Describe what types of foods you noticed contributed most to your character's nutrient of concern recommendation.
- Describe why you think these nutrients are considered nutrients of concern.
- Describe any difficulties you had in meeting your character's recommendation for the nutrient of concern.
- Explain what recommendations you would give your character to help them meet their nutrient of concern recommendation.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure that the youth understand the importance of considering balance when designing a meal plan. Youth should understand that consuming a variety of foods is needed to meet nutrition recommendations. In addition to food groups, recommendations exist for **macronutrients** and **micronutrients**. Youth should also understand that it is important to be aware of **nutrients of concern** for their age group when planning meals. Nutrition Facts Labels can be used to determine whether youth are meeting the **Dietary Reference Intakes (DRIs)** for certain **nutrients**. Additionally, make sure that key vocabulary terms are either discovered by the youth or introduced to them: **calcium, dietary fiber, fortification, iron, metabolism, nutrient composition, nutrient-dense, potassium, supplement,** and **vitamin D.**

AGRICULTURE APPLICATION

MATERIALS NEEDED

- ☐ Two large plastic storage containers with lids (generally inexpensive at hardware stores)
- ☐ A drill, pointed screwdriver, or knife
- ☐ Paper, such as newspaper, or dry leaves
- ☐ Food scraps
- ☐ Gloves, one pair per youth (optional)
- ☐ Art supplies, such as poster paper, markers, crayons, pens, colored pencils, construction paper, scissors, and glue
- ☐ Agriculture maintenance equipment

TIME REQUIRED

15 to 20 minutes

SUGGESTED GROUPINGS

Small groups of 3 to 4

GETTING READY

- ☐ Drill or cut several holes in the bottoms and lids of the storage containers.
- ☐ Supply enough materials to allow each youth to maintain their designated area in the agricultural space.

☐ Organize youth into small groups of 3 – 4 youth.

Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.

PROCEDURE (EXPERIENCING)

1. Explain to the youth that soil health is an important component to successfully growing plants and that composting is a simple way to add nutrients to the soil.
2. Explain to the youth that they will be creating a compost pile in their agricultural space.
3. Ask the youth to designate a composting area in the agricultural space. This area should not be in full sun and should be near the agricultural space, but placed far enough away where insects and organic smells will not be disruptive.
4. Place the prepared storage containers in the spot chosen by the youth.
5. Ask youth to line the bottom of the container with paper or dry leaves, about ¼ full. Then ask youth to fill the container about ½ full with dirt from the agricultural space.
6. Ask youth to add any food scraps and other compostable materials. Many items can be composted, except ashes, animal products, dairy products, and diseased plants.
7. Ask youth to gently mix the food scraps and dirt using a shovel or trowel and then add enough water to just moisten the top. Then ask youth to firmly place the prepared lid on the container.
8. Ask youth to continue collecting food scraps over the next several weeks and adding them to the compost container. Additionally, youth should rotate the contents of the compost by stirring it around every three to four days to ensure quality soil is produced. If the compost looks dry, youth can add enough water to just moisten the top.
9. Provide youth with the art supplies and ask youth to create signs within their groups to post in school lunchrooms to encourage students to compost their food scraps instead of throwing them away.
10. With any time remaining, lead youth in maintaining their designated growing section. This may include discarding weeds, supplying additional nutrients, and watering plants.

SHARING, PROCESSING, AND GENERALIZING

Have the youth discuss the importance of composting and discuss how it will benefit the plants. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about composting.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

☐ *Nutrition at Home* (Appendix N3.4), one per youth

TIME REQUIRED

5 to 10 minutes

Materials provided in curriculum

GETTING READY

☐ Make double-sided copies of *Nutrition at Home* (Appendix N3.4), one for each youth.

PROCEDURE (EXPERIENCING)

1. Provide each youth with a copy of *Nutrition at Home*.
2. Ask youth to use *Nutrition at Home* to track a day of their eating, including the foods eaten and the specified nutrients found in those foods. Encourage youth to complete this worksheet with their families.
3. Explain to youth that they can then use the back of the *Nutrition at Home* to determine whether they met their nutrient of concern recommendations.

SHARING, PROCESSING, AND GENERALIZING

If they are comfortable sharing, have the youth share their *Nutrition at Home* and discuss whether they met their nutrition of concern recommendations for the day they tracked. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share their experience tracking their eating for one day.

Andre is a 16 year-old male who cannot eat wheat products because he has celiac disease and they give him a really bad stomachache.	Jasmine is a 17 year-old female who gets full really fast and prefers to only eat small meals.
Dietary Fiber	Potassium
Bianca is a 15 year-old female who is a vegan and does not eat or drink any animal products.	Peter is a 14 year-old male who is lactose intolerant and can't have milk or cheese.
Iron	Calcium
Mia is a 16 year-old female who lives in a city where it mostly rains. She also prefers to spend her time indoors.	
Vitamin D	

Directions: Use the following table to organize a one-day meal plan for your character.

Meal	Foods in Meal

Directions: Find the nutrient recommendation for your character and determine whether your group's one-day meal plan meets their recommendation.

For the table below: M = males, F = females.

Recommendations for Nutrients of Concern					
Age Range	**Calcium (mg/day)**	**Potassium (mg/day)**	**Iron (mg/day)**	**Vitamin D (mcg/day)**	**Dietary Fiber (g/day)**
1 – 3 years old	700	2,000	7	15	19
4 – 8 years old	1000	2,300	10	15	25
9 – 13 years old	1300	2,300 (F) 2,500 (M)	8	15	26 (F) 31 (M)
14 – 18 years old	1300	2,300 (F) 3,000 (M)	11 (M) 15 (F)	15	26 (F) 38 (M)
19 – 50 years old	1000	2,600 (F) 3,400 (M)	8 (M) 18 (F)	15	25 (F) 38 (M)

Note: Calcium, potassium, iron, vitamin D, and dietary fiber are nutrients of concern for adolescents and adults. These nutrients are generally under-consumed.

Directions: Use this worksheet to track your meals for one day. Then use the following page to identify your recommendations for nutrients of concern and determine whether you met your recommendations.

Meal	Foods in Meal	Amount Included*
		Calcium:
		Potassium:
		Iron:
		Vitamin D:
		Dietary Fiber:
		Calcium:
		Potassium:
		Iron:
		Vitamin D:
		Dietary Fiber:
		Calcium:
		Potassium:
		Iron:
		Vitamin D:
		Dietary Fiber:
		Calcium:
		Potassium:
		Iron:
		Vitamin D:
		Dietary Fiber:

*If you need to look-up nutrients in a given food, go to https://nutritiondata.self.com/ and search for the food item.

For the table below: M = males, F = females.

Recommendations for Nutrients of Concern					
Age Range	**Calcium (mg/day)**	**Potassium (mg/day)**	**Iron (mg/day)**	**Vitamin D (mcg/day)**	**Dietary Fiber (g/day)**
1 - 3 years old	700	2,000	7	15	19
4 - 8 years old	1000	2,300	10	15	25
9-13 years old	1300	2,300 (F) 2,500 (M)	8	15	26 (F) 31 (M)
14-18 years old	1300	2,300 (F) 3,000 (M)	11 (M) 15 (F)	15	26 (F) 38 (M)
19-50 years old	1000	2,600 (F) 3,400 (M)	8 (M) 18 (F)	15	25 (F) 38 (M)

Note: Calcium, potassium, iron, vitamin D, and dietary fiber are nutrients of concern for adolescents and adults. These nutrients are generally under-consumed.

Nutrition Module 4: **Fact or Fiction**

BACKGROUND INFORMATION

Children and adolescents can have a large influence on their guardians' food purchases. With this, food companies have identified young people as key **consumers** driving the food market. In turn, food advertising is heavily geared toward youth. Food advertising has become an industry that targets specific demographics simply by how it is commercialized. Unfortunately, the food that is most heavily marketed to young people is high in saturated fat, added sugars, and sodium. These are all nutrients that are generally recommended to be consumed in limited amounts. The overconsumption of foods high in sugar, sodium, and saturated fat are large contributors to obesity in the United States and have been correlated to chronic disease risk.

Food **advertisements** can be found on television programs, social media, and games geared toward youth. These advertisements commonly employ **marketing strategies** to engage their target audience. One such marketing strategy is through **branding**. When branding, the food company designs the product to **appeal** to the child, or in other words, to "catch the eye" of that target demographic. Advertising that includes bright colors, cartoon animals, or **promotions** on the packaging are common ways to gain **publicity**. When a product is publicized as a brand rather than the nutrient content of the food, popularity increases, and the publicity encourages other children to want that food. In addition, publicity is also created through commercials, billboards, and even social media to create a high demand for that product.

Methods food branding teams use to promote their products are not necessarily meant to help someone choose what foods are the most nutrient-dense. Instead, **reliable resources** are sources for information that do not contain a purely profit-based motivation, rather the marketing strategy of the producer is driven by increasing the knowledge of the consumer. When choosing foods, a reliable resource would be the Nutrition Facts Label, where the facts about the nutritional content of the food are included. These labels are produced by the product company and regulated by the Food and Drug Administration (FDA). When looking for general nutrition information, it is best to consult materials produced by academics from nutrition departments at universities, professional nutrition organizations, such as the Academy of Nutrition and Dietetics or the American Society for Nutrition, or governmental agencies, such as the USDA or FDA.

CONCEPTS AND VOCABULARY

Advertisement: Paid announcement in in which a product is presented to the public, usually with the intent of influencing the public to purchase the product

Appeal: Something that draws the attention of a specific demographic

Branding: Creating a certain and recognizable meaning associated with a product

Consumer: An individual or manufacturer that buys products from an entity that creates goods

Marketing strategies: Plan of action to make a product appeal to the consumer to facilitate a purchase

Promotion: A method of incentivizing a purchase to persuade a consumer

Publicity: A product gaining popularity through repeated advertising to consumers

Reliable resources: Sources that do not contain a purely profit-based motivation and provide information to consumers for educational purposes

MATERIALS NEEDED

- ☐ Flip chart paper
- ☐ Writing utensils
- ☐ *Gym Ad* (Appendix N4.1), one per group
- ☐ *Marketing Strategies* (Appendix N4.2), one per group
- ☐ *Fact Sheets* (Appendix N4.3)
- ☐ Blank standard sized paper or cardstock
- ☐ Art supplies, such as markers, crayons, pens, colored pencils, construction paper, scissors, and glue

Materials provided in curriculum

TIME REQUIRED

30 to 45 minutes

SUGGESTED GROUPINGS

Small groups of 3 to 4

GETTING READY

- ☐ Make copies of the *Gym Ad* (Appendix N4.1), one for each group.
- ☐ Make copies of the *Marketing Strategies* (Appendix N4.2), one for each group.
- ☐ Make copies of the *Fact Sheets* (Appendix N4.3), one fact sheet for each group.
  Facilitator tip: It is recommended that the above appendices be laminated to allow them to be more easily handled by youth and reused.
- ☐ Place the blank paper and art supplies in a central location.
- ☐ Organize youth into small groups of 3 – 4 youth.
  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Provide each group with one sheet of flip chart paper and writing utensils to answer opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

• Describe what methods you think companies use to get people to buy their products.
• Explain how you or people you know find information on nutrition.

PROCEDURE (EXPERIENCING)

1. Provide each group with the *Gym Ad*.
2. Ask youth to look over the *Gym Ad* and describe any marketing strategies they think are being used.
3. Provide each group with the *Marketing Strategies*.
4. Ask the youth to read the *Marketing Strategies* within their groups and discuss whether the *Gym Ad* and any other advertisements they have seen recently use the strategies.
5. Provide each group with one of the *Fact Sheets*.
6. Explain to the youth that they will be creating an advertisement to promote the information in the *Fact Sheets* in an engaging way.
7. Ask youth to use the information provided in the *Fact Sheets* and the techniques in the *Marketing Strategies* to create advertisements on their given topic. Youth may create a paper-based advertisement using the blank paper and art supplies or any other kind of advertisement of their choosing, such as a television commercial or social media post.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their advertisements and discuss how they determined the style of, and information provided in their advertisement.

Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share their advertisement. If necessary, ask more targeted questions.

- Describe what marketing strategies you decided to use in your advertisement.
- Discuss what marketing strategies you think are most effective for nutrition information.
- Explain how you went about deciding what information to include in your advertisement.
- Describe the audience that your advertisement would most appeal to.
- Discuss what could go wrong if someone has incorrect nutrition information.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Youth should understand that information provided in **advertisements** may mislead **consumers** in order to increase sales of a product. This is typically done through the use of carefully selected **marketing strategies**. Youth should recognize the importance of seeking information from **reliable resources** in order to receive the most accurate information on a given topic. Additionally, make sure that key vocabulary terms are either discovered by the youth or introduced to them: **appeal, branding, promotion**, and **publicity**.

AGRICULTURE APPLICATION

MATERIALS NEEDED

- ☐ *Marketing Strategies* (Appendix N4.2), one per group
- ☐ *Homemade Pesticide Recipes* (Appendix N4.4), one per group
- ☐ Bowls or cups for mixing liquids, one per youth
- ☐ Small spray bottles, one per youth
- ☐ Measuring cups, one set per group
- ☐ Measuring spoons, one set per group
- ☐ Cutting boards, one per group
- ☐ Cutting utensils, one per group
- ☐ Natural pesticide ingredients, see *Homemade Pesticide Recipes* (Appendix N4.4)
- ☐ Blank standard sized paper or cardstock
- ☐ Art supplies, such as markers, crayons, pens, colored pencils, construction paper, scissors, and glue
- ☐ Agriculture maintenance equipment

TIME REQUIRED
20 to 30 minutes

Materials provided in curriculum

GETTING READY

- ☐ Place natural pesticide ingredients in a central location.
- ☐ Place paper and art supplies in a central location.
- ☐ Supply enough materials to allow each youth to maintain their designated area in the agricultural space.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.

