



Slow Food USA®

Slow Food USA's **School Garden Curriculum**

**Clean**

Enjoying the pleasures of healthy and delicious food

For Grades **K + up**

Gigia Kolouch



# Clean

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# Slow Food USA®

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# Education

## for Slow Food...

- ...is about **pleasure**, a light and convivial occasion to feel good and enjoy ourselves
- ...teaches the values of **slowness** and **respect** for our own and other people's rhythms
- ...is learning by doing, because **hands-on** experience increases and strengthens educational outcomes
- ...values the **diversity** of cultures, knowledge, skills and opinions
- ...recognizes everyone's needs, and stimulates the interests and motivations of each **individual**
- ...approaches topics in their complexity, favoring a **multi-disciplinary** approach
- ...means taking time to **understand, internalize** and **elaborate** one's own vision
- ...**encourages participation** by facilitating dialogue, self-expression, cooperation, listening and mutual acceptance
- ...is a **personal journey** that involves cognitive, experiential and emotional dimensions
- ...is nourished by its own **context**, giving value to memory, knowledge and local cultures
- ...**facilitates exchange** among local networks, reinforcing the sense of community
- ...**develops self-awareness** of everyone's own role and actions
- ...stimulates **curiosity** and trains **intuition** and critical **thinking**
- ...**promotes change**, generating new and more responsible thoughts and behaviors



# Welcome

to Slow Food USA's *Good, Clean and Fair* school garden curriculum. In this Introduction you will find everything you need to begin gardening and cooking lessons with young learners the Slow Food way. We envision a progression of activities that moves from the personal to the social and from the local to the global.

## What is Slow Food?

Slow Food  
is an idea,  
a way of  
living and  
a way of  
eating.

In 1986, Italian journalist Carlo Petrini recognized that a proposed McDonald's restaurant in Piazza di Spagna near the Spanish Steps in Rome represented a threat to the Italian food culture of trattorias and osterias. Armed with bowls of pasta, Petrini rallied his friends to take a stand against the industrialization of food, and the social and culinary costs of homogenized eating. With this protest, Slow Food was born.

Slow Food is an idea, a way of living and a way of eating. It is a global, grassroots movement with thousands of members around the world that links the pleasure of food with a commitment to community and the environment. Slow Food seeks to create a dramatic and lasting change in the food system. We reconnect Americans with the people, traditions, plants, animals, fertile soils and waters that produce our food. We seek to inspire a transformation in food policy, production practices and market forces to equity, sustainability and pleasure in the food we eat.

Today, Slow Food has over 150,000 members and is active in more than 150 countries. In the USA, Slow Food is headquartered in Brooklyn, NY and there are more than 150 chapters and 2,000 food communities across the country.

## The Purpose of Slow Food School Garden Curriculum

The concept of "conviviality" is at the heart of the Slow Food movement: taking pleasure in the processes of cooking, eating, and sharing meals with others. Education is an important step in gaining the appreciation for conviviality and the pleasure of sharing good food. Therefore, Slow Food School garden curriculum must include the following elements:



# 1

**Activities and instruction regarding growing food**

# 2

**Activities that center around cooking and eating**

# 3

**Promoting the enthusiastic enjoyment of good, clean and fair food for all.**



Slow Food provides a unique contribution to school gardens. By engaging learners on experiential and emotional levels, our garden programs provide a meaningful context for multidisciplinary education.

Our holistic approach allows the learner to understand the network of relationships between humans and the natural environment from a personal point of view.

School gardens are used for many other purposes, including STEM education, nutrition, food production, sensory learning and social connections. These are all praiseworthy efforts to link learners and the school community to the natural environment. A Slow Food school garden may include some or all of these activities, but its primary purpose is to fulfill the Slow Food mission; a Slow Food school garden links the pleasure of good food with a commitment to fairness in the community and a healthy environment. The curriculum is the place where the Slow Food mission is expressed in gardening and cooking activities.

The curriculum is divided into three parts, Good, Clean and Fair. Together they provide a full range of activities centered around the garden; from tasting activities, to cooking with garden produce, to sustainable gardening, to studying food systems, and activities that promote access to affordable fresh food. Please see the following chart to select lessons appropriate for specific age groups.

These activity guides assume that you already have a school garden, or an outdoor space. If you need help starting a garden, check out the Slow Food USA's *School Garden Guide* at <http://gardens.slowfoodusa.org>

	<b>Good</b> Enjoying the Pleasures of Healthy and Delicious Food	<b>Clean</b> Gardening for Sustainability	<b>Fair</b> Producing Food with Respect for Economic and Social Justice
<b>Elementary School</b>	Sensory Education Simple Cooking Techniques	Healthy Soils Wise Water Use Lifecycles of Plants and Insects	Community Justice: Youth Farmers Markets and Sharing with Food Pantries
<b>Middle School</b>	Food and Culture including recipes from around the world	Plants and Culture	Local and National Food Systems
<b>High School</b>	Advanced Cooking Techniques Sharing with Community	Garden Design and Sustainable Agriculture	Global Food Systems and Human Rights

## How to Use the Lessons

We have combined observation-based lessons with skill-based lessons in a progression designed to increase learners' enthusiasm and knowledge of cooking and gardening. Adult leaders can be teachers, garden leaders, after school staff, interns or parents. They do not need to be cooking and gardening experts, but classes will be more successful if the leaders have experience with leading groups of young learners. Often lessons can be more powerful if leaders are learning along with the students. We provide you with the background information you need to lead a class. Additional resources are provided at the end of each section.

Although the lessons are meant to enhance learning with a school garden, many observation lessons as well as cooking lessons do not need a formal school garden. However access to some type of outside landscape is desirable.

Lessons are meant to be adaptable to the widest variety of conditions. They may be taught as single experiences, or as part of an ongoing in school or after school program. Many powerful cooking classes can be accomplished with simple tools and without the use of heat.

## Good, Clean and Fair in the Academic Curriculum

The process-driven lessons contained in these volumes move through four stages of knowledge. The four fundamental skills of observation, research, experimentation and reflection promote learners who are creative, flexible and can engage in critical thinking.

### OBSERVATION

Developing the ability to truly see what is happening in the environment is the fundamental skill to understanding. Both gardening and cooking rely on observation to develop judgment.

Intuition starts with observation. Learners can derive a shallow understanding of life cycles from lectures and reading books, but a deeper understanding starts with observing the small details of life at an intimate scale. Teachers and garden leaders can use the journal page **"What did you see today?"** (pages 42 and 123) to encourage reliable, detailed habits of observation every time they engage in garden related activities.

### RESEARCH

Observation naturally leads to questions. These questions are powerful learning tools for further research and knowledge integration. Questions that come from the learners' own interest and first hand observation are more likely to ensure engagement in the learning process. There are many small mysteries in the garden that can be investigated by research. For example, *why tomato leaves are curled or black? What insect created holes in cabbage leaves?* Once learners





investigate these questions through research, they are often driven back to observation to confirm what they have learned. Research can also lead to experimentation or activity. For example, once a learner discovers that cabbage loopers may be the cause of damage, they can experiment with different methods of controlling the infestation.

## EXPERIMENTATION OR ACTION

Observation and research provide the backdrop for a learner's desire to intervene in the environment. The teacher or garden leader can guide this intervention into the shape of an experiment. Experiments rely on skills developed over time. Just as a chemistry experiment relies on the skill to manage heat, test tubes and measuring, so a recipe relies on skills such as chopping, stirring and seasoning. Use the **"What did you do today?" journal worksheet** (pages 41 and 122) to record all actions while gardening or cooking. Have the learners focus on the process and the results of their actions.

## REFLECTION

Reflection integrates observation, research and the results of experimentation into a synthesis producing knowledge. Make sure to leave time after every lesson for reflection about what has happened. This will allow the learner to take his experience and put it into context, allowing him to remember it in a deeper way. Reflection will lead to new questions and deeper engagement, providing the framework to develop critical thinking.





# Good, Clean and Fair and Academic Standards

The Slow Food USA curriculum is compatible with many Common Core and Next Generation Science Standards (NGSS). School garden and cooking activities are most likely to work with standards in the following subject areas.

## LANGUAGE ARTS

Promotes precise use of vocabulary. Use the **“What did you see today?” worksheet** (pages 42 and 123) to learn new nouns and adjectives and **“What did you do today?” journal worksheet** (pages 41 and 122) to learn new verbs.

Teaches how to describe sensory experiences precisely, to separate out opinions, likes and dislikes

Can be used to teach various writing forms including instructions, descriptions, stories and poetry.

Promotes research skills by using seed packets and websites to decode informational texts

## SCIENCE

Promotes observation skills and note taking

Promotes use of drawing for explanation

Encourages experiential knowledge of lifecycles and connections between animals and plants

Teaches botany and taxonomy of plants, insects, arachnids and birds

## MATHEMATICS

Uses cooking skills to understand measurements and fractions

Uses farmers markets to understand numbers and currency

Teaches measurement via plant growth, garden areas and planting rows

## HEALTH AND WELLNESS

Expands food preferences for fresh fruits and vegetables

Promotes discovery of connections between environmental and human health

Promotes intuitive understanding of healthy cooking process



## How to Cook with Young Learners

If you take the time to set up your classroom environment for cooking classes, you will be able to minimize anxiety and risk. Planning out the flow of the class, the placement of the learners, and having supplies ready will ensure that your classes are successful and enjoyable to both teachers and learners.

**Set Up** Procure the use of a sink for washing dishes.

The cooking area (if using heat) should be separate from the food preparation area and from the children, near an electrical outlet in the cafeteria.

Remove all papers, backpacks and books from surfaces.

Surfaces should be sanitized.

Divide learners into groups no larger than 8, with one adult per group.

Produce should be prewashed and placed in bowls.

Have a bowl or tray for scraps to put in the compost at the end of class.

Wait until AFTER you have talked about knife safety to pass out any knives.

Every learner who will be cutting should have his or her own cutting board.

### Class Introduction

Make sure learners wash their hands before sitting down.

Every class should start with a safety refresher and kitchen rules.

Show learners where to put their scraps.

Briefly explain what you are going to make. Then explain only the first step in detail.

Before transitioning to a new task, make sure all learners are quiet and paying attention.

### Ingredients for a Successful Cooking Class

1. Design activities to be hands-on as much as possible.
2. Every child should have something to do to, which means that recipes should be simple to cook, but labor intensive.
3. Focus on one primary learning goal, with a few sub-goals that are less important.
4. De-emphasize reading instructions and measuring, unless that is your primary goal.
5. For picky eaters, encourage “tasting” or “experimenting” as opposed to “eating.”  
Do more taste classes.
6. Give the learners an opportunity to be in control of the final flavor.
7. Give the learners opportunities to choose ingredients.



## Safety in the Cooking Classroom

Before cooking in the classroom or cafeteria, talk about rules and special behaviors when using tools and heat. Engage learners in a discussion about what rules would be best to promote respect for the teacher, cooking process, safety and for each other. Cooking activities are popular with parents and volunteers. Ask them for help so that they can facilitate groups of learners, ideally no more than eight in a group.

**The following simple rules are examples that you may wish to consider.**

**These simple guidelines will minimize risk of food-borne illnesses.** These rules will help you to avoid cross contamination, keep food at safe temperatures and promote healthy habits. We recommend that you do not cut raw meat or seafood products with the young learners in order to minimize food safety concerns.

- Before the cooking class, learners must wash their hands with soap and water for at least 20 seconds.
- Wipe down all counter and table surfaces with a disinfectant.
- Do not let food sit at room temperature for more than one hour before class.
- Do not bring cooked food to the class.  
Cook all ingredients during or just before the cooking class.
- Do not bring leftovers home.

**If you would like to add meat to your dishes, you can try the following techniques.**

Use slices of ham, chicken or turkey cut into cubes for flavor in stir-fries, wraps and soups. Use a small amount of sausage for flavor in soups or stews. If you would like to use boneless chicken breast or pork, poach it gently while the learners are chopping the rest of the ingredients. Let it cool, and then cut the fully cooked meat before adding it to the dish.





## How to Garden with Young Learners

If you set up your garden for learners to visit and use, you will be able to minimize anxiety and risk outdoors. Planning out the flow of the class, the placement of the learners, and having supplies ready will ensure that your classes are successful and enjoyable to everyone involved.

Teachers and garden leaders can set the tone by introducing the garden as an outdoor classroom, with the same rules and behaviors as an indoor classroom. Discussing rules and expected behavior before going outdoors will result in a more productive and focused garden experience. If possible, reserve a part of your garden or a space near your garden for the class to gather as a group. You can read about more tips for garden design in the *Slow Food School Garden Guide*, <http://gardens.slowfoodusa.org>. Garden-based activities are popular with parents and volunteers. Ask them for help so that they can facilitate groups of learners, especially with the instructions. For more techniques about managing learners in an outdoor setting, refer to Life Lab's brief guide: <http://www.lifelab.org/wp-content/uploads/2003/04/OurdoorClassroomManagement2.pdf>.

**Set Up** Have any necessary tools and supplies ready before going outside.

Make sure there are clear path areas around the beds.

Divide the class into small enough groups so that each child has space around a plot to do the activity.

Connect any hoses or watering needed before the class.

Make sure learners visit the restroom and wash their hands before going outside.

### Class Introduction

Every class should start with a safety refresher and garden rules.

Give any background information in the classroom, while the entire group is paying attention.

Give any specific directions outside, where learners can see and understand what they are doing.

Keep instructions brief and to the point. Give one instruction at a time.

Before transitioning to a new task, make sure all learners are quiet and paying attention.

### Ingredients for a Successful Gardening Class

1. Design activities to be hands-on as much as possible.
2. Every child should have something to do, which means that you have enough garden space for all to participate.
3. Focus on one primary learning goal, with a few sub-goals that are less important
4. Encourage knowledge retention through journal writing.  
Always leave time for observation and reflection.
5. Encourage learners to make decisions and record outcomes.



## Safety in the Garden

Before going outside, talk about rules and behavior when learning outside.

Engage learners in a discussion about what rules would be best to promote respect of the living plants and animals in the garden as well as each other.

The following simple rules are examples that you may wish to consider.

### General Outdoor Safety:

- Encourage garden activities in the morning, before it is hot.
- Bring water to the garden for learners to drink.
- Make sure all participants are wearing sunscreen.
- Remove all puncture vine (goat head) or other thorny weeds before learners use the garden.
- Keep first aid kit with Band Aids and antiseptic on hand.

### Tool safety:

- No running in the garden.
- No children under aged 10 will be allowed to use long handled tools (shovels, hoes, rakes).
- Children will be encouraged to use their hands (as opposed to tools) as much as possible when gardening.
- Children will be provided with gardening gloves if exposed to thorns or other dangerous plant material.
- Closed-toe shoes must be worn at all times, no flip flops.
- All participants will be instructed as to proper handling of tools, including no running and carry tools face downward at their side.
- Children must be supervised when gardening.
- Participants who do not follow safety rules will not engage in gardening.

### Food safety issues outdoors:

- No use of chemical fertilizers or pesticides in the vegetable garden.
- No use of raw manure as fertilizer.
- Soil testing will be done each year for lead (as part of science education).
- All produce will be washed before being eaten.
- All participants will wash hands, using proper hand washing techniques, after being in the garden.

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# Introduction to Clean

Nothing could be simpler than planting a seed in the ground and watching it grow. And yet to create a thriving, sustainable garden you need much more. Ten thousand years of accumulated human knowledge, skill, breeding, cultivating, harvesting and cooking informs every grain and seed we plant. Agricultural wisdom passed on from one generation to another through song, stories, dance and mentoring has given us the food we eat today.

Tourists invade the Roman Coliseum by the hundreds of thousands but who visits Oaxaca to celebrate the birthplace of corn? Who will travel to the Middle East to build a monument to the first wheat farmers? And yet these agricultural achievements have had an enormous impact on human life, allowing us to settle down and grow our own food.

Every garden we cultivate is an homage and extension to the work of those early farmers. When we teach young people how to garden, we are introducing them to an ancient society that has shaped our bodies and our culture. And, when we teach them to garden sustainably with care towards both plants and animals, we are ensuring the future.

Agricultural wisdom passed on from one generation to another... has given us the food we eat today.

A garden involves plants, but in order for those plants to thrive, they need a sustaining environment. The garden environment includes water, temperature, living soil, animals and (of course) humans. Slow Food's promotion of Good, Clean and Fair food for all includes promoting agriculture that is sustainable over time. Sustainable food production will ensure the ecological well being of our natural systems and the health of our diverse human communities. In order to cultivate thriving gardens that can exist well into the future, learners must understand the complex relationship between the environment, plants and humans. Changing climate and other environmental conditions call for resiliency in gardening. By understanding the interdependency of the plants, animals, soil and climate, learners can adjust their methods to encourage a healthy garden and planet. The Clean section of the Slow Food USA's School Garden Curriculum provides tangible learning experiences that demonstrate the garden environment and life cycles of plants and animals.

Imagine that you are entering a garden for the first time. You may be overwhelmed by the variety of shapes, colors and smells. Often you cannot tell the difference between different types of plants, or even if



they are healthy or diseased. Many of the most important signs in the garden are small, such as aphids sucking on the kale or Japanese beetles chomping lacy holes in the bean leaves. Try to answer your questions by researching garden websites or reading garden books. You become overwhelmed with information.

Do the tomatoes have fusarium wilt or blossom end rot? What are the small holes in all of your cabbage plants? Does it matter that you planted the zucchini two weeks late? Often garden experts contradict each other. In order to foster new generations of gardeners, the chaos must be minimized and learners must be introduced slowly into the garden.

In the Slow Food USA's *Good* section of the School Garden curriculum, we provide lessons that support education about healthy food choices—incorporating knowledge of how the quality of food is affected by its freshness, cultural factors, preparation, cooking, and consumption. We introduce concepts of taste, ingredients and cooking techniques in order to present complex concepts that are self-directed and enjoyable. In the same way, the complex interaction between humans, plants and animals in the garden must be managed in a way that increases participation and enthusiasm.

The first section of the *Clean* curriculum, “Basic Garden Skills and Knowledge” includes lessons that guide learners towards noticing plants’ special needs, as well as the interactions of other garden life. The second section, “A Slow Food Garden” presents one model of a school garden with planting guides, recipes and activities that explore specific edibles in the school garden. Both sections assume that learners will have a garden journal to record their observations and findings. In addition, there are specific worksheets at the end of each section that are necessary for the activities.

# Tips for Lesson Planning

All activities have a simple guide at the top of the page to help with lesson planning.

The information includes:

- Estimated length of the activity, not including preparation time or transition time.
- All ages will learn from our activities. For young learners (ages 5-7), look for lessons that are marked GK+up or G2+up. Those lessons require less physical skill.
- Location of the activity (indoors or outdoors)
- Activity type
- Suggested optimal season for the activity

Use the following key as a guide to the Info bar.

## KEY

### TIME REQUIRED



15 minutes



30 minutes



45 minutes



1 hour

### LOCATION



indoors



outdoors

### GRADE LEVEL

**GK+up**

**G2+up**

**G3+up**

**G4+up**

### ACTIVITY TYPE



**Gardening** refers to an activity that has a gardening purpose.



**Sensory Exploration** refers to a food activity whose purpose is to experience the sensory qualities of a food. It does not require assembly or heat, but may require some cutting or preparation.



**Basic Cooking** refers to a food activity that is simple to prepare and requires heat.



**Concept Exploration** refers to an activity whose purpose is to examine, draw, discuss or experiment with a concept related to the garden or food.



**Food Preparation** refers to a food activity that requires assembly, cutting and some simple equipment but no heat.



**Intermediate Cooking** refers to a food activity that requires more complex preparation, heat, and is appropriate for ages 10 and up.

### SEASON



Spring



Summer



Fall



Winter





A red-handled garden tool, possibly a trowel or similar small digging tool, is leaning against a rustic wooden fence. The fence is made of weathered, greyish-brown wooden planks. The background is a soft, out-of-focus green, suggesting a garden or field. The tool's handle is made of wood and is painted red, with some wear and tear visible. The tool's head is made of metal and is also painted red. The overall scene is rustic and evokes a sense of traditional gardening.

# 1 Basic Garden Skills & Knowledge



Slow Food USA®





Learners will be developing powers of observation and judgment so that they will be able to identify problems and create solutions in the garden.

The first part of Slow Food USA's *Clean School Garden Curriculum* includes lessons that guide learners towards noticing plants' special needs, as well as the interactions of other garden life.

Instead of reading and memorizing the various insects that dine on plants, learners are encouraged to observe life cycles in the garden and make their own conclusions. Usually planting times are determined by complex charts and calculations produced by experts like County Extension Offices or seed catalogs, which can lead to confusion for novice gardeners. Using phenology (the scientific study of cyclical events), learners will observe the natural world in order to determine the planting times of different crops. Over a few seasons, they will begin to notice which plants prefer the sun to the shade, which plants like more water and, which plants do best in specific climates. The organization of a school garden will determine what kinds of lessons learners will discover while planting, cultivating, harvesting, cooking and eating. While a garden that is deliberately planted is not as chaotic as a wild landscape, it can still be overwhelming to a novice gardener. Both adults and children unfamiliar with the natural world often cannot differentiate between different plants, animals and diseases.

When using the activities in this section, learners will be developing powers of observation and judgment so that they will be able to identify problems and create solutions in the garden. The process of becoming a gardener relies on one's ability to identify similarities and differences, classify them and then act on the information. Some examples that will be developed throughout this section are:

- Identifying desired plants versus weeds in the garden
- Identifying healthy plants versus diseased plants
- Being able to distinguish friendly insects versus damaging insects
- Knowing plant families and their characteristics
- Identifying plants that like sun versus plants that prefer shade
- Identifying plants that like fertile versus unfertilized soils
- Recognizing edible parts of plants versus inedible parts
- Being able to distinguish harvest times for different parts of edible plants

Building a toolkit of gardening techniques through observation and experience will lead learners to an appreciation of the natural world beginning the journey to becoming a lifelong gardener.



## GARDEN JOURNALS AND WORKSHEETS

Learners will record their experiences and conclusions about the garden in their garden journals and the worksheets provided. Teachers and parents can use garden journals in many ways in order to improve learning outcomes and evaluate their school garden programs.

### **Garden journals provide:**

- A way to evaluate an individual learner's understanding of a concept or lesson. Each portion of a drawing may be worth points in a rubric so that the learner can receive a grade for a project.
- The means for a learner to remember what they have learned in the garden.
- Information that the learner can share with their parents or family in order to bring gardening and cooking information home.
- Vocabulary, concepts and questions that lead to further investigation and study.
- An indication to the teacher or parent about what is important to the learner.

When a learner is using their garden journal to draw what they observe and to make notes, there are a few necessary guidelines. First of all, instructors must remember that the purpose of the drawing is to convey information and questions developed by the learner. Do not reward the most "beautiful" drawing by pointing it out or using it as an example. For example, if the learner is drawing a leaf, it is more important that they have the basic shape, descriptions of the leaf and questions about why it looks the way it does. It is not as important for them to have a beautifully colored leaf. If learners do not have the physical skill yet to accurately draw what they are seeing, they can write notes next to their drawing to remind them of what they are trying to say.

For more information about field journaling along with activities that can be easily adapted to a school garden, see John Muir Laws' Nature Journaling curriculum at <http://www.cnps.org/cnps/education/curriculum/index.php>. Law also includes some tips about drawing plants more accurately, which are available on his YouTube channel.

Examples of field guides written and designed by young learners can be found at the Open World Field Guides website: <http://fieldguides.cnps.org>. Design your own field guide to the insects and/or plants in your school garden and add it to the site.



# The Garden World





# Garden Scavenger Hunts



**Objective** Introduce learners to the plants and animals living in the garden and engage them in becoming more acute observers of their environment.

**Description** Take your class on a garden discovery any season through a fun scavenger hunt. Divide the class into groups of 3-4 learners. Have each group complete one section of the hunt, minimizing the number of items that you are collecting from the garden. Each section is designed to explore a different part of the garden and the plants and animals that live there. Choose a hunt that matches your age level and season.

**Materials**

For each group of learners:	For each learner:
Copy of <b>Scavenger Hunt</b> (pages 58-61) on a clipboard	Garden Journal Pencil

**Preparation**

- Before going outside, describe the garden rules to the learners. Explain that the garden is another kind of classroom. Engage them in a discussion about what rules would be best to promote respect of the living plants and animals in the garden as well as each other.
- Clearly explain where they can walk and where they cannot.
- Ask for help from parents and volunteers so that ideally there is one adult with each group of learners.

**Activity**

1. Each group will be looking for one section of the Scavenger Hunt. They will have 15 minutes to complete the search.
2. After the learners discover an item on the list, have them check it off and then draw it in their journals so that they can share what they have found with the class.
3. After they find all of the items on their list, they will draw or write down the similarities and differences between the items they have found.
4. Gather the class together again and have each group present their findings to the entire class, along with their observations of similarities and differences.

**Discussion** Use the items found in the scavenger hunt to investigate topics of seed dispersal, plant botany and life cycles. For more information about these topics, use the resources below:

- *How Plants Work: The Science Behind the Amazing Things Plants Do* by Linda Chalker-Scott
- *How Seeds Get Around* from Michigan State University <http://kbsgk12project.kbs.msu.edu/blog/2012/03/20/how-seeds-get-around-inquiry-learning-about-seed-dispersal/> and
- *Botany for Gardeners* by Brian Capon.

Write down any new vocabulary words, and have the learners add them to their journals.



# Where Are We?



**Objective** Learners will be able to describe where the garden is located and how its location impacts the length of the growing season, soils, light and other resources plants need to grow.

**Background** Gardens are intimately tied to the landscape in which they are located. Learners often know little about the environment of their schoolyard beyond casual observations. First the class will print out a map of their immediate neighborhood and schoolyard from Google Maps, satellite view. Then the class will discuss the location of the school, and the local conditions of different areas in the schoolyard. After understanding the big picture, the class will go outside and make maps of various features in the schoolyard. This activity will help them explore and understand some of the relationships between their school, garden and environment.

**Materials**

<b>For each group of learners:</b>	<b>For the class:</b>
Graph paper	Computer with Internet access, projector or SmartBoard
Pencil	A globe or world map
Clipboard	Map of your state
	Map of your city
	A printed map of the schoolyard

**Preparation**

- If using a computer and projector, or SmartBoard with Internet connection, load and test the function of a Google Map or Google Earth application.
- If a computer is not available, make and print a satellite map of your schoolyard by going to <http://www.maps.google.com>, zooming in on your address as much as possible. Print a copy to fill a page or multiple pages that can be taped together. This process may take some trial and error.
- Divide the students into groups of 5-8. Assign a volunteer or teacher to each group.
- Give each group leader a clipboard, graph paper and pencil.

**Activity**

- 1.** Begin the lesson in the classroom by pointing out your city's location on a Google Map, Google Earth Application, globe or world map. Ask students to describe how this location impacts the seasons, frosts and the length of the growing season.
- 2.** Next, zooming into or changing to a state-level map, have the students locate your city, and as a group, describe how the location and elevation impacts what can grow there. For example if you lived in Denver, Colorado, it would include the semi-arid climate, elevation's role on frosts and seasonal temperatures, as well as how the city's position east of the mountains gives Denver many sunny days.
- 3.** Finally zoom into the school, or change to a local map, and use it to explain the position of the garden in the schoolyard and assign groups to specific locations for the outdoor exploration.



4. Have each group explore one quadrant of the school grounds and make a sketch or map of what they find. The sketch should include permanent structures like fences, play structures, garden beds, trees and shrubs, as well as the location of wet, shaded or sunny areas.
5. Meet by the garden and discuss the findings.
6. Repeat the investigation in the garden area, focused on what plants are growing there, areas with different soils or features, as well as sunny and shaded locations. If the garden is divided into plots, wrap up by exploring the characteristics of their garden plot.

## Discussion

In the garden or classroom, begin a discussion exploring how the position of the garden impacts what will grow well there.

### The discussion should include:

- How your city's position on the globe impacts the seasons, planting and harvesting dates (frosts), as well as the specific geography of your location. For example, if you are located near the ocean or mountains how is the water cycle affected by your surroundings?
- How the school's position in the city impacts microclimates, exposure to wind, local temperatures and humidity.
- How the garden's position in the schoolyard impacts the amount of sun the garden gets, when the sunlight is available (all day, the morning, or afternoon when it is likely to be hot), exposure to wind and rain, and convenience to the building.

## Further Exploration

There are many opportunities that can be incorporated into this lesson including the introduction of the relationships between position, climate and world biomes; reinforcing basic map skills, using USDA Frost and Plant Hardiness Zone maps to explore local and regional differences, or the map of your state's agricultural products to explore relationships between the environment and what plants will thrive in an area.

Most states have an agricultural map that is available for young learners. These maps show which crops grow in various climates throughout the state. Here are a few examples.

**Colorado:** [https://www.colorado.gov/pacific/sites/default/files/Colorado%20Agriculture%20Map%20for%20Kids\\_1.pdf](https://www.colorado.gov/pacific/sites/default/files/Colorado%20Agriculture%20Map%20for%20Kids_1.pdf)

**Florida:** <http://www.freshfromflorida.com/content/download/16789/269882/P-01331.pdf>

**Oregon:** [http://aitc.oregonstate.edu/store/slide/data1/images/map\\_front.jpg](http://aitc.oregonstate.edu/store/slide/data1/images/map_front.jpg)

Extension activities could also focus on measuring and observing seasonal changes, the availability and local sources for the water used in the garden, as well as a discussion of the garden's position and ways to improve the environment for plants to thrive (e.g. hoop houses).

# What's In My Dirt?



**Objective** Learners will be able to explain the attributes of different types of soil.

**Background** Gardeners must know what kind of soil they have in order to know how to make nutrients available for plant growth. Soil consists of minerals (broken down rock), water, organic matter (dead plant matter), gas (air) and microorganisms. The mineral content can be in the form of large pieces such as sand and pebbles, or very small pieces such as clay or silt. The size of the particles affect what kinds of plants will thrive in your soil, how much water is needed and how many nutrients are available. Typically clay soil needs more organic matter in order to add air pockets for plant roots and drainage. Sandy soil also needs additional organic matter in order to retain moisture and nutrients, as they drain more quickly and dissipate. An ideal soil is composed of a mixture of mineral sizes, as well as organic matter, air and moisture. These conditions encourage a living soil that supports a diversity of microorganisms.

In this activity, learners will become familiar with easily observable mineral and organic soil components.



**Materials** **Collect 4 soil samples (about 5 cups of each soil) from diverse areas such as:**

- Soil from a well-established garden (school, home or community)
- Soil from a parking lot or other unimproved area (heavy clay)
- Some compost, if available from your garden or bagged compost
- Soil from your school garden

**For each table:**

4 Mason jars with lids, ideally quart sized

4 plates

1 cup of each soil

**Soil Observation Sheet** for each learner (Page 62)

Pencils

- Preparation**
- Before the class, take 1 cup from each type of soil and put it in a mason jar. Fill the jar with water and shake it vigorously. Place all of the jars in the classroom at least 2 days before the soil class to let them settle. You will use them at the end of class to demonstrate the different layers of soil.
  - Divide the soil samples so that there is one sample of each type on the table. Number each sample and make a note of its source for use during the discussion.
  - Divide the class into 4 groups, with one adult volunteer per group.





## Activity

1. Talk about soil composition using the **What's in My Dirt?** handout on the next page.
2. Each group should have 4 samples on their table, each numbered.
3. Each group should have a Soil Observation Sheet to record their observations. They should note: the color, texture, smell, how sticky, etc.

Discuss the attributes of each sample. Then tell the learners where each sample came from. Ask the following questions:

- Which sample has the most ideal attributes for growing food?
- What does the school garden soil look like?
- What are some ideas to improve the school garden soil?

Use the **Soil Layer diagram** on page 11 to observe the jars. Which ones have the most clay? Which have the most humus or organic matter? Which would be best for a vegetable garden?

## Discussion

- Read and discuss the book *Soil: Let's Look at a Garden* by Angela Royston or *Soil (Geology Rocks)* by Rebecca Faulkner.
- Have the learners bring in samples from their homes and discuss their qualities.
- Plants need three major nutrients to grow well: nitrogen (N), phosphorus (P) and potassium (K). Often native soils will have an abundance of one or two nutrients, but be low in another. You can also use a quick home test to get an overall idea of your garden's soil fertility. Try the Rapitest Soil Test Kit, available online or in garden stores.
- Take a sample of soil and send it to a soil lab for lead and nutrient testing. There are many different ways to test for the health of your soil. For more information about soil testing, and recommendations for labs, please refer to:  
<https://attra.ncat.org/attra-pub/viewhtml.php?id=285>





# What's in My Dirt?

## Clay

**Sticky, heavy or chunky. You can roll it into balls.**

Clay soil does not absorb water easily. But, when it is wet, it stays wet.

Sometimes plants cannot get enough air and water in clay soils.

Clay soils usually have plenty of nutrients, or minerals, that plants need to grow.

## Silt

**Soft and silky. Very fine particles, but does not stick together.**

Silt does not absorb water well. The particles are very small and plants

sometimes cannot get enough air. Water drains away very fast.

## Sand

**Grainy. Does not stick together.**

Large particles have plenty of air and absorb water easily.

Water drains away very fast and sandy soil dries out quickly.

Soil nutrients can also be washed away quickly.

