



Growing Healthy Kids

Garden-Enhanced Nutrition

Background

As children have more opportunities to experience new foods, they are more likely to accept those foods into their diet (Birch et al. 1987). Thus, providing opportunities for children to try a variety of vegetables and fruits is key to promoting increased fruit and vegetable consumption. Gardening is a great way to introduce children to a variety of vegetables and fruits, while allowing them to experience these foods in a way that is hands-on and fun.

Several studies indicate that garden-based, experiential education activities are effective vehicles for increasing fruit and vegetable consumption and promoting healthy food choices in young children. Specifically, children's willingness to taste vegetables (Morris et al. 2001), knowledge of nutrition (Morris et al. 2002) and preference for fruit and vegetables (Lineberger and Zajicek 2000; Morris et al. 2001, 2002; Morris and Zindenberg-Cherr 2002) have been shown to be positively affected by garden-based educational activities. In addition, a significant increase in consumption of vegetables and fruits has been documented for children participating in garden-based nutrition education programs (Langellotto and Gupta 2012). By comparison, children participating in nutrition education programs without a gardening component increase nutrition knowledge, but not preference for or consumption of vegetables and fruits (Langellotto and Gupta 2012). These results highlight the potential importance of garden-based activities in supporting a comprehensive food and nutrition education program.

Oregon State University's Growing Healthy Kids (GHK) curriculum uses gardening as a vehicle to expose children to a variety of vegetables and fruits, with the hope of encouraging increased consumption of vegetables and fruits. A subset of curricular activities was piloted in two Oregon counties in 2008. A formative evaluation of GHK version 1.0 was conducted in 12 Oregon counties between 2009 and 2012. The results of the formative evaluation informed modifications to the curriculum to improve the teaching and learning experience, as well as to promote expected outcomes.

In 2016, third-graders in three schools from two central Oregon school districts participated in an outcome evaluation of GHK version 4.0. Using a quasi-experimental pre and post-test design (comparing GHK curriculum delivery vs. a comparison group), the evaluation found that students who received the GHK curriculum exhibited significantly larger gains than the comparison group students on two important outcomes: the number of fruits and vegetables eaten, and their reported preference for a range of vegetables. Ongoing evaluation efforts will likely result in further improvements. Users may submit comments, critiques and suggestions to anne.hoisington@oregonstate.edu

How to use the Growing Healthy Kids curriculum

As an educator, your job is to incorporate food and nutrition information activities with garden activities by using the lessons provided by the GHK curriculum. The following suggestions should help you get started.

Research suggests that elementary aged students learn best in classes with 25 or fewer students (Blatchford et al. 2003). Thus, class sizes should be kept small, whenever possible.

This curriculum is for use with an indoor or outdoor garden (defined as a space with soil where seeds can be planted). These options are described on pages 7-8 of this section. Some educators also employ a “mural garden” to supplement indoor or outdoor gardening activities. The intent of these different options is to offer you flexibility. You can adapt these options to a variety of educational settings (e.g. classroom, community garden, children’s club, community center).

The curriculum includes *blue, italicized text*, to demonstrate how Nutrition Educators might choose to present the material to their students. This text’s intent is to guide your presentation of the lesson. You do not have to memorize and recite it. However, please refer to the quoted passages for guidance and to ensure the curriculum is implemented with fidelity.

The GHK curriculum was created for use within the Supplemental Nutrition Assistance Program-Nutrition Education (SNAP-Ed) program of Oregon. Thus, GHK has the needs of these specific programs in mind. When activities and preparation tasks may not fit within the SNAP-Ed guidelines, we suggest that a Master Gardener or other volunteer take the lead.

Current SNAP-Ed guidelines from the U.S. Department of Agriculture, Food and Nutrition Service allow for some expenditures that support garden-based nutrition education activities:

Gardening is a beneficial activity that leads to the economical production and consumption of healthy and fresh food. Costs for the rental or purchase of garden equipment (tractors, etc.) or the purchase or rental of land for garden plots are not allowable. The purchase of seeds, plants, and small gardening tools and supplies, such as fertilizer and potting soil, to assist in developing school and community gardening projects are allowable SNAP-Ed costs. Educational supplies, curricula, and staff salaries to teach gardening concepts that reinforce the beneficial nutrition aspects of gardening are allowable costs. Staff salaries to establish and maintain community gardens, i.e., in low-income housing projects, schools, etc. may be allowable but should be submitted to FNS for prior approval. Provision of time for garden maintenance is an example of an opportunity for community participation in addition to SNAP-Ed funding. Participants may use program benefits to purchase seeds and plants for individual gardening purposes. FNS encourages State agencies to coordinate with the Federal, State, local, and private initiatives that create sustainable gardens as PSE efforts to benefit schools and communities through collaborative efforts.

The GHK curriculum may be used free of charge, as long as Oregon State University Extension is credited appropriately: the Oregon State University Extension logo and a statement crediting Oregon State University Extension must appear on all handouts and other GHK materials.

Curriculum objectives

This curriculum aims to integrate nutrition education with gardening to promote healthy eating and healthy choices among children in 2nd and 3rd grade. Although children are the primary audience for GHK, it is important to remember that they take many curricular materials home and that family members are thus an important secondary audience.

There are three primary objectives. Specifically, children participating in the GHK curriculum will:

- 1) Increase their exposure to vegetables and fruits by tending a garden.
- 2) Increase their consumption of vegetables and fruits.
- 3) Model healthy eating and physical activity choices.

Organization of the curriculum

This curriculum consists of a series of seven lessons, each taking about 50 minutes to complete:

- Lesson 1 – Six Yummy Plant Parts
- Lesson 2 – Root, Root Hurray!
- Lesson 3 – Water for People and Plants
- Lesson 4 – Stand Strong with Stems
- Lesson 5 – Leaves and Fun in the Sun
- Lesson 6 – Bunches of Variety
- Lesson 7 – Healthy Harvest Celebration

There are seven sections in each lesson plan:

1. **Lesson objective:** Stated expectations of what participants will learn from the lesson.
2. **Lesson overview:** Brief list of the activities, described in more detail in the *Teaching outline* (see below).
3. **What you will need:** Recommended materials, including tools and handouts the educator may use when teaching the lesson. Please see Table of Contents, Section IV for a detailed list. Oregon State University Extension Nutrition Educators may order these items from the Oregon State University Extension SNAP-Ed Program Office.
4. **Preparation:** Tasks educator should complete before the lesson (e.g. hang visual aids).
5. **Teaching outline:** A list of the lesson's activities accompanied by a detailed description
6. **Closure:** Statement that reviews key lesson concepts and reminds students of activities they can complete on their own (e.g. the *Food Adventurer* missions).

7. **Supplementary activities:** Some lessons also include additional options the educator or classroom teacher could present to expand upon the concepts introduced in a particular GHK lesson (e.g. storybooks, journal exercises and coloring sheets). Handouts for these supplementary activities are easy to print separately from the rest of the teaching outline.

Team-teaching the curriculum

The lessons in this curriculum may be independently taught by Extension Nutrition Educators, or may be taught as a team in which Nutrition Educators are supported by an Extension Master Gardener volunteer(s), or other volunteer(s).

Before partnering with others to team teach the curriculum, it is important to assign all team members well-defined roles. The team should discuss and decide each person's specific roles and their relationships to one another. Potential roles for team members are identified below.

Nutrition Educator

The Nutrition Educator has the primary responsibility for teaching the curriculum, and for delivering the GHK curriculum at an educational site. The Nutrition Educator solicits volunteers to assist with GHK delivery, coordinates and manages the actions of volunteers, and communicates with the classroom teacher to ensure successful delivery of the curriculum.

Master Gardener

Master Gardeners are volunteers who have received advanced training from their local Extension Service in sustainable gardening techniques. After completing their training and passing a comprehensive final exam, Master Gardeners go on to volunteer their time and talents in support of approved gardening projects within their community. Projects are approved by the faculty or staff members who oversee Master Gardener volunteers within a county or region.

When working with one or more Master Gardener volunteers as part of the GHK curriculum, it is important to remember that the mission of the Master Gardener program is focused on outreach and education. Please do not use Master Gardeners (particularly those Master Gardeners who are volunteering for GHK as part of their volunteer service hours) exclusively for laborious garden tasks, as they are assisting as volunteer educators. Weeding, soil preparation, transplanting seedlings and watering are important garden tasks. However, unless these tasks are a way to educate others about sustainable gardening or growing their own food, Master Gardener volunteers are generally not allowed to apply time spent on these tasks towards their volunteer service hour requirement. Here are some ways that to work with a Master Gardener.

- Consult a Master Gardener to help develop a “master list” of garden vegetables and fruits that will grow well in your local area, and in the site's soils.
- If you have a plot you are considering cultivating for use with this curriculum, invite a Master Gardener to assess the potential benefits and constraints of the proposed site. In this way, you can capitalize on the site's benefits, and remediate or avoid its constraints.

- Master Gardeners have training in plant problem diagnosis. Thus, you can consult a Master Gardener to prevent and remediate problems in an indoor or outdoor garden.
- Master Gardeners may have access to seeds, soil and soil amendments at low or no cost. This will not always be the case, but it will not hurt to let the Master Gardeners in your area know the gardening materials and supplies that you could use.
- Ask your local Master Gardener program for a list of Master Gardeners interested in helping out at school gardens.

Specific tasks should be mutually agreed upon by the Master Gardener volunteer and the Nutrition Educator prior to partnering on the GHK curriculum.

Garden Volunteers

Although some Nutrition Educators may be capable gardeners, others may not have much experience in the garden. It makes sense to partner with knowledgeable volunteers to assist with hands-on gardening activities. In addition to Master Gardeners, you can recruit community gardeners or parent volunteers to work with the children, for example showing them how to sow seeds, transplant starts, and care for and harvest plants within the garden. Knowledgeable volunteers can also take responsibility for or assist with garden design, plant problem diagnosis and pest management.

Classroom Teacher

The classroom teacher manages classroom behavior, assists the Nutrition Educator with activities and tends to any medical or behavior emergencies. Teachers provide a comfortable educational space and should also be encouraged to enhance the lesson objectives by following up with supplemental lesson activities after the structured lesson.

Working with volunteers to deliver the curriculum

Working with volunteers to teach and deliver the GHK curriculum at educational sites can enhance the abilities of Nutrition Educators to use gardening as a vehicle to teach about food, nutrition and physical activity. Volunteers with gardening knowledge and experience can be particularly helpful if they are able to take responsibility for various garden tasks, including garden planning, garden preparation, plant installation and garden maintenance. There is a GHK Volunteer Position Description on page 11 of this section.

Nutrition Educators and others teaching the GHK curriculum should start recruiting GHK volunteers well in advance. One model would be to work with the Extension Agent or Program Assistant who manages the Master Gardener Program in the county where you will be teaching the GHK program. If GHK is cooperatively delivered as a Master Gardener and a SNAP-Ed project, your local Master Gardener coordinator can provide oversight and support of Master Gardener volunteers. You may solicit other volunteers through a notice in your school newsletter, a press release or ad in your local paper, or by contacting your local garden club.

How successfully you incorporate GHK volunteers into your local program depends greatly upon the individuals you select. Although some potential volunteers may feel that they have the right to be a volunteer, no questions asked, avoid the common mistake of trying to accommodate everyone who expresses an interest in the program. Instead, choose those volunteers whose interests, skills, philosophy and availability align with the needs of the GHK program and who can be effective as partners with existing nutrition education staff.

IMPORTANT NOTE: Oregon State University Extension is committed to providing a safe environment for young people participating in its programs. Refer to the current Oregon State University Extension policy and procedures for more specific information on how to screen and select volunteers who will be working with youth as part of their duties as Oregon State University Extension volunteer. This information is online under the heading “Risk Management” at: extension.oregonstate.edu/employees/county-resources/safety-and-risk-management

Garden options: No garden? No sun? No water? No problem!

Although gardens and gardening activities are a vehicle to teach particular concepts, it is important to emphasize that the act of growing food in a garden is not the primary goal of GHK. Instead, gardening is used as a means to promote healthy eating via a series of hands-on activities.

You might want to use this curriculum but lack access to an outdoor garden that has established beds, fertile and healthy soils, and an irrigation system. Even if your educational site has access to an outdoor garden, it may not be possible to teach parts of this curriculum in late fall or winter, when the numbers and types of vegetables that can be grown are limited or the weather may not make for a safe and comfortable instructional environment. Thus, although many of the activities in this curriculum are ideally taught in an outdoor garden, GHK has three gardening options for each lesson:

- Outdoor garden: For those with access to a school or community garden
- Indoor garden: For those who are able to grow plants in containers indoors
- Mural garden: For use in the event educators do not have access to either outdoor or indoor garden spaces. Note that the mural garden activities are to supplement regular indoor or outdoor gardening activities, and are not intended to be the core gardening activity for the program.

Outdoor garden

The outdoor garden option is ideal as long as you can easily and safely transport your students from the site of instruction to the outdoor garden. Ideally, gardens will have soils that are deep, easily worked, well-drained, slightly acidic (pH 6.2-6.8) and that contain at least 5% organic matter by volume. Master Gardener volunteers at your local OSU Extension office may be able to test the pH of your soil, and recommend amendments (such as lime) to correct pH issues.

Raised beds or raised rows are an excellent way to grow many vegetables in a small space. Soil preparation can be more efficiently concentrated into small areas with raised beds, and soils in

raised beds warm up more quickly in the spring, relative to open soil. This allows vegetable plants to be sown or transplanted as seedlings earlier in the spring. However, in areas with high summer temperatures, the soil in raised beds will also dry out more quickly.

For more information on how to plan an outdoor garden, as well as a list of plant varieties especially well-suited to Oregon school gardens, please refer to Oregon State University Extension Publication EM 9032, *An Educator's Guide to Vegetable Gardening* (Appendix J).

For information and varietal recommendations for container gardeners, please refer to *Growing Plants in Containers*, Chip Bubl, Oregon State University Department of Horticulture (Appendix K)

Indoor garden

The indoor garden option will work well for your program as long as you have access to a light bank (see Appendix U for how to build a PVC light rack) and an empty or uncluttered shelf on which plants can be grown and over which the light bank can be placed. A south- or west-facing window with good afternoon sun exposure may also work well. Take time to trial germination rates and seedling growth in the window(s) before deciding on the indoor garden option.

Mural garden

Each lesson contains an optional supplemental mural gardening activity for use in addition to the indoor and outdoor activities. You may suggest this as a supplemental activity for classroom teachers to lead to extend and reinforce the lesson objectives.

- **Option 1:** Create a group mural on a large butcher paper roll with paint, crayons or clip art (Appendix M)
- **Option 2:** Have each child create their own mural on an 11x17 piece of paper
- **Option 3:** Have a local artist work with students to create a permanent indoor mural

The mural garden is a dynamic depiction of different stages or concepts that may occur in an outdoor, growing garden.

Recurring activities

Several activities recur throughout the curriculum, and help to amplify the message that gardening supports healthy food choices and an active lifestyle. The repetition may provide structure to the lessons, and will help students to become accustomed to the lesson flow.

Food Adventurer Missions: Students have the opportunity to complete Food Adventurer missions by finding and trying new, healthy foods with at least one of their senses (e.g. sight, smell, touch, taste). Students can report on their Food Adventurer missions and practice their use of adjectives by describing what they sensed in their Mission logs or Food Adventurer Adjectives Worksheet, and can show their

friends their Food Adventurer stickers or rubber stamps, when missions are completed. For their final mission at the end of the program, students will reflect on what they learned and make a plan for how they will continue to be Food Adventurers at home and at school. Students may take home their Mission Logs after the final lesson as a keepsake of their GHK experience.

Recipes: All lessons include a tasting activity. Lessons 2 - 7 make use of recipes that are suitable for a limited-income, low-literacy audience, utilizing widely available ingredients. Recipes can be prepared in class and used in conjunction with the Food Adventurer Mission Logs or Adjectives Worksheet. Students have the opportunity to try each recipe as a Food Adventurer: with at least one of their senses (e.g. sight, touch, smell and/or taste).

Garden Journal Activity: Students can use garden journal pages to record their observations or thoughts on garden plants or vegetables. They can record their observations in words or drawings. Students can measure plant growth or note the date on which new structures (e.g. fruits, flowers) first appear on their plant. Students can record the personal results of their taste test or can list favorite vegetables. You can find the template for the journal on the GHK website.

MyPlate Garden Poster: The MyPlate Garden Poster has a diagram of MyPlate (with associated food groups) and drawings of children and families enjoying a healthy meal made from garden-grown foods or engaging in garden-related physical activities. You can use this poster to reinforce the message that many foods from MyPlate grow in gardens, and that gardening provides opportunities to be physically active. A smaller version of the MyPlate Garden Poster can be downloaded from the GHK website.

Hand Washing Activity: Prior to handling, preparing or tasting food, or after working in the garden, students must wash their hands. Hand washing is included as an activity in each lesson both prior to preparing and tasting in-class recipes, as well as after working in the indoor or outdoor garden. The first time that you lead the students through a hand washing activity, you will want to thoroughly describe all of the steps involved in proper hand washing. In subsequent lessons, you can briefly remind students of the steps, or allow them to demonstrate their ability to thoroughly and properly wash their hands.

Plant Part Poster: Most GHK lessons use the Plant Part Poster to introduce students to an edible plant part. You can cover the labels on the Poster (using paper and tape), and reveal the name of a new plant part with a corresponding lesson. Within individual lessons, edible plant parts are presented, and isolated from the other parts of the plant that help it grow. The Plant Part Poster is intended to provide students with a visual depiction of how the different parts of a plant fit together. A smaller version of the Plant Part Poster can be downloaded from the GHK website.

Storybook recommendations: A storybook recommendation is included at the end of each lesson. As noted in the supplementary activities section of a few lessons, some of the listed books are more appropriate for younger students (2nd grade and younger). You may find these books to be useful extensions of the GHK lessons. Books may also be useful to classroom teachers who follow up on

curriculum lessons with in-class activities. Because research suggests that positive behavior changes are most likely to occur with longer interventions (Olander 2007), the storybook options are one way to extend and reinforce GHK lessons.

Literature cited

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GHK Volunteer Position Description

Title: Growing Healthy Kids Volunteer

Purpose: To provide support to the Growing Healthy Kids Program by assisting Oregon State University (OSU) Extension faculty and staff with lesson preparations and curricular instruction.

Brief Description of Position

- Work directly with youth in the classroom and/or garden, under the supervision of OSU Extension personnel, by providing assistance with hands-on activities
- Consult with, and provide gardening advice to, OSU Extension Nutrition Educators in support of the Growing Healthy Kids curriculum on an as-needed basis
- Prepare and maintain mural, indoor or outdoor garden for Growing Healthy Kids activities
- Provide general classroom and/or garden set-up for Growing Healthy Kids curriculum
- Cooperate with and assist local OSU Extension faculty and staff

Requirements

- Must be able to perform tasks listed in the Position Description, as agreed upon and supervised by local OSU Extension faculty and staff
- Must agree to and clear a background history check and a criminal history check prior to volunteer service with OSU Extension
- Must demonstrate a commitment to diversity and to ensuring equal opportunity to those wishing to benefit from OSU Extension programs and services
- Should have knowledge and skills in basic horticulture

Supervision

- The OSU Extension faculty member with responsibility for the local SNAP-Ed program provides overall supervision and support.
- Immediate supervision and support may be provided by a Program Assistant or Program Coordinator, if available.

Print Volunteer Name: _____

Volunteer Signature: _____ **Date:** _____

OSU Extension Faculty Signature: _____ **Date:** _____