PROCEDURE (EXPERIENCING)

1. Provide each group with *Homemade Pesticide Recipes, Marketing Strategies*, measuring cups, measuring spoons, cutting boards, and cutting utensils. Additionally, provide each youth with a small spray bottle and a bowl or cup.
2. Explain to youth that they will be making a homemade pesticide and creating an advertisement for the homemade pesticide recipe of their choice.
3. Ask youth to create a homemade pesticide following the recipes provided in *Homemade Pesticide Recipes*. They can utilize the supplies provided to them and gather whatever ingredients that may need from the central location to complete the task.

4. Once youth have developed a homemade pesticide, ask youth to use the *Marketing Strategies* to create an advertisement for their pesticide. Youth may use the paper and art supplies to create a paper-based advertisement or may use the materials to brainstorm for an online advertisement for social media.
5. Ask each youth to carefully spray their pesticide on designated area in the agricultural space. Ask youth to monitor the space to see if their homemade pesticides help keep harmful critters away.
6. With any time remaining, lead youth in maintaining their designated growing section. This may include discarding weeds, supplying additional nutrients, and watering plants.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their homemade pesticide and discuss the marketing strategies used in their advertisement. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered advertising.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *Ad Home Worksheet* (Appendix N4.5), one per youth

TIME REQUIRED

5 to 10 minutes

Materials provided in curriculum

GETTING READY

☐ Make copies of *Ad Home Worksheet* (Appendix N4.5), one for each youth.

PROCEDURE (EXPERIENCING)

1. Provide each youth with an *Ad Home Worksheet*.
2. Explain to the youth that they will use the *Ad Home Worksheet* to analyze a nutrition-related advertisement.
3. Ask the youth to complete the *Ad Home Worksheet* using messaging on the front of a food or supplements package, something in a magazine, a commercial on TV, or an online advertisement.

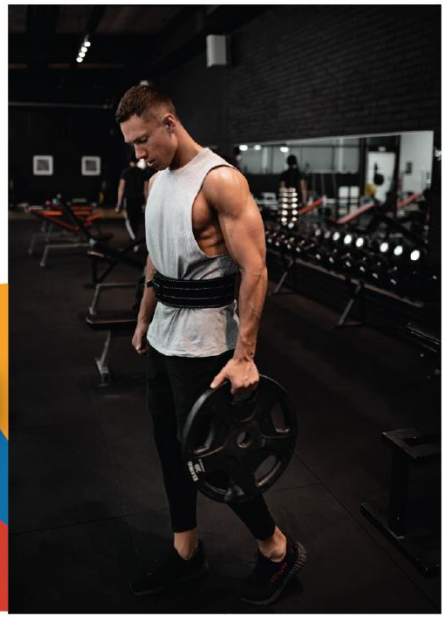
SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *Ad Home Worksheet* and describe the advertisement they chose to analyze. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they learned about the advertised topic.

the GYM

Claim one **FREE** personal training session

Come get **RIPPED** in the gym all the **Hollywood stars** are raving about!



40% OFF first 6 months

Offer ends 02.01.2009 and is valid for the first 6 months of the contract. Contracts are required. Results may vary through individuals: frequency, intensity, age, gender, weight, overall exercise routine, supplements, diet, cardio, genetics, etc...

Marketing Strategies	
Publicity and Branding	The advertisement is easily seen: • Online through social media or website banners • Television commercials • Billboards People recognize the brand in the advertisement: • Logo or product symbol • Spokescharacter or spokesperson
Appeal	People like the look and feel of the advertisement: • Bright colors • Makes them feel a certain way • Includes music • People who look like the intended audience are in the advertisement The advertisement is popular: • References other things that are popular, like movies or video games • Includes popular celebrities, professional athletes, or cartoon characters
Promotions	The advertisement offers something to the audience: • Additional product or service received for free with purchase • Sweepstakes, prizes, or giveaways • Point or reward program • Free downloads • Games or puzzles on packaging

Gluten Fact Sheet

Gluten is a group of proteins found in wheat, rye, and barley, as well as foods made from these grains, including pasta and most baked goods. It may also be found in oats.

Celiac disease is a disease in which the immune system reacts to gluten, causing damage to the small intestine.
Common symptoms:

- Diarrhea
- Abdominal pain
- Fatigue

Nutrients found in whole wheat bread include:

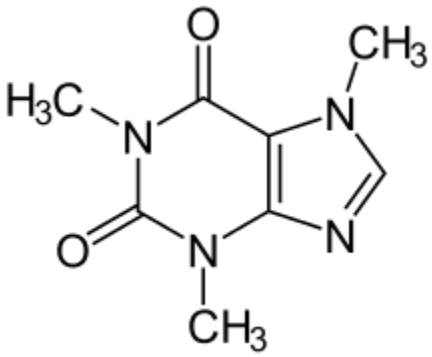
- Fiber: helps your digestive system function normally
- B vitamins: have multiple functions in the body, including forming red blood cells and helping the body use other nutrients
- Iron: helps red blood cells transport oxygen throughout the body
- Complex carbohydrate: provides the body with energy

Other food options for these nutrients:

- Complex carbohydrates and fiber – fruits, vegetables, beans, grains
- B vitamins – fruits, vegetables, beans, grains, meats
- Iron – leafy green vegetables, meats, beans

Energy Drinks Fact Sheet

Energy drinks are beverages made of carbonated water, sugar, and various added ingredients (typically caffeine and vitamins and minerals in excessive amounts). Energy drinks provide a feeling of energy because they usually contain relatively high amounts of caffeine and sugar.



Caffeine can enhance alertness and mood. Caffeine consumption is also associated with nervousness, irritability, increased urination, abnormal heart rhythms, and stomachaches. All effects of caffeine vary between individuals and also vary depending on the amount consumed.

If consuming caffeine, the *Dietary Guidelines for Americans* recommends that adults do not consume more than 400mg per day. For reference, there is about 80mg in a small cup of black coffee. It is generally advised that children, adolescents, and pregnant or nursing women limit caffeine consumption.

Substitutes for energy drinks:

- Water
- Flavored water
- 100% fruit juice
- Carbonated water
- Unsweetened tea

Protein Fact Sheet

Protein is an important nutrient that provides energy and also provides structure for cells in the body. Protein has important roles in the function of our muscles, in the repair and production of new cells, and in the general growth and development of our bodies.

Excess protein is not used efficiently by the body and is stored as fat. Over time, excess protein can cause damage to bones, kidneys, and the liver.

Protein requirements vary between individuals. Some people, such as athletes, injured people, and older adults, may have higher protein needs compared to other people.

High quality proteins include:

- Meat
- Fish
- Eggs
- Dairy
- Soy

After exercising, it is important to eat high quality protein within two hours to enhance muscle repair and growth. However, it is also important to consume carbohydrates to replenish stores that were used during exercise.

Water Fact Sheet

The human body is made up of 60% water, which is found in blood, cells, and bodily fluids, such as saliva and sweat. The consumption of water is essential to maintain healthy bodily functions. Water can be consumed in various forms. Fruits and vegetables, basic drinking water, and other beverages contain water and can help hydrate the body.

Drinking adequate amounts of water can help:

- Prevent dehydration
- Improve skin health and reduce acne
- Boost immune system
- Increase energy and brain power

Dehydration is a health condition that results from not drinking enough water or from losing large amounts of bodily fluids, such as excessive sweating, vomiting, or diarrhea. The symptoms of dehydration include:

- Dizziness
- Headache
- Extreme thirst
- Dry mouth and tongue

A simple equation can be used to estimate the average amount of water you should be consuming daily:
Body weight (in pounds) ÷ 2 = # of ounces of water you should drink

It is recommended that anyone above the age of 13 drink at least 8 to 10 glasses or two liters of water every day. However, if a person is physically active or in very warm temperatures, they likely need more water to prevent dehydration.

Homemade Pesticide Recipes

Salt Spray:

- ¼ teaspoon sea salt
- ¼ cup warm water

Citrus and Cayenne Pepper Spray:

- ¼ teaspoon citrus juice (orange or lemon) or 5 drops of citrus essential oil
- A pinch of cayenne pepper
- ¼ cup warm water

Onion and Garlic Spray:

- ¼ clove of garlic, minced
- One dice-sized piece of an onion
- 3-4 drops of liquid soap
- ¼ cup warm water

Tomato Leaf Spray:

- 2 tablespoons chopped tomato leaves
- ¼ cup warm water

Baby Shampoo Spray:

- ¼ teaspoon baby shampoo
- ¼ cup warm water

Olive Oil Spray:

- 1 teaspoon olive oil
- ⅛ teaspoon liquid soap
- ¼ cup warm water

Jalapeño Spray:

- ¼ chopped jalapeno
- ¼ cup of warm water

Directions: Choose a nutrition-related advertisement to analyze using the following questions. The advertisement can be messaging on the front of a food or supplements package, something in a magazine, a commercial on TV, or an online advertisement.

Describe why the advertisement caught your attention.

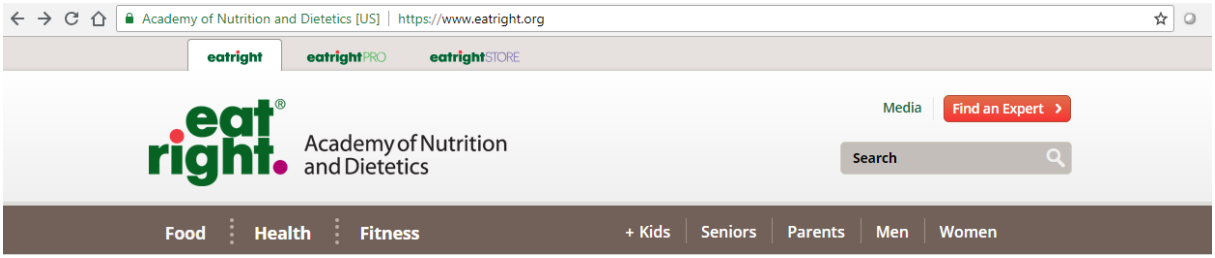
What is the advertisement claiming?

Does the advertisement state information different from other information you have seen on this topic? If so, how do the messages differ?

How would you go about verifying the information on this topic?

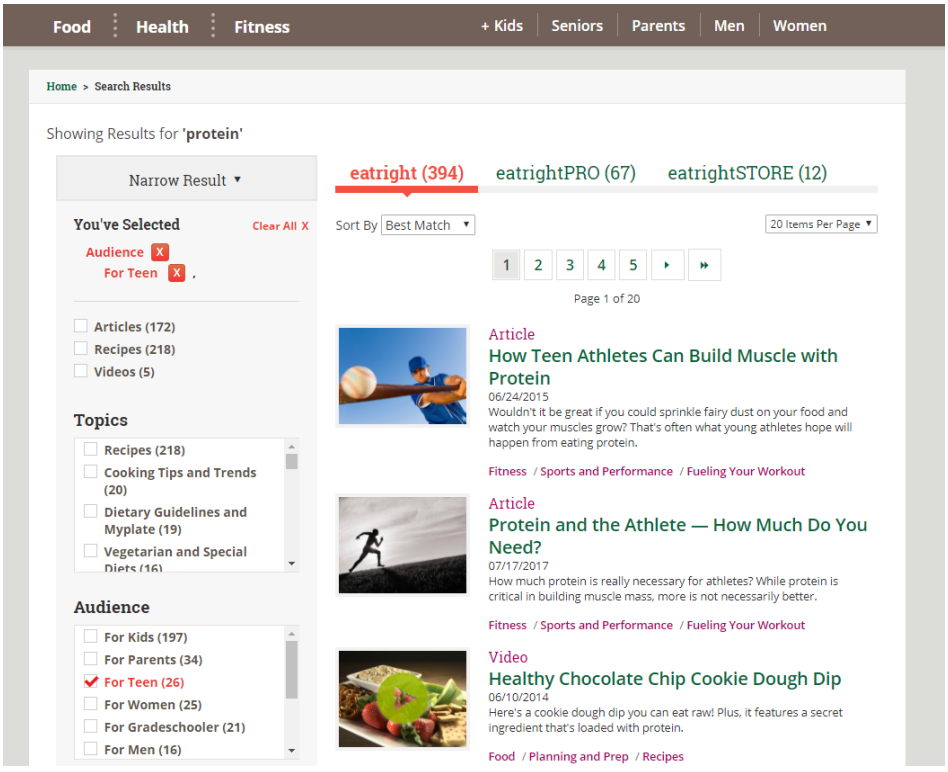
Use the Academy of Nutrition and Dietetics website (https://www.eatright.org/) to learn more about the topic of the advertisement you found. This website includes several science-based articles on nutrition that are easy to search.

1. Go to https://www.eatright.org/.



2. Type the nutrient of interest into the search bar in the top right corner and hit enter or click the magnifying glass.

3. Several articles will likely appear. You may find it helpful to use the column on the left to narrow the results. Read through the article titles and click on the one that best aligns with your advertisement.



Cooking Module 1: **Safety in the Kitchen**

BACKGROUND INFORMATION

Food safety describes the practice of handling, preparing, and storing of foods to prevent **foodborne illness**. An essential piece of equipment for storing foods is the refrigerator. Refrigeration of food slows bacterial growth. **Bacteria** exists everywhere in nature including soil, water, air, the foods we eat, and even on our hands, skin, and inside our bodies. Bacteria will rapidly grow when they have moisture, favorable temperatures, and nutrients. Some bacteria are harmful to our bodies in small quantities, while other bacteria are only harmful once they grow too large enough quantities. Bacteria will grow most rapidly in temperatures between 40-140°F. This temperature range is referred to as the "**Danger Zone**" and it is best to be avoided. This is why it is recommended that refrigerator temperatures be kept below 40°F and that hot foods be cooked to and kept above at least 140°F. Some foods, like meats, poultry, and leftovers should be heated to even higher temperatures to prevent bacterial growth.