## Humus

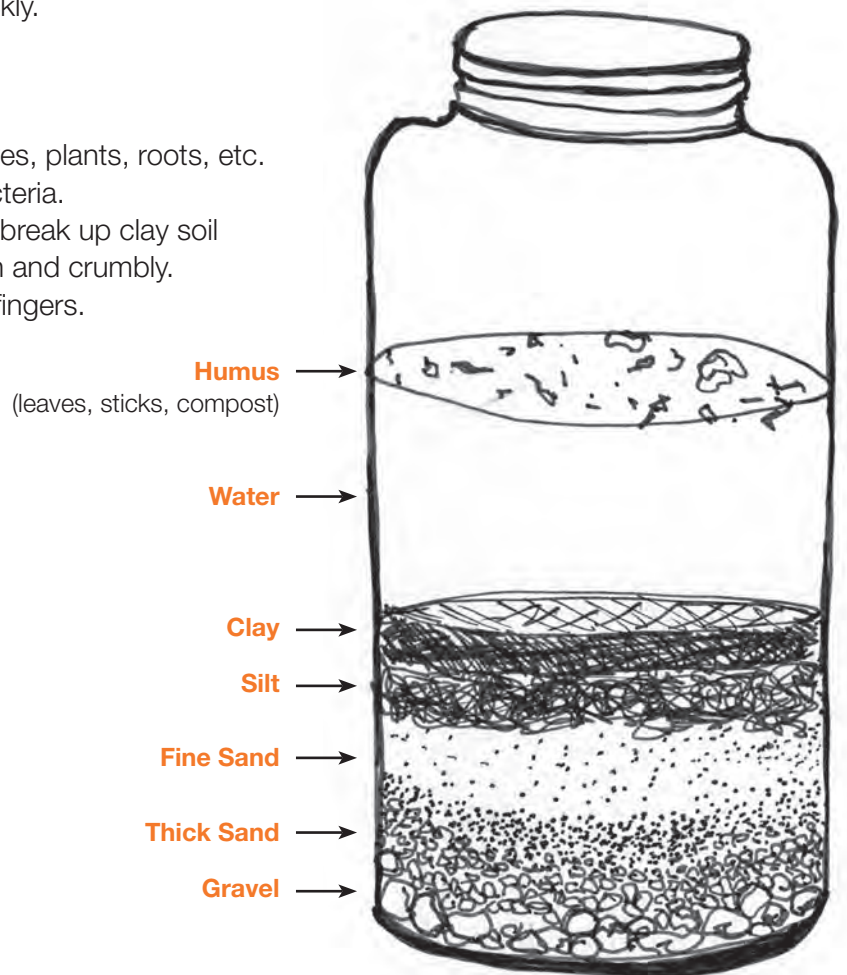
**Crunchy, earthy smelling and woody.**

Decomposed living material made up of leaves, plants, roots, etc.

Humus also has living small animals and bacteria.

Humus is necessary for healthy soil. It helps break up clay soil and holds nutrients for sandy soil. It is brown and crumbly.

It is a little slippery and sticky between your fingers.



# Water Test



## Objective

Learners will be able to discern how well their soil retains moisture and develop a strategy for watering that is appropriate to their school garden location.

## Background

Plants need water in order to thrive, but watering needs vary according to the weather, soil type, and the individual plant. Most vegetables prefer soil that is moist and crumbly. If the soil is too dry, then the plant does not have enough water to thrive. However, if the soil is too wet, it becomes compacted and waterlogged. Most plants do not thrive in waterlogged soil because there is not enough oxygen for the roots to respire. In order to design a watering plan that conserves water in the school garden, learners must first understand how long the soil stays moist and what factors affect water retention.

## Materials

- Empty garden plot
- 6 1-liter water bottles
- 6-8 Trowels
- Stop watch
- Water Test Chart Sheet** (Page 64)
- Pencil
- 5 gallon bucket of mulch or straw
- 2-3 cups gravel
- 6 cups garden or bagged compost



## Preparation

- Prepare the plot if necessary by removing weeds and loosening soil enough so that learners can dig holes with their trowels.
- Before going outside, describe the garden rules to the learners. Explain that the garden is another kind of classroom. Engage them in a discussion about what rules would be best to promote respect of the living plants and animals in the garden as well as each other.

## Activity

1. Divide the class into 6 groups and have them dig 6 holes that are the same size, about 8" in diameter and 4" deep.
2. Prepare the holes in the following way:

1. Nothing is added	4. Add 2" of straw or bark as mulch
2. Nothing is added	5. Add 3 cups of compost
3. Add 2" gravel as mulch	6. Add 3 cups of compost and 2" of straw or bark as mulch
3. Pour 1 liter of water into the first hole. Use a stopwatch to determine how long it takes for the water to drain out of the hole. Record the result on the **Water Test Chart Sheet**, page 64.
4. Add ¼ liter of water to the second hole. Use a stopwatch to determine how long it takes for the water to drain out of the hole. Record the result on the **Water Test Chart Sheet**.



5. For the next four holes, pour 1 liter of water into each hole and time how long it takes for each hole to drain. Record the results in the same manner.

6. Visit the holes once a day for the next week to see how long it takes for each hole to become dry. Use a butter knife or small spoon to dig 1" into the soil. Record the data on the **Water Test Chart Sheet**. For each day, record whether each hole is Dry, Moist, Wet, or Muddy.

**Discussion** While the class is looking at the results of the water test, ask the following questions:

- Are there any holes that stayed muddy for longer than a day? If so, the garden may have drainage issues and it would be better to build high areas (furrows) and plant on the top of them.
- Which holes stayed moist the longest?
- How long did the hole with only ¼ liter of water stay moist? This hole simulates what happens if you only sprinkle a plot and do not soak it when you water. How can you water more deeply?
- Which combination of mulch and compost will give you the most time between waterings? Which combination of mulch and compost will give you the least time between waterings?



# Planning Our Garden



**Objective** Learners will be able to gather information from several sources to create a garden planning chart for their school garden.

**Background** Gardeners use various techniques to help them plan a vegetable garden. Understanding the timing for sowing, planting and harvesting of many different vegetable varieties can sometimes be overwhelming. Previous gardeners' expertise is often collected in many different materials from seed packets, to zone charts and garden guides. This lesson will teach you how to see the over all plan of your garden in order to ensure a more successful season.

**Materials**

- Pencils
- Seed packets or seed catalogs, 4 per table
- Slow Food Plant Cultivation Chart** (page 18), one per table
- Blank Slow Food Garden Planning Chart** (page 65), one per table
- Sample Garden Planning Chart** (page 19), one per table
- Year long calendar
- Graph Paper, 2-3 sheets per table

**Preparation**

- Divide the class into groups of 8 learners
- Make sure each table has the materials
- Create a large version of the **Garden Planning Chart** on a whiteboard for the entire class.

**Activity**

1. Find out which USDA agricultural zone you live in by entering your zip code at this website: <http://planthardiness.ars.usda.gov/PHZMWeb/>. You can also print out a map of your state's zones. Write the zone at the top of the **Garden Planning Chart**.
2. Find out what your average last frost date is by entering your zip code on this website: <http://www.almanac.com/gardening/frostdates>. Write the date in the appropriate blank at the top of the **Garden Planning Chart**. You will use this date when you calculate what time to start your seeds indoors or plant them outdoors. Also note the Average First Frost Date, which marks the end of the growing season.
3. Have each group use the seed packets to fill in the following blanks on the form:  
Plant name (use the full name including variety), Seed Depth, Seed Spacing, Days to Sprout, and Days to Maturity.
4. Use the **Plant Cultivation Chart** to look up whether or not the plant variety needs a heating mat to start the seeds, and type of plant hardiness.





**5.** If the seeds can be started inside, calculate the date that learners should plant the seeds in the classroom by subtracting the number of weeks in the Start Inside column from the last frost date. Write the date in the Start Inside column.

**6.** Using the hardiness information for each seed, fill in the Plant Outside Date.

- For hardy plants, subtract between 2 and 4 weeks before the last frost date.
- For Tender plants, add one week after frost date.
- For Very Tender plants, add 2 weeks after the last frost date.

**7.** To calculate the Estimated Harvest Date, add the germination days on the seed packet to the days to maturity, also found on the packet. Add the total days to the date that you first planted the seeds. This will be the earliest date that the crop might be ready for harvest.

**8.** Use the **Sample Garden Planning Chart** to help learners fill out the form.

**9.** Enter all of the information provided by each group into the master form at the front of the classroom.

**10.** Make sure that you have enough days in the growing season to harvest before winter. Check to see that the Estimated Harvest Date does not fall after the average first frost date.

Once the form has been filled out, you will understand the overall picture of your garden better.

## Discussion

**Answer the following questions using the form:**

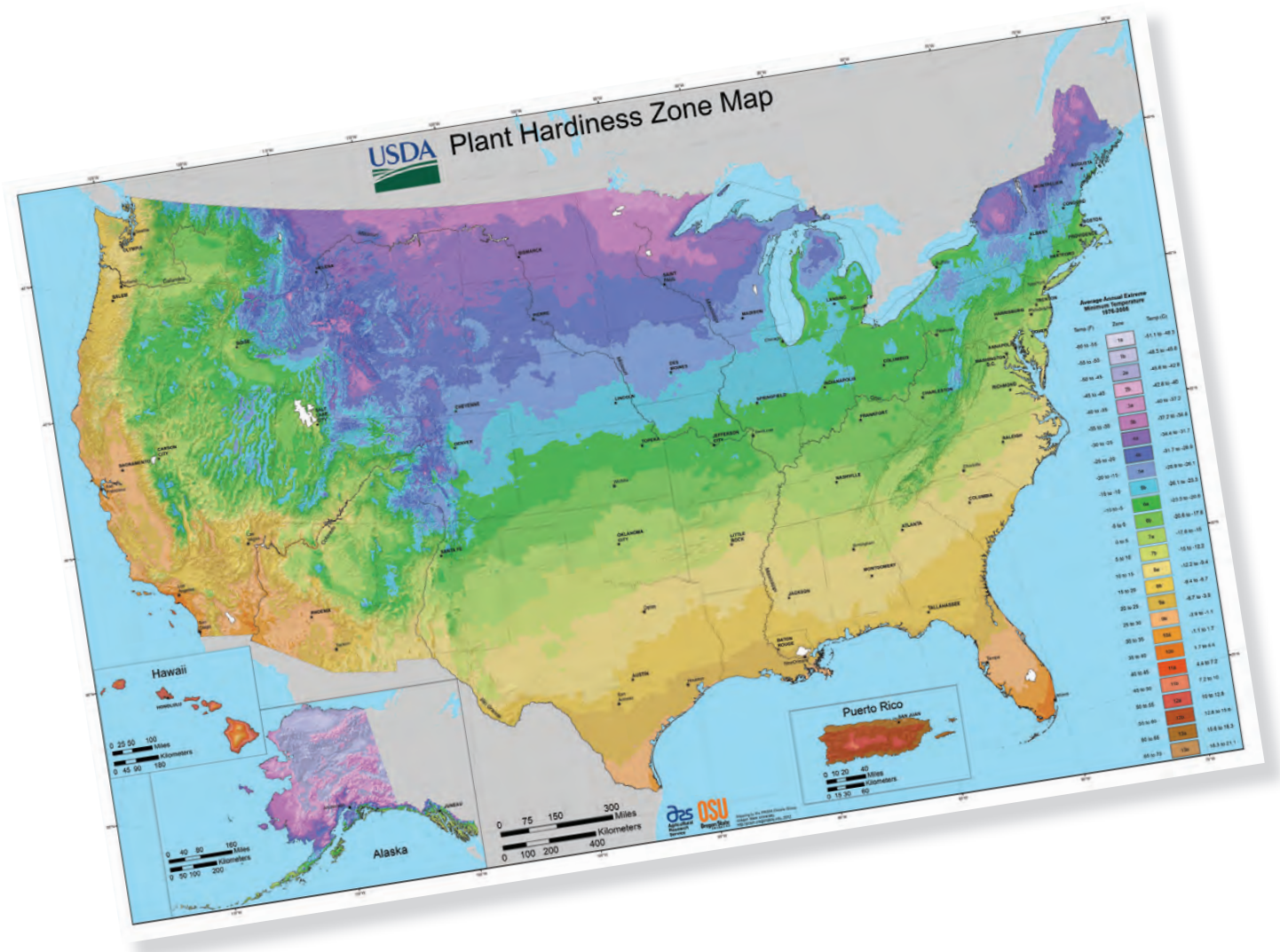
- Do we have any plants that will be ready to harvest before the end of school?
- Which plants do we need to plant inside?
- Which plants or seeds can we plant outside early?
- Which ones must be planted after the last frost date?
- Which seeds can be planted directly into the ground?
- When is the best time to have a community planting day?
- Do we have plants that are ready to harvest in the middle of the summer?  
Who will harvest and eat these plants?
- How can we adjust the schedule to create more plants that are ready to be harvested when school is in session?

## Further Exploration

Learners can explore the uses of spreadsheets by entering the data into a spreadsheet program such as Microsoft Excel. Afterwards, they can create a more powerful chart by sorting according to planting date or other columns.

Create a visual graph of the chart by using the **Visual Planning Chart** on page 66 following the sample provided on page 20.

Print out and explore the zone map of the entire United States at [http://planthardiness.ars.usda.gov/PHZMWeb/Images/All\\_states\\_halfzones\\_poster\\_300dpi.jpg](http://planthardiness.ars.usda.gov/PHZMWeb/Images/All_states_halfzones_poster_300dpi.jpg). What would happen to your planting dates if you lived in a different zone?





# What is Plant Hardiness?



Plant hardiness describes how much cold a plant can take and thrive. Some plants enjoy cold, even freezing weather, while others cannot tolerate even a light frost. Common annual fruits and vegetables fall under four types of plant hardiness.

Hardy and Semi-Hardy vegetables are also known as cold season vegetables. Tender and Very tender vegetables are also known as warm season vegetables.

**40°F+**  
daytime temperature

## Hardy

Hardy vegetables grow with daytime temperatures as low as 40°F and can survive light frosts. They are often planted for a second crop mid summer. Examples include arugula, peas, lettuce, spinach, radish, broccoli, cabbage, and kohlrabi.

**40°-50°F+**  
daytime temperature

## Semi-Hardy

Semi-Hardy vegetables grow with daytime temperatures of 40°F-50°F but are less tolerant of frosty nights. Examples include beets, carrots, cauliflower, parsley, woody herbs, artichokes, potatoes, and Swiss chard.



**55°F+**  
daytime temperature

## Tender

Tender vegetables prefer daytime temperatures above 55°F and are not tolerant of frost. Examples include corn, beans, summer squash, cucumbers and New Zealand spinach.

**55°F+**  
nighttime temperature

## Very Tender

Very tender vegetables must have evenings above 55°F to thrive and are not tolerant of frost. Examples include basil, tomatoes, peppers, eggplant, melons, winter squash and watermelon.





# Plant Cultivation Chart

Name	Family	Edible Plant Part	Start Inside*	Hardiness†	Warming Mat?	Days until Harvest**	Plant in Succession
Artichoke	Sunflower	Flowers	8-10	SH	No	110-150	No
Arugula	Cabbage	Leaves	No	H	No	40-55	Yes
Asparagus	Lily	Stems	No	H	No	2nd yr	No
Beans, Dried	Legumes	Seeds	No	T	No	85-100	No
Beans, Green	Legumes	Fruit	No	T	No	50-70	Every 4 weeks
Beet	Beets	Roots	No	SH	No	50-70	Yes
Broccoli	Cabbage	Flowers	6-8	H	No	50-65	85-100 days before 1st frost
Cabbage	Cabbage	Leaves	6-8	H	No	60-90	85-100 days before 1st frost
Cantaloupe	Cucumber	Fruit	2-4	VT	No	75-100	No
Cardoon	Sunflower	Leaves	8-12	H	No	110-150	No
Carrot	Parsley	Roots	No	SH	No	60-80	Every 3 weeks
Cauliflower	Cabbage	Flowers	6-8	SH	No	55-80	85-100 days before 1st frost
Celery	Parsley	Leaves	6-10	H	No	100	No
Corn	Grasses	Seeds	No	T	No	65-100	No
Cucumber	Cucumber	Fruit	No	T	No	55-65	No
Eggplant	Nightshade	Fruit	8-12	VT	Yes	75-90	No
Fava bean	Legumes	Seeds	No	H	No	85-100	85-100 days before 1st frost
Fennel	Parsley	Leaves	6-8	H	No	90-115	No
Garlic	Lily	Roots	No	H	No	90-150	No
Kale	Cabbage	Leaves	6-8	H	No	50-85	60-80 days before 1st frost
Kohlrabi	Cabbage	Stem	6-8	H	No	55-70	85-100 days before 1st frost
Leek	Lily	Roots	6-10	H	No	100-120	No
Lettuce	Sunflower	Leaves	No	H	No	45-60	60 days before last frost
Onion	Lily	Roots	6-8	H	No	100-120	No
Parsnip	Parsley	Roots	No	SH	No	110-130	No
Peanut	Legumes	Seeds	4-6	VT	Yes	120-150	No
Pea	Legumes	Seeds	No	H	No	55-85	60-80 days before 1st frost
Pepper	Nightshade	Fruit	8-12	VT	Yes	60-90	No
Potato	Nightshade	Tuber	No	SH	No	90-120	No
Radish	Cabbage	Roots	No	H	No	22-70	Yes
Rhubarb	Buckwheat	Leaves	No	H	No	2nd yr	No
Rutabaga	Cabbage	Roots	No	SH	No	80-100	No
Shallot	Lily	Roots	6-8	H	No	60-75	No
Spinach	Beets	Leaves	6-8	H	No	45-60	Yes
Squash, Winter	Cucumber	Fruit	No	T	No	85-120	No
Squash, Summer	Cucumber	Fruit	2-4	T	No	50-60	No
Strawberry	Rosacea	Fruit	No	H	No	2nd yr	No
Sweet Potato	Morning Glory	Tuber	No	VT	No	100-125	No
Swiss Chard	Beets	Leaves	6-8	SH	No	40-80	Yes
Tomatillo	Nightshade	Fruit	8-10	VT	Yes	85-90	No
Tomatoes	Nightshade	Fruit	8-12	VT	Yes	65-90	No
Turnip	Cabbage	Roots	No	SH	No	45-70	No
Watermelon	Cucumber	Fruit	2-4	VT	No	70-100	No

\* Numbers indicate number of weeks before last frost date

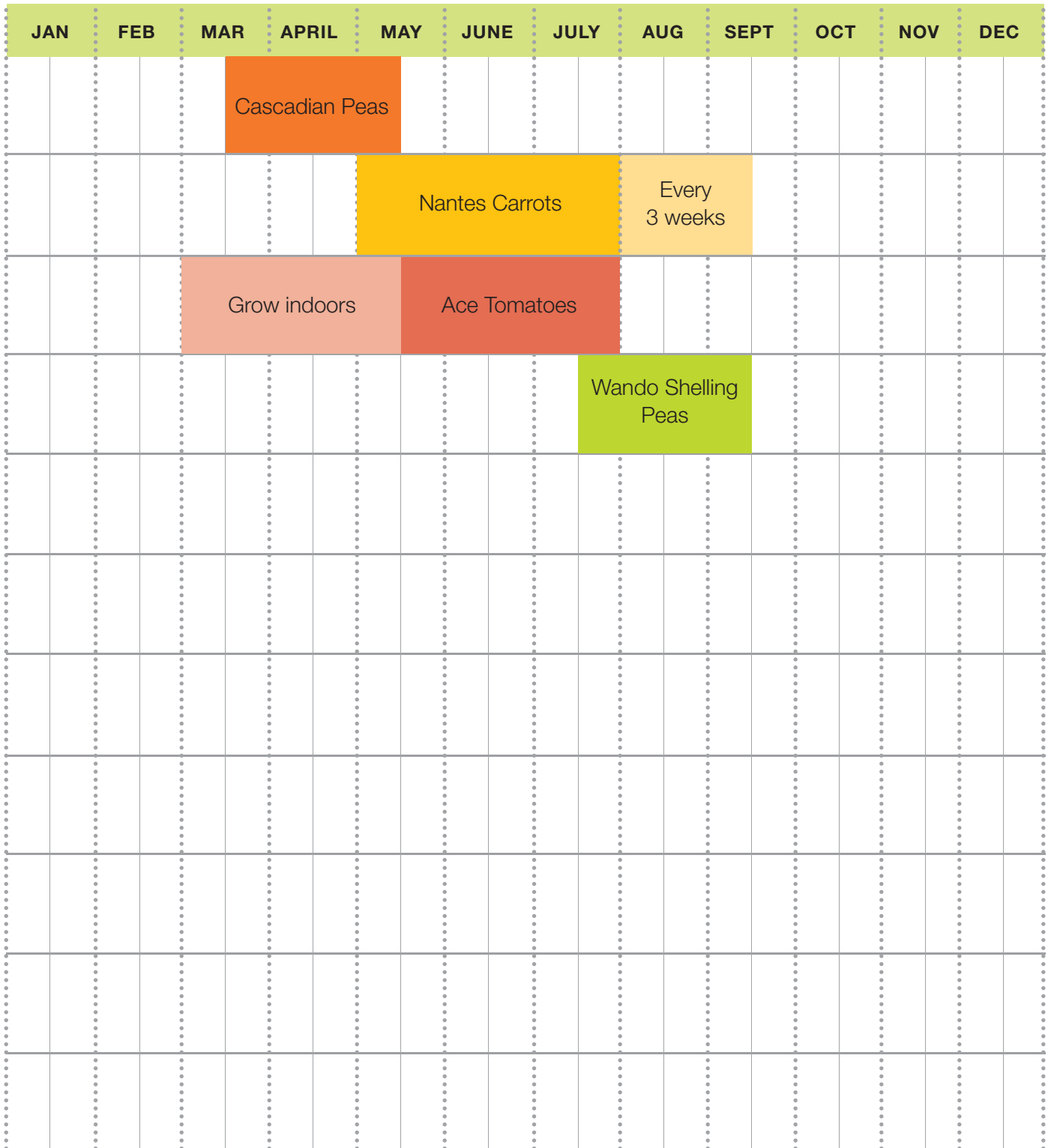
† Key: H=Hardy (2-4 weeks before last frost), SH=Semi Hardy (0-2 weeks before last frost),

T=Tender (after last frost), VT=Very Tender (2 weeks after last frost)

\*\* From the date of germination



# Visual Planning Chart Sample



# Follow the Signs



## Objective

Learners will expand their knowledge of their local environment through observation and correlating plant growth to specific seasons. They will use this knowledge to develop a planting schedule.

## Background

All experienced farmers rely on past experience to judge the proper planting times. Starting with the first signs of spring, they look at trees, weeds, flowers, animals and local weather conditions to decide when is the best time to plant each crop. The study of periodic biological phenomena is called Phenology. Following these natural signs often provides more useful guidelines than relying on frost dates and USDA zone charts. The frost dates and zone charts are based on averages and statistics. They may not work for a particularly hot or cold season and do not rely on fixed dates. Local observations become folk sayings or “plant lore.” Some examples are “Plant beans when elm leaves are as big as a penny,” or “When daffodils bloom, its time to plant peas,” or “When dandelions are blooming, plant beets, lettuce, spinach and carrots.”

Most recorded phenology lore deals with climates where frost is an issue, in order to tell people when it is safe to plant tender crops. If your climate has only two seasons, look for plant signs that are relevant to your location. This observational activity takes place throughout the planting season. You will create your own phenology chart based on observation of your garden area. At the end of the season, you will have a planting guide to use as a schedule for planting hardy, semi hardy, tender and very tender crops. Learners will sharpen their observational skills because they will be using natural signs as markers for planting events.

## Materials

Pencils  
Garden Journal  
**“What did you see today?” worksheet** (Page 74)  
**Nature Signs Chart**, example page 23, one per table

## Preparation

- Look over the Nature Signs chart. Do some of these plants grow in your area? If not, are there other common plants which you might substitute to use as a guide to planting cool season and warm season crops?
- Divide the class into groups of 8 learners.
- Make sure each table has the materials.

## EXAMPLES OF Phenology FROM THE *Old Farmer’s Almanac*

Plant corn and beans when elm leaves are the size of a squirrel’s ear, when oak leaves are the size of a mouse’s ear, when apple blossoms begin to fall, or when dogwoods are in full bloom.

Plant lettuce, spinach, peas, broccoli, and cabbage when the lilacs show their first leaves or when daffodils begin to bloom.

Plant tomatoes, early corn, and peppers when dogwoods are in peak bloom or when daylilies start to bloom.

Plant cucumbers and squash when lilac flowers fade.

Start succession plantings of beets and carrots when dandelions are blooming.

Plant peas when the forsythia blooms.



## Activity

Begin this activity 4 weeks before the last average frost date and continue through the year if possible.

1. Take a quick walk around your schoolyard or school garden. Look for some of the plants that are in the **Nature Signs Chart Example** on page 23. Do you see any of them sprouting or blooming?
2. Record the date and what you see in your garden journal. If you have time, draw a picture of the plants you see sprouting or blooming. Use the **What Did You See Today? Worksheet**.
3. Each week take a similar walk and record your observations.
4. Use the chart to decide when to plant each type of crop.

## Discussion

- What other plants do you notice in early and late spring? Add any more signs that you have observed on a new chart. Keep your chart for each year. Do the signs vary from year to year?
- Use the blank **Nature Signs Chart** on page 67 to help organize your observations. Have you noticed if there are specific times when you see larvae or insects emerge to eat the plants?
- When do pollinators such as butterflies, bees and wasps arrive?

Participate in the National Phenology Network by recording observations of plant cycles in your area. Create an account at: <https://www.usanpn.org/nn/become-observer>





# Nature Signs Chart Example

TYPE OF VEGETABLE	WEEDS	TREE BLOSSOMS	BULBS	PERENNIALS
<b>Hardy</b>	Dandelion buds	Sweet Cherry, Plum, Peach, Forsythia blooms	Grape Hyacinth, Daffodil blooms	Asparagus sprouting
<b>Semi Hardy</b>	Lambs Quarters sprouting, Dandelion blooming	Sour Cherry blooms, Lilac in first leaf	Tulips blooming	Raspberry leafing, Strawberry blooming
<b>Tender</b>	Marigold sprouting	Apple blossoms, Lilac blossoms	Iris, Allium blooming	Grapes leafing out
<b>Very Tender</b>	Pigweed sprouting	Apple blooms complete, Dogwood peak bloom	Iris bloom complete, Daylilies and Lily of the Valley blooming	Grapes blossoming



# Blooming Timeline



**Objective** Learners will use the blooming times of plants as guides to planting various vegetables.

**Background** Create your own living schedule that will indicate planting times in your climate. You will be planting a series of bulbs or flowers whose bloom time match up with planting dates in your area. For northern climates, the blooming times of daffodils, tulips, iris and daylilies correspond to planting hardy, semi hardy, tender and very tender crops, respectively. The planting timeline can also be incorporated into an herb garden. Plant herbs in the fall or spring as groundcovers on top of the bulbs. For areas that do not freeze in the winter, select bulbs that do not require an extended cold period. Examples of these types of bulbs include anemone, freesia, ranunculus, alstroemeria, iris, spraxis and day lilies. Use the materials list as a guideline for your area, but feel free to expand the choices based on your preferences. This activity should take place mid fall, at least three weeks before the soil freezes.



**Materials** Empty garden plot

**Cold winters:**

- Hardy-1 dozen King Alfred daffodil bulbs
- Semi Hardy-1 dozen Darwin tulips
- Tender-6 German (bearded) Iris rhizomes or 6 allium
- Very tender-3 Early Isbel or Flava Major daylily plant roots

**Warm winters:**

- Hardy-18 anemone corms
- Semi Hardy-18 Freesia bulbs
- Tender-12 Dutch Iris bulbs
- Very Tender-6 alstroemeria (Peruvian Lily) bulbs

**Preparation** Prepare a garden bed by weeding and turning in compost or soil conditioner.



## Activity

1. Mark off 4 squares in the plot with string and wooden stakes.
2. Plant each type of bulb in a different square. Daffodils and tulips should be planted with the root side down, in a hole two to three times as deep as the bulb is tall. German iris should be planted so that they are just barely covered with soil, roots facing down.
3. Water bulbs thoroughly and wait until spring.
4. Watch the plants in the spring. As each group blooms, plant the corresponding vegetable in their appropriate plot. In areas without frost, the planting times are not as critical because the vegetables won't be killed by frost. Instead, make sure to plant crops that like cooler weather first.

## Discussion

Look up your average last frost date on the Farmer's Almanac website:

<http://www.almanac.com/gardening/frostdates>

### Answer the following questions:

- Did your hardy bulbs bloom two weeks before the last frost date?
- Did the other bloom times match up with what you expected?
- Were any of your vegetables killed by frost?
- What can you plant next time to adjust your blooming timeline?



# Looking for Traces



## Objective

Learners will discover the animals that live in the garden from insects to small mammals and track their preferred habitats and food.

## Background

Many insects, arthropods, small mammals and birds call the garden home. You may not be able to see them, but you can find evidence of their presence. Their traces are distinctive and you may be able to identify who is in your garden by the clues they leave. Learners will look for specific clues in the garden to see if they can identify some of the creatures that live there. Some insects, such as spiders, are beneficial to the garden in that they eat insects that prey on plants. Other insects, such as aphids, may damage plants but do not usually kill them. Use the resources provided to create a web of life based on your garden.



## Materials

Pencil	Garden journals
Color pencils	Digital camera (optional)
Eye loupe magnifier	Small trowel

## Preparation

- Before bringing the class outside, look in the garden and select areas where you can observe clear evidence of animal life. Examples could be damaged leaves or stems, insect eggs underneath leaves, holes or tunnels in the soil, piles of leaves or other organic debris, areas under rocks, and areas near small puddles or standing water. Pick 4 or 5 of these activity areas so that you can send groups of learners to different sites in the garden.
- Describe the garden rules to the learners while you are still inside the classroom. Explain that the garden is another kind of classroom and that the same behavior and attention is expected. Engage them in a discussion about what rules would be best to promote respect of the living plants and animals in the garden as well as each other. Clearly explain where they can walk and where they cannot. Ask for help from parents and volunteers so that there is one adult with each group of learners.
- Divide the class into small groups of 4 or 5 learners, ideally with a volunteer or parent in charge of each group.

## Activity

1. Explain to the class that they will be like explorers to a new world, searching for signs of life. Discuss some of the signs they might see. Send each group to a different area of the garden.
2. Have them draw or write down in their journals all of the evidence that they find that animal life exists in their assigned area. Young learners should work with adults to record what they observe.
3. Learners should draw a picture of the evidence they find. Use the magnifying loupes to observe small holes or eggs more closely. If they have a digital camera, they can also take a photo.





4. Learners should ask questions about the evidence. What do they notice? What do they wonder about it?

5. Are there any animals that they directly observed? What were they doing?

## Discussion

Gather the class together and discuss what they have found.

Were there similar types of animal traces found in different areas of the garden?

Groups should compare their findings and see if they can expand their knowledge together. What types of animals could have created the various types of evidence?

## Further Exploration

Create a field guide to the various types of animal traces found in your garden. Use the following websites and books to try to determine the species of animals that are living there. What connections are there between the animals? What do they eat and where do they live?

Many of the animals you discover may be classified as pests. Which animals would you like to discourage? How would you do it? Are there any animals that eat the pests?

*Garden Insects of North America* by Whitney Cranshaw

*The Secret Life of Backyard Bugs: Discover Amazing Butterflies, Moths, Spiders, Dragonflies, and Other Insects* by Judy Burris

<http://davesgarden.com/guides/articles/view/2287/#b>

<http://www.garden.org/pestlibrary/>

<http://www.ipm.ucdavis.edu/PMG/menu.vertebrate.html>

<http://www.ipm.ucdavis.edu/PMG/menu.invertebrate.html>





# Compost World



## Objective

Learners will discover the organisms that live in a compost pile and be able to see those that are visible to the naked eye.

## Background

Decomposition is an important part of the life cycle of a garden. Carbon and nitrogen in the form of dried (carbon sources) and green (nitrogen sources) plant materials are converted by a host of bacteria, fungi, earthworms, insects and arthropods into nutritious compost, providing a good source of humic acid and nutrients to plants. Having a dedicated area to decomposition in the garden provides many hours of activities to learners. Find instructions for building your own composting bin or three bin system from Cornell University at <http://cwmi.css.cornell.edu/designscompostingsystems.pdf>. Or, if you have less time to manage the compost, try pit composting or sheet mulching, as described on the next page. Both of these methods provide a good habitat for millipedes, spiders, slugs, fungus and other visible decomposers.

Each group will have a sample of compost from the garden and survey how many living things they can find in it. Some of the most visible elements will include fungus, mold, mites, earthworms, spiders, wood louse, and millipedes. If you have a large compost pile, take samples from different depths of the pile. Or compare a finished compost pile to one that is relatively new.

## Materials

Pencil  
Color pencils  
Eye loupe magnifier  
Garden journals  
Small latex gloves  
**Compost World Worksheet**  
(Page 68)

## Preparation

- Before bringing the class outside, check your compost pile or sheet mulch to make sure that there are plenty of visible organisms to observe. If there is more than one area in your garden with decomposition present, use different habitats for different groups of learners.
- Describe the garden rules to the learners while you are still inside the classroom. Explain that the garden is another kind of classroom and that the same behavior and attention is expected. Clearly explain where they can walk and where they cannot.
- Divide the class into small groups of 4 or 5 learners, with a volunteer or parent in charge of each group.



## Activity

1. Explain to the class that they will be looking at different compost samples to do a survey of fungus, insects, arthropods and earthworms. Send each group to a different area of the garden, or take samples from different parts of the compost bin.
2. Have them draw or write down in their journals all of the living organisms that they can find in their compost sample.
3. Learners will draw a picture of the organisms they find.  
Use the magnifying loupes to observe small organisms more closely.
4. Learners should ask questions about the evidence. What do they notice?  
What do they wonder about it?
5. Use the **Compost World Worksheet** to help learners identify any arthropods that they find.

## Discussion

Gather the class together and discuss what they have found. Were there similar types of organisms that lived at similar depths (habitats) of the compost pile? Groups should compare their findings and see if they can expand their knowledge together. Which samples had the most diversity? Which samples had the most earthworms?

Does the number of organisms increase or decrease as the composting process continues? Try the observation again in 2-3 weeks and compare results.

## Further Exploration

For more composting activities, information and lessons, use this activity book from the Central Vermont Solid Waste Management District: [http://www.cvswwmd.org/uploads/6/1/2/6/6126179/do\\_the\\_rot\\_thing\\_cvswwmd1.pdf](http://www.cvswwmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswwmd1.pdf).



