

Discovering Healthy Choices

Module 4:
Food Math

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Adapted from *Nutrition to Grow On*

This curriculum is an adaptation of *Nutrition to Grow On*, a garden-enhanced nutrition curriculum for upper elementary school children. Authors: Jennifer Morris and Sheri Zidenberg-Cherr, Department of Nutrition, University of California, Davis in collaboration with the California Department of Education and Mary Shaw, Solano County Master Gardener, University of California Cooperative Extension.

Results from Research

This curriculum was tested as part of the Shaping Healthy Choices Program research project during the 2012–2013 school year. Fourth grade youth participating in the Shaping Healthy Choices Program increased knowledge about nutrition and consumption of vegetables, and the rates of obesity were reduced from 56% to 38% (Scherr et al. 2014). In a subsequent study the Discovering Healthy Choices curriculum was implemented by fourth-grade teachers as part of the Shaping Healthy Choices Program in the 2013–2014 school year. Participating youth improved their knowledge about nutrition, critical thinking skills, and ability to identify vegetables (Linnell et al. 2016). Additionally, there was a significant reduction in average body mass percentile-for-age. The Shaping Healthy Choices Program was then piloted through the University of California CalFresh SNAP-Ed program and University of California Cooperative Extension and positive outcomes were observed, though they varied among implementation sites (Bergman et al. 2018). The research team attributed the variation to differences in fidelity to the curriculum, with the highest fidelity corresponding to the greatest improvements in outcomes.

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Facilitator Tips: How to Get the Most from This Curriculum

Teaching and Learning Strategies

All activities in the *Discovering Healthy Choices* curriculum were designed using experiential learning and inquiry. Experiential learning is grounded in the idea that experience is essential to learning and understanding. Specifically, experiential learning involves a recurring sequence of three distinct steps: 1) an experience (“Procedure/Experiencing”) that involves learner exploration; 2) a period of discussion and reflection (“Sharing, Processing, and Generalizing”), where learners share their reactions and observations, process their experience, and make generalizations to real-life examples; and 3) an opportunity to apply (“Apply”) new knowledge and skills in an authentic manner, which helps learners deepen and broaden their understanding (it helps learning last!).

Inquiry is a teaching and learning strategy whereby learners are engaged in activities that require the observation and manipulation of objects and ideas in order to construct knowledge and develop skills. Inquiry is grounded in experience, focuses on the use and development of critical thinking skills, and targets the learning and application of specific content knowledge. Furthermore, inquiry starts with a question, and effective questioning strategies are critical when facilitating inquiry-based learning. Open-ended questions or prompts (e.g., “Explain what you know about...”; or “Discuss your understanding of...”) promote learner inquiry and are considered more effective than closed-ended questions or prompts (e.g., “Name the parts of...”; or “What is the name of...?”).

The inquiry-based activities in the *Discovering Healthy Choices* curriculum were designed using the 5-step Experiential Learning Cycle by Pfeiffer and Jones (1983): Experience, Sharing, Processing, Generalizing, and Application. It is recommended that adequate time be allotted for youth learners to proceed through each step in order for learning to be maximized.

Behavior Change Strategies

As part of *Discovering Healthy Choices*, learners will discover nutrition concepts through hands-on and garden-based nutrition activities. Garden-based activities allow youth to enhance nutrition knowledge, preferences for vegetables, and consumption of fruits and vegetables, and also gives them an opportunity to explore agriculture and the environment while improving life skills, self-esteem, social skills, and behavior (Heim et al. 2009; Jaenke et al. 2012; Lineberger and Zajicek 2002; Linnell et al. 2016; McAleese and Rankin 2007; Morgan et al. 2010; Morris and Zidenberg-Cherr 2002; Parmer et al. 2009; Robinson-O’Brien et al. 2009; Scherr et al. 2014).

The *Discovering Healthy Choices* curriculum activities were designed using the Social Cognitive Theory as a framework (Glanz and Viswanath 2008). The structure and content of the activities address Social Cognitive Theory domains of behavioral capability, self-efficacy, and reciprocal determinism. A detailed description of how the behavior change strategies were applied is available elsewhere (Linnell et al. 2016).

Target Audience

Discovering Healthy Choices was developed for youth in upper elementary school (grades 4–6) and to be used in formal and non-formal educational settings. Curriculum activities support educational standards for grades K–12 and may be adapted for use in other grade levels.

Facilitator Tips: How to Get the Most from This Curriculum (cont.)

Organization of the Learning Environment: Creating Environments Where Learning Happens

The activities in the *Discovering Healthy Choices* curriculum were designed to be facilitated in a small group-learning environment. Learners construct understanding through inquiry using observations, the manipulation of objects and ideas, and personal reflection. However, learning is a social endeavor where dialogue and reflection with others are critical elements. Therefore, creating physical and social environments where learners can carry out inquiry will help learners organize their thoughts and develop an understanding of the content and processes being emphasized in specific curriculum activities.

Organization of the Curriculum

The modules are sequenced so that foundational concepts are discovered first and then built upon with more advanced concepts as they continue through the modules.

Each module consists of one hands-on activity, one application activity in the instructional garden, and multiple take-home application activities. When learners apply their new knowledge and skills in authentic situations, this is when they are able to develop deeper understanding of the subject matter. At this point, youth have already completed the hands-on activities that have introduced new concepts and skills. The application activities provide the youth with the opportunity to take what they have learned and apply it to independent, real-world situations in the instructional garden, at home, or in the classroom. This application of knowledge is a critical step of the learning process.

Curriculum Activity Layout

- **Activity Title**
The activity title introduces the facilitator to the topic that will be addressed during the activity.
- **Background Information**
This introductory section provides facilitators with a brief overview of the subject matter and provides examples that help to explain the importance of the topic.

Facilitator Tip: The background information is not meant to be shared with the youth prior to the activity. Rather, it is intended to support facilitators by providing factual information that may help ground and inform group discussions.
- **Life Skills**
Life skills are abilities that help youth become productive, contributing members of society. The activities are designed to provide youth with the opportunity to practice particular life skills that are utilized in everyday life. The life skills targeted are listed for each activity (Norman and Jordan n.d.).
- **Subject Links**
This describes other subject areas that are connected to the module.**Education Standards Supported**

This curriculum supports Common Core State Standards, Next Generation Science Standards, and California Nutrition Education Competencies. Specific details for standards addressed for each grade level is described in the “Education Standards Supported” section on page 9.
- **Time Required**
Each module includes an estimate of the time needed to complete the activities. The actual time required for the activities will vary based on level of learner interest, size of the group, age of the group members, and the setting in which the activities take place.

Facilitator Tips: How to Get the Most from This Curriculum (cont.)

- **Learning Objectives: Concepts and Vocabulary**
Facilitators are provided with a list of defined concepts and vocabulary that is meant to be discovered by the youth during their exploration and completion of the activities. The list should not be provided to the youth at the beginning of the activity. At the end of each activity, the facilitators should ensure that the appropriate terms and concepts have been discovered by or introduced to the youth.
- **Suggested Groupings**
Suggestions are provided for the group size designed for each activity. The suggested groupings are meant to help facilitate quality learning among the youth. Some activities are designed for youth to work in either small groups, large groups, or individually.
- **Materials Needed**
A list of the materials needed to complete the activities is provided for the facilitator. The list describes the materials to be used. Most materials are provided (these are marked with an *); however, other materials will need to be obtained prior to activity implementation.
- **Getting Ready**
This list describes what needs to be done by the facilitator to prepare for the activity, how many of each of the materials to prepare, and what tasks need to be completed prior to the beginning of the activity.
- **Opening Questions/Prompts**
Questions or prompts presented at the beginning of each activity are meant to draw the youth into the topic being addressed in the activity. Responses to the questions will provide the facilitator with an understanding of what the youth already know about the topic. Facilitators should encourage the youth to record their answers to these introductory questions on the provided flip chart paper, as this is an important part of the learning process. This is the point when the activity begins with the youth. Opening Questions/Prompts should be asked as they are written. Open-ended questioning is a key element of inquiry-based learning.
- **Procedure (Experiencing)**
This is the part of the curriculum when the youth experience and complete the activity itself. It is highly recommended that facilitators read the procedure in its entirety before implementing with the youth so that the activity flows smoothly. It is important for youth to record their observations, ideas, and other thoughts during the procedure on the flip chart paper provided, as this is an important part of the learning process.
- **Facilitator Tips**
These are suggestions and additional information for the facilitator.
- **Sharing, Processing, and Generalizing**
Following the procedure, there is a period of reflection, during which time the youth come back together as one group and share their observations with each other. This phase provides youth an opportunity to communicate their findings, listen to what others discovered, consider the various thought processes, and learn from each other. It helps to solidify what the youth have learned throughout the course of the activity. This phase also contains prompts that allow the youth to engage in thinking about how they went about solving a problem. This is called meta-cognition, which is considered a key element in developing a deeper understanding.
- **Concept and Term Discovery/Introduction**
At this point of the activity, most of the concepts will have most likely already been discovered by the youth. Many concepts will have already been defined by now as well. However, some concepts may have been missed or poorly understood and need to be clarified; additionally, technical terms may need to be introduced to the youth. Ensure that all terms/concepts have been discovered or introduced to the youth. Additionally, make certain that any misconceptions have been addressed.

Facilitator Tips: How to Get the Most from This Curriculum (cont.)

Starting an Instructional Garden

- **Books and Downloadable Resources**

Gardens for Learning: A Guide for Creating and Sustaining Your School Garden. Available at the California School Garden Network website, <http://www.csgn.org>.

Getting Started: A Guide for Creating School Gardens as Outdoor Classrooms. Available at the Center for Eco Literacy website, <http://www.ecoliteracy.org/downloads/getting-started>.

Sunset Western Garden Book (9th ed). 2012. New York, NY: Time Home Entertainment.

- **School Garden Grant Opportunities**

California Fertilizer Foundation awards grants of \$1,200 to California K–12 school garden programs. Awards include educational materials. Applications reviewed in January and June. The grant application is available at the California Fertilizer Foundation website, <http://www.calfertilizer.org>.

KidsGardening offers a variety of grant programs with awards of up to \$500. Information about grants is available at the KidsGardening website, <https://kidsgardening.org>.

Western Growers Foundation offers grants and start-up supplies for school gardens in California and Arizona. Information and grant applications are available at the Western Growers Foundation website, <http://www.wga.com>.

Extension Opportunities Beyond the Learning Setting

Discovering Healthy Choices was developed as part of the Shaping Healthy Choices Program. The Shaping Healthy Choices Program is a multicomponent approach to improving children's food choices. Other components of this program include a curriculum for cooking demonstrations, *Cooking Up Healthy Choices*, and family newsletters called *Team Up for Families*.

Cooking Up Healthy Choices is directly linked to *Discovering Healthy Choices*. It was developed to offer more opportunities for youth to apply the concepts they have learned through the participation in five cooking demonstrations.

The *Team Up for Families* newsletters include messages about what the youth are learning in the *Discovering Healthy Choices* curriculum, in addition to positive nutrition-related parenting practices. Each of the eight newsletters is designed to link to each of the eight modules in *Discovering Healthy Choices*.

Food Safety and Other Considerations

The *Discovering Healthy Choices* curriculum includes activities where food is prepared for consumption and for handling. When preparing foods, it is important to follow food safety guidelines published by the Food and Drug Administration at their website, <http://www.fda.gov/Food/FoodborneIllnessContaminants/BuyStoreServeSafeFood/ucm255180.htm>. It is also important to be aware of youths' food allergies and alter recipes accordingly.

Facilitator Tips: How to Get the Most from This Curriculum (cont.)

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Educational Standards Supported

Next Generation Science Standards Supported

	Modules	K	1	2	3	4	5	6	7	8	9	10	11	12
Life Science Progression														
LS1.A Structure and function	2, 3													
LS1.C Organization for matter and energy flow in organisms	2, 3, 5													
LS2.A Interdependent relationships in ecosystems	2, 3, 7													
LS2.B Cycles of matter and energy transfer in ecosystems	2, 3, 7													
LS4.D Biodiversity and humans	2, 3, 7													
Science and Engineering Practices														
1. Asking questions and defining problems	1, 2, 3, 4, 5, 6, 7, 8													
3. Planning and carrying out investigations	2, 3, 4, 5, 7													
4. Analyzing and interpreting data	2, 3, 4, 5, 7, 8													
5. Using mathematics and computational thinking	2, 4, 6													
6. Constructing explanations and designing solutions	2, 3, 4, 8													
7. Engaging in argument from evidence	1, 2, 3, 4, 7													
8. Obtaining, evaluating, and communicating information	1, 2, 3, 4, 5, 6, 7, 8													
Crosscutting Concepts														
1. Patterns	2, 3, 4, 5, 7, 8													
3. Scale, Proportion, and Quantity	2, 3, 4, 6, 8													

- Standard is not applicable for grade level

• Supports standard for grade level

• Can be adapted to support standard for grade level

Educational Standards Supported (continued)

Common Core State Standards in English Language Arts Supported

	Modules	K	1	2	3	4	5	6	7	8	9	10	11	12
Reading Standards for Literature														
Key Ideas and Details	1	•	•	•	•	•	•	•	•	•	•	•	•	•
Craft and Structure	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Range of Reading and Level of Text Complexity	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Reading Standards for Informational Text														
Key Ideas and Details	1, 2, 3, 5	•	•	•	•	•	•	•	•	•	•	•	•	•
Craft and Structure	1, 2, 3, 5, 6	•	•	•	•	•	•	•	•	•	•	•	•	•
Integration of Knowledge and Ideas	1, 3, 7	•	•	•	•	•	•	•	•	•	•	•	•	•
Range of Reading and Level of Text Complexity	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Reading Standards: Foundational Skills														
Print Concepts	1, 2, 3, 4, 5, 6, 7, 8	•	•	-	-	-	-	-	-	-	-	-	-	-
Phonological Awareness	1, 2, 3, 4, 5, 6, 7, 8	•	•	-	-	-	-	-	-	-	-	-	-	-
Phonics and Work Recognition	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Fluency	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Writing Standards														
Text Types and Purposes	1, 2, 3, 4, 5, 6, 7, 8				•	•	•	•	•	•	•	•	•	•
Production and Distribution of Writing	1				•	•	•	•	•	•	•	•	•	•
Research to Build and Present Knowledge	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Range of Writing	1, 2, 3, 4, 5, 6, 7, 8	-	-	-	•	•	•	•	•	•	•	•	•	•
Speaking and Listening Standards														
Comprehension and Collaboration	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Presentation of Knowledge and Ideas	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Language Standards														
Conventions of Standard English	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Knowledge of Language	1, 2, 3, 4, 5, 6, 7, 8	-	-	•	•	•	•	•	•	•	•	•	•	•
Vocabulary Acquisition and Use	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•

- Standard is not applicable for grade level

• Supports standard for grade level

• Can be adapted to support standard for grade level

Educational Standards Supported (continued)

Common Core State Standards Supported in Literacy in History/Social Studies, Science, and Technical Subjects 6-12

	Modules	6	7	8	9	10	11	12
Reading Standards for Literacy in History/Social Studies								
Integration of Knowledge and Ideas	1, 2, 4	•	•	•	•	•		
Reading Standards for Literacy in Science and Technical Subjects								
Key Ideas and Details	2, 3, 4	•	•	•	•	•	•	•
Integration of Knowledge and Ideas	2, 3, 4	•	•	•	•	•	•	•
Range of Reading and Level of Text Complexity	2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•
Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects								
Text Types and Purposes	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•
Production and Distribution of Writing	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•
Research to Build and Present Knowledge	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•
Range of Writing	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•

- Standard is not applicable for grade level

- Supports standard for grade level
- Can be adapted to support standard for grade level

Educational Standards Supported (continued)

Common Core State Standards in Mathematics

	Modules	K	1	2	3	4	5	6	7	8	9	10	11	12
Counting and Cardinality	2, 4, 5, 6	•	-	-	-	-	-	-	-	-	-	-	-	-
Operations and Algebraic Thinking	2, 3, 4, 5, 6	•	•	•	•	•	-	-	-	-	-	-	-	-
Number and Operations in Base Ten	2, 4, 5, 6	-	-	-	•	-	•	-	-	-	-	-	-	-
Number and Operations - Fractions	4, 5, 6, 7	-	-	-	•	•	•	-	-	-	-	-	-	-
Measurement and Data	2, 3, 4, 5, 6	•	•	•	•	•	•	-	-	-	-	-	-	-
Geometry	2, 3, 4, 5	•	•	-	-	-	•	-	-	-	-	-	-	-
Ratios and Proportional Relationships	2	-	-	-	-	-	-	•	-	-	-	-	-	-
The Number System	4, 5, 6	-	-	-	-	-	-	•	-	-	-	-	-	-
Statistics and Probability	2	-	-	-	-	-	-	•	-	-	-	-	-	-
Number and Quantity														
Quantities	2	-	-	-	-	-	-	-	-	-	•	•	•	•

- Standard is not applicable for grade level

• Supports standard for grade level

• Can be adapted to support standard for grade level

Educational Standards Supported (continued)

Nutrition Education Competencies Supported

	Modules	K	1	2	3	4	5	6	7	8	9	10	11	12
1. Overarching Nutrition Competency: Essential Nutrition Concepts - All youth will know the relationships among nutrition, physiology, and health.														
1a. Know the six nutrient groups and the functions.	3, 5	•	•	•	•	•	•	•	•	•	•	•	•	•
1b. Know nutrition and health guidelines.	4, 5, 6, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
1c. Know factors affecting energy balance.	2, 5, 6	•	•	•	•	•	•	•	•	•	•	•	•	•
1d. Describe how nutritional needs vary throughout the life cycle.	5	•	•	•	•	•	•	•	•	•	•	•	•	•
1e. Identify the physiological processes in digestion, absorption, and metabolism of nutrients.	3, 5	•	•	•	•	•	•	•	•	•	•	•	•	•
1f. Explain the influence of nutrition and physical activity on health.	2, 3, 5, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
1g. Know principles of handling (growing, harvesting, transporting, processing, storing, and preparing) foods for optimal food quality and safety.	8	•	•	•	•	•	•	•	•	•	•	•	•	•
1h. Consider the interactions among nutrition science, ecosystems, agriculture, and social systems that affect health, including local, national, and global perspectives.	1, 2, 3	•	•	•	•	•	•	•	•	•	•	•	•	•
2. Overarching Nutrition Competency: Analyzing Nutrition Influences														
All youth will demonstrate the ability to analyze internal and external factors influencing food choices and health outcomes.	7	•	•	•	•	•	•	•	•	•	•	•	•	•

- Standard is not applicable for grade level

• Supports standard for grade level

• Can be adapted to support standard for grade level

Educational Standards Supported (continued)

Nutrition Education Competencies Supported (continued)

	Modules	K	1	2	3	4	5	6	7	8	9	10	11	12
3. Overarching Nutrition Competency: Accessing Valid Nutrition Information														
All youth will demonstrate the ability to access and analyze nutrition information, products, and services to analyze the accuracy and validity of nutrition claims.	2, 5, 6, 7	•	•	•	•	•	•	•	•	•	•	•	•	•
4. Overarching Nutrition Competency: Interpersonal Communication about Nutrition														
All youth will demonstrate the ability to use interpersonal communication skills to optimize food choices and health outcomes.	7						•							
5. Overarching Nutrition Competency: Decision Making for Nutrition Choices														
All youth will demonstrate the ability to use decision-making skills to optimize food choices and health outcomes.	2, 3, 5, 6, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
6. Overarching Nutrition Competency: Goal Setting for Nutrition														
All youth will demonstrate the ability to use goal-setting skills to enhance nutrition and health.	2, 3, 5, 6, 8		•	•	•	•	•	•	•	•	•	•	•	•
7. Overarching Nutrition Competency: Practicing Nutrition-Enhancing Behaviors														
All youth will demonstrate the ability to practice nutrition-related behaviors that reduce risk and promote health.	2, 3, 5, 6, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
8. Overarching Nutrition Competency: Nutrition Promotion														
All youth will demonstrate the ability to promote and support a sustainable, nutritious food supply and healthy lifestyles for families and communities.	1, 2, 3, 5, 8	•	•	•	•	•	•	•	•	•	•	•	•	•

-Standard is not applicable for grade level

- Supports standard for grade level
- Can be adapted to support standard for grade level

Module 4: Food Math

Background Information

The amount of nutrients you can obtain from a food depends on the size of a serving. This amount, called **serving size**, is displayed on the **Nutrition Facts** label found on food packaging. Serving sizes are **standard reference amounts** that are set by the United States Food and Drug Administration (FDA). Serving sizes differ depending on the type of food. For example, a serving size of peanut butter is 2 tablespoons, while a serving size of breakfast cereal is 1 cup. Serving sizes are often considered the recommended amount that a person should eat; however, they are simply reference amounts that help us to compare the nutrients in different foods.

In contrast to serving sizes, which are standard measurements, **portions** are **subjective amounts**. Portion sizes vary from person to person and can be as large or as small as someone chooses.

Portion sizes and serving sizes can be described using different measurements: length, weight, or volume. **Length measurements** are commonly used with fruits like bananas, vegetables such as whole carrots or celery, or dishes like casseroles and lasagnas. **Weight measurements** refer to the mass of a food and can be thought of in ounces or grams for dry products and fluid ounces for liquids. **Volume measurements** refer to the amount of three-dimensional space a product takes up, like a tablespoon or cup, whether liquid or dry.

Concepts and Vocabulary

- **Length:** a measurement that uses inches or centimeters to describe an object end to end.
- **Nutrition Facts:** a label on food packaging that lists a variety of nutrients and how much of each is contained in a serving.
- **Portion:** a subjective amount of food that can vary in size from person to person.
- **Serving size:** a standardized amount of a food determined by the FDA; found on the Nutrition Facts label on food packaging.
- **Standard reference amount:** an amount that is used for the basis of comparison.
- **Subjective:** something that is dependent upon the views or thoughts of an individual and may be different from person to person.
- **Volume:** a measurement of the three-dimensional space that a food takes up; measured using teaspoons, tablespoons, or cups for both liquid and dry foods.
- **Weight:** a measure of the mass of an object using grams, ounces, or pounds.
- **Yield:** the amount of crops produced through cultivation of a garden or agricultural land.

Life Skills

Teamwork, Contributions to Group Effort, Problem Solving, Healthy Lifestyle Choices, Communication, Sharing, Critical Thinking.

Subject Links

Science, Math, Health, Nutrition

Educational Standards Supported

Discovering Healthy Choices curriculum supports Next Generation Science Standards, Common Core State Standards, and California Nutrition Education Competencies. For specific details on standards and grade levels, please see page 9.

4.1

Activity 4.1: Classroom Activity

Time Required

60 to 75 minutes

Suggested Groupings

Small groups of 3 to 4 youth

Materials Needed

(*Materials provided in curriculum)

- Flip chart paper
- Markers or writing utensils
- **Breakfast Breakdown* (Appendix 4A)
- **Breakfast Patties* (Appendix 4B)
- Popular children's cereal; enough for each group to pour a generous portion
Facilitator Tip: It is important that the cereal chosen is a popular cereal, not a healthy or generic cereal. You will need enough cereal for each group to pour one generous portion.
- 100% juice (e.g., apple, orange); enough for each group to pour a generous portion
Facilitator Tip: Juice may be substituted with water.
- Peanut Butter
Facilitator Tip: These foods will not be eaten. However, if there are youth with severe peanut allergies, the peanut butter should be substituted with almond butter or fruit jelly.
- Set of measuring cups ($\frac{1}{4}$, $\frac{1}{2}$, and 1 cup); one set for each group.
- Large measuring cup (preferably holding 2 cups or more); one for each group.
- Measuring spoons with teaspoons and tablespoons; one set for each group.
Facilitator Tip: Ask to borrow measuring cups and spoons from parents so they don't have to be purchased.
Facilitator Tip: If there are not enough measuring tools for each group to have one set, they can be shared at a central supplies table.
- Plastic spoons for spreading peanut butter; one for each group
- Paper or plastic cereal bowls; one for each group
- Drinking cups (at least 12 oz); one for each group
- Small paper or plastic plates; one for each group
- Plastic bag or other container for food waste; one for each group

Getting Ready

1. Make copies of the *Breakfast Breakdown* worksheet (Appendix 4A), one for each group.
2. Make copies of the *Breakfast Patties* (Appendix 4B), one set for each group.
3. Set up four food stations: one with the cereal; one with the juice; one with the peanut butter; and one with the sets of *Breakfast Patties*.

Facilitator tip: The peanut butter can get a little messy. Flip chart paper or newspaper can be placed under the food items to help keep the areas clean. Additionally, have paper towels available for wiping hands clean.

- Organize the class into small groups of 3 to 4 youth.

Facilitator Tip: These can be the same groups that were formed in Lesson 1, Activity 1. By doing so, the youth may continue developing teamwork skills with the same group members.

- Provide each group with a sheet of flip chart paper and markers to answer opening questions/prompts.

Opening Questions/Prompts

Ask the youth to respond to each question below by recording their thoughts on their flip chart paper with markers and sharing their ideas verbally.

- Explain how you decide how much food to eat when you sit down for a meal or have a snack.
- Explain what you know about how we measure amounts of food.

Procedure (Experiencing)

1. Provide each group with a copy of the *Breakfast Breakdown* worksheet.
2. Provide each group with a set of measuring cups and a set of measuring spoons.
3. Provide each group with a plastic spoon, cereal bowl, drinking cup, paper or plastic plate, and plastic bag for food waste.
4. Explain to the youth that they will be serving themselves amounts of foods that are commonly consumed at breakfast. Tell them that the foods used in this activity are not to be eaten during this activity.
5. Distribute the groups equally among the different food stations.
6. Ask the groups at each of the stations to work together to decide how much of each food they might typically take. Ask them to pour the amount of cereal they might typically eat into one bowl. Then, ask them to pour the amount of juice they might typically drink into the cup. Next, ask them to spread the quantity of peanut butter onto the plate that they would spread onto a piece of bread or toast. Lastly, from the set of *Breakfast Patties* handouts, ask the youth to select the size of breakfast patty they might typically choose at breakfast.

Facilitator Tip: These foods may not be what the youth customarily eat, but it is important that they take some of each food. Some youth may take very large amounts of cereal and/or peanut butter.

7. Have the youth rotate between the stations until they have taken one of each of the foods.
8. Ask the youth to use any of the measuring tools available to measure the amounts of cereal, juice, and peanut butter that they served themselves. Have them record the measurements in the second column on the *Breakfast Breakdown* worksheet titled “Portion,” making sure to record the units of measurement they used. For the breakfast patties, ask them to record the amount that is found in the lower right-hand corner of the *Breakfast Patties* portion they chose.

Facilitator Tip: Some youth may need help being precise in their measurements. Make sure that they fill up the cups and level them off.

Procedure (Experiencing) (continued)

Facilitator Tip: Do not continue to Step 9 until the youth have finished Step 8. It is important that the serving sizes are not revealed until the youth have finished measuring their portions.

9. On the chalkboard, whiteboard, or overhead projector, write the serving sizes of each food type:
 - Cereal = 1 cup (56 grams)
 - Juice = 8 ounces (1 cup)
 - Peanut butter, almond butter, or jam = 2 tablespoons ($\frac{1}{8}$ cup)
 - Meat patty = 2 ounces (56 grams)
10. Ask the youth to record the serving sizes for each food on their *Breakfast Breakdown* worksheet.
11. Ask each group to calculate the difference between the portion they served themselves and the serving size. Have them record the difference in the third column, titled “Difference between portion and serving size” on the *Breakfast Breakdown* worksheet.

Facilitator Tip: In order to calculate the difference, youth may first need to convert their measurements between cups, tablespoons, and ounces. Conversions are listed near the bottom of the *Breakfast Breakdown* worksheet.
12. Ask each group to calculate the number of servings that were in the portions they served themselves by dividing the portion by the serving sizes. Have them record this in the “Number of Servings in the Portion” column.

Sharing, Processing, and Generalizing

1. Have each of the groups share what they noticed as they completed the *Breakfast Breakdown* worksheet.
2. Follow the lines of thinking by the youth through their general thoughts, observations, and questions; if necessary, ask more targeted questions:
 - Explain what you observed when you compared the amount you chose for each food and the serving size.
 - Explain how you went about deciding which measuring tools to use.
 - Explain how you went about finding the difference between the portion and serving size.
 - Explain how you found the number of servings you measured in the portion of each food.
 - Explain what you think is important about knowing serving sizes.

Concept Term Discovery/Introduction

It is important that youth understand the difference between a **portion**, an amount of food subjectively served, and a **serving size** that is a standard measure that is measured precisely. They should also understand that serving sizes are important for being able to compare the nutrients content of foods from one to another. It is important that youth clearly understand that the serving size of a food is not a recommended amount but a reference amount. Make sure the youth discover or are introduced to the following key terms: **volume, length, weight, cups, ounces, tablespoons, teaspoons, serving size, portion, standard, and subjective.**

Activity 4.2: Home Concept Application

Getting Ready

- Make copies of the *Track Your Snack* worksheet (Appendix 4C), one for each youth.

Procedure (Experiencing)

1. Ask the youth to complete the *Track Your Snack* worksheet at home with their families.
2. Explain that the activity will ask the youth and their family members to serve themselves a portion of any food, and then measure it. Next, they will locate the serving size on the Nutrition Facts label. Finally, they will calculate the difference between the portion and the serving size, and find out the number of servings in the portion.
3. After the youth have returned with their completed worksheets, ask them to share their findings.

Time Required

5 to 10 minutes

Materials

- (*Materials provided in curriculum)
- **Track Your Snack* (Appendix 4C)

Activity 4.3 Garden Concept Application

Getting Ready

1. Purchase or harvest vegetables.
2. Prepare the whole vegetables, one for each group, by washing them.
3. Prepare the chopped vegetables by washing them and roughly chopping them, so that there is one whole vegetable that has been chopped for each group. Store each chopped vegetable in a separate plastic storage container, one for each group.
4. Make copies of the *What's in a Vegetable* worksheet (Appendix 4D), one for each group.
5. Make copies of the *Garden to Kitchen Predictions* worksheet (Appendix 4E), one for each group.
6. Organize the class into small groups of 3 to 4 youth.

Facilitator Tip: These can be the same groups that were formed in Lesson 1, Activity 1. By doing so, the youth may continue developing teamwork skills with the same group members.

Facilitator Tip: One-third of the groups will receive two carrots: one whole carrot and one that has been chopped.

One third of the groups will receive two cucumbers: one whole and one that has been chopped. One third of the groups will receive Swiss chard: one whole bunch and one bunch that has been chopped.

7. Provide each group with a sheet of flip chart paper and markers to answer opening questions.

Time Required

60 to 75 minutes

Suggested Groupings

Small groups of 3 to 4 youth

Materials Needed

(*Materials Provided in the Curriculum)

- Flip chart paper
- Markers or other writing utensils
- **What's in a Vegetable* (Appendix 4D)
- **Garden to Kitchen Predictions* (Appendix 4E)
- Vegetables: medium carrots (6-7"), medium cucumbers (8"), and bunches of Swiss chard
- Plastic storage containers
- Measuring cups
- Rulers

Facilitator Tip: If there are not enough measuring tools for each group, set up a central supplies table for sharing.

Opening Questions/Prompts

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

- Describe what you know about serving sizes.
- Explain what you know about the different tools that are used for measuring serving sizes.

Procedure (Experiencing)

1. Provide one copy of the *What's in a Vegetable* worksheet to each group.
2. Count off the groups in threes (1s, 2s, and 3s).
3. Provide all number 1 groups with one whole carrot and one chopped carrot each.
4. Provide all number 2 groups with one whole cucumber and one chopped cucumber each.
5. Provide all number 3 groups with one whole bunch of Swiss chard and one chopped bunch each.
6. Provide each group with a set of measuring cups and a ruler.
7. Explain to the youth that what they have received is one whole vegetable, and then in the storage container is a whole vegetable that has been chopped.
8. Explain to the youth that the vegetables are not to be eaten.
9. Ask the youth to examine the whole vegetable and record their observations on the *What's in a Vegetable* sheet.
10. Ask the youth to use the measuring tools to find out how much there is when a whole vegetable is chopped. Have the youth record their findings on the *What's in a Vegetable* worksheet.
11. Have each group share the amount of the chopped vegetable that they measured. On the whiteboard, chalk board, or overhead projector, record each group's vegetable type and measurements.
12. Using the measurements reported by every group, have the youth calculate the average for each vegetable type. Ask the youth to record the averages on their *What's in a Vegetable* worksheet.
13. Have the youth convert their measurements into number of servings on the *What's in a Vegetable* worksheet.
14. Have the youth go out to the garden. Ask them to use what they learned about how many servings each whole vegetable provides to make predictions about how many servings their garden plot will provide when the vegetables are fully grown. Have them record their predictions on their *Garden to Kitchen Predictions* sheet.
15. Have the youth record their predictions of total servings from their plot on the white board, chalk board, or overhead projector. When all of the predictions are reported, ask the youth to calculate the total number of servings of vegetables the whole garden will provide.

Sharing, Processing, and Generalizing

1. Have the youth share their findings.
2. Follow the lines of thinking developed by the youth through the general thoughts, observations, and questions raised by the youth as they share and compare their thoughts and ideas. If necessary, ask more targeted questions/prompts:
 - Explain how you went about deciding how much (i.e., How was it measured?) one whole vegetable provided.
 - Explain how you went about deciding how many servings your whole vegetable provided.
 - Explain how you went about predicting how many servings of vegetables your garden plot will provide.
 - Explain why you think there is a different serving size for vegetables like cucumbers and carrots than leafy greens like chard.
 - Explain your thoughts about how many servings of vegetables the entire class garden will provide.

Concept Term Discovery/Introduction

It is important that youth understand the difference between the serving sizes of a leafy green and other vegetables, in addition to the idea that many vegetables contain multiple servings in one whole vegetable or one vegetable plant. Make sure the youth discover or are introduced to the following key term: **yield**.

APPENDIX 4A: Breakfast Breakdown

Food	Portion	Serving size	Difference between portion and serving size	Number of servings in the portion
peanut butter or jam				
cereal				
juice				
breakfast patty				

Measurement Conversions

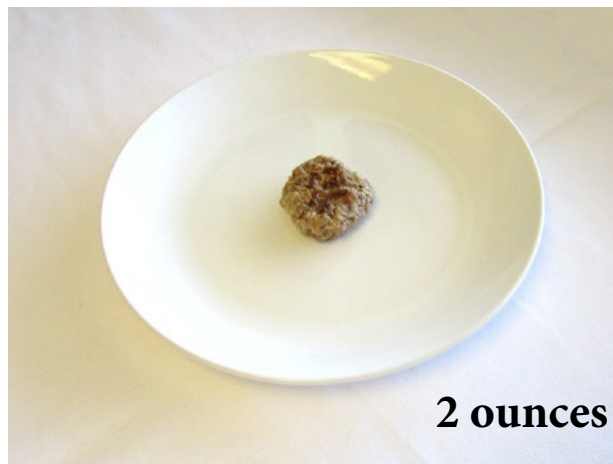
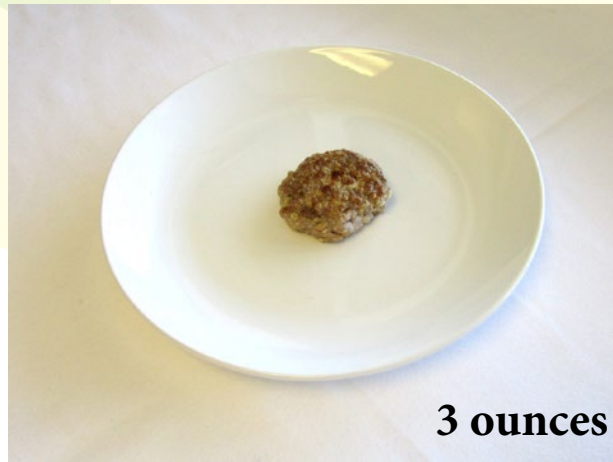
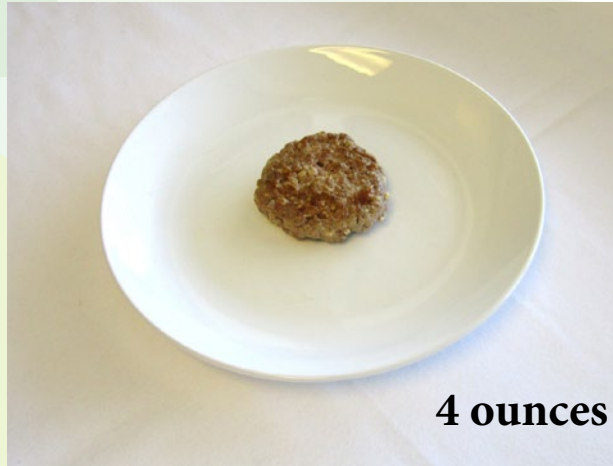
8 ounces = 1 cup

1 cup = 16 tablespoons

1 tablespoon = 3 teaspoons

28 grams = 1 ounce

APPENDIX 4B: Breakfast Patties



APPENDIX 4C: Track Your Snack

Activity: Record some of the foods that you and your family members eat and find the number of serving sizes in the portion you eat. Ask your parents to help you find measuring instruments in your kitchen.

1. Measure and record the amount you serve yourself in the “Portion” column. Be sure to write down the units of measurement that you used.
2. Find and record the serving size. This is found on the food packaging.
3. Calculate the difference between the amount you portioned for yourself and the serving size.
4. Find the number of servings in the portion by dividing the portion by the serving size.

Family member	Food	Portion (the amount you serve yourself)	Serving size (listed on the Nutrition Facts label)	Difference between portion and serving size	Number of servings in the portion



APPENDIX 4D: What's in a Vegetable?

1. **What vegetable did your group receive?**

2. **What are your observations about the whole vegetable?**

3. **When you measured the chopped vegetable, what amount did you find?**

	Carrot	Cucumber	Swiss chard
Find the average amount measured for each vegetable			
Serving size	1 cup	1 cup	2 cups
Number of servings from one vegetable			

APPENDIX 4E: Garden to Kitchen Predictions

1. **In your garden plot, how many servings do you think your vegetables will provide?**

2. **How many servings will the entire class garden provide?**

Photo, Graphic, and Illustration Credits

Cover

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Module 4: Food Math

- Photos of Breakfast Patties—Jessica (Dusti) Linnell