Along with ensuring proper temperature control of foods, foodborne illness can also be prevented by avoiding **cross-contamination**. Cross-contamination can happen anywhere in the kitchen and involves foods that are ready-to-eat, such as raw fruits and vegetables, being exposed to bacteria from foods that should be cooked before eaten, such as raw meats. The general guidelines of storing food in the refrigerator to prevent cross-contamination are to store all leftovers and ready-to-eat foods on the upper shelves. Dairy items, including milk and cheese, and eggs should be stored on the middle shelves. Raw meats, seafood, and poultry should be stored in sealed containers or wrapped securely and stored on the bottom shelf. This will prevent any juices that may leak from contaminating other foods. The refrigerator door can be used to store butter, condiments, nut butters, juices, water, and dairy substitutes.

Cross-contamination can also occur outside of the refrigerator. During food preparation, it is important to wash your hands before and after handling food to decrease the chances of contaminating foods. It has been estimated that over 50% of diarrheal disease can be prevented by regularly washing hands with hot soapy water for at least 20 seconds. Aside from improper hygiene, cross-contamination can occur on counter tops and cutting boards. Make sure when preparing foods to keep all raw meat, poultry, and seafood away from other foods. After cutting raw meat, poultry, or seafood, make sure to thoroughly wash hands and clean the cutting board, knife, and any utensils used with hot soapy water before moving onto the next task. It is also a good idea to completely switch equipment if possible before preparing ready-to-eat foods and to prepare ready-to-eat foods prior to others.

CONCEPTS AND VOCABULARY

Bacteria: Naturally occurring microscopic organisms that can be harmful or beneficial to the body

Cross-contamination: The transfer of illness-causing microorganisms from one food or surface to another

Danger Zone: The temperature range where bacteria grow the most rapidly, between 40-140°F

Foodborne illness: Sickness caused by contaminated foods

Food safety: The practice of handling, preparing, and storing foods to prevent foodborne illness

MATERIALS NEEDED

- ☐ Flip chart paper
- ☐ Writing utensils
- ☐ Light colored cutting boards (preferably white), one per group

  Facilitator tip: This activity will also work with a large piece of paper, such as flip chart paper, folded into the size of a common cutting board
- ☐ Two different colors of washable craft paint, enough for each group to have about ¼ cup of each color
- ☐ Small container or cups, two per group
- ☐ Sponge, one per group
- ☐ Kitchen towel, one per group
- ☐ GloGerm, one small bottle
- ☐ Blacklight, one per group
- ☐ Stopwatch, one per group

TIME REQUIRED

15 to 20 minutes

SUGGESTED GROUPINGS

Small groups of 3 to 4

GETTING READY

- ☐ Pour the craft paint into the small containers. Each group should have two containers, one container of each paint color.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Provide each group with one sheet of flip chart paper and writing utensils to answer opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

- Explain what you know about how food can make you sick.
- Explain what you know about food safety strategies.

PROCEDURE (EXPERIENCING)

1. Provide each group with a cutting board, two containers with different colored paints, one sponge, a kitchen towel, and a stopwatch.
2. Explain to youth that GloGerm is a lotion-based product that is meant to represent harmful bacteria and glows when illuminated with a blacklight. Go around to willing youth and squeeze a dime-sized amount of GloGerm onto their hands, instructing them to rub it around their hands.
3. Explain to the youth that they will be using the different colored paints to represent raw meats and ready-to-eat foods.
4. Explain that the youth will need to take their sponge and dip it into one of the colors. They will then use the sponge to spread the paint onto their cutting board. Afterwards, they will wipe the cutting board down as much as they can with a kitchen towel in 10 seconds, keeping track of the time with the stopwatch.
5. Ask youth to repeat the same process with the other paint color and time the process for 10 seconds again using the stopwatch.
6. Provide each group with a blacklight.
7. Ask youth to shine the blacklight onto the cutting board, sponge, kitchen towel, and their hands to see where the “germs” spread.
8. Ask youth to wash their hands and then shine the blacklight on their hands again to see how well they washed away the “germs.”

SHARING, PROCESSING, AND GENERALIZING

Have youth share their reactions to how well they were able to clean their cutting boards between paint colors and to how far the “germs” spread throughout the activity.

Follow the lines of thinking developed through the youth’s thoughts, observations, and questions as they share their experience. If necessary, ask more targeted questions.

- Explain what you observed when shining the blacklight onto your items.
- Explain why it is important to clean and sanitize kitchen equipment.
- Explain what you think are the major contributors to foodborne illnesses.
- Describe some things you can do to stay food safe.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure that the youth understand what causes **foodborne illnesses** and how they can be prevented. Youth should understand that **cross-contamination** can play a major role in increasing the incidence of foodborne illnesses. Youth should also understand how proper handwashing and preparation methods can decrease the chance of cross-contamination. Additionally, make sure that key vocabulary terms are either discovered by the youth or introduced to them: **bacteria**, **Danger Zone**, and **food safety**.

CULINARY APPLICATION

MATERIALS NEEDED

- ☐ *Safety in the Kitchen* (Appendix C1.1), one per group
- ☐ *Food Safety Charade Cards* (Appendix C1.2), one set per group
- ☐ *Charade Prop Cards* (Appendix C1.3), one set per group
- ☐ *Observation Sheet* (Appendix C1.4), one per group
- ☐ Stopwatch, one per group
- ☐ Common cooking equipment, enough for all groups

Materials provided in curriculum, one per group

TIME REQUIRED

20 to 30 minutes

GETTING READY

- ☐ Make double-sided copies of *Safety in the Kitchen* (Appendix C1.1), one for each group.
- ☐ Make copies of *Food Safety Charade Cards* (Appendix C1.2), one set for each group. Cut the cards out along the dashed line.
- ☐ Make copies of *Charade Prop Cards* (Appendix C1.3), one set for each group. Cut the cards out along the dashed line.

  Facilitator tip: It is recommended that the above appendices be laminated to allow them to be more easily handled by youth and reused.
- ☐ Makes copies of *Observation Sheet* (Appendix C1.4), one sheet for each group.
- ☐ Designate cooking areas and equipment for groups.

PROCEDURE (EXPERIENCING)

1. Orient youth to equipment available to them and ask youth to become familiarized with the cooking utensils provided in the cooking space.
2. Ask youth to setup their cooking space as if they were going to make a meal that requires chopping and cooking ingredients.
3. Provide each group with *Safety in the Kitchen*. Ask youth to follow along with the guide to check their setups and make any changes that are needed.
4. Once each group's cooking space is setup properly, provide each group with *Food Safety Charade Cards, Charade Prop Cards*, an *Observation Sheet*, and a stopwatch.
5. Explain to youth that they will be playing charades using the *Food Safety Charade Cards*, which contain both proper and improper food handling techniques.
6. Explain to youth that with charades rules, each youth will take turns silently reading a card and acting out what it says without speaking for a maximum of 10 seconds. Youth can keep track of the 10 seconds using the stopwatch. They should not share whether the card is proper or improper with their group members, who instead should guess what they are acting out and

whether it is proper or improper.

7. Explain that youth can use anything from their cooking setup and the *Charade Prop Cards* to help them in acting out the *Food Safety Charade Cards*.
8. Ask youth to record the improper food handling techniques and what should be done to maintain food safety instead on their *Observation Sheet*.

SHARING, PROCESSING, AND GENERALIZING

Have youth share their reactions to how foodborne illness can spread in the kitchen and why it is important to follow safe food handling techniques. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about food safety.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *Food Safety Stoplight* (Appendix C1.5), one per youth

Materials provided in curriculum

TIME REQUIRED

5 to 10 minutes

GETTING READY

☐ Make copies of the *Food Safety Stoplight* (Appendix C1.5), one for each youth.

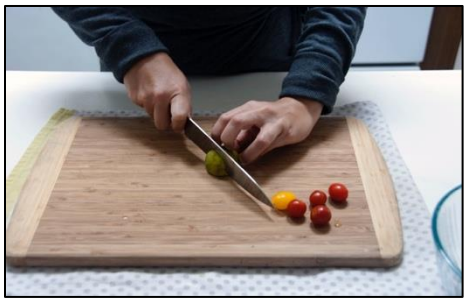
PROCEDURE (EXPERIENCING)

1. Provide each youth with a *Food Safety Stoplight*.
2. Explain to the youth that a food safety hazard refers to the biological, chemical, and physical conditions in a food preparation site that can cause danger or illness.
3. Ask youth to complete the *Food Safety Stoplight* by picking a food preparation space and determine the location of potential hazards, describe the hazards, and come up with potential solutions to avoid food safety hazards.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *Food Safety Stoplight* and discuss the locations they observed, the possible food safety hazards in those spaces, and how they think the hazards could be avoided. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about food safety hazards.

	☐ Designate a counter or table to set up your preparation station ☐ Clear the area of anything not needed to prepare the recipe ☐ Sanitize the area with food grade sanitizing solution or antibacterial soap or wipes
	☐ Be sure to wash your hands thoroughly using soap and warm water and dry them with a clean hand towel or disposable paper towel
	☐ Place a damp rag onto the counter where you will be placing the cutting board ☐ The damp rag should be about six inches away from the edge where you will be standing ☐ Place a clean cutting board directly on top of the damp rag ☐ Secure the cutting board by pushing it down to ensure it does not move easily.
	☐ Gather the ingredients and equipment needed for your recipe • Be sure to wash any raw produce and peel off any unwanted pieces if needed ☐ Place a bowl or plate for collecting scraps to prevent a cluttered cutting board
	☐ Get out a clean chef's knife and place it on the cutting board with the sharp side of the knife facing the center of the cutting board • When walking with a knife, hold the knife by the handle and face the tip toward the floor as you hold it by your side • Always place a knife where it is visible to everyone • Never catch a falling knife! Instead, back away from the falling knife When handing a knife off to another person, the safest way is to place the knife on a clean stable surface and have the recipient pick up the knife themselves



- ☐ When cutting an ingredient, hold the item with your less dominant hand, curling your finders back (in a claw position)
- ☐ Hold the knife with your dominant hand by pinching the end of the blade with your thumb and index finger and wrapping your hand around the handle with a comfortable grip
- ☐ The knife tip should always be on the cutting board while cutting
- ☐ Cut in a rocking motion by moving the ingredient and not the knife
- ☐ Square off one side of the ingredient to make it easier to achieve the rest of the desired knife cuts and improve stability
    - If the ingredient is hard to cut through, square it off so it does not move around on the cutting board. Then apply some pressure when cutting with your less dominant hand by placing it on the non-sharp side of the blade toward the heel

- ☐ Cut raw produce before meats, use different cutting boards, and wash the knife in-between ingredients to prevent cross-contamination

- ☐ When cooking, never leave the stove or oven unattended
- ☐ Be sure to turn pan handles away from walkways to prevent someone from accidently bumping them and dumping hot ingredients

- ☐ Once completed with the recipe, wash all materials
- ☐ Never leave a knife in a sink where it may go unnoticed by someone sticking their hand into the sink

Improper Uses the restroom and washes hands without soup 	**Proper** Folds back fingers when chopping to protect fingertips 	**Improper** Sneezes into hands while cooking and continues to cook 	**Proper** Turns the handle of the pan away to avoid hitting it 
Improper Kills fly above salad, the fly falls into salad, picks bug out and serves 	**Proper** Uses a thermometer to check the temperature of meat 	**Improper** Drops knife and tries to catch it 	**Proper** Carries knife with the tip of the knife facing down 
Improper Wipes dirty hands on pants and continues cooking 	**Proper** Rubs raw meat, then washes hands for 30 seconds with soap and warm water 	**Improper** Sends a text message and continues cooking 	**Proper** Spills liquid on the floor, cleans it up immediately to avoid falling 
Improper Cuts meat, wipes cutting board with only a dish towel, then cuts vegetables on the same surface 	**Proper** Washes hands for 30 seconds with warm water and soap (hum the happy birthday song) 	**Improper** Leaves meat to defrost on the counter overnight (this causes bacteria to grow and can make people sick) 	**Proper** Have to sneeze. Turns away from the food to sneeze into your arm, then go and wash hands with soap and warm water 

Improper

Has the stomach flu and continues to work

Proper

Cuts finger and it's bleeding. Rinses finger with soap and warm water, puts on a Band-Aid, and puts gloves on

Improper

Drops something on the floor for 3 seconds, picks it up and brushes it off

Improper

Mixes food with a spoon, licks the spoon to try food, then mixes food again with same spoon

Improper

Puts face over sink while pouring hot liquid into the sink (steam could burn your face)

Improper

Sneezes into both hands and continues cooking

Improper

Can't find a can opener, tries to use a knife to open a can instead

Proper

Rinses fruits and vegetables with water in a colander to remove dirt and chemicals

Improper

Washes meat (spreads bacteria all over the meat and kitchen space)

Raw Meat

Fruit and Vegetables

Thermometer

Soap

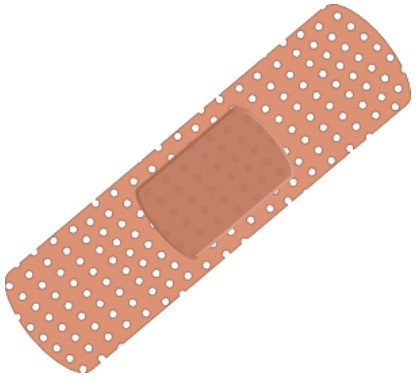
Warm Water

Cold Water

Gloves

Knife

Band-Aid



Improper Food Handling	What Change Would You Make?

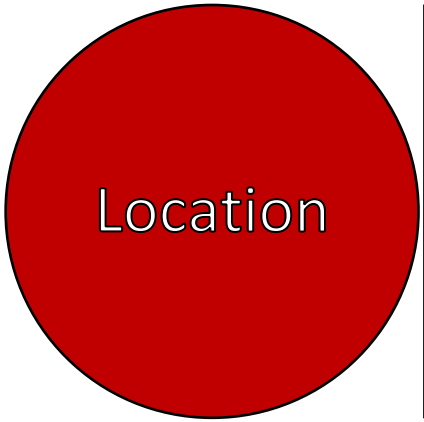
Improper Food Handling	What Change Would You Make?

Directions:
Observe any space where food is prepared and complete the Food Safety Stoplight for three potential food safety hazards.

Red: Record the locations of the potential food safety hazards.

Yellow: Record the potential food safety hazards.

Green: Record solutions for the potential food safety hazards.



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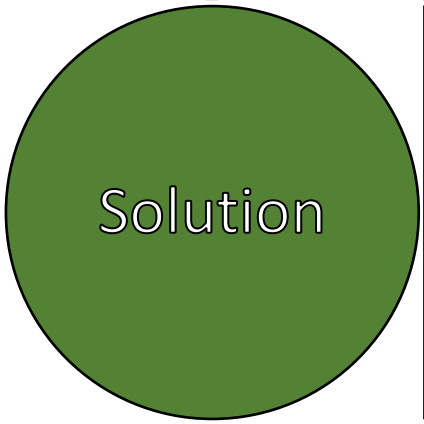

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Cooking Module 2: **Chop, Chop, Dice**

BACKGROUND INFORMATION

Cooking skills allow for the ability and confidence in food preparation. Although cooking can be quite fun, it can also be dangerous due to sharp objects and high heat. Anyone can learn to cook, but it is important to do so while also being safe. Knives, a very common cooking tool, can be quite dangerous if improperly handled. The first step to properly using a knife is making sure it is sharp because pressure applied to a dull knife increases the risk of the blade slipping and accidentally cutting a finger. The precautions for **knife safety** are to first correctly hold your knife; anchor the cutting board; curl fingertips back; keep your eyes on the knife; take your time when cutting; and yield to a falling knife. One method for anchoring the cutting board is to place a dampened towel under the board prior to working on top of it. A knife can be securely held by the user by wrapping the fingers of their dominant around the handle and putting their thumb in a comfortable position either on the side of the blade or wrapped around the handle, depending on the cut needed. With the non-dominant hand, the user should hold the ingredient with curled fingertips to prevent accidental cuts. It is also important in this process to always be aware of where the sharpened blade is in relation to the user's fingers. If the knife ever is dropped or falls from the cutting board, it is best to avoid the knife and pick it up off the ground after it has fallen. Never try to catch a falling knife. Additionally, when passing a knife to another person, it is best to place the knife on the cutting board with the blade facing away. The other person can then pick up the knife safely by the handle.

When cutting, there are several techniques that can achieve the size wanted. "**The draw**" is the approach of dragging the tip of the knife through an ingredient on the cutting board to achieve a clean slice. The result of this will yield thin slices. Another technique, **chopping**, involves keeping the tip of the knife down while cutting with the edge of the blade. This skill is used for **mincing** ingredients, such as garlic, into tiny pieces. Chopping can also be used to cut larger pieces, or **dice**, them into small squares. Lastly, **slicing** uses the edge of the blade in a downward motion. Slicing is a commonly used method for cutting a variety of ingredients and can result in several different sizes for the final product.

In addition to knife techniques, different **cooking techniques** are vital to making a meal. Before and during cooking, a common procedure called **mise en place** can be used. Mise en place is a French term that means measuring, cutting, and organizing all ingredients and placing them within arm's length on the counter before the cooking process begins. The purpose of this routine is to limit the amount of movement necessary when cooking to increase convenience and safety. Other common techniques used are **boiling** and **sautéing**. Boiling involves putting a pot of water or other liquid, such as soup, over a burner and bringing the water up to high heat. Placing a cover on the pot will make the liquid boil more quickly. Boiling can be used for cooking rice, pasta, or soup.

It is best to stir the ingredients occasionally while boiling to prevent sticking at the bottom of the pot. Unlike boiling, sautéing involves heating on a flat pan with a form of fat covering the surface. First, put the pan over the burner, then add a fat, such as olive oil, as a base. Then the ingredients you intend on cooking can be added to the heated fat. It is best to stir the ingredients occasionally so that they cook evenly on all sides.

CONCEPTS AND VOCABULARY

Boiling: A technique used to bring liquid up to a high heat in a pot

Chopping: Keeping the tip of a knife down while cutting with the edge of the blade

Cooking techniques: The combination of steps followed, and tools used, to achieve a particular dish

Dice: Chopping an ingredient into small cube-like pieces

Knife safety: A set of precautions utilized to prevent accidents while using a knife

Mincing: Chopping an ingredient into finely cut pieces

Mise en place: A French term used to signify having all ingredients cut and equipment set out within arm's length before cooking

Sautéing: A technique used to brown an ingredient evenly using a pan and fat

Slicing: Using the edge of a knife blade in a downward motion to cut an ingredient

The draw: Dragging the tip of a knife through an ingredient to achieve a clean slice

MATERIALS NEEDED

- ☐ Flip chart paper
- ☐ Writing utensils
- ☐ *Slice and Dice Cards* (Appendix C2.1), one set per group
- ☐ *Knife Cuts Guide* (Appendix C2.2), one per group
- ☐ Common cooking equipment, including cutting boards and cutting utensils, enough for all groups
- ☐ Zucchini, one per group and one for demonstration
- ☐ *Safety in the Kitchen* (Appendix C1.1), one per group
- ☐ Additional adult assistant (recommended)

Materials provided in curriculum

TIME REQUIRED

20 to 30 minutes

SUGGESTED GROUPINGS

Small groups of 3 to 4

GETTING READY

- ☐ Make copies of *Slice and Dice Cards* (Appendix C2.1), one set for each group. Cut the cards out along the dashed line.

- ☐ Make copies of *Knife Cuts Guide* (Appendix C2.2), one for each group.

  Facilitator tip: It is recommended that the above appendices be laminated to allow them to be more easily handled by youth and reused.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Provide each group with one sheet of flip chart paper and writing utensils to answer opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

- Explain what you know about different ways to cut food.
- Explain what you know about safe knife handling skills.

PROCEDURE (EXPERIENCING)

1. Provide each group with *Slice and Dice Cards.* Explain to youth that these cards contain terms that are commonly found in recipes and picture that represent each term.
2. Ask youth to match the term with the corresponding image.
3. Provide each group with the *Knife Cuts Guide* and ask youth to compare the matches they made with the guide.
4. Explain to youth that they will all be preparing to cook a recipe.
5. Ask youth to gather around to watch a demonstration about knife cuts.
6. Demonstrate how to safety use a knife, as detailed in the *Safety in the Kitchen Guide*, by dicing a zucchini. Be sure to utilize proper food safety practices during your demonstration.
7. Ask youth to setup their cooking stations and wash their hands because they will be preparing a stir-fry recipe. Youth may find it helpful to review the *Safety in the Kitchen Guide*.
8. Once their stations are properly setup, provide each group with a zucchini.
9. Ask youth to take turns practicing their skills while chopping the zucchini into the size of their choosing. Supervise youth during this process to ensure that they are safety using the cutting utensils.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their experience identifying different knife cuts. Ask youth to discuss how different knife cuts could affect different recipes and cooking time.

Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share about knife cuts. If necessary, ask more targeted questions.

- Explain some food safety techniques that you observed during the knife cuts demonstration.
- Explain how different knife cuts could affect the cooking process of a recipe.
- Explain why you think it would be important to understand different knife cuts and cooking techniques when preparing a recipe.
- Describe how you determined the best knife cut to use for this recipe.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure that the youth understand the importance of **knife safety**. Youth also should be able to recognize different commonly used knife cuts, such as **dicing** and **mincing**, and how these cuts may impact a recipe's result. Additionally, make sure that key vocabulary terms are either discovered by the youth or introduced to them: **boiling, chopping, cooking techniques, mise en place, sautéing, slicing, the draw**.

CULINARY APPLICATION

MATERIALS NEEDED

- ☐ *Safety in the Kitchen* (Appendix C1.1), one per group
- ☐ *Knife Cuts Guide* (Appendix C2.2), one per group
- ☐ *Tofu Rice Bowls Shopping List* (Appendix C2.3)
- ☐ *Facilitator Tofu Rice Bowls Recipe* (Appendix C2.4)
- ☐ *Youth Tofu Rice Bowls Recipe* (Appendix C2.5), one per group
- ☐ Food grade sanitizer and rag
- ☐ Freezer bags
- ☐ Bowls or plates, one per youth
- ☐ Forks, one per youth
- ☐ Napkins, one per youth
- ☐ Common cooking equipment, enough for all groups
- ☐ Writing utensils
- ☐ Additional adult assistant (recommended)

TIME REQUIRED

30 to 45 minutes

Materials provided in curriculum

GETTING READY

- ☐ Gather all ingredients for the recipe, refer to the *Tofu Rice Bowls Shopping List* (Appendix C2.3). Ask youth to help you harvest and wash any ingredients that will be used from the agricultural space.
- ☐ Review the recipe and facilitation steps outlined in *Facilitator Tofu Rice Bowls Recipe* (Appendix C2.4).
- ☐ Make copies of *Youth Tofu Rice Bowls Recipe* (Appendix C2.5), one for each group.
- ☐ Place bulk ingredients, such as those needed for the marinade and rice, in a central location.
- ☐ If not already complete, ask groups to setup their cooking stations as detailed in the Safety in the *Kitchen Guide (Appendix C1.1).*
- ☐ Ask youth to thoroughly wash their hands before beginning the next activity.

PROCEDURE (EXPERIENCING)

1. Briefly review the importance of food safety, in particular proper handwashing, with youth.
2. Go through each fresh ingredient with the youth and describe how you selected each one when shopping or harvesting from the agricultural space. For example, when selecting the red bell peppers, you likely looked for peppers that were firm, bright in color, and free of any scratches.
3. Provide each group with a *Youth Tofu Rice Bowls Recipe* and ingredients to complete the recipe.
4. Using the *Facilitator Tofu Rice Bowls Recipe* and asking youth to refer to the *Youth Tofu Rice Bowls Recipe*, lead youth through the preparation of the recipe.
5. Ask youth to fill-in the blanks on the Y*outh Tofu Rice Bowls Recipe* of what equipment and knife cuts they think should be utilized as they prepare the recipe.
6. Collect any leftovers in the freezer bags and promptly refrigerate them. Youth can take the leftovers home if they would like.
7. Clean kitchen areas and discard scraps, preferably through compost, and any garbage.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their opinions about making the stir-fry recipe. Ask youth to discuss the knife cuts and equipment they used to make the recipe. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they discovered about preparing the recipe.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *Youth Tofu Rice Bowls Recipe* (Appendix C2.5), one per youth
- ☐ *Knife Cuts Table and Recipes* (Appendix C2.6), one per youth

Materials provided in curriculum

TIME REQUIRED

5 to 10 minutes

GETTING READY

- ☐ Makes copies of the *Youth Tofu Rice Bowls Recipe* (Appendix C2.5), one for each youth.
- ☐ Make double-sided copies of *Knife Cuts Table and Recipes* (Appendix C2.6), one for each youth.

  Facilitator tip: It is recommended to laminate Knife Cuts Table and Recipes to improve its longevity.

PROCEDURE (EXPERIENCING)

1. Provide each youth with a *Youth Tofu Rice Bowls Recipe* and *Knife Cuts Table and Recipes*.
2. Encourage youth to prepare the recipe as is at home with their families. Encourage youth to also adapt the recipe to include ingredients that may better match their family's tastes and

preferences. The *Knife Cuts Table and Recipes* can help ensure that they are cutting ingredients into appropriate sizes and also provides some other recipes to try.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their experience preparing the recipe at home and whether they made any modifications. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share how they prepared the recipe at home.

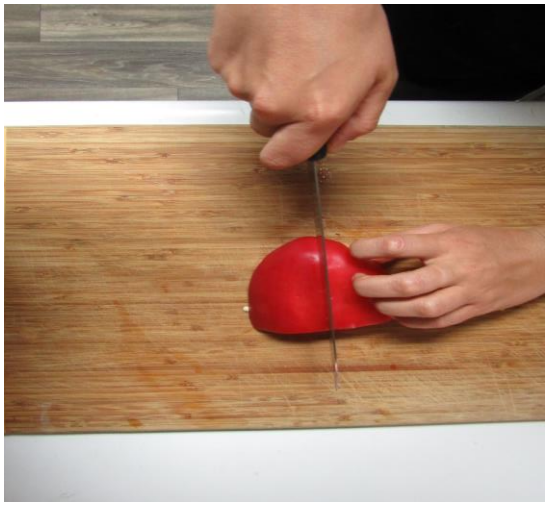
		
Large Dice	Dice	Medium Dice

		
Small Dice	Fine Dice	Mince

		
Thin Slice or Fine Julienne	Julienne or Matchstick	Slice

The Draw

The Chop



The Slice

Recipes usually call for the ingredients to be cut in a certain way. Below are general references for some common knife cuts and techniques. Use this guide to help you approximate the cut in the recipe. It is okay if your cuts do not match these perfectly.

<table>
<tr><td colspan="2">Thin slice or fine Julienne
$^1/_{16}$ x $^1/_{16}$ x 1–2 inches
  </td><td colspan="2">Julienne or matchstick
$^1/_8$ x $^1/_8$ x 1–2 inches
  </td><td colspan="2">Slice
$^1/_4$ x $^1/_4$ x 2–2$^1/_2$ inches
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<tr><td>Mince
$^1/_{16}$ x $^1/_{16}$ x $^1/_{16}$ inches
  </td><td>Fine dice/chop
$^1/_8$ x $^1/_8$ x $^1/_8$ inches
  </td><td>Small dice/chop
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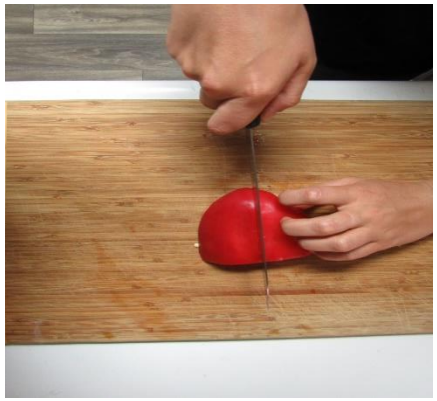
  </td><td>Medium dice/chop
$^1/_3$ x $^1/_3$ x $^1/_3$ inches
  </td><td>Dice/chop
$^1/_2$ x $^1/_2$ x $^1/_2$ inches
  </td><td>Large dice/chop
$^3/_4$ x $^3/_4$ x $^3/_4$ inches
  </td></tr>
</table>

<table>
<tr><td> 
The Draw
Place the tip of the knife blade on the cutting board and then drag the blade through the food to create slices</td><td> 
The Slice
Use a clawed hand to hold the food while you gently bring the knife blade down to cut the food</td><td> 
The Chop
Put your opposite hand on the top of the knife blade to apply more pressure when cutting the food</td></tr>
</table>

Tofu Rice Bowls Harvesting/Shopping List

Yields: About 16 servings (amount needed for 4 groups of 3–4 youth)

- ☐ 28 oz tofu, firm or extra firm
- ☐ 4 red bell peppers
- ☐ 4 zucchini
- ☐ About ½ cup oil (such as olive oil)
- ☐ 1 cup soy sauce
- ☐ ½ cup ketchup
- ☐ ¼ cup honey
- ☐ 4 teaspoons sesame oil
- ☐ 4 teaspoons apple cider vinegar
- ☐ 1 teaspoon red pepper flakes
- ☐ 1 teaspoon ground ginger
- ☐ 7 cups dry quick-cooking brown rice
- ☐ 5 cups water
- ☐ ½ cup basil
- ☐ ½ cup cilantro
- ☐ 1 bunch green onion
- ☐ 2 teaspoons salt
- ☐ 1 teaspoon black pepper
- ☐ Roll of paper towels
- ☐ Disposable (preferably compostable) bowls or plates
- ☐ Disposable (preferably compostable) forks

Note: Additional or alternative vegetables can be used in this recipe. Some great options are broccoli and carrots. It is recommended to use fresh or frozen vegetables for best results. Feel free to add other vegetables that are ready to harvest from your agricultural space.

Tofu Rice Bowls

Time: 45 minutes Yields: 4 servings

Ingredients (per group)

7 oz. tofu, firm or extra firm
1 red bell pepper
1 zucchini
2 tablespoons oil (such as olive oil), divided
2 tablespoons green onion

Marinade:
$1/4$ cup soy sauce
2 tablespoon ketchup
1 tablespoon honey
1 teaspoon sesame oil
1 teaspoon apple cider vinegar
$1/4$ teaspoon red pepper flakes
$1/4$ teaspoon ground ginger

Rice:
$1\,3/4$ cups dry quick-cooking brown rice
$1\,1/2$ cup water
2 tablespoons basil
2 tablespoons cilantro
$1/2$ teaspoon salt
$1/4$ teaspoon black pepper
1 teaspoon oil

Directions

1. Drain the tofu liquid
2. Cut the tofu in half horizontally and wrap the pieces in 4 paper towels
3. Place the wrapped tofu on a cutting board
4. Put a frying pan on top of the wrapped tofu and set it aside
5. Whisk together marinade ingredients in a medium-sized bowl
6. Unwrap the tofu, discarding the wet paper towels, and cut into medium dice-sized pieces
7. Add diced tofu to the marinade mixture and carefully stir it so that the tofu does not break apart and is evenly coated with marinade; set aside
8. To start the rice, add water to a medium saucepan, cover with a lid, and bring it to a boil
9. Add the rice and stir until it is evenly distributed and bring back to a boil
10. Put a cover on the sauce pan and turn off the heat; set aside
11. Medium dice the zucchini and red bell pepper and finely chop the basil, cilantro, and green onion; place the chopped ingredients in bowls and set aside
12. In a large frying pan, heat 1 tablespoon oil over medium-high heat and add the marinated tofu
13. Cook the tofu until it starts to get crispy, flipping pieces with tongs occasionally
14. Once cooked, pour the tofu into a bowl and set it aside
15. Add 1 tablespoon oil to the heated frying pan
16. Add chopped zucchini and red bell pepper to the frying pan. Season with salt and pepper and cook until just tender; turn off the heat once vegetables are finished cooking
17. In a large bowl, mix together the cooked rice, 1 teaspoon oil, chopped herbs, cooked tofu, cooked vegetables, and salt and pepper
18. Top with the green onion and serve

Tofu Rice Bowls

Time: 45 minutes Yields: 4 servings

Ingredients

7 oz. tofu, firm or extra firm
1 red bell pepper
1 zucchini
2 tablespoons oil (such as olive oil), divided
2 tablespoons green onion

Marinade:
$1/4$ cup soy sauce
2 tablespoon ketchup
1 tablespoon honey
1 teaspoon sesame oil
1 teaspoon apple cider vinegar
$1/4$ teaspoon red pepper flakes
$1/4$ teaspoon ground ginger

Rice:
$1\ 3/4$ cups dry quick-cooking brown rice
$1\ 1/2$ cup water
2 tablespoons basil
2 tablespoons cilantro
$1/2$ teaspoon salt
$1/4$ teaspoon black pepper
1 teaspoon oil

Directions

1. Drain the tofu liquid
2. Cut the tofu in half horizontally and wrap the pieces in 4 paper towels
3. Place the wrapped tofu on a cutting board
4. Put a frying pan on top of the wrapped tofu and set it aside
5. _____ together marinade ingredients in a medium-sized bowl
6. Unwrap the tofu, discarding the wet paper towels, and cut into medium dice-sized pieces
7. Add diced tofu to the marinade mixture and carefully stir it so that the tofu does not break apart and is evenly coated with marinade; set aside
8. To start the rice, add water to a medium _____, cover with a lid, and bring it to a boil
9. Add the rice and stir until it is evenly distributed and bring back to a boil
10. Put a cover on the sauce pan and turn off the heat; set aside
11. _____ the zucchini and red bell pepper and finely chop the basil, cilantro, and green onion; place the chopped ingredients in bowls and set aside
12. In a large _____, heat 1 tablespoon oil over medium-high heat and add the marinated tofu
13. Cook the tofu until it starts to get crispy, flipping pieces with _____ occasionally
14. Once cooked, pour the tofu into a bowl and set it aside
15. Add 1 tablespoon oil to the heated frying pan
16. Add chopped zucchini and red bell pepper to the frying pan. Season with salt and pepper and cook until just tender; turn off the heat once vegetables are finished cooking
17. In a large bowl, mix together the cooked rice, 1 teaspoon oil, chopped herbs, cooked tofu, cooked vegetables, and salt and pepper
18. Top with the green onion and serve

Recipes usually call for the ingredients to be cut in a certain way. Below are general references for some common knife cuts. Use this guide to help you approximate the cut in the recipe. It is okay if your cuts do not match these perfectly.

<table>
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  </td><td>Dice/chop
$^1/_2$ x $^1/_2$ x $^1/_2$ inches
  </td><td>Large dice/chop
$^3/_4$ x $^3/_4$ x $^3/_4$ inches
  </td></tr>
</table>

SAVE YOUR VEGETABLE SCRAPS!

Vegetable scraps should not be thrown away. Instead, save them in a bag in your freezer. Once you have a good amount, make the following vegetable broth. The vegetable broth can then be used in a variety of recipes and/or kept in the freezer.

Some common vegetable scraps include: peels, skins, stems, ends, leaves

Vegetable Broth Recipe*

Time: 60 minutes Yield: about 6 cups of broth

Ingredients

- 1 tablespoon oil
- 5 gloves garlic, minced
- 2 large onions, medium chopped
- 3 ribs celery, large chopped
- 3 carrots, large chopped
- 8 cups water
- 2-3 cups frozen vegetable scraps
- 2 bay leaves
- 1½ teaspoon dried parsley
- 1 teaspoon dried thyme
- Salt and pepper to taste

Directions

1. Heat the oil in a large pot over medium heat.
2. Add the garlic, onions, celery, and carrots. Cook until softened, about 5 minutes, stirring often.
3. Add the water, frozen vegetable scraps, bay leaves, parsley, and thyme. Reduce heat to low and simmer, partially covered, for 45 minutes.
4. Pour the broth through a strainer into a large heat-proof bowl or pot to cool; compost solids.
5. Once the broth has cooled, transfer it to airtight containers or freezer bags and store it in the freezer. It is recommended to freeze it in 2-cup portions so that you do not have to thaw all the broth every time.

*Recipe adapted from *Oh My Veggies* (ohmyveggies.com)

Cooking Module 3: **Shopping with the Seasons**

BACKGROUND INFORMATION

Often eating healthy and living on a budget can be viewed as two different lifestyles, but with the right information and practices, these two concepts can be achieved together. One method to help with this is to evaluate your food **budget** and plan according to financial needs. When making a budget, it is important to account for the income being earned and the amount that must be allocated toward bills and other required monthly costs. Once the necessary money has been set aside for monthly expenses, additional funds can be allotted for groceries for the month. A great way to minimize the cost of the grocery list is by utilizing store weekly ads and sales given for signing up for free store memberships. By signing up for a membership, or cutting coupons out of the weekly ad, one can save money that otherwise would have been spent toward a whole price item. **Meal planning** is a strategy used to get the most worth out of the food bought. By planning out what meals that are going to be eaten that week, buying ingredients with a purpose will keep the structure for how the money is spent. By meal planning, leftover dinners can be also turned into lunches for the following day instead of purchasing lunch, which shows how strategizing meals saves money.

Not only are there strategies for how to plan meals helpful for budgeting, but where one chooses to buy the products is a great way to save money as well.

Usually, the most amount of food for the cheapest price can be found in bulk food stores, which are the best way for **economic grocery shopping**. When **buying in bulk**, items are found in larger quantity and the price of a single unit is less compared to buying the commercially packaged item. This is effective when the items are used frequently and will even save additional trips to the store. For example, you could buy the larger portioned meat and freeze what you do not use, or purchase a larger sized yogurt that is not individually packaged. In addition, stores that sell their products in bins where the consumer portions it themselves and pays based on weight are also economically efficient. For example, portioning a specific amount of oats into a provided plastic bag, or a bag from home, that is going to be used for the week and paying a price that does not include packaging is a great money saver.

There are so many options to buy fruits and vegetables. **Conventional produce** includes fruits and vegetables treated with pesticides, whether in the United States or imported from other countries, that have been regulated by governmental agencies. In contrast to conventional produce, **organic produce**, which is also regulated by the government, are grown under strict rules for land and pesticide use. While conventional and organic produce are grown under different conditions, they are virtually the same in terms of nutrition. Organic produce is usually much more expensive compared to conventional produce, however both can be more affordable throughout the year when in season. **Seasonal produce** are fruits and vegetables that are naturally

harvested in a given season, which has a high supply at that time, causing the price to go down for the consumer. Whether the product is conventional or organic, seasonal produce is frequently the cheapest option for fresh produce. Other than fresh produce, frozen produce is also an affordable, nutritious, and accessible option. The produce is typically picked and frozen at the peak of ripeness, making the quality similar to that of fresh produce and providing another great option when economically buying produce.

CONCEPTS AND VOCABULARY

Budget: An allocation of funds calculated from the amount of income after deducting expenses for a period of time

Buying in bulk: Purchasing a product in a larger quantity so that the price of a single unit is less compared to buying the individually packaged item

Conventional produce: Commercially produced fruits and vegetables that are treated with pesticides

Economical grocery shopping: A collection of methods for purchasing items at the grocery store while saving money

Meal planning: Strategizing and planning meals for a given time using ingredients that can be used for multiple meals

Organic produce: Fruits and vegetables that are grown following strict governmental guidelines

Seasonal produce: Fruits and vegetables that are harvested during their peak of ripeness

MATERIALS NEEDED

- ☐ Flip chart paper
- ☐ Writing utensils
- ☐ *Organizing the Grocery Store* (Appendix C3.1)
- ☐ *Grocery Store Food Cards* (Appendix C3.2)
- ☐ *Shopping Trip Summary* (Appendix C3.3), one per group
- ☐ Clipboard, one per group
- ☐ Calculator, one per group

Materials provided in curriculum

TIME REQUIRED

30 to 45 minutes

SUGGESTED GROUPINGS

Small groups of 3 to 4

GETTING READY

- ☐ Make one copy of the *Grocery Store Food Cards* (Appendix C3.2), cut cards out along the dashed line.

  Facilitator tip: It is recommended that the Grocery Store Food Cards be laminated to allow them to be more easily handled by youth and reused.

- ☐ Make double-sided copies of the *Shopping Trip Summary* (Appendix C3.3), one for each group.
- ☐ Setup a grocery store by organizing the *Grocery Store Food Cards* into store sections. Place each section of cards in different parts of the room, laying them out so that the names of the foods are visible. A suggested grouping of the cards is provided in *Organizing the Grocery Store* (Appendix C3.1).
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Provide each group with one sheet of flip chart paper and writing utensils to answer the opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

• Explain what you think should be considered when shopping for food at the grocery store.
• Explain what factors you think influence the price of foods.

PROCEDURE (EXPERIENCING)

1. Provide each group with a *Shopping Trip Summary*, clipboard, and calculator.
2. Orient youth to the room setup, pointing out that the room has been transformed into a grocery store during the wintertime.
3. Explain to the youth that they each have been given $100 to shop for meals to feed four people for a week.
4. Ask youth to begin the shopping activity. They should just refer to the *Grocery Store Food Cards* and should not remove cards from the grocery store setup.
5. Ask youth to record the items they decide to buy and complete the other components of the *Shopping Trip Summary* as they shop.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *Shopping Trip Summar*y and discuss what they decided to purchase. Ask youth to describe their methods for staying within the given budget.

Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share about shopping on a budget. If necessary, ask more targeted questions.

• Explain how the food you chose to purchase was affected by the given budget.
• Discuss whether there is something you would change about your group's grocery shopping trip.
• Explain what you could do differently to stay within the budget.
• Explain what you noticed about the prices of different foods.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure that youth understand the importance of grocery shopping on a **budget** and that an individual's budget may limit which foods they are able to purchase. Youth should also understand that season and whether the produce is **conventional** or **organic** influences the prices of fresh fruits and vegetables. Although nutritionally similar, **seasonal** and conventional produce are the most affordable. Additionally, make sure that key vocabulary terms are either discovered by the youth or introduced to them: **buying in bulk, economical grocery shopping**, and **meal planning**.

CULINARY APPLICATION

MATERIALS NEEDED

- ☐ *Safety in the Kitchen Guide* (Appendix C1.1), one per group
- ☐ *Green Salad Shopping List* (Appendix C3.4)
- ☐ *Green Salad Price Cards* (Appendix C3.5), one card per ingredient
- ☐ *Group Salad Plan* (Appendix 3.6), one per group
- ☐ *Green Salad Dressing Recipes* (Appendix 3.7), one per group
- ☐ Dry-erase marker
- ☐ Food grade sanitizer and rag
- ☐ Freezer bags
- ☐ Bowls or plates, one per youth
- ☐ Forks, one per youth
- ☐ Napkins, one per youth
- ☐ Common cooking equipment, enough for all groups
- ☐ Additional adult assistant (recommended)

Materials provided in curriculum

TIME REQUIRED

15 to 20 minutes

SUGGESTED GROUPINGS

Small groups of 3 to 4

GETTING READY

- ☐ Gather all ingredients for the recipe, refer to *Green Salad Shopping List* (Appendix C3.4). Ask youth to help you harvest and wash any ingredients that will be used from the agricultural space.
- ☐ Make note of any ingredient that is in season. You can find what is in season in your area by visiting *https://www.seasonalfoodguide.org/*.

- ☐ Make enough copies of the *Green Salad Price Cards* (Appendix C3.5) so that you have one for each ingredient. Cut cards out along the dashed line.

  Facilitator tip: It is recommended that the Green Salad Price Cards be laminated to allow them to be reused.
- ☐ Place ingredients in a central location and label each one with the *Green Salad Price Cards* (Appendix C3.5). Base and add-in items should be labeled with either the "grocery store" or "garden" cards and salad dressing ingredients should be labeled with the "already had" cards.
- ☐ Use the dry-erase marker to write in the price you paid for each ingredient from the grocery store.
- ☐ Make copies of the *Group Salad Plan* (Appendix C3.6), one for each group.
- ☐ Make copies of the *Green Salad Dressing Recipes* (Appendix C3.7), one for each group.

  Facilitator tip: It is recommended that the Green Salad Dressing Recipes be laminated to allow them to be reused.
- ☐ If not already complete, ask groups to setup their cooking stations as detailed in the Safety in the *Kitchen Guide* (Appendix C1.1).
- ☐ Ask youth to thoroughly wash their hands before beginning the next activity.

PROCEDURE (EXPERIENCING)

1. Briefly review the importance of food safety, in particular proper handwashing, with youth.
2. Go through each fresh ingredient with the youth and describe how you selected each one when shopping or harvesting from the agricultural space. For example, when selecting the salad greens, you likely looked for greens that were not wilted or soggy and bright in color. Also mention whether any of the ingredients are in season.
3. Explain to the youth that they will be making a green salad for their groups for under $15.
4. Provide each group with a *Group Salad Plan* and *Green Salad Dressing Recipes*.
5. Explain to the youth that each available ingredient is from either their agricultural space, the grocery store, or something that was already on hand and has been labeled with its price. As a group, they will decide which items they would like to buy to make their salad and salad dressing. Youth can use the *Green Salad Dressing Recipes* to help in picking a salad dressing to make.
6. Ask youth to "shop" for their ingredients from those available and to record the ingredients and their cost on the *Group Salad Plan*.
7. Ask youth to work together within their groups to prepare their green salad. Assist youth in the preparation as needed.
8. Collect any leftovers in the freezer bags and promptly refrigerate them. Youth can take the leftovers home if they would like.
9. Clean kitchen areas and discard scraps, preferably through compost, and any garbage.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their *Group Salad Plan* and discuss the ingredients they decided to include in their salad. Youth should also discuss whether they created the salad within the given budget and any challenges they had. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share their experience preparing their group salad.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *Home Meal Planner* (Appendix C3.7), one per youth

Materials provided in curriculum

TIME REQUIRED

5 to 10 minutes

GETTING READY

- ☐ Makes copies of *Home Meal Planner* (Appendix C3.7), one for each youth.
- ☐ If youth have limited access to the internet, provide a list of what is in season in the area. You can find what is in season by visiting *https://www.seasonalfoodguide.org/.*

PROCEDURE (EXPERIENCING)

1. Provide each youth with the *Home Meal Planner*.
2. Ask youth to plan meals for one week and record the cost per meal, day, and week.
3. Encourage youth to eat seasonally to save the most money. They can find what is in season in their area by visiting *https://www.seasonalfoodguide.org/.* Remind youth that the produce that tends to be the most affordable at the grocery store is typically what is in season.
4. Encourage youth to make a green salad for one of their meals, as they did for the culinary activity, and adapt it to include ingredients that are in season or ones that better match their family's tastes and preferences.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share the meals they prepared at home and discuss how they incorporated seasonal produce. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share what they learned about meal planning and shopping seasonally.

Below is a suggestion of how to group the *Grocery Store Food Cards* to mimic a real grocery store.

Produce		
Apples	Broccoli (organic)	Celery
Apples (organic)	Broccoli	Carrots
Oranges	Green Beans	Carrots (organic)
Bananas	Avocado	Spinach
Strawberries	Tomato	Romaine Lettuce
Clementines	Zucchini	Red Skin Potatoes
Watermelon	Cucumber	Sweet Potato
Bell Pepper		

Meat		
Ground Beef	Steak	Salmon
Ground Beef (grass-fed)	Chicken Breast	Bacon

Refrigerated		
Almond Milk	Deli Sandwich	Eggs
Chocolate Milk	American Cheese	Eggs (organic)
Reduced Fat (2%) Milk	Cheddar Cheese	Lunchmeat (Ham)
Orange Juice	Low-fat Yogurt	Lunchmeat (Turkey)
Monterey Jack Cheese	Tofu	

Canned and Packaged		
Whole Corn Kernels	Sweet Cereal	Wheat Cereal
Black Beans	Almonds	Oatmeal
Kidney Beans	Walnuts	Blueberry Muffin
Peanut Butter	Mayonnaise	English Muffins
Strawberry Jam	Soda	Flour Tortillas
Potato Chips	Ketchup	Corn Tortilla
Pretzels	Italian Salad Dressing	White Rice
Crackers	Ranch Dressing	Brown Rice
Cookies	Soup (canned)	White Bread
Granola Bards	Pita Bread	Whole Wheat Bread

Freezer		
Veggie Burgers (frozen)	Ice cream	Pepperoni Pizza (frozen)
Chicken Nuggets (frozen)	Mixed Vegetables (frozen)	Pasta Entrée (frozen)
Burrito (frozen)	Mixed Fruit (frozen)	

Almond Milk
$3.69/half gallon
1 half gallon = 8 servings

Chocolate Milk
$2.99/ 1 half gallon
1 half gallon = 8 servings

Reduced Fat (2%) Milk
$3.99/gallon
1 gallon = 16 servings

Orange Juice
$3.49/half gallon
1 half gallon = 8 servings

Monterey Jack Cheese
$2.99/8-oz package
1 package = 8 servings

American Cheese
$3.99/package
1 package = 12 slices

Cheddar Cheese
$2.99/8-oz package
1 package = 8 servings

Low-fat Yogurt
$0.99 each
1 serving

Ice Cream
2.99/pint
1 pint = 4 servings

Eggs
$2.99/dozen
1 dozen = 12 eggs

Eggs (organic)
$4.49/dozen
1 dozen = 12 eggs

Ground Beef
$3.69/lb
1 lb = 4 servings

Ground Beef (grass-fed)
$6.49/lb
1 lb = 4 servings

Steak
$11.99/lb
1 lb = 4 servings

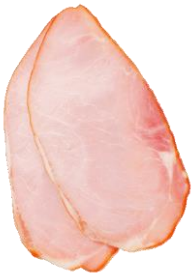
Chicken Breast
$4.49/lb
1 lb = 4 servings

Salmon
$10.99/lb
1 lb = 4 servings

Bacon
$5.99/lb
1 lb = 12 slices

Tofu
$1.49/package
1 package = 5 servings

Lunchmeat (Ham)
$3.49/package
1 package = 12 slices



Lunchmeat (Turkey)
$3.29/package
1 package = 12 slices

Deli Sandwich
$6.49 each
1 serving

Whole Corn Kernels
$0.99/can
1 can = 3 servings

Black Beans
$0.99/can
1 can = 3 servings

Kidney Beans
$0.99/can
1 can = 3 servings

Peanut Butter
$3.99/jar
1 jar = 14 servings

Strawberry Jam
$3.99/jar
1 jar = 16 servings

Potato Chips
$2.99/bag
1 bag = 9 servings

Pretzels
$2.99/bag
1 bag = 16 servings

Crackers
$2.99/box
1 box = 30 servings

Cookies
$2.49/bag
1 bag = 12 cookies

Granola Bars
$3.29/package
1 package = 6 bars

Sweet Cereal
$3.49/box
1 box = 12 servings

Wheat Cereal
$3.49/box
1 box = 12 servings

Oatmeal
$3.99/container
1 container = 30 servings

Blueberry Muffin
$3.99/package
1 package = 4 muffins

English Muffins
$2.99/package
1 package = 6 English muffins

Pita Bread
$1.99/bag
1 bag = 6 pita breads

Flour Tortillas
$2.29/package
1 package = 10 tortillas

Corn Tortillas
$1.99/package
1 package = 24 tortillas

White Rice
$0.89/lb
1 lb = 10 servings

Brown Rice
$0.89/lb
1 lb = 10 serving

White Bread
$2.49/loaf
1 loaf = 16 slices

Whole Wheat Bread
$2.49/loaf
1 loaf = 16 slices

Almonds
$6.99/bag
1 bag = 12 servings

Walnuts
$7.99/bag
1 bag = 16 servings

Mayonnaise
$3.99/jar
1 jar = 60 servings

Ketchup
$2.99/bottle
1 bottle = 50 servings

Italian Salad Dressing
$1.99/bottle
1 bottle = 16 servings

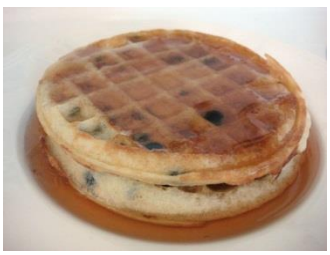
Ranch Dressing
$2.49/bottle
1 bottle = 16 servings

Soda
$5.99/box
1 box = 12 cans

Mixed Vegetables (frozen)
$1.49/bag
1 bag = 4 servings

Mixed Fruit (frozen)
$1.99/bag
1 bag = 6 servings

Waffles (frozen)
$3.49/box
1 box = 10 waffles



Pepperoni Pizza (frozen)
$7.99 each
1 pizza = 6 servings

Pasta Entrée (frozen)
$3.49 each
1 serving

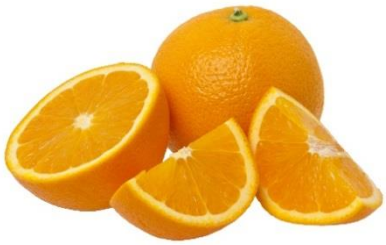
Veggie Burgers (frozen)
$3.50/package
1 package = 4 servings

Chicken Nuggets (frozen)
$4.99/package
1 package = 10 servings

Apples
$0.99/lb
1 lb = 3 apples

Apples (organic)
$1.99/lb
1 lb = 3 apples

Oranges
$0.99/lb
1 lb = 3 oranges

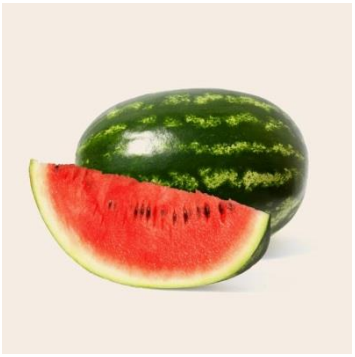


Bananas
$0.67/lb
1 lb = 2 large bananas

Strawberries
$4.99/lb
1 lb = 4 servings

Clementines
$3.29/lb
1 lb = 6 servings

Watermelon
$6.99 each
1 melon = 16 servings



Avocado
$1.49 each
1 avocado = 2 servings

Tomato
$1.99/lb
1 lb = 8 servings

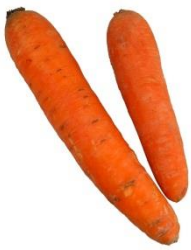
Zucchini
$2.79/lb
1 lb = 6 servings

Cucumber
$0.99 each
1 cucumber = 2 servings

Celery
$1.99 each
1 celery stalk = 6 servings

Carrots
$0.99/lb
1 lb = 6 servings

Carrots (organic)
$1.99/lb
1 lb = 6 servings



Bell Pepper
$1.49 each
1 pepper = 2 servings

Broccoli (organic)
$2.79/lb
1 lb = 4 servings

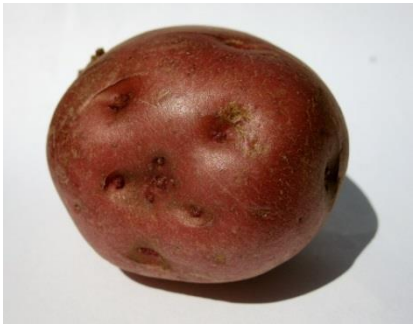
Broccoli
$1.99/lb
1 lb = 4 servings

Green Beans
$2.49/lb
1 lb = 4 servings

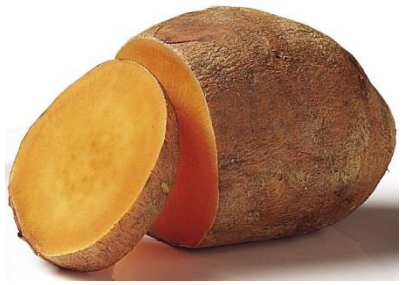
Spinach
$2.50/bag
1 bag = 5 servings

Romaine Lettuce
$2.49 each
1 head lettuce = 6 servings

Red Skin Potato
$1.49/lb
1 lb = 6 servings



Sweet Potato
$1.69/lb
1 lb = 4 servings



Burrito (frozen)
$0.99 each
1 burrito = 1 serving

Soup (canned)
$2.49 each
1 can = 2 servings

Budget for the Week: $100 for 4 people

Meal	**Item**	**Price**	**Quantity**	**Number of Servings**	**Total Price** (Quantity x Price)
Snack	Apples	$0.99	2 lb.	6	2 x $0.99 = $1.98

Meal	**Item**	**Price**	**Quantity**	**Number of Servings**	**Total Price** (Quantity x Price)
				Total spent:	
				Amount over/under budget:	

Green Salad Harvesting/Shopping List
Yields: 16 servings (amount needed for 4 groups of 4 youth)

Provide the following base ingredients and choose 3–4 of the suggested add-ins for youth to customize their salads. Try to purchase add-ins that are in season. If applicable, encourage youth to incorporate vegetables harvested from their garden.

Base Ingredients:

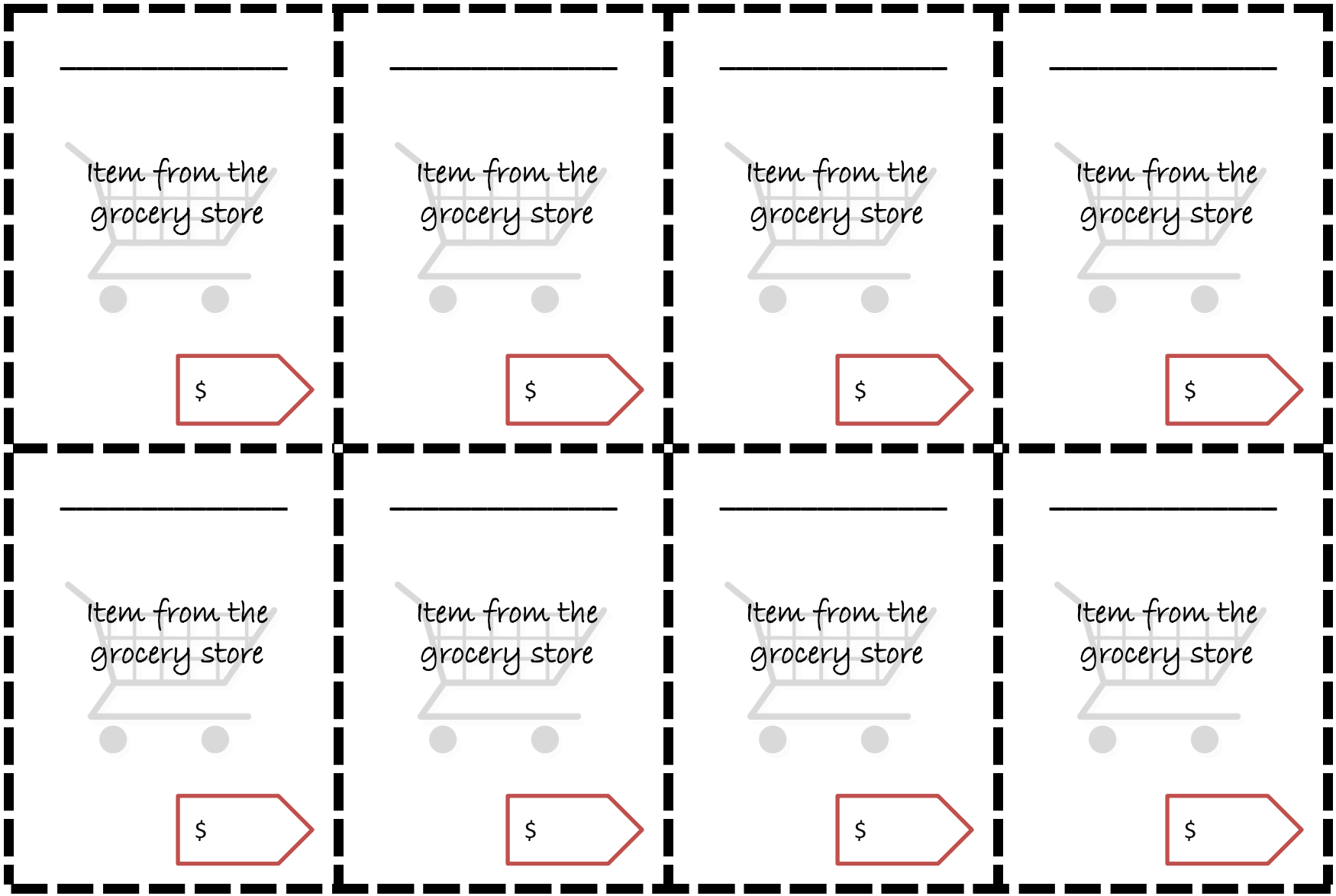
- 16 cups assorted greens (spinach, spring mix, arugula, romaine, etc.)
- Optional: assorted herbs (parsley, cilantro, etc.)

Suggested Add-ins:

- 4 bell peppers
- 2 red onions
- 4 green onions
- 2 avocados
- 8 celery stalks
- 8 carrots
- 4 cups cherry tomatoes
- 2 6-oz cans of pitted olives
- 2 cups cheese (feta or cojita)
- 4 cups broccoli
- 2 15-oz cans of beans (chickpeas, kidney beans)
- 4 oz dried fruit (dried cranberries, raisins)

Dressing Ingredients:

- 4 ½ cups olive oil
- ½ cup fresh lemon juice or apple cider vinegar
- ½ cup balsamic vinegar
- ½ cup rice vinegar
- 4 teaspoons garlic powder
- 6 teaspoons honey
- 3 teaspoons salt
- 3 teaspoons pepper
- 2 teaspoons dried basil
- 6 teaspoons Dijon mustard
- 1 teaspoon red pepper flakes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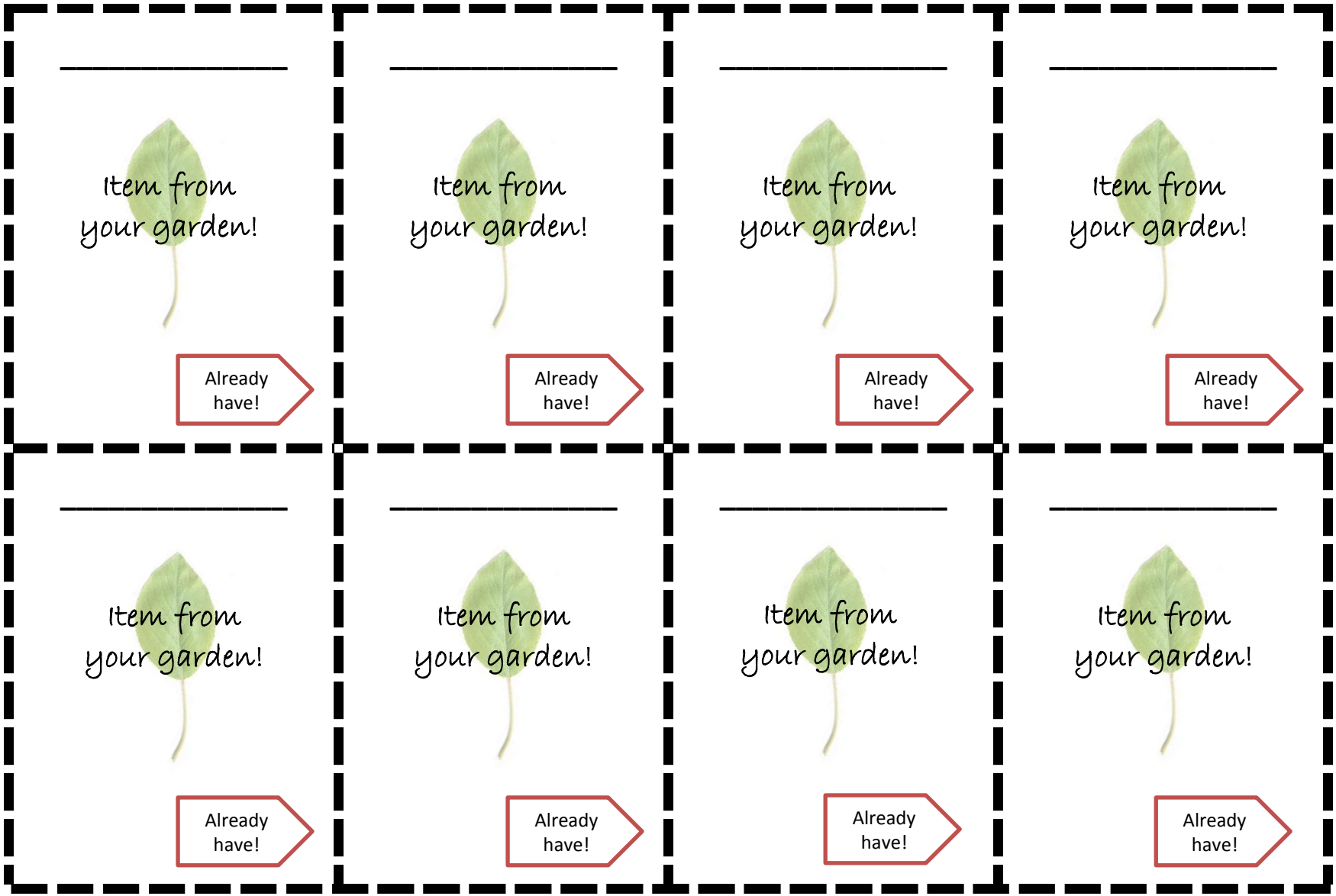
Item from your garden!
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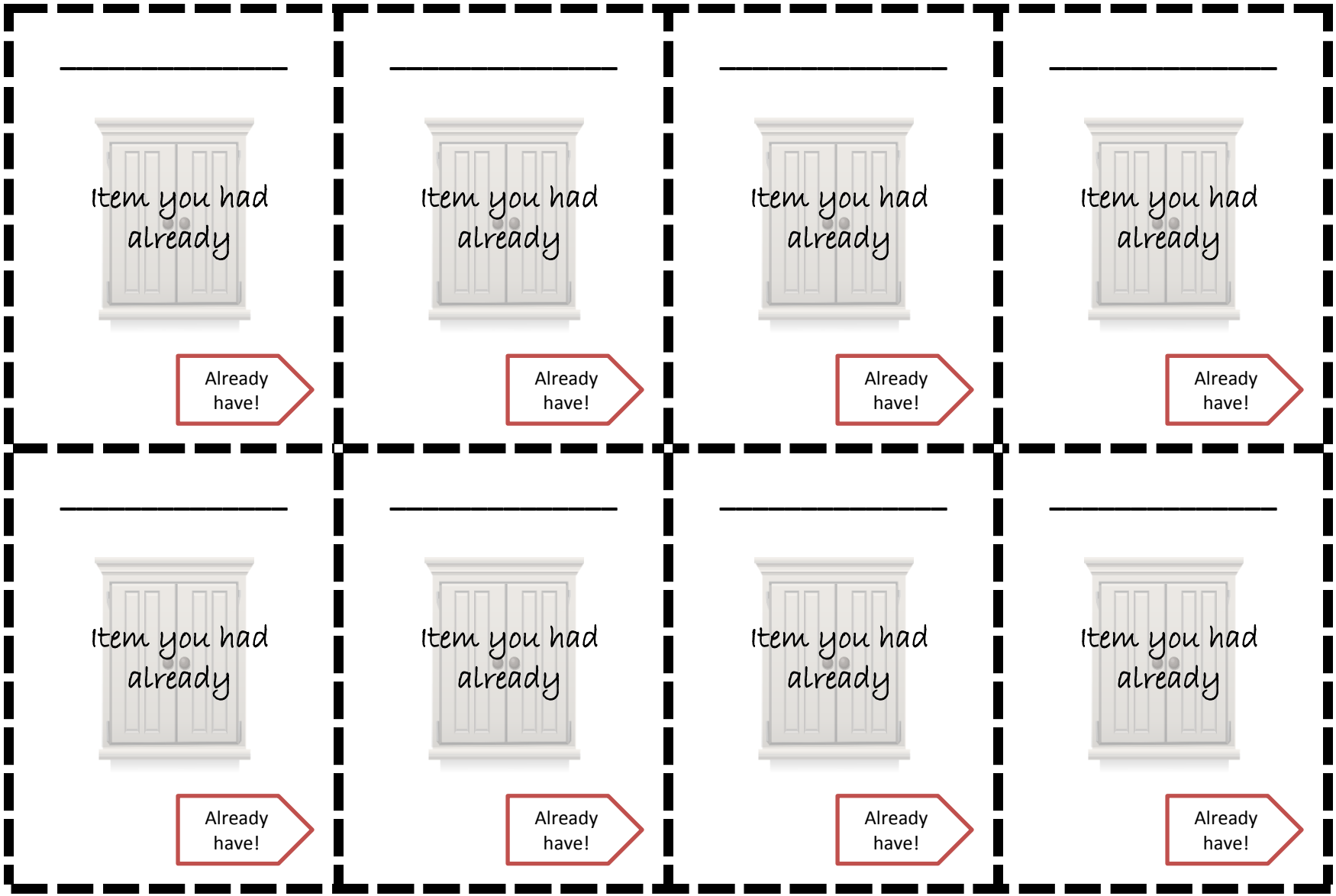
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Group Budget: $15

Ingredient/Item	Price
Total Cost for Group:	

Green Salad Dressing Recipes

Directions: Once you have your salad base ready, make one of the following dressings for it. Each recipe will make enough dressing for your group to share.

1. Lemon Herb Vinaigrette Dressing
    - 2 tablespoons fresh lemon juice or apple cider vinegar
    - 6 tablespoons olive oil
    - ½ teaspoon garlic powder
    - ¼ teaspoon salt
    - ¼ teaspoon pepper
    - ½ teaspoon honey
    - ¼ teaspoon dried basil

2. Balsamic Vinaigrette Dressing
    - 2 tablespoons balsamic vinegar
    - 6 tablespoons olive oil
    - ½ teaspoon honey
    - ½ teaspoon Dijon mustard
    - ¼ teaspoon dried basil
    - ¼ teaspoon salt
    - ¼ teaspoon pepper
    - ¼ teaspoon red pepper flakes (optional)

3. Sesame Asian Dressing
    - 2 tablespoons rice vinegar
    - 6 tablespoons olive oil
    - 1 teaspoon Dijon mustard
    - ½ teaspoon honey
    - ½ teaspoon garlic powder
    - ¼ teaspoons salt
    - ¼ teaspoon pepper

4. Make Your Own!
    - 2 tablespoons vinegar (any kind you want)
    - 6 tablespoons olive oil
    - Anything else you want. It may help to reference the above recipes for ideas.

Directions: Use this meal planner to plan out your meals for the week. Be sure to include the ingredients needed for each meal and the estimated cost for each meal. Next, total up the cost per day and the cost per week of your meal plan. You will save the most money if you eat produce that is in season. Go to https://www.seasonalfoodguide.org/ to search for what is in season right now in your area.

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
	Ingredients:	Ingredients:	Ingredients:	Ingredients:	Ingredients:
Meal 1					
Meal cost:	$	$	$	$	$
	Ingredients:	Ingredients:	Ingredients:	Ingredients:	Ingredients:
Meal 2					
Meal cost:	$	$	$	$	$
	Ingredients:	Ingredients:	Ingredients:	Ingredients:	Ingredients:
Meal 3					
Meal cost:	$	$	$	$	$
	Ingredients:	Ingredients:	Ingredients:	Ingredients:	Ingredients:
Other					
Meal cost:	$	$	$	$	$

Cost per day:	$	$	$	$	$
				Cost per week:	$

Cooking Module 4: **Food Fractioning**

BACKGROUND INFORMATION

Nutrition Facts Labels are the labels on the back or side of food packaging that contains information relating to **serving size**, nutrients, and calories. Using this information can help explicitly determine the number of macronutrients and micronutrients being purchased. In addition, the serving size and 'number of servings per container' line are included toward the top of the label. The purpose of the serving size is specifically for numerical accuracy. This line indicates the amount, commonly in measurements such as cups, or tablespoons, of that food that contains the nutrients listed on the label. When thinking about serving size, a large misconception is that the serving size is the suggested amount of portion recommended to consume for a standard 2,000 calorie diet. But in reality, the "recommended" portion of food depends on several individual factors and overall eating pattern. **Portion size** is the amount of food chosen to be consumed by an individual. This means that the serving size on the package can be used for numerical reference while portioning out an amount of food used in a meal. The servings per container on the package can thus be used for reference when portioning out the entire package of food and determining how many containers should be purchased for the desired time. This concept works when **recipe scaling** as well. Recipe scaling is when someone alters the amount of each ingredient in a recipe to yield a different amount than originally indicated. For example, if someone wants to double a recipe, they can multiply all of the ingredients by two.

CONCEPTS AND VOCABULARY

Nutrition Facts Label: The label on the side of packaged foods that lists the number of calories and selected nutrients found within a given serving size of that food

Servings size: A measured amount of food or drink that is included on Nutrition Facts Labels to help when calculating the amount of a nutrient in a food item

Portion size: The amount of food served in one sitting

Recipe scaling: Adjusting the number of ingredients in a recipe in order to adjust the yield

MATERIALS NEEDED

- Flip chart paper
- Writing utensils
- *Burrito Bowl Price Cards* (Appendix C4.1)
- *Green Salad Price Cards* (Appendix C3.4), as needed
- *Serving vs. Portion Worksheet* (Appendix C4.2), one per youth
- Calculator, one per group
- Clipboard, one per group

Materials provided in curriculum

TIME REQUIRED
15 to 20 minutes

SUGGESTED GROUPINGS
Small groups of 3 to 4

GETTING READY

- ☐ Make a copy of *Burrito Bowl Price Cards* (Appendix C4.1), cut them out along the dashed line.
- ☐ Use the *Green Salad Price Cards* (Appendix C3.4) to supplement the *Burrito Bowl Price Cards* if needed.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Place the price cards spread out in a central location.
- ☐ Make copies of *Serving vs. Portion Worksheet* (Appendix C4.2), one for each youth.
- ☐ Organize youth into small groups of 3 – 4 youth.

  Facilitator tip: These can be the same groups that were formed in previous lessons. By doing so, the youth may continue developing teamwork skills with the same group members.
- ☐ Provide each group with writing utensils or markers, and one sheet of flip chart paper to answer the opening questions.

OPENING QUESTIONS

Ask the youth to respond to each question/prompt below by recording their responses on the flip chart paper provided and sharing their ideas verbally.

• Explain what you think people consider when determining how much to eat for one meal.
• Explain what you know about the difference between serving sizes and portion sizes.

PROCEDURE (EXPERIENCING)

1. Provide each group with a *Serving vs. Portion Worksheet*, a clipboard, and calculator.
2. Explain to youth that they will be making a burrito bowl and orient youth to where the price cards have been placed.
3. Explain to youth that before portioning out their own burrito bowls, they will work with their

group members to figure out how much a serving for one would cost. Explain to youth that serving sizes can be found on the *Burrito Bowl Price Cards* and that these values are used for calculations. Servings sizes are not recommendations of how much of the food someone should eat.

4. Ask youth to reference the *Burrito Bowl Price Cards* to complete the first five columns of the *Serving vs. Portion Worksheet* and to figure out the cost of a burrito bowl per serving.
5. Once the first five columns of the Serving vs. Portion Worksheet are complete, ask youth to save the worksheet for the next activity.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their process for figuring out the cost per serving of the burrito bowls and discuss whether they think the cost per portion will differ in cost.

Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share. If necessary, ask more targeted questions/prompts:

- Describe your experience in figuring out the cost per serving.
- Explain what you think about the cost per serving that you calculated.
- Describe any differences you expect to have from the serving sizes when portioning out your own burrito bowl.
- Explain how you think the cost per portion will compare to the cost per serving.

CONCEPT AND TERM DISCOVERY/INTRODUCTION

Make sure that the youth understand the difference between **servings size** and **portion size**. Youth should also understand that servings sizes are used exclusively for calculations and are not recommendations for how much food someone should consume. Additionally, make sure that key vocabulary terms are either discovered by the youth or introduced to them: **Nutrition Facts Label** and **recipe scaling**.

CULINARY APPLICATION

MATERIALS NEEDED

- ☐ *Safety in the Kitchen Guide* (Appendix C1.1), one per group
- ☐ *Burrito Bowl Shopping List* (Appendix C4.3)
- ☐ *Burrito Bowl Recipe* (Appendix C4.4), one per group
- ☐ *Burrito Bowl Price Cards* (Appendix C4.1)
- ☐ *Green Salad Price Cards* (Appendix C3.4), as needed
- ☐ *Serving vs. Portion Worksheet (*Appendix C4.2), one per youth
- ☐ Calculator, one per group
- ☐ Clipboard, one per group
- ☐ Food grade sanitizer and rag
- ☐ Freezer bags
- ☐ Bowls, one per youth
- ☐ Forks, one per youth
- ☐ Napkins, one per youth
- ☐ Common cooking equipment, enough for all groups
- ☐ Additional adult assistant (recommended)

TIME REQUIRED

30 to 45 minutes

Materials provided in curriculum

GETTING READY

- ☐ Gather all ingredients for the recipe, refer to *Burrito Bowl Shopping List* (Appendix C4.3). Ask youth to help you harvest and wash any ingredients that will be used from the agricultural space.
- ☐ Make copies of the *Burrito Bowl Recipe* (Appendix C4.4), one for each group.
- ☐ Place ingredients in a central location and label each one with the *Burrito Bowl Price Cards* and, if using, the *Green Salad Price Cards* from the last activity.
- ☐ If not already complete, ask groups to setup their cooking stations as detailed in the *Safety in the Kitchen Guide* (Appendix C1.1).
- ☐ Ask youth to thoroughly wash their hands before beginning the next activity.

PROCEDURE (EXPERIENCING)

1. Briefly review the importance of food safety, in particular proper handwashing, with youth.
2. Go through each fresh ingredient with the youth and describe how you selected each one when shopping or harvesting from the agricultural space. For example, when selecting the tomatoes, you likely looked for tomatoes that were slightly firm, bright in color, and free of any bruises.
3. Ask youth to have their partially completed *Serving vs. Portion Worksheet* from the last activity in front of them.

4. Orient youth to where the ingredients have been placed and provide each group with the *Burrito Bowl Recipe*.
5. Ask youth to follow the directions on the Burrito Bowl Recipe to prepare their ingredients as a group.
6. Once everything is prepared, ask youth to assemble their own burrito bowls by measuring their desired amount of each ingredient using measuring cups or spoons and recording their portion sizes on the *Serving vs. Portion Worksheet.*
7. Ask youth to calculate the cost per portion of their burrito bowl by completing the remainder of the *Serving vs. Portion Worksheet*.
8. Collect any leftovers in the freezer bags and promptly refrigerate them. Youth can take the leftovers home if they would like.
9. Clean kitchen areas and discard scraps, preferably through compost, and any garbage.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share their process for figuring out the cost per portion of the burrito bowls and discuss the cost per portion that they calculated. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share their experience preparing their burrito bowls.

HOME CONCEPT APPLICATION

MATERIALS NEEDED

- ☐ *Burrito Bowl Recipe* (Appendix C4.4), one per youth

TIME REQUIRED

5 to 10 minutes

Materials provided in curriculum, one per youth

GETTING READY

☐ Make copies of *Burrito Bowl Recipe* (Appendix C4.4), one for each youth.

PROCEDURE (EXPERIENCING)

1. Provide each youth with the *Burrito Bowl Recipe.*
2. Encourage youth to scale and make the *Burrito Bowl Recipe* at home with their family members, adapting it to include ingredients that are in season or ones that better match their family's tastes and preferences.

SHARING, PROCESSING, AND GENERALIZING

Have the youth share the meal they prepared at home and discuss whether they made any adaptions to the recipe. Follow the lines of thinking developed through the youth's thoughts, observations, and questions as they share their experience scaling and preparing the burrito bowl recipe at home.

Black Beans
Serving size: ½ cup
Servings per container: 3

$0.89

Brown Rice
Serving size: ½ cup dry
(1 cup cooked)
Servings per container: 15

$3.99

Lettuce
Serving size: 1 cup
Servings per container: 6

$1.49

Corn
Serving size: ½ cup
Servings per container: 3.5

$0.99

Tomato
Serving size: ½ cup
Servings per container: 1

$0.49

Green Onion
Serving size: ¼ cup
Servings per container: 4

$0.99

Avocado
Serving size: ½ cup
Servings per container: 2

$2.50

Lime
Serving size: ¼ cup
Servings per container: 2

$0.69

Cilantro

Serving size: ¼ cup
Servings per container: 15

$1.09

Cheese

Serving size: ¼ cup
Servings per container: 8

$2.99

Diced Tomatoes and Green Chilies

Serving size: ½ cup
Servings per container: 2.5

$0.99

Tortilla Chips

Serving size: About 7 chips
Servings per container: 13

$2.99

Ingredient	**Item Cost**	**Serving Size** (found on package)	**Servings per Container** (found on package)	**Cost per Serving** (Item Cost ÷ Servings per Container)	**Portion**	**Servings per Portion** (Portion ÷ Serving Size)	**Cost per Portion** (Cost per Serving x Servings per Portion)
Example: Pinto Beans	$0.99	½ cup	3.5	$0.99 ÷ 3.5 = $0.28	¾ cup	¾ ÷ ½ = 1.5 or 0.75 ÷ 0.50 = 1.5	$0.28 x 1.5 = $0.42
		Total Cost per Serving:			**Total Cost per Portion:**		

Burrito Bowls Harvesting/Shopping List

Yields: About 16 servings (amount needed for 4 groups)

- ☐ 6-15 oz cans black beans
- ☐ 6 cups dry quick-cooking brown rice
- ☐ 6 cups water
- ☐ 8 cups corn, canned (5-15.25 oz cans) or frozen (4-16 oz bags)
- ☐ 4 large tomatoes tomato
- ☐ 2 bunches green onion
- ☐ 4 avocadoes
- ☐ 2 heads of lettuce (romaine or butter lettuce recommended)
- ☐ 4 limes
- ☐ 1 bunch cilantro
- ☐ 4 cups sharp cheddar cheese (optional)
- ☐ 4 cans diced tomatoes and green chilies
- ☐ 1 bag tortilla chips
- ☐ 16 cloves garlic (1 large head)
- ☐ About 3 tablespoons salt
- ☐ 4 teaspoons black pepper
- ☐ 1 cup oil (such as olive oil)

Burrito Bowl Recipe

Ingredients

_____ black beans, canned
_____ dry quick-cooking brown rice
_____ water
_____ corn, canned or frozen
_____ tomatoes and green chilies, canned
_____ tomato, diced
_____ green onion, thinly sliced
_____ lettuce
_____ avocado, medium diced
_____ tortilla chips
_____ lime juice
_____ cilantro, thinly sliced
_____ cheese (optional), shredded
_____ garlic, minced
_____ salt
_____ black pepper
_____ oil (such as olive oil)

Directions

1. To start the rice, add water (equal amount as planned for the rice) to a medium saucepan and bring it to a boil

2. Add the rice and stir until it is evenly distributed; bring back to a boil. Add a can of crushed tomatoes and green chilies to create a Spanish style rice.

3. Put a cover on the saucepan and set aside off of the heat for 10 minutes

4. Open canned black beans and rinse under cold water in a colander

5. If using, open and rinse canned corn in a colander

6. Heat oil in a large frying pan over medium heat

7. Add beans, corn, garlic, salt, and pepper to the frying pan and cook until the corn starts to brown; turn off heat when done

8. In a bowl, mix together cooked rice, lime juice, and cilantro

9. Top the rice mixture with the cooked beans and corn, cheese (if using), tomato, avocado, green onion, lettuce, and crumbled tortilla chips.

10. Enjoy

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