# Composting Choices

If you have volunteers or staff to manage a composting system, the classic design is the 3 bin system. It will provide you with plenty of compost for your garden over a season. Find instructions for building your own composting bin or three bin system from Cornell University at <http://cwmi.css.cornell.edu/designscompostingsystems.pdf>. However, you can observe the decomposition process in other ways, which might require less labor. See the suggestions below.

## Pit Composting

Dig a trench or large hole and fill it with kitchen scraps, leaves and weeds that have been pulled. Pile dirt on top to cover the hole. The advantage is that you don't need a compost bin and the compost is hidden. The disadvantages are that you will not be able to plant in that area for 6-8 months, until the waste decomposes.

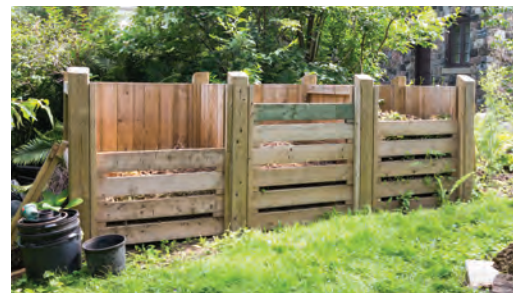


## Sheet Mulching (Lasagna Gardening)

This method is great for large areas where the soil needs improvement. Cover the area with a layer of weed free straw and aged manure. Then cover with cardboard or thick layers of newspaper and water well. Top off the cardboard with at least 6" of organic material and compost. Finish with a top layer of mulch. You can plant in the bed right away by making a hole and adding some potting soil, and then planting on top of the cardboard layer. The disadvantages are that you need to gather quite a bit of material. The advantages are that you can quickly improve a very large area with minimal labor. Sheet mulching kills many types of weeds but does not kill bindweed or other aggressive perennial weeds.

## Three Bin Composter

Three large 3'x3' open bins side by side can be formed from wood and wire or from a chain link fence. The 3-bin design allows for the convenient holding of a pile of organic materials while facilitating the flipping of a pile every several weeks. A pile is first made in bin #1 (left bin) and allowed to "cook" for 2 weeks. After the core temperature of the pile has hit its peak and is starting to decline the pile is then turned with a garden fork into bin #2 (center bin). A new pile can then be made in bin #1. Again, after several weeks, the pile in bin #2 is turned into bin #3 and the pile in bin #1 is turned into bin #2. Thus, using the 3-bin system, several piles can be maintained at a time at different stages, allowing the almost continual use of garden scraps throughout the summer. We recommend having a labeling system for greens, browns and finished compost.





## Vermiculture

Vermiculture uses earthworms to turn food scraps into worm castings, which can be used for fertilizer. The advantages are that it can be done indoors and, if managed properly, will not cause unpleasant odors. Learners love to investigate earthworms. The disadvantages are that the amount of food scraps can easily overwhelm the capacity of the worms to decompose them, causing the compost to be too wet. Also, fruit flies or other insects can invade the vermiculture system, making it less attractive to be kept inside.

## Tumbler

Tumblers are enclosed bins that are less labor intensive than three bin systems. They are good for small areas, but fill up quickly. In school gardens, they may be too small for your needs. When they are full, you cannot add more scraps until the compost process is finished. They also do not become hot, therefore weed seeds will not be destroyed.

<http://www.finegardening.com/6-ways-make-great-compost>



the 1990s, the number of people in the UK who are aged 65 and over has increased from 10.5 million to 13.5 million (19.5% of the population).

There is a growing awareness of the need to address the needs of the ageing population. The Department of Health (1998) has published a strategy for ageing, which sets out the government's commitment to improve the lives of older people. The strategy is based on the following principles:

- To ensure that older people are able to live independently and actively in their own homes for as long as possible.
- To ensure that older people are able to access the services and support they need to live well.
- To ensure that older people are able to participate in the life of their communities.

The strategy is based on the following key messages:

- Older people should be able to live independently and actively in their own homes for as long as possible.
- Older people should be able to access the services and support they need to live well.
- Older people should be able to participate in the life of their communities.

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# Plant Life Cycles



# Seeds We Eat



**Objective** Learners will explore the parts of a seed and taste common seeds.

**Background** Seeds have proteins, fats and carbohydrates that sustain seedlings during plant growth and protect them from harsh environments. Those same nutrients provide nutritious foods for humans. Seed proteins provide more than half of global protein sources. Use this activity to demonstrate the wide variety of seeds we eat.

**Materials** Garden Journals  
Pencils  
Small plates  
**Seed Words Worksheet** on page 69  
1 cup each edible seeds  
(roasted soy nuts, sunflower seeds, pumpkin seeds, canned chickpeas, sugar snap peas)  
8 oz. mung bean sprouts

**Preparation**

- Place a sample of each seed on a plate.
- Make one plate per learner.
- Pass out journals and pencils to each learner.

Pass out a copy of the **Seed Words Worksheet** on page 69.



## This is driving me nuts!

All nuts are seeds, but which kind? Nuts, seeds, legumes and drupes can be confusing. There is a difference between botanical nuts and culinary nuts. The botanical definition of a nut is a seed that is surrounded by a hard shell and that does not burst open by itself (indehiscent). A seed that is surrounded by a hard shell and then a fleshy fruit is actually a drupe (like an almond or walnut). A legume is a member of the bean family. Legumes can be toasted and eaten as a snack, similar to a nut.

All seeds are important nutritionally because they are dense in calories and nutrition in order to feed the plant embryo. Some have more carbohydrates and protein, such as legumes. Others have more fat, such as walnuts.

Botanical True Nuts	Botanical Drupes	Legumes
Hazelnuts	Almonds	Peanuts
Chestnuts	Walnuts	Soy nuts
Acorns	Pecans	
	Pistachio	

### Allergies and Culinary Tree Nuts

Tree nut and peanut allergies are common in classrooms. Tree nuts are a culinary category that usually includes almonds, chestnuts, pecans, coconuts, walnuts, pine nuts, hazelnuts, cashews, brazil nuts and pistachios. Seeds such as sunflower, pumpkin, sesame and poppy are not common allergens. These may be substituted in many recipes for tree nuts.

## Activity

1. Discuss the functions of the parts of the seeds for plants as well for as humans.
2. Pass out the plates of seeds and sample them.
3. Pass out the mung bean sprouts and have the learners examine them. Compare the mung bean sprouts to the illustration on the worksheet.
4. Have the learners choose one of the sprouts to draw in the empty box. Have them label the parts of their seed.



## Discussion

### Discuss the following questions:

- Which seeds were your favorite and why?
- How do the legume seeds taste compared to the other seeds?
- What are seeds for? What happens to them when they are planted?
- What do seeds need to grow?



# Create a Spread



**Objective** Learners will be able to make their own spread according to their flavor preference.

**Background** Seeds are nutrient dense foods that provide fiber, healthy fats, B vitamins and minerals. They are ideal snacks because they are filling as well as nutritious. Mixing beans or peas with nuts or seeds will give learners a good mixture of protein, carbohydrates and healthy fats. All of the legumes should be cooked. Use the equation on the following page to try spreads with different combinations of legumes and seeds or nuts.

**Materials** 1 food processor or blender  
1 spatula

**For each station:**

1 medium sized bowl  
Pita bread cut into triangles or crackers for tasting  
Spoon for serving  
Plates for each learner  
Container of water  
Assortment of ingredients from **Create a Spread**, page 38

(each group should have a different type of legume for the primary ingredient)



**Preparation** *Young learners or short on time*—Prepare additional ingredients ahead of time and divide into the number of groups.

*Older learners or more time available* —Have them prepare additional ingredients at each table.

- Wash the ingredients.
- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized.
- Make sure everyone has washed his/her hands.
- Divide the class into groups of no more than 8 learners.
- Place the blender or food processor at the front of the room.

- Activity**
1. Have each group assemble the ingredients for a spread using the **Create a Spread** guidelines on page 38.
  2. After they have finished, one learner from each group will bring his bowl of ingredients to the front of the room and the instructor will blend them into a paste. The instructor may need to add water to create a spread consistency.
  3. The instructor will use the spatula to scrape the spread back into the bowl. The learners will bring it back to their table and adjust the flavor with more salt, lemon or other seasonings if needed.
  4. Learners will dip and compare.





## Discussion

Have the learners compare the dips and explain why they like each one.

- What was the main flavor of the beans before they added enough salt?
- What does salt do to bitter flavors?
- Do they feel full after eating these dips? How much could they eat?
- Which ingredients are seeds? Are beans seeds?

## From the Garden

Use freshly blanched: 1. Garden peas; 2. Shelled fava beans; 3. Sugar snap peas; or 4. Fresh shelling beans. The legumes will not become creamy unless they are blanched or cooked first, softening the fiber. The translucent casing should be removed from the fava beans before puréeing.





# Create a Spread

Use the Spread equation and chart to create a delicious fresh spread. Choose a variety of ingredients from each category. If you like, you can structure the activity as a friendly competition between groups.

# Spread =

## Beans + Seeds

- Canned chick peas
- Canned black beans
- Canned white beans
- Shelled edamame
- Blanched, peeled fava



- Sesame
- Sunflower
- Pumpkin
- Walnuts\*



+

## Liquid + Flavorings

- Olive oil
- Water
- Lemon juice
- Orange juice

- Garlic
- Fresh herbs
- Olives, pitted
- Green onions
- Salt



*\*Nuts are common allergens. Often sunflower or pumpkin seeds are good alternatives.*

# Seed Windows



## Objective

Learners will be able to explain seed germination and root growth during the first stages of plant growth and the differences between monocot and dicot plants.

## Background

This activity will allow learners to see inside the seed during the first stages of plant growth. They can also observe the root and cotyledon emerging from the seed coat. Learners will be able to clearly identify the two basic types of plants: monocots and dicots. Monocots only have one cotyledon (first leaf) and are often members of the grass family. In addition, they usually have fibrous root systems, without one main root. Dicots (most vegetable plants) have two cotyledons and usually have tap roots. Monocots take advantage of shallow surface water, while dicots prefer infrequent deep watering.

**Note:** These seedlings will not be useful for transplanting. Usually corn and beans are planted directly into the ground.

## Materials

Garden Journals  
Pencils  
1-2 packages of any kind of bean seeds  
1-2 packages of any kind of corn seeds  
1 clear plastic cup per learner  
Black construction paper  
Paper towels  
Spray bottle filled with water per table

## Preparation

- Soak the seeds overnight.
- Measure the height of the cups. Cut the construction paper into strips that are as wide as the height of the cups.
- Pass out materials so that each learner has a cup, two paper towels, one construction paper strip, two bean seeds and two corn seeds.

## Activity

1. Line the inside of the cup with the black strip of paper. Dampen the paper towel and place in the middle of the cup.
2. Place the seeds between the cup and the black paper, so that you can clearly see them against the black background. Each cup should have 2 corn seeds and 2 bean seeds.
3. Spray the paper towel with water so that it is wet, but there is no standing water in the cup.
4. Spray the paper towel as needed as the seed germinates and grows. Check the moisture level every day.

5. After the third day, remove one seed from each cup. Split it open and observe the embryo. Have learners identify the root and first leaves (cotyledon) and draw the embryo in their garden journal.

6. After 4-7 days, the root and leaves will emerge from the seed. Split open the seed (if it is not already) and observe the seedlings. Which seedling is a monocot? Which is a dicot?

**Note:** Learners may want to transplant these baby plants to the garden. Instead, allow them to take them home to show their family what they have discovered.

## Further Exploration

Use the **Seed to Plant Worksheet** (Page 70) to go over vocabulary words and learn the parts of the germinated seed. Connect the word with the illustration.

Read *Bean and Plant* by B. Watts. Compare the pictures in the book to your seedlings..



## Plant Parts

### GLOSSARY

**Bean Pod:** The fruiting body of the bean plant that contains the seeds.

**Cotyledon:** The leaf of an embryo of a plant, sometimes called a seed leaf.

**Flower:** The reproductive structure of a plant.

**Foliage:** The leafy parts of a plant.

**Hypocotyl:** The part of the plant below the cotyledon that leads to the radicle.

**Leaf:** The leaf is attached to the stem and is the main organ of photosynthesis.

**Nitrogen Capsule:** Small capsules attached to the root of leguminous plants that contain bacteria that fix nitrogen in the soil.

**Radicle:** The first part of the seed to emerge, that later turns into the primary root.

**Root:** The plant part that attaches to the ground and brings up water and nutrients from the soil.

**Seed:** The reproductive part of a flowering plant.

**Seed Coat:** Outer cover of a seed that protects it.

**Stem:** The main body or stalk of a plant.

# Sowing Seeds



**Objective** Learners will be able to plant a seed and describe how to care for the developing young plants.

**Materials**

- Light table
- 2 plastic dish tubs
- 8 qt. Soilless seed starting mix
- Seed packets
- 4 permanent markers
- 1 4-pack starting container per learner
- 2-3 plant trays without drainage holes
- 1 short plastic plant tag per learner
- 1 plastic dome for each tray
- Small watering can or water bottle with squirt type top
- Extra tub of water to wash off hands
- 2 towels



**Preparation**

- Divide soilless seed starting mix between two tubs. Moisten each tub of soil to encourage seed germination. It should not be soggy or dripping with water, but damp like a wrung out sponge.
- Set up two stations: one for “warm seeds” or those that need a warming mat and one for “cool seeds” or those do not need to be warm to germinate (see **Plant Cultivation Chart** on page 18).

**Each station should have:**

- Tub of moistened potting soil
- Selection of 3-5 types of warm or cool seeds
- 2 permanent markers
- 4-pack plastic containers
- 1-2 flats with plastic dome covers
- 1 short plant tag per learner

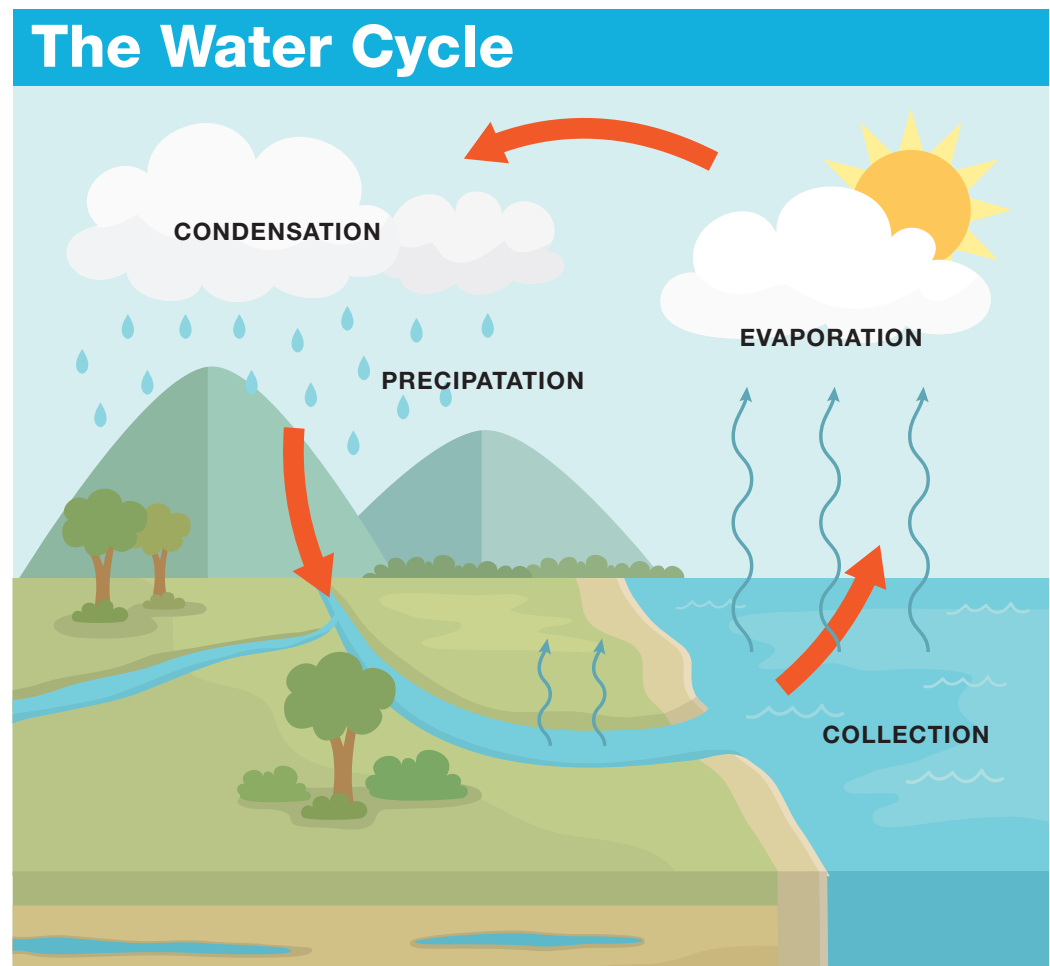
- Set up a tub with water and paper towels so the learners can rinse their hands and minimize dirt in the classroom sink.
- Divide the learners into two groups. Explain how to plant the seeds. Have them line up 3-4 at a time at each station. Those that are not planting can do other class work or reading.

**Activity**

1. Loosely fill the 4-cell tray with potting soil, almost up to the top.
2. Pour a few seeds into the learner’s hand. Have them place one seed into each cell.
3. Cover seed loosely with more potting soil, about  $\frac{1}{4}$ ". Seeds should be planted as deep as the diameter of the seed.



4. Label the plant tag with the learner's name and classroom number on one side and the plant variety on the other. Place the tag in the 4-pack.
5. Place the planted container into a large plant tray. Make sure to group "warm seeds" and "cool seeds" together in separate trays.
6. When each group has finished, have them write down the date and type of seed they planted in their garden journals, so that they can note the number of days until germination.
7. If time permits, follow up with the **Seeds We Eat** on page 34.
8. Introduce the dome to the learners. Ask if they know what it is for. Discuss the water cycle, evaporation and condensation. Ask them what they might observe in a couple of days.



**Watering the trays:**

Once covered, the trays should not need water until the seeds germinate. If the domes get knocked off and the water evaporates, go ahead and lightly sprinkle the potting soil with water and replace the domes. Position each plant tray on light table shelf. Talk about “cool” seeds and “warm” seeds. Which trays require a heat pad? Why or why not?

Turn on the lights above the tray. The lights serve the role as the sun. Small seedlings can receive 24 hours of light until they are transplanted. Ask the learners if they know what purpose the light serves.

After germination, water them when the soil is dry with the water bottle with the squirt top. Do not leave the seedling containers in standing water.

**Dome:**

Leave the dome on in between watering to help conserve water.  
Remove the dome when the seedlings brush the top of the dome.

**Water:**

Water at the base of the plants with a gentle stream, using the water bottle with squirt top to minimize spills.

Over watering is a common cause of seedling failure.

Water the seedlings only when the soil is dry on the top. Do not let seedlings sit in water.

If the seedlings wilt over the weekend, it is time to transplant them to a larger pot.

The weekend is a time when the seedlings can die. It is best to water extra heavy on Friday afternoon and then be sure to water first thing Monday morning.

If you have a fan available, leave it on about 5 feet away from the seedlings. It will help to promote air circulation and make the seedlings stronger.

# Thinning and Transplanting



G2+up



## Objective

Learners continue basic gardening skills by learning how to transplant and thin plants.

## Background

They will also understand the difference between tender annuals and hardy annuals.

Six to eight weeks after your seeds have germinated, they will become crowded in the small 4-packs. At this point, you will transplant the tender annuals to 4" pots. These will remain inside until two weeks after the last frost date. The hardy annuals can be planted outside two weeks before the last frost date if they have been hardened off first. Hardening off means that you gradually get them used to the outside world, first in the shade, exposing them to more sunlight each day. If there is a heavy frost forecasted, bring them inside at night. The hardening off period should be about a week.

While you are transplanting the plants, you should also thin them. Often learners plant more than one seed in each cell. For the cold hardy plants, pull out but the strongest seedlings. For the tender plants, you can separate the seedlings and plant each one into its own 4" pot. Save the discarded seedlings for the plant observation activity.

When transplanting into pots, we recommend using a potting soil that has some nutrient amendment either in the form of worm castings, manure or fishmeal. The larger plants will need a balanced form of N-P-K in order to thrive.

## Materials

- Garden book from recommended list to read to the learners
- 2 plastic dish tubs
- 2 8-qt. bags of potting soil
- Light table
- 30-40 4" pots
- 4 permanent markers
- 30-40 plant tags
- 3-4 plant trays

## Preparation

Separate the cold hardy plants from the tender plants. Examples of cold hardy plants include broccoli, cabbage, kale, spinach, and lettuce. These will not be transplanted, but can be hardened off. Planting the hardy vegetables first will save you space in the classroom.

Tender annual vegetable plants include basil, tomatoes, eggplant, peppers, and squash. Any plant that must be planted after the last frost date will die if exposed to freezing temperatures. Only transplant these into larger pots unless you have plenty of indoor space for seedlings with a good light source. Windows often do not provide enough light for seedlings; they need supplemental grow or florescent lights. If you don't have enough indoor light space then thin all seedlings and supplement them with liquid fertilizer on a weekly basis to keep them healthy before planting outside.





## Activity

Set up planting stations that include empty 4" pots, flats to be transplanted, moistened potting soil, plant tags and markers.

1. Have a tub of moistened potting soil ready to go and four 4" pots.
2. Fill 4" pots with potting soil about half way up and make a small indentation in the middle of the pot.
3. Transplant only the tender annuals unless you have plenty of indoor growing space. Take a 4-cell pack and loosen the dirt in one cell by pinching the outside of the cell. Gently turn the cell over and place the stem between your fingers, cupping the roots in your hand.
4. If there is more than one seedling in a cell, save the strongest ones and discard the rest. Gently pull on those that will be discarded so that you have the entire plant to use later for observation. Another option is to cut the unwanted seedlings' stems with scissors. Save the discarded seedlings for the **Plant Part Observation** activity on page 46.
5. Place seedling into new pot and cover roots with more potting soil. Press down gently on soil and make sure that the seedling is standing tall.
6. If the plant is a tomato plant, place it in the bottom of an empty pot and fill the pot with soil to the top. The top two sets of leaves should still be showing. Tomatoes will make new roots along the stems, strengthening the plant.
7. Make new name tag and place into pot.
8. Place pot into plant tray and repeat with the rest of the cells.
9. Look over the cold hardy plants. If there is more than one seedling in a cell, cut or separate the weakest and save them for the **Plant Observation** activity. Top off the cells with fresh soil if needed.
10. While learners are waiting for their turn to transplant, have them do the **Plant Observation** activity on page 46.

If you would like each learner to take a plant home, then have them transplant one of their plants from the 4-pack into a 4" pot. They can use their original tag to put in their pot to bring home. Make sure they know when they can plant it outside and how to care for it.

Use a liquid fish/kelp or other organic fertilizer once a week to provide nutrients to the growing plants.

If you are planning a plant sale, make sure all of the plants are labeled, thinned, filled with soil and are fertilized so that they can look their best for the sale.



# Plant Observation



**Objective** Learners will observe the immature parts of the plant and learn simple botanical terms.

**Background** Using the thinned seedlings from the previous lesson, learners observe how the small plants grow. They will still be able to see the cotyledons (“seed” leaves), as well as the true leaves of the plant, the stem and immature root system. The flowers and fruit will not be visible until the plant matures outside in the garden. Most of the seedlings will be dicots (two first leaves) as opposed to monocots (one first leaf).

**Each plant will eventually have five basic parts with different functions:**

<b>Roots</b>	<b>Stem</b>	<b>Leaves</b>	<b>Flowers</b>	<b>Fruit</b>
Anchor plants in soil, provide nutrients to the plant	Keeps plants upright, moves water and nutrients to leaves	Supports growth of plant through photosynthesis	Pollination of fruit	Holds seeds, attracts animals to help spread seeds





## Materials **For each learner:**

- Plant journals
- Seed to Plant Worksheet** on page 70
- 1 or 2 seedlings to observe
- Magnifying glass or eye loupe magnifier for closer observation
- Pencils and/or colored pencils

## Preparation

- Give each learner the materials above.
- Place the discarded seedlings in the middle of the table.

## Activity

1. Answers to the **Seed to Plant Worksheet** are on the following page. Refer to the **Plant Parts Glossary**, page 40, for definitions. Review plant vocabulary and the activity instructions.
2. Have each learner label the plant parts on the worksheet.
3. Learners will observe the seedling in front of them. They will try to match the parts of their seedling to the worksheet.
4. Each learner will draw their own seedling and label the parts in their journal.
5. If the learner knows the name of the plant, add that as well.

## Discussion

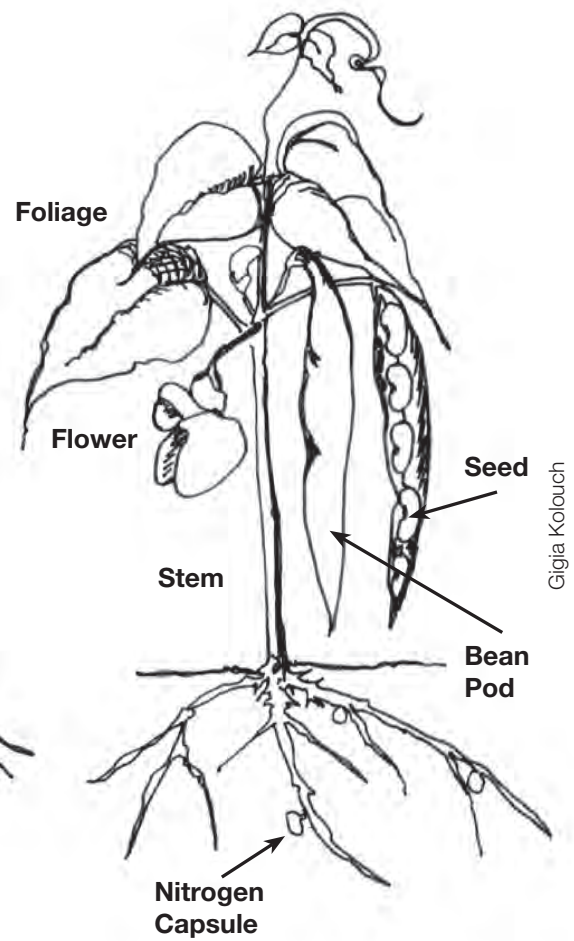
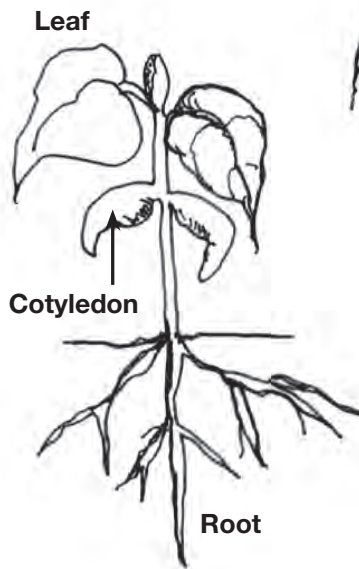
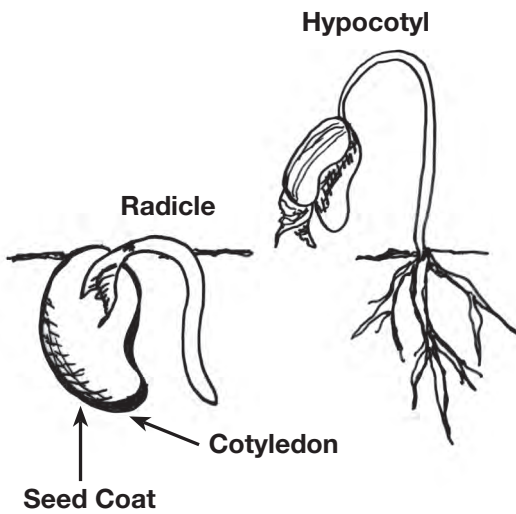
Have the class answer the following questions as a group, or individually in their journals:

- How many seed leaves (first leaves) does the plant have? If there are two, it is a dicot (most plants, with a tap root). If there is one, it is a monocot (grass type plants with fibrous roots).
- Can you find all of the plant parts?
- What does each plant part do?
- Which parts are missing from the young seedling?
- When do you think that the missing parts will grow on the plant?
- Compare roots systems on similar species. What do you notice?



# Seed to Plant Worksheet: Beans

- Radicle
- Cotyledon
- Leaf
- Seed Coat
- Stem
- Bean Pod
- Seed
- Flower
- Hypocotyl
- Nitrogen Capsule
- Root
- Foliage



Gigja Kolouch

# Weeds: What kind of root?



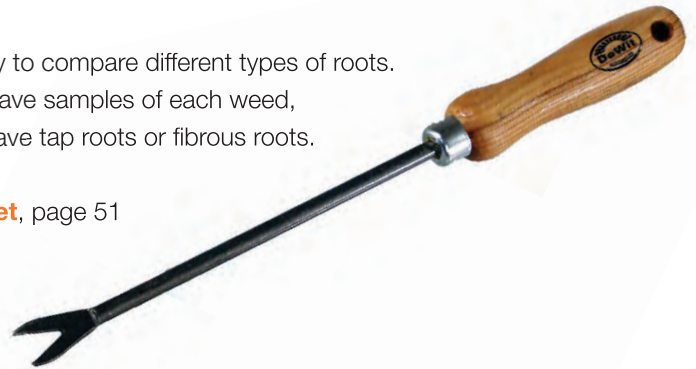
**Objective** Learners will discover the differences between taproots and fibrous roots and be able to identify them.

**Background** Roots provide the anchor that keeps plants in the ground. Plants have different root structures that take advantage of local growing conditions. Root systems can be classified into two types: taproots and fibrous roots. A taproot consists of one main root that has smaller side roots. Most taproots are also dicots; that is they have two cotyledons such as beans or carrots. Taproots can search deep in the soil for water and nutrients. Fibrous roots consist of many thin, branching roots that form a mat near the soil surface. Plants with fibrous roots are monocots, with one cotyledon, such as corn or grass. They take advantage of rain or floods to quickly absorb water and nutrients.

Weeding provides an opportunity to compare different types of roots. Learners will weed the garden, save samples of each weed, and then identify whether they have tap roots or fibrous roots.

**Materials** **What Kind of Root? Worksheet**, page 51

- Journals
- Pencils
- Ruler
- Hand trowels
- Dandelion weeders (optional)
- Children's garden gloves (optional)



**Preparation** Before going outside, describe the garden rules to the learners. Explain that the garden is another kind of classroom. Engage them in a discussion about what rules would be best to promote respect of the living plants and animals in the garden as well as each other. Clearly explain where they can walk and where they cannot. Ask for help from parents and volunteers so that there is one adult with each group of learners.

- Activity**
1. Pull weeds in the garden, making sure that students pull up the roots as well. Try different weeding techniques to see which is the most effective; pulling by hand, using a trowel, using a dandelion weeder.
  2. Line up all of the roots. Measure which roots are the longest and which roots are the shortest.
  3. Have learners draw a picture of one of the roots that they pulled.
  4. Use the **What Kind of Root** illustration on page 51 to determine which type of root they have.



## Discussion

Is their plant adapted to reaching for water deep into the soil? Is it adapted to take advantage of surface water and rain?

Are there any roots that are hard to classify? Why?

## Further Exploration

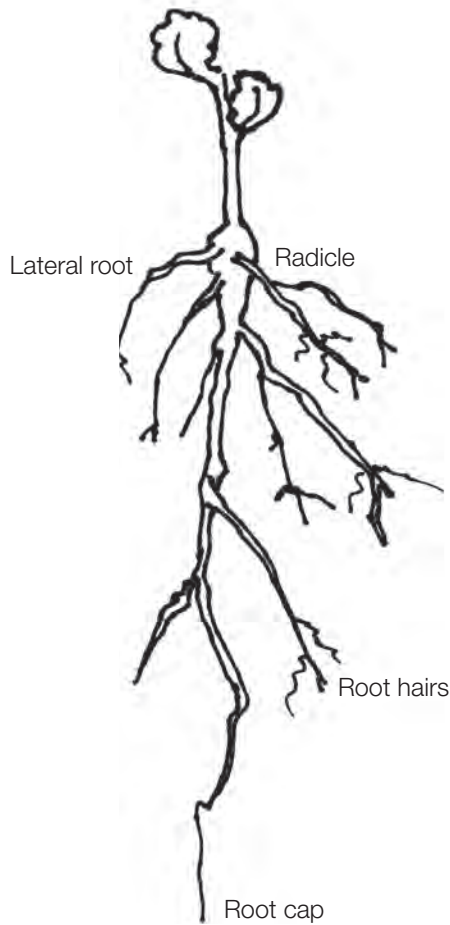
Use the National Gardening Association Weed Library to identify the weeds you have pulled.

<http://www.garden.org/weedlibrary/>

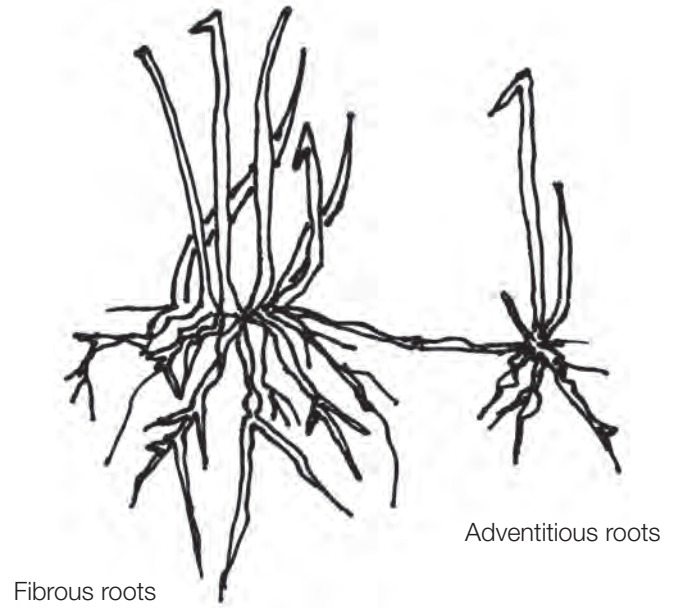


# What Kind of Root?

## Tap Roots



## Fibrous Roots



Gigja Kolouch

Have one main root  
Are usually dicots (two first leaves), like carrots  
Have side (lateral) roots

Have many small roots and no radicle  
Are usually monocots (one first leaf), like corn  
Often have runners (adventitious roots)

# Garden Survey



**Objective** Learners will observe the condition of their growing garden, research any problems, and design solutions for any issues.

**Background** Learners often get plenty of experience planting seeds but do not learn the entire life cycle of the plant and do not get practice cultivating gardens. Use this garden survey in the fall, or during the peak growing season, to determine how your plants are doing and identify any problems. Use the resources provided to devise a solution for the disease, insect damage or condition.

**Materials** **For each group of learners:**  
Copy of **Garden Survey Checklist**, page 71 on a clipboard  
Pencil

**Preparation**

- Before going outside, describe the garden rules to the learners. Explain that the garden is another kind of classroom. Engage them in a discussion about what rules would be best to promote respect of the living plants and animals in the garden as well as each other.
- Clearly explain where they can walk and where they cannot.
- Ask for help from parents and volunteers so that there is one adult with each group of learners.

**Activity**

1. Divide the learners into 4 groups and assign each group one section of the survey.
2. Have the learners observe and answer the questions in their part of the survey while they are walking around the garden and looking at the different plots.
3. Have them write down any questions or observations in the Notes section.
4. Return to the classroom and use the provided websites to look up any insects or plant diseases.
5. Discuss the actions suggested by the results of the survey. Create a plan to care for the garden based on the survey results and suggestions.

**Discussion** **Discuss the following questions:**

- Is the garden thriving? Is there a common problem that was present in many areas?
- Does the insect damage seem to be causing the plants to die, or is the infestation small?
- Can a thriving garden include some insect damage or disease?

Use the National Gardening Association Weed Library to identify the weeds you have pulled.  
<http://www.garden.org/weedlibrary/>

# Harvest Time



**Objective** Learners will be able to determine when the proper time is to harvest a wide variety of fresh produce.

**Background** The plant life cycle begins with a seed and then progresses from root to sprout, to leaves, to stems, flowers, fruit, ending with mature seeds. This life cycle can be used as a guide to harvesting produce at its peak flavor. If the produce you are harvesting is from the leaves or stems of a plant, it is best to harvest them at the beginning of the cycle, before the flowers, fruit and seeds form. For example, kale is sweetest before it begins to flower. However if the produce is a fruit or seed, it will be harvested near the end of its life, later in the season. Mature fruits like tomatoes are at peak flavor when they have had a chance to ripen. Seeds must be mature and plump before they reach their peak.

Any produce that is a root, leaf or stem loses flavor and tenderness after the plant blooms and sets seeds. At that stage, the plant expends its energy forming the reproductive organs of flowers, fruit and seeds, so the rest of the plant suffers. If you are not planning on harvesting the flowers, fruit or seeds, it is best to remove them at the flowering stage, so that the leaves or roots will be viable longer. If the plant has reached the fruiting and seed stage, the leaves are often very bitter or tough. It is best to remove those plants and compost them. Replant with a new crop.

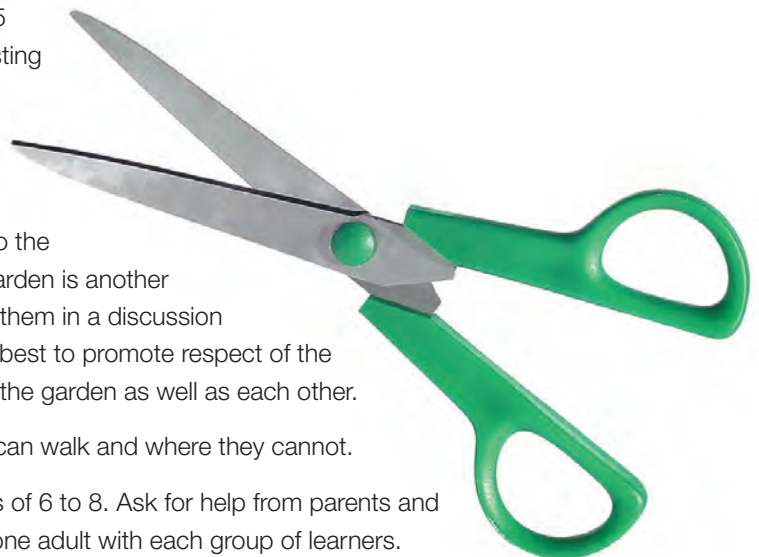
Many plants can be eaten at different stages. For example beet greens can be harvested when the plants are small and the greens are still tender. Often gardeners will thin the beets at that time and eat the greens. Beet roots can be harvested after the roots have had a chance to form but before the plant sets blossoms or seeds. Caution: do not eat any leaves from plants in the nightshade family: peppers, potatoes, tomatoes, tomatillos and chiles. These leaves have compounds that may be poisonous to humans in large doses.

**Materials** **Harvest Time Chart**, page 55

Clean plastic basket for harvesting  
Scissors  
Small Trowels

## Preparation

- Before going outside, describe the garden rules to the learners. Explain that the garden is another kind of classroom. Engage them in a discussion about what rules would be best to promote respect of the living plants and animals in the garden as well as each other.
- Clearly explain where they can walk and where they cannot.
- Divide the class into groups of 6 to 8. Ask for help from parents and volunteers so that there is one adult with each group of learners.





## Activity

1. Send each group to a different garden plot.
2. Have them observe the plants. What plant life stages do they observe? Which plants have flowers? Which have fruits? Which have seeds?
3. Use the **Harvest Time Chart** on the following page to determine which plants may be ready for harvest. Use the scissors to harvest greens and the trowels to harvest root vegetables.
4. Remove any flowers or seeds that are on root vegetables or greens.



# Harvest Time Chart

PART OF PLANT TO HARVEST	EXAMPLES	TOO SOON	TIME TO HARVEST	TOO LATE
<b>Root</b>	beets, carrots, radishes	Leaves are small, root is thin. If thinning is needed, use young plants as greens.	Root is well formed. Root is showing above ground.	Plant is flowering or has seeds.
<b>Leaf</b>	lettuce, kale, mustard greens	Can always eat leaves, even as micro greens	Leaves are numerous, healthy and tender.	Plant is flowering or has seeds.
<b>Stem</b>	asparagus, celery, fennel, kohlrabi	Stem is too thin.	Stem is formed but still tender.	Stem has lots of leaves, flowers or seeds.
<b>Flower</b>	squash blossoms, cauliflower, broccoli	Not formed	Depends, for broccoli should be tight buds	Flowers are fully opened or gone to seed.
<b>Fruit</b>	peppers, tomatoes, melons	Hard or green	Yields slightly to the touch	Fruit is very soft, fallen on the ground or fermented.
<b>Seed</b>	dried beans and lentils, sesame, sunflower	Seed pod immature, seeds not fully formed	Seed pod is plump and dried.	Seed pod has burst open or seeds have been eaten.





# Worksheets



# Early Season Garden Scavenger Hunt Checklist

## GK-2

### Signs of new growth

Find one of each kind of sprout:

- New grass
- Tree bud or new leaf
- New leaves on small plant
- Flowering bulb
- \_\_\_\_\_

### Comparing Seeds and Seed Pods

Look for:

- Dried bean or pea pod
- Dried fruit with seeds
- Sticker or burr
- Seed from a tree
- \_\_\_\_\_

### Alive and Dead

Some plants live over the winter and grow again in the spring (perennials), while others die.

Can you tell the difference?

- Branch or stick that is dead
- Branch or stick that is alive
- \_\_\_\_\_

### Animal Traces

Dig in the compost pile or a plot from last year and look for:

- Roly poly
- Worm
- Larvae
- Spider
- \_\_\_\_\_



# Early Season Garden Scavenger Hunt Checklist

## G3+up

### Signs of new growth

Find one of each kind of sprout:

- New grass
- Tree bud or new leaf
- New leaves on an herb plant
- Sprout with 2 cotyledons
- Sprout with one cotyledon
- Flowering bulb
- \_\_\_\_\_

### Comparing Seeds and Seed Pods

Look for:

- Dried bean or pea pod
- Dried fruit with seeds
- Sticker or burr
- Seed from a tree
- \_\_\_\_\_

### Alive and Dead

Some plants live over the winter and grow again in the spring (perennials), while others die.

Can you tell the difference?

- Branch or stick that is dead
- Branch or stick that is alive
- Plant that is a new sprout
- Old plant that has new leaves
- \_\_\_\_\_

### Animal Traces

Dig in the compost pile or a plot from last year and look for:

- Roly poly
- Worm
- Larvae
- Spider
- \_\_\_\_\_

# Mature Garden Scavenger Hunt Checklist

## GK-2

### Comparing Leaves

Find one of each kind of leaf:

- Furry leaf
- Grey leaf
- Oval leaf
- Pointy leaf
- Grass
- \_\_\_\_\_

### Comparing Seeds and Seed Pods

Look for:

- Dried bean or pea pod
- Dried fruit with seeds
- Sticker or burr
- Grass seed
- Seed from a tree
- \_\_\_\_\_

### Comparing Flowers

Look for:

- Orange flower
- Yellow Flower
- Flower from the pea (legume) family
- Many small flowers
- Purple flower
- \_\_\_\_\_

### Animal Traces

Look for:

- Leaf that has a bite mark or hole
- Fruit that has a bite or hole
- Leaf with brown marks
- \_\_\_\_\_

# Mature Garden Scavenger Hunt Checklist

**G3+up**

## Comparing Leaves

**Find one of each kind of leaf:**

- Furry leaf
- Grey leaf
- Serrated leaf
- Oval leaf
- Lobed leaf
- Leaves arranged opposite along the stem
- \_\_\_\_\_

## Comparing Seeds and Seed Pods

**Find one of each kind of seed:**

- Dried bean or pea pod
- Fruit with seeds
- Sticker or burr
- Grass seed
- Multiple seed (like a berry)
- Seed from a tree
- \_\_\_\_\_

## Comparing Flowers

**Find one of each kind of flower:**

- Orange flower
- Cruciform flower (4 petals)
- Flower from the pea (legume) family
- Composite flower
- Purple flower
- Flower that grows in a spiral
- \_\_\_\_\_

## Animal Traces

**Find one of each. These are more difficult. Look closely!**

- Leaf that has a round hole in the middle
- Leaf that has a bite taken out
- Fruit that has a bite taken out
- Fruit that has a hole
- Leaf with brown marks
- Leaf with insect trace marks
- \_\_\_\_\_

# Soil Observation Sheet

Soil Sample 1

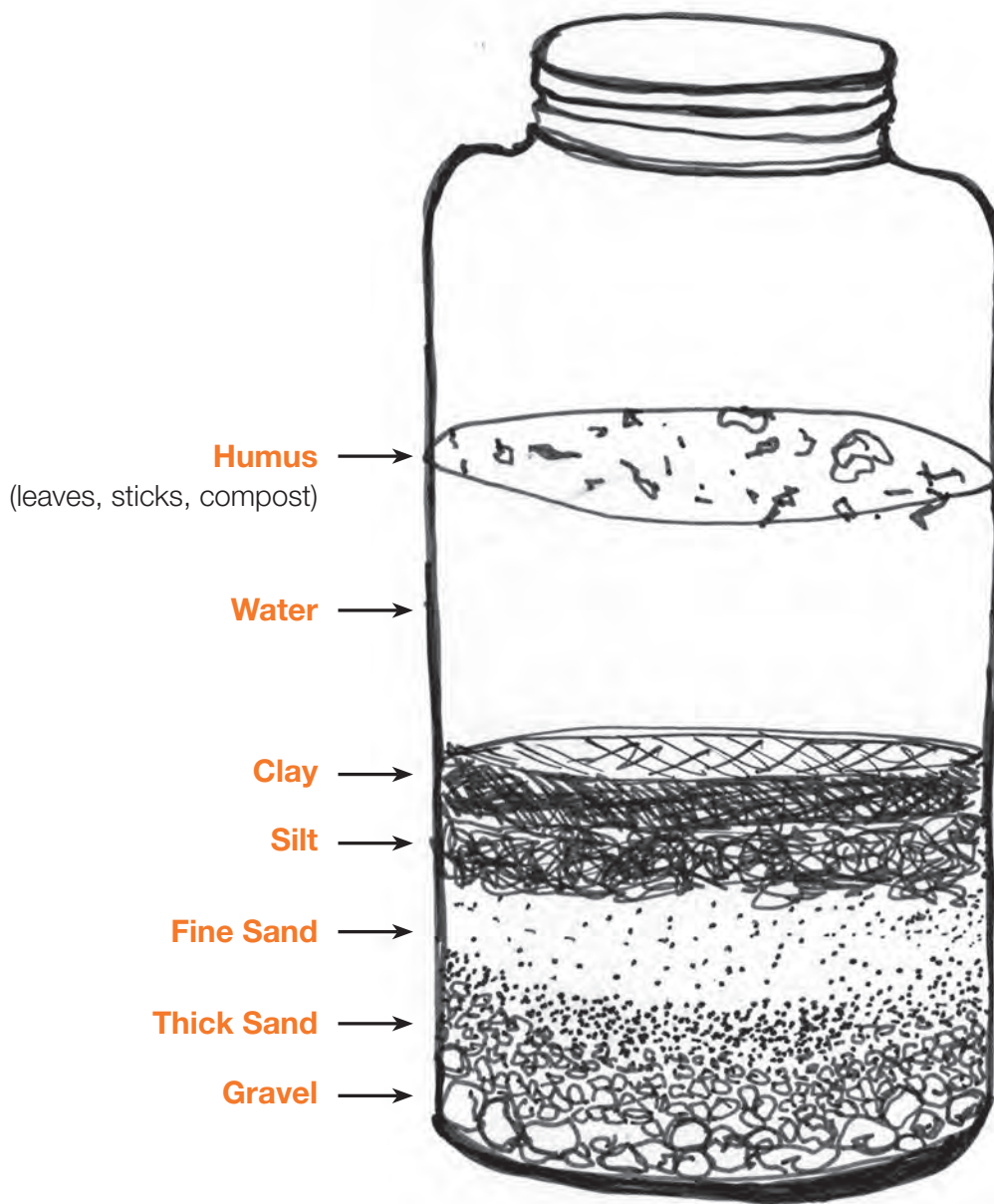
Soil Sample 2

Soil Sample 3

Soil Sample 4



# Soil Layer Diagram



Using the soil layer diagram as a guide, select the phase(s) that matches your soil sample:

- Mostly sand and gravel, not much clay.
- Mostly silt, not much clay and sand.
- Mostly clay, not much sand.
- Lots of humus and organic matter.

# Water Test Chart

	DAY <b>1</b> Time hole takes to drain	DAY <b>2</b> (Dry, Moist, Wet, Muddy?)	DAY <b>3</b> (Dry, Moist, Wet, Muddy?)	DAY <b>4</b> (Dry, Moist, Wet, Muddy?)	DAY <b>5</b> (Dry, Moist, Wet, Muddy?)	DAY <b>6</b> (Dry, Moist, Wet, Muddy?)	DAY <b>7</b> (Dry, Moist, Wet, Muddy?)
<b>HOLE</b> <b>1</b> 1 liter water							
<b>HOLE</b> <b>2</b> ¼ liter water							
<b>HOLE</b> <b>3</b> w/gravel							
<b>HOLE</b> <b>4</b> w/mulch							
<b>HOLE</b> <b>5</b> w/compost							
<b>HOLE</b> <b>6</b> w/compost and mulch							



# Visual Planning Chart

JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC

# Nature Signs Chart

TYPE OF VEGETABLE	WEEDS	TREE BLOSSOMS	BULBS	PERENNIALS



# Compost World Worksheet

You may see some of these creatures, fungi and mold in your sample of compost. Circle the ones you see. They may be much smaller than these pictures!



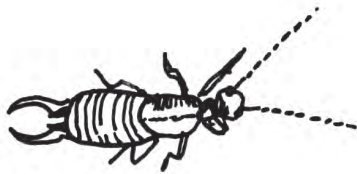
**Ants** make tunnels and break apart decaying matter



**Pill Bugs** roll up into a ball



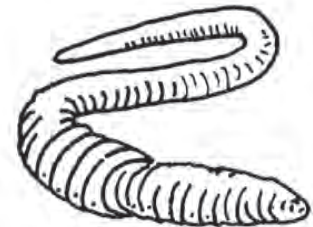
**Millipedes** have many legs and rolls into a spiral



**Earwigs** live in decaying matter



**Fungi** grow on wood chips and can be white threads



**Earthworms** are soft and do not have eyes or legs



**Springtails** are very tiny, less than 1/16 of an inch and jump



**Mold** can be green or white and grows on moist food scraps



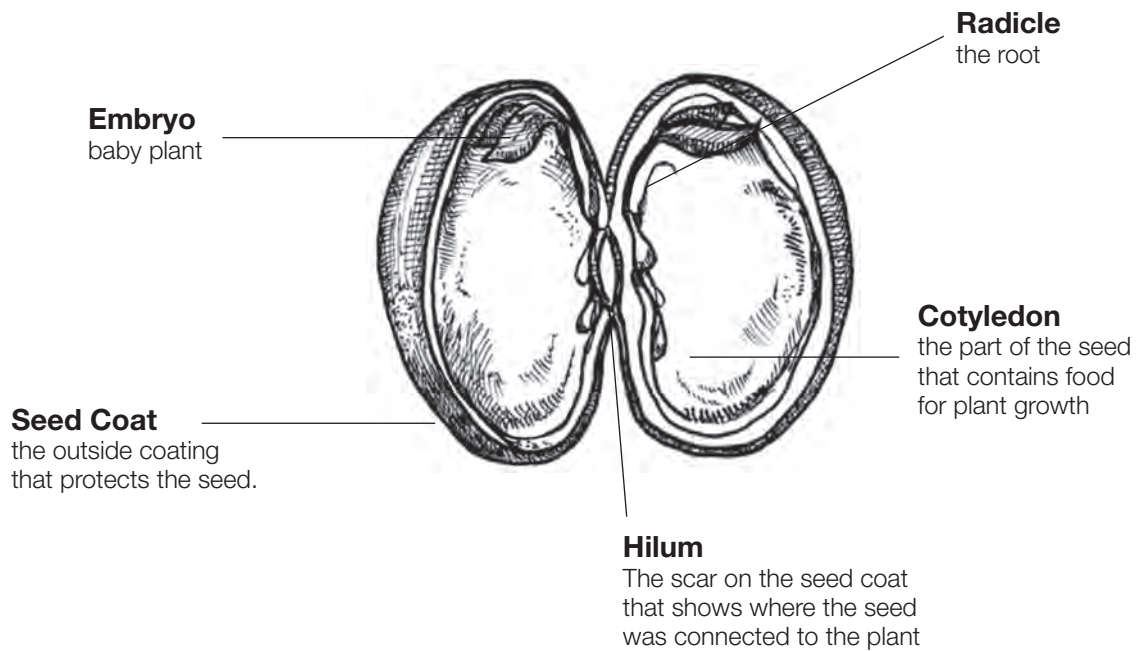
**Wood lice** are very tiny and round.

Do you see other living creatures? Draw them in this space.

Name \_\_\_\_\_ Date \_\_\_\_\_ Location \_\_\_\_\_

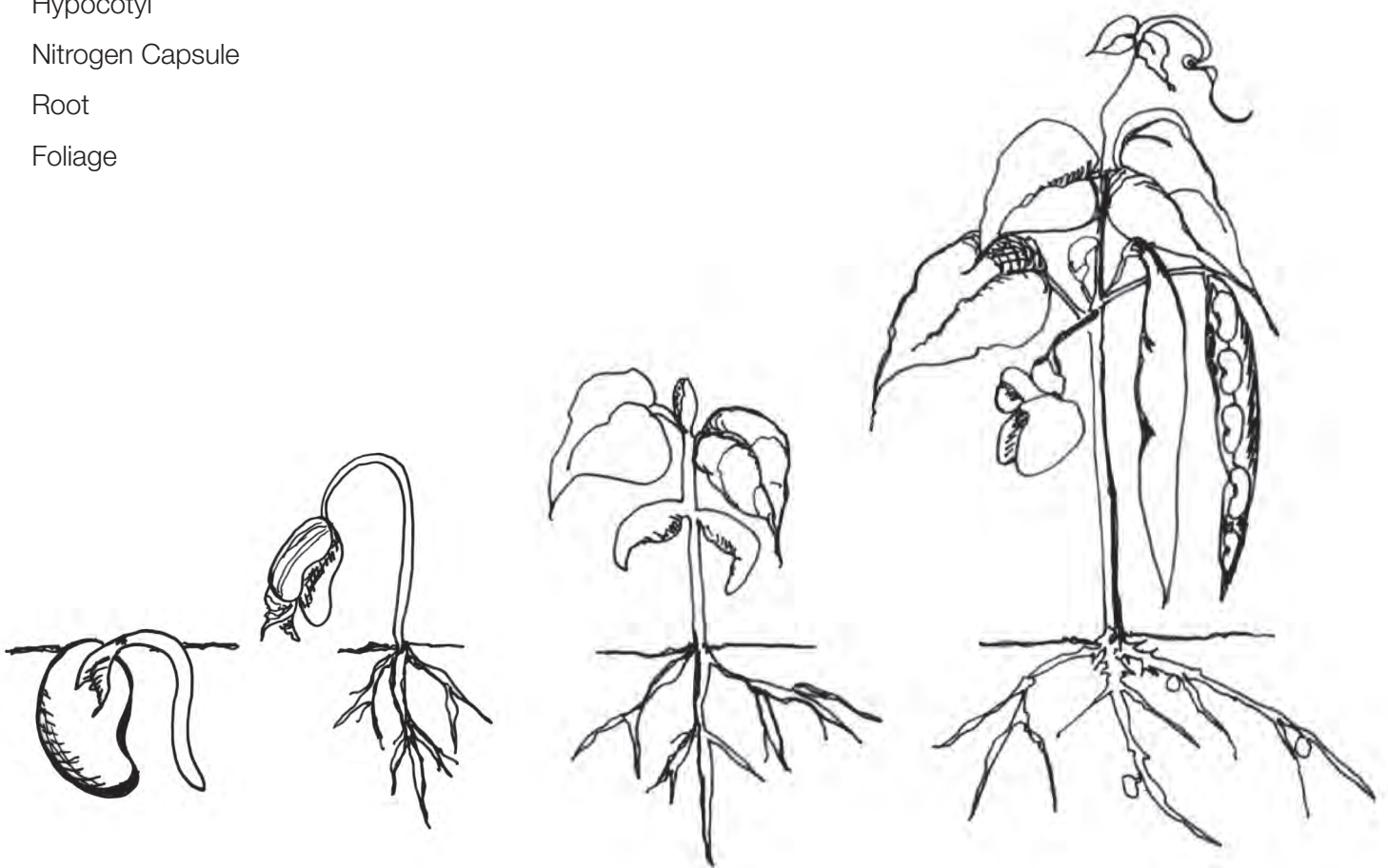
# Seed Words Worksheet

## Bean Seed



# Seed to Plant Worksheet: Beans

- Radicle
- Cotyledon
- Leaf
- Seed Coat
- Stem
- Bean Pod
- Seed
- Flower
- Hypocotyl
- Nitrogen Capsule
- Root
- Foliage



# Garden Survey Checklist

## Leaves

**Q: Are there any leaves that are yellow or drooping?**

**A:** Check the soil to see if it is dry and water if necessary.  
Mulch around larger plants to retain moisture.

**Q: Do you see any insects on your leaves? Are there any large holes? Are there any leaves that have brown spots or that are discolored?**

**A:** Take a picture of any diseased or insect damaged leaves. Use the photos to identify the problem by looking up the pest or disease on the National Gardening Association website: <http://www.garden.org/pestlibrary/>. Remove any diseased or insect-infested leaves. Do not put them in the compost.

**Q: Are the leaves so crowded that they have no room to grow?**

**A:** Plants should be thinned. Refer to seed packets for the best spacing between plants and pull up the weakest seedlings.

Notes: \_\_\_\_\_

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## Stems

**Q: Are there any plants with drooping stems?**

**A:** Check the soil to see if it is dry and water if necessary

**Q: Are there any plants that are floppy or seem like they need support?**

**A:** If so, provide a trellis or other support so that the branches and fruit are not sprawled on the ground. Use this Wisconsin Extension website for ideas: <http://fruit.wisc.edu/wp-content/uploads/2011/06/Trellising-Staking-and-Caging.pdf>

# Garden Survey Checklist

## Fruit

**Q: Are there any fruits that are lying on the ground like tomatoes or chiles? Are there any fruits that have holes or other insect damage?**

**A:** *If so, provide a trellis or other support to keep fruit away from the ground and insects. Use this Wisconsin Extension website for ideas: <http://fruit.wisc.edu/wp-content/uploads/2011/06/Trellising-Staking-and-Caging.pdf>*

**Q: Are there any tomatoes that have black or shriveled bottoms?**

**A:** *If so, they have blossom end rot, which can be caused by uneven watering. <http://www.garden.org/pestlibrary/diseases.php?q=show&id=1793>*

**Q: Are there any fruits that have fallen on the ground?**

**A:** *If so, pick them up and compost them to reduce diseases and insects.*

Notes: \_\_\_\_\_

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## Flowers and Seeds

**Q: Are there any plants that are flowering?**

**A:** *If you normally eat the stems, roots or leaves (greens, basil, celery, garlic), then remove the flowers or the leaves will become bitter. If you normally eat the flowers (broccoli, cauliflower), make sure to pick them before the blossoms open.*

**Q: Are there any plants that have gone to seed?**

**A:** *If you normally eat the stems, roots or leaves (greens, basil, celery, garlic), then remove the seeds or the entire plant if the edible parts look unappetizing or taste too bitter. If you would like to save or eat the seeds, wait until the seedpod is fully mature (plump and dried out) before harvesting them.*

Notes: \_\_\_\_\_

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# Journal

Name of activity \_\_\_\_\_

**What did you do today?** *First... Second... Third...*

## Favorite Verbs

\_\_\_\_\_  
\_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_ Location \_\_\_\_\_

# Journal

Name of plant or food \_\_\_\_\_

**What do you see today?** *I notice... I wonder... That reminds me of...*

## Favorite Nouns

\_\_\_\_\_

\_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_ Location \_\_\_\_\_



2

# A Slow Food Garden



Slow Food USA®





The second part of the Clean curriculum presents a typical Slow Food school garden, arranged according to proposed garden plots. Each garden plot is comprised of plants that have similar cultivation requirements or are in the same plant family. In addition, compatible legumes are recommended along with each type to add soil fertility. Along with general planting information, each chapter also contains recipes, experiments and plant worksheets. The worksheets show the plant at every stage so that learners can recognize seedlings as well as the flowering and fruiting stages of a plant.

**We recommend organizing a school garden according to the type of plant for these reasons:**

- Planting similar species together means that they have similar cultivation requirements;
- Mixing legumes in with other vegetables helps soil fertility;
- It is easy to do taste comparisons or cooking if similar plants are near each other;
- It is easier to engage an entire class around a plot if they are all doing the same thing and,
- It is easier to compare edible plant parts if the plants are growing near each other.
- Encourage garden participation by organizing plants in a way that is identifiable, even to non-gardeners. Grouping plants together allows a place for garden signs to work.

For example, comparing the texture, growing habits, and flavor of different types of braising greens becomes obvious when they are grown next to each other. One way for learners to better understand a plant is to compare similarities and differences of species in the same plant family. By growing these plants together, it is easy to compare and contrast specific features, such as flowers or seeds.

## CREATING GROUP FRIENDLY PLOTS

Look at the **Garden Map** on page 79 for one example of a school garden design that is group friendly (and child friendly). Note that the paths are 3' wide and well marked. The plots are also 3' wide, allowing gardeners to reach into the middle of the plot from the edges of the garden. Ideally all parts of the garden plots should be accessible from the path, so that gardeners do not have to step into the plot in order to cultivate or harvest the plot. In this map, the plots are 12' long, but they can be longer or shorter to suit your needs.

Handicapped-accessible plots consist of raised beds and should have 5' paths surrounding the plot. The paths should be made of a stable material such as finely crushed compacted rock or paving to allow for easy access by wheelchairs and assisted walkers.

Remember that you may have 8-30 learners in the garden at one time, so there needs to be enough space to keep all of them busy. We recommend that the plots be long enough so that 15 learners can stand around the perimeter of a plot at one time, planting in clearly marked areas.

There are several different ways to plant vegetables, depending on if you are planting seeds or transplants. Choose one of these planting methods that is suitable for your class size as well as the growing conditions needed for each crop.





## PLANTING PATTERNS

- *Squares for direct seeding, for example see the root vegetable plot.* Young children find it easier to broadcast seeds within a designated square, as opposed to planting in rows. Many crops with small seeds, such as root vegetables, greens and lettuces grow well planted in broadcast squares. They will need to be thinned as they grow so that each plant has enough space. Squares tend to save water; the dense leaves shade the ground as the plants grow.
- *Furrows for direct seeding, for example peas or beans.* Large seeds can be planted in furrows, which are narrow trenches dug into the ground. In dryer climates, plant at the bottom of the furrow where water will collect. In wet climates, plant at the top of a furrow for better drainage. Follow seed packet directions for spacing.
- *Holes for large seedlings, such as tomatoes.* Dig planting holes for each plant ahead of time. Learners can loosen the soil with their hands or with trowels and add fertilizer or compost as needed. Pre-digging holes by an adult will minimize accidents with long handled tools, especially for younger gardeners.



## MANAGING PLOTS

Time complicates gardens in unexpected ways. A garden is a process that repeats with variation over many years. One result is that plant varieties should be rotated across plots in order to maintain fertility and reduce pest issues. Historically, one of the most important soil fertility inventions was the schedule of crop rotation that relied on alternating legumes and grains. A typical three-field system that was developed in medieval Europe relied on a rotation of grains, legumes and one fallow field. The legume family, which includes peas, beans and lentils, fixes nitrogen into the soil, increasing soil fertility.

Plots should be rotated every year so that plants that require a more fertile soil (tomatoes, corn, greens) be alternated with legumes. In addition, crops that are planted in the same plot year after year will attract pests more easily and may deplete specific minerals or nutrients.

Consider growing a cover crop of a mix of grains and legumes during times when your garden lies fallow, such as the winter. Cover crops help reduce weeds, build good soil and retain water. They are dug into the plot a month before planting so that they have time to decompose. Visit the resources page for more information. Peaceful Valley Farm (<http://www.groworganic.com/cover-crops.html>) has videos explaining how to use them and a large selection of cover crops.

# Garden Map



Edible Perennial and Permaculture  
Sheet Mulching



Root Vegetables and Tubers



Cold Season  
Crops and Greens



Nightshade and Legumes



Melon Family



Pollinator and Herb Plot



Squash Family

Compost

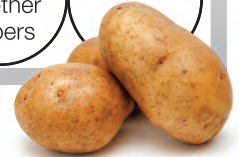


Tool  
Shed

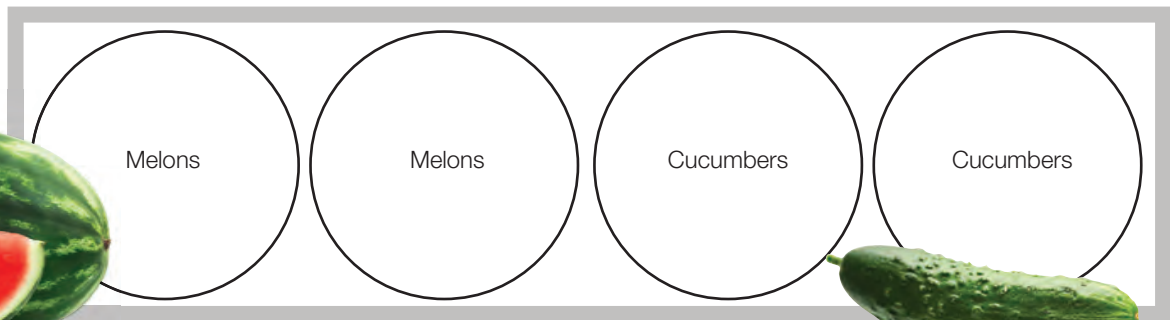
# Garden Map



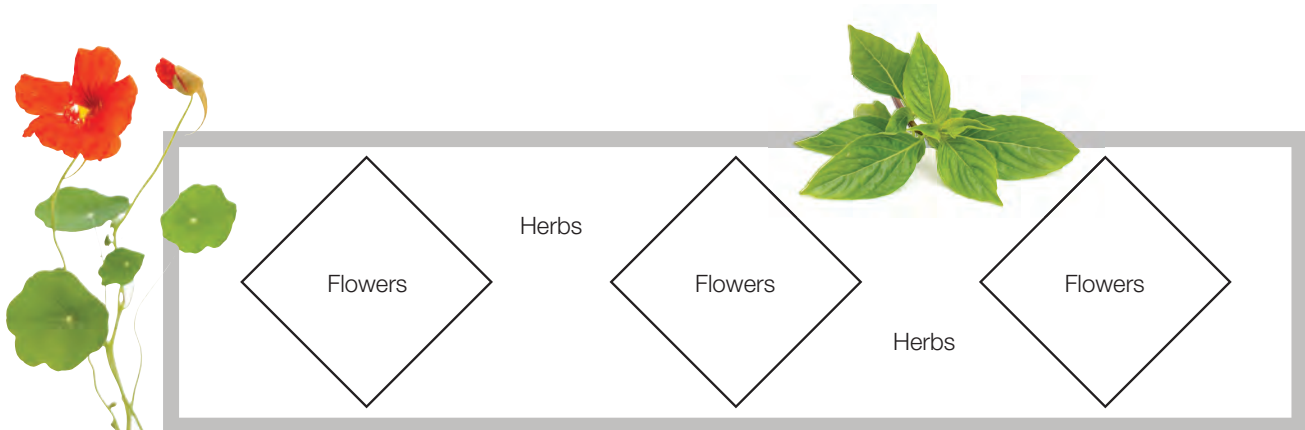
Radish	Carrots	Beets	Parsnips	Turnips	Potatoes or other Tubers	Potatoes or other Tubers	Potatoes or other Tubers
Radish	Carrots	Beets	Celeriac	Rutabaga	Potatoes or other Tubers	Potatoes or other Tubers	



**Root Vegetables and Tubers**



**Melon Family**



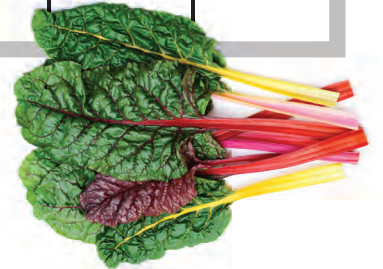
**Pollinator and Herb Plot**

# Garden Map



Lettuce	Arugula	Kale	Collards	Broccoli	Onions	Peas	Peas
Lettuce	Spinach	Kale	Chard	Cauliflower	Garlic	Fava	Fava

## Cold Season Crops and Greens



Tomatoes	Tomatoes	Tomatoes	Tomatillos	Beans	Peppers	Eggplant
Tomatoes	Tomatoes	Tomatoes	Tomatillos	Beans		

## Nightshade and Legumes



Summer Squash	Summer Squash	Winter Squash	Winter Squash
---------------	---------------	---------------	---------------



## Squash Family





# Garden Signs





**G**arden signs help keep the gardener's presence in the landscape even when you are not there. They show that learners, teachers and community members care about this space and tend to it carefully. They can also be a substitute for an experienced gardener, providing instruction or information so that more of the school community will be comfortable in the space. If learners and staff are new to gardening, they are often reluctant to participate because they are worried that they will damage something or disturb pre-existing plans. Signs help to tell them that they are welcome and show what is happening.

Signs are also excellent means of communicating information in a brief format. Creating signs, including the symbols, images and words in order to convey complex information provides an excellent literacy activity. In order to get the deepest lessons from the signs, explain the messages that are needed and let the learners choose the words and design that will communicate the message.

**Here are some of the ways learners can design signs for the garden:**

- *Entry* signs show the entrance, who owns the garden and who maintains it. They should include contact information for the garden leader(s) and any of the classrooms involved in the garden. They may be temporary (e.g. a painted banner) or more permanent (e.g. a metal or engraved plastic).
- *Orientation* signs point the way to various highlights of the garden. Students can also practice orienteering skills (being able to locate themselves on a map) by marking the north, south, east and west directions.
- *Identification* signs include common names for plants or animals, edible plant parts, as well as plant families in English and other languages. Identification signs can also be used for learning games. For example, devise a scavenger hunt where learners count how many plants in the Cabbage (Brassicaceae) family there are, or how many edible fruits are growing.
- *Interpretive* signs offer more in depth knowledge of the garden or certain projects including life cycles, compost critters and worm anatomy.
- *Regulatory* signs indicate garden rules. They can also indicate which plants are ready for harvest, how to manage compost or where to put tools.
- *Temporary* signs may indicate the presence of special animal visitors, projects or events. A bulletin board that includes a map of the garden indicating which vegetables are planted in each plot is very useful.



# SIGN MATERIALS

## For the Stakes

- Wooden stakes (use screws or bolts to fasten signs) will last for 2-4 years
- Metal T-posts (for fences) come in many lengths and last for years

## For the Sign Materials

- *Coroplast* corrugated plastic cut into any size. Weatherproof and can use a paint marker or paint for the words. Markers fade and need to be rewritten.
- Fence boards cut into 2' or 3' lengths. Prime the entire board front and back for the longest use. Paint or use permanent marker for words.
- Painted large rocks
- Recycled slats from venetian blinds for individual plants
- Popsicle sticks, to mark individual plants
- Plywood for large signs
- Banners for large signs
- White board with plots marked off using electrical tape for a garden map



Use the following chart to help you create informational signs. The chart provides the plant family, origin, and edible part of the plant. It also provides the Latin names of common garden plants as well as the name in Spanish, Italian and French.

## Slow Food Plant Family and Languages Chart

The following is a list of plant families that contain common edible plants.

The names are in English and Latin. Also included is a list of the edible parts of a plant.

### Plant Families

1. Legumes-Fabaceae
2. Cabbage-Brassicaceae
3. Nightshade-Solanaceae
4. Sunflower-Compositae or Asteraceae
5. Beets-Chenopodiaceae
6. Cucumber-Cucurbitaceae
7. Lily-Liliacea
8. Parsley-APIaceae
9. Grasses-Poaceae
10. Buckwheat-Saxifrage
11. Morning Glory-Convulvaceae
12. Rose-Rosaceae

### Plant Parts

1. Roots
2. Stems
3. Leaves
4. Flowers
5. Fruit
6. Seeds



# Plant Family and Languages Chart

Name	Botanic Name	Origin	Family	Edible Part	Spanish	French	Italian
<b>Apple</b>	<i>Pyrus malus</i>	Caucasus			Manzana		
<b>Artichoke</b>					Alcahofa		
<b>Arugula</b>	<i>Pyrus malus</i>	Caucasus	Rose	Fruit	Rúcula	Pomme	Mela
<b>Asparagus</b>	<i>Cynara scolymus</i>	Mediterranean	Sunflower	Flowers	Espárago	Artichaut	Carciofi
<b>Beet</b>	<i>Eruca vesicaria</i>	Mediterranean	Cabbage	Leaves	Betabel	Roquette	Rucola
<b>Black beans</b>	<i>Asparagus officinalis</i>	Europe	Lily	Stems	Frijole nero	Asperge	Asperago
<b>Broccoli</b>	<i>Beta vulgaris</i>	Mediterranean	Beets	Roots	Brécol	Beterave	Barbabetolo
<b>Cabbage</b>	<i>Phaseolus vulgaris</i>	North America	Legumes	Seeds	Repollo	Haricot noir	Fagiolo nero
<b>Cantaloupe</b>	<i>Brassica oleracea</i>	Italy	Cabbage	Flowers	Melon	Broccoli	Broccolo
<b>Cardoon</b>	<i>Brassica oleracea Capitata</i>	Europe	Cabbage	Leaves	Cardo	Ghou	Cavolo
<b>Carrot</b>	<i>Cucumis melo</i>	Egypt-Iran	Cucumber	Fruit	Zanahoria	Melon	Melone
<b>Cauliflower</b>	<i>Cynara cardunculus</i>	Mediterranean	Sunflower	Leaves	Coliflor	Cardon	Cardone
<b>Celery</b>	<i>Daucus carota</i>	Afghanistan	Parsley	Roots	Apio	Carotte	Carota
<b>Corn</b>	<i>Brassica oleracea Botrytis</i>	Near East	Cabbage	Flowers	Elote	Chou fleur	Cavolfiore
<b>Cucumbers</b>	<i>Apium graveolens</i>	Europe/W.Asia	Parsley	Leaves*	Pepino	Celeri	Sedano
<b>Eggplant</b>	<i>Zea Mays</i>	Mexico	Grasses	Seeds	Berenjena	Mais	Granoturco
<b>Fava beans</b>	<i>Cucumis sativa</i>	India	Cucumber	Fruit	Haba	Concombre	Cetriolo
<b>Fennel</b>	<i>Solanum melongena</i>	India	Nightshade	Fruit	Hinojo	Aubergine	Melanzana
<b>Garlic</b>	<i>Vicia faba</i>	Mediterranean	Legumes	Seeds	Ajo	Fève	Fava
<b>Jer. Artichoke</b>	<i>Foeniculum vulgare</i>	Europe	Parsley	Leaves	Topinambur	Fenouil	Finocchio
<b>Kale</b>	<i>Allium sativum</i>	Middle East	Lily	Roots	Col	Ail	Aglio
<b>Kohlrabi</b>	<i>Helianthus tuberosus</i>	North America	Sunflower	Tuber	Colinabo	Topinambour	Carciofo gerusalemme
<b>Leek</b>	<i>Brassica oleracea Acephala</i>	Europe	Cabbage	Leaves	Porro	Cou frisé	Cavolo
<b>Lettuce</b>	<i>Brassica oleracea Gongylodes</i>	Europe	Cabbage	Stern	Lechuga	Chou rave	Cavolo rapa
<b>Onion</b>	<i>Allium porrum</i>	Mediterranean	Lily	Roots	Cepolla	Poireau	Porro
<b>Parsnip</b>	<i>Lactuca sativa</i>	Middle East	Sunflower	Leaves	Pastinaca	Laitue	Lattuga
<b>Peanut</b>	<i>Allium cepa</i>	Iran or India	Lily	Roots	Cacahuete	Oignon	Cipollo
<b>Pea</b>	<i>Pastinaca sativa</i>	Europe/W.Asia	Parsley	Roots	Chicharo	Pastenaque	Pastinaca
<b>Pear</b>	<i>Arachis hypogaea</i>	Africa	Legumes	Seeds	Pera	Cacahuète	Arachide
<b>Pepper</b>	<i>Pisum sativum</i>	Near East	Legumes	Seeds	Chile	Pois	Pisello
<b>Potato</b>	<i>Pyrus</i>	Caucasus	Rose	Fruit	Papa	Poire	Pera
<b>Radish</b>	<i>Capsicum annuum</i>	Latin America	Nightshade	Fruit	Radice	Piment	Peperoncino
<b>Raspberry</b>	<i>Solanum tuberosum</i>	Peru	Nightshade	Tuber	Frambuesa	Pomme de Terre	Patata
<b>Rhubarb</b>	<i>Raphanus sativus</i>	W. Asia	Cabbage	Roots	Ruibarbo	Rave	Rafano
<b>Rutabaga</b>	<i>Rubus idaeus</i>	Europe	Rose	Fruit	Rutabaga	Framboise	Lampone
<b>Shallot</b>	<i>Rheum rhabarbarum</i>	Asia	Buckwheat	Leaves*	Chalote	Rhuibarbe	Rabarbaro
<b>Spinach</b>	<i>Brassica napus</i>	Europe	Cabbage	Roots	Espinaca	Rutabaga	Navone
<b>Squash-Winter</b>	<i>Allium cepa</i>	Europe	Lily	Roots	Calabaza	Échalotte	Scalognò
<b>Strawberry</b>	<i>Spinacia oleracea</i>	Iran	Beets	Leaves	Fresa	Epinard	Spinacio
<b>String bean</b>	<i>Cucurbita</i>	North America	Cucumber	Fruit	Ejote	Courge	Zucca
<b>Sweet Potato</b>	<i>Fragaria</i>	North America	Rosacea	Fruit	Camote	Fraise	Fragola
<b>Swiss Chard</b>	<i>Phaseolus vulgaris</i>	North America	Legumes	Fruit	Acelga	Haricot vert	Fagiolo
<b>Tomatillo</b>	<i>Ipomoea batatas</i>	Africa	Morning Glory	Tuber	Tomatillo	patate douce	Patata americana
<b>Tomato</b>	<i>Beta vulgaris cicla</i>	Babylonia	Beets	Leaves	Tomate	Bette à cardé	Bietola
<b>Turnip</b>	<i>Physalis ixocarpa</i>	Mexico	Nightshade	Fruit	Naba	Tomatillo	Tomatillo
<b>Zucchini</b>	<i>Lycopersicon esculentum</i>	Mexico	Nightshade	Fruit	Calabaza	Tomate	Pomodoro
	<i>Brassica rapa</i>	Europe	Cabbage	Roots		Navel	Rapa
	<i>Cucurbita pepo</i>	North America	Cucumber	Fruit		Courgette	Zucchini

\*Cold tolerant means that the plant can survive winters with prolonged freezing



# Slow Food Ark of Taste





The Ark of Taste is a living collection of delicious and culturally significant foods in **danger of extinction or underappreciation**. It was created to point out the existence of these products, **draw attention to the risk** of their extinction within a few generations, and **invite everyone to take action** to help protect them. In some cases this might be **by buying and consuming** them, in some **by telling their story** and **supporting their producers**, in the cases of endangered wild species, this may initially mean **eating less or none of them in order to preserve them** and favor their reproduction.

Since 1996, more than 3,200 products from over 140 countries have been boarded onto the International Ark of Taste. Over 300 of these foods are from the USA, and we are always seeking more edible treasures to include. The Ark of Taste is the result of citizen research. It collects the knowledge of everyday people, just like you, who have identified foods and crops special to them and the places they live. Slow Food understands the complex issue of food biodiversity through the simple interactions of eaters and the plants, animals and landscapes they live with. Together, we create our food system. Anyone and everyone is encouraged to become a defender of biodiversity by nominating a food to the Ark of Taste! Find the form at <http://www.slowfoodusa.org/files/files/ark-of-taste-nomination-form2.pdf>.

Preserving foods starts with seed saving. Save seeds from the largest and most healthy plants to share with others and plant for next year. For information about seed saving, take the online Seed School course from Rocky Mountain Seed Alliance: <https://rockymountainseeds.org/attend/seed-school-online>, or read these tips from Seed Savers Exchange: <http://www.seedsavers.org/learn>.

The following chart is a list of fruits and vegetables that have been added to the United States Ark of Taste. They are organized by the chapters in this section of the Clean school garden activities. Visit the Slow Food USA website for more information about the history and the growing requirements of each variety: <http://www.slowfoodusa.org/ark-of-taste>. Search the database by region to ensure successful planting.

**The following seed companies have Ark of Taste collections available for purchase:**

Nature and Nurture Seeds

<http://natureandnurtureseeds.com/collections/ark-of-taste-collection>

Seed Savers Exchange <http://www.seedsavers.org/onlinestore/Ark-of-Taste/>

Terroir Seeds

<http://store.underwoodgardens.com/Slow-Foods-Ark-of-Taste/products/167/>

Victory Seed <http://www.victoryseeds.com/ark-of-taste.html>

Baker Creek Seeds <http://www.rareseeds.com/store/vegetables/slow-foods-ark-of-taste/>



# Ark of Taste in the School Garden

## Root Vegetable Plot

Bodega Red Potato  
 Early Blood Turnip-Rooted Beet  
 Gilfeather Turnip  
 Green Mountain Potato  
 Hayman Sweet Potato  
 I'toi Onion  
 Inchelium Red Garlic  
 Ivis White Cream Sweet Potato  
 Lorz Italian Garlic  
 Makah Ozette Potato  
 Manalauloa Kalo  
 Nancy Hall Sweet Potato  
 Red McClure Potato  
 Spanish Roja Garlic  
 Wild Ramps

## Greens and Peas

Amish Deer Tongue Lettuce  
 Speckled Lettuce  
 Tennis Ball Lettuce  
 Yellow Cabbage Collard

## Nightshades and Legumes

Amish Paste Tomato  
 Aunt Molly's Ground Cherry  
 Aunt Ruby's German Green Tomato  
 Beaver Dam Pepper  
 Burbank Tomato  
 Chalk's Early Jewel Tomato  
 Cherokee Purple Tomato  
 Chiltepin Pepper  
 Datil Pepper  
 Djena Lee's Golden Girl Tomato  
 Fish Pepper  
 German Pink Tomato  
 Hinkelhatz Hot Pepper  
 Hussli Tomato Pepper  
 Inciardi Paste Tomato  
 Jimmy Nardello's Sweet Italian Frying pepper

Livingston's Globe Tomato  
 Livingston's Golden Queen Tomato  
 New Mexican Native Chile Pepper  
 New Mexico Native Tomatillo  
 Orange Oxheart Tomato  
 Radiator Charlie's Mortgage Lifter Tomato  
 Sheboygan Tomato  
 Sheepnose Pimiento  
 Sudduth Strain Brandywine Tomato  
 Valencia Tomato  
 Wenk's Yellow Hot Pepper  
 White Velvet Okra

Arikara Yellow Bean  
 Bolita Bean  
 Brown and White Tepary Bean  
 Carolina African Runner Peanut  
 Cherokee Trail of Tears Bean  
 Christmas Lima Bean  
 Four Corners Gold Bean  
 Hidatsa Red Bean  
 Hidatsa Shield Figure bean  
 Hopi Mottled Lima Beans  
 Jacob's Cattle Bean  
 Lina Cisco's Bird Egg Bean  
 Marrowfat Bean  
 Mayflower Bean  
 Mississippi Silver Hull Bean-Crowder Cowpeas  
 O'odham Pink Bean  
 Rio Zape Bean  
 Santa Maria Pinquitos Bean  
 Sea Island Red Peas  
 True Red Cranberry Bean  
 Turkey Craw Bean

## Melons and Cucumbers

Bradford Watermelon  
 Crane Melon  
 Kleckley Watermelon  
 Moon & Stars Watermelon  
 Yellow-Meated Watermelon

## Summer and Winter Squash

Algonquian Squash  
 Amish Pie Squash  
 Boston Marrow Squash  
 Canada Crookneck Squash  
 Candy Roaster Squash  
 Green-striped Cushaw  
 Long Island Cheese Pumpkin  
 Seminole Pumpkin  
 Sibley Squash  
 Sugar Hubbard Squash

## Fruit Trees and Perennials

Yates Apple  
 Autumn Strawberry Apple  
 Capitol Reef Apple  
 Esopus Spitzenberg Apple  
 Granite Beauty Apple  
 Harrison Cider Apple  
 Hauer Pippin Apple  
 Hoover Apples  
 Milwaukee Apple  
 Newtown Pippin Apple  
 Plumb Cider Apple  
 Reine de Reinette Apple  
 Sebastopol Gravenstein Apple  
 Sierra Beauty Apple  
 Blenheim Apricot  
 Wilson Popenoe Avocado  
 Fuerte Avocado  
 Puebla Avocado  
 Ele Ele "Black Hawaiian" Banana  
 Hua Moa Banana  
 Black Republican Cherry  
 Emmett's Cherry  
 Ciolim, Cholla Cactus Flower Buds  
 Tabarzal Date  
 TR Triumph Date  
 Abada Date  
 Black Sphinx Date  
 Blonde Beauty Date  
 Brunette Beauty Date  
 Empress Date

Honey Date  
 McGill Date  
 Hog Island Fig  
 Marsellaise Fig  
 Bronx Grapes  
 Meyer Lemon  
 Hatcher Mango  
 Mesquite Pod Flour  
 Inland Empire Old-Grove Orange  
 Pawpaw  
 Baby Crawford Peach  
 Fay Elberta Peach  
 George IV Peach  
 Indian Blood Peach  
 Oldmixon Free Peach  
 Rio Oso Gem Peach  
 Silver Logan Peach  
 Sun Crest Peach  
 Buerre Clairgeau Pear  
 Burford Pear  
 Duchesse d'Angouleme Pear  
 Beach Plum  
 Elephant Heart Plum  
 Inca Plum  
 Laroda Plum  
 Mariposa Plum  
 Padre Plum  
 Robe de Sargeant Plum  
 California Mission Olive  
 Meech's Prolific Quince  
 Sonoran Quince  
 Pantin Mamey Sapote  
 Louisiana Satsuma  
 Louisiana Heritage Strawberries  
 Pixie Tangerine of Ojai Valley  
 Hawaiian 'Ulu



# What is Your Ark of Taste?



**Objective** Learners will gather knowledge about favorite traditional foods by interviewing their family.

**Background** In order to be nominated to Slow Food's Ark of Taste, a food must meet several criteria. Learners will discuss their favorite family foods in class and then interview their parents and grandparents in order to collect stories. Classes may use these stories to decide which plants they want to include in their school garden. The class may also nominate their choice to be included on the Ark of Taste.

## Here's a quick look at what it takes to be on the Slow Food USA Ark of Taste.

**Endangered** Produced in limited quantities, these foods will not be around in another generation or two without immediate action. Risk factors may be biological, commercial, or cultural.

**Good** Whether an animal breed, baked treat, fruit, spice, grain, or beverage, these foods are prized by those who eat them for their special taste.

**Clean** No engineered foods here. These foods are linked to the place and the community that protects them. Everything on the Ark of Taste has the potential to be grown, raised or produced without harm to the environment.

**Fair** To keep these foods' traditions alive takes many hands. No commercial or trademarked items are allowed onto the Ark of Taste, only foods that anyone may champion, produce, share or sell.



**Materials** **Ark of Taste Information Form**, on page 208.

- Preparation**
- Explain the Ark of Taste and describe the purpose of the project.
  - Discuss any Ark of Taste produce that you plan to grow in the school garden.
  - Pass out the Ark of Taste Information form to each learner.
  - Go over the questions on the form with the learners.
  - Ask them who in their family cooks?
  - Is there a special food that they eat that defines their family, or a special food holiday tradition?



## Activity

1. Each learner will take the form home and interview a person in their family or neighborhood about a special food that is important to them.
2. The learners will bring the forms back to class and will present their foods to the class.
3. Learners may bring a sample of the food to class as well.
4. Mark the geographical origin of the foods from the class on a large map

## Discussion

Would any of the foods qualify for admission to the Ark of Taste? For more information about the nomination process, go to <http://www.slowfoodusa.org/nomination-process>.

What are some ways that learners can keep their food traditions alive and spread the knowledge to others in their families?

Why is this food or traditional recipe important to their family?







# Soil Preparation



**B**efore planting, the garden soil needs to be prepared to encourage healthy and thriving plants. Healthy soils support diverse life, including bacteria, arthropods and fungi. This biodiversity creates available nutrients and mycorrhizae fungi that support plant growth. There are many ways to increase soil health and biodiversity through soil amendments, compost, organic matter and/or well-composted manure. Research some of the following soil preparation techniques and decide what might best fit your environmental conditions, garden size and class size.

## GROUND THAT HAS NEVER BEEN BROKEN

(e.g. a lawn or hard surface)

The challenge with unbroken ground is that it may be compacted, needing organic matter and tilling in order to aerate the soil and allow water to penetrate. Soil aeration is important as plant roots and soil organisms need oxygen to survive. If the ground has been contaminated or if the surface is hard (asphalt), consider raised beds.

### 1. Sheet mulching, also known as lasagna gardening.

*Lasagna Gardening* by Patricia Lanza or

<http://www.motherearthnews.com/organic-gardening/lasagna-gardening-zmaz99amztak.aspx>

### 2. Rototilling with or without cover crops.

*Managing Cover Crops Profitably* by SARE Outreach or

<http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition/Text-Version/Managing-Cover-Crops-in-Conservation-Tillage-Systems>

### 3. French intensive, also known as double digging

*How to Grow More Vegetables* by John Jeavons

<http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition/Text-Version/Managing-Cover-Crops-in-Conservation-Tillage-Systems>

### 4. Square foot gardening

*All New Square Foot Gardening* by Mel Bartholomew or

<http://www.melbartholomew.com/what-is-square-foot-gardening/>

### 5. Raised beds

*Plan and Build a Raised Vegetable Garden* by Jeanne Gruner.

<http://www.ext.colostate.edu/mg/Gardennotes/713.html>





## MAINTENANCE OF A GARDEN OVER TIME

### 1. No Till gardening

*Small Scale No Till Gardening Basics* by Anna Hess, *Weedless Gardening* by Lee Reich or <http://www.no-dig-vegetablegarden.com/index.html>

### 2. Traditional Organic Gardening

*The Vegetable Gardener's Bible* by Edward C. Smith or *Rodale's Basic Organic Gardening* by Deborah L. Martin or <http://garden.org/courseweb/>

### 3. Raised beds

*All New Square Foot Gardening* by Mel Bartholomew or <http://learn.eartheasy.com/2011/03/raised-beds-preparing-your-garden-beds-for-spring/>





# Root Vegetables





Carrots, beets, parsnips, radishes, turnips, and rutabagas are the most commonly grown root crops. They all have similar environmental requirements and grow best in cool weather. Since they are hardy, root crops may be planted early in the spring, and left in the garden until fall. In addition, tops of beets and turnips are commonly used as cooked greens and can be harvested while the plants are young. Carrot tops are also edible and can be made into a pesto.

### Root Vegetable Botany

Root vegetables are plant roots that are consumed as vegetables, such as carrots, turnips and beets or sweet potatoes. These are either taproots or tuberous roots. Other underground plant parts such as stem tubers, bulbs, corms or rhizomes are often called root vegetables even though they are not botanically roots.

For example, potatoes are the swollen part of a stem and they belong to the nightshade family. Onions and garlic, members of the lily family, have layers that are actually underground leaves. Sweet potatoes are swollen parts of roots and belong to the morning glory family. Use the [Root Vegetable tasting](#) and the [Roots and Tubers? Worksheet](#) to explain some of these botanical oddities.

Regardless of the botanical definition of root vegetables, stem tubers, bulbs and root tubers, in the culinary world they are often all called “root vegetables.”

### Soil preparation and fertility

Root vegetables need soil that retains moisture yet is well drained, so that they have plenty of space to grow. Add compost and an organic fertilizer that is higher in phosphorus and potassium than nitrogen.

Radish	Carrots	Beets	Parsnips	Turnips	Potatoes or other Tubers	Potatoes or other Tubers	Potatoes or other Tubers
Radish	Carrots	Beets	Celeriac	Rutabaga	Potatoes or other Tubers	Potatoes or other Tubers	



**Root Vegetables and Tubers**

### Planting and thinning

Root crops are best planted directly in the garden before the weather becomes hot. Broadcast the seeds and after they have two true leaves, thin them to allow space for the root to grow. Thinning can occur over a period of time, so that you harvest baby root vegetables to allow space for larger ones to grow later. The tops of beets, carrots and turnips are also edible and can be added to any braised green dish. Most root vegetables may be planted in succession so that there is a continuous supply.

Potatoes, casava and yams, which are tubers, are not planted by seed. Slips, or pieces of the tuber, are planted into the ground. For more information, see the **Planting Potatoes** lesson, page 109.

### Watering

Water root vegetables deeply to encourage growth, allowing the soil to dry out between waterings.

### Harvesting

Root crops should be harvested before the plant has gone to seed. The tops of many root crops will begin to rise out of the ground, which is a sign that they are ready to be harvested. Once the plant flowers and develops seeds, the roots become fibrous, bitter, or pithy.



# Planting Root Vegetables



**Objective** Learners will be able to sow root vegetable seeds outside, and identify various types of root vegetable crops.

**Background** Root vegetables are considered cold season crops because they can withstand cool temperatures and germinate in cooler soils. Use the individual worksheets for cultivation tips. Choose a variety of roots so that learners can compare them later in a taste test. Radishes may be a good choice because they demonstrate how different plants can taste even though they are the same species. Examples of radishes to try are daikon radish, black radish, watermelon radish and icicle radish.

**Materials** String to lay out squares or plots  
1 dozen wooden stakes to lay out plots  
Garden journals  
Pencils  
6-10 varieties of root vegetable seed packages,  
such as radishes, carrots, parsnips, turnips, rutabagas  
Watering cans  
Trowels  
Signs for various seeds

**Preparation**

- Prepare the beds ahead of time if you are working with younger learners and/or are short on time. The soil must be soft and easy to work with. Water the soil the day before planting.
- Place the stakes in 1½ foot intervals around the plot, following plot map on page 98. You will be making 1½ foot squares.
- Tie the string to the stakes so that the plot is divided in half lengthwise, and then into 1½ foot squares.
- Place one seed packet in the middle of each square.  
Review how to plant seeds using information from the back of the seed packet; often learners plant seeds too close together or too deep. Make sure to go over these issues with the learners before planting.



## Activity

1. Assign one or two learners to each square and demonstrate how to broadcast seeds evenly within their square. For small seeds (e.g. carrots) have them pat the dirt with their fingers and tamp down lightly. For larger seeds (e.g. beets) have them press each seed down  $\frac{1}{4}$ " with their fingers.
2. Water each square with a watering can that has a gentle spray.
3. If there is not enough space for the entire class to plant at once, have learners take turns planting. Other students can use one of these prompts to work in their journals:
  - What are the instructions for planting a seed?
  - How would you create a seed package including the spacing and planting time
  - Draw a picture of the kind of seed you planted.
  - Draw a picture of how you think the garden will look later in the summer.
  - Draw your favorite vegetable that we have planted today.
4. After the seedlings have 1 or 2 sets of true leaves, thin them.

## Further Exploration

Use the gardening books in the Recommended Books on page 240 to get more advice about specific gardening practices or techniques.





# Tap Root or Tuber?



## Objective

Learners will observe and draw different edible roots and tubers in order to determine if they are tap roots or tubers.

## Background

Roots are the part of the plant that grows underground. They have the following functions:

- Roots keep the plant in the soil
- Roots absorb water and mineral salts from the soil
- Some roots store food
- Roots form a path for water and dissolved minerals between the root and the stem
- There are two basic types of root systems: tap roots and fibrous (or adventitious) roots

**Tap Root System:** Has one main root that grows down into the soil. Secondary (lateral) roots grow from the side of the main root. The tap root can get water from deep in the soil. Also, most dicots (plants that have two leaves when they sprout) have tap roots. Dicot plants include carrots, beans, tomatoes and squash.

**Fibrous (Adventitious) Root System:** The main root usually dies at an early stage and is replaced by many roots that develop from the stem. These roots, are equal in size. They form a mat, and sometimes have runners that grow near the surface and start a new plant (adventitious roots). They get water close to the surface and can soak up rain water quickly. Most monocots (plants that have one leaf when they sprout) have fibrous root systems. Monocot plants include corn, grass, onions, and wheat.

**Tubers:** Tubers are starchy storage plant parts that are found underground. Fibrous root tubers, like yams, are part of the root that are swollen and filled with energy for the plant. Stem tubers, like potatoes are not roots at all! They are a swollen part of a stem that lives underground, also providing energy for the plant. Tubers are one of the first human foods. People have been growing them so long that they have bred out many bitter and poisonous compounds in order for us to enjoy them today. The **Roots or Tubers? Worksheet** (page 209) demonstrates the differences. See the following page for answers.

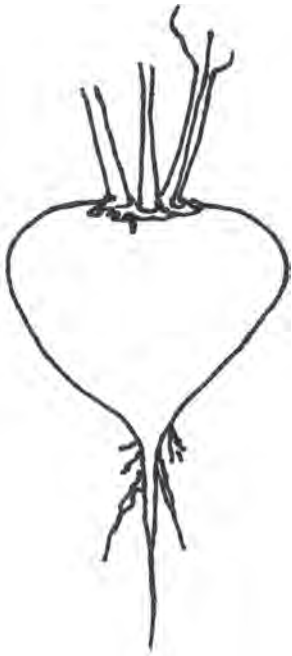
Many anthropologists believe that carbohydrates from cooked tubers gave early humans the extra energy they needed to support larger brain development. Read more about this theory in Richard Wrangham's *Catching Fire: How Cooking Made Us Human*.



# Roots or Tubers?

## Tap Roots

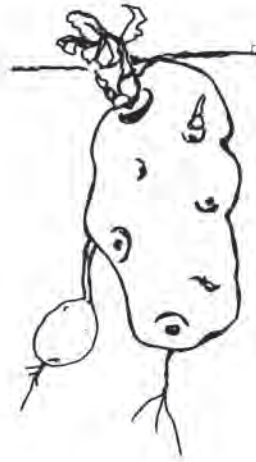
- Have a core
- Are the main support of the plant
- Have side (lateral) roots



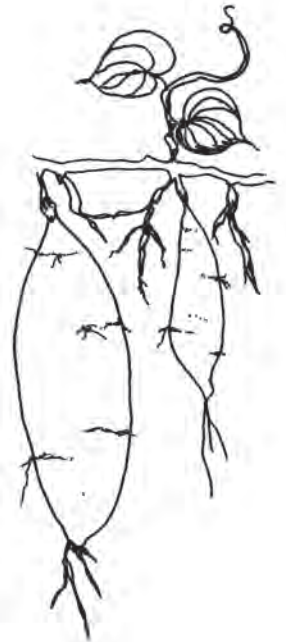
Beet-Tap root

## Tubers

- Are starchy and fleshy
- Are underground storage
- Stem tubers have eyes and are part of the plant stem
- Root tubers are the thick part of a fibrous root



Potato-stem tuber



Sweet Potato-Root tuber

### List plants that are tap roots:

Carrot

Parsnip

Jicama

Radish

Beet

Celery root

Rutabaga

Turnip

### List plants that are tubers:

Potato

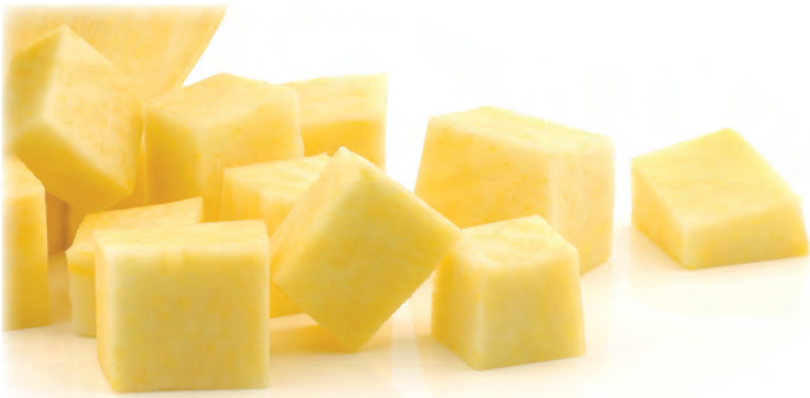
Sweet Potato

Yam

Jerusalem artichoke

Yucca

Casava



## Materials **For each station:**

4-6 varieties of root vegetables or tubers: Daikon radish, garden radish, black or watermelon radish, red beet, golden beet, Chioggia beet, celeriac (celery root), parsnips, yellow, purple or orange carrots, yams, sweet potatoes, potatoes, turnips, rutabaga, Jerusalem artichoke, or jicama  
The answer worksheet on the previous page will provide a reference for the instructor.

Platter or large cutting board for the vegetables

Sheet of paper for each variety

Marker

**Roots or Tubers? Worksheet** for each learner (pg 198)

Pencils

Colored pencils

Journals

## Preparation

- Prepare enough stations so that there are 6-8 learners in each group.
- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized.
- Cut each vegetable in half lengthwise so that the core of the root is visible and lay them out on a platter.
- Label each sample.
- Make sure everyone has washed his/her hands
- Pass out plates and copies of the **Roots or Tubers? Worksheet** (page 209)

## Activity

1. Use the **Roots or Tubers? Worksheet** (page 209) to help students guess which vegetables are roots and which are tubers.
2. Divide the vegetables into two piles, according to which category they decide.
3. Discuss those vegetables that are difficult to decide
4. Have the learners fill out the worksheet according to their decisions.
5. This activity may be followed by the Root Vegetable Tasting (page 105) activity.

## Discussion

Discuss the following topics:

- Is the potato a root or a stem?
- What do these big roots do for the plant?
- What do they do for people?

**Note:** *do not eat sweet potatoes, cassava, taro or yucca raw. They have indigestible or toxic compounds when raw.*

# Root Vegetable Tasting



**Objective** Learners will be able to describe what root vegetables taste like and distinctions between common varieties

**Materials** **For each station:**  
3-4 varieties of root vegetables: Daikon radish, garden radish, black radish, jicama, red beet, golden beet, celeriac (celery root), parsnips, yellow, purple or orange carrots, rutabaga, turnips  
3-4 varieties of tubers: Jerusalem artichokes, potatoes, yams (cooked), or sweet potatoes (cooked)  
Platter or large cutting board for the vegetables  
Sheet of paper for each variety  
Marker  
**Tasting Worksheet** for each learner (page 237)  
**Carrot Worksheet** (page 210) or **Beet Worksheet** (page 212) for each learner  
Pencils  
Colored pencils  
Journals



**Preparation**

- Prepare enough stations so that there are 6-8 learners in each group.
- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized.
- Young learners or short on time—Peel and cut vegetables prior to the tasting. Place each variety in a labeled plastic bag. Make sure to save a whole vegetable to show the class. Older learners or more time available—Have them prepare vegetables into appropriate shapes. Hard, large roots may be precooked whole for easier cutting.
- Label each sample.
- Make sure everyone has washed his/her hands
- Pass out plates and copies of the **Beets** or **Carrots Worksheet** (page 210, 212)

**Activity**

1. Have the learners write in the names of the vegetables they are tasting.
2. Have them try each sample, one at a time.
3. Ask students which flavors they taste (possibilities include: spicy, sweet, earthy, cabbage, nutty, bitter)
4. Make a list of the flavors. Have them decide which vegetable belongs in which flavor group.
5. Make a chart on a large board or flip chart. Have them vote if they like/dislike each vegetable. Mark the favorites.
6. Which is the favorite group of roots? Are they tap roots or tubers? Is there a new vegetable that they like?



## Discussion

Gather back together into one group. Discuss the results of the taste test by using the following questions:

- Which one is the most starchy?
- Which one is the sweetest?
- Which one is the most fibrous (hard to chew)?

**There are several possibilities for further discussion:**

- Read and share *Tops and Bottoms* by Janet Stevens.
- Brainstorm the ways you can cook and eat root vegetables.
- Which vegetables would be better cooked?

## Further Explanation

Explore the flavors of raw versus cooked root vegetables. Select three (e.g. carrots, turnips, jicama) and try them both raw and cooked. Which do the learners prefer?

## From the Garden

Harvest a wide variety of carrots, radishes and beets. Compare garden grown carrots to supermarket carrots.

**Note:** *do not eat sweet potatoes, cassava, taro or yucca raw. They have indigestible or toxic compounds when raw. For the tasting, boil them or roast them whole. Then cut into small pieces to taste.*



# Root Vegetable Curry



## Objective

Learners will be able to make a curry using their favorite root vegetables and will know what a curry dish is.

## Background

In India, a curry is a spiced dish that is either “wet” (in a sauce) or “dry” (without sauce). The original Tamil word, kari, was changed by the British into a dish with a specific combination of spices, that we now call curry powder. This root vegetable curry is a wet curry similar to a stew. Although there are quite a few ingredients, the cooking method is simple. This comforting fall dish can be a satisfying finale to the garden season. If time is short, precook the harder root vegetables whole. Or cut them into smaller pieces so that they will cook more quickly.

## Materials

### For each group of 8 students:

8 cutting boards  
4 peelers  
8 knives  
Mixing bowl for the vegetables  
3 small bowls for the herbs  
1 large bowl for the onions, garlic and ginger

### For the class:

Induction cook top  
Large pot  
Stirring spoon  
Ladle

## Preparation

- Make sure all of the desktops and/or counters are cleared of materials, cleaned, and sanitized.
- Make sure everyone has washed his/her hands.
- To save time, instructor can boil the root vegetables whole ahead of time and the learners can peel them and cut them.
- Remind learners of knife techniques and safety. For more information, see page 46 of the *Slow Food USA Good Curriculum*.
- Review the recipe so that the learners know what to do. Do not have the learners read the recipe while cooking.
- Divide the learners into groups of no more than 8.

## Set-Up

1. Place the vegetables in the middle of the table.
2. Set up the spices and flavorings at one table, and have the learners in that group prepare the flavorings and tear the herbs into small pieces.
3. Set up the induction burner on a separate table with a large pot or wok.

## Eating and Evaluation

Remind class to wait politely to be served before eating.

Show the learners where India is located on a world map. If there are any learners who have made curry before, ask them how it is made in their family.

Talk about the spices in the dish and pass samples around so that everyone can smell them. Which ones seem familiar?

Can the learners taste the individual root vegetables? Which are their favorites? Which taste best with the curry spices?

# Recipe Root Vegetable Curry

## Ingredients

- 4 lbs mixed root vegetables or tubers (parsnip, golden beets, celery root, turnip, carrot, rutabaga, yam, or potato)\*
- 2 cans of chickpeas, drained
- 1" piece of ginger root
- 2 large onions
- 3 cloves garlic
- 3 tablespoons butter
- 1 teaspoon black or brown mustard seeds
- 1 teaspoon fennel seeds
- ¼ to ½ teaspoon cayenne
- ½ teaspoon turmeric
- 1 teaspoon cumin
- 1 teaspoon ground coriander
- 2 teaspoons paprika
- 1 teaspoon ground cardamom
- 1 28-oz can diced tomatoes, or 3 large tomatoes, diced
- 2 cups coconut milk
- 2 cups water
- salt to taste
- ½ cup cilantro, mint, or Thai basil leaves

## Method

1. Peel the vegetables and cut them into 1" cubes or half circles. For hard vegetables, have the instructor cut them in half lengthwise first, so that learners will be cutting flat pieces.
2. Place all of the root vegetables in a large pot, along with 2 cups of water. Simmer while you are preparing the rest of the vegetables.
3. Cut the ends off of the onions and cut them in half. Peel the garlic. Peel the ginger. Dice the onions. Mince the garlic and the ginger.
4. Measure the mustard seeds and fennel seeds and place them in a small bowl. Measure the cayenne, turmeric, ground cumin, ground coriander, paprika, ground cardamom and 1 teaspoon of salt. Place the spices in a small bowl. Remove the fresh herbs from the stems and tear them into small pieces. Place them in a small bowl.
5. If you have two burners, use the second one to prepare the flavorings. If you only have one burner, remove the simmering vegetables while you prepare the flavorings. Fry mustard and fennel seeds in butter until they pop. Add the powdered spice mixture and stir. Then, add the onions, ginger and garlic and sauté until transparent, adding a tablespoon of water from time to time to prevent scorching, about 5 minutes.

Add the onion mixture to the large pot of vegetables and continue simmering. Stir in the diced tomatoes, coconut milk, canned chickpeas and water. Bring the pot to a boil and then reduce the heat. Add salt to taste. Just before serving, stir in the fresh herbs.

**Note:** If you have leftover roots from the tasting, you can use those, but limit the amount of tasting turnips, radishes or rutabagas.



# Planting Potatoes



**Objective** Learners will be able to plant potatoes and explain how to grow them.

**Background** Potatoes are an ancient vegetable, originally domesticated in Peru over 7,000 years ago. Wild potatoes contain toxic alkaloids, especially solanine. Early Andean farmers gradually developed strains of potatoes that had less and less solanine. In Peru, there are over 4,000 varieties of potatoes, each adapted to different microclimates and culinary uses. Potatoes are one of the most productive and versatile crops in the world.

Potatoes are a popular crop for the school garden. They are ready for harvest at the beginning of the school year. In warm season areas, they may also be planted in the winter season as they prefer cool weather. They are easy to plant, need little care and are fun to harvest. Similar to other root vegetable crops, they need a well-drained, fertile soil high in phosphorus. However, they are grown using an unusual technique. The tubers must be protected from the sun, so that they do not become green and develop bitter flavors. After the plants sprout, compost, organic material or soil is mounded around the plant. This hilling technique supports the plant and keeps the potatoes underground.

Potatoes are planted from seed potatoes. Purchase seed potatoes from a local nursery or seed company. Potatoes from the grocery store may have been treated with an agent that inhibits sprouting, so it is best to purchase potatoes that are sold specifically for planting. Each seed potato can be cut so that there are at least two “eyes” on every piece. The potato eyes are the small indentations that sprout if you have ever kept potatoes too long in your kitchen.

**Materials**

- 1 dozen seed potatoes, 4 different varieties
- 2 bags compost or fully composted manure
- 1 bale straw
- 4 six foot metal garden stakes
- 1 hammer
- 4 pieces of 3' x 10' chicken wire
- Signs and markers for different varieties

**Preparations**

- Make round tubes with the chicken wire by joining together the edges. Fold any cut wires over so that they won't be hazardous.
- Loosen six circles of soil, as shown on the root vegetable plot map, page 98.
- Cut the potatoes so that there are at least 2 eyes in each piece.

**Set-Up**

1. Divide learners into 4 groups.
2. Explain the potato planting activity before going outside, or in the outdoor meeting area.



## Activity

1. Give each group one variety of potato.
2. Have the learners place the potatoes in their circle, evenly spaced apart. Bury them lightly with the loosened soil.
3. Place a chicken wire tube around each circle. Pound the stake into the ground, just inside the circle to support it. Tie the chicken wire to the stake.
4. Add compost to the top of each potato mound so that it is 3" deep. Cover with 1" of straw.
5. Water the potatoes thoroughly.
6. After the potatoes have sprouted and are 1' tall (about 6-8 weeks), add more compost around each group of plants, until the compost is gone.
7. As the potatoes grow, add straw so that the leaves and stems are just coming out of the top.
8. Leave the potatoes in the ground until the plants are finished blooming.
9. To harvest, remove the chicken wire and stakes. Have the learners brush aside all of the compost and straw and then dig for potatoes carefully.
10. In order to minimize damage to the potatoes, loosen the soil gently with a spading fork. Then have the learners find them with their hands. Usually the soil is very soft.

**Note:** *Potatoes should be moist but not dripping wet. Allow the soil to dry between waterings. They will need less water than many crops because of the deep mulch.*

## Discussion

Read the book *From Eye to Potato* by Ellen Weiss so that learners can understand what the plant will look like as it is growing.



# Peruvian Causa



## Objective

Learners will be able to make the popular Peruvian dish Causa and season it according to their preferred taste.

## Background

Causa is a Peruvian potato salad that uses mashed starchy potatoes with the addition of lime, salt and oil. It is a healthy alternative to the traditional American mayonnaise based potato salad. It is served as an appetizer with many possible toppings, including tuna, onions, avocado, tomatoes, chiles and shrimp. Usually it is served as a terrine, with mashed potatoes on the bottom and top layers, with filling in the middle.

A special bright yellow potato is used in Peru, but Yukon Gold or Yellow Finn are good substitutes. The word “causa” comes from the Quechua word “kausay,” which means “what nourishes you.” Usually a purée of Aji Amarillo, a spicy yellow pepper, is stirred into the potatoes along with the lime and salt. Gardeners who live in areas with long, hot growing seasons may be interested in growing Aji Amarillo. Seeds are available from [www.tradewindsfruit.com](http://www.tradewindsfruit.com) and [www.reimerseeds.com](http://www.reimerseeds.com).

## Materials

### For each group:

1 12-cup muffin tin  
1 metal tablespoon  
Small mixing bowls for the fillings  
Cutting boards  
Paring knives  
Metal spatula

### For the class:

Induction cook top  
Large pot  
Potato ricer  
Tongs

## Preparation

- Make sure all of the desktops and/or counters are cleared of materials, cleaned, and sanitized.
- Make sure everyone has washed his/her hands.
- To save time, instructor should cook the potatoes before class.
- Remind learners of knife techniques and safety. For more information, see page 46 of the *Slow Food USA Good Curriculum*.
- Review the recipe so that the learners know what to do. Do not have the learners read the recipe while cooking.
- Divide the learners into groups of no more than 8.

## Set-Up

1. Place the vegetables in the middle of the table.
2. Set up the mashed potatoes at one table with the ricer. Have one group make the mashed potatoes.
3. Set up the other tables with the fillings. Have these groups prepare all of the fillings.
4. Set up the induction burner on a separate table with a large pot or flat-bottom wok.

## Eating and Evaluation

Remind class to wait politely to be served before eating.

Show the learners where Peru is located on a world map.

Talk about potatoes in the dish. Have they seen other varieties of potatoes?

Have they noticed any differences between them?



# Recipe Causa

## Ingredients

### For the mashed potatoes:

- 5 pounds Yukon Gold or similar yellow flesh potatoes
- 1 tablespoon yellow aji amarillo (spicy yellow pepper paste that you can find in most Latin grocery stores) or
- ¼ – ½ teaspoon cayenne pepper
- 1½ teaspoons salt
- 3 tablespoons extra virgin olive oil
- Juice of 2-3 limes

### For the filling, choose

#### any of the following:

- Canned tuna, in water or oil
- Red onion, diced
- Capers, drained
- Small cooked salad shrimp
- Hardboiled eggs, chopped
- Avocados, diced
- Green or black olives
- Tomatoes, diced
- Crumbled feta cheese or queso fresco
- 1 pkg defrosted corn or fresh corn kernels
- Grated carrots or beets
- Cilantro leaves, torn
- Spray oil



## Method

### For the Mashed Potatoes:

1. Cook the whole potatoes in water until soft. Drain them. Cut the potatoes in half and then place the cut side down in a ricer. Rice the potatoes and compost the peel.
2. Add lime juice, salt, pepper, yellow aji and oil. Mix well. Adjust seasoning to taste.
3. Set aside for ½ hour to cool.

### For the fillings:

1. All of the fillings should be cut or diced into very small pieces. Tuna and cheese may be crumbled.
2. After the fillings have been prepared, divide them so that each table has an assortment of fillings.

### For the Causa:

1. Spray the muffin tin with oil. Each learner should place about ½" of potatoes in the bottom of a muffin cup.
2. Then everyone can choose their own fillings and place them on top of the mashed potato.
3. Finish with another layer of potato and smash the causa down into the muffin cup with the back of a large tablespoon to seal the potato.
4. Place a clean cutting board over the muffin tin and then turn it over. Tap the top. The causas should now be on the cutting board. Serve each one with the metal spatula. Garnish with more fillings or cilantro if you desire.





# Greens and Peas







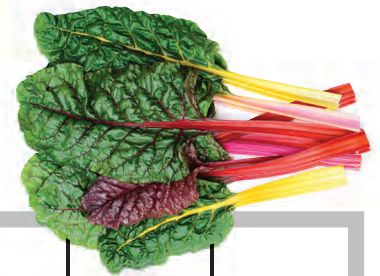
**G**reens may be used raw in salads or cooked in braised dishes and soups. They include lettuces and salad greens, as well as braising or cooking greens. Swiss chard, kale, mustard greens, collards, bok choy, cabbage and endive are all braising greens. They are often more bitter than salad greens and most people prefer them cooked in order to reduce the bitterness. Greens of all types tend to be very hardy and withstand some frost. Grow them with peas and fava beans, as they have similar growing requirements, preferring cooler weather. In warmer climates, consider planting greens and peas in the late fall or winter. Many gardeners plant them under shade cloth if the sun is too intense.

In addition, you can rotate the crops and grow successive plantings of salad greens and peas, planted every 2 weeks. Since peas are in the legume family, they fix nitrogen in the soil. After the first peas have been harvested, plant lettuce in their place. Or, after the first crop of lettuce, replace them with a late summer crop of peas. Pea shoots and fava shoots can also be included in salads. Many greens and related vegetables such as broccoli and kohlrabi grow quickly. For school gardens that are planted in late spring, consider waiting until mid summer to plant greens, so that they will reach their peak as school begins in the fall.

Onions and garlic may be planted in this plot along with the greens, or in the root vegetable plot, depending on how much space is available.

### Botanical Families of Greens

Edible greens may belong to one of many families: the sunflower (Compositae), cabbage (Brassicaceae) or beet (Chenopodiaceae). Plants in the same family share similar flower shapes, leaf shapes or flavors. Lettuce, endive and chicory are all in the sunflower family. They all have a white substance inside the stem, which is why their Latin name means milk. Kale, collards, broccoli, cabbage, arugula, mustard and cress all belong to the cabbage family. Broccoli and kohlrabi can be grown next to the other cabbages, although they will require more space between plants. Encourage learners to compare their flowers, noting the similarities and differences. Beets and Swiss chard belong in the same family along with the common edible weed named "lamb's quarters." All are very nutritious.



Lettuce	Arugula	Kale	Collards	Broccoli	Onions	Peas	Peas
Lettuce	Spinach	Kale	Chard	Cauliflower	Garlic	Fava	Fava

**Cold Season Crops and Greens**



Peas and fava beans both belong to the legume family. All legumes have a unique flower shape that is easily identifiable.

### Soil preparation and fertility

Crops that are grown for their leaves need plenty of nitrogen. They usually require plenty of water and appreciate mulch. Many seeds are quite small, so the soil should be turned over and raked smooth before planting. A good strategy is to alternate planting leafy green crops with legumes, to maintain soil fertility.



### Planting and thinning

Greens, peas and fava beans are best planted directly in the garden at least two weeks before the last frost date. If your garden is small, consider mixing all of the salad greens together and broadcasting them in one or two squares. Sprinkle some compost or soil over the seeds, about ¼" deep, and then pat them down. Sprinkle gently with water and keep moist for 7-10 days, at which time small seedlings should start to appear.

Greens may be harvested up to three times by snipping off the leaves and leaving the main plants. Braising greens may be combined in the same way, although they may need some thinning, as they are larger plants. A braising mix of different kales, chard, and mustard or turnip greens can be harvested and cooked all together.

Plant peas or fava beans in rows, about 2" apart. Read the seed package to determine whether the peas need support or not. Some peas are shorter than 30" and do not need staking. Others can be grown on simple trellises made with bamboo and string. For trellis ideas, see <http://blog.seedsavers.org/blog/which-trellis-is-the-best>, or look in one of the basic vegetable gardening books listed on page 240.

Garlic, onions and leeks can be planted in narrow rows in between varieties of greens. Plant garlic in the fall for early summer harvest. Plant onions and leeks in the fall in areas with mild winters, or very early spring.

### Watering

Greens enjoy overhead watering. Keep moist but not soggy. Peas enjoy regular watering, and fava beans need a little less.

### Harvesting

Greens should be harvested before any flowers develop. Broccoli should be harvested when the buds are tight, no matter the size of the head. Peas and favas may be eaten green or dried. Harvest when the pods are plump for green peas but are not dried out. Dried peas are left on the vine. When the pod is dried, they are ready for harvest.

### More with Peas and Greens

Check out the "Salad Greens Tasting" and "Create a Salad Dressing" from the *Good Curriculum*, pages 9 and 18.

Make the "Create a Spread" with peas or fava beans, page 36.





# Planting Greens and Peas



**Objective** Learners will be able to sow greens and peas outside, and identify various types of greens.

**Background** Greens and peas are the first crops that can be sown outside and are considered very hardy. Use the individual worksheets on pages 216-219 for cultivation tips. Choose a variety of greens so that learners can compare them later in a taste test. Examples of peas to try are sugar snap, Wando English pea for hotter climates and snow peas.

If you are planting onions from seed, plant them outside as soon as the ground can be worked. You may plant onions in the fall as well if you live in an area with warm winters. The cloves of garlic may be planted in the fall, a month before the ground freezes. Garlic will “overwinter” and stay dormant through the cold weather. When the warmth of spring arrives, garlic shoots will be the first signs of a spring garden.

<b>Materials</b>	String to mark squares or plots	2 cauliflower or kohlrabi seedlings
	1 dozen wooden stakes	2 seed packages of peas
	Garden journals	2 seed packages of fava beans
	Pencils	1 package of bunching onion seeds
	2 seed packages of different lettuce varieties	16 garlic cloves (may be planted in the fall)
	3 seed packages of different types of kale and chard	Watering cans
	1 seed package of spinach	Trowels for each student
	1 seed package of arugula	Garden signs for each variety
	2 broccoli seedlings	

## Preparation

- Prepare the beds ahead of time if you are working with younger learners and/or are short on time. Remove any weeds. Turn in 2” of compost/manure blend. The manure will provide extra nitrogen for the greens. Make sure the manure is fully composted. The soil must be soft and easy to work with.
- Water the soil the day before planting.
- Place the stakes in 1½ foot intervals around the plot, following the plot map on page 116. You will be making 1½ foot squares.
- Tie the string to the stakes so that the plot is divided in half lengthwise, and then into 1½ foot squares.
- Place one seed packet in the middle of each square.
- Review how to plant seeds; often learners plant seeds too close together or too deep. Make sure to go over these issues with them before planting.



## Activity

1. Assign one or two learners to each square and demonstrate how to broadcast seeds evenly within their square. For small seeds (lettuce and greens), have them pat the dirt with their fingers and tamp down lightly after broadcasting. For larger seeds (peas) have them press each seed down  $\frac{1}{4}$ " with their fingers. Try to space seeds evenly throughout the plot.
2. Water each square with a watering can that has a gentle spray. After the seedlings have 1 set of true leaves, thin them (after 2-3 weeks). Sometimes young learners dump all of the seeds into one small area. If the seedlings are very crowded, thin them in several sittings and eat them as a special treat. All greens can be eaten at any stage, even as mini or microgreens.
3. If there is not enough space for the entire class to plant at once, have learners take turns planting. Other students can use one of these prompts to work in their journals:
  - What are the instructions for planting a seed?
  - How would you create a seed package including the spacing and planting time?
  - Draw a picture of the kind of seed you planted.
  - Draw a picture of how you think the garden will look later in the summer.
  - Draw your favorite vegetable that we have planted today.

## Further Exploration

Use the gardening books in the Recommended Books on page 240 to get more advice about specific gardening practices or techniques.



# Create Braised Greens



## Objective

Learners will be able to identify the flavors of various greens and be able to create their own recipe according to their flavor preference.

## Background

Leafy green vegetables are one of the most nutritious foods but they are often a challenge to enjoy eating because of their bitter flavor. Learning how to combine salt, sweet and sour to reduce bitterness turns them into a delicious treat.

## Materials

### For the class:

Induction burner  
Flat bottomed wok or frying pan with lid  
Container with 2 cups of water  
Tongs  
1 platter for each station for the cooked greens

### For each station:

1 large bowl for the greens  
1 small bowl for the flavorings (e.g. apple, raisins, carrots, etc)

## Preparation

- Wash the ingredients.
- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized.
- Make sure everyone has washed his/her hands. Divide the class into groups of no more than 8 learners.
- Each table should have a pile of mixed greens along with a selection of flavorings from the list. In order to make the greens taste differently for each group, give each table different sweet ingredients. For example, give one group apples, another carrots, and another raisins.
- Create a separate station for cooking.





- Activity**
1. Remove the stems from the greens by grabbing the leaf with one hand and the stem with the other hand. Pull the stem away from the leaf. Save the chard stems, compost the rest. Roll the leaves up and slice the greens into ½” strips, or tear them into small pieces. Place all of the greens in the large bowl.
  2. Chop any flavoring ingredients such as garlic, apples or carrots. Slice the chard stems into thin pieces. Place all of the chopped ingredients in the small bowl.
  3. One at a time, have a group bring up their small and large bowls. Sauté the chopped flavoring ingredients, along with any chard stems, until they are tender. Add the greens and the water. Cover, and steam for 3-5 minutes, until the greens are slightly wilted.
  4. Remove from heat and add salt and pepper to taste, along with any sour liquid such as lemon juice.

### Eating and Evaluating

Bring all of the bowls of greens up to the front and have the learners taste each dish. Ask them the following questions:

- Which dish is the saltiest?
- Which dish is the sweetest?
- Is there one version that tastes least bitter? Which flavors work best for taking away the bitterness?

### From the Garden

Any garden greens can be used in this recipe including beet and turnip greens. Harvest fennel, rhubarb, beets or carrots to add as flavorings.

## Greens Dishes Around the World

Countries around the world enjoy these greens, especially in the spring or when the rainy season starts, as they are traditionally one of the first fresh foods available.



### USA (southern style)

Collards, mustard greens, kale and turnip greens. They are typically braised with ham hocks and water until the greens are soft and garnished with spicy vinegar.



### Italy

(erbe selvatiche) Arugula, fennel, chard, nettles, asparagus, borage, chicory, dandelion. They are typically blanched and dressed with olive oil, or blanched and sautéed with garlic, anchovies and lemon.



### Greece (horta)

Dandelion, arugula, amaranth, borage or other wild greens. Horta is typically sautéed with currants, pine nuts and olive oil. It is often stuffed into home made filo pastry.



### Mexico (quelites)

Cenizo, purslane (verdulagas), wild amaranth, lambs quarters. Quelites are sautéed with onion, garlic and tomato.



### China (ye cai)

Purslane or pigweed, dandelion, shepherd's purse, pig's thigh, field sow's thistle, ferns, daisy Ye cai is usually prepared boiled, chilled and then tossed with sesame oil and vinegar. They can also be added to stuffings or vegetable soup.





# Create Braised Greens

Use the Braised Greens equation and chart to create tasty braised greens. Choose a variety of ingredients from each category. Learners may enjoy structuring the activity as a friendly competition between groups.

## Braised Greens =

**Bitter** + **Fat** + **Salty** + **Sweet** + **Sour**

Kale  
Swiss Chard  
Spinach  
Dandelion Greens  
Escarole  
Mustard Greens  
Turnip Greens  
Collards  
Bok Choy

Olive Oil  
Butter  
Sesame Oil  
Peanut Oil  
Bacon  
Pancetta  
Pine Nuts  
Walnuts

Salt  
Salted Sunflower  
Seeds  
Salted Pumpkin  
Seeds  
Soy Sauce  
Anchovies

Apples  
Beets, grated  
Pears  
Fennel  
Raisins  
Currants  
Mango  
Carrots, grated  
Orange Juice  
Onion  
Garlic

Rhubarb  
Lemon Juice  
Grapefruit Juice  
Cider Vinegar  
Balsamic Vinegar  
Rice Vinegar  
Tomatoes  
(also sweet)  
Sorrel



# Celery Light and Dark



## Objective

Learners will use the agricultural technique of blanching celery to observe the effect of sunlight on the presence of chlorophyll.

## Background

Humans have devised many techniques to change wild plants to suit our tastes, reducing bitterness and increasing sweetness. One technique reduces bitterness and increases tenderness by depriving the plants of light before harvesting. This technique, known as blanching, is traditionally used with white asparagus, celery, cardoons, chicory, rhubarb and cabbage. The word “blanch” comes from the French word for “white.” The agricultural use is different than the culinary technique, which means to boil briefly and then chill.

Bitter or fibrous vegetables such as asparagus, celery, Belgian endive, cardoons, leeks and cauliflower are often blanched by blocking out sunlight to produce a sweeter, milder flavor. Blocking out the sun while the plant is still growing reduces the color by reducing chlorophyll production and increases tenderness, making the vegetables white or pale green. This process is called etiolation. In the natural environment, it occurs when shaded plants reach for the light, and cells become longer and leaves turn pale.

Try blanching celery for a few weeks before harvest in order to observe the affect of blocking sunlight from plants. Use this exercise as part of a series of lessons about photosynthesis.

## Materials

8 celery plants  
6 paper bags  
Twine

## Preparation

- If you plan to grow the celery from seed, start it inside 10 weeks before planting outside. In mild winter climates, plant celery in the autumn, as it prefers cool weather. Celery can be transplanted outside two weeks before the last frost date.
- Allow the celery to grow until 2 weeks before you plan to harvest.

## Activity

1. Measure the height of the celery stalks.
2. Cut the paper bags so that you have strips that are as wide as the height of the stalks.
3. Wrap the strips around four of the celery plants, making sure that the leaves at the top of the plant still have access to sunlight. Tie twine around the bags, holding them in place.
4. Wait for two weeks.
5. Unwrap the plants and compare the appearance of the stalks.
6. Taste the both the covered and uncovered celery. How does the blanched celery differ from the unblanched celery?

## Discussion

- Read the book *Living Sunlight: How Plants Bring the Earth to Life* by Molly Bang & Penny Chisholm for more explanations of photosynthesis.
- Why did the celery become pale when it was covered with the bag?
- How did it change the texture and flavor of the celery?
- Which do you prefer, the blanched or unblanched celery?
- Are there other vegetables that you think has a flavor that is too strong? Experiment with blanching them, and see if you like them better when they are blanched.
- What is the difference between the cooking technique “blanching” and the agricultural blanching technique?





# Nightshade and Legumes

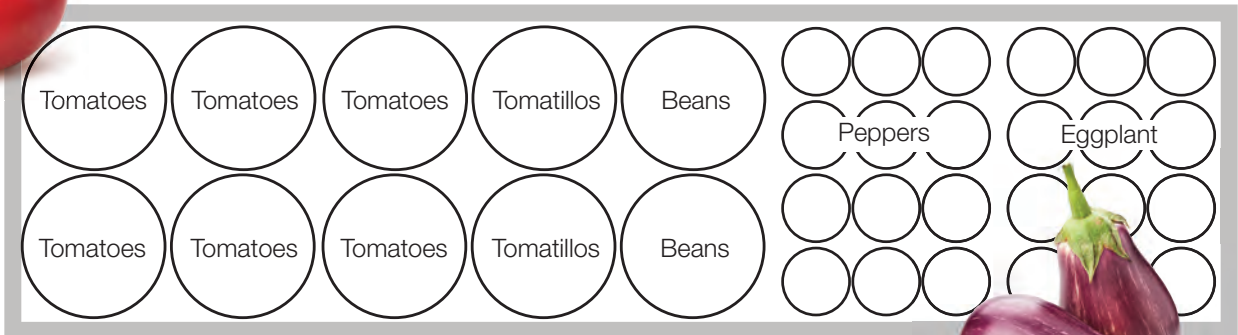




This plot consists of plants in which the edible part is the fruit. Nightshades include tomatoes, chili and bell peppers, eggplant and tomatillos. Potatoes are also part of the nightshade family, but they are best grown with the root vegetables or on their own. Pole beans, bush beans, black-eyed peas, lentils and chickpeas are good companions to the nightshades. They have similar cultivation requirements, similar scale and may require more growing days until maturity. Make sure to choose varieties that grow well in your climate. For short season, northern climates, choose varieties with small fruits and less than 90 days until maturity. Varieties that need 100-120 days to mature are heat tolerant and grown in southern climates.

In addition, we recommend that you rotate the crops and grow successive plantings of the nightshades and bush beans or pole beans. Since beans are in the legume family, they fix nitrogen in the soil. Ensure a continuous supply of beans by planting a few rows every two weeks up until two months before the average first frost date.

If you would like to grow pulses such as black beans, cranberry beans or other long season climbing beans, consider growing them with the squashes either on trellises or with corn for the support.



**Nightshade and Legumes**



### Botanical Families

Nightshades, members of the *Solanaceae* family, are world travelers. Eggplant's origin is northeast India, Burma and throughout Southeast Asia, where it still continues to grow wild. It was known in Persia 1,200 years ago and spread to Europe with the Muslim expansion, and then to the Americas through the Spanish. Tomatoes, peppers (chiles), tomatillos and potatoes traveled in the opposite direction. They are native to Central and South America and were introduced to Europe as part of the Columbian Exchange. Plant a plot of nightshades and you can trace world trade routes and conquest for the past 1,000 years.

Beans and legumes are staples in all areas of the world except the most northern climates. In combination with grains, they provide complete proteins to areas where meat is scarce. In addition, they are high in fiber and B vitamins. All green beans, kidney beans, pinto beans and navy type beans are native to the Americas, and are members of the *phaseolus vulgaris* species. The Mediterranean is home to lentils (*lens culinaris*), peas (*pisum sativum*), fava beans (*vicia faba*), chickpeas (*cicer arietinum*) and lupini. Chickpeas, also known as garbanzo beans, were first domesticated in southern Turkey 11,000 years ago.



### Soil preparation and fertility

Nightshades prefer fertile, loamy soil that has been amended with compost. Legumes grow well in similar conditions.

### Planting and thinning

Beans are considered tender annuals, while nightshades are considered very tender annuals. Beans may be planted any time after the average last frost date, or when the soil has warmed up to 55°F. Nightshades should be planted two weeks later, as they cannot survive or thrive in weather where the nights are lower than 55°F. Use starts to grow eggplant, tomatoes, peppers and tomatillos in short season climates. Plant leggy or sprawling tomatoes sideways, leaving only 2 sets of leaves above the soil. The stem will sprout new roots to support a more vigorous mature plant. Beans and other legumes grow well when planted by seed, typically 2"-4" apart. Plant beans in succession of weeks to ensure continuous supply of beans.

Many of these plants need trellises or staking in order to thrive. Refer to **Stakes and Trellises** on the following page for ideas. Tomato cages are not the best solution, as they are usually too small for the mature plant.

### Watering

Tomatoes require consistent water or they may develop blossom end rot. Plants grow better watered deeply fewer times per week. Mulch in a circle around the plant, leaving the stem uncovered to ensure even moisture. Water roots as opposed to leaves.

### Harvesting

All of the edible parts in this plot are fruit. They will mature later than the greens, roots and stem vegetables. Encourage learners to note the stage of maturity of the fruit as the harvest season approaches. Green beans are harvested when the fruit is immature, while dried beans, tomatoes, eggplant and tomatillos are harvested when fully mature. All peppers turn red, yellow or orange when they are mature. Green peppers are immature colored peppers.

Fruits should be plump and firm when harvesting beans and green peppers. Fully mature tomatoes and tomatillos will give a bit when gently pressed.

### More with Nightshades and Legumes

Check out the "Tomato Tasting" and "Create a Salsa" from the *Good Curriculum*, pages 11 and 23.

Make the "Romesco Sauce" with fresh green beans, page 90 or the Pasta Sauce, page 107 from the *Good Curriculum*.

Make the "Create a One Pot Meal" page 171.



# Stakes and Trellises

## Materials

### For the stakes:

Bamboo, wooden stakes, plastic coated steel stakes, u-channel posts, trimmed tree branches, PVC pipes and connectors.

### For the supports:

Twine, plastic netting, chicken wire, hardware cloth, 2" steel mesh, wooden trellis, plastic safety fencing

## Shapes

- Triangle or tipi <http://themicrogardener.com/how-to-make-bamboo-tepee/>
- Round wire mesh <http://www.motherearthnews.com/organic-gardening/using-wire-mesh-in-the-garden-zmaz02jjzgoe.aspx>
- Shed <http://www.gardeners.com/buy/cucumber-trellis/36-558.html>
- Arches
- Trellis panels
- Ladders
- Quadripod—Triangle with cross supports  
<https://www.garden.org/ediblelandscaping/?page=201105-trellising-tomatoes>
- Florida weave <https://www.youtube.com/watch?v=XSf3aSj46jo>





# Planting Nightshades and Legumes



## Objective

Learners will be able to sow seeds outside and list some of the vegetables that must be planted after last frost.

## Background

Nightshades and beans are both considered warm season crops. They must be planted after all danger of frost between May and the beginning of June in most growing areas. Use the [Plant Cultivation Chart](#) on page 18 to help you decide what to plant. Use the individual worksheets for cultivation tips. If possible, plant transplants on a cloudy day to minimize sun damage.

Before going outside, review the seeds that you are going to plant in this session. Consider using seedlings for the tomatoes, peppers, tomatillos and eggplant if you live in a short season climate. If you are using seedlings (as opposed to seeds), make sure they have been hardened off for ten days before the planting date. Hardening off means getting plants used to being outside by gradually exposing them to more sun over a length of time. Have the learners look at the seed packages to see how far apart to plant the seeds. Discuss how large each plant will grow. Create a plan of what you are going to do when you are outside. Review your garden safety rules.

Choose which seeds to plant according to age group. Young learners do better with larger seeds that they can hold. Older learners can manipulate smaller seeds better and are better at spacing. If you have started warm season plants in the classroom, you can also transplant them at this time.



## Materials

Seedlings, if using	Seed packages
String to mark squares or plots	Watering cans
Stakes	Trowels
Garden journals	Garden signs for each variety
Pencils	

## Preparation

- If you have seedlings, make sure they are hardened off for 10 days before planting. Gradually introduce them to sun exposure and night time temperatures over a 10 day period.
- Prepare the beds ahead of time if you are working with younger learners and/or are short on time. Remove any weeds. The soil must be soft and easy to work with.
- Set up each plot according to the plan, creating furrows for the beans spaced according to the needs of each plant.
- For younger learners, dig the holes for the transplants before they come out to the garden.
- Review how to plant seeds; often learners plant seeds too close together or too deep. Make sure to go over these issues with them before planting.
- Create plant identification signs ahead of time so that learners will know where to put each type of plant.



## Set Up **Planting options:**

1. Use the string and stakes to mark one square for each variety of plant. Refer to the map of this plot.
2. Place a sign or seed pack in front of each place where the various types of plants will be planted.
3. When transplanting seedlings, have the learners dig a hole that is twice as wide as their root ball. Refer to your planing chart, or the seed packet for the optimum spacing. Tip the seedling into the palm of the hand, allowing the stem to hang down between the index and middle fingers. Gently turn the plant right side up to plant. Do not pull the plant out by the stem as it might break. If the roots are crowded and are growing around in a circle, loosen them before planting in order to encourage new root growth.
4. Tomatoes will be stronger if they are buried, leaving 2-3 sets of leaves showing. The stem will become part of the root system and reduce the occurrence of sprawling plants.

## Activity **Have learners take turns planting. Other students can use these prompts to work in their journals:**

1. What are the steps for planting a seed?
2. How would you create a seed package, including the spacing, planting time, and harvest time of the seeds that you have planted today?
3. Draw a picture of the kind of seed you planted.
4. Draw a picture of how you think the garden will look later in the summer.
5. Draw your favorite vegetable that we have planted today.

Use the gardening books in the Recommended Books on page 240 to get more advice about specific gardening practices or techniques.



## Discussion **Discuss what the plant needs to thrive. How will the learners be able to tell if the plant needs water?**

What will we have to do to encourage plant growth throughout the growing season?

# Pasta Salad



**Objective** Learners will be able to create a pasta salad and identify common vegetables in the nightshade and legume families.

**Background** First time gardeners have difficulty imagining the eventual result of their work. Use this pasta salad to introduce learners to the nightshades and legumes that you are planting.

If you are combining this with the outdoor planting activity, make the salad first. If you have an herb garden, harvest some fresh herbs to add to the salad dressing. Let the salad marinate while you go outside and plant. Eat the salad for a snack when you return.

If you do not have access to a cooktop to boil the pasta, you can use couscous instead of pasta. Simply soak the couscous in warm water, at a ratio of 2 cups of water for 1 cup of couscous, for 20 minutes while you are preparing the rest of the ingredients. For a gluten free option, use canned beans (e.g. garbanzos, black beans) instead of pasta.

## Materials

### For each table:

1 large salad bowl  
1 small bowl for the dressing  
1 bowl with 2 cups precooked pasta (fusilli, bow ties, or penne)  
Forks to mix dressing  
2 peelers  
Serving spoons  
1 platter or tray for ingredients  
Knives  
Cutting boards

### For each student:

Salad plate  
Fork

## Preparation

- Wash all of the herbs and vegetables.
- Make sure everyone has washed his/her hands.
- Divide the class into groups of no more than 8 learners.
- Remind learners of knife techniques and safety. For more information, see page 46 of the *Slow Food USA Good Curriculum*.
- Review the recipe so learners know what to do. Do not have learners read the recipe while cooking.

## Set Up

Each group will make their own bowl of pasta salad. Each table should have a selection of the vegetables and bowl to mix the dressing. Each table should have an adult to help demonstrate how to cut each vegetable. Leave one example of each kind of vegetable in front of the class, displayed on a tray or platter.

**Discussion** After eating, see if the learners can name the vegetables in the salad.

**Answer the following questions:**

- Which vegetables have they tried before?
- Which vegetables are their favorites?
- Which vegetables should be planted in the garden?

**From the Garden** Use fresh herbs from the garden to add flavor.



# Recipe Pasta Salad

## Ingredients

- 1 red tomato
- 1 orange or yellow tomato
- 1 tomatillo
- 1 bell pepper
- 1 jalapeño pepper (optional)
- 1 Anaheim or poblano pepper
- 1 clove garlic
- 1 16 oz. can kidney or chickpeas (garbanzo beans)
- 2 cups cooked pasta (penne, fusilli, bowties, or orecchiette)\*

### For the dressing:

- ¼ cup vinegar or lemon juice
- ½ cup olive oil
- ½ teaspoon salt
- ¼ cup fresh parsley, basil, dill or mint (optional)

## Method

1. Prepare the vegetables. All of them should be in small pieces or diced. Peel the cucumber, cut in half lengthwise and scoop out the seeds for a better flavor. Make sure the garlic and jalapeño pepper are minced. You can remove the seeds from the jalapeño if you want it less spicy.
2. Toss the vegetables and pasta together in a large bowl.
3. Mix together the ingredients for the salad dressing in a separate bowl. Taste it to see if the learners want to adjust any of the flavors. Pour over the salad and let it sit for at least 5 minutes before serving.

\*If you do not have a way to cook the pasta, use couscous or bulgur wheat instead and soak it for 30 minutes in warm water before class.

**Note:** You can use more or less of any warm season vegetable. The amounts and types above are just suggestions. Other options are adding cooked corn kernels, olives, capers, or feta cheese.





# Where in the World is My Dinner?



**Objective** Learners will be able to distinguish which foods in their favorite dishes came from the Americas and which came from the Old World.

**Background** The Columbian Exchange refers to cultural and biological exchanges between the Americas and Europe. Agriculture and food were changed forever after Europeans came to the Americas. Many dishes we consider traditional were created after the Columbian Exchange in the 1500s. For example, there were no tomatoes in Italy to create red sauce and no corn to make polenta. In Mexico, there was no cheese to eat with quesadillas and no rice to eat with beans. In this exercise, learners will choose a few common modern dishes and imagine an alternative that could exist before the Columbian Exchange.

Many European countries had colonies in or traded with countries in Africa, China, India and Southeast Asia. Europeans also brought these foods to the Americas, often as part of the same system that traded slaves. For more information about the causes and effects of the Columbian Exchange, read *1493: Uncovering the New World Columbus Created* by Charles C. Mann or *Why We Eat What We Eat: How the Encounter Between the New World and Old Changed the Way Everyone on the Planet Eats* by Raymond Sokolov.



**Materials** **For each table:**  
Pencil  
Garden Journals  
1 set of **Brought to the Americas** and **From the Americas cards**, page 136-143.

**Set Up**

1. Divide the class into groups of 6
2. Discuss as a class some of the meals that the students ate last night.
3. Use one of the meals as an example for the exercise.

**Activity** **Ask this question of each group:**

1. "Name one dish you ate for dinner last night and write it down."
2. Have each group choose one of the dishes to use in the activity.

3. Write down the main ingredients in the chosen dish. Learners can use their phones or computers to look up the ingredients if they do not know them.
4. Which ingredients came from the Americas? Which ingredients came from Europe?
5. Choose cards that represent ingredients that are in the chosen dish.
6. Are all of your ingredients from one of the continents?
7. Now, choose either the orange or green cards (**Brought to the Americas** or **From the Americas**). Choose ingredients from the cards to change your dish so that all of the ingredients come from one of the groups.
8. Make up a new name for your recipe.

## Discussion

Gather the group back together and discuss the new recipes. Would they taste very different?

What would your diet look like if you lived in the Americas before the Columbian Exchange?

Which do you think is more important in the flavor of a dish: the main ingredients, the herbs and spices or the cooking method?

# Where in the World is My Dinner? Activity Cards

BROUGHT TO THE AMERICAS

**Almonds**

BROUGHT TO THE AMERICAS

**Bananas**  
(SOUTHEAST ASIA)

BROUGHT TO THE AMERICAS

**Barley**

BROUGHT TO THE AMERICAS

**Basil**

BROUGHT TO THE AMERICAS

**Broccoli**

BROUGHT TO THE AMERICAS

**Cabbage**

BROUGHT TO THE AMERICAS

**Cheese**

BROUGHT TO THE AMERICAS

**Chickens**

# Where in the World is My Dinner? Activity Cards

BROUGHT TO THE AMERICAS

**Chickpeas**

BROUGHT TO THE AMERICAS

**Cilantro**  
(SOUTHEAST ASIA)

BROUGHT TO THE AMERICAS

**Coffee**  
(AFRICA)

BROUGHT TO THE AMERICAS

**Cows**

BROUGHT TO THE AMERICAS

**Dandelions**

BROUGHT TO THE AMERICAS

**Eggplant**

BROUGHT TO THE AMERICAS

**Garlic**

BROUGHT TO THE AMERICAS

**Goats**



## Where in the World is My Dinner? Activity Cards

BROUGHT TO THE AMERICAS

**Lemons**

(CHINA)

BROUGHT TO THE AMERICAS

**Lentils**

BROUGHT TO THE AMERICAS

**Lettuce**

BROUGHT TO THE AMERICAS

**Milk**

BROUGHT TO THE AMERICAS

**Oats**

BROUGHT TO THE AMERICAS

**Olives**

BROUGHT TO THE AMERICAS

**Onions**

BROUGHT TO THE AMERICAS

**Oranges**

# Where in the World is My Dinner? Activity Cards

BROUGHT TO THE AMERICAS

**Parsley**

(CHINA)

BROUGHT TO THE AMERICAS

**Peaches**

BROUGHT TO THE AMERICAS

**Pears**

BROUGHT TO THE AMERICAS

**Pigs**

BROUGHT TO THE AMERICAS

**Rice**

BROUGHT TO THE AMERICAS

**Rye**

BROUGHT TO THE AMERICAS

**Sheep**

BROUGHT TO THE AMERICAS

**Sugarcane**

# Where in the World is My Dinner? Activity Cards

BROUGHT TO THE AMERICAS

**Turnips**

BROUGHT TO THE AMERICAS

**Walnuts**

BROUGHT TO THE AMERICAS

**Wheat**

FROM THE AMERICAS

**Allspice**

FROM THE AMERICAS

**Amaranth**

FROM THE AMERICAS

**Avocados**

FROM THE AMERICAS

**Beans**

(GREEN, KIDNEY, NAVY, LIMA, PINTO)

FROM THE AMERICAS

**Bell peppers**

# Where in the World is My Dinner? Activity Cards

FROM THE AMERICAS

**Blackberries**

FROM THE AMERICAS

**Cacao**

(FOR CHOCOLATE)

FROM THE AMERICAS

**Chile peppers**

FROM THE AMERICAS

**Corn**

FROM THE AMERICAS

**Cotton**

FROM THE AMERICAS

**Jerusalem  
Artichokes**

FROM THE AMERICAS

**Papayas**

FROM THE AMERICAS

**Peanuts**



# Where in the World is My Dinner? Activity Cards

FROM THE AMERICAS

**Pineapples**

FROM THE AMERICAS

**Pine nuts**

FROM THE AMERICAS

**Potatoes**

FROM THE AMERICAS

**Pumpkins**

FROM THE AMERICAS

**Quinoa**

FROM THE AMERICAS

**Squashes**

FROM THE AMERICAS

**Sunflowers**

FROM THE AMERICAS

**Sweet  
potatoes**

# Where in the World is My Dinner? Activity Cards

FROM THE AMERICAS

**Tomatoes**

FROM THE AMERICAS

**Tomatillos**

FROM THE AMERICAS

**Turkeys**

FROM THE AMERICAS

**Vanilla**



# Melons and Cucumbers





Cucumbers are one of the easiest crops to grow in the school garden. They can be grown on the ground in trenches or mounds, or they can be grown on a low, slanted trellis in order to keep the fruit from touching the ground. Some cucumber varieties are good climbers and will climb a vertical trellis. Choose a wide variety of cucumbers, so that learners can try types they have never seen.

Melons require warm evenings and long seasons to ripen. In short season climates, choose smaller varieties of muskmelons and watermelons, planting them near a wall or the hottest area of the garden, in an area with plenty of space. Fresh melons are delicious, but they may be a disappointing crop unless the climate is optimal. Often one or two vines will overrun a plot and the harvest might only be 1-2 underripe melons.

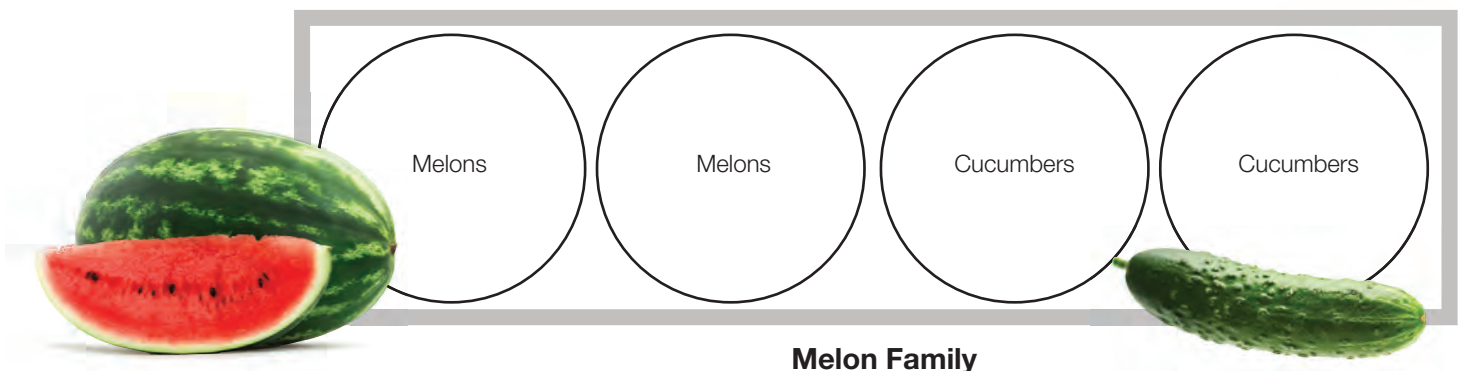
### Botanical Families

Both melons and cucumbers are members of the gourd (Cucurbitaceae) family. Cucumbers originated in Southeast Asia, but have been grown throughout the Mediterranean for at least 3,000 years. Romans loved cucumbers and grew them all year long. Melons originated in Southwest Asia and Africa. There are several melon families— the largest is the muskmelon or cantaloupe (c. melo). Some cucumbers, such as the Armenian cucumber, are actually melons. They have a denser flesh and are more drought tolerant.



### Soil preparation and fertility

Cucumbers are one of the easiest vegetables to grow. However, for the best flavor, they need rich soil with plenty of nitrogen and organic matter. They may turn bitter if the soil dries out during the fruiting stage.



### **Planting and thinning**

Plant seeds directly in the ground, either in circular mounds or wide trenches. In short season climates, consider starting seeds indoors 2-3 weeks before planting outdoors. If your climate is dry, plant them at the bottom of a furrow or bowl in order to capture water and mulch lightly with straw. You can also plant them at the bottom of a slanted trellis, allowing the vines to climb the trellis. The trellis will keep the fruit from touching the ground. For heavier melons, you may have to cradle the fruit with a cloth tied to the trellis to prevent them from falling to the ground.

### **Watering**

Water cucumbers deeply several times a week. Do not sprinkle water on the leaves, but focus the water near the roots of the plant. Overhead watering may encourage the spread of powdery mildew.

### **Harvesting**

Cucumbers are ready for harvest when they are plump and firm. To save the seeds, leave the cucumbers on the vine until the skin hardens, and they turn a bit yellow. Otherwise, the seeds will not be fully mature. To harvest melons, allow the connecting vine to dry wither. Musk melons will have a strong scent when ripe and give to the touch on the top where they are connected to the vine.

### **More with Cucumbers and Melons**

Check out the “Cucumber Tasting” from the *Good Curriculum*, page 7.



# Planting Melons and Cucumbers



**Objective** Learners will be able to sow seeds outside and list varieties of melons and cucumbers.

**Background** Cucumbers and melons are both considered warm season crops. They must be planted after all danger of frost between May and the beginning of June in most growing areas. Use the Plant Cultivation Chart on page 18 to help you decide what to plant. Use the individual worksheets for cultivation tips. You may start melons inside if you live in a short season climate. However, they quickly become leggy and unruly, so start them just 2-3 weeks before planting outside.

Before going outside, discuss the seeds that you are going to plant in this session. Have the learners look at the seed packages to see how far apart to plant the seeds. Discuss how large each plant will grow. Create a plan of what you are going to do when you are outside. Review your garden safety rules.

Choose which seeds to plant according to age group. Young learners do better with larger seeds that they can hold. Older learners can manipulate smaller seeds more easily and are better at spacing. If you have started warm season plants in the classroom, you can also transplant them at this time.

<b>Materials</b>	Seedlings, if using	Watering cans
	Garden journals	Trowels
	Pencils	Garden signs for each variety
	Seed packages	

- Preparation**
- If you have seedlings, make sure they are hardened off a 10 days before planting. To harden off young seedlings, gradually introduce them to sun exposure and night time temperatures over a period of ten days.
  - Prepare the beds ahead of time if you are working with younger learners and/or are short on time. The soil must be soft and easy to work with. Make each plot no wider than 3'–4' so that learners can reach the middle from each side of the plot.
  - Set up each plot according to the plan of four mounds, each the diameter of the plot. Two mounds will be for the melons and two for the cucumbers. If you live in an area with low rainfall, make the mounds into bowls, with a deep depression in the middle. This depression will hold water, keeping the plants evenly moist. If you live in an area with high rainfall, plant the seeds at the top of a mound that is flat, like a mesa. The excess water will drain, keeping the roots from being waterlogged.
  - Review how to plant seeds; often learners plant seeds too close together or too deep. Make sure to go over these issues with them before planting.
  - Create plant identification signs ahead of time so that learners will know where to put each type of plant.

**Set Up** Place a sign or seed pack in front of each place where the various types of plants will be planted. You may plant 2-3 varieties in each mound.

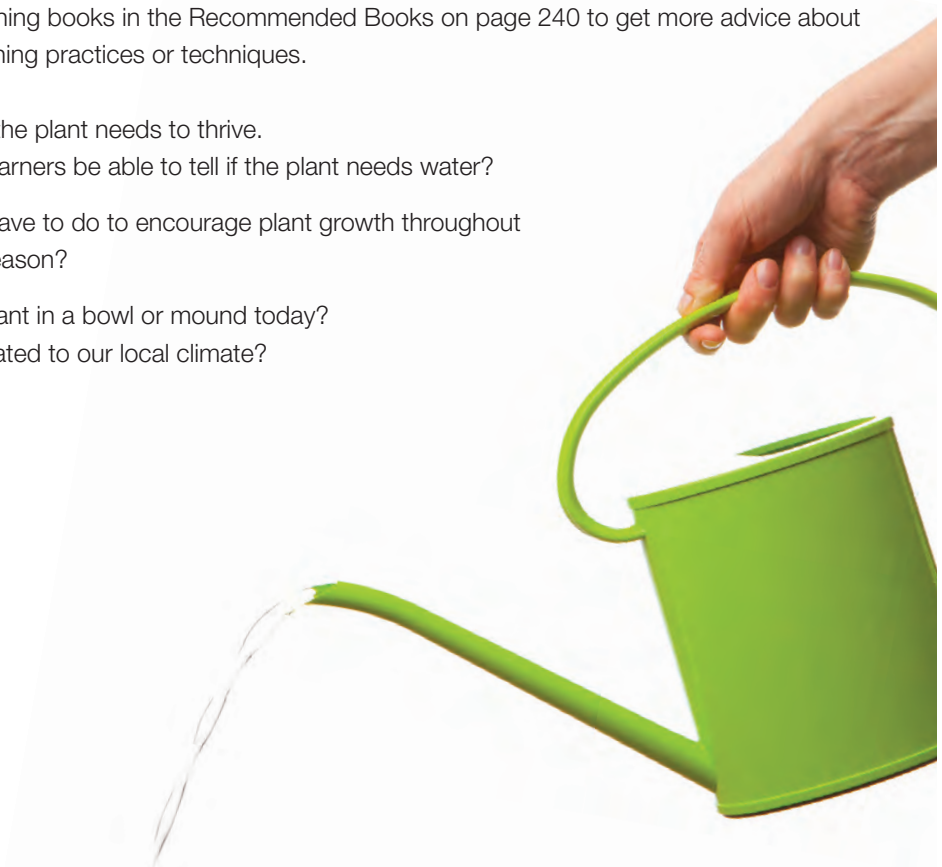
- Activity**
1. When transplanting seedlings, have the learners dig a hole that is twice as wide as their rootballs. Space the seedlings apart according to the seed packet, or your planning chart. Tip the seedling into the palm of the hand, allowing the stem to hang down between the index and middle fingers. Gently turn the plant right side up to plant. Do not pull the plant out by the stem as it might break.
  2. Plant the seeds around in a circle, following the inside edges of the mound. Space the seeds according to instructions on the seed packet. You will need 8-12 seeds total for each mound.

**Have learners take turns planting. Other students can use these prompts to work in their journals:**

- What are the instructions for planting a seed?
- How would you create a seed package including the spacing and planting time and harvest time of the seeds that you have planted today?
- Draw a picture of the kind of seed you planted.
- Draw a picture of how you think the garden will look later in the summer.
- Draw your favorite vegetable that we have planted today.

Use the gardening books in the Recommended Books on page 240 to get more advice about specific gardening practices or techniques.

**Discussion** Discuss what the plant needs to thrive.  
How will the learners be able to tell if the plant needs water?  
What will we have to do to encourage plant growth throughout the growing season?  
Why did we plant in a bowl or mound today?  
How is this related to our local climate?





# Melon Tasting



**Objective** Learners will be able to explain how melons grow, how to harvest them, what they taste and smell like, and list differences between varieties.

**Background** Melons provide an opportunity to explore the role of aroma in food. While the predominant taste of a melon is sweet, their full flavor can only be appreciated through smelling their perfume. It is important to use fully ripe, preferably local, melons for this activity. Your local farmers' market is the best source to purchase these melons.

**Materials** **For each station:**  
Variety of melons  
Plate for each student  
Bowl or platter for each variety of melon  
Sheet of paper for each variety  
Marker  
**Tasting Worksheet** (page 237) for each student  
**Melon Worksheet** (page 224) for each student  
Pencils  
Colored pencils



**Preparation** **Young learners** or short on time—

- Cut melons from the rind, and into small pieces prior to the tasting.
- Place each variety in a labeled plastic bag.
- Make sure to save one whole melon of each kind to show them.

**Older learners** or more time available—

- Have them prepare melons into bite sized shapes.
- Prepare enough stations so that there are 6-8 learners in each group.
- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized.
- Make sure each table has one container of each type of melon. Label each sample.
- Make sure everyone has washed his/her hands.
- Pass out plates and copies of the **Tasting Worksheet** (page 237).

**Activity**

1. Have the learners write the name of the variety they are tasting on the **Tasting Worksheet**.
2. After they taste a sample, have them indicate their response on the tasting sheet.
3. **For each type sample, ask these questions:**
  - What color is it?
  - Is it soft or firm?
  - Describe the smell. Does it smell like something else that you know?
  - Have the learners try a piece with their nose pinched closed so they cannot smell. Does the melon taste different?

## Discussion

Gather back together into one group. Discuss the results of the taste test.

### **There are several possibilities for discussion:**

Make a chart of the varieties you tasted. Have everyone vote on which variety smells the best, which is the sweetest, and which they like the best.

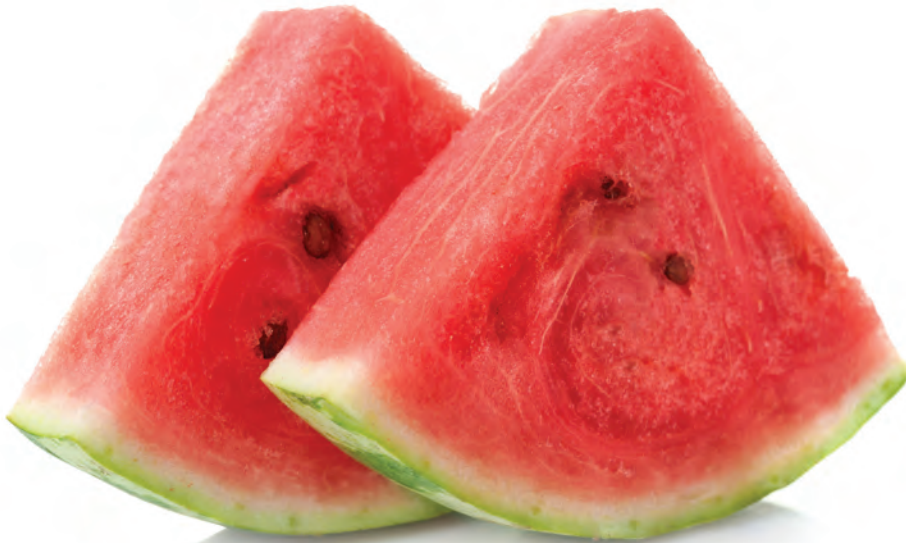
Brainstorm words that describe flavors that the learners experienced.

Circle the words that are actually smells as opposed to tastes.

What is their favorite food? How does it smell?

Read and share *Anansi and the Talking Melon* by Eric A. Kimmel.

See the Recommended Books on page 240.



# Melon Mint Salad



**Objective** Learners will enjoy different flavors of melons and eat them in a simple salad.

**Background** This salad uses orange blossom water and mint to enhance the aroma of fresh melons. Floral aromatic flavors are unusual in American cuisine but common in the Middle East, India and Southeast Asia. Introduce learners to this type of flavor with this delicious salad. Cutting melons can be challenging. For young learners, demonstrate how to peel the melons and then give them quarters to cut up themselves. Use butter knives or salad knives for those with small hands, as the melons can be slippery. Those in 4th grade and up can try cutting the peels off of the melons under the supervision of the instructor.

**Materials** **For each table:**  
1 large bowl  
1 small bowl for seeds

**Preparation**

- Make sure all of the desktops and/or counters are cleared of materials, cleaned, and sanitized.
- Wash all of the ingredients. Be sure to wash the outside of the melons as there may be bacteria on the peels.
- Make sure everyone has washed his/her hands.
- Review the recipe so learners know what to do. Do not have learners read the recipe while cooking.

**Set Up**

1. Divide the learners so that they are in groups no larger than 8, with one adult per table.
2. For large, hard to cut vegetables, cut them in half or in quarters unless the learners are older than age 10.
3. Make sure that each learner has a chopping board and they are spaced apart from one another.
4. Pass out the knives when the learners are quiet and paying attention to the instructor.



**From the Garden** Choose a variety of melons, especially those that have a strong aroma, such as Galia or Charentais. Use fresh mint from the garden. Try basil as a substitute for mint. Use lavender blossoms as a substitute for orange blossom water.

# Recipe Melon Mint Salad

## Ingredients

4 melons, any variety  
½ cup mint leaves  
2 teaspoons orange flower water\* or 1 teaspoon grated orange rind and juice of 1 orange  
2 tablespoons honey

## Method

- 1.** Cut the top and bottom of each melon. Place the melon so that it is sitting on one of the cut ends. Cut the rind off of the melon, slicing from the top to the bottom of the melon, following the contour of the fruit. After the rind has been removed, cut the melon in half and scoop out the seeds. Cut it into quarters and give each table one quarter.
- 2.** Cut the melon into wedges, and then cut each wedge into bite-sized pieces. Cut the mint leaves into thin strips.
- 3.** Toss the melons together with the mint leaves, orange flower water and honey.

\*Note: Orange flower water can be found in Middle Eastern grocery stores, or in natural foods stores. It is used in North African and Mediterranean cooking.





# What Kind of Fruit?



Learners will be able to identify various types of fruits and describe their differences.

We think of fruit as a sweet container for seeds of a plant. Commonly known fruit are raspberries, apples and oranges. However, the botanical definition of a fruit is an organ of the plant that contains seeds. Winter squash, cucumbers, green beans and almonds are all examples of fruit because they contain seeds. In a school garden, fruit is typically harvested near the end of the plant's life cycle.

## Objective

## Background



### Some common types of fruit are:

**Berry**—All of the pericarp (ovary wall) is fleshy. It may have one or many seeds. Examples are grapes, tomatoes, currants and gooseberries.

**Drupe**—The seed is surrounded by a hard shell, followed by a fleshy pericarp. Examples are peaches, cherries and apricots.

**Aggregate Drupe**—Many small drupes are clustered together to form an aggregate fruit. Examples are blackberries, raspberries and loganberries.

**Achene**—The pericarp is dry, and the seed is still attached when mature. The most common example is the sunflower, but also strawberries are clusters of achenes attached to a fleshy receptacle.

**Schizocarp**—The fruit is divided into two or more mericarps (sections), with seeds in each part. Examples are fruiting bodies from the parsley family including carrot and fennel seeds.

**Pome**—The core (ovary) is surrounded by flesh that is not part of the ovary. Examples are apples, pears and quinces.

**Legume**—A dry pericarp surrounds the seeds when mature. There are clear dividing lines where the pericarp splits to allow the seeds to disburse. Examples are beans, lentils, chickpeas and fava beans.

**Pepo**—A thick skin surrounds the fleshy pericarp. Examples are cucumbers, squash and melons.

**Hesperidium**—A leathery rind surrounds the flesh pericarp. Examples are lemons, oranges and limes.

Using the worksheet on page 156, discuss some of the categories of edible fruit and investigate their structure. Throughout the fall and winter, learners can investigate the dried fruits in their immediate landscape, in order to classify them as well.





## Materials

### For each table:

Assortment of edible fruits (10-15), see examples above for ideas

**Fruit Types Worksheet** for each learner, page 156.

**Blank Fruit Types Worksheet** for each learner, page 229.

Pencil for each learner

Colored pencils

## Set Up

Divide the class into groups of 8.

Spread out the fruit over the table, making sure that there is enough for each learner to examine. Try to have multiple fruits per category.

## Activity

1. Before explaining the different types of fruit, have the learners observe what is on their table. Ask them to sort them according to similarities.
2. Ask the following question: Why did you put certain fruits together?
3. Explain the definition of a fruit to the class. Ask them to look at the objects on the table to see if they meet the definition of a fruit.
4. Pass out the **Fruit Types Worksheets** and explain the different botanical categories of fruit.
5. Have the learners fill out the blank **Fruit Types Worksheet**, writing down which fruit belongs in each category.

## Discussion

Bring the class back together and have each group share their findings. Ask the learners what reasons they have for their decisions. Ask them about commonly misidentified fruits (e.g. tomatoes, cucumbers).



# Fruit Types

Berry—grape



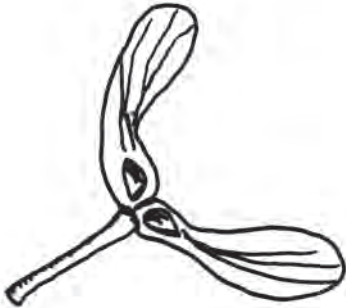
Agregate Drupe—raspberry



Achene—sunflower



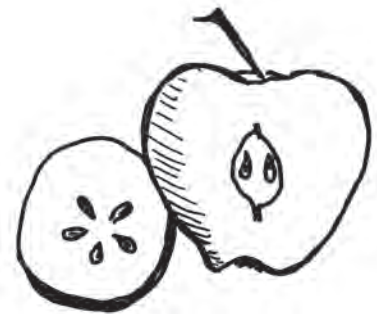
Schizocarp—maple



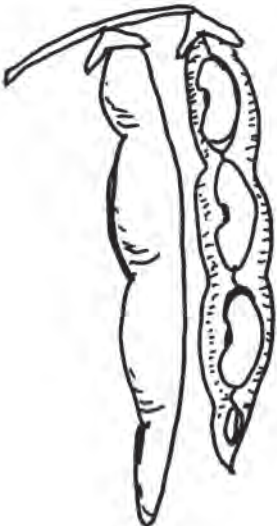
Drupe—cherry



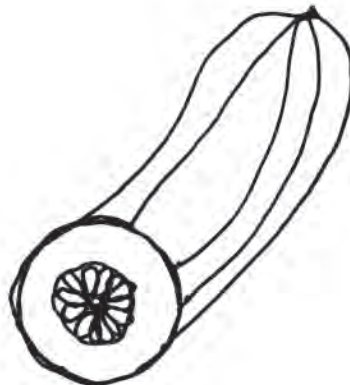
Pome—apple



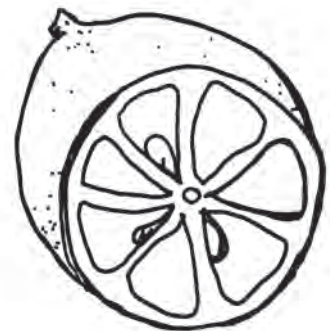
Legume—bean



Pepo Berry—cucumber



Hesperidium—lemon



# Fruit Types

Berry—grape

Tomato  
Cranberry  
Banana  
Blueberry  
Papaya  
Eggplant  
Chili pepper

Agregate Drupe—raspberry

Blackberry  
Boysenberry

Achene—sunflower

Buttercup  
Strawberry

Schizocarp—maple

Carrot  
Fennel  
Puncture vine

Drupe—cherry

Peach  
Plum  
Almond  
Apricot

Pome—apple

Pear  
Rose hips  
Quince  
Loquat

Legume—bean

Pea  
Lentil  
Fava  
Black eyed pea  
Peanut

Pepo Berry—cucumber

Gourd  
Canteloupe  
Squash  
Zucchini  
Watermelon

Hesperidium—lemon

Orange  
Grapefruit  
Kumquat  
Lime





# Summer and Winter Squash

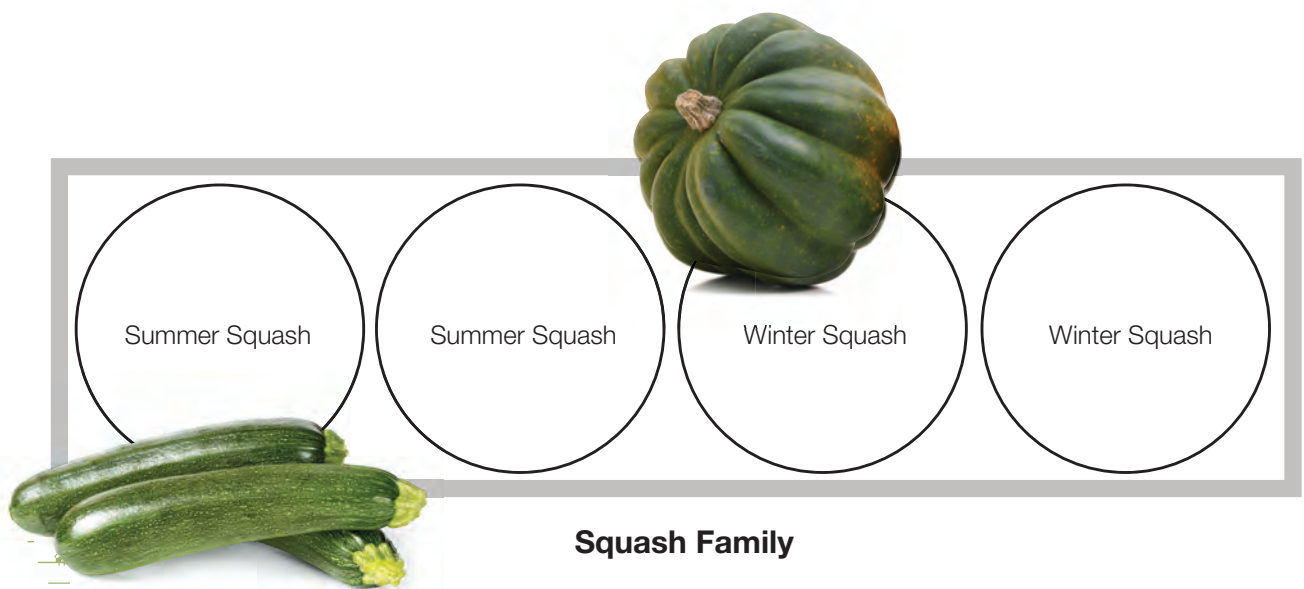


Squashes, pumpkins and gourds all originate from the Americas. Those that are orange are rich in betacarotene, the precursor to Vitamin A. Summer squashes are eaten when immature, before the skin has hardened and the seeds have matured. Squashes have many uses. Their shells can be used as containers, the seeds provide fat and protein, and their flesh is edible.

Native Americans often grew squash with beans and corn. The combination is known as the Three Sisters. Squash shades the roots of the corn, reducing weeds and water evaporation from the soil, while beans fix nitrogen in the soil, improving fertility. The corn stalks provide support for the beans to grow up. Squash seeds from northern Peru similar to the Hubbard variety (*C. maximus*) were determined to be 10,000 years old. Seeds from *C. pepo*, similar to pumpkin were discovered in Oaxaca, Mexico and were also determined to be 10,000 years old. Domestication of wild plants in the Americas is as old as that in the Middle East.

### Botanical Families

Winter squashes, pumpkins, summer squashes and gourds are all members of the large *Curcubitaceae* family. Four species, native to the Americas, make up the summer and winter squashes. *C. mixta* includes the cushaw pumpkin and winter squash such as Hopi. *C. maxima* includes most of the large, round decorative pumpkins, the turban gourds, and the large hubbards, as well as banana and buttercup squash. *C. moschata*, includes the large cheese and crookneck pumpkins as well as the butternut squash. And finally *C. pepo* includes the field, pie, naked-seed and miniature pumpkins, as well as zucchini, acorn squash and ornamental gourds. All squash and gourd plants have both male and female flowers. Their large size makes them ideal for teaching the anatomy of flowers, as well as lending themselves to pollination experiments.







### **Soil preparation and fertility**

Squash prefer well drained soil amended with compost or other organic matter. Native varieties of winter squash can tolerate harsher conditions. Plant seeds directly in the ground, either in circular mounds or wide furrows. If your climate is dry, plant them at the bottom of a furrow or bowl in order to capture water and mulch with straw. You can also plant them at the bottom of a slanted trellis, allowing the vines to climb the trellis. The trellis will keep the fruit from touching the ground.

### **Watering**

Water squash plants deeply several times a week. Do not sprinkle water on the leaves, but focus the water near the roots of the plant. Overhead watering may encourage the spread of powdery mildew.

### **Harvesting**

Harvest summer squash when it is small and tender, before the seeds have matured. Ideally zucchini should be harvested when it is 6" long. For seed saving, allow the summer squash to fully mature until the rind is hard.

### **More About Summer and Winter Squash**

Use summer or winter squash in soups or in the Moroccan Vegetable Tagine recipe on page 58 of the *Good Curriculum*. Use grated squash as a filling for making Pupusas on page 84, or Parathas on page 104 of the *Good Curriculum*.



# Planting Summer and Winter Squash



**Objective** Learners will be able to sow seeds outside and identify summer and winter squash varieties.

**Background** Summer and winter squash are both considered warm season crops. They must be planted after all danger of frost between May and the beginning of June in most growing areas. Use the **Plant Cultivation Chart** on page 18 to help you decide what to plant. Use the individual worksheets for cultivation tips. You may start squash inside if you live in a short season climate. However, they quickly become leggy and unruly, so start them just 2-3 weeks before planting outside. If possible, plant transplants on a cloudy day to minimize sun damage.

Choose varieties that will grow in your area. Gourds or very large squash that have an average maturity of 100 days or more will not be successful in short season climates.

Before going outside, review the seeds that you are going to plant in this session. Have the learners look at the seed packages to see how far apart to plant the seeds. Discuss how large each plant will grow. Create a plan of what you are going to do when you are outside. Review your garden safety rules.

Choose which seeds to plant according to age group. Young learners do better with larger seeds that they can hold. Older learners can manipulate smaller seeds more easily and are better at spacing. If you have started warm season plants in the classroom, you can also transplant them at this time.

**Materials**

- Seedlings, if using
- Garden journals
- Pencils
- Seed packages
- Watering cans
- Trowels
- Garden signs for each variety



- Preparation**
- If you have seedlings, make sure they are hardened off a week before planting. Gradually introduce them to sun exposure and night time temperatures.
  - Prepare the beds ahead of time if you are working with younger learners and/or are short on time. The soil must be soft and easy to work with. Make each plot no wider than 3' - 4' so that learners can reach the middle from each side of the plot.
  - Set up each plot according to the plan of four mounds, each the diameter of the plot. Two mounds will be for the summer squash and two for the winter squash. If you live in an area with low rainfall, make the mounds into bowls, with a deep depression in the middle. This depression will hold water, keeping the plants evenly moist. If you live in an area with high rainfall, plant the seeds at the top of a mound that is flat, like a mesa. The excess water will drain, keeping the roots from being waterlogged.



- Review how to plant seeds; often learners plant seeds too close together or too deep. Make sure to go over these issues with them before planting.
- Create plant identification signs ahead of time so that learners will know where to put each type of plant.

### Set Up

Place a sign or seed pack in front of each place where the various types of plants will be planted. You may plant 2-3 varieties in each mound.

### Activity

1. When transplanting seedlings, have the learners dig a hole that is twice as wide as their plants, spacing them according to the seed packet or planning chart. Tip the seedling into the palm of the hand, allowing the stem to hang down between the index and middle fingers. Gently turn the plant right side up to plant. Do not pull the plant out by the stem as it might break.
2. If using seeds, plant them around in a circle, following the inside edges of the mound. Space the seeds according to instructions on the seed packet. You will need 8-12 seeds total for each mound.
3. **Have learners take turns planting. Other students can use these prompts to work in their journals:**
  - What are the instructions for planting a seed?
  - How would you create a seed package including the spacing and planting time and harvest time of the seeds that you have planted today?
  - Draw a picture of the kind of seed you planted.
  - Draw a picture of how you think the garden will look later in the summer.
  - Draw your favorite vegetable that we have planted today.

Use the gardening books in the Recommended Books on page 240 to get more advice about specific gardening practices or techniques.

### Discussion

Discuss what the plant needs to thrive.

How will the learners be able to tell if the plant needs water?

What will we have to do to encourage plant growth throughout the growing season?

Why plant the squash in mounds versus furrows? Which work better for our climate?

Read the story of the origin of squash in “The Wiseman’s Big Bald Head” from *When the Storm God Rides: Tejas and Other Indian Legends* by Florence Stratton.

# Hand Pollinating Squash



## Objective

Learners will be able to distinguish between male and female squash blossoms, using this knowledge to increase the productivity of their squash plants.

## Background

All members of the curcubit family (squash, melons and cucumbers) are unusual in that they have both male and female flowers on the same plant. Bees transfer the pollen from the male flowers to the female flowers in order to produce the fruit of the plant. The male flower is different from the female flower because of its large pollen-covered anther. The female flower is slightly swollen at the base, where the ovary will become a fruit when pollinated. If the ovary is not pollinated, it will shrivel and there will be no fruit.

Often the male flowers appear first, followed a few days later by the female flowers. As the season progresses there may be more female blossoms and fewer male, leaving many blossoms unpollinated.

Use this activity to test whether squash plants will be more productive when hand pollinated. Choose two plants of the same variety. For example, grow two Black Beauty zucchini plants. Hand pollinate one plant, while allowing the other to be pollinated by bees. Track which plant has more fruit.

This activity works best if you have a summer program, so that you can track the fruit throughout the summer. However, if you do not have a summer program, you can start pollinating as soon as school starts and count the number of fruit produced in the fall.

## Materials

Squash seeds  
Signs for plant varieties  
2 blank garden signs  
Masking Tape  
Permanent marker  
Garden journal  
Pencils



## Preparation

- Create a plot for squashes, as on page 160.
- Plant at least two plants of the same variety of squash, making sure that they are at least 4 feet apart, so that you can keep the plants separate. Label the plants so that you know which variety they are.
- When the first blossoms appear, notice if they are male or female. Write the date of the first blossoms in the garden journals.
- When the first female blossoms appear, do the activity.



**Activity** Do this activity in the morning if possible to reduce the chance of finding bees in the flowers.

1. Create two signs. One will be “Bee pollinated” and one will be “Hand pollinated.”
2. Put the “Bee pollinated” sign near one of the plants.
3. Put the “Hand pollinated” sign near the other plant of the same variety.
4. Pick a male flower from the “Hand pollinated” sign and remove all of the petals, exposing the pollen-covered anther.
5. Choose a female blossom to pollinate. Check the inside for bees and gently shake them out if they are present.
6. Brush the anther against the inside of the female blossom. Close the blossom loosely with the masking tape to prevent further pollination.
7. Each day wait for more female blossoms to appear and keep pollinating the “Hand pollinated” plant in the same way with a new male flower.
8. Create a page in the garden journals with two columns: “Bee Pollinated” and “Hand Pollinated”
9. Harvest the squash in both plants and record the number of squash produced from each plant in the appropriate column.
10. At the end of the season, count how many squash each plant produced.

**Discussion** Discuss the results of the experiment. What were some of the uncontrolled variables in your experiment? How could it be improved?

Why do you think one plant was more productive than the other?

**Further Exploration** For more information and photos about how to hand pollinate squash, visit <http://www.nativeseeds.org/pdf/squashpollination.pdf>.

1. Draw the two types of squash blossoms and label the parts of the flower.
2. You may also try an alternate activity with hand-pollination. Will a cucumber cross pollinate with a zucchini and produce a new type of plant? Actually, the cucurbits must be in the same species in order to cross-pollinate. For example, a zucchini and an acorn squash (which both belong to the species *Curcubita pepo*) may cross-pollinate and produce a type of squash. But you will only see it after you plant the seeds of the cross-pollinated fruit the next year and harvest those fruits. If you want a garden project that will take place over several years, teach your students how to cross-pollinate squash and plant those seeds to see what types of new varieties develop. Save the most promising seeds, and plant them the following season. Use the **Curcubit Family Tree** on the following page to choose varieties that are in the same species.



# Curcubit Family Tree



## Cucurbita pepo



Acorn Squash  
 Algonquin Pumpkin  
 Big Tom Pumpkin  
 \*Canada crookneck Squash  
 Cinderella Pumpkin (Rouge vif d'Estampes)  
 Connecticut Field Pumpkin

Decorative Gourds  
 Delicata Squash  
 Jack O'Lantern Pumpkin  
 Jackpot Pumpkin  
 Scallop/Patty Pan Squash  
 Small Sugar Pumpkin  
 Spaghetti Squash

Sugar Pie Pumpkin  
 Sweet Dumpling Squash  
 Yellow Crookneck or Straightneck Squash  
 Zucchini, all types

## Cucurbita moschata

Alladin ornamental squash  
 \*American Butternut Squash  
 Atlantic Giant Pumpkin  
 Climbing Zucchini or Trombetta D'Albenga

Dickinson Field Squash  
 Golden Cushaw  
 Kentucky Field Pumpkin  
 \*Long Island Cheese Pumpkin

\*Seminole Pumpkin

## Cucurbita maxima

\*Amish Pie Pumpkin  
 Big Max Pumpkin  
 \*Boston Marrow  
 \*Candy Roaster Squash  
 Kabocha Squash

King of the Mammoths Pumpkin  
 Mammoth Chile Pumpkin  
 Mammoth Prize Pumpkin  
 Red Kuri Squash

\*Sibley Squash  
 \*Sugar Hubbard Squash  
 Turk's Turban squash

## Cucurbita argyrosperma

\*Green-Striped Cushaw  
 Japanese Pie Pumpkin  
 Mixta Gold Pumpkin

Tennessee Sweet Potato Pumpkin  
 White Cushaw

## Cucumis sativus



All slicing and pickling Cucumbers (except Armenian cucumber)  
 Beit Alpha cucumber  
 Lemon cucumber

## Cucumis melo

Armenian Cucumber (aka Snake Cucumber or Serpent Melon)  
 All Muskmelons (Netted Melons)

Cantaloupe  
 Casaba Melon  
 \*Crane Melon  
 Honeydew Melon



## Citrullus lanatus

All Citron Melons  
 All Watermelons  
 \*Moon and Stars Watermelon  
 \*Yellow Meated Watermelon

\*Ark of Taste varieties, for more information go to <https://www.slowfoodusa.org/ark-of-taste-in-the-usa>

# Zucchini Flower Fritters



**Objective** Learners will be able to distinguish between male and female squash blossoms and prepare squash blossom fritters.

**Background** Teach learners about the male and female blossoms while you enjoy this savory treat. All squash produce both male and female flowers. The plants need both to produce squash. Any variety of summer or winter squash blossoms will work for this activity. Look for male blossoms, with a single pollen covered anther and no swelling where the squash will develop. Male flowers bloom first, followed by the female a few days or weeks later. Make sure to leave some male blossoms on the plant so that the female blossoms will be pollinated, otherwise you will reduce your squash harvest.

Check blossoms before harvesting, as bees tend to hang out in them. Gently shake them to make sure the insects have left. Harvest extra blossoms so that learners can dissect and draw them while they are waiting for the fritters.

**Materials** **For each table:**  
1 small bowl for filling  
1 large platter or cutting board for stuffed blossoms  
1 fork for mixing

**For the cooking station:**  
Induction burner  
Large frying pan or skillet  
Tongs  
Spatula  
Serving platter



**Preparation**

- Make sure all of the desktops and/or counters are cleared of materials, cleaned, and sanitized.
- Make sure everyone has washed his/her hands.
- Review the recipe so learners know what to do. Do not have learners read the recipe while cooking.

**Set Up**

1. Divide the learners so that they are in groups no larger than 8, with one adult per table. One group can make the batter, the others will make the fritters.
2. Make sure that each learner has a chopping board and they are spaced apart from one another.

**Eating and Evaluation** Try the fritters with fresh garden salsa or pesto. While the fritters are cooking, have the learners draw and label male and female squash flowers.

# Recipe Zucchini Flower Fritters

## Ingredients

12 zucchini flowers  
1 cup ricotta cheese  
2 tablespoons chopped fresh chives  
2 tablespoons chopped fresh parsley  
1 teaspoon chopped fresh thyme  
½ teaspoon salt

## For the batter:

1 cup flour  
1 egg  
1 cup water  
salt and pepper  
olive oil



## Method

1. Choose male flowers that are large and well shaped, leaving the female flowers to produce squash. Shake out the flowers to make sure there are no insects before bringing them inside.
2. Mix together the ricotta cheese with the chives, parsley, thyme and salt. Stuff the flowers with 1-2 tablespoons of cheese and press them closed.
3. Mix together the flour, egg, water, salt and pepper. The batter will be lumpy, do not mix a long time.
4. Heat a heavy frying pan on medium-high heat. Add ¼" of olive oil to the pan. Dip the flowers in the batter one at a time and place them in the frying pan. When they are golden brown, turn them over and cook them on the other side.
5. Do not crowd the pan; make sure there is enough room for the flowers. Drain them on paper towels and eat them while they are hot.
6. If there are extra flowers, dip them in the batter and cook them without the filling.

# Summer Squash Ribbon Salad



**Objective** Learners will be able to create a salad made from zucchini ribbons.

**Background** Use this salad recipe when you want to create a dish right from the garden. No knives needed, only peelers and hands. Tossing the ribbons with salt releases water from the squash, increasing flavor as well as softening them. Try this salting technique with other vegetables such as cabbage, cucumbers, grated root vegetables and greens.

**Materials** **For each table:**  
1 large bowl  
1 small bowl for seeds

**Preparation**

- Make sure all of the desktops and/or counters are cleared of materials, cleaned, and sanitized.
- Wash all of the ingredients.
- Make sure everyone has washed his/her hands.
- Review the recipe so learners know what to do. Do not have learners read the recipe while cooking.

**Set Up**

1. Divide the learners so that they are in groups no larger than 8, with one adult per table.
2. Make sure that each learner has a chopping board and they are spaced apart from one another.
3. Pass out the knives when the learners are quiet and paying attention to the instructor.

**Eating and Evaluation** Read *Carlos and the Squash Plant* by Jan Romero Stevens.

**From the Garden** Choose a mixture of small to medium-sized summer squashes to add more color to the salad.





## Recipe Summer Squash Ribbons

### Ingredients

6 small summer squash  
½ teaspoon salt  
½ cup chopped walnuts or toasted pumpkin seeds  
Juice of 1 lemon  
2 tablespoons chives  
¼ cup fresh mint, dill, basil, cilantro and/or parsley  
½ cup olive oil  
Pepper to taste



### Method

1. Use a peeler to make long strips of summer squash. If you have large summer squash, that have well-developed seeds, cut from the skin and inner flesh until you reach the seeds. Do not use large seeds. Toss the squash ribbons with salt in a bowl and let them sit for 15 minutes.
2. Snip the mint with scissors, or tear it into small pieces.
3. Drain the water off the squash and toss it with the lemon juice, walnuts, herbs and olive oil.
4. Add pepper to taste.



# Create a One-Pot Meal



**Objective** Learners will be able to prepare a one-pot meal based on ethnic flavors using a variety of garden produce.

**Background** One-pot meals combine vegetables, protein and carbohydrates in a delicious, satisfying stew or braised dish. Typical one-pot meals include the Moroccan tagine, Mexican posole, Thai curry, Coq au Vin, beef stew, Chinese hot pot or Vietnamese pho. Use your school garden produce to create a satisfying autumn meal that can easily feed the entire class or staff. If you have two induction burners, create two contrasting dishes, so that learners can compare flavors from different cultures.

One-pot meals can include almost any garden produce. Make it at the end of harvest season to use up all of the extra vegetables. Root vegetables and squashes are especially satisfying. The cooking technique is simple, but you should allow for 30 minutes cooking time. You could start a garden class by assembling the one-pot meal and then letting it simmer as you go out to the garden for autumn clean up. Be sure an adult is keeping an eye on the simmering pot. Emphasize the plant kingdom by substituting dried beans (pulses) for the traditional meat in these dishes.

<b>Materials</b>	<b>For the cooking station:</b>	<b>For each table:</b>
	Induction burner	1 large bowl for each group of 8 learners
	Large pot with lid	1 cutting board for each learner
	Wooden or other stirring spoon	1 knife for each learner
		Forks and plates for each learner

**Preparation**

- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized.
- Make sure everyone has washed his/her hands.
- Review the recipe so learners know what to do. Do not have learners read the recipe while cooking.
- Remind learners of knife techniques and safety. For more information, see page 46 of the *Slow Food USA Good Curriculum*.

**Set Up**

1. Divide the learners into groups of 8.
2. Each table should have a large bowl for the cut vegetables, knives and cutting boards for each learner and a pile of vegetables to cut.
3. Give each table a different combination of flavorings and liquids. Make sure that they only have 1-2 teaspoons of each flavoring.

## Activity

1. Have the learners cut up the vegetables into bite sized-pieces. Cut the hardest vegetables first as they will take longer to cook.
2. As the vegetables are cut, add them to a large pot with 3” of water or liquid. Bring to a simmer and cover, adding more as they are ready.
3. For young learners, the hard vegetables such as yams or winter squash should be precooked.
4. Add the desired beans and starch to the vegetables.
5. While the vegetables are simmering in the large pot, have the learners combine seasonings, liquid and salt to their large bowl.
6. After the vegetables have cooked, divide them into equal parts so that each table has the same amount of vegetables, beans and starch. Stir the cooked vegetables into the liquid and flavorings.
7. Have learners adjust seasoning until they like the taste.
8. If there is enough time, heat each dish until it is simmering.

## Eating and Evaluation

Have the learners compare the different One Pot Meals. Which flavorings are their favorite? Read the book *Stone Soup* while you wait for the meal to cook.

### Ask these questions:

Does this dish remind you of anything you eat at home?  
What are your favorite one-pot meals?



# Create a One-Pot Meal

## One-Pot Meal =

**Vegetables** + **Beans** + **Starch** + **Flavorings** + **Liquid**

Tomatillos  
 Summer squash  
 Winter Squash  
 Green beans  
 Braising Greens  
 (cabbage, kale,  
 chard, collards, etc)  
 Kohlrabi  
 Peppers  
 Carrots  
 Beets  
 Parsnips  
 Onions



Beans  
 Garbanzo beans  
 Kidney beans  
 Black beans  
 Lentils  
 Pinto beans



Potatoes  
 Sweet potatoes  
 Pasta  
 Cracked wheat  
 Barley  
 Hominy

Mexican  
 Dried chiles, coriander,  
 cumin, cinnamon,  
 oregano

Italian  
 Basil, oregano, thyme,  
 rosemary, garlic

North African  
 Cumin, coriander,  
 cinnamon, paprika,  
 turmeric, garlic

Indian  
 cardamom, black  
 pepper, cumin, cloves,  
 cinnamon, ginger,  
 garlic or mustard  
 seeds, turmeric,  
 cumin, black pepper,  
 fenugreek, fennel

Chinese  
 Ginger, garlic, soy  
 sauce, star anise,  
 cinnamon, pepper,  
 miso

Thai  
 Lemongrass,  
 ginger or galangal,  
 fish sauce, lime juice,  
 Thai curry paste

Chicken or  
 vegetable stock  
 Tomatoes  
 Coconut milk









# Pollinators and Herbs



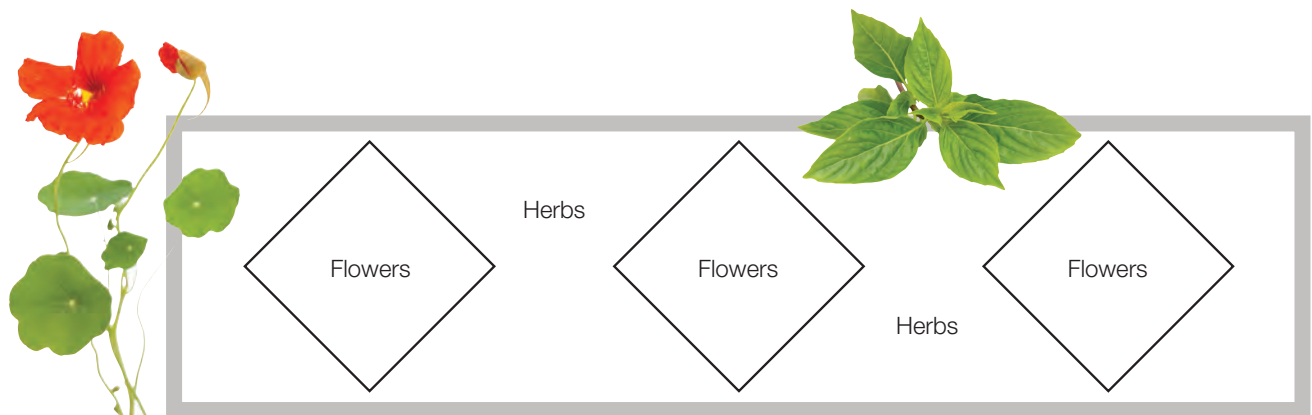


Create a plot that is beautiful, attracts beneficial pollinators, adds zest and flavor to your cooking and is easy to maintain. Adding herbs and perennial native flowers to your garden promotes a diverse beneficial insect population. School gardens will want to include a culinary herb garden to complete the school food program. Here are a few of the reasons to have an herb garden:

- Herbs add flavors to foods.
- Herbs provide activities early or late in the season when other plants are dormant.
- They make your garden beautiful even when the annual vegetables are gone.
- Masses of flowers attract bees and other pollinators to the garden.
- Strongly scented essential oils discourage pests.
- Leaves add wonderful aromas to your garden and food.
- Herbs are high in antioxidants, antifungal and antibacterial compounds.
- Herbs provide a wide variety of trace minerals.
- Perennial herbs and flowers can live for years with little care.
- Many perennial flowers have medicinal qualities and/or are edible.



Flowers and herbs can be either perennial (come back every year) or annual (grow only one season). In general, the perennials are less fussy about soil and water. Common garden perennial flowers include echinacea, roses, peony and daylily. Typical perennial herbs include lavender, thyme, and oregano. While rosemary is also a perennial, it is not reliably hardy in climates that have temperatures below 28°F. Perennial herbs like to grow in well-drained soil with a gravel mulch to prevent splashing dirt on their leaves.



**Pollinator and Herb Plot**

Traditional European herbs such as thyme, oregano and rosemary do not thrive in tropical climates. If you live in a tropical area, choose herbs and flowers that grow in similar climates around the world. Expand your cooking program to include foods from Southeast Asia, India, Central America and Africa. For suggestions and information about growing herbs, refer to the **Herb Cultivation Chart**, page 180.

Garden friendly annual flowers include marigolds, bachelor's buttons, zinnia and sunflowers. Typical annual herbs include basil, dill and cilantro. Usually annual herbs grow better mixed in with other annual vegetables as they need more water and a richer soil. Use marigolds around vegetable plots to discourage pests and create beauty.



Plant hardy herbs from mid April to early June. Plant tender annuals after the last frost date, on a cool or cloudy day. If you have water throughout the winter, you can also plant the hardy perennials in the fall.

Most herbs are grown for their leaves, although their flowers are edible and attractive to bees. After blooming, perennial herbs should be trimmed to encourage new growth. Do not allow annual herbs to bloom, unless you plan to use or harvest seeds, as the leaves quickly lose their quality.

Use the following activities to explore the properties of herbs. For more resources and activities, as well as tips on growing herbs, see the Recommended Books on page 240.

### **Watering**

Encourage deep roots and drought resistance by watering less often, but for a longer amount of time. In cold winter areas, trim plants in the spring instead of the autumn. The extra plant material will help protect plants through the winter.

### **Harvesting**

Harvest herbs in the early morning before they have flowered. Rinse them and use immediately, or roll them into a paper towel and refrigerate for later use. Tender herbs like basil and parsley can be cut like flowers and stored in a vase of water.

To dry herbs for later use, tie them in bundles and hang them in a cool, dark place until they are dry, about a week. If you live in an area with high humidity, consider drying them in a dehydrator and then storing them in an airtight container. Harvest edible flowers in the morning if possible. To store for a day or two, lay them on paper towels and spray them with water. Cover with another damp paper towel and store them in the refrigerator until they are ready to be used.



# Planting a Flower and Herb Plot



**Objective** Familiarize learners with different herb plants, what they smell like and how they grow.

**Materials** Potted herb plants  
String  
Wooden stakes  
Scissors  
1 sheet Coroplast (plastic corrugated sheet for signs)  
Metal landscape stakes  
Permanent markers  
10 small trowels  
1-2 bags pea gravel  
Garden journals  
Pencils

**Woody Herb Worksheet**, page 235



- Preparation**
- Before class, prepare the area you would like to use as your perennial herb bed by digging up and loosening the soil, as well as removing all weeds. If you have particularly heavy clay, consider adding something like Clay Busters to help break up the soil.
  - Cut the sheet of Coroplast into rectangles (3" x 8"). Make sure that the tubes run vertically. Ease a metal stake in between the corrugations so that you have a sign.
  - Bring all of the supplies outside. Keep the trowels to one side.
  - Place the herbs on the edge of the plot. If you want to make a formal herb garden with a pattern, you should buy more than one plant of each type so that you can fill a section.

## Edible Flowers

**Bachelor's Buttons**  
**Basil blossoms**  
**Bee Balm**  
**Banana Flowers**  
**Begonia**  
**Borage**  
**Calendula**  
**Carnations**  
**Chive blossoms**  
**Chrysanthemums**

**Citrus Flowers**  
**Dandelions**  
**Daylilies**  
**Fushia**  
**Hibiscus**  
**Lavender**  
**Lilac**  
**Marigold, Signet**  
**Marigold, French**  
**Marigold, Mexican**

**Nasturtiums**  
**Pansy**  
**Peony**  
**Roses**  
**Safflower**  
**Snapdragon**  
**Squash Blossom**  
**Sunflowers**  
**Violet**  
**Yucca**





## Activity

1. Bring the learners outside and have them stand around the empty bed. Pass around each type of herb and have the learners smell each one. Ask them if the scent reminds them of anything.
2. Mark out a design for your herb garden with the garden stakes and string. Common shapes are diamonds within a rectangle, triangles and circles. You can also just plant them randomly leaving the taller herbs in the middle.
3. Dig the holes where you want the plants. Make the holes a few inches deeper than the size of the pot, and about twice as wide.
4. Give the learners trowels and show them how to remove plants from their pots: Hold your hand open flat and put the main herb stem between the index and middle finger. Then, squeeze the pot into the palm of the hand, upside down, and lift the pot off. Do not pull the plant out of the pot by its stem or it may break.
5. Gently pull the roots apart so that the roots will grow out and not in a circle.
6. Place the herb into the hole and pat the soil around it. It should be level with the ground, not sitting above it.
7. After all of the herbs have been planted, place a 2" layer of pea gravel or mulch around the plot. The gravel/mulch will keep the leaves from getting muddy when watering or in the rain.
8. Give each learner a sign and a sharpie. Have them write the name of the herb on the sign and place it next to the plant.
9. Have the learners draw their favorite herb in their journal. Or they can use the **Woody Herb Worksheet** on page 235 as an aid in identifying the plants.

## Further Exploration

### Ideas for using herbs:

- Tie them in bundles, place them in a pitcher of water and sell them at your youth farmers market. Or give the bundles away to customers.
- Preserve them by tying them in bundles, hanging them upside down and drying them in a dark place like a basement.
- