







SNAP-Ed

Washington State University Extension

Energize Your Life

Gardening for a Healthier You

Nutrition education for adults in a garden setting.

Energize Your Life – Gardening for a Healthier You!

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I. Introduction

Current guidance for SNAP-Ed programming emphasizes efforts in public health approaches, specifically environmental change. This, when coupled with growing community interest in home and community food gardening, served as impetus to update the 2006 *Energize Your Life – Garden for a Healthy You*. Diets high in fruits and vegetables help to improve human health and reduce the risk of many diseases such as cancer, heart disease, diabetes and high blood pressure. Gardening increases access to fresh produce and presents an opportunity for increased physical activity – both behavioral objectives of the SNAP-Ed program.

II. Curriculum Overview

Goal: The *Gardening for a Healthier You (GFHY)* curriculum is designed to support nutrition educators who teach adults with limited resources the importance of gardening as part of a healthy lifestyle. Through the five lessons, participants will understand the nutrition and physical activity benefits of gardening. Participants will increase their skill, motivation and self-efficacy to incorporate gardening into their daily routine to help achieve a healthy lifestyle.

Objectives

By the end of the lesson series, participants will be able to:

1. Understand basic, key gardening concepts and their applications
2. Recognize nutritional benefits of growing produce with high nutritional value
3. Practice new skills to successfully develop and maintain a food garden
4. Explore personal food preferences for fruits and vegetables as a way to enhance motivation and increase access and appeal of produce in personal environments
5. Increase consumption of fruits and vegetables
6. Increase regular physical activity
7. Promote and share their experience with food gardening as part of a healthy lifestyle

GFHY includes lessons with themes that reflect the process of successful food gardening from the beginning to the end of the local growing season. The first two lessons need to be taught in sequence, but the remaining lessons can be taught in the order that makes sense to the educator/leader for the local geographical region, e.g. time of year, climate and length of growing season. Each lesson is designed to be completed in 60-90 minutes. The lessons are intended to offer adults who may not have any food gardening experience the time and support needed to develop the basic skills and experience in each stage of growing a food garden. This approach will more likely improve the personal capacity and competence of the new gardener to sustain their efforts in the future.

Based on evidence-based learning theory, these lessons use a mix of learning formats including small and large group discussions, brainstorming, planning, learning how to access resources, and gardening and food activities. All of these activities are intended to create discussion, encourage problem-solving, establish social support and develop and practice

skills to support participants' success as they plant, grow, maintain, harvest and enjoy the fruits of their labor.

The Lessons

Each lesson folder has the following components:

A. *Preparation and Teaching Outline*. The Preparation Outline defines the topic, learning objectives, supplies and resources needed along with references. The Teaching Outline presents a semi-scripted timed sequence of activities and applications on the lesson topic. Bolded and underlined terms may be new to participants. The easy to understand definitions are included on pages 13-14 of this document.

B. *Lesson Recipe.* Recipes that accompany the lesson reinforces the subject matter of the lesson. For instance, in Lesson 1, the learner is introduced to growing food from seed and related activities. The Recipe is "Seed Salad" which can be prepared in class; or if time is short, can be prepared prior to class and brought in to taste.

C. *Educator's Background Information Sheets*. This information provides the class leader with added detailed information that is not contained in the lesson itself, but serves to inform the educator of science-based information related to the lesson topic. The number of background sheets vary with each lesson.

D. *Teaching Tools*. These are visual aids that provide the educator with graphics that enhance the learning experience.

Resources

These resources are for the class leader and are considered optional for use. They may lend added value for questions that arise in class or from individual participants.

A. *Fresh from the Farm (FFF) Brochures.* Selected from a series, these optional handouts provide a snapshot of specific crop growing calendar, nutrient benefits, fun facts; crop selection, preparation and storage tips; and 3 recipes. The back panel space allows local agencies to add their own agency identifier (as fillable pdf/stamp/sticker) so participants can track the distribution source.

B. Make a Fit Ball

C. Garden Planting Records

D. *Select Garden Mosaics* science series' are relevant topics and can supplement the content of lessons as determined by the group facilitator.

E. What to Feed Your Worms

Participant Workbook

This workbook compiles all handouts, worksheets, references and lesson recipes. They can be printed individually or as a booklet. The latter is better-suited for keeping learning resources organized and contained, as many are used in more than one lesson. The lessons themselves will reference the name or page numbers of these 'handouts' to minimize locating them in the activities. The workbook has three sections: Gardening Resources; Nutrition Resources including lesson recipes; and Community Resources.

III. Using Evidence-based Theories & Approaches for Teaching Adults

Choosing a proven framework for teaching a target group helps to assure the likelihood that the intervention will be effective. *GFHY!* applies the constructs of two learning theories that support adult learning and a teaching approach that supports those theoretical constructs.

Social Cognitive Theory (SCT)

This learning theory puts forward that our actions are the result of personal, behavioral and environmental factors that influence each other in an interactive way. It further proposes that although an individual's personal environments can influence behavior, so too does an individual's capacity to modulate that influence through their own self-reflection and self-regulation processes such as thinking, discussing, planning ahead, and setting goals. (Contento, 2011)

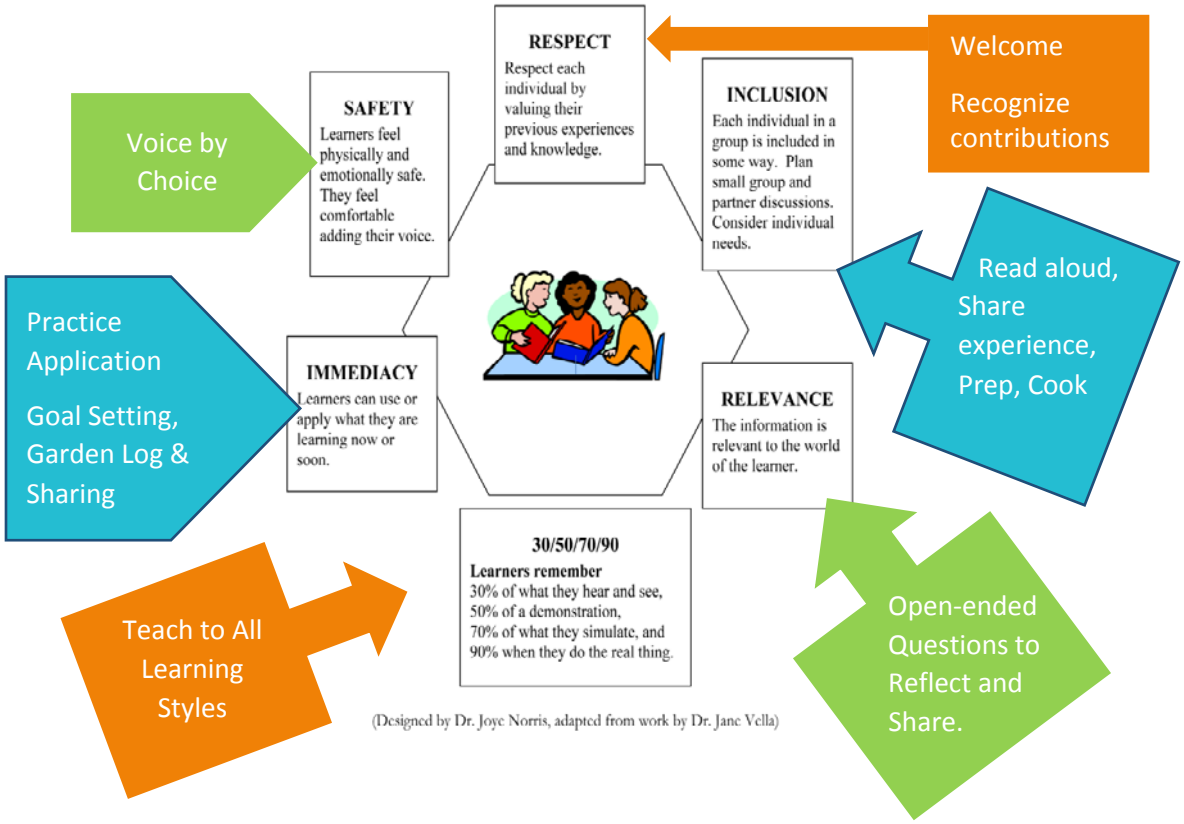
The GFHY! curriculum applies the concepts of the SCT through its lesson structure and recommended time frame for teaching this curriculum. *Outcome expectations* and *reinforcement* are applied through activities and the perceived benefits of growing your own food such as saving money, improved health, increased access of fresh food, and the enjoyment of eating and sharing the fruits of one's labor. In adding new information on health benefits and gardening techniques, participants gain knowledge, understanding and the skills needed to support behavior change (*behavioral capability)*. The peer-to-peer lesson activities and life-experience shared by others bring social support and peer-sharing that reinforces *observational learning* through peer modeling. Lastly, the amount of time suggested (~3 months) to teach this series, allows participants time to experience success. They can realize challenges, and use positive problem-solving skills and strategies that build *self-regulation, self-efficacy, and overcome barriers*.

Adult Learning Theory (ALT)

Figure 1 below summarizes the six principles of adult learning: those concepts that when incorporated into the learning process helps to engage adults in the learning process. In adult education, it is important to *respect* the vast life experience and knowledge that bring "added value" to class discussions, as well as contributes to the social support of other adult learners. *Personal safety* in a new learning environment is essential to bring all learners to the table for interactive exchange. Some may feel comfortable expressing themselves or their experiences without reservation; others may hesitate due to learned trust issues or shyness. Applying the "Voice by Choice" concept (Norris, 2003) allows individuals to speak when they are ready – or are comfortable in their learning environment. This essential concept of feeling safe reduces personal stress of being in class, and may lower barriers so individuals return to subsequent sessions. Lesson topics must be *relevant* to the learner. In the structure of the lessons, the use of open-ended questions (i.e. asking questions that lead to more than a 'yes' or 'no' answer) supports lesson relevancy, enriches discussion through sharing of life experience and stories, and builds social support.

How adults learn best varies from person to person. We learn from our senses…what we see (Visual learners), hear (Auditory learners), smell, taste and touch (Kinesthetic learners or learn by doing). Individuals may have a dominant learning style, but the other styles also help reinforce learning. The lesson design incorporates the 30/50/70/90 principle by using varied modalities such as verbal interaction, teaching visuals, demonstration, modeling, and practices. The ALT principle of *Immediacy* is integrated into the lesson by applying the information, for example: entries into their garden diaries, applying new knowledge and practicing new skills during the class period.

FIGURE 1: Using a Facilitated Dialogue Approach to Apply Adult Learning Principles



The ALT principle of *inclusion* requires that each participant be actively involved in class learning in some way. The use of small groups or peer-to-peer helps to facilitate this, especially for those who are hesitant to express themselves in the larger group. *Inclusion* is also applied by having participants volunteer to read seed packets or recipe information aloud, discuss their view on an open-ended question with a peer (one-to-one); or help prepare the lesson recipe. *GFHY!* lessons are designed to integrate these principles to effect success for all types of its adult learners.

Setting the Context of the Lessons: The learner-centered approach

The *Gardening for a Healthier You! (GFHY!)* uses a learner-centered approach to promote food gardening and physical activity that takes into account adult learning styles, life experiences and learning needs, and participation using the "4A" design. This design encompasses what we know about adult learning, delivering new information with an

opportunity to utilize the information in a safe environment and time to reflect on how that information can be used in their lives. It provides the framework to deliver gardening education based on the six principles of adult learning.

The 4 As

Anchor: The anchor serves as the warm up activity. The activity introduces the topic of the learning activity by building on previous experiences and knowledge. It helps the learner name what they know about the topic and gives them a place to put new information. These activities are often done in partners or small groups. This allows participants to get to know each other, helps create a safe learning environment and sets the foundation for what is coming next.

Add: The "Add" section of the lesson provides information that is related to the topic that the learners need to know before they can take action. This is intended to be brief. The goal of this segment is to engage learners with new information, and apply meaning as it relates to their lives.

Apply: This activity provides the learner opportunity to talk about the new information and practice using the information in a safe environment. These activities usually include hands-on activities, with participants working together in pairs or small groups, allowing learners to share ideas and practical tips to apply the new knowledge.

Away: The "Away" activity asks the learner, "What will you do with this information?" It provides the learner an opportunity to reflect on what they learned and how to apply new skills between lessons. The activity helps the learner take the information away with them, with concrete ideas on how to use the information outside of the learning setting.

IV. Helpful Hints for Facilitating Group Discussions

The *GFHY!* lessons support participant learning by sharing new information, providing the opportunity to reflect on how this information relates to their lives and practice how they might use the new information once they leave the classroom. The design relies on providing a safe learning environment that supports this process. Consider these elements when leading your groups:

Review of Facilitations skills

- Create a welcoming environment. Greet participants as they enter.
- Review the curriculum. Be clear on the main points and sequence of the lesson.
- Encourage dialogue. People learn by sharing their experiences, ask open-ended questions. Provide open and non-judgmental feedback.
- Encourage working in small groups. Some participants feel more comfortable sharing in small groups.
- At the end of the lesson, be sure to reflect back on the discussion, to help participants take the new knowledge and skills away to use in their lives.

Setting Ground Rules

Ground Rules can help create the atmosphere you want to support participation and learning.

You may negotiate ground rules within in each group, or use established ground rules, allowing the group to add as needed. It is helpful to post the ground rules, in large clearly written type so all participants can see them. Review the ground rules at the beginning of each session. As the facilitator, demonstrate the ground rules by practicing them throughout the meeting yourself.

Here are some example of ground rules:

- ***Everyone participates.*** This assumes everyone will participate, at least mentally in each activity. This is a time to ask participants to turn off cell phones or other electronic devices that may be distracting to themselves and the group.
- ***Everyone has a right to pass.*** This protects participants from having to speak out, from revealing herself when s/he may not wish.
- ***All opinions are honored.*** Honoring each person's attitudes, opinions, and beliefs emphasizes their life experiences and personal validity. This rule affirms adult's ability to think and decide for themselves, and protects from group or program decision of right or wrong.
- ***Leader will maintain group time.*** Dialogue and sharing is important to learning. However to respect everyone's time commitment the facilitator will be the "group time keeper."

V. What You Need to Know to Teach This Curriculum.

If there is one "best practice" for starting a new nutrition education and gardening series, it is to PLAN AHEAD. This supports minimizing costs of implementation, obtaining collaborative community partners, and maximizing a successful experience for the new food gardener.

Who Should Teach This Curriculum?

The preferred educator to lead this series is one who has basic knowledge of nutrition and has done food gardening experience with some success. In addition, having an understanding of different adult learning styles will assist the leader to provide a better experience for the adult learner. Although formal training in adult education is not required, potential implementers should be acquainted with the introductory overview of the six principles of adult learning and the 4 A's (Anchor, Add, Apply, and Away) approach used in the lesson design. Using these encourages and sets the tone for learners to actively participate.

Timeline

Establish a timeline for the five lessons in partnership with the host agency or collaborator that will allow time for participants to experience success between lessons. For example if

beginning the series in spring, allow time for some cool weather crops to germinate, grow and mature to harvest. If a minimum amount of time is available for the five essons, choose crops and varieties that mature in the shortest amount of time. For example, radishes and lettuce will mature in 45-60 days in most places. Refer to seed packets and catalogs for this information.

The time from germination to harvest of all crops is based on crop variety. Some warm season crops can be planted as early as April or May in parts of the state. Days to harvest will depend upon the crop type, crop variety, and weather. Warm season crops such as cucumbers and summer squash may be ready for harvest in mid to late summer. Other warm season crops can take longer. For example, winter squash crops such as pumpkins or butternut may not be mature until October or even the first frost.

Once the first two lessons are completed, the following lessons can be taught in an order that corresponds to your region's growing season for either cool or warm season crops. Check the Region Maps (Table 1) in the Participant Workbook for planting to harvesting dates of cool and warm season crops. You may choose to start the series with a spring and early summer garden *or* a summer garden of warm season crops, and end the series with a fall garden of cool weather crops. In either case, once the skills from lessons 1 and 2 are learned, you may adjust which lessons follow based on the time of year and which crops you intend to grow. The length of time between lessons will also be dictated by the time it takes for a majority of your crops to germinate, grow and reach harvest or near harvest time. This will vary depending upon your location and the kinds of crops you choose to grow.

Crop Selection

Guide participant choices of appropriate crops to select and grow in your location and weather conditions (always consider: space, growing season, and value of crop compared to the cost of purchasing the same food in a grocery store or market).

Audience

Ideally, this curriculum is designed for groups of adults (5-15 participants) living in low-income community settings, and ideally where a community garden area is available for a SNAP-eligible audience to use. A minimum of five people per group is recommended, a nearby site is needed for hands-on lessons, and participants should be committed to the duration of lessons.

Community Locations

Consider the following:

- Community. Food banks, low income housing sites, community centers, community gardens where there is nearby access to a classroom or other out building, and faith-based sites where a garden site is already in place and/or there is space for a garden.
- On-site versus off-site classrooms. Lessons can be taught at one central site or location accessible to participants. Garden sites may be in multiple locations, and/or one demo garden site is identified for participant hands-on experiential activities. If this is not possible, the educator will need to create and/or simulate a station or place at the

teaching site that will allow a combination of participant hands-on experience and/or educator demonstration of gardening practices and planting techniques.

- Classroom needs. If planning to include food preparation and sampling, or tasting the harvest, the meeting area will need both cold and warm running water available during the lessons.
- Garden needs. Sunlight with southern and western exposure is best for food gardens in the Pacific Northwest. This maximizes production during the growing season. The garden area needs good drainage for soil and a water source nearby.

Potential Cost or Expense

- Staff time = 1-1.5 hours of preparation time is needed for every 1-1.5 hours of teaching.
- Food sampling of approximately a 2-3 oz. portion per participant may be used at the educator's discretion.
- Printing of participant handouts:
  - Given the number of reference handouts for this skill-based curriculum, all required handouts are contained in the Participant Workbook. For efficiency, this booklet is designed to be printed on 11 x 17 paper, folded into a booklet with saddle stitched binding. Alternatively:
  - A Pocket Folder can be given out to each participant to store individual handouts. There are approximately 24-26 handouts to which participants will refer when planning and planting over the 5 lessons.
  - Lesson Tasting Recipes are contained in the last section of the Participant Workbook.
  - Selected *Fresh-from-the-Farm* Brochures are optional, but can also be distributed with each lesson.
  - Participants will be encouraged to keep a garden log. A sample master log entry page is provided in the workbook. This one was chosen as it encourages logging physical activity. Participants can use this reference to set up their log entries on blank paper or book, journal or tablet provided by the participant. Other formats can be used. There are three examples provided in the Resource Section.
  - Materials – see sections below for **Materials and Tools, and Seeds**

Lesson Preparation

Read Educator Background Information in each lesson well in advance of teaching the lessons**.**

Before lessons complete these steps:

- Review teaching materials.
- Print and prepare handouts or workbook.
- Read any and all instructions for optional, special tools or materials such as water sensors or fertilizer applications.

Curriculum Fidelity

Lessons are an average of 60-90 minutes, depending upon the length of time needed to travel to the garden area, the time spent on the physical activity break and whether the educator chooses to do food preparation and/or sampling. To minimize lesson time to 60 minutes, one or two of the following are recommended:

- Prepare the salad recipe in advance or eliminate the food sampling and provide the written recipe (in the Nutrition Section of the Participant Workbook) for participants to try at home. (15-20 minutes)
- Show visual examples, YouTube videos, graphs, photos or diagrams of planting techniques instead of a hands-on approach for participants. (Approx. 10 minutes)
- Demonstrate planting techniques in a controlled space or area, using seeding trays, pots or containers in a classroom setting or indoor garden or in a small garden space. (Approx. 10-15 minutes)
- Each lesson preparation outline has suggestions for minimizing lessons to 60 minutes.

Local Resources

- Home and garden supply stores often will donate materials for community garden groups and/or offer small grants to support the construction of new gardens.
- Donations can sometimes be secured from local topsoil and compost companies.
- County resources may be available for free or low cost compost composed of bio-solids.
- Volunteers can often be found through horticulture teachers and their participants at high schools, community colleges and correction facilities where residents have chosen to work in a horticulture class or setting.
- Local WSU Master Gardeners (MG) often accept special projects as part of their training. Check your local WSU Extension website to submit applications for MG assistance.
- Lastly, educators should encourage participants to seek out co-op gardening efforts with neighbors and community groups. This saves time, effort and money and encourages community-building.

Materials and Tools

Gather gardening materials in advance of teaching the session of 5 lessons.

- Gardening tools should be provided by the educator for demo purposes. All other items need to be obtained by participants and/or donated to the gardening group. See lesson outlines.
- Depending upon the teaching site, the cost will vary. Educators will need to seek out teaching tools listed in the lesson outlines and provide additional materials should they have to teach the lessons in a confined indoor area and simulate the “gardening experience.” Some of those materials will include: seeding trays, pots or other containers to demonstrate planting; potting soil or seeding mix and possibly grow lights if daylight is not available in the classroom setting.

- Edible seed crops, seed starting mixes or growing mediums, potting soil and small gardening hand tools are allowable SNAP-Ed expenses.

SNAP-ED Guidance page 77 - This is the most recent version of the Guidance published on-line. (https://snaped.fns.usda.gov/snap/Guidance/FinalFY2016SNAP-EdGuidance.pdf accessed 2/3/2017)

In the section called "Financial and Cost Policy Supplement"

A. Costs Associated with Program Efforts"
GARDENING

Food-based 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 food gardening projects are allowable SNAP-Ed costs.** Educational supplies, curricula, and staff salaries to teach food gardening concepts that reinforce the beneficial nutrition and physical activity aspects of food gardening are allowable costs. Staff salaries to establish and maintain community food gardens, i.e., in low-income housing projects or schools may be allowable but should be submitted to FNS for prior approval. Provision of time for food 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 food gardening purposes. FNS encourages State agencies to coordinate with the Federal, State, local, and private initiatives that create sustainable food gardens as PSE efforts to benefit schools and communities through collaborative efforts. SNAP-Ed providers can play an instrumental role in community food gardening for the low-income population.

- **California Fruit and Vegetable Photo Cards $20-$60**
  California Department of Education
  1430 N Street
  Sacramento, CA 95814
  http://www.cde.ca.gov/ls/nu/he/nutredres.asp
  https://www.amazon.com/Fresh-Fruit-Vegetable-Photo-Cards/dp/0801113652

- **Fruit and Vegetable Photo Cards for Washington Fresh Fruit & Vegetable Program**
  Pierce Co. Extension SNAP-Ed programming. Available for free download at:
  http://extension.wsu.edu/pierce/health/food-ense/fresh-fruit-and-vegetable-program/

Seeds

Some seed companies will donate seeds and have a place on their website to make a request. Many companies will donate seeds, if you pay for shipping. Seed catalogs are free by phone or written request. It is best to make requests after the first of the new year.

Old seed catalogs and seed packets have valuable teaching information about planting instructions, germination and harvest times. They can be reused for that purpose.

Most healthy seeds are viable and will sprout and grow for up to 3 years beyond the stamped date on the seed packet. To test seed viability, germinate a small selection of seeds from the packet in a damp paper towel (*be sure to keep the towel moist at all times)* or in a shallow seeding tray with a starting medium or seeding soil mix.

This list of seed sources is designed to help readers find seed. It is not meant to endorse any of these businesses or detract from any businesses not listed.

Seed Companies:

Burpee Seed Co
W. Atlee Burpee & Co
300 Park Ave
Warminster, PA 18974
1-800-888-1447
Web: http://www.burpee.com/

Ed Hume Seeds
11504 58th Ave E
Puyallup, WA 98373
(253) 435-4897
Web: http://www.humeseeds.com/

Irish Eyes Seed Co.
5045 Robinson Canyon Rd.
Ellensburg WA 98926
509-933-7150 *press 1*
Web: www.irisheyesgardenseeds.com
Email (Retail):
customerservice@irisheyesgardenseeds.com
Email (Wholesale):
wholesale@irisheyesgardenseeds.com
http://irisheyesgardenseeds.com/

Johnny's Seed Co.
1-877-564-6697
Web: http://www.johnnyseeds.com/

Seed Savers Exchange
3094 North Winn Road
Decorah, Iowa 52101
(563)382-5990
Web:
http://www.seedsavers.org/catalog?gclid=CICO_5bIh9ACFUpNfgodB8IAdg

Territorial Seed Co.
PO Box 158
Cottage Grove, OR 97424
Phone: 800-626-0866
Fax: 888-657-3131
Customer Service/Gardening Questions: 541-942-9547
Toll Free: 800-626-0866
Customer Service Email:
info@territorialseed.com
Web: http://www.territorialseed.com/

Gardening and health terms used in this curriculum are summarized below. To the new food gardener, these terms may need clarification. The definitions below use language that is easy to understand.

Lesson 1

- **Yield** - the amount of food produced by a single plant or the amount produced per area (e.g. per 10 ft. of row)
- **Germination time** – the time it takes for a seed to sprout once planted.
- **Easy to Grow** – For the new food gardener targeted in this curriculum, vegetables that fit into this category are crops that:
  - **Mature fairly quickly**- Approximately 45 – 90 days, given the optimum temperature required to mature in your growing region. This varies per crop and region. Check the Regional Maps for cool and warm season crops in the publication, *Home Vegetable Gardening in Washington* by Carol Miles (EM057E).
  - Are **fairly pest resistant** e.g. disease resistant hybrids or varieties, crops not prone to mold, moths, or aphids.
  - **Do not require a lot of extra care** such as specific fertilizing requirements at certain stages of growth, extensive pruning, or watering requiring equipment such as drip or other irrigation systems that have specific water pressure specifications of pounds per square inch (PSI).

    NW Crops that fit most or all of these conditions include:
    - **Hardy greens**: kale, Asian greens, Bok or Pak choi varieties, collards, water cress, and mustard greens
    - **Tender greens:** spinach, chard, salad greens and many varieties of loose leaf lettuce
    - **Root crops**: carrots, beets, radishes, turnips, green onions or scallions, and parsnips
    - **Fruits**: strawberries, cucumbers, summer squash, tomatillos, and winter squash
    - **Legumes**: bush variety green beans, sugar snap peas and shelling peas
    - **Herbs**: parsley, chives, cilantro, oregano, sage, thyme, arugula, and basil

    NOTE: oregano, sage, thyme and chives are perennial type herbs and can spread quickly so it's best to grow them in containers.

Lesson 2

- **Cool season crops** – These are plants that are adapted to cool climates. Most cool season crops prefer temperatures below 70°. When the temperature is greater in the spring or early summer, the crops tend to bolt, which means they produce a flower stalk. Cool season crops include hardy greens, Asian greens, salad greens such as most varieties of lettuce, spinach, radishes, sugar snap peas, and cilantro.

- **Warm season crops** – These crops require both warm soil and high day temperatures to grow steadily and produce crops. They include traditional summer crops such as snap beans, corn, cucumbers, melons, peppers, tomatoes, and squash.
- **Direct seed** – The planting of vegetable seeds directly into the soil in a garden area as opposed to planting into a seeding tray and then transplanting the seedlings or sprouts into the garden area at a later date.

Lesson 3

- **Cotyledon** – an embryonic leaf in seed-bearing plants, one or more of which are the first leaves to appear from a germinating seed
- **Hardening off** – The process of moving plants outdoors for a portion of the day to gradually introduce them to the direct sunlight, dry air, and cold nights. The process takes 3-7 days.
- **Moderate-intensity** physical activity pertains to physical movement or work that raises an individual's heart rate for a sustained time. Examples of gardening activities that fit this description include: digging, hoeing, and raking.
- **Warming up muscles –** Gently moving muscles to increase circulation and subsequent heat flow to muscle groups that will be exercised by specific more intensive activities.

Lesson 4

- **Phytochemicals** – These are naturally occurring chemical compounds in plants. "Phyto" means "plant" in Greek. These substances provide sensory characteristics (visual, aromatic, taste, touch) to an individual experience. Examples would be the deep purple color (sight) of blueberries, or the smell of garlic. The have added human health benefits, but are not considered "nutrients."
- **Transplant** – The technique of moving a plant from one location to another. Most often this takes the form of starting a plant from seed in optimal conditions, such as in the house, a greenhouse, or a protected nursery bed, then replanting it in another, usually outdoor, growing location. It also pertains to purchased plant starts when transferred from pot to permanent growing site.
- **Compost** – Decayed organic material used as a plant fertilizer.

Lesson 5

- **First hard frost** – Any day in the year that the temperature reaches 32°F or below.
- **Mulch** – A material (such as decaying leaves, straw, bark, or compost) spread on the surface of the soil and around a plant to control weeds, enrich or insulate the soil.
- **Fertilizer** – A chemical or natural substance added to soil or land to increase its fertility and supports continued growth of plants. The legal definition refers to soil amendments that guarantee the minimum percentages of nutrients (nitrogen, potash and phosphate).
- **Pests** – Any insect, plant, fungus, animal, or microscopic organism in a garden that causes harm to crops.
- **Soil Amendments –** Anything mixed into the soil; soil amendments are materials added to soil to improve its physical or chemical properties. Unlike fertilizers, the

exact ingredients and chemical composition of soil amendments vary among different sources. You can use soil amendments to improve the permeability and water retention characteristics of your soil, and fertility or the ability to provide nutrition for plants.

VII. References by Lesson

Lesson 1 Plan, Prep and Plant

Washington Climate Factors Affecting Vegetable Production, Figure 1
Cool and Warm Season Crop Chart, Table 1
Vegetable Value Chart, Table 2
Vegetable Production Chart, Table 3
Vegetable Seeding Chart, Table 4

- Home Vegetable Gardening In Washington EM057E, by Carol Miles, 2013; http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf

Vegetables for Greater Nutrition, Table 9

- FDA Standards of Industry (2013); ESHA Food Processor V11.3.23 (2016)

Five Steps to Food Safe Fruit and Vegetable Home Gardening

- University of New Hampshire Cooperative Extension, Sept., 2006; Project of the Universities of Rhode Island, New Hampshire Connecticut, Maine, New Hampshire and Vermont and funded by CSREES/USDA. Project 2003-5111001713); https://extension.unh.edu/resources/files/Resource001094_Rep1367.pdf

Seed Salad Recipe

- *Growing Healthy Habits*, Unit 6 Seed Magic, page 222, University of Maryland Extension (http://eatsmart.umd.edu/sites/eatsmart.umd.edu/files/GHH_6_Seed%20Magic_516_Rev.pdf)

Lesson 2 Weed Water and Wait

Suggested Planting Calendars, Table 5
Rooting Depths for Common Vegetables, Table 6

- *Home Vegetable Gardening In Washington* EM057E, by Carol Miles, 2013; http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf

Garden Planting Log

- WSU Extension SNAP-Ed, 2016

Plant Parts Diagram

- *Growing with Plants*; WSU Extension

Spring Greens with Vinaigrette Recipe

- WSU Extension SNAP-Ed, 2016

Lesson 3 Food Fun and Fitness

Plant Part Salad Recipe

- *Growing Healthy Kids*, Lesson 2, Six Yummy Plant Parts, Oregon State University Extension Service http://search.oregonstate.edu/?q=Plants+Part+Salad&client=default_frontend&x=0&y=0

Educator Background Information - Vegetable Planting – Seeds & Irrigation

- *Home Vegetable Gardening In Washington* EM057E, by Carol Miles, 2013; http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf

Educator Background information – Weed Management

- *Home Vegetable Gardening In Washington* EM057E, by Carol Miles, 2013; http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf; https://www.researchgate.net/publication/299916139_Visual_Assessments_of_Biodegradable_Mulch_Deterioration_Are_Not_Indicative_of_Changes_in_Mechanical_Properties

Lesson 4: Seed, Feed and Harvest

Herb Harvest Chart, Table 7

- Puget Sound Fresh, Seattle Tilth http://www.pugetsoundfresh.org/harvest-schedule?productID=39&productName=Squash%2C%20Winter&tid=4877

Common Herbs Chart, Table 8

- WSU Spokane County Extension, Master Gardner Program http://extension.wsu.edu/spokane/wp-content/uploads/sites/33/2015/02/C060-Herbs-09.pdf

Spicy Panzanella Recipe

- Washington State Farmers Market Association https://www.facebook.com/WSFMA/posts/982138725179971

Compost Science

- College of Agriculture and Life Sciences at Cornell University

Educator Background information – Phytochemicals

- Ohio State University Extension Fact sheet; http://ohioline.osu.edu/factsheet/HYG-5581
- Extension Issues, Innovation Impact; Health Benefits of Eating Fruits and Vegetables: http://articles.extension.org/pages/27730/health-benefits-of-eating-fruits-vegetables

Educator Background information –Transplanting

- *Home Vegetable Gardening In Washington* EM057E, by Carol Miles, 2013; http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf

Educator Background information –Transplanting Options: Advanced Planning – Seed, Feed and Harvest

- WSU Extension SNAP-Ed, 2016

Lesson 5: Healthy Soil for a Healthy Harvest

Vegetable and Fruit Storage Chart , Table 10

- Storing Food for Safety and Quality; Sandra McCurdy, Joey Peutz and Grace Whittman, PNW 6, University of Idaho, Sept. 2009; pages 18-19 http://extension.oregonstate.edu/fch/sites/default/files/documents/pnw_612_storingfoodforsafetyquality.pdf

Five Steps to Food Safe Fruit and Vegetable Home Gardening

- Five Steps to Food Safe Fruit and Vegetable Home Gardening; *(University of New Hampshire Cooperative Extension, 9/2006; Project of the Universities of Rhode Island, Connecticut, Maine, New Hampshire and Vermont CSREES/USDA. Project 2003-5111001713)*

Harvest Tips

- *Home Vegetable Gardening In Washington* EM057E, by Carol Miles, 2013; http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf

Healthy Harvest Salad Recipe

- WSU Extension SNAP-Ed, 2016

Educator Background Information – Soil Management, Harvest and Storage

- *Home Vegetable Gardening In Washington* EM057E, by Carol Miles, 2013; http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf

Educator Background information –Soil Preparation, Management and Fertilizing

- Home Gardener's Guide to Soils and Fertilizers (Cogger 2005, EB1971E) http://cru.cahe.wsu.edu/CEPublications/eb1971e/eb1971e.pdf
- Gardening in Washington State http://gardening.wsu.edu/category/vegetables/
- Washington State University Extension, Gardening tips – Fertilizer http://ext100.wsu.edu/gardentips/category/fertilizer/
- Colorado State University – Fertilizing the Vegetable Garden http://extension.colostate.edu/topic-areas/yard-garden/fertilizing-the-vegetable-garden-7-611/



Section 2
Lessons

Lesson 1: Plan and Prep to Plant

PREPARATION OUTLINE

LEARNING OBJECTIVES	**AWARENESS** • EBT can be used to purchase food seeds and edible plant starts. **KNOWLEDGE** • Identify what, where, when and how to plant an edible garden • Understand gardening safety principles to protect body through warm-up activities **SKILL** • Plan an edible garden considering space, seasonal growing patterns in region, and personal preference • Prepare Seed Salad recipe **BEHAVIOR** • Buy seed packets, start season appropriate plants • Try one new edible plant part
ESTIMATED TIME	**60-90 minutes** To keep time to 60 minutes: 1) Prepare the recipe in advance or eliminate the food sampling and provide the written recipe for participants to try at home. (10-15 min.) 2) Demonstrate planting techniques in a controlled space (classroom) instead of a "hands on" approach in actual garden site for participants. (Approximately 15-20 min.)
SUPPLIES	**Teaching:** • Name tags or folded name table tents for participant introductions • A variety of pictures of fruits and Fruit & Vegetable (F&V) Photo Cards • Sample seed packets (2-5/group) • Visual Aids of garden diagrams and photos of different gardens • Blank paper for sketching a garden design for each participant • Colored or regular lead pencils • GFHY Student Workbook **Food Tasting – Seed Salad:** • Unpopped popcorn or microwave unsalted popcorn, sunflower seeds, pumpkins seeds, dried cranberries • Air popper or pre-pop • Bowl or container • Disposable gloves • Measuring cups/spoons • Serving spoon • Portion cups, napkins

HANDOUTS	*Refer participants to Workbook for the following materials:* *1.* Cool and Warm Season Crop Chart, Table 1 *2.* Vegetable Value Chart, Table 2 *3.* Vegetable Production Chart, Table 3 *4.* Vegetables for Greater Nutrition Chart, Table 9 *5.* Vegetable Seeding Chart, Table 4 6. Five Steps to Food Safe Fruit & Vegetable Home Gardening, p 32 7. Seed Salad Recipe, p 37 *Additional Handouts:* • A sample seed packet or photo copy of one *(optional)* *Optional:* • *Fresh-from-the-Farm* Brochure – Peas
PREPARATION	*Before class complete these steps:* • Review teaching materials and educator background briefs • Print and prepare handouts

Lesson1: Plan and Prep to Plant

TEACHING OUTLINE

Introduction 5 minutes HINT: may be helpful to visual learners if these were written on a large chart.	Welcome Introduce yourself and your program. Ice breaker or group introductions: • Have participants fill out their name tags or folded name table tents. • Ask participants to share one of their thoughts on: - **What attracted you to sign up for this gardening series? OR** - **What experience, if any, do you have with gardening?** • These can be shared during the group introductions and throughout the lesson. Encourage participants to save and use their name tags/name tents again. Share the program and lesson objectives, by starting with… - One of the things that I am excited about, is that people who receive SNAP benefits/EBT benefits can use them to buy food seeds and plants at retail stores that take the benefits. Raise your hands if you knew that? • Then continue with sharing objectives.
Anchor 10 minutes	Have participants work in pairs or small groups. Distribute approx. 6-8 California F&V cards, or alternative, to each group. • Ask them to spread out the cards, look at the photo side and share with each other which F&V's they like to eat and/or any they may not have tried.
Add 10 minutes *Distribute Participant Workbooks*	**PLAN ACTIVITY 1** Next have the group examine the nutrition information on the opposite side of the cards. • Ask them to note the nutrients on the bar graph, the edible part of the plant in the right column and the nutrition facts for one serving. • Have them identify 3-4 examples of F&V's they might like to grow. • Ask them to decide what influenced their choices: taste, color, nutritional value, save money, try something new, etc. When planning the garden there is a lot of choice. Consider the following: **Easy-to-Grow** Start with vegetables that are easy to grow. These are vegetables that are well-suited to the geography and climate of Washington State or the Pacific NW Region.

Workbook, Handout: Table 1, pg. 8 Workbook, Handouts: Tables 2 and 3, pgs. 9-10 Workbook, Handout: Table 9, pgs. 30-31 Reference Workbook, Handout: Table 1, pg. 8	• For our purposes, these would be plants that: 1) grow fairly quickly, 2) are disease resistant, 3) do not require special soil conditions; and 4) do not require much extra care (feeding and fertilizing at certain times during growth, pruning or special watering conditions). • Depending upon the garden area, choose about 5-8 different vegetables to try at first, with experience and confidence more can be added each year. Have participants open workbooks to the ***Warm and Cool Season Crop Chart, Table 1*** and select from their choices 2-3 that are listed on the chart. **Value** Look at the ***Vegetable Value and Production Charts, Tables 2 and 3***. It's smart to plan for the most vegetable value for your gardening space. *Vegetable value* is based on the **cost of buying** the vegetables or the amount produced (yield) by each plant. The vegetables at the top of the list are highest in value for the space they take. **Nutrient Value** You also should consider nutrition when planning your garden. Eating a variety of vegetables is recommended each day. Vegetables that score high in nutrients are dark leafy greens and orange vegetables. Choose vegetables that will be successful in the garden and give you the most nutritional value. Crops that are harder to grow are bolded on the ***Vegetables for Greater Nutrition Chart, Chart A***. Ask if their choices from the ***Warm and Cool Season Crop Chart, Table 1*** offer at least one nutrient that contains 10% of its nutrient value in a ½ cup serving. • If not, ask "Is there another choice you could make to improve your garden's nutritional value?"
Physical Activity Break 5 minutes Hint: relate each movement to an applied gardening action	Reaches and stretches: Briefly discuss the fact that gardening is physical activity and that warming up muscles with movements and activities that mimic gardening tasks is necessary to avoid soreness or injury. Try movements such as: squats (planting/harvesting or picking up plant debris); arm presses down, forward and up (pushing a wheel barrow or other equipment); arm reaches in several directions that stretch the upper body (reaching and grabbing tools and or weeding); slight torso rotations or forward and side bends that warm up and stretch the lower back and side of the torso (to stretch muscles that will be worked). Encourage participants to keep knees soft or bent and the pelvis slightly tucked forward by engaging the abdominal muscles to protect the lower back.
Apply 10-15 minutes *Use Teaching Tools included with this lesson.*	**PLAN Activity 2**: Design and sketch a garden area or space. Distribute pictures of gardens or examples of garden designs/diagrams to participants. Make sure there are 2-5 examples of seed packets with readable directions at each table or group. Each participant will need a blank sheet of paper, pencil and the 4 reference handouts.

HINT: Write these on a large chart paper and post. Encourage participants to write them down on the back of their garden design sheet. Workbook, Handout: Table 4, pgs. 11-13	There are key concepts to consider when creating a successful garden design: • Total planting area if directly planting into the soil and/or size and depth of containers • Sun exposure; the amount of sun and from which direction (south and west exposure are best for heat) • Nearest water source • Desired crops and their planting directions to obtain best sun/heat exposure • Seed planting methods • **Germination time** and required soil temperature for germination • Time to plant: after the last frost and • Time until harvest: before the **first hard frost** Have participants create a garden design even if they are unsure where or what they may be planting in their own gardens. Have them practice reading 2-3 seed packets to become familiar with seed planting directions, then draw or write where in the garden area 2-3 different crops might be placed. (See ***Vegetable Seeding Chart, Table 4***.)
Add	Things to consider when planting seeds: • Planting method – rows or scatter pattern • Space between seeds • Distance between rows • Size and depth of containers or pots • Water drainage, especially if using pots or containers We will cover this information in our next lesson.
Food Prep/ Sampling 10-15 minutes Workbook, Handout: 5 Steps…, pgs. 32-33	**ACTIVITY 3**: Preparation of SEED SALAD Recipe The time spent on this will depend upon whether the experience is limited to tasting a pre-made sample of the salad or making the recipe together. Use the ***Five Steps to Food Safe Fruit & Vegetable Home Gardening*** to review the importance of washing all F&V's before use (STEP 5), even if you plan to peel and discard the skin!
AWAY and Closing 2-5 minutes	• Distribute copies of any optional handouts to the workbook. • Review what tasks need to be completed before Lesson 2: 1. Purchase seeds (EBT cards can be used to buy food seeds and edible plant starts.) 2. Prepare garden area/space by clearing it of weeds & plant debris. • Share the scheduled date of Lesson 2. • Close with wishing them fun planning and preparing for next time.

Garden Photos

(Teaching Tools)

All royalty free photos from Pinterest

Plot Area

Plot Area

Plot Area

Raised Beds

Raised Beds

Raised Beds

Raised Beds

Raised Beds

Raised Beds

Raised Beds

Square Foot Gardening

Square Foot Gardening

Vertical or Trellis Gardening

Vertical or Trellis Gardening

Vertical or Trellis Gardening

Vertical or Trellis Gardening

Vertical Container Gardening

Vertical Container Gardening

Vertical Container Gardening

Container Gardening

Container Gardening

Container Gardening

Container Gardening

Container Gardening

Container Gardening

Container Gardening

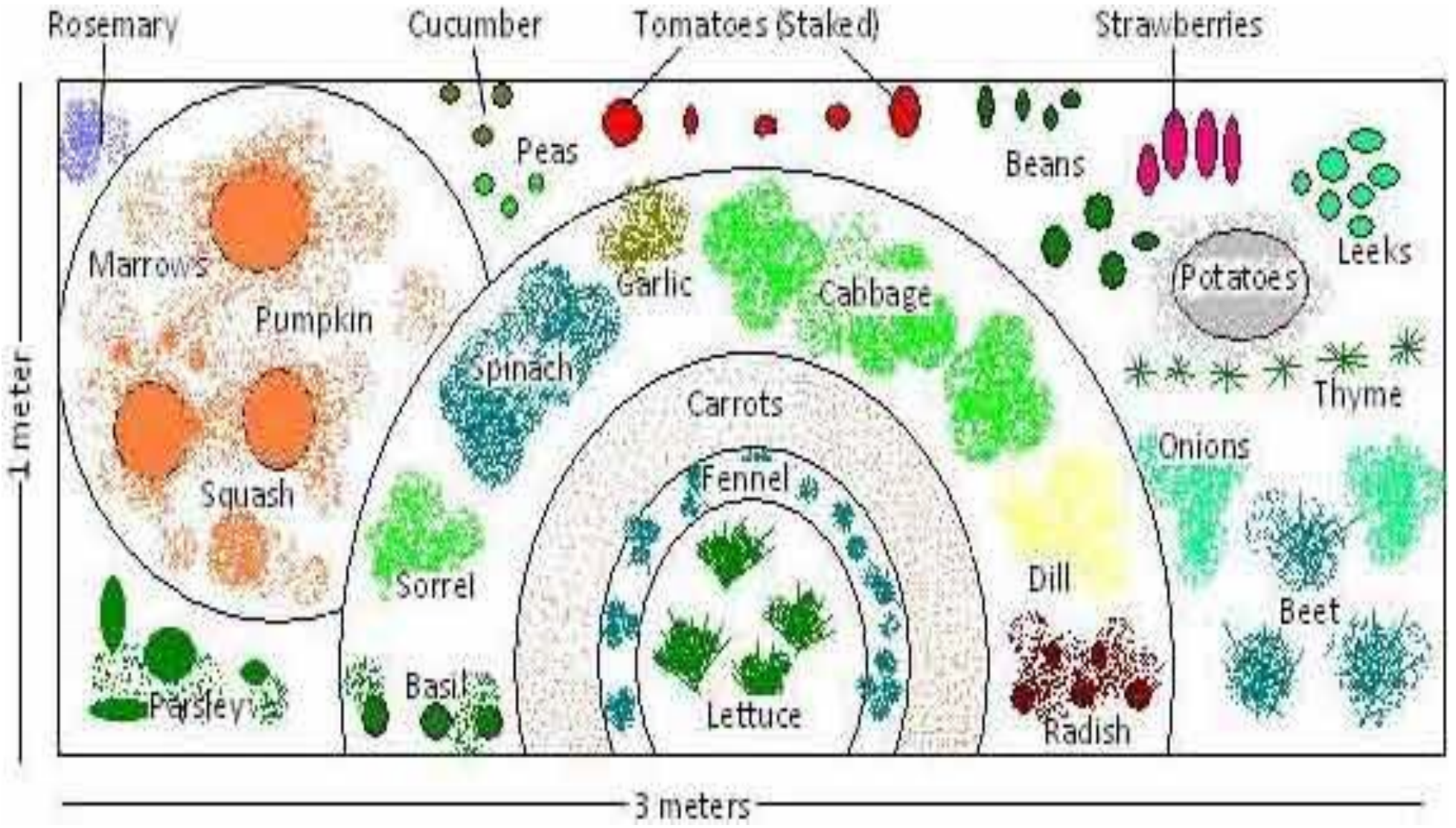
Hoop Covers

*Extend the season

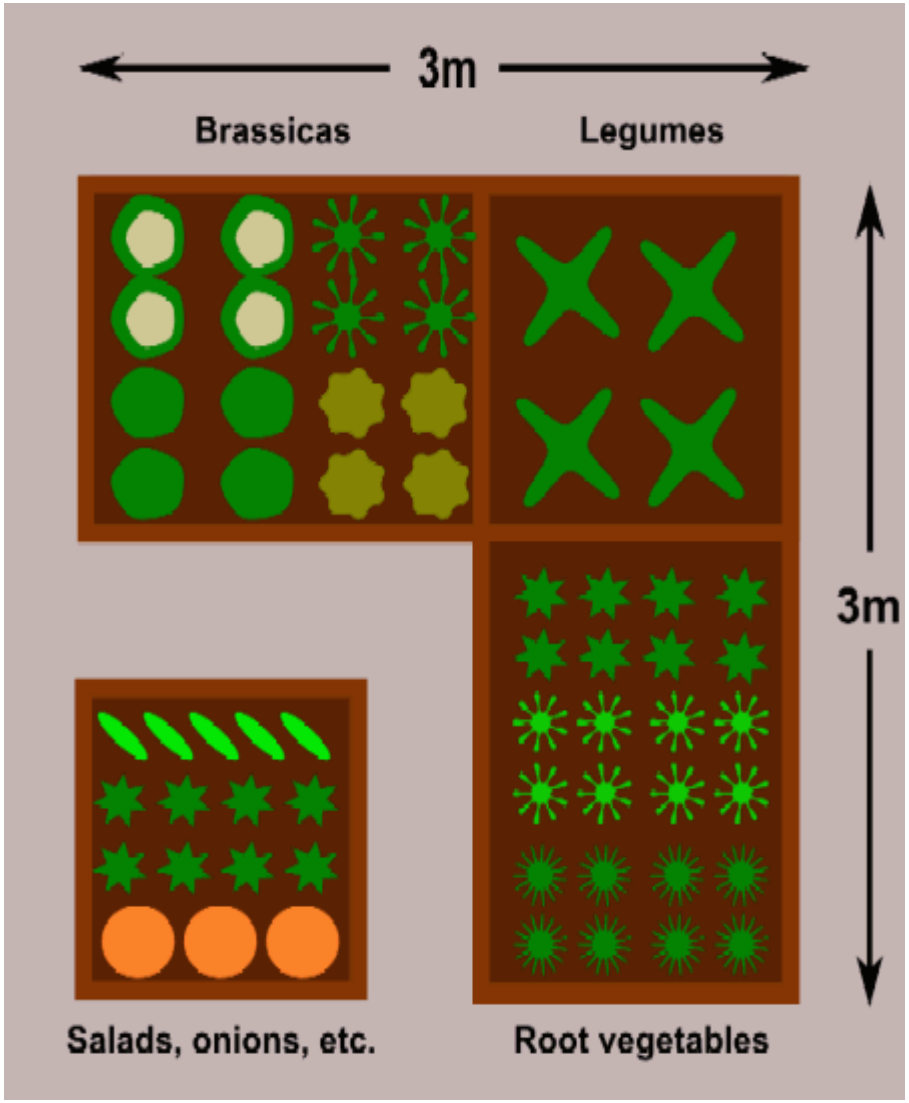
*Control temperatures

Hoop Covers extend theseason & control temperatures

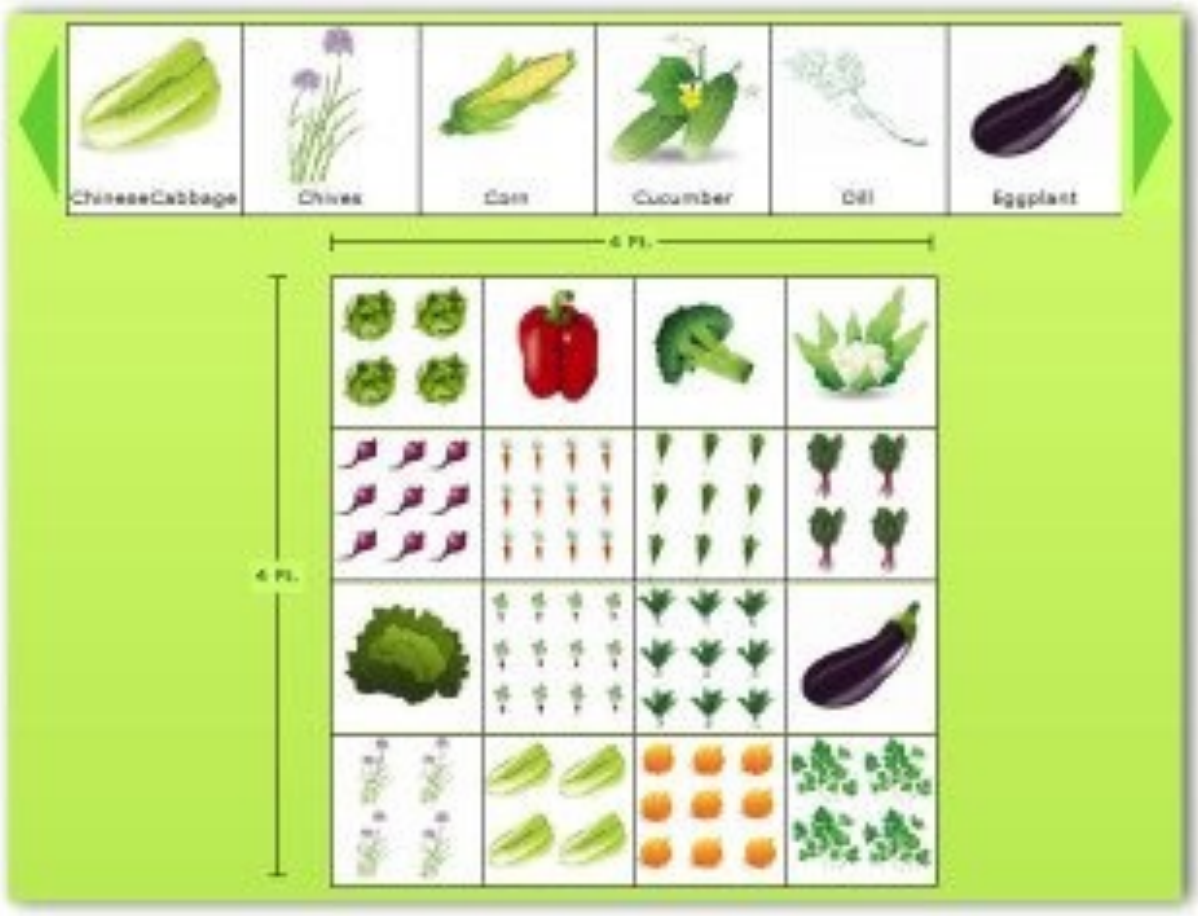
Hoop Covers extend the season & control temperatures



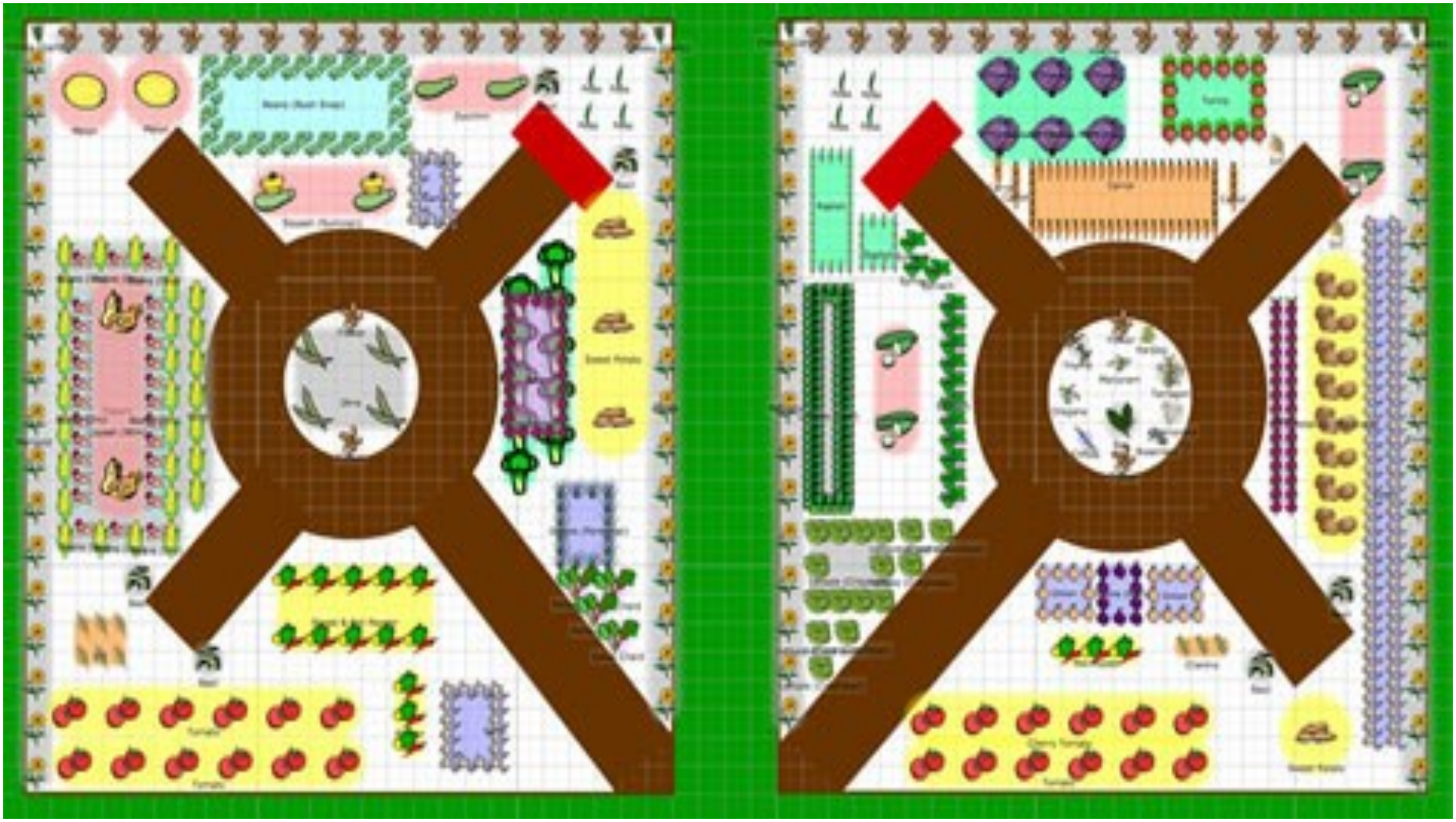
Garden Diagrams and Designs



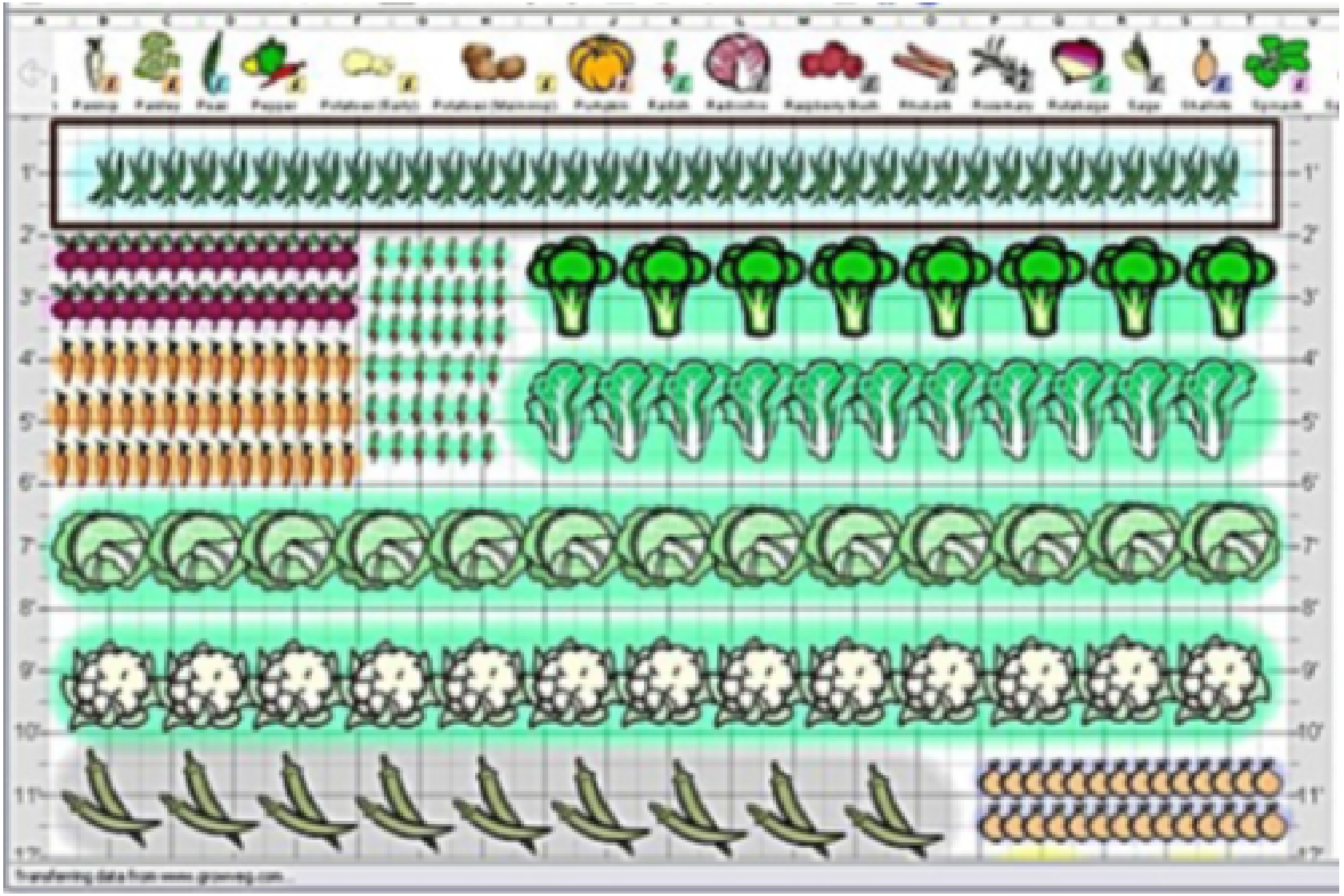
Garden Diagrams and Designs



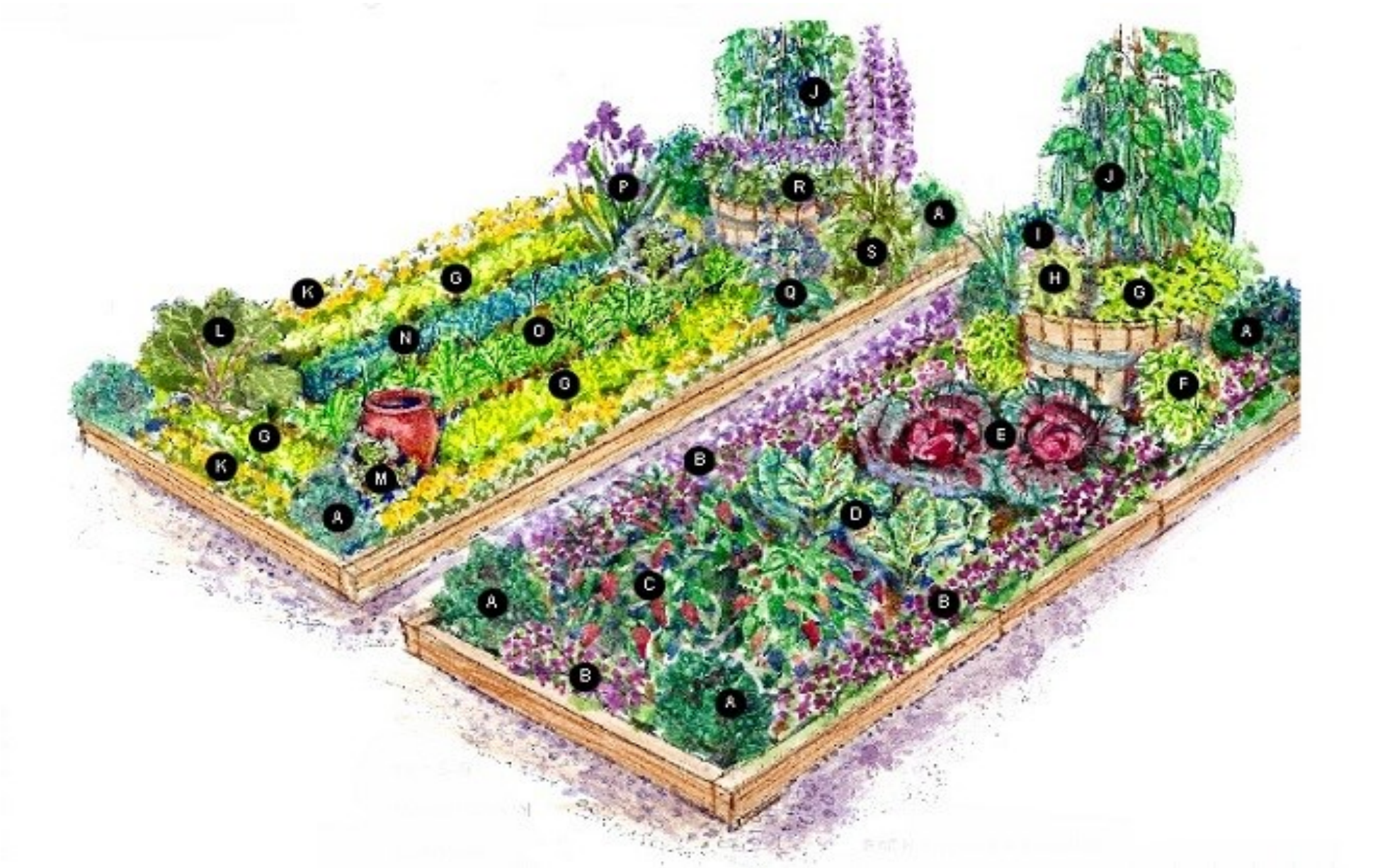
Garden Diagrams and Designs



Garden Diagrams and Designs



Garden Diagrams and Designs



Garden Diagrams and Designs

Lesson 2: Weed, Water and Wait

PREPARATION OUTLINE

LEARNING OBJECTIVES NOTE: In the next two lessons, we will be talking about getting physical activity time through gardening activity. This week we learn to warm up our muscles for this kind of activity.	**Awareness** • Growing an edible garden is an investment with great returns **Knowledge** • Identify stretching and strengthening activities experienced when gardening • Recognize personal physical limitations. • Identify vegetables by plant parts and their nutritional value • Understand the benefits of keeping a garden log **Skill** • Read seed packets • Practice measuring soil temperature and moisture level • Plant a spring or cool season garden as a group or an individual **Behavior** • Water and weed planted garden x 2 weeks using a written schedule and record in garden log • Warm-up muscles to prepare for planting activities • Record garden physical activity time and type in garden log.
ESTIMATED TIME	**60-90 minutes** If you need to minimize lesson time to 60 minutes use one or both of the following: 1) Prepare the recipe in advance or eliminate the food sampling and provide the written recipe for participants to try at home. (15-20 min.) 2) Demonstrate planting, soil temperature and water measuring techniques in a controlled space or area instead of a "hands on" approach in the actual for participants. (Approx. 10-20 min.)
SUPPLIES	**Teaching:** • Photo F&V Cards of various hardy greens & Edible Plant Parts • Seed packets of various greens, radishes, green onions, etc. • Participants' garden diagram or sketch from Lesson 1 • Garden journal or log • Seeding tray and soil (opt.) • Hoe or planting stick & gloves • Watering can, ruler/yard stick • Row markers & permanent marker • Soil moisture sensor (optional) • Meat thermometer (soil temperature) **Food Tasting** • Choose one of the 3 Vinaigrette Recipes • Tender baby greens such as spinach, watercress, Asian greens or Salad/Mesclun Mix; seeds to top salad • Container for dressing • Bowl for salad mix • Food safety gloves • Measuring cups/spoons • Tongs or serving utensils • Portion cups or plates • Napkins, eating utensils

HANDOUTS	*Refer students to Student Workbook for the following materials:* • Plant Parts Diagram • General Rooting Depths for Common Vegetables, Table 6 • Garden Planting Record • Suggested Planting Calendars, Table 5 - pages 1-2 • Spring Greens Salad Recipe *Optional:* • Watering (Resource Section, from *Garden Mosaics*) • Alternative examples of Garden Log Sheets 1-3 (see Resource Section) • *Fresh-from-the-Farm* (FFF) Brochures – Hardy Greens
PREPARATION	Before class complete these steps: • Review teaching materials, print and prepare handouts if not using wkbk • Read Educator Background: Planting Seeds & Irrigation • Gather needed equipment and supplies for gardening and food tasting • Sort groupings of F&V photo cards per teaching outline
REFERENCES	1. Planting Calendars 1-2 *(EM057E, by Carol Miles, 2013)* 2. General Rooting Depths for Some Common Vegetable Crops Grown in WA *(EM057E, by Carol Miles, 2013)* 3. FFF Brochure – Hardy Greens *(WSU SNAP-Ed 2017)* 4. Statement on how to clean and sanitize a dual use meat thermometer (Stephanie Smith, PhD. Consumer Food Safety Specialist, WSU Extension; personal communication, February 6, 2017) *Resource Section* • Build a Mega Fit Ball *(WSU Extension- Pierce County SNAP-Ed)* • Watering *(College of Agriculture and Life Sciences at Cornell University)*

Lesson 2: Weed, Water and Wait

TEACHING OUTLINE

Introduction 5 minutes	Welcome Review key points from Lesson 1: The seed packet will tell you what, where, when and how to plant. • Ask participants to recall ways of warming up the body to prepare muscles for physical activity in the garden. Share Lesson 2 objectives
Anchor 10 minutes Workbook, Handout: Plant Parts Diagram, pg. 17 F & V Photo Cards	Have participants work in pairs or small groups. Point out the ***Plant Parts Diagram*** in the workbook and distribute 3-5 F&V photo cards of various edible plant parts to each group. Ask participants to look at the graph side of the cards to identify what part of the plant is edible, the serving size of the plant parts and the nutrient content. Then have them discuss any similarities or differences in nutritional value. Prompt with questions such as: • Which plant parts have high vitamin value for a serving? • Which plant parts are high in carbohydrates and fiber? • Which plant parts do you like to eat? • Do you have preferences for roots, leaves, fruits? Label parts on diagram.
Add 10 minutes Distribute seeds if needed Pay attention to required soil depth for crops Workbook, Handout: Table 6, pg. 16	Ask participants to take out their garden diagram/sketch and any seeds they brought. Have participants refer to the workbook charts from Lesson 1: • Cool and Warm Season Crop Chart, Table 1 • Vegetable Production Chart, Table 3 • Vegetables for Greater Nutrition Chart, Table 9 • Vegetable Seeding Chart, Table 4 As individuals, pairs or a group have them identify which edible plant part are cool season crops by plant part; and which crops they want to plant first. Remind them to consider the following: 1) Easy to Grow; 2) Value; 3) Nutrient Value; 4) Available space. After selections are made, distribute 2-3 seed packets to participants and read the planting directions for each crop. Be sure to determine that the planting area has soil depth appropriate for the desired crops. Use the ***General Rooting Depths for Some Common Vegetable Crops Grown in WA, Table 6***. If necessary, label the planting area on the diagram and indicate which edible plant parts they will be growing (i.e. radishes are roots, collards are leaves, and green onions are edible bulbs and leaves, etc.).

Journal or log entry Ex. see Workbook, Handout: Garden Planting Record, pg. 18	Encourage participants to enter information into their garden journal or log. Have them begin with a blank piece of paper with 2-3 columns. Log the first planting entry with the crop name, planting date and time spent. Keep the garden diagram with the journal or log and alter as needed for future plantings.
Physical Activity Break 5 minutes Option A. Option B.	Remind participants that gardening is physical activity and that warming up muscles with movements and activities used in gardening is necessary to avoid or minimize soreness or injury. Demonstrate warm-up movements and perform exercises as a group. Alternative warm-up activities to those listed in Lesson 1 can include a activity ball or dice that dictates common stretching and strengthening exercise such as: 1) Arm circles or arm rows; 2) Cross lateral movements rotating the upper/lower torso in opposite directions; 3) Wall push-ups; 4) Draw shapes in the air with limbs or other body parts; 5) Knee lifts front, side and cross the body; 6) Reaches, presses or pulls in different directions. All these movements utilize the larger muscles of the arms, torso, back and legs commonly used when gardening. Choose 4-5 movements and perform each of them for 30 seconds to 1 minute. In addition, be sure to stretch the lower back with a mini squat and slight pelvic tilt. Activity balls can be made with a beach ball and dice with cardboard or card stock. See Resource Section to Make a Fit Ball. • Write stretches or strengthening exercises on the various spots of the ball and toss among the group. Participants call out an exercise for the group to perform. • Write stretches or strengthening exercises on the sides of the dice. Participants roll the dice and the group performs the activities. • You may also write these exercises on small pieces of paper and place them in a bowl. Have participants draw them at random and then perform the exercises together.
Apply 15-20 minutes	**Activity: Planting** **Option 1**. If your lesson group is planting at a community garden or other site that will accommodate all participants, you may choose to “direct seed” into the prepared planting area as a team and divide the 2-4 different crops among small planting groups. Follow the instructions on the seed packets for spacing, depth of seeds and distance between rows. Be sure to demonstrate how to use the garden tools to make rows and use row markers to indicate what has been planted and where. You may also demonstrate how to use a scatter pattern to plant in

more confined areas. Lightly sprinkle with additional water but do not upset the planted seeds.

Option 2. If your group has sites or gardens of their own, use a seeding tray or other small container to demonstrate how to plant the seeds in a scatter pattern, rather than in rows. See background materials on planting seeds and irrigation.

Soil temperature
Demonstrate how to use a common meat thermometer to determine soil temperature in 1-3 spots of the garden.

- Have students record the daily temperatures in their garden log that will help determine the best location for the next crops.
- Let a few participants practice using this tool and recording temperature.
- Let them know that working in pairs (one person records; one reads the thermometer) helps to get the job done efficiently.

Advise participants to take two readings daily; one in the early morning and one in the mid or late afternoon. Tell participants:

- After every garden use, be sure to clean the thermometer thoroughly. Ideally gardeners should have a meat thermometer dedicated for garden use ONLY.
- However, if using one for dual use (garden and kitchen), "*Be sure to clean the thermometer thoroughly with warm soapy water and rinse. Then sanitize the thermometer by dipping it in a light solution of bleach water of 1/2 tsp. bleach (5.25-6.25% bleach strength) in 1 quart of water and then rinse and air dry (minimum of 2 minutes) after garden use.*"
- Remember, the order of these steps is important. If you are sanitizing, it has to follow washing and rinsing if organic matter remains on the probe, it will not be sanitized.

Watering:
Many vegetable crops have rather shallow root systems (18 inches or less). If the soil becomes too dry, their growth may be seriously limited. Most vegetable crops require 1 inch of water per week for optimum production. If your area does not receive this amount of rainfall each week during the growing season, you will need to irrigate your garden using overhead sprinklers, soaker hoses, drip tape or hand watering.

To determine watering needs, demonstrate these methods:

1) If available, demonstrate how to use the moisture sensor based on purchase instructions of the tool. OR…
2) Dig down 6-12 inches into the soil, scoop out a cup or handful of dirt and squeeze the dirt to see how it holds together. Soil should be moist, not muddy or dry.

(See optional ***Watering*** handout in Resource Section)	Based on your findings, water with your preferred method. See optional ***Watering*** handout with suggested methods for irrigation for specific sites. While watering, place a small cup, can or other container in the middle of the area to be watered. Check frequently to ensure proper level of 1 inch of water accumulates.
Food Prep and/or Sampling 10-15 minutes	**Activity: Spring Greens Salad with Vinaigrette** The time will depend upon whether you choose to taste a pre-made sample of the salad or make the recipe together. Follow directions on recipe page of this lesson. • Tell the participants that this recipe is contained in the back of the Participant Workbook.
Away and Closing 2-5 minutes Workbook, Handouts: Table 5, pgs. 14-15 FFF Brochure for Hardy Greens	• Point out that the dressing recipe and ***Suggested Planting Calendar*** are in their workbooks. • Distribute any additional handouts (FFF Hardy Green brochure, watering handout from Resource Section (optional) Review what tasks need to be completed before Lesson 3: 1. Test for adequate soil moisture, check water requirements for your crops and **Water** newly planted seeds as directed. Measure the water level with a small cup, can or other container. 2. Create a 2 week log of soil temperature readings for future planting. 3. Remove any newly grown **Weeds** from your previously cleared planting area to allow new vegetable sprouts room to grow. Avoid pulling any sprouts in the planted row until it can be clearly identified as the intended, seeded crop. 4. Watch and **Wait** 5. Our next class is scheduled for (Date, time, place). Make sure to bring your workbook, garden design/plan, and garden log.

Edible Roots

Roots – Absorb water and other nutrients from the soil.

Edible Stems

Stems – Move water and other nutrients throughout the plant.

Edible Leaves

Leaves – make food through photosynthesis

Edible Flowers

Flower – produces the plants seeds

Edible Fruit

Fruits – part of the plant that protects the seeds

Edible Seeds

Seeds – Produces new plants

Lesson 2 Educator Background Information

Vegetable Planting – Seeds & Irrigation

Use care and precision in planting vegetable seeds. Consult the Vegetable Seeding Chart (Table 4) for specifications regarding planting depth and spacing, germination, temperature, and days to maturity for most vegetable crops. Most seed packets provide directions for specific varieties. If planting depth is not specified, a general rule is to plant two times as deep as the diameter of the seed. Plant seeds slightly shallower in clay soils and slightly deeper in sandy soils.

Most vegetable seeds require moist and fine soil in a firm seedbed for successful germination and establishment. The top 2–6 inches of soil should be light and well-aerated. Rake the top of the bed to create a flat surface and crumble clods so that soil is smooth and fine. Seeds planted in cloddy soil will germinate poorly and often die, as the soil dries out quickly.

Form the seeding row with a hoe or a narrow stick. After sowing the seed, cover to the recommended depth and firm the soil over the seed. This can be done by gently tapping the row with the flat side of a hoe or rake for small seeded crops or walking one time over the seed row for large-seeded crops. In dry areas, form the seeding row at the bottom of a slight trench to trap precipitation and irrigation water, keeping it around the plant where it is needed. In areas with heavy rainfall, plant in raised beds to allow for water drainage.

Sow seeds thinly but evenly. Spread small seeds evenly by gently tapping the edge of the seed packet to move the seeds over the edge a few at a time. Alternately, place a small amount of seed in the palm of one hand, take a small pinch of seed between the fingers of your other hand, and slowly move your fingers back and forth to drop seeds one at a time. It is difficult to sow small seeds thinly enough, so the stand will usually have to be thinned to the recommended row spacing after the seeds have germinated. You will need to remove some of the seedlings that are too close together when they have reached approximately 2-4 inches. Plant large seeds such as beans, corn, and squash at the recommended row spacing to avoid having to thin the stand later.

While it is not necessary that each plant have the exact recommended spacing (Table 4), the average density should not exceed those recommendations. If planted too far apart, vegetable plants will not reach their optimum yield. Additionally, weeds will be more likely to grow in the open area. If planted too close, plants will compete with their neighbors for light, water, and fertilizer. An overly dense planting is also more likely to have disease. These issues will decrease vegetable yield and quality.

In Western Washington, fall crops such as cabbage, kale, broccoli, and lettuce can be direct-seeded in the garden in short dense rows or patches and transplanted as needed. Transplant fall crops into areas where spring or summer crops have been completely harvested and the plants have been removed by cutting them off at the soil surface. This keeps roots in place and causes the least disturbance to the soil. By leaving the roots in place, they will decompose deep in the soil, leaving channels that allow water to drain and worms to move more freely.

Irrigation

Many vegetable crops have rather shallow root systems (18 inches or less). If the soil becomes too dry, their growth may be seriously limited. Most vegetable crops require 1 inch of water per week for optimum production. If your area does not receive this amount of rainfall each week during the growing season, you will need to irrigate your garden using overhead sprinklers, soaker hoses, drip tape or hand watering. For specific irrigation methods and amounts, see *Drip Irrigation for the Yard and Garden* (Peters 2011, FS030E) and *Watering Home Gardens and Landscape Plants* (Ophardt 2001, EB1090).

Resource:
(EM057E) Home Vegetable Gardening in Washington by Carol Miles, pages 7 & 10
http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf

Lesson 3: Food, Fun and Fitness: Energize for Health!

PREPARATION OUTLINE

LEARNING OBJECTIVES NOTE:	**Awareness** • Understand that a plant-based diet is important for health **Knowledge** • Understand that varying your vegetables in color adds interest and a wider variety of nutrients for human health • Learn the basic function of plant parts • Identify gardening techniques that provide moderate-level activities that improve fitness • Recognize personal limitations for physical activity • Recognize other safe gardening practices such as need for hydration and sun protection • Learn that thinning seedlings optimizes growth of food plants **Skill** • Plan and select spring season vegetables by color, include root vegetables. • Practice thinning plantings • Begin the process of 'hardening off' plant starts for preparing to transplant. **Behavior** • Water, weed and thin seedlings as needed in the garden • Select and plant spring season vegetables with varied colors (chard, lettuce, root crops such as carrots, beets and onions)
ESTIMATED TIME	**60-90 minutes** To keep to the minimum lesson time of 60 minutes, do one or two of the following: 1) Prepare the recipe in advance or eliminate the food sampling and provide the written recipe for participants to try at home. (15-20 min.) 2) Show visual examples of overcrowded planting and thinned crops and explain thinning techniques instead of a "hands on" approach at the garden site for participants. Use Educator Background Information on thinning (Approx. 10 min.) 3) Demonstrate planting techniques in a controlled space or area instead of a "hands on" approach for participants. (Approx. 10-15 min.)

SUPPLIES	**Teaching:** • F&V Photo Cards of various colors & edible plant parts • Seed packets of spinach, lettuce, chard, carrots, beets, leeks, onions, chives, etc. • Garden journal or log (participants) • Hoe or planting stick & gloves • Ruler or yard stick • Watering can • Row markers, permanent marker • Scissors for thinning For off-site class: • Seeding tray and soil **Food Tasting** • Plant Parts Salad: carrot, celery, lettuce or spinach, cauliflower or broccoli, tomatoes or peppers, peas, corn or other seeds • Salad dressing recipe • Knives & cutting boards • Bowl/plate for plant parts • Disposable gloves • Measuring cups/spoons • Tongs or serving utensils • Bowls or plates • Napkins, eating utensils
HANDOUTS	*Refer participants to these pages in their Workbooks:* • Recipe, Plant Part Salad *Optional see Resource Section:* • FFF Brochure – Carrots or Beets
PREPARATION	Before class complete these steps: • Review teaching materials, print and prepare handouts if needed • Read Educator Background Information on Thinning and Weeding • Pre-sort the photo F & V cards so each activity group has a photo of each of the six plant parts. • Hang Edible Parts of the Plant Poster
REFERENCES	*Resource Section* • Edible Plant Parts Diagram poster *(Royalty Free Stock Photos)* • Recipe, Plant Part Salad (*Oregon State University Extension Service)* • FFF Brochure – Carrots or Beets *(WSU Extension SNAP-Ed, 2017)*

Lesson 3: Food, Fun and Fitness: Energize for Health!

TEACHING OUTLINE

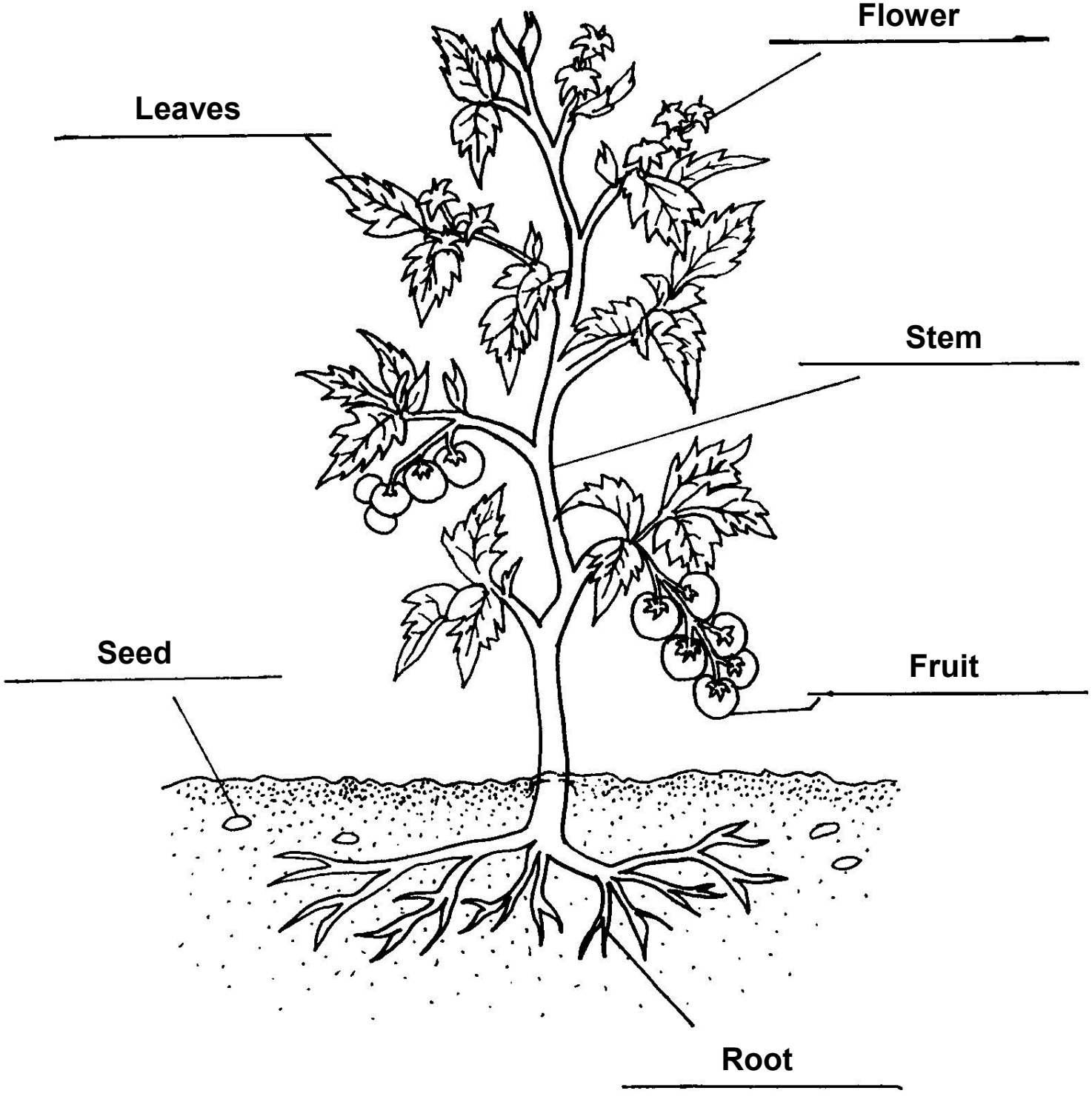
Introduction 5 minutes	Welcome Share Lesson 3 objectives. Review key points from Lesson 2: • Edible plant parts; • How to determine moisture levels and when to water; • How to measure soil temperature and understand planting directions on seed packets.
Anchor 5 minutes HINT: Write the questions up on chart paper to display for reference.	Have participants work in pairs and ask for one or two volunteers to share the following: • What type of fruit or vegetable did you eat last week? • Describe it by color and plant part. • Estimate the amountof F&V's you eat/ate daily.
Add 15 minutes Hang Edible Plant Parts Diagram poster	Distribute a variety of F &V photo cards of various colors (6 cards for each group). Make sure all plant parts are in each group of cards. Based on the graph information of their 6 cards, have participants determine which 2-3 nutrients appear the most often and in the greatest quantity. Remind participants that the daily recommendation for F&V's are: ▪ 2 cups of fruit ▪ 2 ½ cups of vegetables • More and more nutrition research encourages us to consume a plant-based diet. This doesn't necessarily mean eating vegetarian or vegan, but it does suggest that increasing fruits, vegetables and whole grains have many health benefits. • To get these health benefits, we need to eat more and a bigger variety of fruits and vegetables to get the variety of nutrients for good health. • Choosing a variety of colors and different plant parts is one way to do this. It's great to eat seasonal F&V's which means "fresh" are more available and affordable. But all types count towards our recommended daily intake including frozen, canned and dried. • Remember, fruits and vegetables are processed (frozen, dried, canned) at the peak of the season when produce is at its best.

HINT: May help visual learners to write these items into their worksheets.	Refer participants to the Edible Plant Parts photos (Lesson 2). Introduce the plant parts' functions by pointing to the parts on the Edible Plant Parts *poster*: 1. Roots – the roots gather water and nutrients from the soil. They also anchor and support the plants. 2. Stems – the stem moves water and nutrients from the roots to the rest of the plant, stores liquids and foods. 3. Leaves – the leaves produce food for the plant through photosynthesis. 4. Flowers – the flowers make the plant's seeds. They also attract birds, insects and other pollinators. 5. Fruits – the fruit protects the plant's seeds. 6. Seeds – the seeds produce new plants, store energy for the new plant
Apply Use student garden diagrams Distribute Seed packs Record in Gardening Logs	Ask participants to get out their garden diagram/sketch and any seeds they brought. As individuals, pairs or a group have them sort through the available seeds and find 2-3 additional crops to plant. Encourage them to choose a variety of colors and plant parts. Then, label the planting area on their diagram and indicate which edible plant parts they will be growing. Encourage participants to record in their garden journal or log they started in Lesson 2. Log today's planting entry with the crop name, planting date and time spent doing moderate level activity in the garden. Have participants keep their journal or log with their garden diagram and workbooks and alter or add to the log or journal as needed for future plantings.
Add 2-3 minutes HINT: To help kinesthetic/visual learners, have them stand and go through the motions of the activities being mentioned. Point out the muscle groups being used.	**FITNESS** Remind participants that regular physical activity is part of a healthy lifestyle. Gardening and yard work increases endurance, improves flexibility and provides strength training, three important parts of physical fitness. • 30 minutes of activity most days a week is needed to maintain health and reduce the risk of disease. • Gardening for 30 minutes or more a day will keep you and your garden in shape. • It's recommended that we do moderate intensity activity. In the garden, what qualifies as moderate intensity is raking, weeding, digging, lifting, etc. • Gardening burns calories and uses major muscle groups. A 150 pound person burns 330 calories for one hour of light gardening. • Are you starting to understand how vital home food gardening can be for living a healthy lifestyle? **Keep it safe:** • As with any activity it is important to warm up your muscles and stretch before starting. • Use a variety of moderate-intensity movements such as raking, hoeing, weeding, pruning, digging, and alternate between them. • Know your limits and take breaks when needed.

	• Be sure to protect yourself from the sun. Use sunscreen; wear a hat, sunglasses and gloves. Consider wearing long sleeves to reduce sun exposure. • Drink plenty of water to stay hydrated.
Physical Activity Break 3-5 minutes	Take a walk to the garden site or choose some of the warm-up exercises from Lessons 1 or 2, such as reaches and push/pull movements in different directions and at different levels in space.
Apply 10-15 minutes Show photo visuals of thinning; if at garden site, practice this skill.	**Activity:** Planting more seeds If your lesson group is planting at a community garden or other site that will accommodate all participants, you may choose to direct seed into the prepared planting area as a team and divide the 2-4 different crops among small planting groups. Follow the instructions on the seed packets for spacing, depth of seeds and distance between rows. Mark rows or planted areas. Lightly sprinkle with additional water but do not upset the planted seeds. Check to see if any previously planted seeds have germinated. Explain the concept of thinning. If planted too far apart, vegetable plants will not reach their optimum yield. Additionally, weeds will be more likely to grow in the open area. If planted too close, plants will compete with their neighbors for light, water, and fertilizer. An overly dense planting is also more likely to have disease. These issues will decrease vegetable yield and quality. If there are seedlings that have germinated too closely, demonstrate thinning by carefully clipping with a small pair of scissors or pinching away sprouts that are too close. Pulling sprouts may upset the soil and roots of newly formed sprouts.
Food Prep and/or Sampling 10-15 minutes Workbook: Plant Parts Salad Recipe, p 39	**Plant Parts Salad** The time will depend upon whether you choose to taste a pre-made sample of the salad or make the recipe together.
Away and Closing 2-5 minutes	**Tell participants:** • Distribute any additional handouts (FFF Brochure – Carrots or Beets). • Remind participants that our next lesson is scheduled for (date/time). They will need to bring: workbook, log, garden diagram, seeds or seedlings, gloves and other items for working in the garden or harvesting.

	Review what tasks need to be completed before Lesson 4 (have them write down the date for Lesson 4 in their logs or on a calendar: 1. Test for adequate soil moisture, water sprouts/seedlings as needed. 2. Remove any grass, unwanted plant growth or weeds between rows. 3. Thin seedlings to the recommended spacing based on directions and/or instructions on the seed packet. 4. If you have prepared any transplants or crop seedlings that have been started in a greenhouse or seeded in trays under lights, you will need to gradually expose them to the outdoor temperatures over 3-7 days before you intend to transplant. This process is called, "hardening off." ▪ Reduce watering to one light watering per day. ▪ Move plants to a protected outdoor area away from heavy wind or rain during the day, and bring them in at night or cover them with a plastic dome top if left outside. ▪ Leave plants outside and remove the dome top during the day and cover again during the night. ▪ Remove the cover permanently. Happy Gardening! See you next time!

Plant Parts Diagram



Lesson 3 Educator Background
Thinning Seedlings

Thinning

While it is not necessary that each plant have the exact recommended spacing (Table 4, Lesson 1 Vegetable Seeding), the average density should not exceed those recommendations. If planted too far apart, vegetable plants will not reach their optimum yield. Additionally, weeds will be more likely to grow in the open area. If planted too close, plants will compete with their neighbors for light, water, and fertilizer. An overly dense planting is also more likely to have disease. These issues will decrease vegetable yield and quality.

In Western Washington, fall crops such as cabbage, kale, broccoli, and lettuce can be direct-seeded in the garden in short dense rows or patches and transplanted as needed. Transplant fall crops into areas where spring or summer crops have been completely harvested and the plants have been removed by cutting them off at the soil surface. This leaves roots in place and causes the least disturbance to the soil. By leaving the roots in place, they will decompose deep in the soil, leaving channels that allow water to drain and worms to move more freely.

Suggested seeding, transplanting, and harvesting dates for most vegetable crops are listed in the Workbook, Table 5 Planting Calendar. Experiment with these dates in your area and adjust as needed to create a year-round vegetable production calendar that is tailored to your growing conditions.

See Workbook, Table 4, for Seeding recommendations for common vegetable crops grown in Washington (adapted from Kumar et al. 2009, p3-4)

Reference:

(EM057E) Home Vegetable Gardening in Washington by Carol Miles, pages 8- 10 http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf

Lesson 3 Educator Background
Weed Management

Weed Control

Weeds can cause significant damage by competing with vegetable plants for sunlight, water, and nutrients. For the most effective control, target weeds at the seedling stage, before they become large enough to interfere with vegetable crop development. Use shallow, frequent cultivation with a hoe to manage small or shallowly-rooted weeds. Hoeing following a light rain manages weeds and prevents crusting of the soil surface. However, digging in saturated soil can destroy soil structure and result in soil compaction, which prevents roots of vegetable plants from growing deeper into the soil and accessing nutrients.

Mulching

By applying organic or synthetic mulches to the soil surface, you can minimize weeds, improve soil quality, modify soil temperature, and increase water conservation. In addition, mulching can prevent soil erosion, eliminate crop damage caused by deep cultivation or hoeing, and help keep crops free of soil particles.

Common organic mulches are wood chips, compost, grass clippings, newspaper, paper, cardboard, and straw; common synthetic mulches are plastic and landscape fabric. Mulches affect weed growth by blocking light, and in the case of black plastic, landscape fabric, paper, and cardboard, also act as a physical barrier to weed growth. Mulches can be a key part of garden weed management, but they do not completely control weeds. They also have limited effectiveness against perennial weeds such as horsetail, quack grass, and morning glory that can send rhizomes or roots considerable distances. In areas of heavy rainfall, synthetic mulches may cause water to pool on the surface or become runoff.

Mulches can also be used to help regulate soil temperatures. Depending on the type of mulch chosen, it can either increase or decrease soil temperature. Organic mulches insulate the soil, resulting in lower temperatures and less drastic temperature fluctuations. This can be a disadvantage in the spring when warm soil temperatures are needed to speed germination and crop growth. In the heat of summer, however, organic mulches can be a benefit by keeping soils cooler. Black plastic mulch absorbs heat and warms the soil in the spring and summer, creating a better environment early in the season for warm-season crops such as melons, tomatoes, and peppers. See *Using Biodegradable Plastics as Agricultural Mulches* (Corbin et al. 2013, FS103E)* for another option.

Apply organic mulches when vegetable plants are 2–3 inches tall, leaving 2–3 inches around the plant unmulched. If you apply mulch to a newly-seeded area, do not cover the seed row with the mulch. Before applying mulch, first remove weed seedlings from the area. If you are using drip irrigation, lay the drip tape on the bed or next to the row (not closer than 2 inches to the vegetable plant) before applying the mulch. Coarse-textured mulch materials, such as straw or

grass clippings, are more desirable than fine or flat materials, such as sawdust or leaves. If fine or flat materials are used, loosen them occasionally to prevent sealing the soil surface. Only a thin layer (less than 1 inch) of organic mulch is needed to conserve soil moisture, and 2 inches or more is desirable for weed control.

Use bark mulches or wood chips around perennial plantings and on pathways. To create an attractive and effective weed barrier, first place a thick layer of newspapers or cardboard on the soil surface, then cover with bark, wood chips, or straw. This can be an excellent way to manage weeds in alleyways. When the mulch decomposes, rake it onto the bed and place a fresh layer of both in the alleyway. Do not till bark or wood chip mulches into the soil close to plants, as they will tie up nitrogen as they decompose.

Synthetic mulches should be removed and discarded at the end of the season or when they are no longer useful as mulches. Organic mulch materials can be turned into the soil with a spade or rototiller or placed in your compost pile. A benefit of using an organic mulch material is that it adds organic matter to the soil. If you are gardening in the winter or live in an area with heavy rainfall or wind, do not remove organic mulch. Leaving organic mulch on the soil surface will protect the soil from wind and water erosion and reduce weed germination. The organic mulch will break down over the winter, creating a rich top layer of humus. This method is suitable for minimum or no-till gardening.

References:
(EM 057E) Home Vegetable Gardening in Washington by Carol Miles, pages 20-23
http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf,
https://www.researchgate.net/publication/299916139_Visual_Assessments_of_Biodegradable_Mulch_Deterioration_Are_Not_Indicative_of_Changes_in_Mechanical_Properties

Lesson 4: Seed, Feed and Harvest

PREPARATION OUTLINE

LEARNING OBJECTIVES	**Awareness** • Understand that seedlings started indoors can extend the growing season for many crops **Knowledge** • Identify nutrient content of summer season or warm weather crops (vitamin A, C, fiber, folate, potassium) and other healthful substances (phytochemicals) • Review and consider factors that will affect growing time for edible plants • Learn the basic concept of composting and fertilizing for soil and vegetable crop health **Skill** • Read seed packets or other resources such as seed catalogs to identify growing time needed to harvest • Record predicted days to harvest in garden log with estimated harvest dates • Practice how to transplant seedlings or crops started indoors, a cold frame or greenhouse • Select and plant warm season crops by color and plant part; include fruits such as peppers, tomatoes, cucumbers, tomatillos, and herbs such as basil or dill • Prepare recipe using mid-season or summer fruits and vegetables **Behavior** • Seed, transplant, feed and harvest planted garden • Record efforts in garden log; including time spent doing moderate activity • Prepare and consume harvested produce
ESTIMATED TIME	**60-90 minutes** To minimize lesson time to 60 minutes, consider one or two of the following: 1) Prepare the recipe in advance or eliminate the food sampling and provide the written recipe for participants to try at home. (15-20 minutes) 2) Show visual examples of transplanting techniques instead of a hands-on approach in the garden for participants. Use a diagram or an example of a seedling or start transplanted from a pot or seeding tray. There is a sketch of a transplant in the Educator Background Information on transplanting. (~ 10 minutes) 3) Demonstrate planting techniques in a controlled space or area instead of on-site approach for participants. (~ 10-15 min.)

SUPPLIES	**Teaching:** • F&V Photo Cards of various colors & edible plant parts • Seed packets of tomatoes, cucumbers, summer squash, green beans, and herbs such as dill or basil • Garden journal or log • Easel or chart paper, markers • Hoe or planting stick & gloves • Ruler or yard stick • Watering can • Row markers, permanent marker • Trowel or hand shovel for transplanting • Dish bin or bowl for soaking harvested vegetables in the field *If remote classroom* • Seeding tray and soil (opt.) **Food Tasting** • Spicy Panzanella: cucumber, tomatoes, spicy peppers, bread, lime, olive oil, salt & pepper • Saucepan • Knives & cutting boards • Bowl for salad • Disposable gloves • Measuring cups/spoons • Tongs or serving utensils • Bowls or plates • Napkins, eating utensils
HANDOUTS	*Refer participants to these pages in their Workbooks:* • Herbs Harvest Schedule, Table 7 • Common Herbs Chart, Table 8 • Compost Science • Spicy Panzanella Salad Recipe *Optional (Resource Section):* • FFF Brochure – Summer Squash, or Peppers
PREPARATION	Before class complete these steps: • Review teaching materials, lesson workbook pages. • Copy any optional handouts for distribution. • Read Educator Background Information on Phytochemicals, Transplanting, and Transplanting Options • Gather any garden tools/equipment needed for demonstration. • Display any charts or visuals needed for this lesson.
REFERENCES	1. Vegetables for Greater Nutrition Chart, Table 9 *(WSU SNAP-Ed, 2017.* Adapted from California Dept. of Education 2007) 2. Planting Calendars Table 5 *(EM057E, by Carol Miles, 2013)* *Resource Section* 1. FFF Brochure –Summer Squash or Peppers *(WSU Extension SNAP-Ed, 2017)*

Lesson 4: Seed, Feed and Harvest

TEACHING OUTLINE

Introduction 5 minutes	Welcome • Review key points from Lesson 3: A variety of F&V's provides a variety of nutrients for good health, six plant parts and functions, crops need room to grow to optimum the size and health of plants. • Share Lesson 4 objectives. • Then share: Recording your moderate activity level on a regular basis will help you recognize your physical activity improvements or help you to adjust your physical activity routine.
Anchor 10 minutes	Have participants work in pairs or small groups. Ask participants: • Which fruits and vegetables come to mind when you think of warm weather or summer? • What colors and which plant parts are most plentiful that time of year? • What are your favorites and why?
Add 15 minutes	Remind participants that if the plant part contains seeds, it is the fruit part of the plant (i.e. squash like pumpkins and zucchini; eggplant, cucumbers, peppers, tomatoes and green beans). • So, think of the 'fruit" part of a plant as a 'suitcase' for the seeds. The fruit can be 'sweet' or 'savory.' • Many fruits are high in nutrients such as vitamins A & C, folate, potassium and fiber. • Fruits and vegetables also contain many different phytochemicals essential to good health. • Phytochemicals are compounds found in plant foods and work together with nutrients, like vitamins and minerals to protect health. • Phytochemicals present in a vegetable, vary by the color of the plant. • Research has identified several ways phytochemicals work in the body to prevent chronic disease. They are found in all six parts of the fruit or vegetables, but they are frequently concentrated in the skin which is also the part that provides fiber for healthy digestion.
Apply Workbook, Handout: Table 9, pgs. 30-31	Use the ***Vegetables for Greater Nutrition Chart, Table 9*** from Lesson 1 or choose a variety of F&V photo cards to display/demonstrate the bar graph of warm season crops that are high in the above mentioned nutrients. Good examples will be peppers, tomatoes and winter squash. These types of crops are both high in essential nutrients and fiber but lower in starch than other warm season crops like corn, green beans and shelling peas. • Remind participants that this is a reason to have a variety of crops, plants parts and colors in our gardens and in our daily diet.

Distribute seeds and /or seed catalogs Workbook, Handout: Table 5, pgs. 14-15 Journal or log entry	**ACTIVITY** • Ask participants to take out their garden diagram/sketch and any seeds they brought. As individuals, pairs or a group have them sort through the available seeds/catalogs and find 2-3 additional crops to plant. Encourage them to choose a variety of colors, plant parts and nutrient values. Then, label the planting area on their diagram and indicate which edible plant parts they will be growing. • At this point it will be important to determine which crops can be planted and harvested within the available growing season in your area. • Most seed packets and seed catalogs will list, "days until harvest." • You will need to choose plant varieties of crops that can ripen within the growing season of your area. • Use the ***Planting Calendars Table 5, pages 1-2*** from Lesson 2 in addition to the available seed packets and catalogs to make these decisions. • Encourage participants to add to their garden journal or log. Log today's planting entry with the crop name, planting date, and time spent doing moderate level activity in the garden. Add a column to include projected harvest date of crops already planted and those they will plant today.
Physical Activity Break 3-5 minutes	Remind participants that regular physical activity is part of a healthy lifestyle. • Based on what they have learned and done so far, invite participants to choose 2-4 warm-up and stretching activities that will get them ready for their gardening activities. • Ask them to see if they are experiencing less muscle soreness. If you are walking to a planting area or garden space, pick up the pace and make it a "Power Walk," by vigorously pumping or moving your arms and slightly increasing the speed and length of your walking stride.
Add 10-15 minutes	**Transplanting seedlings or starts:** Important things to remember before transplanting: • Make sure the transplants have had time to "harden off" and are ready to endure the day and nighttime outdoor weather. This will take 3-7 days depending upon weather conditions. Here are the steps: 1. Reduce watering to one light watering per day. 2. Move plants to a protected outdoor area away from heavy wind or rain during the day, and bring them in at night or cover them with a plastic dome top if left outside. 3. Leave plants outside and remove the dome top during the day and cover again during the night. 4. Remove the cover permanently. If you have seedlings/starts from a greenhouse or nursery, there are a few key points that will increase your success:

HINT: May want to write the steps down on chart paper so they can visually see them; Suggest writing them into their Garden Log.	• Transplant in the late afternoon or on a cool, misty day to reduce plant shock. • Avoid exposing the roots to drying air. • Water the transplanted crops immediately to settle the soil around the roots and reduce shock. • Apply a small amount of soluble or liquid fertilizer around each transplant. The directions for mixing a starter solution appear on all soluble fertilizer products. Follow the directions carefully, and do not add more fertilizer to the solution than is recommended, as this can burn the transplant. **Demonstration**: how to transplant Now to actually do the transplanting, we gently loosen the plant from its tray or container and transfer it to the prepared garden area. Use the transplanting diagram in the educator's information as a visual. 1. Dig a transplant hole that is about 1 inch wider and deeper than the transplant pot. If you want to add compost, dig the transplant hole another 1–2 inches deeper and place 1–2 inches of compost in the bottom of the hole. 2. Set the transplant into the soil so that it is slightly deeper than the starting container. 3. Place ½–1 inch of soil over the top of the potting mix and press down gently so the transplant is secure. When transplanting peat pots, cover the pot rim with soil to prevent it from acting as a wick that draws moisture away from the roots.
Apply 10-15 minutes HINT: For Transplanting Options 2 or 3 see Educator Background Material, Transplanting Options	**Planting more seeds:** If your lesson group is planting at a community garden or other site that will accommodate all participants, you may choose to direct seed into the prepared planting area as a team and divide the 2-4 different crops among small planting groups. Have them: • Follow the instructions on the seed packets for spacing, depth of seeds and distance between rows. • Mark rows or planted areas. • Lightly sprinkle with additional water but do not upset the planted seeds.
Add 10 minutes Workbook: Table 7, pg. 20; Table 8, pgs. 22-23	In the garden, be sure to demonstrate how to harvest each kind of available and mature crop. Refer participants to the ***Herbs Harvest Schedule, Table 7*** and ***Common Herbs, Table 8*** workbook handouts. Give the vegetables their first soaking or rinse in the garden and then rinse them again thoroughly in the classroom or kitchen.

	How to Harvest: Demonstrate and Practice • Pinch or snip a few leaves of lettuce, chard or other leafy greens from several plants. Do not pull up the plants. Show participants how to gently loosen and pull up the radishes, carrots or beets and brush excess dirt from the root. You may need a trowel or shovel to loosen root crops. • Gently pinch pea leaves, pods and tendrils from several plants, explain that these parts of the plant are all edible. Remind them not to pull up the plants. • If bean or pea pods are ripe they can be gently pulled from the plant with one hand, while holding on to the stem end with the other. • If you have vine crops that are mature (e.g. summer squash, cucumbers), use garden scissors or a knife to cut the fruit at least 1-2 inches from the stem of smaller fruits. Allow 3-4 inches of stem end for larger vine crops like squash. • Soak harvested crops in a dish bin or other container of cold water, and then thoroughly rinse a second time to remove all soil, drain.
Apply 10 minutes	Now have participants harvest remaining vegetables that are ready. Have them place the harvest into the bins for their first soaking.
Add 5 minutes Feed or Fertilize Provide a visual by writing on easel or chart paper numbers and first letter of each soil nutrient?	**Feeding with added fertilizer:** There are several places to reference and learn what, when and how much added fertilizer or food may be needed for edible crops. This information is often on seed packets and purchased containers of plant food. • A common recommendation for vegetables is to apply 1 pound of a 10-10-10 fertilizer or 2 pounds of a 5-10-5 (or 5-10-10) fertilizer per 100 feet of row. • The first number is the percentage by weight of nitrogen, the second the percentage by weight of phosphorus and the third number is the percentage by weight of potassium in the fertilizer product. • Thus, 100 pounds of a 5-10-10 fertilizer contains 5 pounds of nitrogen, 10 pounds of phosphorus and 10 pounds of potassium. Follow the label directions because applying nutrients when they are not needed can cause problems with the vegetable crops you are growing. **Chart Example:** Fertilizer application of 1 lb. per 100 feet of row • 10% nitrogen • 10% phosphorus • 10% potassium
Food Prep and/or Sampling 10-15 minutes	**Spicy Panzanella:** The time spent will depend upon whether you choose to taste a pre-made sample of the salad or make the recipe together.

Away and Closing 2-5 minutes Workbook, Handout: Compost Science, pgs. 24-25	• Remind participants that the recipe is in the back of their workbooks. • Distribute optional handouts (FFF Brochure: Summer Squash or Peppers). Review what tasks need to be completed before Lesson 5: 1. Test for adequate soil moisture and water accordingly 2. Read ***Compost Science*** handout before Lesson 5 3. Complete garden diagram and record activities in log. • Remind participants of the date/time of our last lesson. Happy Harvesting!

Lesson 4 Educator Background
Phytochemicals

Fruits, vegetables, and their combination of nutrients and phytochemicals likely play a role in preventing or delaying the development of age-related chronic diseases, like cancer and cardiovascular disease. ***The 2016 Dietary Guidelines recommend that most people consume 2 cups of fruit and 2.5 cups of vegetables per day.***

Fruits and vegetables provide important nutrients and fiber that help maintain good health. They are full of phytochemicals, the natural plant compounds that produce the bright color. As opposed to nutrients, omission of phytochemicals in the diet will not cause deficiency symptoms, but including them can have additional health benefits. Some examples include anthocyanins in berries, capsaicin in peppers, and carotenoids in melons, carrots, tomatoes, sweet corn, green leafy vegetables, and green beans. Here is a link to an article the health benefits of eating fruits and vegetables that contain phytochemicals, http://articles.extension.org/pages/27730/health-benefits-of-eating-fruits-vegetables.

Eating large amounts of colorful fruits and vegetables that are high in phytochemicals may decrease the risk of developing diabetes, heart disease, and high blood pressure and may protect from some cancers. Fruits and vegetables that are naturally yellow, orange, red, green, blue, purple, or white in color, along with a diet of whole grains/cereals and beans, can provide a powerful health benefit. For optimum health, create a colorful plate with these naturally beautiful hues:

- Red foods like tomatoes, red peppers, cranberries, cherries and other naturally red foods will help maintain a healthy heart, memory function, and urinary tract health.
- Blue/purple foods such as blueberries, plums, blackberries, purple grapes and cabbage and others help maintain healthy aging, memory, and urinary track health.
- Yellow/orange foods like carrots, sweet potatoes, yellow peppers, oranges, and pumpkin also help maintain a healthy heart, immune system, and night-vision health.
- Green fruits and vegetables like spinach, broccoli, kiwi, green grapes, and green peppers help prevent macular degeneration and cataracts.
- White foods like bananas, garlic, apples, onions and cauliflower help maintain heart health and lower the risk of some cancers.

Reference:
Ohio State University Extension Fact sheet; http://ohioline.osu.edu/factsheet/HYG-5581
Extension Issues, Innovation Impact; Health Benefits of Eating Fruits and Vegetables:
http://articles.extension.org/pages/27730/health-benefits-of-eating-fruits-vegetables

Lesson 4 Educator Background information
Transplanting

Transplants

One way to achieve an earlier harvest date for vegetables is to transplant them into your garden. Most vegetables can be readily transplanted with the exception of root crops such as carrots, beets, and radishes. An advantage of growing your own transplants is that you get to choose the specific varieties for each crop. Oftentimes stores only sell nationally-recognized varieties and these may not be best-suited for your area or taste preference. A sunny, warm area is the main requirement for growing transplants. All vegetable plants need high light intensity to develop normal growth. Less than full daylight exposure causes spindly, weak growth which will not produce satisfactory transplants.

Warm-season vegetables such as tomato, pepper, and eggplant prefer 70–75°F day temperatures and 55–60°F night temperatures for best development. These are about normal windowsill temperatures in the average home. Cool-season crops such as broccoli, lettuce, and cabbage do well with 65–75°F day and 50–55°F night temperatures.

Determine when to sow each vegetable seed by selecting the date you intend to transplant to your garden; count backwards on your calendar the approximate number of weeks needed to grow that vegetable (see Table 4). Do not seed too early, as plants can become root bound in their pots and this can delay their establishment after transplanting.

(L) Seedlings growing in individual containers.

(R) Lettuce transplanted relatively close together when first leaves are formed.

Vegetable transplants do best in a light potting soil that holds water well. You can choose among the many commercial potting mixes available for starting seed.

Harden vegetable plants for 3-4 days before transplanting them to your garden. Hardening will prepare the transplants to endure the colder outdoor temperatures, direct sun rays, and variable moisture. Harden transplants in the following steps:

1. Reduce watering to one light watering per day.
2. Move plants to an outdoor area during the day for several hours where they are protected from direct rain or wind. Remove any dome covers. Bring them in at night.
3. Increase the outdoor, daytime exposure 1-2 hours each day and bring them in at night.
4. After 3-7 days, they can be transplanted.

Dig a transplant hole that is about 1 inch wider and deeper than the transplant pot. If you want to add compost, dig the transplant hole another 1–2 inches deeper and place 1–2 inches of compost in the bottom of the hole. Set the transplant into the soil so that it is slightly deeper than the starting container (Figure 5). Place ½–1 inch of soil over the top of the potting mix and press down firmly so the transplant is secure. When transplanting peat pots, cover the pot rim with soil to prevent it from acting as a wick that draws moisture away from the roots.

Transplant in the late afternoon or on a cool, misty day to reduce transplant shock. Do not expose the roots to drying air. Water the transplanted vegetables immediately to settle the soil around the roots and reduce shock. Apply a small amount of soluble or liquid fertilizer around each transplant. The directions for mixing a starter solution appear on all soluble fertilizer products. Follow the directions carefully, and do not add more fertilizer to the solution than is recommended, as this can burn the transplant.

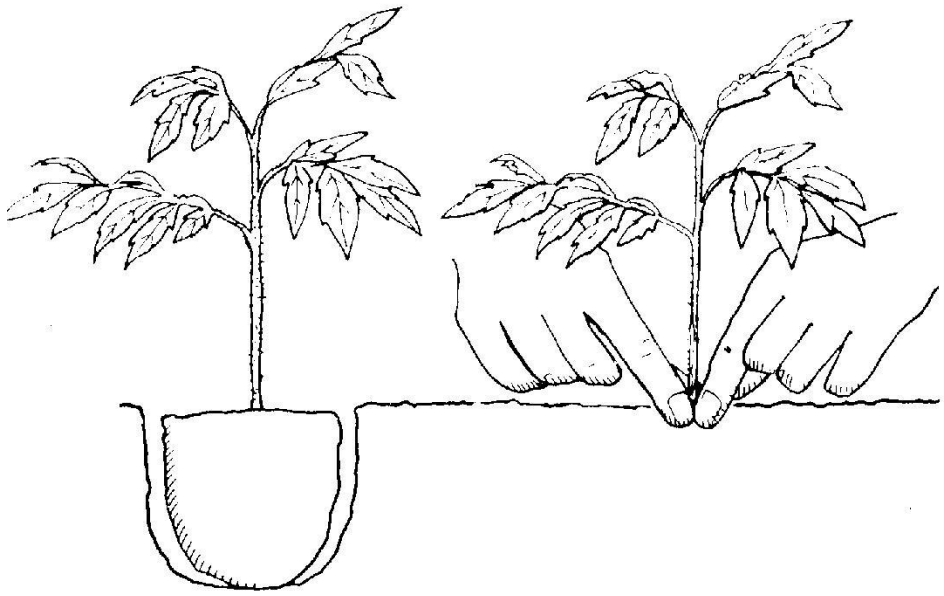


Figure 5. Transplant depth should be slightly deeper than in starting container (Antonelli et al. 2004, 10).

Reference:
(EM057E) Home Vegetable Gardening in Washington by Carol Miles, pages 10, 13-14 http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf

Lesson 4 Educator Background Information
Transplanting Options: Advanced Planning – Seed, Feed and Harvest

Option 1: Demonstration by educator (Low level student participation)
The demonstration can take place in a classroom or garden setting performed by the educator. One or two vegetable seedlings or plant starts should be purchased in advance at a nursery or other retail outlet that sells vegetable plant starts. They can be any seedling that is in season and has developed two sets of well-established leaves beyond the cotyledon or very first leaves.

- If working in a classroom setting, you will need a larger pot or container with soil in which to transplant the seedlings.
- Follow the transplanting steps described in Lesson 4, Apply #1, Transplanting seedlings or starts.
- Use the Transplanting Diagram in the Lesson 4, Educator Background Information – Transplanting, as a visual for participants or as a separate handout for their workbook.

Option 2: Demonstration by educator **with help** from 3-6 other class participants, (Medium level student participation)
The demonstration should take place in a garden setting performed by the educator with class participant helpers. Several vegetable seedlings or plant starts should be purchased in advance at a nursery or other retail outlet. The educator may also choose to start seedlings in advance in a seeding tray and/or invite class participants to bring any vegetables starts they may have or wish to contribute. You may use any type or variety of seedlings in season that have developed two sets of well-established leaves beyond the cotyledon or very first leaves. Make sure there is an area clear of weeds, rocks and other plant debris for the vegetable plant starts.

- In the garden, the educator demonstrates how to remove the seedlings from the trays or small pots and follows the transplanting steps described in Lesson 4, Apply, Transplanting seedlings or starts.
- Next have the participant helpers demonstrate one or two at a time in separate areas allowing observing participates to see the process.
- Repeat until all available seedlings have been transplanted.
- If desired, use the Transplanting Diagram in the Lesson 4, Educator Background Information – Transplanting, as a visual for participants or as a separate handout if teaching in a classroom setting.

Option 3: Demonstration by educator **with participation by all participants**, (High level student participation)

The demonstration should take place in a garden setting performed by the educator with all class participants having the chance to transplant at least once vegetable start after the educator's demonstration. The educator will need to purchase a half or full flat of vegetable seedlings in advance at a nursery or other retail outlet. This is an allowable SNAP-Ed expense. Most flats are filled with 4 or 6-pack containers of seedlings. There are usually 18-24 separate cells with a single seedling in each cell.

The educator may also choose to start seedlings in advance in a seeding tray on their own (approximately $3 without seed starting mix or soil). You can also invite class participants to bring vegetables starts, or start seeds as a group exercise well in advance of the transplanting lesson (approximately 3-4 weeks). You may use any type or variety of seedlings in season that have similar growing periods.

- Follow the seed planting instructions on the seed packet when planting the tray.
- Allow time for germination (7-10 days) and growth to the point that seedlings have developed two sets of well established leaves beyond the cotyledon or very first leaves (14-21 days).
- Keep the seeding tray in a warm, well lit area such as a sunny window, under a grow light or in a greenhouse.
- Keep the seedlings evenly moist but not soaking wet. The cells will allow water to drain into the tray, but the cells should not be continuously sitting in excess water.
- You may use a clear, plastic dome top to add warmth and contain moisture (approximately $1). This is optional. Once seedlings have established sets of leaves, remove the dome top.
- When seedlings have developed two sets of well established leaves beyond the cotyledons, allow time to "harden off" the vegetable starts so they will be ready for outdoor conditions (3-7 days).
- See "hardening off" directions in Lesson 3: Food, Fun and Fitness: Lesson "Away" section, page 5.
- In the garden, follow the transplanting steps described in Lesson 4, Apply, Transplanting seedlings or starts.
- Use the Transplanting diagram in the Lesson 4, Educator Background Information – Transplanting, as a visual for participants.

- With class participant assistance, separate the seedlings from the 4 or 6-pack cells so that each participant has a vegetable start to transplant. Take turns with 2-4 people transplanting along a measured, prepared row or planting area. You may choose to start at either end of the measured row with a ruler or measuring tape to indicate spacing between rows and work toward the center. Or, you may have participants start at one end of a row on opposite sides of the planting area and work toward the other end. This should allow room for people to work and others a chance to observe.

NOTE: A link to several examples with planted cells.
https://www.google.com/search?q=free+pictures+of+seedling+trays&safe=active&rls=com.microsoft:en-US:IE-SearchBox&biw=1524&bih=696&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwiu3NHv-pLSAhVY0GMKHc29CVsQsAQIHA




Lesson 5: Healthy Soil for a Healthy Harvest

PREPARATION OUTLINE

LEARNING OBJECTIVES	**Awareness** • The Pacific NW coastal region can grow foods all year round • Many cool season crops can be grown August-November in some areas of Washington State **Knowledge** • Identify which crops continue to grow through fall and mild winters • Understand frozen and canned fruits and vegetables are picked at harvest and are healthy choices, rich in nutrients • List the steps to closing the growing season **Skill** • Harvest any mature cool or warm season crops • Read seed catalogs for information on time needed before winter harvest • Select and plant vegetables and herbs for the fall garden • Plan for healthy soil for next season **Behavior** (maintenance) • Harvest and consume mature garden vegetables • Water, weed, feed and or mulch current crops • Clean and clear harvested areas to prevent crop disease • Continue to log garden activities and how to care for your garden crops
ESTIMATED TIME HINT: Participants can be referred to videos to use as refreshers after series completion.	**60-90 minutes** If you need to minimize time to 60 minutes, do one or two of the following: 1) Prepare the recipe in advance or eliminate the food sampling and provide the written recipe for participants to try at home. (15-20 min.) 2) You may choose to seek out "How to videos" that show how to harvest various crops. They can be found at Seed Company sites like Burpee Seed Company, http://www.burpee.com/gardenadvicecenter/standard-articles-and-videos/gardening-how-to-articles/harvesting-vegetables/article10387.html, the National Gardening Association, http://garden.org/, Good Gardening Videos https://goodgardeningvideos.org/fall-crops-harvesting/ and YouTube. (~ 10-15 min.) 3) Demonstrate planting techniques in a controlled space or area instead of a "hands on" approach for participants. (~ 10-15 min.)

SUPPLIES	**Teaching:** • Seed catalogs for locations where a fall garden can be planted • Seeds for cool season crops • Garden journal or log • Spades, hoes, rakes • Planting stick & gloves • Ruler or yard stick • Watering can • Row markers, permanent marker • Bins to wash harvested vegetables • Bucket or container for garden waste **Food Tasting** • Healthy Harvest Salad (pre-roasted Winter squash, hearty greens, pre-cooked whole grain like quinoa or bulgur; Dressing (see recipe) • Saucepan • Knives & cutting boards • Bowl for salad • Disposable gloves • Measuring cups/spoons • Tongs or serving utensils • Bowls or plates • Napkins, eating utensils
HANDOUTS	*Refer participants to the Workbook for the following materials:* 1. Vegetable and Fruit Storage Chart, Table 10 2. Harvest Tips, p 26 3. Healthy Harvest Salad Recipe, p 41 4. Community Resources, p 42 *Optional See Resource Section:* 5. FFF Brochure – Winter Squash or Green Beans *(WSU Extension SNAP-Ed)*
PREPARATION	Before class complete these steps: • Review teaching materials, print and prepare any additional handouts • Read Educator Background Information #1: Soil Preparation, Management and Fertilizing • Read Educator Background Information #2: Soil Monitoring, Harvesting and Preparation
REFERENCES	1. Cool and Warm Season Crops in WA Region Maps *(EM057E by Carol Miles, 2013)* 2. Seeding Recommendations for Common Vegetable Crops in WA *(EM057E by Carol Miles, 2013)* 3. Suggested Planting Calendar *(EM057E by Carol Miles, 2013)* 4. Vegetables for Greater Nutrition Chart *(WSU SNAP-Ed, 2017 Adapted from California Dept. of Education 2007)* 5. Composting Science *(Garden Mosaics is funded by the National Science Foundation Informal Science Education program, and the College of Agriculture and Life Sciences at Cornell University.)*

Lesson 5: Healthy Soil for a Healthy Harvest

TEACHING OUTLINE

Introduction 5 minutes	Welcome • Review key points from Lesson 4: Review the common nutrient content of warm weather crops and the relationship to good health; importance of "days to harvest" for successful crops. • Share Lesson 5 objectives • It's important to understand that healthy soil is necessary for healthy crops.
Anchor 10 minutes	Have participants work in pairs or small groups. Ask them to share what seasonal produce they have eaten recently. Ask a couple of the following questions and have participants share their comments and opinions. 1. What frozen or canned vegetables throughout the year? 2. How do you use or prepare them? 3. Which are you favorites? 4. How does the fresh seasonal produce you tried recently compare to those frozen or canned versions you have tried? What was its appeal? (i.e. color, texture, flavor, cost; easy access, convenience).
Add 5 minutes Workbook, Handout: Vegetable and Fruit Storage Chart, Table 10, pgs. 34-35	Share the following information with class participants. Refer participants to the ***Vegetable and Fruit Storage Chart, Table 10*** handout in their workbook. • In order to preserve the nutritional value of fresh produce, consumers and gardeners should practice proper storage. • Research indicates that a change in nutrient composition from harvest to consumption depends upon the nutrients a vegetable contains and the handling of the produce after harvest. • Nutrient retention is optimized if fruits and vegetables are gently handled and stored at high relative humidity and refrigerated. • If foods are processed soon after harvest they retain many of the nutrients we need. In some cases, processing fresh produce with fat soluble nutrients such as carotenoids, and phytochemicals like lycopene (in tomatoes), makes the nutritional content more available for absorption by the body. • While we may have preferences for fresh or frozen, a good diet should include a variety of fruits and vegetables, whether they are fresh, frozen, canned, dried, or otherwise preserved. The Nutrition Facts label on processed products accurately reflects the nutritional content.
Add 10 minutes	• Let's turn now to consider a fall garden. It will be important to determine which crops can be planted and harvested within the remaining and available growing season in their area.

Refer to Workbook, Handouts: Tables 1, 4 and 5, and Table 9 on pgs. 8, 11-13, 14-15, and 30-31 Refer to lesson 1 garden photo visual aids with hoop covers and the tables in their Workbook.	• Some seed packets and most seed catalogs will list, "approximate days until harvest." Use the ***Seeding Recommendations for Common Vegetable Crops in WA, Table 4*** from Lesson 1. Participants will need to choose plant varieties of crops that can ripen before the **first killing frost**, which is shown on the ***Region Maps, Figure 1*** in the workbook. Use some of the pictures of gardens from Lesson 1 to remind participants that in both the early spring and fall that cold frames, hoop houses or gardens that are covered can extend the growing season. If this is an option, it may influence which fall crops or varieties of crops to plant. Have participants review the charts from previous lessons: • Seeding Recommendations for Common Vegetable Crops in WA, Table 4 • Region Maps, Figure 1 • Suggested Planting Calendar, Table 5 • Vegetables for Greater Nutrition Chart, Table 9
Apply 5-7 minutes Pass out seed catalogs and packets of cool season crops Refer to Workbook, Handout: Table 1, pg. 8 Journal or log entry	Along with the information in seed catalogs have participants select 1-3 cool season crops that can be planted and harvested in the remaining growing season in their area. • Most cool season crops will need to mature in 65 days or less; some examples include loose leaf lettuce, spinach, chard, kale, mustard greens, Tatsoi and other Asian greens. • Depending upon the variety, cilantro and radishes will mature in 4-5 weeks. • Remind participants that keeping their garden journal or log current will contribute to a healthy harvest. Log today's gardening activities, even if no seeds are sown, and the time spent doing moderate level activity.
Physical Activity Break 3-5 minutes	Based on what participants have learned and done so far, invite participants to choose the warm-up and stretching activities they prefer and work best for their level of gardening activity.
Apply 10-15 minutes Workbook, Handout: Harvest Tips, pg. 26 and/or Healthy Harvest Salad Recipe	**Food Harvesting and/or Tasting:** Refer participants to the ***Harvest Tips*** handout in their workbook. • <u>Option 1:</u> If your garden is still producing and the growing season has not yet come to a close, you may choose to harvest any crops that are mature for a sample tasting or to add to a salad recipe. • <u>Option 2</u>: If no new seeds will be planted in the lesson, more time can be taken to have participants help prepare the Harvest Salad recipe provided with this lesson.
Add 20 minutes	Verbally describe the steps to preparing the garden for the off-season. There may be a small area that you can clear as an example of how to treat the rest of the garden as weather and time permits.

Demonstration Refer to Workbook, Handout: Composting Science from Lesson 4, pgs. 24-25	**Preparing the Garden for the Off-season** 1. Pull up old vines and vegetable plants. Discard in your yard waste container. If you are composting yard debris yourself, you may add the debris to your compost pile or bin as long as it is not diseased with mildew, mold, rust or other visible fungus. 2. You may also cut old stalks and vines at soil level, discard the plant debris, then break up the roots and work them into the soil. Many crops such as peas and other legumes have nodules on their roots that fix/add healthy nitrogen into the soil. 3. If available, add organic material such as aged and well-rotted manure, compost, or leaves into the soil. 4. You also can apply a light covering of ammonium sulfate (20-0-0) at the rate of a pound per 1,000 square feet of garden area. Spade all these materials into the soil, mixing well to a depth of 8 to 12 in. 5. You may leave the area intact where you've planted root crops if they are not fully harvested. They can be mulched until you are ready to dig them up. Any mulch such as leaves, straw or grass clippings will help extend the digging season by weeks. Place straw or other mulch around root crops such as carrots, beets and parsnips. Keep mulch about 2 inches away from the vegetable stems. Parsnips and other root crops turn sweeter after the ground cools. 6. After a light frost, harvest winter squash and pumpkins. A light frost may frost your fruit, the surrounding vegetation or a light top layer of soil but does not freeze the soil deeper. Harvest before a heavy frost is able to damage the fruits. Heavy frost penetrates deeper than the very top layer of the soil, making it difficult to dig into the soil. 7. Cut from the vines leaving 3 to 4 inches of stem on the fruit. Discard the vines or compost.
Apply: 20-25 minutes Practice preparing garden for winter.	• Have participants practice the *demonstration* steps if at garden site.
Away and Closing 5 minutes Refer to Workbook, Handout: Community Resources, pgs. 44-45	• Remind participants that lesson recipe is in the back of their workbook • Encourage participants to make use of the local resources: ▪ County Extension offices such as Master Gardeners, city or county environmental education and community garden groups. Let them know that the link to our MGs (http://mastergardener.wsu.edu/) is in the back of workbook. • Add that the National Gardening Association is a reliable source for information and can be easily accessed from a library computer http://garden.org/.

If ask about preserving their garden produce, suggest calling their nearest WSU Extension Office	• Lastly, many counties have free resources through the public works, solid waste and/or health department about yard waste, and composting.
	• It has been my pleasure to work with you in planning and planting an edible garden. I am looking forward to hearing about your gardening accomplishments, eating home grown fruits and vegetables and the strength gains you are bound to achieve through your work.
	• Please feel free to send your garden photos, recipes and other stories to our Extension office address (list address). I would welcome the chance to share your success with other community members and our funders. Here is one *(or are some)* of my favorite garden quotes. At the end of the gardening season, please send me one of yours.
	  • *The greatest gift of the garden is the restoration of the five senses*. ~Hanna Rion
	  • *My garden is my favorite teacher*. ~Betsy Cañas Garmon
	  • *Gardening is cheaper than therapy and you get tomatoes*. ~Author Unknown
	  • *A garden is always a series of losses set against a few triumphs, like life itself*. ~May Sarton
	
	Happy Gardening and Healthy Eating!

Lesson 5 Educator Background
Soil Preparation, Management and Fertilizing

A good garden soil allows water to enter and excess water to drain from the root zone. It has the capacity to hold water, air, and nutrients and make them available for plants and microorganisms. It has a stable structure that is easy to dig and resists erosion.

Resources on Gardening in Washington State
For questions on common vegetable growth problems from lack of proper and essential nutrients, contributed by several Master Gardeners: http://gardening.wsu.edu/category/vegetables/
For questions on Gardening tips – Fertilizer by Marianne C. Ophardt, WSU Extension Faculty http://ext100.wsu.edu/gardentips/category/fertilizer/.

NEXT STEPS IN STARTING A GARDEN
Preparing the Soil
Few gardeners are satisfied with their soil. Complaints range from soil that's too heavy and poorly drained to soil that's too sandy and dry. The solution for both these problems is the addition of stable organic matter. Good quality compost is one of the easiest ways to add organic matter to your soil. The compost should be dark and crumbly, with no identifiable chunks of bark, twigs, pieces of wood, or other items. You can usually purchase compost in bulk from a local garden center.

How much is needed? You should never add more than one-third by volume of relatively stable organic matter to your soil. That means if you're working the soil to a depth of six inches; don't add more than two inches of organic matter. Some affordable options would include municipal compost or mushroom compost, which is available in some areas of the state.

To thoroughly mix organic matter into the soil, use a spading fork. This is hard work. If you find the task too backbreaking, consider renting a rototiller. It will also come in handy for working fertilizer into the soil, which is the next step.

Fertilizing
If you're starting a garden in a brand new spot and adding organic matter, you'll also want to add some fertilizer. An excellent organic fertilizer is compost animal manure.

Resources on Fertilizing the Vegetable Garden – Colorado State University
A common recommendation for vegetables is to apply 1 pound of a 10-10-10 fertilizer or 2 pounds of a 5-10-5 (or 5-10-10) fertilizer per 100 feet of row. The first number is the percentage by weight of nitrogen, the second the percentage by weight of phosphorus and the third number is the percentage by weight of potassium in the fertilizer product. Thus, 100 pounds of a 5-10-10 fertilizer contains 5 pounds of nitrogen, 10 pounds of phosphorus and 10 pounds of potassium. Follow the label directions, applying nutrients not needed can cause problems with the vegetables you are growing.

By C.E. Swift, former Colorado State University area extension agent, Horticulture, Tri River Area and J. Self. Published 4/2003, Revised 5/2014. For more information on soil testing go to the fact sheet fertilizing the Vegetable garden – 7.611
http://extension.colostate.edu/topic-areas/yard-garden/fertilizing-the-vegetable-garden-7-611/

Lesson 5 Educator Background
Soil Management, Harvest and Storage

Integrated Pest Management (IPM)

Insect pests, diseases, weeds, birds, rodents and other vertebrate animals can affect your garden's productivity and aesthetics. In combination, they have an additive effect. For example, rodents, insects, and diseases tend to be more common in weedy gardens. IPM is the science of using multiple targeted tactics that maximize plant pest and disease control and minimize environmental impact. Among the wide range of IPM options is cultivation, mulching, physically excluding or removing pests, advancing planting or harvest dates, inter-planting, using resistant plant varieties, enhancing the number of biocontrol organisms or environments that support them, and applying environmentally-friendly pesticides.

For questions on IPM contact Master Gardeners at
http://hortsense.cahnrs.wsu.edu/Home/HortsenseHome.aspx

Fact sheets available for download at
http://gardening.wsu.edu/

Sanitation

Regular removal of plant debris during the growing season is another useful preventive IPM method. Many plant diseases and some insect pests overwinter in gardens on dead plants or vegetables that were not harvested. Do not compost infected plant material, as many home composts do not become hot enough to reliably kill disease-causing organisms, weed seeds, or insects. Similarly, tilling any remaining plant material after the growing season into your garden can cause insect pest and disease problems the following season.

Monitoring

Look for problems in your garden each week and treat appropriately before the damage becomes severe. It is important to accurately identify the problems in order to determine how best to control it. For help in identifying insect pests and diseases, contact the Master Gardener clinic in your county (http://mastergardener.wsu.edu/mgpcounty.html). Be prepared to select the type of management program you are prepared to use, such as no-chemical, organic-only, or conventional pesticides.

Harvesting

To enjoy the highest quality flavor and texture from the vegetables you grow, harvest them at their prime maturity. If you are new to gardening and unsure about the best size or stage of maturity for your vegetable crops, try them at different stages and see what you prefer. The following are some general guidelines.

Pick tomatoes when they are fully colored but still firm. When picked at this stage, the tomatoes can be stored for 1–2 weeks. Overripe tomatoes quickly lose flavor as well as texture.

Snap beans are best when the bean is just beginning to develop in the pod. However, some people prefer them at a slightly more mature stage. When beans are full-size in the pod, they can be harvested and shelled.

Harvest summer squash when they are 4–7 inches long and the skin feels soft and rubbery. Once the skin begins to feel smooth or slick, they are past the best eating stage.

Harvest sweet corn as soon as the kernels are well-filled and milky. The tip of the ear within the husk should be blunt and not pointed. If in doubt, peel back the husk and examine the tip before you break off the ear. If it is not ready, just fold the husk back over the ear, and check again in a week or so.

Begin to harvest head lettuce and cabbage as soon as the heads become firm. If you have a number of plants, you may want to begin harvesting when they are immature, which will spread out the harvest over the growing season. Cabbages with firm heads can be given a quarter-turn twist to break part of the roots and slow growth. This can also help prevent splitting.

Beets, turnips, and kohlrabi are usually best at 2–2½ inches in diameter. They will grow larger if harvest is delayed, but may lose flavor and become woody.

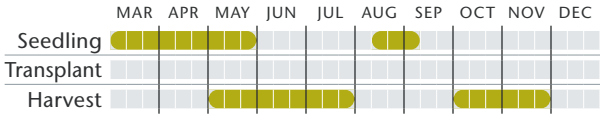
Harvest winter squash (Hubbard, acorn, butternut, etc.) when they are fully mature and the skin is hard and waxy. Winter squash can be left in the garden until cold or wet weather begins in the fall, but need to be harvested before temperatures remain below 40°F for several days at a time. Pick winter squash with the stems attached.

Reference:
(EM057E) Home Vegetable Gardening in Washington by Carol Miles, pages 20, 23-24
http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf

Section 3
Other Resources

All About Peas

Seasonal Crop Growth



Adapted from Miles et al. 2010, 6-29–31

Nutrient *Power Pack*

Peas contain key nutrients that benefit your health. ½ cup provides the following Daily Value (%DV).

Vitamin A ▸ 10–19 %

More than 20 % **◂ Vitamin C**

Folate ▸ 10–19 %

2–9 % **◂ Potassium**

Calcium ▸ 2–9 %

2–9 % **◂ Iron**

Fiber ▸ 10–19 %

ESHA Food Processor 11.2.23; database V 11.2.0 (2016); FDA Guidance for Industry Food Labeling Guide (2013)

Did You Know?

* Washington State grows three types of peas! The fresh, dried and seed peas grown across the state are all full of vitamin C and protein.
* Peas are one of the **oldest cultivated crops,** and have been eaten by humans for more than 9,000 years!
* **Peas and legumes** are great plants for farms because they take nitrogen from the air and fix it into the soil. This helps future plants grow.

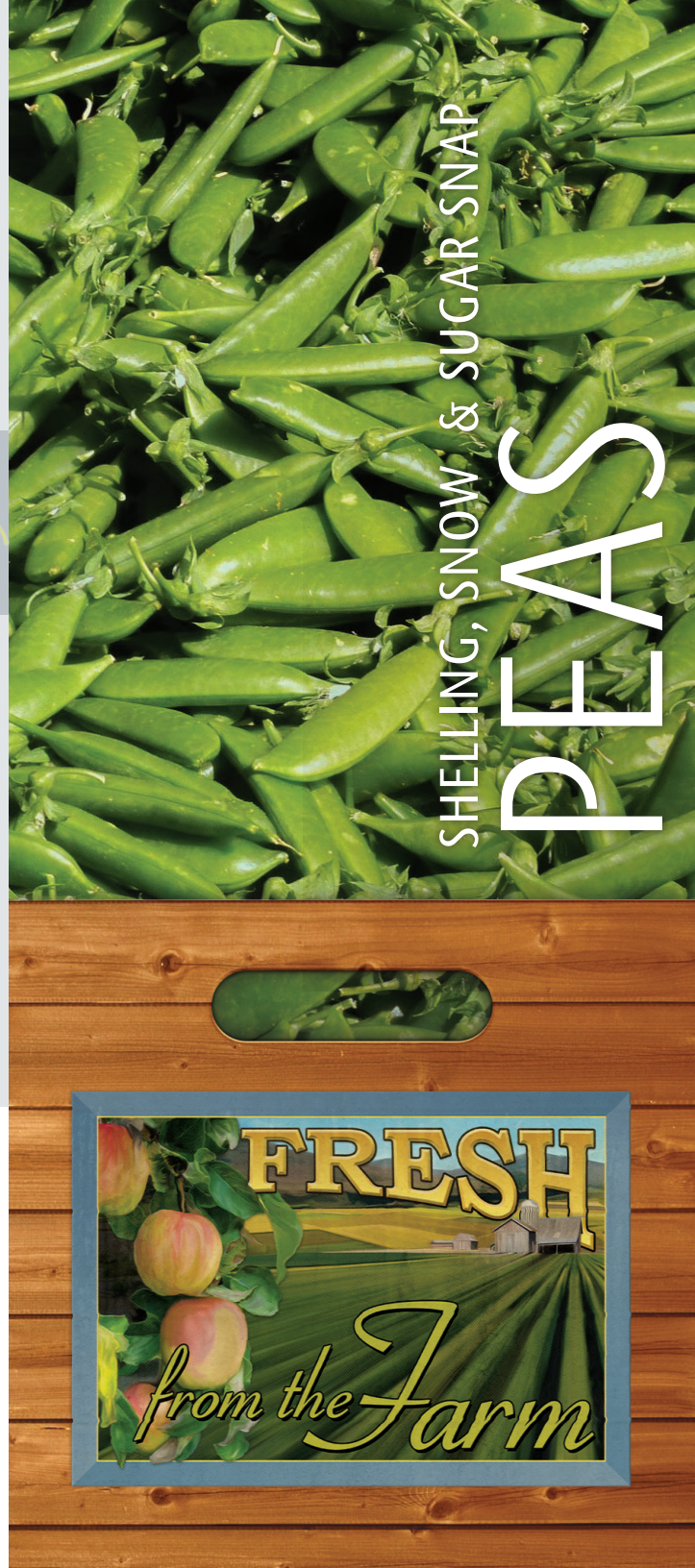
Distributed by

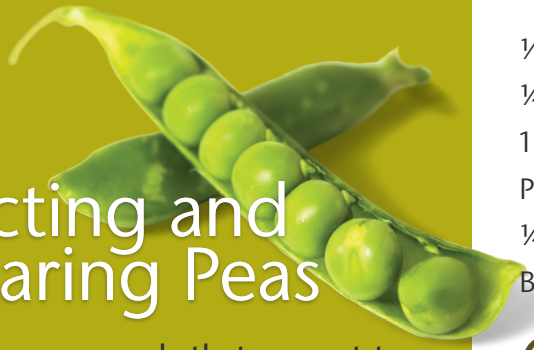
[Agency contact info]

More brochures to help you add fruits and vegetables to your diet are available at ***nutrition.wsu.edu.***

SNAP-Ed
WASHINGTON STATE UNIVERSITY EXTENSION

Adapted from the WIC and Senior Farmers Market Nutrition Program *Fresh from the Farm* series (2004) by Washington State University's SNAP-Ed Nutrition Education Program. Designed by Andrew Mack.





Selecting and Preparing Peas

- Choose green pods that are not too big—large peas can be old and tough.
- One pound of unshelled pea pods will yield about 1 cup of peas (2 servings).
- Peas should be stored in the refrigerator, and used within 3 to 5 days.
- Shell peas then steam or boil for 5 minutes, or cook peas in the pod then shell them. Shelled peas can be added directly to stir fry, boiling rice, soup or stews and will cook along with the other ingredients.
- Unlike shell peas, snow peas and sugar snap peas don't need to be shelled! Eat them raw, or cook for 3 to 5 minutes.
- If fresh peas are not available, frozen peas are a good substitute.

Marinated Sugar Snap Peas

Makes 3 servings

½ pound sugar snap peas
¼ small onion, thinly sliced
1 garlic clove, minced
Pinch of sugar
¼ cup oil
Black pepper, to taste

1. Heat a pot of water to boiling. Add peas and cook 1 minute. Drain peas and rinse under cold running water.
2. Place peas in a bowl. Add onion, garlic, sugar, oil, and pepper. Toss gently.
3. Refrigerate, covered, at least 30 minutes before serving.

Couscous Salad

Makes 5 servings

¾ cup dry couscous
½ cup dried cranberries
1 cup boiling water
½ cup low-fat Italian salad dressing
1 cucumber, peeled, seeded and diced (about 1 cup)
2 green onions, sliced
¾ cup shelled peas, cooked
¼ cup toasted pecans, chopped

1. Place the couscous and cranberries in a large bowl.
2. Pour boiling water over the mixture; cover and let stand until just warm. Fluff with a fork to separate.
3. Add salad dressing and mix gently.
4. Wash and prepare vegetables and chop nuts.
5. Add to salad and toss lightly to distribute.

Adapted from www.foodhero.org

Asian Snap Pea Salad

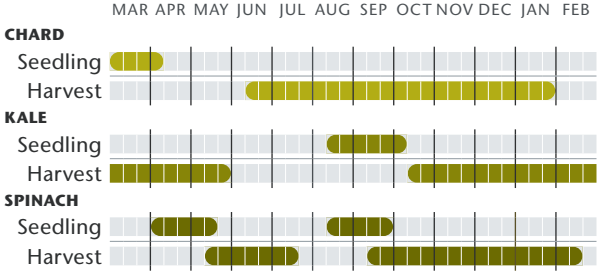
Makes 2 servings

1 pound fresh sugar snap peas
1 small bunch (about ⅓ cup) fresh cilantro or parsley
2 tablespoons oil
¼ teaspoon sesame oil (optional)
2 tablespoons rice vinegar
¼ teaspoon salt

1. Blanch peas in boiling water for 2 minutes.
2. Drain immediately and cover with ice water until cooled.
3. Chop cilantro.
4. In a medium bowl, mix oil, vinegar and salt. Whisk to combine.
5. Drain peas. Add peas and cilantro to the bowl, and toss to combine.

All About Greens

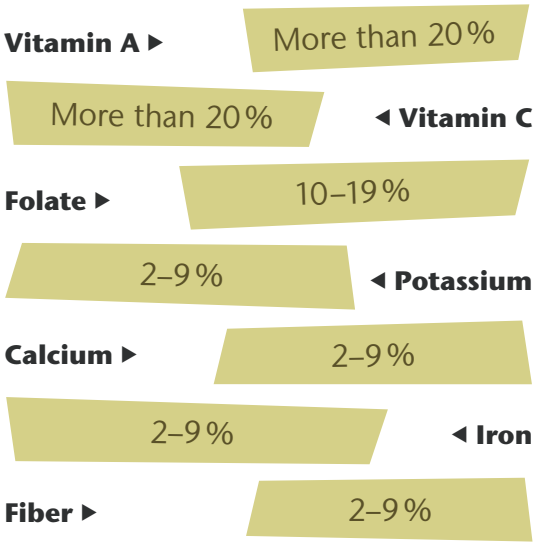
Seasonal Crop Growth



Adapted from Miles et al. 2010, 6-29–31

Nutrient *Power Pack*

Hardy greens contain key nutrients that benefit your health. ½ cup provides the following Daily Value (%DV).



ESHA Food Processor 11.2.23; database V 11.2.0 (2016); FDA Guidance for Industry Food Labeling Guide (2013)

Did You Know?

* Chard is from the **same family** as beets, but puts all of it's energy into growing leaves. Try the leaves from both plants to **taste the similarity.**
* Eating hardy greens contributes to **healthy eyes, bones and teeth.**

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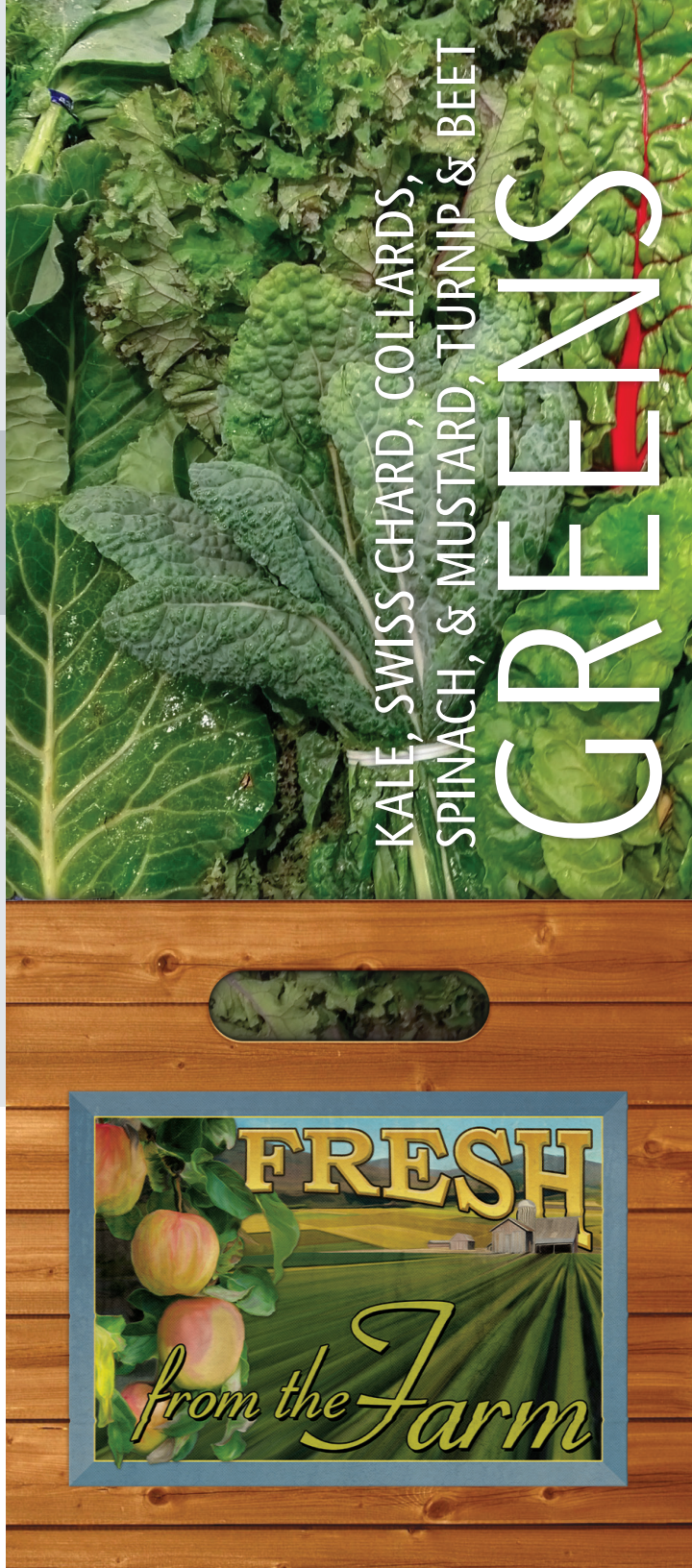


Selecting and Preparing Greens

- Choose crisp leaves with a nice green color. Avoid yellowed, browned or wilted leaves. Smaller leaves will have a milder flavor and will be more tender.
- Refrigerate unwashed greens in a plastic bag with a damp paper towel. Best if used within one week.
- Wash well in cold water and remove tough stems before cooking. Swiss chard stems are edible, but must cook longer than leaves.
- To steam greens, add a small amount of water at the bottom of a pot and cook for 5 to 10 minutes.
- One pound of fresh greens will cook down to about 1 cup (2 servings).
- Mellow strongly flavored greens like collards, turnip, beet or mustard greens by dropping greens in a pot of boiling water and cooking until just wilted. Cool under running water to stop cooking.
- Try raw spinach or young greens in salad.

Garlicy Greens

Makes 2 servings

2 teaspoons oil
2 cups dark, leafy greens (any type)
1 clove fresh garlic, minced
2 tablespoons water
Salt and pepper, to taste

1. Wash greens well, remove tough stems, and chop.
2. In a skillet, heat oil on medium heat.
3. Add greens and garlic. Stir and cook for 1 minute.
4. Add water, cover and cook over medium heat for 5 to 8 minutes, stirring frequently. Remove from heat and serve.

Microwave: Combine all ingredients in a microwavable dish. Cover and cook for 3 to 5 minutes.

Spinach & Rice Casserole

Makes 2-3 servings

½ cup chopped onion
1 clove garlic, minced
1½ tablespoons vegetable oil
1 pound fresh spinach, chopped
2 eggs, beaten
2 cups cooked brown or white rice
½ cup low-fat milk
¾ cup shredded cheese
1 tablespoon light soy sauce

1. Pre-heat oven to 350° F.
2. Add vegetable oil to a pan and sauté onions and garlic over medium heat.
3. When onions are soft, add spinach or greens. Cook for 2 minutes.
4. Add remaining ingredients and mix well.
5. Spread mixture evenly in a greased casserole dish. Cover with a lid and bake for 35 minutes.

Skillet Roasted Potatoes & Greens

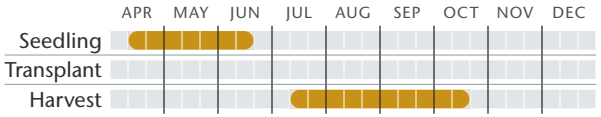
Makes 4-5 servings

4 medium potatoes
1 cup tender greens, chopped
2 tablespoons vegetable oil
1 large clove garlic, minced
Salt & pepper, to taste
2 teaspoons vinegar *(optional)*

1. Pre-heat skillet on MEDIUM-LOW. Wash potatoes and cut into ¼-inch slices. *(If using new or gold potatoes, simply cut into small chunks.)*
2. In a large bowl, mix the potatoes and oil. Add to potatoes to skillet, cover skillet and cook for 5 minutes. Stir, and cook for another 5 minutes.
3. Turn heat to LOW and add greens and garlic. Cook until greens are done, about 5 to 10 minutes. Remove from heat and add salt and pepper to taste.
4. *Optional* Add vinegar to bring out the flavor of the greens.

All About Beets

Seasonal Crop Growth



Adapted from Miles et al. 2010, 6-29–31

Nutrient *Power Pack*

Beets contain key nutrients that benefit your health. ½ cup provides the following Daily Value (%DV).

Vitamin A ▶ Less than 2% (BEETS) / More than 20% (GREENS)

2–9% (BEETS) / 10–19% (GREENS) **◀ Vitamin C**

Folate ▶ Less than 2% (BEETS) / 10–19% (GREENS)

2–9% (BEETS) / 2–9% (GREENS) **◀ Potassium**

Calcium ▶ Less than 2% (BEETS) / 2–9% (GREENS)

2–9% (BEETS) / 2–9% (GREENS) **◀ Iron**

Fiber ▶ 2–9% (BEETS) / 2–9% (GREENS)

ESHA Food Processor 11.2.23; database V 11.2.0 (2016); FDA Guidance for Industry Food Labeling Guide (2013)

Did You Know?

* **Handling beets can stain your hands!** Try placing your hands inside plastic sandwich bags while you prepare beets to keep them from turning **'beet red'.**

* Beets come in a wide range of **colors** and sizes, such as red, white, golden or yellow, chioggia (striped), and baby beets.

* **Beet greens** are extremely high in **vitamin A,** while the **beet root** is a good source of **folate.**

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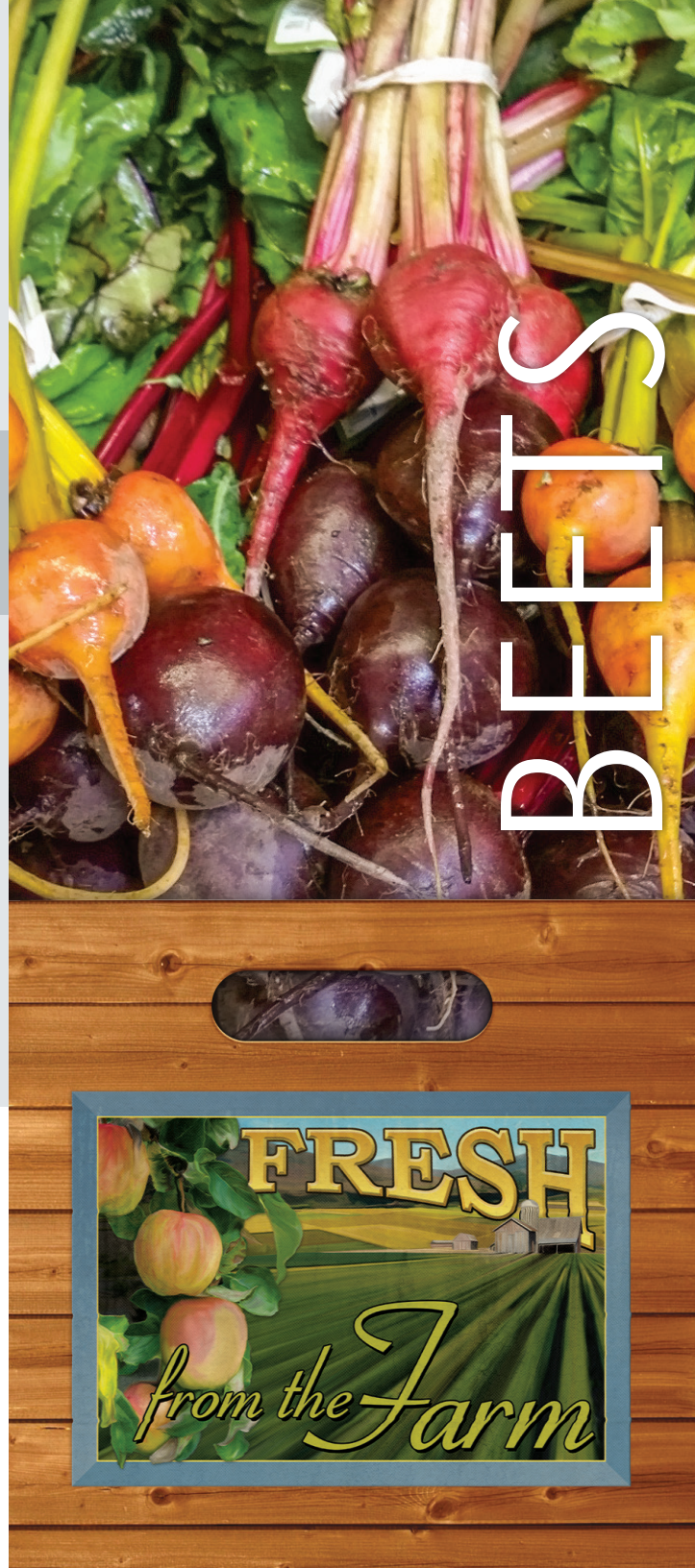


Selecting and Preparing Beets

- Beets come in a variety of colors, however look for small- to medium-sized beets with skins that are smooth and firm. Avoid beets that are soft or shriveled, or that have rough skins.
- Beets should be kept cool and dry in the refrigerator, and used within 2 weeks.
- A half pound of beets makes 1 to 2 servings.
- Wash beets well. Cut off greens, leaving 1 to 2 inches of stem. Beet greens can be eaten as you would spinach. Try them steamed, or raw in salad.
- Leave skins on when boiling or steaming. Cook covered in boiling water until tender (15 to 45 minutes, depending on size.) Cool slightly and rub off skins.
- Roasting beets is easy, too. Wash, peel, and cut into 1″ pieces. Wrap in foil and roast in a 350° F oven for about an hour.

Rainbow Potato Purée

Makes 2 servings

½ pound potatoes (1 large potato), washed, peeled and cubed

1 cup peeled and chopped vegetables (such as beets, carrots, pumpkin, parsnips, etc.)

⅛ cup water

¼ cup low-fat milk

2 teaspoons vegetable oil

1. Place potatoes, vegetables and water in 2-quart microwave dish covered with plastic wrap. Microwave on HIGH for 8 to 9 minutes.
2. Remove from microwave and let stand 3 minutes.
3. Remove plastic wrap; add milk and oil.
4. Mash with a potato masher, leaving some texture to the vegetables.

Beet Salad

Makes 2-3 servings

2 beets

1 tablespoon lemon juice

1 tablespoon mustard

2 teaspoons vinegar

1 to 2 teaspoons oil

½ teaspoon sugar

1 teaspoon dill or fresh thyme

Pepper, to taste

1. Trim beet greens, leaving ≥1″ attached (do not remove tap root or fork beets as this will make them bleed).
2. Place beets in a pan of boiling water and cook until tender (depending on size, between 15 to 45 minutes).
3. Drain water and allow beets to cool slightly, then peel and slice.
4. In a medium bowl, stir together remaining ingredients.
5. Add beets to the bowl; stir gently to coat with dressing.
6. Refrigerate for 1 hour before serving.

Roasted Root Vegetables

Makes 4 servings

4 medium root vegetables (such as potatoes, rutabagas, turnips, parsnips, beets, sweet potatoes, etc.)

2 medium carrots

1 medium onion

¼ cup vegetable oil

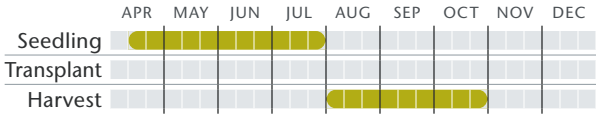
3 tablespoons Parmesan cheese

1. Pre-heat oven to 350° F.
2. Wash vegetables and cut into large chunks.
3. Place in a medium bowl and pour oil over top. Add seasonings and cheese, and mix well.
4. Spread an even layer on a baking sheet.
5. Bake for 1 hour, or until tender. Check a few vegetables to see if they are tender.

Adapted from www.whatscooking.fns.usda.gov/recipes/.

All About Carrots

Seasonal Crop Growth



Adapted from Miles et al. 2010, 6-29–31

Nutrient *Power Pack*

Carrots contain key nutrients that benefit your health. ½ cup provides the following Daily Value (%DV).

Vitamin A ▸ More than 20 %

2–9 % **◂ Vitamin C**

Folate ▸ 2–9 %

2–9 % **◂ Potassium**

Calcium ▸ 2–9 %

Less than 2 % **◂ Iron**

Fiber ▸ 2–9 %

ESHA Food Processor 11.2.23; database V 11.2.0 (2016); FDA Guidance for Industry Food Labeling Guide (2013)

Did You Know?

* Carrots come in a **rainbow of colors!** Carrots are not only orange but red, yellow, white, and purple too!

* Carrots are full of **beta-carotene**, which turns into vitamin A in our bodies.

* Carrots contain antioxidants that help keep your heart healthy, aid night vision and improve your immune system.

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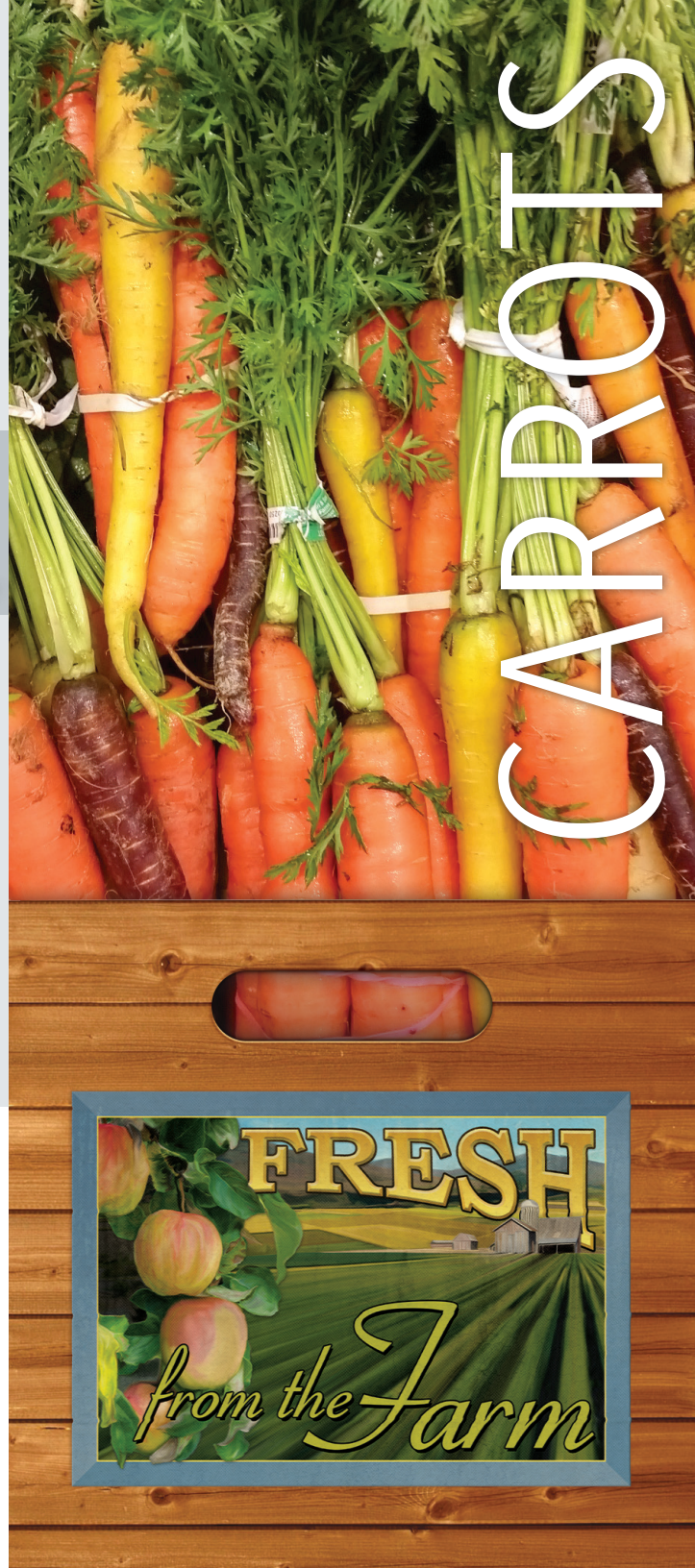


Selecting and Preparing Carrots

- Choose carrots that are firm, smooth, evenly shaped, and bright in color.
- Avoid flabby, soft, or rough carrots and those that are cracked, split, or show signs of mildew or decay.
- When you purchase carrots you should immediately trim off the green tops and store carrots unwashed in a plastic bag in the refrigerator.
- Carrots are best when used within one to two weeks.
- Wash well. Eat raw or cut up and steam, boil, microwave, stir-fry, or add to soups or stews.
- To cook in the microwave, add about two tablespoons water to carrot slices, and loosely cover the bowl. Cook until carrots are tender-crisp.

Oriental Carrot Salad

Makes 4 servings

2 cups shredded carrots
¼ cup finely chopped bell pepper
¼ cup raisins
¼ cup sunflower seeds or unsalted cashews
¼ cup orange juice
1 tablespoon oil
1 tablespoon low sodium soy sauce
⅛ teaspoon ground ginger
⅛ teaspoon garlic powder
1 teaspoon honey or sugar

1. In a bowl, combine carrots, peppers, raisins and sunflower seeds.
2. In a jar, combine orange juice, oil, soy sauce, ground ginger, garlic powder and honey. Close and shake to blend.
3. Add the dressing to bowl, and stir to combine.
4. Refrigerate for a few hours to blend flavors.

Adapted from www.foodhero.org

Peach and Carrot Smoothie

Makes 3 servings

1 medium banana (fresh or frozen, peeled and cut into chunks)
1 cup frozen carrots
1 (15-ounce) can peaches, with juice

1. Combine all ingredients in a blender or food processor.
2. Blend until smooth.
3. Serve immediately. Leftovers should be refrigerated or frozen within 2 hours.

Adapted from www.foodhero.org

Curried Carrot & Bean Spread

Makes 6 servings

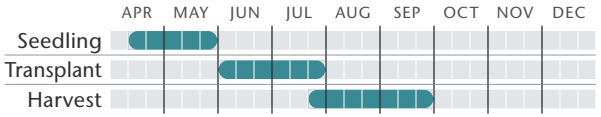
2 cups water
3 to 4 medium carrots, peeled & sliced
1 tablespoon vegetable or olive oil
½ cup chopped onion
2 garlic cloves, minced
1 teaspoon curry powder
1 (15-ounce) can* white beans, rinsed and drained
¼ teaspoon salt
½ teaspoon ground cumin *(optional)*

1. Bring water to boil in a small saucepan. Add carrots and cook until tender (5 to 7 minutes). Drain and set aside.
2. Heat oil in a small skillet over medium-high heat. Add onion, garlic, curry powder, and cumin. Cook until onion is tender (about 4 to 5 minutes).
3. Place carrots, onions, and beans in blender; blend until smooth.
4. Transfer to a bowl to serve. Garnish with cilantro, if desired.

**Note: Fresh dried beans can be substituted, if available.*

All About Summer Squash

Seasonal Crop Growth



Adapted from Miles et al. 2010, 6-29–31

Nutrient *Power Pack*

Summer squashes contain key nutrients that benefit your health. ½ cup provides the following Daily Value (%DV).

Vitamin A ▸	2–9 %
2–9 %	**◂ Vitamin C**
Folate ▸	2–9 %
2–9 %	**◂ Potassium**
Calcium ▸	2–9 %
Less than 2 %	**◂ Iron**
Fiber ▸	2–9 %

ESHA Food Processor 11.2.23; database V 11.2.0 (2016); FDA Guidance for Industry Food Labeling Guide (2013)

Did You Know?

* **Size isn't everything!** The most flavorful zucchini are the small to medium sized ones.

* Zucchini comes in many different **shapes and sizes.** Some are even round!

* The longest zucchini recorded was **8 feet 3.3 inches** long! And the biggest weighed more than **64 pounds.**

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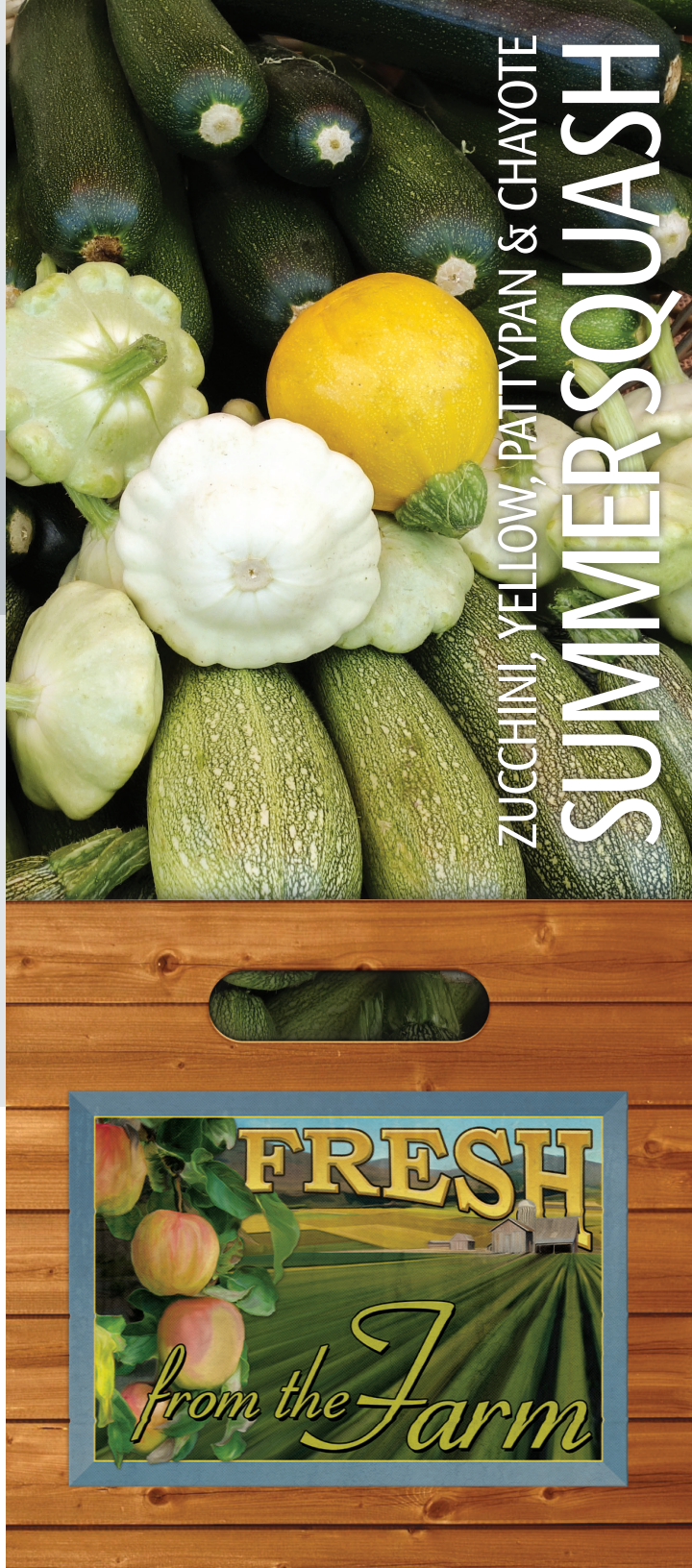


Selecting and Preparing Squash

- Choose squash that are on the small side (unless you plan to stuff them), crisp and free of soft spots or wrinkled skin.
- One half pound makes about 1½ cups of sliced or shredded (about 2 servings).
- Store squash in the refrigerator. They are best if used within one week.
- Wash skin well. Do not peel, just trim off the ends to remove the tough stem.
- Steaming is a easy way to cook summer squash. Place slices in a pan with a small amount of water and cook for 5 to 8 minutes.
- Summer squash can be eaten raw, too! Simply slice it and add to salads or as part of a cold vegetable platter.

Cheesy Squash Casserole

Makes 2-3 servings

1½ cups chopped summer squash
½ cup cracker crumbs
½ cup shredded cheese
1 tablespoon vegetable oil
2 tablespoons chopped onion
1 egg, beaten

1. Pre-heat oven to 350° F.
2. Combine all ingredients and mix well.
3. Put in a greased baking dish, cover and bake for 35 to 40 minutes, or until done.
4. Allow to cool for 5 minutes as cheese can be very hot.

Squash Bread

Makes 1 loaf

1½ cups flour
2 teaspoons cinnamon
1 teaspoon baking powder
½ teaspoon baking soda
1½ cups shredded summer squash
2 eggs, well beaten
¾ cups sugar
½ cup oil
2 teaspoons vanilla extract

1. Preheat oven to 350° F.
2. Mix flour, cinnamon, baking powder and baking soda.
3. In another bowl combine eggs, sugar, oil and vanilla extract. Beat for 3 minutes.
4. Add squash to egg mixture; stir to coat.
5. Add dry ingredients to wet ingredients and mix just until moistened.
6. Pour into well-greased bread loaf pan. Bake 40 minutes, or until a toothpick inserted in the center comes out clean.

Pasta Primavera

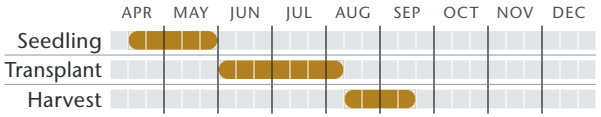
Makes 3 servings

12 ounces whole grain pasta
2 tablespoons olive oil
2 carrots, peeled
1 medium zucchini
1 yellow squash
½ onion, thinly sliced
1 bell pepper
1 large tomato *(optional)*
1½ teaspoons dried Italian herbs
½ cup grated Parmesan cheese

1. Cook pasta according to package. Drain, set aside.
2. Cut all vegetables into thin strips; set aside.
3. Heat a large, non-stick skillet over MEDIUM heat; add the oil and garlic. Cook 1 to 2 minutes, or until garlic is soft, but not brown.
4. Add vegetables and continue cooking over MEDIUM-HIGH heat for 4 to 5 minutes.
5. Combine pasta and vegetables in a large bowl. Sprinkle cheese on top and toss well. Serve immediately.

All About Peppers

Seasonal Crop Growth



Adapted from Miles et al. 2010, 6-29–31

Nutrient *Power Pack*

Peppers contain key nutrients that benefit your health. ½ cup provides the following Daily Value (%DV).

Vitamin A ▶ More than 20%

More than 20% **◀ Vitamin C**

Folate ▶ 2–9%

2–9% **◀ Potassium**

Calcium ▶ Less than 2%

2–9% **◀ Iron**

Fiber ▶ 2–9%

ESHA Food Processor 11.2.23; database V 11.2.0 (2016); FDA Guidance for Industry Food Labeling Guide (2013)

Did You Know?

* **Red and orange peppers** are an excellent source of vitamin A.
* "Hot" peppers contain **capsaicin**, a fat soluble compound that causes a mild burning sensation; that's why drinking water after eating salsa doesn't cool the heat. For relief, scientists suggest milk, since it contains casein which binds to the capsaicin and helps wash it down.
* Bell peppers have twice as much **vitamin C** as citrus fruits (by weight).

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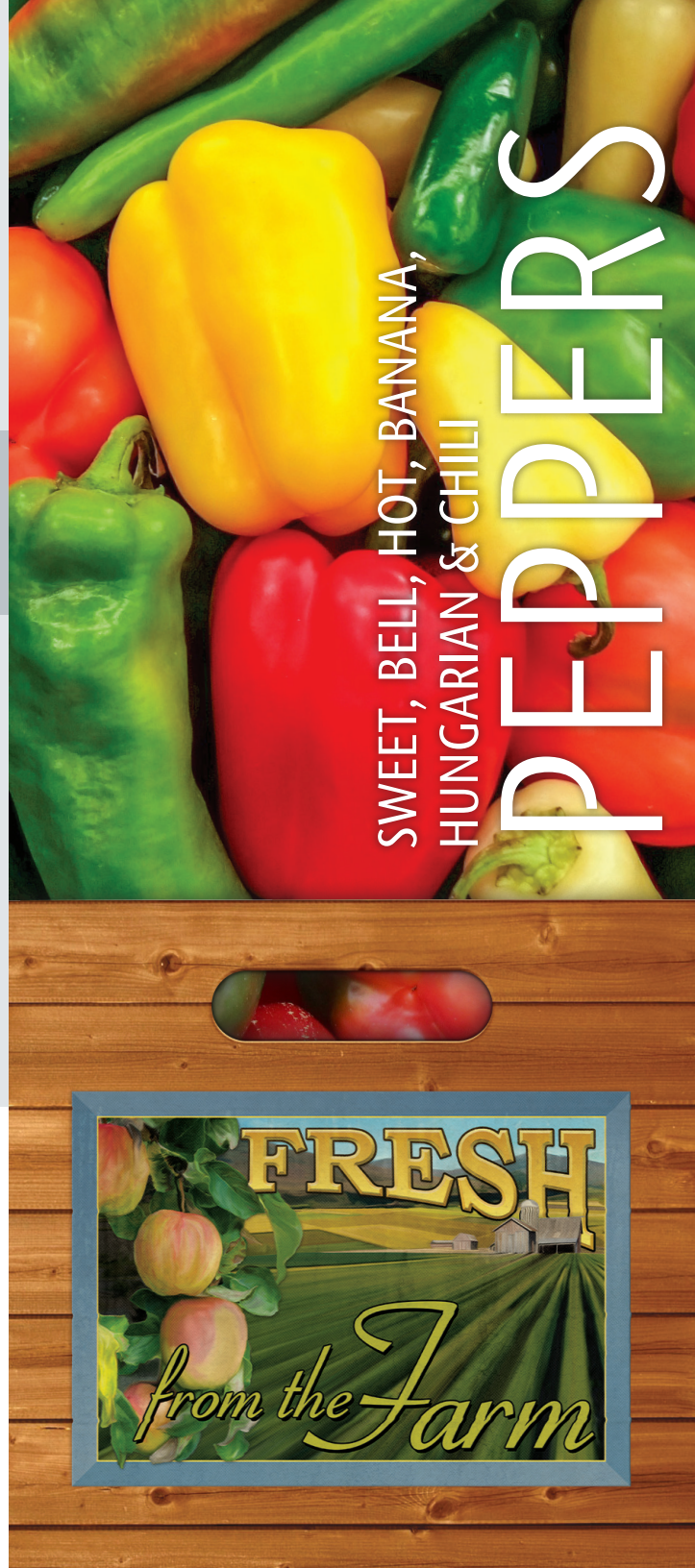
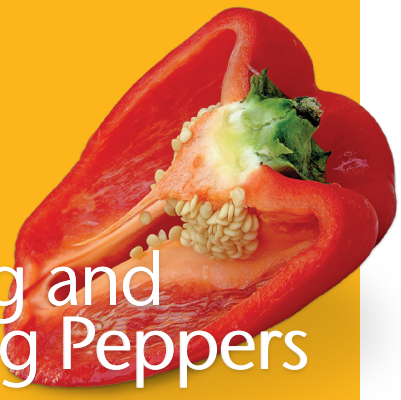




Selecting and Preparing Peppers

- Choose firm peppers with smooth, richly-colored skins. Avoid peppers with soft spots or wrinkled skin.
- Store peppers in the refrigerator. They are best when used within 7 days.
- Wash well and remove the seeds and stem before using.
- Red, orange and yellow bell peppers are sweeter in flavor than green peppers.
- Wear rubber gloves when cutting hot peppers, and while cleaning the cutting board and knife. Avoid touching your eyes; *Capsaicin*—the chemical that gives hot peppers their kick—also puts the burn in pepper spray.

- Bell peppers are delicious on salads, dipped in dressing or added to pasta dishes, casseroles and soups.

Pepper & Cabbage Salad

Makes 3 servings

¼ cup vinegar
¼ cup vegetable oil
2 cups shredded cabbage
1 bell pepper, thinly sliced
½ small onion, thinly sliced
1 clove garlic, chopped

1. Combine all ingredients in a large bowl and mix well.
2. Cover and place in the refrigerator to marinate for several hours.

Stuffed Pepper

Makes 2 servings

1 bell pepper
1 teaspoon vegetable oil
¼ cup chopped onion
1 clove garlic, chopped or ½ teaspoon garlic powder
1 cup cooked rice
¾ cup tomato sauce
1 tablespoon shredded cheese

1. Cut pepper in half lengthwise and remove seeds.
2. Place pepper halves cut-side down in a microwavable dish. Cook covered for 4 minutes.
3. Carefully remove pepper from dish and set aside. In the same dish, add oil, onion and garlic or garlic powder. Cover and microwave for 3 to 4 minutes, or until tender.
4. In a bowl combine rice, tomato sauce and onion mixture.
5. Place pepper back into microwavable dish cut-side up and spoon rice mixture into pepper. Sprinkle with cheese.
6. Cover and cook for 3 to 4 minutes or until hot. Serve hot.

Three Pepper Salsa

Makes 3-4 cups

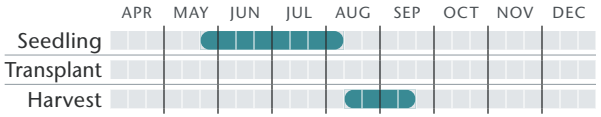
1 16-ounce can* low-sodium black beans, drained and rinsed
8 ounces canned* corn, drained
2 tablespoons canned* diced green chiles, mild
½ orange bell pepper, diced
1 teaspoon hot sauce
1 tablespoon finely diced jalapeño pepper
3 tablespoons chopped fresh cilantro
2 tablespoons minced onion
2 plum tomatoes, chopped (juice and remove seeds)
3 tablespoons fresh lime juice
⅛ teaspoon salt *(optional)*

1. Add all ingredients together in a large bowl.
2. Stir well to combine.
3. Cover and refrigerate for at least 30 minutes to allow flavors to combine.
4. Serve chilled.

**Note: Substitute fresh green chiles, corn and dry cooked beans if available in season.*

All About Snap Beans

Seasonal Crop Growth



Adapted from Miles et al. 2010, 6-29–31

Nutrient *Power Pack*

Snap beans contain key nutrients that benefit your health. ½ cup provides the following Daily Value (%DV).

Vitamin A ▸ 2–9 %

10–19 % **◂ Vitamin C**

Folate ▸ 2–9 %

2–9 % **◂ Potassium**

Calcium ▸ Less than 2 %

2–9 % **◂ Iron**

Fiber ▸ 2–9 %

ESHA Food Processor 11.2.23; database V 11.2.0 (2016); FDA Guidance for Industry Food Labeling Guide (2013)

Did You Know?

* There are many kinds of snap beans. Some grow on **bushy plants.** Other varieties grow as **vines,** and need a trellis or stakes to help support them as they grow.

* Green beans are generally **sweetest** when harvested *early.*

* Green beans grow very fast. They are generally ready to harvest in only **45 to 60 days!**

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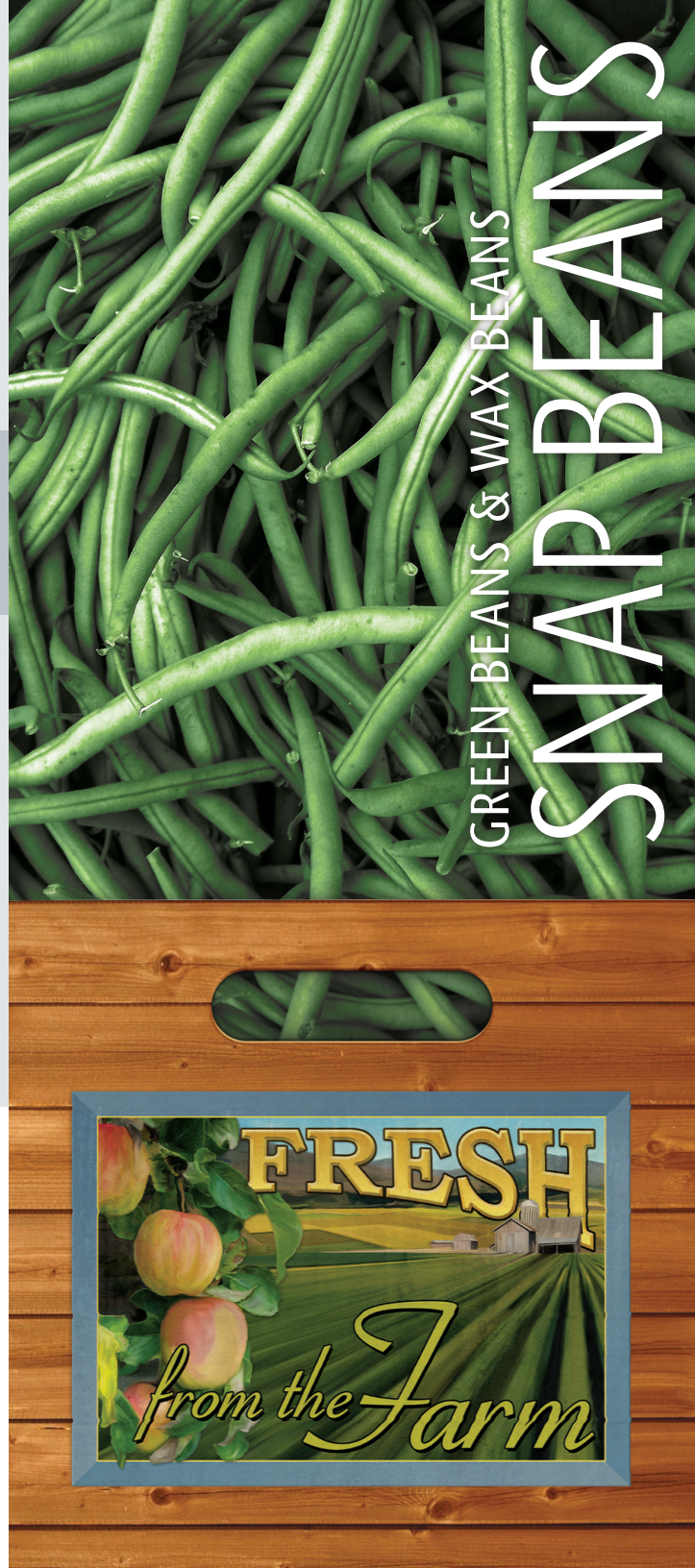


Selecting and Preparing Snap Beans

- Choose beans that are uniform in color and have smooth pods.
- The pods should be crisp and "snap" when broken.
- Avoid mature beans with swollen pods as they will be tough and often stringy.
- Snap beans should be kept refrigerated and are best when used within one week.
- Keep snap beans dry and do not wash until you are ready to use them.
- Snap beans freeze well.
- Cook beans by steaming or microwaving in a small amount of water, until tender crisp, about 5 to 8 minutes.
- Snap beans can be cooked directly in soups and stews.

Garlic Green Beans

Makes 4-5 servings

1 pound snap beans (wash & trim)
1½ tablespoons oil
1½ tablespoons vinegar
1 clove garlic, minced
Pepper to taste

1. Steam beans for 5 minutes to cook through. Drain excess water.
2. Combine oil, vinegar, garlic and pepper in a jar with a tight fitting lid. Place lid on jar and shake until well blended.
3. Pour dressing over drained beans. Toss to coat evenly.

Settler Succotash

Makes 4 servings

2 teaspoons oil
½ cup sliced onion
1 clove garlic, minced
¾ cup green beans, cooked
½ cup frozen baby lima beans, thawed
½ cup canned* navy beans, rinsed and drained
½ cup canned* corn
2 teaspoons chopped fresh dill or 1 teaspoon dried dill
⅛ teaspoon black pepper

1. Heat oil in a medium skillet.
2. Add onions and sauté 1 minute. Add garlic and cook for another 30 seconds.
3. Stir in the green beans, lima beans, navy beans and corn. Sauté over medium heat for 3 minutes, or until the vegetables are cooked and the mixture is hot.
4. Stir in the dill and pepper. Serve hot.

**Note: Substitute fresh dried beans and corn when available. Leftovers freeze well.*

Green Beans with Tomatoes & Basil

Makes 6 servings

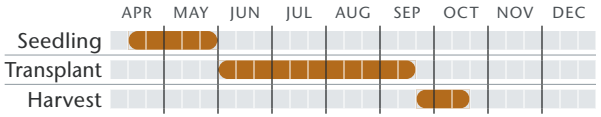
1 pound green beans (wash & trim)
1 tablespoon olive oil
1 small onion, finely chopped
1 can (14-ounce) diced tomatoes, drained
1 tablespoon fresh basil or ½ teaspoon dried basil
1 tablespoon fresh parsley or ½ teaspoon dried parsley
Salt and pepper to taste *(optional)*

1. Cook beans in a large saucepan of boiling water for 5 minutes; beans will still be crisp. Drain and rinse under cold running water. Set aside.
2. In a large frying pan, heat olive oil over MEDIUM heat. Add onion and cook 2 to 3 minutes until softened.
3. Add drained tomatoes, basil and parsley. Cook 3 minutes to heat and combine flavors.
4. Stir beans into pan and cook 5 to 6 minutes. Season with salt and pepper, if desired.

Adapted from USDA Mixing Bowl (www.whatscooking.fns.usda.gov)

All About Winter Squashes

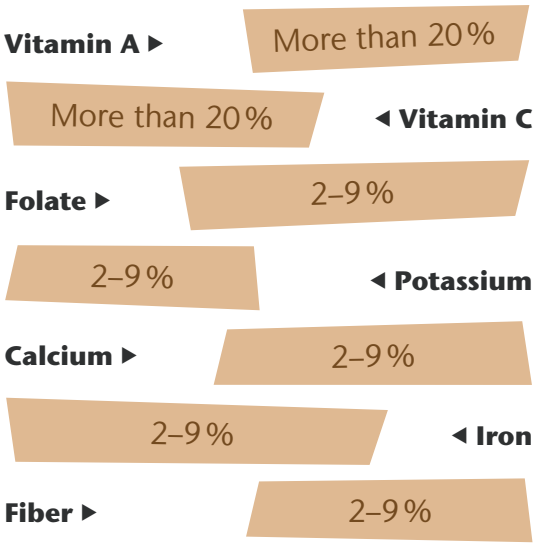
Seasonal Crop Growth



Adapted from Miles et al. 2010, 6-29–31

Nutrient *Power Pack*

Winter squashes contain key nutrients that benefit your health. ½ cup provides the following Daily Value (%DV).



ESHA Food Processor 11.2.23; database V 11.2.0 (2016); FDA Guidance for Industry Food Labeling Guide (2013)

Did You Know?

* Squash are one of the **"three sisters"** traditionally planted together by Native Americans, along with maize (corn) and beans.

* Popular varieties include **pumpkin**, butternut, acorn and spaghetti squash.

* The center has seeds which are usually scooped out before cooking. The **seeds can be roasted** in the oven and eaten as a snack.

Distributed by

[Agency contact info]

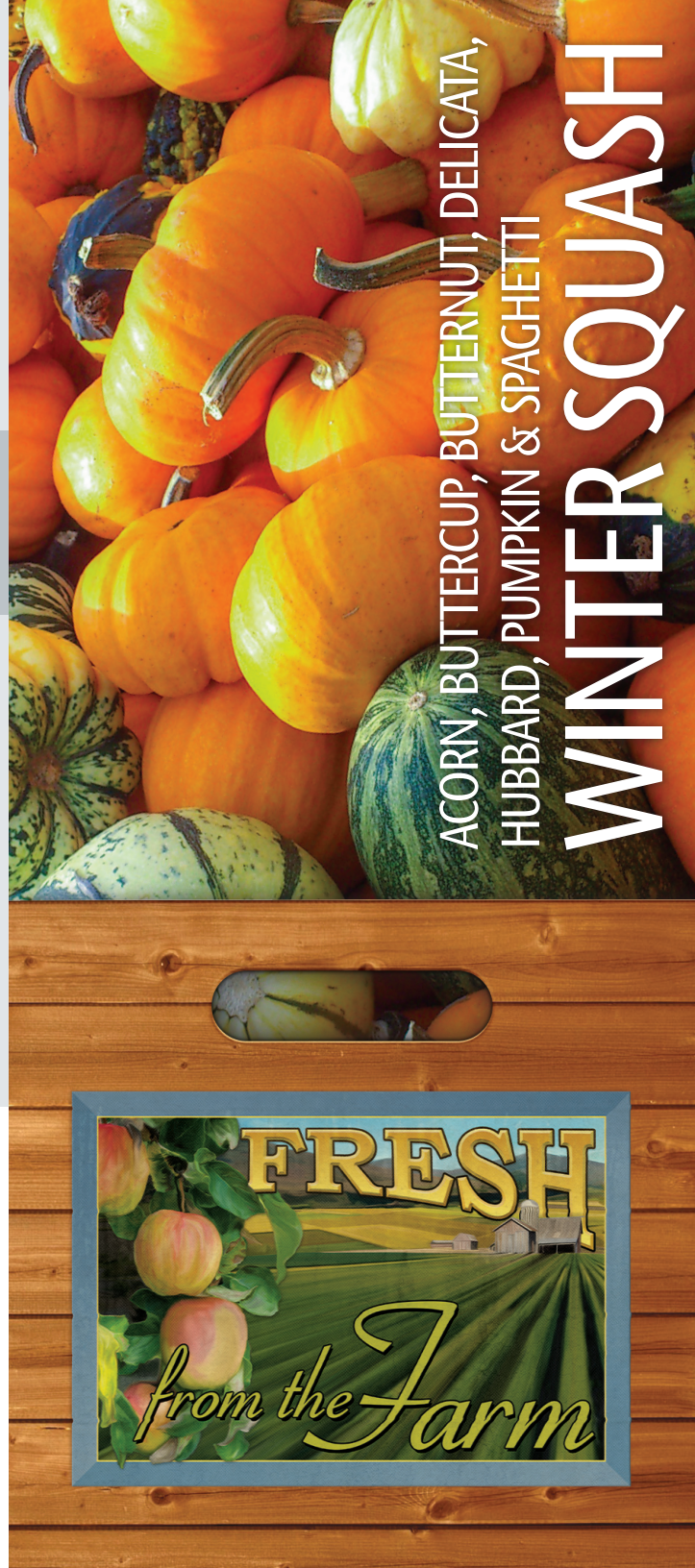
More brochures to help you add fruits and vegetables to your diet are available at ***nutrition.wsu.edu.***

SNAP-Ed
WASHINGTON STATE UNIVERSITY EXTENSION

Adapted from the WIC and Senior Farmers Market Nutrition Program *Fresh from the Farm* series (2004) by Washington State University's SNAP-Ed Nutrition Education Program. Designed by Andrew Mack.

USDA is an equal opportunity provider and employer. This material was funded by USDA's Supplemental Nutrition Assistance Program (SNAP). The Supplemental Nutrition Assistance Program (SNAP) provides nutrition assistance to people with low income. It can help you buy nutritious foods for a better diet. To find out more, contact: http://foodhelp.wa.gov or the Basic Food Program at: 1-877-501-2233.

WSU Extension programs and employment are available to all without discrimination. Evidence of noncompliance may be reported through your local WSU Extension office.



Selecting and Preparing Squash

- Choose firm, well-shaped squash that are heavy for their size and have a hard, tough skin.
- Avoid squash that have sunken, soft or moldy spots.
- Store in a cool dry place. Winter squash will keep for several months if stored correctly.
- To bake, wash and cut in half or quarters depending on the size. Scoop out seeds with a spoon. Place cut side down on a shallow baking pan and bake at 375° F for about 40 to 50 minutes.
- To boil or steam, wash and cut into smaller pieces. Peel and remove seeds. Boil or steam in a small amount of water for about 25 to 35 minutes or until tender.

Stuffed Squash

Makes 4-6 servings

1 medium winter squash, any type
½ cup chopped onion
1 clove garlic, crushed
½ teaspoon sage
½ teaspoon thyme
3 tablespoons oil
½ cup diced celery
1 cup bread crumbs
½ cup shredded cheese

1. Pre-heat oven to 350° F.
2. Cut squash in half and remove seeds. Set aside.
3. Heat oil in a skilled over LOW heat. Add onions, garlic, sage, thyme and celery, stirring until onions are soft.
4. Add bread crumbs. Cook for 5 to 10 minutes.
5. Remove from heat and add cheese.
6. Spoon mixture into squash halves. Place in a casserole dish, cover and bake for 40 to 50 minutes.

Pumpkin/Squash Bread

Makes 1 loaf

½ cup sugar
½ cup oil
¾ cup puréed pumpkin or other winter squash
2 eggs
1½ cups flour
1 teaspoon baking powder
1 teaspoon baking soda
1 teaspoon cinnamon

1. Pre-heat oven to 350° F.
2. In a large bowl, beat together sugar, oil, pumpkin or other winter squash and eggs.
3. In a medium bowl, stir together flour, baking powder, baking soda and cinnamon.
4. Add flour mixeture into pumpkin mixture, stirring only until the dry ingredients are just moist. Pour the batter into a greased 9 × 5-inch loaf pan.
5. Bake for 1 hour, or until a toothpick inserted in the center comes out clean.

Butternut Squash & Chile Fry

Makes 10 servings

1½ to 2 pounds butternut or delicata squash
1½ tablespoons olive or vegetable oil
1 cup onion, chopped
1 teaspoon salt
½ teaspoon chili powder
2 (4-ounce) cans diced green chilies
1 cup grated cheese

1. Peel squash and remove seeds; cut into ½ inch cubes.
2. In a large skillet, heat oil over MEDIUM heat. Add onions and cook, stirring for about 3 minutes. Add squash, salt and chili powder.
3. Cover and cook, stirring occasionally, about 10 to 12 minutes. Add chilies and cook about 3 minutes.
4. Top with cheese and cover until cheese melts. Serve hot.

Adapted from www.foodhero.org

Lesson 2 Weed Water and Wait
Optional information for Educator or Handout for Participants

Make a Fit Ball-Instructions

What you need to make a Fit Ball:

- 12 inch Beach Ball
- Permanent marker
- List of fitness activities

How to make a Fit Ball:

1. Blow or inflate the beach ball.
2. Using a permanent marker, write about 10 fitness activities all over the ball.

How to play Fit Ball:

- Stand in a circle and play music. Pass the beach ball around as the music plays.
- When the music stops, the person holding the beach ball calls out the fitness activity written closest to their right thumb. Everyone does the activity together. Start the music and play again!

Fitness activity suggestions: squats, lunges, sit-ups, push-ups, arm circles, shoulder rolls, toe touches, run in place, jumping jacks, hop on 1 foot, side stretch, jumps to the sky, torso twists and arm reaches in different directions (side, front/back diagonally across the body, etc.). You can also try dance steps like the twist, the swim, the cha cha, or mambo.

Garden Record

Date:_____

Crop:_____

Measurements and Observations: _____

_____

_____

_____

_____

_____

_____

_____

_____

Date:_____

Crop:_____

Measurements and Observations: _____

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GARDEN PLANTING RECORD

Date Planted	Crop			
_____	Measurements			

Observations or plant conditions
Harvest Dates

Date Planted	Crop			
_____	Measurements			

Observations or plant conditions
Harvest Dates

GARDEN PLANTING RECORD

Date Planted	**Crop**		
	Measurements		
Observations about plant progress, condition			
Harvest Dates			

Date Planted	**Crop**		
	Measurements		
Observations about plant progress, conditions			

Date Planted	**Crop**		
	Measurements		
Observations about plant progress, condition			
Harvest Dates			

GARDEN PLANTING RECORD

Date Planted	**Crop**		
	Measurements		
Observations about weather, soil or plant condition			
Harvest Dates			

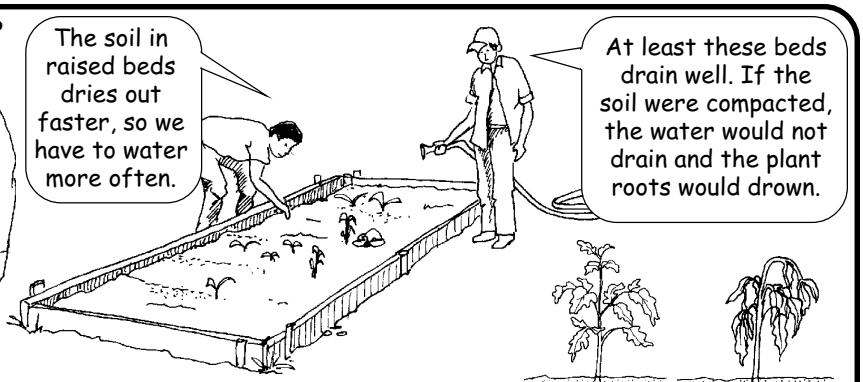
Date Planted	**Crop**		
	Measurements		
Observations about plant progress, condition			
Harvest Dates			

Date Planted	**Crop**		
	Measurements		
Observations about plant progress, condition			
Harvest Dates			

WATERING GARDEN PLANTS Science Page

TO WATER OR NOT TO WATER?

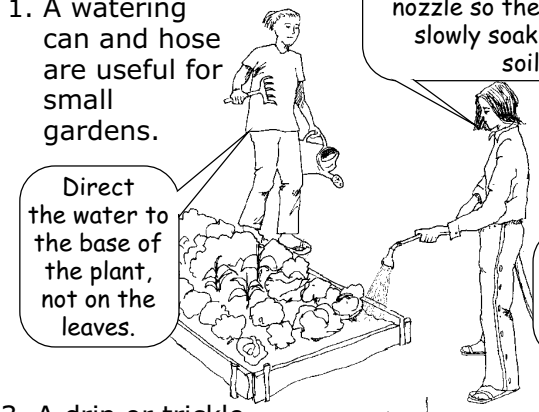
In most areas, rain alone does not meet all the water needs of garden plants. You need to water the garden.



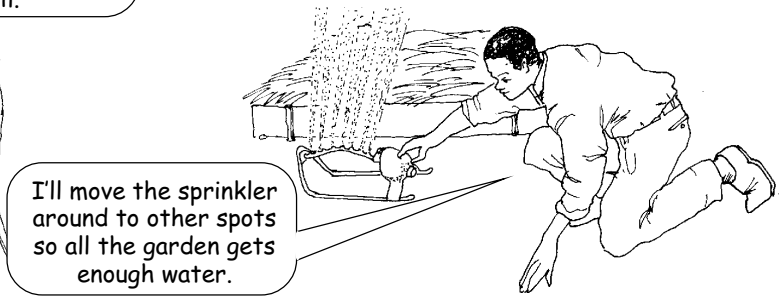
You need to add enough water so that it seeps all the way down to the plant roots. If you just water the soil surface, the roots will grow close to the surface and then the plants will wilt more quickly.

WATERING METHODS

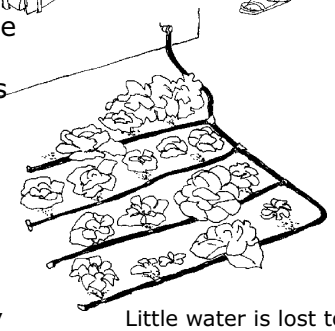
1. A watering can and hose are useful for small gardens.



2. Sprinklers are cheap and convenient, but they waste a lot of water to evaporation, especially on hot, windy days.

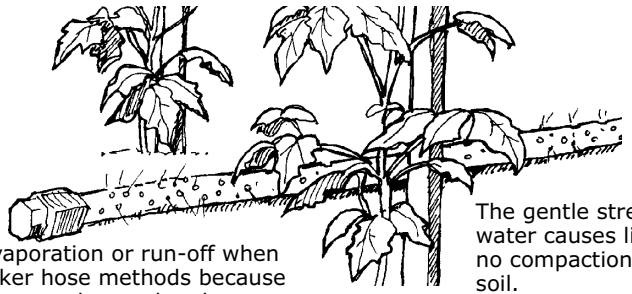


3. A drip or trickle irrigation system applies water directly to the area in the soil where roots are growing.



Many farmers in hot, dry places use drip or trickle irrigation.

4. A soaker hose is a plastic or canvas hose with holes all along its length. It is placed along one side of plants or underneath mulch. Water seeps out slowly.



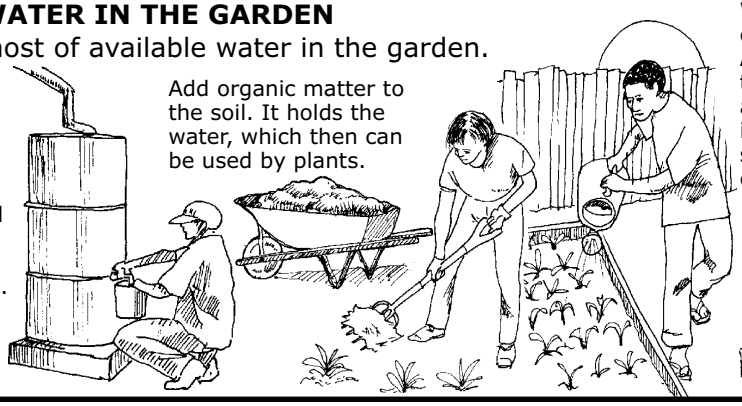
The gentle stream of water causes little or no compaction of the soil.

Little water is lost to evaporation or run-off when you use the drip or soaker hose methods because the water goes into the ground near the plant.

SAVING WATER IN THE GARDEN

Make the most of available water in the garden.

Collect rain water from roof-tops in rain barrels. Keep the rain barrel covered to prevent mosquitoes from breeding.



Add organic matter to the soil. It holds the water, which then can be used by plants.

Water during early morning. At this time temperatures are cooler and it is less windy, so there is less evaporation.

Cover the soil with mulch, which smothers weeds and allows water to seep slowly into the soil. A mulch cover also reduces evaporation of water from the soil.

Garden Mosaics is funded by the National Science Foundation Informal Science Education program, and by the College of Agriculture and Life Sciences at Cornell University.

PEPPERS Science Page

DID YOU KNOW?

When Christopher Columbus set out for the New World, he hoped to find black pepper, a spice that grew in Asia. Instead he found the Arawak Indians eating another plant that was spicy, but not related to black pepper. He called it "red pepper" because it had red pods.

ORIGINS

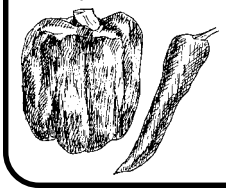
Peppers are native to South America. People there ate wild peppers nearly 10,000 years ago, and farmers began growing the plant over 7,000 years ago.

THE PEPPER PLANT

In temperate climates, pepper plants last only one growing season. In tropical areas, they are woody shrubs that grow from year to year.

Pepper plants have pointed leaves and small, star-shaped flowers.

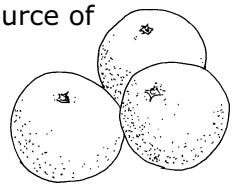
The fruits come in a variety of shapes, sizes, and colors.

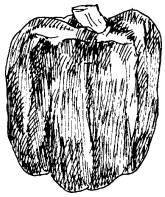


NUTRITIONAL VALUE OF PEPPERS

Peppers are an excellent source of vitamins A and C.

As green pods turn red, the vitamin content increases. One red bell pepper has ...



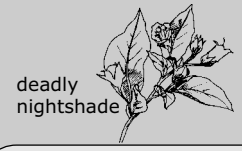


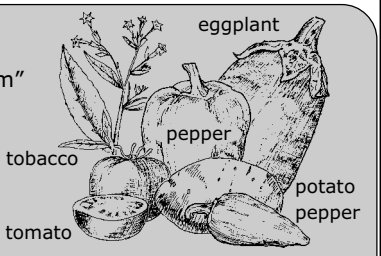
... the same amount of vitamin C as 3 oranges.

... the same amount of vitamin A as 1/3 of a carrot.

CLASSIFYING PEPPERS

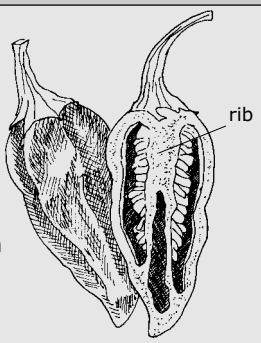
FAMILY
Solanaceae
The Latin name "solanum" means "nightshade."



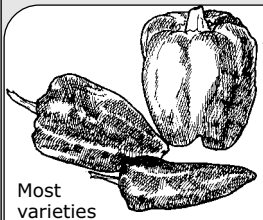


GENUS
Capsicum
This name comes from the Greek word "kapto" meaning to bite. Hot peppers have a taste that bites your mouth!

The heat in hot pepper is from capsaicin, a substance mostly found in the tip of the fruit, in the ribs, and in the seeds.

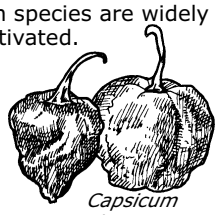


SPECIES
Three capsicum species are widely cultivated.



Most varieties belong to the species *Capsicum annuum*.

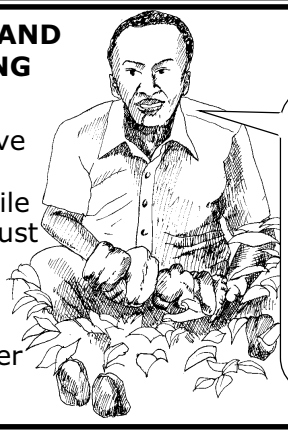
Capsicum frutescens



Capsicum chinense

GROWING AND HARVESTING PEPPERS

Peppers thrive in well-drained, fertile soil. They must have a constant supply of water in order to set fruit.



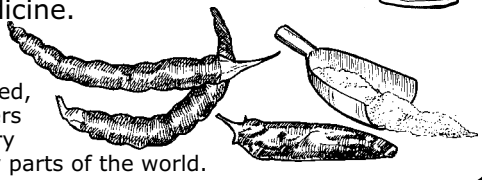
These peppers are ripe and full of flavor. I'll leave the green peppers on the plant until they ripen fully and turn red, yellow, and orange.

USES

Peppers are used raw in salads or in cooking. They can be used fresh or dried, whole or ground into spices. The capsaicin in hot peppers is also used in medicine.

Paprika is a spice that is made from any dried red pepper that is not hot.

Fresh, dried, whole or crushed, cayenne peppers are used in fiery dishes in many parts of the world.



Garden Mosaics is funded by the National Science Foundation Informal Science Education program, and by the College of Agriculture and Life Sciences at Cornell University.

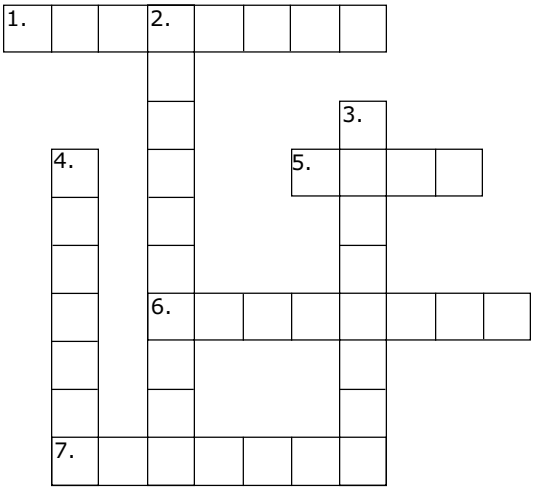
CROSSWORD PUZZLE

Across

1. Peppers belong to this genus.
5. Hot peppers are hottest when _____.
6. The name 'pepper' was given to the plant by this explorer.
7. Peppers are native to South _____.

Down

2. Peppers belong to this family.
3. One red pepper has as much _____ as a third of a carrot.
4. This is made from dried red peppers that are not hot.



RIDDLE

What sounds cold but burns?

Answer: Hot chili peppers!

SPOTLIGHT ON RESEARCH

Do spices preserve food?

There is an age-old belief that people living in hot climates use a lot of spices, like hot pepper, to keep their food from spoiling. In contrast, traditional dishes from colder climates are not as spicy, because food does not spoil so quickly at lower temperatures. Two Cornell scientists wondered if these beliefs were really true.

To find out, they tested 43 different spices to see which ones, if any, keep bacteria from growing on meat. At warm temperatures, some bacteria that land on meat will multiply and cause the meat to rot. The scientists found that 30 of the spices they tested actually do slow down the growth of bacteria on meat. Among the most effective spices were garlic, onion, allspice, oregano, hot peppers, thyme, cinnamon, cumin, and cloves.

Next, the scientists looked at 4,578 traditional recipes from around the world. They found that traditional recipes from the hottest climates used the greatest number of anti-bacterial spices. In fact, all the recipes from the tropics called for at least one spice, whereas a third of the recipes from the north were spice-free. Based on their findings, the scientists concluded that people living in hotter climates traditionally use spices as a way to preserve food.

Source: Billings, J. and Sherman, P.W. (1998). Antimicrobial functions of spices: why some like it hot, The Quarterly Review of Biology. 73 (1).

CHILI RELLENOS

Yield: 4 servings

In Mexico, this popular dish is often eaten with rice and refried beans.

Ingredients

* 4 medium-size hot peppers, like Cubanelles or Hungarian hot wax peppers
* 1/2 pound of Monterey Jack cheese
* 6 eggs, separated
* oil
* salsa

Instructions

1. Broil the hot peppers on a tray under the broiler of an oven until brown and blistered. Then turn and broil the other side.
2. Put the peppers inside a paper bag and allow them to steam for 10 minutes. Cut off the stems and pull off the thin outer skin. Slit them about 2 inches down one side, and remove the seeds.
3. Slice four finger size pieces of cheese, and put one piece of cheese inside each hot pepper. Grate the remaining cheese.
4. Separate the eggs. Beat the egg whites until stiff. In a separate bowl, beat the egg yolks until smooth. Gradually fold the whites into the yolks, keeping the mixture as puffy as possible.
5. Put about one tablespoon of oil in a frying pan. Spoon some of the puffy egg batter about the size and shape of a hot pepper into the pan. Allow it to cook for about one minute, until it is slightly firm. Lay a stuffed hot pepper gently in the batter, spoon some batter on top, and gently flip. Cook on the second side until the egg is slightly golden around the edges. Put the relleno in a baking dish, and prepare the other rellenos in the same way.
6. Cover the rellenos with salsa, and sprinkle with the grated cheese. Bake at 350°F for 15 to 20 minutes. The rellenos should puff up and the cheese should be melted.
7. Serve with rice and refried beans.

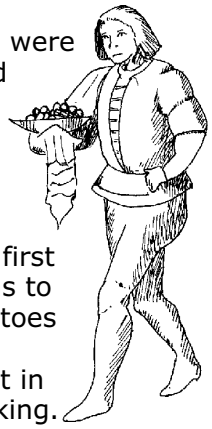
Garden Mosaics is funded by the National Science Foundation Informal Science Education program, and by the College of Agriculture and Life Sciences at Cornell University.

GARDEN MOSAICS
(www.gardenmosaics.org)

TOMATOES Science Page

DID YOU KNOW?

Spanish explorers brought tomato seeds to Europe in the early 1500's. At that time, most Europeans thought tomatoes were toxic, and would not even taste them. Italians were the first Europeans to use tomatoes as a key ingredient in their cooking.



ORIGINS

Tomatoes are native to the Andes Mountains in South America.

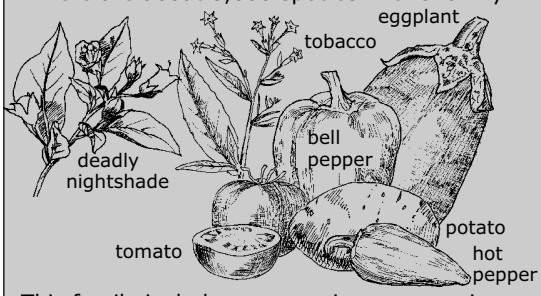
By the time the Spanish arrived in Mexico, the native Mexicans were growing and eating tomatoes. The name "tomato" comes from the Mexican word "tomatl."

CLASSIFYING TOMATOES

FAMILY

Solanaceae
(Nightshade family)

There are about 3,000 species in this family.



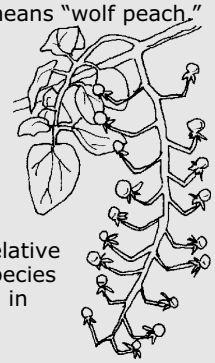
This family includes many poisonous species, such as deadly nightshade, as well as many edible species.

GENUS

Lycopersicon

In Greek this means "wolf peach."

Scientists gave tomatoes this genus name at the time when most people thought they were poisonous.

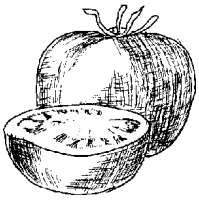


This wild tomato relative is one of several species in this genus found in Ecuador and Peru.

SPECIES

esculentum

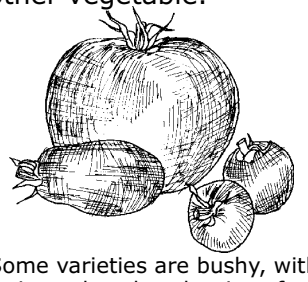
means "something that can be eaten."



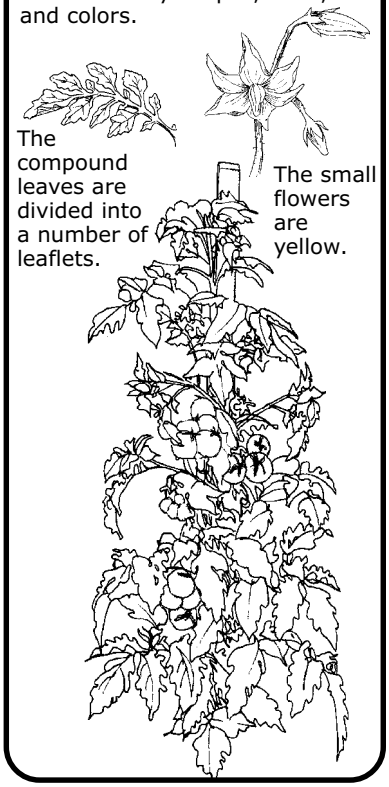
Scientists gave tomatoes this species name after people realized that they were not poisonous.

THE TOMATO PLANT

There are more varieties of tomatoes than of any other vegetable.



Some varieties are bushy, with fruit produced at the tips of branches. Other varieties are more like vines. The fruits come in many shapes, sizes, and colors.

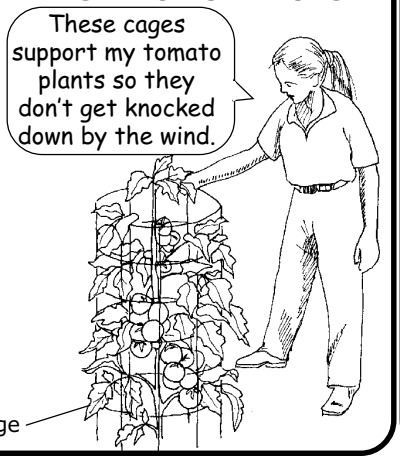


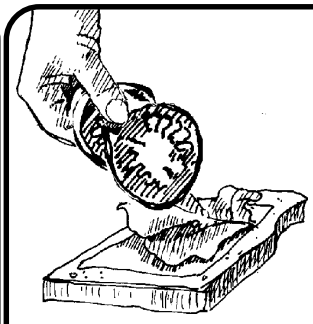
The compound leaves are divided into a number of leaflets.

The small flowers are yellow.

GROWING AND HARVESTING TOMATOES

Tomatoes thrive in full sun in well drained, fertile soil. Set out transplants one week after the last frost date. Most varieties need to be supported by stakes or cages. Keep well watered. Once fruits begin to ripen, pick them daily.

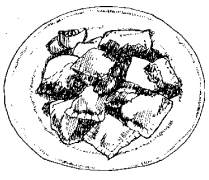




tomato slices

USES

Most tomato varieties can be used for both fresh eating and cooking. However, Italian paste tomatoes are best for cooking into sauces. Large beefsteaks are good for slicing.



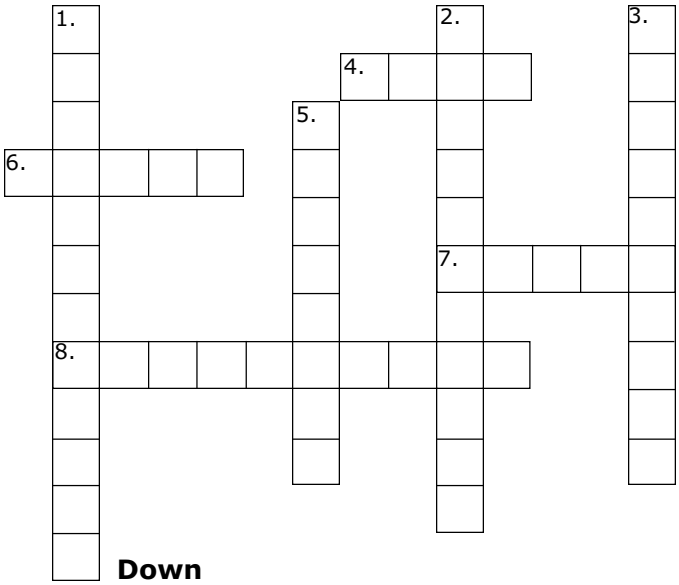
ravioli with tomato sauce

Garden Mosaics is funded by the National Science Foundation Informal Science Education program, and by the College of Agriculture and Life Sciences at Cornell University.

CROSSWORD PUZZLE

Across

4. Tomatoes are _____-season crops.
6. Tomatoes are native to _____ America.
7. A type of tomato that is good for cooking.
8. Tomatoes belong to this family.



Down

1. Genus name for tomato.
2. Set out tomato _____one week after the last frost date.
3. Species name for tomato.
5. A vegetable in the same family as tomatoes.

RIDDLE

How do you fix a broken pizza?

SPOTLIGHT ON RESEARCH

Are wild relatives of crop plants useful?

In 1962, two young plant explorers were studying wild potatoes in Peru. Wild species of many important crops in the Solanaceae family are native to the Andean region. Botantists look for these wild relatives because they may have important traits, such as disease resistance, which can be incorporated into cultivated plants.

Eating lunch on a rocky mountain slope, the two plant explorers picked some fruits from a wild tomato plant that was growing nearby. The fruits were green and only the size of marbles, but very sweet. The botanists saved the seeds, and later mailed them to a well-known geneticist named Charles Rick.

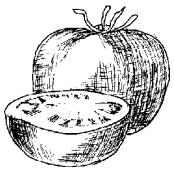
When Rick grew the seeds, he realized that the plants were a species new to scientists. The tiny fruits of this wild species were very high in sugar — almost twice as high as that found in most garden tomatoes. After ten years of cross-breeding the wild species with the common tomato, Rick was able to produce new varieties of tomatoes that have the desirable features of both species. They were large and red, and very sweet. The scraggly wild tomato plant with the marble-sized, green tomatoes found on that rocky mountain slope proved to be very useful!

Source: Vietmeyer, N. (Ed.) with Advisory Panel from the National Research Council. (1989) Lost crops of the Incas: little known plants of the Andes with promise for worldwide cultivation. National Academy Press, Washington, D.C.

Answer: with tomato paste!

GAZPACHO

Yield: 6 servings



Ingredients

* 6 large tomatoes
* 1 large cucumber, peeled, seeded, and finely diced
* 1 large bell pepper, finely chopped
* 1 medium-sized red onion, minced
* 3 tablespoons red wine vinegar
* 2 tablespoons olive oil
* juice of 1/2 lemon
* 2 to 3 tablespoons chopped fresh parsley to taste**
* 2 tablespoons chopped fresh basil or 2 teaspoons dried basil**
* salt and freshly ground pepper to taste
* hot sauce to taste

Instructions

1. Peel the tomatoes by submerging them in boiling water for 15 seconds. Remove to a strainer and rinse under cold water. The skins should slip right off.
2. Core the tomatoes and gently squeeze out the seeds, which are discarded. Chop half of the tomatoes coarsely and puree the other half in a blender. Combine the puree and chopped tomatoes in a large mixing bowl.
3. Blend the remaining ingredients with the tomatoes. Cover and refrigerate. Serve chilled.

**Variation: Use 3 to 4 tablespoons of cilantro instead of parsley and basil.

Garden Mosaics is funded by the National Science Foundation Informal Science Education program, and by the College of Agriculture and Life Sciences at Cornell University.

WHAT TO FEED YOUR WORMS:

Yummy!

Anything green - especially the leafy stuff!

Fruits

Vegetables

Coffee grounds & filters

Tea bags

Brown Paper, Black & White newspaper

Eggshells – crushed; adds calcium

Yucky!

Citrus - no orange, lemon or lime

Fats, Oils, Salad dressing

Breads & Cereals - can attract gnats

Salts - no seasoned food

Meat - creates odors

Sugars- no processed food

Garlic, Onions - creates odors

Section 4
Participant Workbook









SNAP-Ed

Washington State University Extension

Energize Your Life

Gardening for a Healthier You

Nutrition education for adults in a garden setting.

Participant Workbook

Energize Your Life – Gardening for a Healthier You!

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Co-authors of *Gardening for a Healthy You*! 1st edition (2006)

Welcome to Gardening for a Healthier You!

Dear Participant,
Welcome to *Gardening for a Healthier You!* This series of lessons teach nutrition education in the context of learning gardening skills. We know that growing food gardens promotes health as it provides more fruits and vegetables for your access; and also provides moderate physical activity – both are goals for all Americans. This workbook will provide you with the information you need to develop and grow a food garden. The charts and tables will help you:

- Discover which edible plants you want to grow
- Plan the dollar and nutritional value of your garden
- Design your space for the best variety and yield of food
- Learn what grows well in your area and how to seed, feed and water your crops
- Harvest and store your produce safely
- Manage your soil for healthy plants

This Workbook is divided into three sections: gardening resources, nutrition resources that include lesson recipes; and community resources. You will refer to some of them several times throughout the five lessons.

You will need to bring your workbook to every lesson. It is recommended you keep handouts together and maintain a log of planting and physical activity. This will ensure you have the information you need for each lesson, help you track the growth of your plants, and the time and effort you spend managing your garden.

We hope this gardening reference booklet will continue to serve you as your personal gardening knowledge and experience expands. Should you decide to grow a greater variety of fruits and vegetables than those chosen during the series, you will find that these resources will provide you enough information to support your garden expansion from seed to harvest.

We hope that your experience in this series inspires you to continue food gardening that will help sustain your health. May your gardening experience continue to blossom and grow.

Linda O. Mathews
Kathleen Manenica

My garden is my favorite teacher.

Betsy Canas Garmon

Gardening allows us to experience the seasons: a spring shower, summer warmth, first bite of fall frost, and the chill of winter. It is more than the sweet taste of berries, the snap of beans or the crunch of a carrot. It is a connection to nature and a pathway to health. Gardening is a chance to learn and grow. It is your opportunity to share.

Participant Workbook
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Participant Workbook
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Section 1
Gardening Resources

Figure 1. Washington climate factors affecting vegetable production: length of growing season (frost-free days) (A); average last killing frost date in spring (B); and average first killing frost date in fall (C) (adapted from Antonelli et al. 2004, 4).

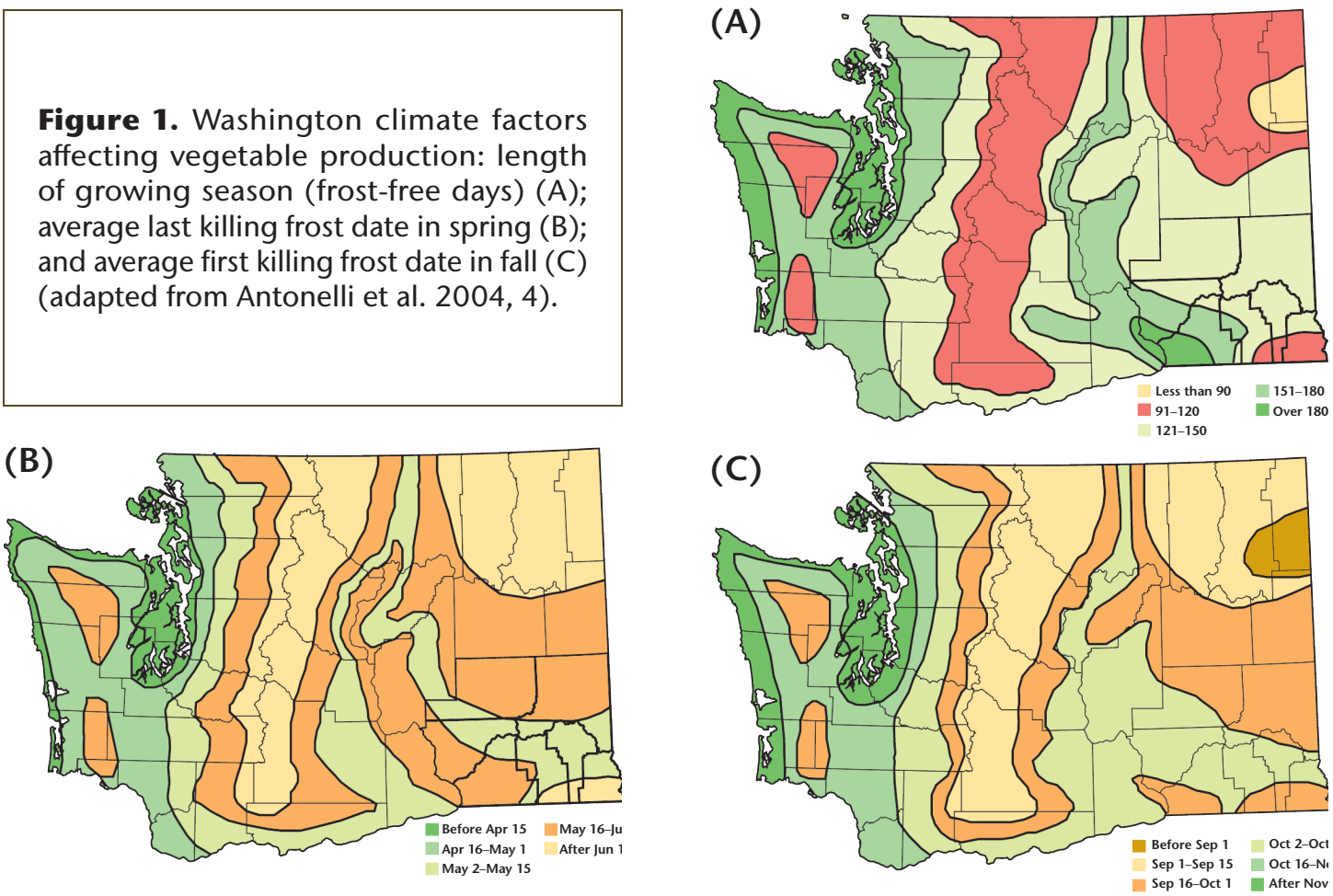


Table 1. Crops well-suited to warm and cool temperatures in Washington (adapted from Maynard and Hochmuth 1997, 89).

Warm-Temperature Crops	Cool-Temperature Crops		
Bean	Artichoke**	Collards	Rhubarb**
Corn, Sweet	Artichoke, Globe**	Garlic	Salsify
Cucumber	Asparagus**	Horseradish**	Spinach
Edamame	Bean, Broad	Kale	Turnip
Eggplant*	Beet	Kohlrabi	
Melon	Broccoli	Leek	
New Zealand Spinach	Brussels Sprout	Lettuce	
Okra*	Cabbage	Mustard	
Pepper	Carrot	Onion	
Pumpkin	Cauliflower	Parsley	
Squash, Summer	Celery	Parsnip	
Squash, Winter	Chard, Swiss	Pea	
Sweet Potato*	Chicory (Endive)	Potato	
Tomato	Chive	Radish	

*These crops require the most warmth to be productive; in cooler areas they will need to be grown in plastic covered tunnels or greenhouses.
**These crops are perennial.

Table 2. Differences in quality, production, and value between common home-grown and store-bought vegetables in Washington (adapted from Antonelli et al. 2004, 3).

Vegetable	Quality of Garden-Grown vs. Store-Bought	Value of Garden-Grown vs. Store-Bought	Relative Yield per Square Foot
Asparagus	much better	much better	medium
Bean, Green	better	better	high
Beet	better	better	high
Bok Choy	same	better	medium
Broccoli	better	much better	high
Brussels Sprout	better	much better	low
Cabbage	same	same	low
Carrot	better	better	high
Cauliflower	same	much better	medium
Celery	same	better	medium
Chard, Swiss	much better	better	high
Collards	better	much better	medium
Corn, Sweet	better	same	low
Cucumber	better	much better	medium
Edamame	better	much better	medium
Eggplant	better	much better	low
Kale	better	much better	medium
Kohlrabi	same	better	high
Leek	better	much better	medium
Lettuce, Leaf	better	much better	medium
Lettuce, Head	same	better	medium
Muskmelon (Cantaloupe)	same	better	low
Onion, Bulb	same	same	low
Onion, Green	much better	much better	medium
Parsnip	same	better	high
Pea	much better	much better	medium
Pepper	better	much better	medium
Potato	same	same	low
Pumpkin	same	same	medium
Radish	same	better	low
Rhubarb	better	much better	high
Spinach	better	better	high
Squash, Summer	much better	much better	medium
Squash, Winter	same	same	high
Tomato	much better	much better	medium
Turnip	better	better	medium
Watermelon	better	same	high

Adapted from Miles, C. 2013. Home Vegetable Gardening in Washington. *WSU Extension Publication* EM057E.

Table 3. Average home-grown vegetable productivity and consumption for crops commonly grown in Washington (adapted from Antonelli et al. 2004, 5).

Vegetable	Plants per 10-ft Row	Production per 10-ft Row	Average Pounds Consumed per Adult per Year		
			Fresh	Processed	Total
Asparagus	10	5-8 lbs	10	10	20
Bean, Green	35	6-8 lbs	15	25	40
Beet	50	10-12 lbs	3	4	7
Broccoli	10	10-12 lbs	5	6	11
Brussels Sprout	10	6-8 lbs	3	0	3
Cabbage	8	10-15 lbs	10	10	20
Carrot	60-80	12 lbs	8	8	16
Cauliflower	9	8-10 lbs	6	9	15
Celery	20	15 lbs	5	0	5
Chard, Swiss	20	30 lbs	3	5	8
Corn, Sweet	20	3 dozen ears	17	33	50
Cucumber	5	2-3 dozen	6	12	18
Eggplant	5	15 eggplants	2	3	5
Kohlrabi	30	7-8 lbs	4	2	6
Lettuce, Head	10	10 lbs	5	0	5
Lettuce, Leaf	30-60	5 lbs	5	0	5
Muskmelon (Cantaloupe)	3	10-15 melons	5	0	5
Onion, Bulb	40	10 lbs	10	0	10
Onion, Green	60-80	2 lbs	2	0	2
Parsnip	40	10-15 lbs	5	0	5
Pea	60-100	10-12 lbs	5	8	13
Pepper	6	20 lbs	3	7	10
Potato	10	20 lbs	70	0	70
Pumpkin	3	10 pumpkins	10	10	20
Radish	100-120	3 lbs	1	0	1
Rhubarb	3-4	15-20 lbs	5	5	10
Spinach	30-40	5 lbs	3	5	8
Squash, Summer	3	25 lbs	7	10	17
Squash, Winter	2	20-30 lbs	20	20	40
Tomato	8	30-50 lbs	35	50	85
Turnip	30-40	20 lbs	3	0	3
Watermelon	3	6-12 melons	10	0	10

Adapted from Miles, C. 2013. Home Vegetable Gardening in Washington. *WSU Extension Publication* EM057E.

Table 4. Seeding recommendations for common vegetable crops grown in Washington (adapted from Kumar et al. 2009, 3-4).

	Seeding			Germination		Growth		
Vegetable	Depth to Plant (inch)	Distance Between Plants (inch)	Distance Between Rows (inch)	Number of Days to Germinate	Optimum Soil Temperature Range (°F)	Base Air Temperature (°F)	Weeks to Grow to Transplant Size	Days to Maturity
Artichoke	¼-½	18	36	8-14	65-82	50	6-8	85-120
Arugula	¼	6	10-12	7-14	45-75	40-55	DS[1]	30-40
Asparagus, Seed	1½	12	18-36	24-30	50-85	40	12-14	2-3 years
Asparagus, Crown	6-9	12	18-36	12-20	60-85	40	DS	1-2 years
Celtuce	¼	8	10-20	7-10	50-80	50-60	4-5	80
Bean, Bush	1½-2	2	18-30	6-14	60-90	50	DS	50-70
Bean, Lima Bush	1½-2	3	18-30	7-12	70-85	55	DS	75-80
Bean, Lima Pole	1½-2	3-4	24-36	7-12	75-85	55	DS	85-90
Bean, Pole	1½-2	3	24-36	6-14	60-85	50	DS	55-65
Bean, Scarlet Runner	1½-2	4-6	36-48	8-16	65-85	50	DS	60-70
Bean, Yardlong	1	3	24-36	6-13	60	50	DS	75-85
Beet	½-1	3	12-18	7-10	50-85	40	DS	45-55
Belgian Endive (Witloof Chicory)	¼-½	4-8	18-24	7-21	50-75	45	4-6	100-120
Black-Eyed Pea (Cowpea, Southern Pea)	1-1½	2-4	24-30	7-14	70-85	65	DS	105-125
Bok Choy	¼-½	4-12	10-18	5-14	50-80	45	4-5	30-50
Broccoli	¼-½	12-18	18-24	3-10	50-60	40	5-6	50-80
Brussels Sprout	¼-½	18-24	24-36	3-10	45-85	40	5-6	80-105
Cabbage	¼-½	12-24	24-36	4-10	50-90	50	5-6	65-95
Cabbage, Chinese	¼-½	10-18	18-30	4-10	60-85	50	4-6	70-90
Carrot	¼-½	1-2	12-24	7-21	50-75	45	DS	60-80
Cauliflower	¼-½	18	24-36	4-10	45-85	50	5-6	65-80
Celeriac	⅛	8	24-36	9-21	70-75	60	10	90-120
Celery	⅛	8	24-36	9-21	60-70	45	10-12	120-140
Chard, Swiss	½	4-12	18-24	7-14	50-85	40	DS	55-65

[1]*DS is direct-seeded.*

Table 4 (continued). Seeding recommendations for common vegetable crops grown in Washington (adapted from Kumar et al. 2009, 3-4).

	Seeding			Germination		Growth		
Vegetable	Depth to Plant (inch)	Distance Between Plants (inch)	Distance Between Rows (inch)	Number of Days to Germinate	Optimum Soil Temperature Range (°F)	Base Air Temperature (°F)	Weeks to Grow to Transplant Size	Days to Maturity
Chicory (Endive, Escarole)	½	8-10	12-24	5-9	50-80	40	4-6	50-60
Chicory, Italian Dandelion	¼-½	8-10	12-16	7-14	50-75	40	DS	45-55
Chive	¼-½	2-4	12-18	7-21	50-70	45	4-6	80-90
Collards	½-¾	8-18	18-30	4-10	40-85	40	5-6	65-85
Corn, Sweet	2	6-12	24-36	6-10	60-90	48	DS	65-90
Corn Salad (Mâche, Feldsalat)	¼-½	4-6	6-18	10-14	50-65	40	DS	45-55
Cress	¼-½	4-6	3-4	4-10	55-75	45	DS	25-45
Cucumber	1	12-18	36-48	6-10	70-95	55	4-5	45-65
Edamame	1½-2	2-3	24-30	6-14	55	50	DS	85-100
Eggplant	¼-½	18	24-36	7-14	70-90	60	6-9	75-95
Fennel (Finocchio)	¼-½	10-12	24-36	12-18	50-75	30	6-8	100-120
Garbanzo (Chickpea)	1½-2½	3-4	24-30	6-12	45	65	DS	85-125
Garlic	2	4-6	12-24	6-10	35-50	30	DS	90-150
Horseradish	4	12-24	24-48	10-20	45-75	40	DS	140-160
Jerusalem Artichoke (Sunchoke)	4	12-18	36-48	10-20	65-90	50	DS	110-150
Kale	¼-½	8-12	18-24	3-10	60-90	40	5-6	55-80
Kohlrabi	¼-½	8	18-24	3-10	50-80	40	6-8	60-70
Leek	¼-½	4-6	18-24	7-12	45-90	35	10-12	80-90
Lettuce, Head	⅛-¼	12-14	18-24	4-10	40-80	40	4-6	55-80
Lettuce, Leaf	⅛-¼	2-4	4-6	7-10	50-80	40	4-6	45-60
Muskmelon (Cantaloupe)	1	24-36	36-48	4-8	75-95	50	3-4	75-95
Mustard Greens	¼-½	8-18	12-24	3-10	45-85	35	5-6	35-65

[1]*DS is direct-seeded.*

Table 4 (continued). Seeding recommendations for common vegetable crops grown in Washington (adapted from Kumar et al. 2009, 3-4).

	Seeding			Germination		Growth		
Vegetable	Depth to Plant (inch)	Distance Between Plants (inch)	Distance Between Rows (inch)	Number of Days to Germinate	Optimum Soil Temperature Range (°F)	Base Air Temperature (°F)	Weeks to Grow to Transplant Size	Days to Maturity
New Zealand Spinach	¼-½	6	24	5-10	60-75	50	4-6	70-80
Onion, Set	1-2	2-3	12-24	n/a	50-90	40	DS	90-110
Onion, Seed	¼-½	1-2	12-18	10-20	50-90	40	5-6	80-120
Parsley	¼-½	2-4	12-18	20-30	50-85	35	6-8	75-90
Parsnip	¼-½	2-3	18-24	20-25	50-85	45	DS	100-120
Pea	1-2	2-3	18-36	6-15	45-85	40	DS	65-85
Pepper	¼-½	18-24	12-24	10-20	65-95	50	6-8	60-80
Potato	2-3	12	30-36	14-21	40	40	DS	90-105
Pumpkin	1-1½	36	72	6-10	70-90	45	4-6	70-110
Radicchio	¼-½	8-10	8-18	7-10	45-85	40	4-6	65-90
Radish	½	1-2	6-12	3-10	50-65	40	DS	20-30
Rutabaga	½	6-8	18-24	3-10	45-85	40	DS	80-90
Salsify	½	3-4	18-24	14-20	55-75	40	DS	110-150
Shallot	1	4-6	12-18	18	45-95	32	DS	60-75
Spinach	½	2-4	12-18	6-14	45-75	15-20	DS	30-40
Squash, Summer	1-1½	18-24	36-48	3-12	70-95	45	4-6	45-60
Squash, Winter	1-1½	24-36	72	6-10	60-90	45	4-6	85-120
Sweet Potato	1-2	12-18	36-48	14-20	75-80	60	DS	150
Tomatillo	¼-½	18-36	36-48	6-14	70-85	51	5-6	55-90
Tomato	¼-½	18-36	36-48	6-14	70-85	51	5-6	55-90
Tomato, Ground Cherry (Husk Tomato)	¼-½	18-24	36	6-13	70-85	51	6-7	90-100
Turnip	¼-½	2-3	12-18	3-10	40-85	35	DS	40-50
Watermelon	1-1½	24-36	48-60	3-12	60-95	55	4-6	80-100

[1]*DS is direct-seeded.*

Adapted from Miles, C. 2013. Home Vegetable Gardening in Washington. *WSU Extension Publication* EM057E.

Table 5. Suggested planting calendar for vegetable crops in the Pacific Northwest; specific dates should be obtained by experimenting in your area (adapted from Miles et al. 2010, 6-29–31).

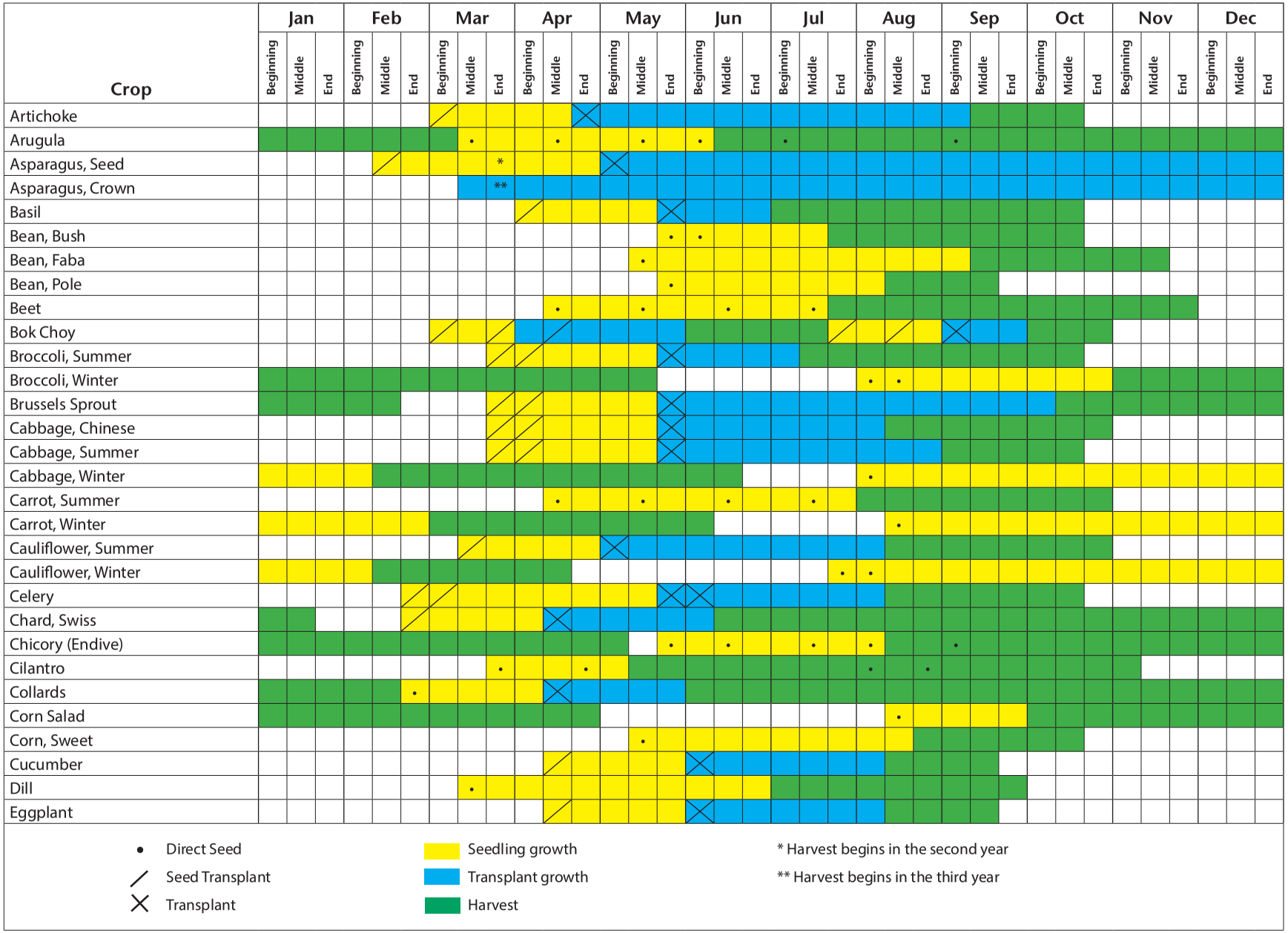


Table 5 (continued). Suggested planting calendar for vegetable crops in the Pacific Northwest; specific dates should be obtained by experimenting in your area (adapted from Miles et al. 2010, 6-29–31).

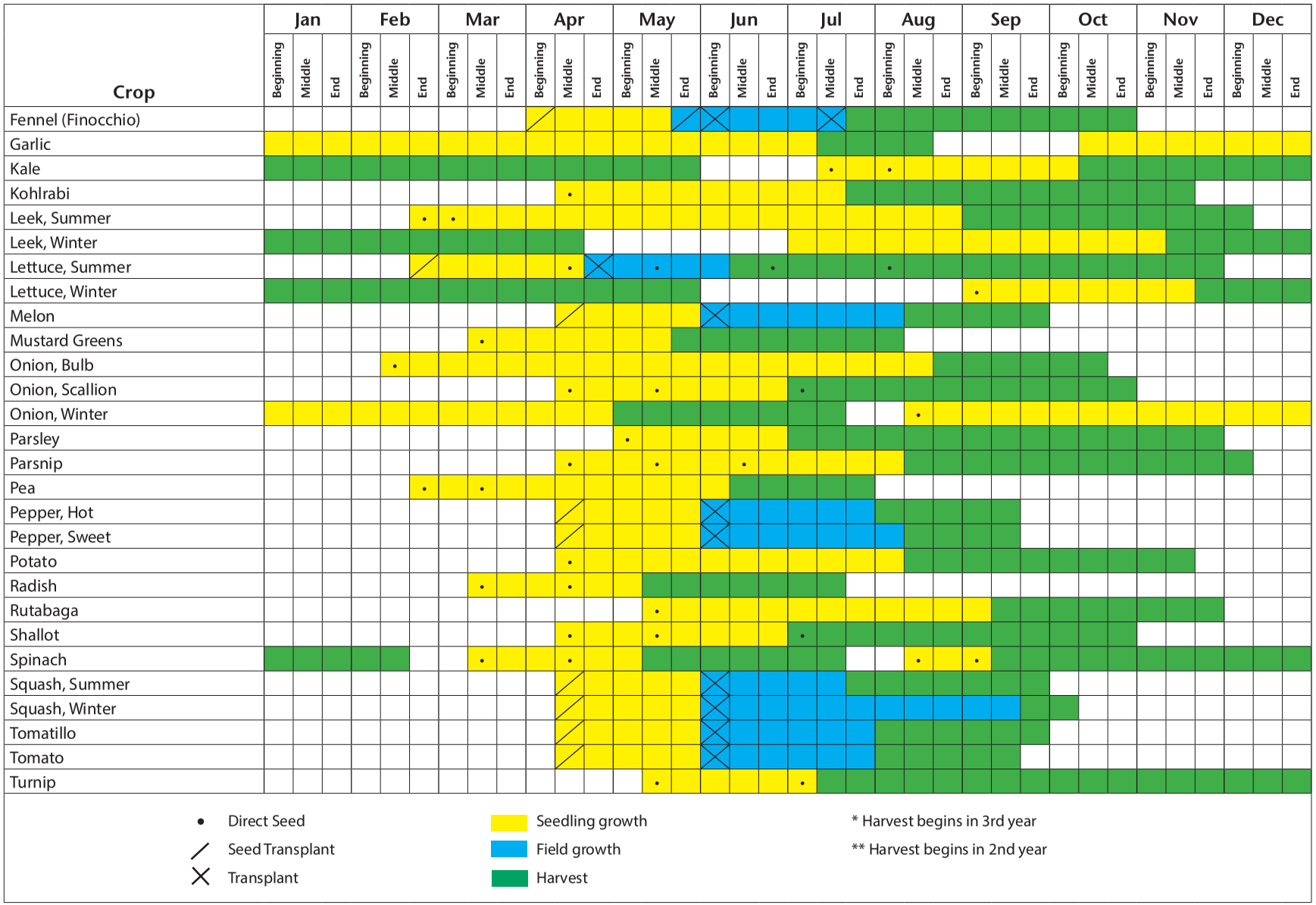
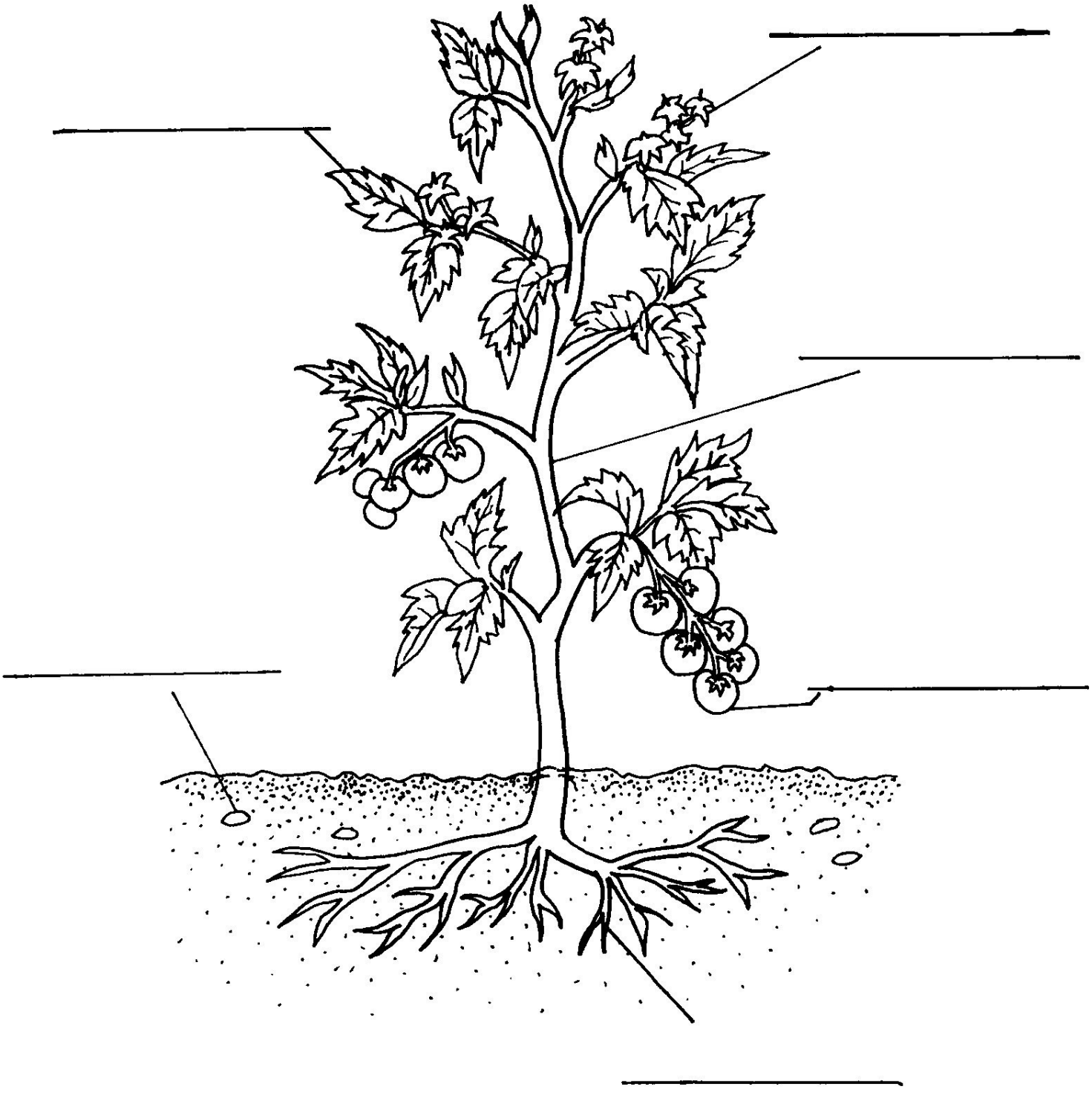


Table 6. General rooting depths of some common vegetable crops grown in Washington (adapted from Maynard and Hochmuth 1997, 221).

Shallow-Rooting (18-36 inches)		Medium-Rooting (36-48 inches)		Deep-Rooting (48+ inches)
Broccoli	Garlic	Bean, Snap	Rutabaga	Artichoke
Brussels Sprout	Leek	Beet	Squash, Summer	Asparagus
Cabbage	Lettuce	Carrot	Turnip	Bean, Lima
Cabbage, Chinese	Onion	Chard, Swiss		Parsnip
Cauliflower	Parsley	Cucumber		Squash, Winter
Celery	Potato	Eggplant		Sweet Potato
Chicory (Endive)	Radish	Mustard		Tomato
Corn	Spinach	Pea		
		Pepper		

Plant Parts Diagram

Label the plant parts



Washington State University, *Growing with Plants,* 2002

Garden Planting Log

DATE PLANTED	CROP	MEASUREMENTS PROGRESS	PHYSICAL ACITIVITY	HARVEST DATES

Table 7. Herb Harvest Schedule

Puget Sound Region-Western Washington

Basil			Jul	Aug	Sept	Oct	
Chives	May	Jun	Jul	Aug	Sept		
Cilantro		Jun	Jul	Aug	Sept	Oct	
Dill		Jun	Jul	Aug	Sept		
Lavender			Jul	Aug	Sept		
Parsley		Jun	Jul	Aug	Sept	Oct	Nov
Rosemary		Jun	Jul	Aug	Sept	Oct	Nov
Sage		Jun	Jul	Aug	Sept	Oct	Nov
Tarragon		Jun	Jul	Aug	Sept		
Thyme		Jun	Jul	Aug	Sept	Oct	

For more information about specific farm products, farms,
farmers markets and other places to buy locally grown food, vist www.pugetsoundfresh.org

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Table 8. COMMON HERBS

A= Annual B=Biennial P=Perennial

Name (Common/Scientific)	A B P	Height	Propagation	Soil and Exposure	Uses	Comments
Anise *Pimpinella anisum*	A	18”-24”	Sow seed directly in May.	Dry, well-drained soil. Full sun.	Oil extract and seeds used in flavoring pastries.	Has licorice-like flavor, use fresh seed.
Basil (sweet) *Ocimum basilicum*	A	18”-24”	Sow seed directly in May or seed indoors early spring and transplant in early May.	Moist, well-drained soil. Full sun, part shade.	Fresh leaves to flavor cheese, fish, and tomato dishes.	Purple leaf basil "Dark Opal" excellent in vinegar. Many other varieties available.
Bee Balm *Monarda didyma*	P	18”-30”	Sow seed directly in May. Root divisions in spring, cuttings in spring or fall.	Moist, fairly rich soil. Full sun, part shade.	Leaves and flowers to flavor jellies, fruit salads, or as tea.	Grows wild in many areas; attractive to bees. Can be invasive.
Borage *Borago officinalis*	A	18”-24”	Sow seed directly in May or seed indoors early spring and transplant in early May.	Dry, poor, light soil. Full sun.	Flowers candied as garnish; young stems have cucumber flavor.	Seed, if self-sown from plant; comes up in following spring.
Calendula (pot marigold) *Calendula officinalis*	A	6”-12”	Sow seed indoors in March. Transplant to garden in mid-May.	Dry, light, sandy soil. Full sun.	Petals and buds used fresh in salads and soups.	Self-sows readily.
Chamomile (German) *Matricaria recutita*	A	18”-24”	Self-sows readily.	Dry, light, sandy soil. Full sun.	Flowers dried and used in tea oil used in soups and perfume.	Often confused with other Chamomiles.
Chervil *Anthriscus cerefolium*	A	6”-12”	Seed directly every 2 weeks mid-March thru mid-July for continuous harvest.	Light, well-drained soil. Part shade.	Leaves fresh or dried, salads and potato and corn soup.	Can sow directly in fall for crop in following spring.
Chives *Allium schoenoprasum*	P	12”-18”	Direct seed in early spring or bulb divisions.	Moist, well-drained, moderately rich soil. Full sun.	Leaves are used fresh and added to cottage cheese, salads or potatoes.	Good ornamental qualities. Will readily self-sow.

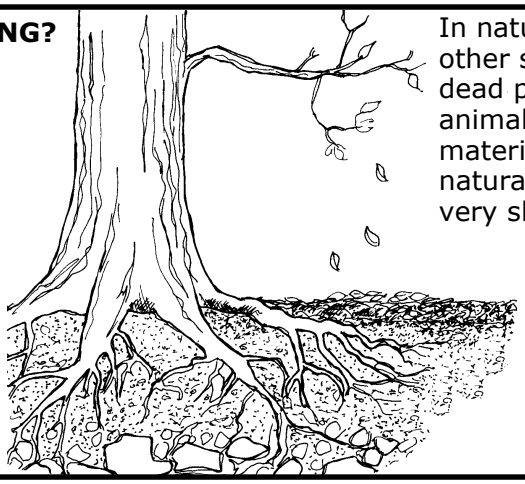
C060 A= Annual B=Biennial P=Perennial

Name (Common/Scientific)	A B P	Height	Propagation	Soil and Exposure	Uses	Comments
Dill *Anethum graveolens*	A	24”-36”	Seed directly in early spring or allow plant to go to seed in fall for spring germination.	Light, well-drained moderately rich soil. Full sun.	Soups, salads, pickles, dried used in meats and vegetables.	Self-sows readily and might become invasive.
Fennel *Foeniculum vulgare*	A	24”-36”	Seed directly in early spring.	Light, well-drained soil. Full sun.	All parts of leaves, stem and seeds are aromatic; used for fish seasoning and sauces.	Harvest flower stalks just before bloom to eat like celery, use leaves fresh.
Garlic *Allium sativum*	A	12”-18”	Divide a bulb into individual cloves and plant in fall for harvest following summer.	Rich, moist, well-drained soil. Full sun.	Whole or minced used in salads, meat dishes or butters.	Harvest whole bulb in late summer and hang to dry.
Geranium *Pelargonium* spp.	A	12”-18”	Rooted cuttings transplanted in garden after risk of frost, or overwinter plants indoors.	Rich, moist, well-drained soil. Full sun, part shade.	Leaves for flavoring teas, biscuits, jelly and sugar. Dried leaves for potpourri.	Many scented geraniums, including apple, rose, mint, lemon, pineapple
Horseradish *Armoracia rusticana*	P	30”-48”	Root division in fall.	Medium to heavy soil. Full sun.	Roots crushed in sauces, as condiment in meat dishes.	Very invasive.
Marjoram *Origanum majorana*	A	10”-12”	Seed indoors early spring and transplant in early May.	Light, medium rich, well-drained soil. Full sun.	Leaves used in herb vinegar, soups and poultry stuffing; oils for perfumes.	Also useful in potpourri.
Oregano *Origanum vulgare*	P	12”-18”	Self-sows readily. Root divisions in spring or fall.	Tolerates poor soil and dry conditions. Full sun, part shade.	Often blended with other herbs, used to flavor Italian foods.	Attractive flowers. Many forms available. Can be invasive.
Parsley *Petroselinum crispum*	B	12”-18”	Seed directly in early spring. Very slow germination rate.	Medium rich, moist soil. Full sun, part shade.	Leaves as flavor in stews and soups.	Thick root varieties can be cooked as a vegetable.
Sage *Salvia officinalis*	P	18”-24”	Seed directly in early spring. Root divisions in spring.	Well-drained soil. Tolerates dry conditions. Full sun.	Leaves and tender shoots used dried in poultry stuffing and meat dishes.	Several leaf color variations, golden, tri-color.
Summer Savory *Satureja hortensis*	A	8”-12”	Sow directly in May or seed indoors early spring and transplant in early May.	Semi-dry, well-drained soil. Full sun.	Leaves used fresh or dry for meat and poultry stuffing, popular in bean-lentil dishes.	Leaves are high in vitamin C.
Winter Savory *Satureja montana*	P	8”-12”	Sow seed directly in May. Root divisions in spring.	Semi-dry, well-drained soil. Full sun.	Leaves used fresh or dry for meat and poultry stuffing.	Leaves are high in vitamin C. Short-lived perennial.
Thyme *Thymus vulgaris*	P	6”-8”	Direct seed in May or use a layering technique for rooting.	Moist, rich soil. Full sun, part shade.	Leaves used in soups and stews	Delicate flavor with steamed vegetables. Woody stems.

COMPOSTING Science Page

WHAT IS COMPOSTING?

Composting is the controlled decay of plant and animal matter to produce compostÑa dark, rich soil-like material. Compost can be added to soil to improve its structure and nutrient content.



In nature, bacteria, fungi, worms, and other soil organisms help to break down dead plants and animals, as well as animal wastes. The decomposed organic material becomes part of the soil. This natural decay process usually takes place very slowly.

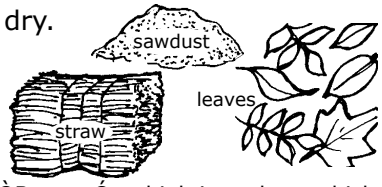
Leaves that fall to the forest floor slowly decay to form part of the organic matter in soil.

Composters create ideal growing conditions for compost organisms. This speeds up the natural decay process.

WHAT COMPOST ORGANISMS NEED

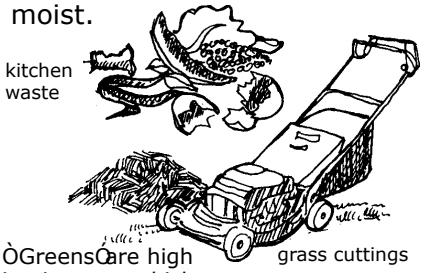
1. A balanced diet of compost materials

ÒBrownsÓare compost materials that are brown and dry.

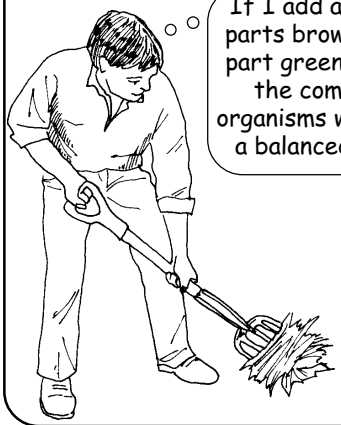


ÒBrownsÓare high in carbon, which is energy food for microbes.

ÒGreensÓare compost materials that are green and moist.



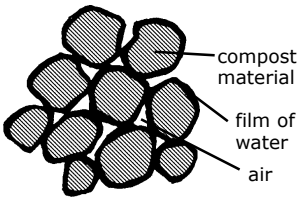
ÒGreensÓare high in nitrogen, which microbes need to make proteins.



2. Just the right amount of air and water

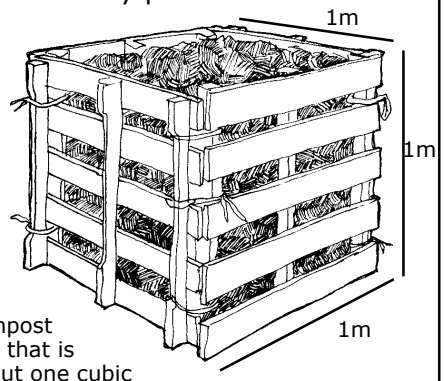
If thereÕs the right amount of oxygen and moisture, microbes can rapidly grow and multiply. Too muchÑor too littleÑ water, and microbes will die.

Compost materials should have a thin film of water around them, and lots of pore spaces filled with air.

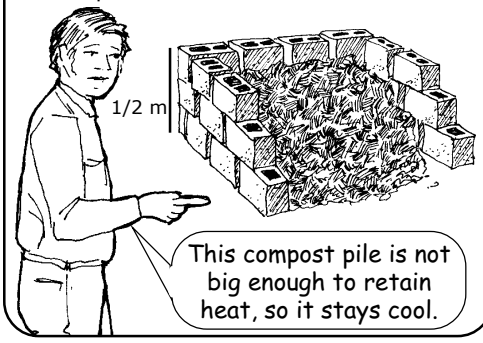


3. The right temperature

Organic materials will eventually decay, even in a cold compost pile. But the decay process is speeded up in a hot compost pile. When bacteria and fungi grow rapidly, they burn a lot of food, and give off a lot of heat. If the compost pile is big enough, the heat will build up inside the pile. Bacteria that grow well at high temperatures take over and speed up the decay process.



A compost pile that is about one cubic meter (1m x 1m x 1m) in size is big enough to hold in heat and warm up.



Garden Mosaics is funded by the National Science Foundation Informal Science Education program, and by the College of Agriculture and Life Sciences at Cornell University.

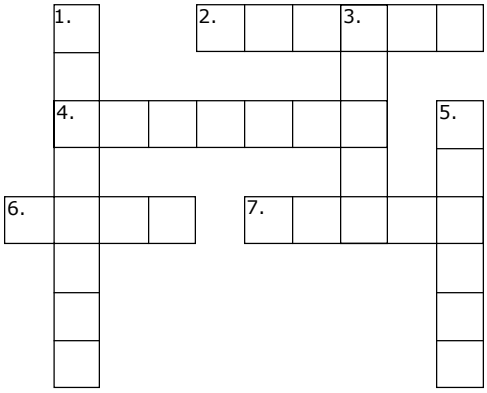
CROSSWORD PUZZLE

Across

2. Compost materials that are high in carbon.
4. Dark, rich, soil-like material.
6. A compost pile should be big enough so _____ builds up inside it.
7. A balanced diet for microbes is about _____ parts browns to one part greens.

Down

1. Microbes that help break down plant and animal matter.
3. Compost organisms need just the right amount of _____.
5. Compost materials that microbes use to make proteins.



TRY THIS

BUILD A COMPOST PILE

What you need

* 3-meter length of wire mesh fencing
* wire cutters
* twist ties
* compost materials
* duct tape

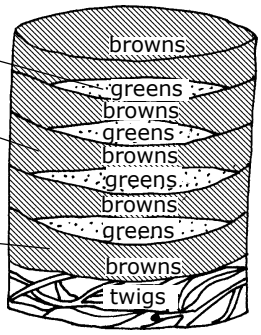
What to do

1. Choose a site to set up your compost bin. Try to find a shady, well-drained, level place that is convenient.
2. Snip off the fencing close to the cross wires and cover the sharp ends with duct tape to avoid getting scratched. Lap the ends of the fencing together and tie together with twist-ties to make a cylinder one meter high and one meter in diameter.
3. Put a layer of twigs in the bottom of the bin to help air to reach the center of the pile.
4. As you collect compost materials, layer them in the compost pile, as shown in the picture.
5. Stir or turn the compost every week or so to let in more air. To reach the compost, undo the twist-ties and open the fencing.
6. The length of time it takes for compost to be ready depends on many factors, such as weather conditions, the type of materials included, and the amount of turning. If you want your compost to be finished faster, keep it moist and turn it a couple of times a week. Finished compost is about one-third or less of its original size, dark brown, and has a nice, earthy odor.

Green layers should be no more than 3-5 cm thick.

Brown layers should be 2-3 times as thick as green layers.

Start with a brown layer, then a green layer, then a brown layer, and so on. Always end with a brown layer so that wastes are covered.



SPOTLIGHT ON RESEARCH

Compost Can Help Control Plant Diseases

Recent research has shown that compost not only improves soil. It can also help to control plant diseases caused by fungi. Fungi that attack plants include molds, rusts, mildews, and smuts. They over-winter in the soil and in plant debris. When the weather is warm, they produce spores, which can be splashed or blown onto wet leaves. Then the spores can germinate and infect plants.

Scientists are testing different composts to find out what types are most effective at suppressing harmful fungi. In one study, a team of scientists tested different composts to see which one would be best for controlling fruit rot in pumpkins. Fruit rot is a serious problem that affects pumpkins, melon, squash, peppers, tomatoes, and eggplants. In greenhouse trials, scientists first screened composts made of several different materials. One product, made from brewery wastes, stood out as very effective. In the following year, the brewery waste compost was applied to two fields where fruit rot had been a big problem in the past. In one field, no disease occurred, and the growth and yield of pumpkins improved a great deal compared to untreated fields. In the other field, the brewery waste compost was not effective in suppressing fruit rot. Scientists think that perhaps there was just too much of the fruit rot fungi present. If brewery compost were added to this field for several more years, then the disease might be suppressed. Time will tell.

Source: Rangarajan, A., Tuttle McGrath, M., and Blomgren, T. (2001). Evaluation of two commercially available composts for managing phytophthora fruit rot of pumpkin. New York IPM Program, Cornell University, Ithaca, NY. <www.hort.cornell.edu/extension/commercial/vegetables/ online/2001veg/pdfs/text/IPMfinalreportPumpkins.pdf>

RIDDLE

Why did the gardener bury money in his compost pile?

Answer: Because he wanted his soil to be rich!

Garden Mosaics is funded by the National Science Foundation Informal Science Education program, and by the College of Agriculture and Life Sciences at Cornell University.

Harvest Tips

To enjoy the highest quality flavor and texture from the vegetables you grow, harvest them at their prime maturity. If you are new to gardening and unsure about the best size or stage of maturity for your vegetable crops, try them at different stages and see what you prefer. The following are some general guidelines.

Pick tomatoes when they are fully colored but still firm. When picked at this stage, the tomatoes can be stored for 1–2 weeks. Overripe tomatoes quickly lose flavor as well as texture.

Snap beans are best when the bean is just beginning to develop in the pod. However, some people prefer them at a slightly more mature stage. When beans are full-size, they can be harvested and shelled.

Harvest summer squash when they are 4–7 inches long and the skin feels soft and rubbery. Once the skin begins to feel smooth or slick, they are past the best eating stage.

Harvest sweet corn as soon as the kernels are well-filled and milky. The tip of the ear within the husk should be blunt and not pointed. If in doubt, peel back the husk and examine the tip before you break off the ear. If it is not ready, just fold the husk back over the ear, and check again in a week or so.

Begin to harvest head lettuce and cabbage as soon as the heads become firm. If you have a number of plants, you may want to begin harvesting when they are immature, which will spread out the harvest over the growing season. Cabbages with firm heads can be given a quarter-turn twist to break part of the roots and slow growth. This can also help prevent splitting.

Beets, turnips, and kohlrabi are usually best at 2–2½ inches in diameter. They will grow larger if harvest is delayed, but may lose flavor and become woody.

Harvest winter squash (hubbard, acorn, butternut, etc.) when they are fully mature and the skin is hard and waxy. Winter squash can be left in the garden until cold or wet weather begins in the fall, but need to be harvested before temperatures remain below 40°F for several days at a time. Pick winter squash with the stems attached.



Section 2
Nutrition Resources

Table 9. Vegetables for Greater Nutrition

Sources: FDA Standards of Industry (2013); ESHA Food Processor V11.3.23 (2016)

Fruits and vegetables are good sources of vitamins, minerals, fiber. They are naturally low in calories, fat and cholesterol. When increasing fruit and vegetable intake it is important to eat a variety. The following tables help identify nutrient sources of seasonal vegetables and emphasize the benefit of eating a variety of vegetables.

½ cup serving contains 2-9% daily value (+); 10- 19% daily value (++), or ≥20% DV (*)

Early or Cool Season Crops							
Vegetable (Calories)	**Vitamin A**	**Vitamin C**	**Folate**	**Potassium**	**Calcium**	**Iron**	**Fiber**
Asparagus (15)	++	+	*	+		+	+
Hardy Greens:							
Beet Greens[1] (5)	*	++		+	+	+	+
Collards (5)	++	++	+		+		+
Cress (5)	++	++			+		
Endive/Escarole (5)	++	+	+	+			+
Mache (5)	*	++			+	+	+
Kale (15)	*	*			+	+	+
Mustards (8)	++	*		+	+	+	+
Bok or Pak Choi (5)	*	*	+	+	+	+	
Tastoi (8)	*	*	++	+	+	+	+
Other Greens:							
Spinach, cooked	*	*	++	+	+	+	+
Spinach, raw(20)	*	*	++	+	+	++	+
Swiss Chard[1] (6)	*	++		+	+	+	+
Peas (60)	++	*	++	+	+	+	++
Lettuce: (5)							
Romaine	++	++	++			+	
Bibb	++	+	+	+		+	
Iceberg	+	+	+				+
Radish (10)		++	+	+			+
Rhubarb (15)		+		+	+		+

[1] Cooking increases the available potassium (chard, beet greens) to 10-19% (++).

½ cup serving contains 2-9% daily value (+); 10- 19% daily value (++), or ≥20% DV (*)

Mid-Summer or Warm Season Crops							
Vegetable	**Vitamin A**	**Vitamin C**	**Folate**	**Potassium**	**Calcium**	**Iron**	**Fiber**
Beans, green (16)	+	++	+	+	+	+	+
Bell Peppers¥ (25)	*	*	+	+		+	+
Cucumber (5)		+	+	+			
Corn (60)	+	+	+	+		+	+
Eggplant (10)		+	+	+			+
Summer squash	+	+	+	+	+		+
Tomatoes (15)	++	*	+	+			+

Late Summer or Warm Season Crops							
Vegetable	**Vitamin A**	**Vitamin C**	**Folate**	**Potassium**	**Calcium**	**Iron**	**Fiber**
Beets (29)		+	++	+		+	+
Broccoli (10)	*	*	+	+	+	+	+
Brussels Sprouts (20)	+	*	+	+	+	+	+
Cabbage (11)		*	+	+	+		+
Carrots (26)	*	+	+	+	+		+
Cauliflower¥ (15)		*	+	+			+
Kale (15)	*	*			+	+	+
Kohlrabi (35)		*	+	++	+	+	++
Leeks (25)	++	+	+	+	+	+	+
Onions (30)		++	+	+	+	+	+
Parsnips (50)		++	++	+	+	+	+
Potato (60)		+	+	+	+	+	+
Rutabaga (25)		*	+	+	+	+	+
Sweet Potato¥ (57)	*	+	+	+	+	+	+
Turnip (18)		*	+	+	+		+
Winter Squash & Pumpkin (32)	*	*	+	+	+	+	+

¥ Harder to grow

UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

FIVE STEPS TO FOOD SAFE FRUIT AND VEGETABLE HOME GARDENING

Food Safety and Your Garden Produce
Increasingly, foodborne illness outbreaks are being traced to lettuce, tomatoes, cantaloupe and other raw fruits and vegetables. Most foodborne illness is caused by the bacteria, viruses, molds and parasites *(or pathogens*) found on raw produce that is not carefully washed or prepared. Many of these can make you sick. ***These microorganisms are a natural part of the environment and can be a problem whether you choose to use organic or conventional gardening methods***.

It is also possible to get sick from contamination of produce with chemicals such as cleaning solutions, fertilizers, pesticides, and heavy metals (lead) and other chemicals that may be found in garden soil or well water.

FIVE STEPS TO FOOD SAFE GARDENING
Follow the five simple steps listed here and reduce the risk of someone suffering a foodborne illness after eating produce from your home garden.

STEP 1-PREPARE THE GARDEN FOR PLANTING
- Locate vegetable gardens away from manure piles, well caps, garbage cans, septic systems and areas where wildlife, farm animals, or the family pets roam.
- Use compost safely. Compost is the natural breakdown product of leaves, stems, manures and other organic materials-and also a source of pathogens. To be safe for gardening, your compost must reach a temperature of at least 130°F. Check the temperature with a compost thermometer. Do not use any animal waste, including pet waste, meat scraps or dairy product waste into your compost bin.

STEP 2- MAINTAIN THE GARDEN
Water source: Be familiar with the quality and safety of the water source(s) you use in your garden.
- If you get your water from a *municipal* or *public water system*, you can be sure that it is safe and potable (drinkable).
- Surface water (lakes, ponds, rivers and streams) can be polluted by human sewage or animal waste, fertilizers and pesticides from lawns and farm fields, or chemicals from industry.
- *Ground water* (which is the source for *well water*) is less likely to have microbial contaminants than surface water. If a well is your water source, you need to take a little more care to be sure that it is providing you with safe, clean water.
- Conduct a standard water test at least once a year to determine if your well water meets the standards of the Environmental Protection Agency (EPA).

Animals: Animal waste can be a source of bacteria, parasites and viruses.
- During the gardening season, keep cats, dogs and other pets out of the garden.
- Curtail nesting and hiding places for rats and mice by minimizing vegetation at the edges of your fruit and vegetable garden.
- Do not feed wild animals, even birds, near your garden. Fencing or noise deterrents may help discourages other wild animals.

STEP 3-HARVEST GARDEN PRODUCE

- Use clean, food-grade containers. ***Food-grade*** containers are made from materials designed *specifically* to safely hold food. Garbage bags, trash cans, and any containers that originally held chemicals such as household cleaners or pesticides are not food-grade.
- Use clean gloves (that have not been used to stir compost or pull weeds) or clean hands when picking produce.
- Brush, shake or rub off any excess garden soil or debris before bringing produce into the kitchen.

STEP 4-STORE GARDEN PRODUCE

- If you choose to wash fruits and vegetables before storing, be sure to dry them **thoroughly** with a clean paper towel. (NEVER wash berries until you are ready to eat them.)
- If you choose to store without washing, shake, rub or brush off any garden dirt with a paper towel or soft brush while still outside. Store unwashed produce in plastic bags or containers.
- Keep fruit and vegetable bins clean.
- When washing produce fresh from the warm outdoors, the rinse water should not be more than 10 degrees colder than the produce. If you are washing refrigerated produce, use cold water.
- Fruits and vegetables needing refrigeration can be stored at 40° F or less.
- Fruits and vegetables stored at room temperature (onions, potatoes, tomatoes) should be in a cool, dry, pest-free, well-ventilated area separate from household chemicals.

STEP 5-PREPARING AND SERVING FRESH GARDEN PRODUCE

More often than not, we eat fresh fruit and vegetables raw so we cannot rely on the heat of cooking to destroy pathogens that might be on our lettuce or tomatoes, it is important to prepare raw produce with food safety in mind.

- Always wash your hands first.
- Rinse fresh fruits and vegetables under cool, running, clean water even if you do not plan to eat the skin or rind.
- Never use soap, detergent, or bleach solution to wash fresh fruits or vegetables. These solutions can affect flavor and may not be safe to ingest.
- Avoid cross-contamination when preparing fruits and vegetables. *Cross-contamination* occurs when a clean work surface such as a cutting board or utensil (paring knife) or uncontaminated food is contaminated by dirty work surfaces, utensils, hands or food. Be sure to wash your hands (as well as the knife and cutting surface) before preparing any ready-to-eat foods such as salad, fresh fruit or a sandwich.
- If you have leftover produce that has been cut, sliced, or cooked, store it in clean, air-tight containers in the refrigerator at 40°F or less.

PRESERVING FRESH GARDEN PRODUCE

Canning, freezing or drying fruits and vegetables allows you to enjoy the fruits (or vegetables) of your labor all winter long. Choose and follow recipes and methods that are tested by a United States Department of Agriculture (USDA) endorsed source such as Cooperative Extension.

1. The National Center for Home Food Preservation offers tested recipes and procedures. http://www.uga.edu/nchfp/index.html
2. The USDA complete guide to Home Canning. http://foodsafety.cas.psu.edu/canningguide.html;
3. Home Canning.com (Ball/Kerr). http://www.homecanning.com/usa/

Project of the Universities of Rhode Island, Connecticut, Maine, New Hampshire and Vermont and funded by CSREES/USDA. Project 2003-5111001713

Table 10. Vegetable and Fruit Storage Chart

The storage times listed in the chart below are intended as useful guidelines, not set rules.

Product	Room Temp.	Refrigerate at 35°- 40°F	Comments
Fruits			
Berries (blackberries, blueberries, strawberries, raspberries), and cherries		1-2 days	Before storing berries remove any spoiled or crushed fruits. Store berries unwashed in plastic bags or plastic containers; do not remove green tops from strawberries before storing.
Vegetables			
Artichokes, whole	1-2 days	1-2 weeks	
Asparagus		3-4 days	
Beans, green or wax		1 week	
Beets	1 Day	7-10 days	
Bok choy		2-3 days	
Broccoli, raab, repini		3-5 days	
Brussels sprouts		3-5 days	
Cauliflower		3-5 days	
Cabbage		1-2 weeks	
Carrots, parsnips		3 weeks	
Celery		1-2 weeks	
Corn on the Cob		1-2 days	For the best flavor use corn immediately.
Cucumbers		4-5 days	
Eggplant	1 day	3-4 days	
Garlic	1 month	1-2 weeks	
Ginger root	1-2 days	1-2 weeks	
Greens		1-2 days	
Herbs Fresh		7-10 days	
Leeks		1-2 weeks	
Lettuce, Iceberg		1-2 weeks	Store in a bag or lettuce keeper
Lettuce, leaf		3-7 days	Store in a bag or lettuce keeper
Mushrooms		2-3 days	Do not wash before refrigerator storage
Okra		3-5 days	

Table 10. Vegetable and Fruit Storage Chart

The storage times listed in the chart below are intended as useful guidelines, not set rules.

Product	Room Temperature	Refrigerate at 35°- 40°F	Comments
Vegetables cont'			
Onions dry (red, white, yellow) green	2-4 weeks	1 month	Store dry onions loosely in a mesh bag in a cool, dry, well-ventilated place away from sunlight. , Store green onions unwashed.
Parsley, cilantro		1 week	
Peas, lima beans, unshelled		3-5 days	Store unshelled in refrigerator until used.
Peppers, bell or Chile		4-5 days	
Potatoes	1-2 months	1-2 weeks	Store unwashed potatoes in a cool dry, well-ventilated area away from light, which causes greening. Storing in the refrigerator reduces sprouting. However, starches will turn into sugar (causing fried potatoes to darken.) For more information see "Options for storing Potatoes at home": http://info.ag.uidaho.edu/pdf/CIS/CIS1153.pdf
Radishes		10-14 days	
Rutabagas	1 week	2 weeks	
Spinach		3-7 days	
Squash, summer		4-5 days	
Squash, Winter	1 week	2 weeks	Cured winter squash will last 2 to 6 months in cool temperatures (55-60°F).
Turnips		2 weeks	
Tomatoes	To ripen tomatoes, store at room temperature away from sunlight	5-6 days	For best flavor, store unwashed at room temperature and eat immediately when ripe. Tore fully ripened tomatoes unwashed in the refrigerator.

Table updated by Stephanie Smith, WSU Extension Consumer Food Safety Specialist, March 2017.

Table adapted from materials prepared by the Food Marketing Institute and Cornell University Institute of Food Science.
http://www.fmi.org /consumer/foodkeeper/Food_Keeper_Brochure.pdf
Storing Food for Safety and Quality; Sandra McCurdy, Joey Peutz and Grace Whittman, PNW 612, University of Idaho, Sept. 2009; pages 18-19
http://extension.oregonstate.edu/fch/sites/default/files/documents/pnw_612_storingfoodforsafetyquality.pdf

Workbook Section 2
Lesson Recipes

Lesson 1: Seed Salad

Lesson 2: Spring Greens with Vinaigrette

Lesson 3: Plant Parts Salad

Lesson 4: Spicy Panzanella

Lesson 5: Healthy Harvest Salad

Lesson 1 Recipe: Seed Salad

Makes: 20 sample portions; or 6 snack portions

SOURCE: Adapted from Oregon State University *Growing Healthy Habits* Curriculum, page 223.

This is a tasty snack that lets you experience how much energy is inside seeds.

Ingredients

½ cup un-popped popcorn + 2 tablespoons vegetable oil
OR
1 bag microwave unsalted popcorn

1 cup toasted sunflower seeds*
1 cup toasted pumpkin seeds
1 cup dried cranberries
*(optional) If popcorn and seeds are both unsalted, add up to ¼ teaspoon of salt.

Directions

1. Place large pot on the stove, or plug in electric skillet. If using microwave, place bag in microwave for approximately 3 minutes or until popping slows and skip to step 6.
2. Add the oil and 3 popcorn kernels and cover the pot or skillet.
3. Turn the burner on to medium high, or the skillet on to high.
4. When you hear the kernels pop, add the rest of the popcorn and replace the lid.
5. Swirl the pot as it pops. When the popping starts to slow, turn off the heat and let the pot/skillet cool, or if using a stove, place the pot on a cool flame-proof surface until the popping stops.
6. After the popcorn is popped, pour into large bowl. Mix in the sunflower seeds and cranberries.
7. If needed, add up to ¼ teaspoon of salt.
8. Serve.

Lesson 2 Recipe: Spring Greens with Vinaigrette

Makes: Per serving

Source: WSU Extension – Pierce County Food $ense

Ingredients

2 cups of greens per person
1-2 tablespoons of salad dressing (below)

Directions

1. Make sure greens are washed and dry.
2. Place appropriate measure of greens in mixing bowl to allow all participants to have a sample.
3. Measure appropriate amount of vinaigrette for number of samples.
4. Toss until greens and dressing well mixed.
5. Serve.

Orange Zest Vinaigrette (Makes about ¾ cup)

Ingredients

1/2 cup olive oil
2 tablespoon grated orange zest
1 tablespoon red wine vinegar
1 tablespoon balsamic vinegar
1 tablespoon orange juice
Coarse salt to taste
Freshly-ground black pepper to taste

Directions

1. Mix oil, zest, red wine vinegar, balsamic vinegar, orange juice and salt and pepper to taste in small bowl.
2. Can be made a day ahead and refrigerated. Let Vinaigrette come to room temperature before using.

Honey Dressing (Makes about ¾ cup)

Ingredients

2 tablespoons clear honey
4 tablespoons of lemon juice
6 tablespoons of olive oil
1/2 teaspoon prepared yellow mustard
1/2 teaspoon of salt
1/8 teaspoon black pepper
Optional: chopped, fresh herbs (mint, basil, savory)

Directions

1. In a small mixing bowl, beat all the ingredients together with a fork until they are well combined **OR**
2. Put all ingredients in a screw-top jar. Cover the jar and shake it for 10 seconds.
3. Use as required.

This material was funded by USDA's Supplemental Nutrition Assistance Program. SNAP. The Supplemental Nutrition Assistance Program (SNAP) provides nutrition assistance to people with low income. It can help you buy nutritious foods for a better diet. To find out more, contact: http://foodhelp.wa.gov or the Basic Food Program at: 1 877 501 2233. All responses will be kept confidential. Information provided by Washington State University Extension's Food $ense. Rev. 11/15

Lesson 3: Plant Parts Salad

Adapted from: *Growing Healthy Habits Curriculum* (2012), Oregon State University SNAP-Ed

Makes: 6 cups. Sample size serving: ¼ cup

Ingredients

3 cups **leaves** (lettuce, spinach, chard)

½ cup **roots** (beets, carrots, radishes)

2 cup **flowers** (broccoli, cauliflower)

½ cup **stems** (celery, broccoli stems, chard stems)

1 cup **fruit** (apple, tomato, cucumber)

2 Tablespoons **seeds** (sunflower seeds, peas, beans)

Dressing

2 tablespoons **fruit juice or vinegar** such as lemon, orange or apple cider vinegar

2 tablespoons oil

1 clove garlic, minced

Directions

1. Wash all fruits and vegetables.
2. Tear leaves into small pieces. Place in large bowl.
3. Cut or grate roots, stems, flowers and fruit into bite-sized pieces. Add to bowl.
4. Add seeds to bowl.
5. Make dressing by combining oil, liquid, and garlic in a small container with a secure lid. Shake until well-mixed.
6. Pour dressing over salad and toss lightly.

Lesson 4: Spicy Panzanella

Adapted from: WA State Farmers Market Association (www.wafarmersmarkets.com)

Makes: 4 servings; or 16 sample servings

This fun Italian salad is a great way to use old bread. The dry bread absorbs the vegetable juices and dressing. It's perfect for using summer tomatoes, cucumbers and peppers.

Ingredients

1 large English cucumber, chopped
4 slices of old bread, cut into 1-inch pieces
2 fresh tomatoes, chopped
1 jalapeno pepper, remove seeds and white ribs; finely chopped
Juice of 1 lime
2 tablespoons olive oil
Salt and pepper to taste

Directions

1. Select old bread that is slightly crusty. Old bread helps absorb the juices from the vegetables and dressing. Cut bread into 1 inch cubes. Set aside.
2. Reserve 2 tablespoons of the chopped tomatoes for use in the dressing.
3. Place chopped tomatoes and cucumber pieces into a large bowl. Sprinkle lightly with salt and pepper. This will help draw out the vegetable juices. Toss vegetables.
4. In a small saucepan on medium heat, sauté the pepper with a few drops of olive oil for about a minute. Add the reserved tomatoes and a tablespoon of water. Cook for another 2 minutes until the tomato juices release.
5. Once the water evaporates, remove from heat source and remove tomato-jalapeno mixture to a cutting board. Chop it finely and put it back into the pan with the lime juice and olive oil.
6. Mix the bread and vegetables with the dressing. Adjust salt and pepper if needed. Let the salad set at room temperature for a few minutes so that the bread can soak up the juice. It's ready to serve.

Lesson 5 Recipe: Healthy Harvest Salad

Source: WSU Extension Food $ense

Makes: per serving

Ingredients:

2 cups bite-sized pieces of Italian kale (flat leaf) or other hearty greens
¼ cup diced roasted butternut (or other winter type) squash
¼ Honeycrisp or other sweet/tart apple
1-2 tablespoons Apple Cider Vinaigrette (below)
1 tablespoon toasted sunflower or pumpkin seeds (optional)

Directions

1. Preheat oven to 425 degrees.
2. Wash hands with warm soap and water; wash vegetables under running water. Drain and pat dry.
3. Peel squash; removed seeds and strings in core. Slice cross-wise into 1/2 inch half rings; and then dice each ring into ½ inch pieces.
4. Place on baking sheet; spray lightly with nonstick cooking spray and toss. Roast diced squash 20 minutes at 425 degrees; then turn over and roast for 10-15 more minutes until roasted (turning brown).
5. Meanwhile, remove stems kale, breaking into bite-sized pieces and place in mixing bowl.
6. Cut apple in half, core, and dice into ½ inch pieces.
7. Add apples into bowl; toss with vinaigrette; top with roasted squash (great use of leftover squash) and seeds (optional)

Apple Cider Vinaigrette

(Makes: 3/4 cup)

Ingredients

¼ cup Apple cider/juice concentrate
2 tablespoons apple cider vinegar
4 Tablespoons vegetable oil
¼ teaspoon salt
½ teaspoon minced garlic

Directions

1. Place all ingredients into jar or container that will not leak.
2. Put the top on tightly.
3. Shake jar.
4. Shake each time before you put it on a salad.

Section 3
Community Resources

Energize Your Life!
Gardening for a Healthier You

Community Resources:

- County resources may be available for free or low cost compost composed of bio-solids. Check with your county Public Works and/or Solid Waste Division.
- Volunteers can often be found through Horticulture teachers and their students at high schools, community colleges.
- Local WSU Master Gardeners (MG) often accept special projects as part of their training. Check your local WSU Extension website to submit applications for MG assistance.
- Lowes, Home Depot and Fred Meyer often donate materials for community garden groups and/or offer small grants to support the construction of new gardens for non-profit or community organizations.
- Consider co-op gardening efforts with neighbors and community groups. This saves time, effort and money and encourages community building.

Horticulture Resources:

1. WSU CAHNRS and WSU Extension, **WSU Hortsense**
   http://hortsense.cahnrs.wsu.edu/Home/HortsenseHome.aspx
2. WSU Master Gardeners,
   http://mastergardener.wsu.edu/
3. WSU Gardening in Washington State
   http://gardening.wsu.edu/
4. National gardening Association
   https://garden.org/

Seed Resources:

Some seed companies will donate seeds and have a place on their website to make a request. Many companies will donate seeds, if you pay for shipping. Seed catalogs are free by phone or written request. It is best to make requests after the first of the New Year.

Most healthy seeds are viable and will sprout and grow for up to 3 years beyond the stamped date on the seed packet. To test seed viability, germinate a small selection of seeds from the packet in a damp paper towel (*be sure to keep the towel moist at all times)* or in a shallow seeding tray with a starting medium or seeding soil mix.

This list of seed sources is designed to you locate seeds. It is not meant to endorse any of these businesses or detract from any businesses not listed.

Seed Companies:

Burpee Seed Co
W. Atlee Burpee & Co
300 Park Ave
Warminster, PA 18974
1-800-888-1447
http://www.burpee.com/

Ed Hume Seeds
Address: 11504 58th Ave E
Puyallup, WA 98373
(253) 435-4897
http://www.humeseeds.com/

Irish Eyes Seed Co.
5045 Robinson Canyon Rd.
Ellensburg WA 98926
509-933-7150 *press 1*
Web: www.irisheyesgardenseeds.com
Email (Retail): customerservice@irisheyesgardenseeds.com
Email (Wholesale): wholesale@irisheyesgardenseeds.com
http://irisheyesgardenseeds.com/

Johnny's Seed Co.
1-877-564-6697
http://www.johnnyseeds.com/

Seed Savers Exchange
3094 North Winn Road
Decorah, Iowa 52101
(563)382-5990
http://www.seedsavers.org/catalog?gclid=CICO_5bIh9ACFUpNfgodB8IAdg

Territorial Seed Co.
PO Box 158
Cottage Grove, OR 97424
Phone: 800-626-0866
Fax: 888-657-3131
Customer Service/Gardening Questions: 541-942-9547
Toll Free: 800-626-0866
Customer Service Email
info@territorialseed.com
http://www.territorialseed.com/

Notes

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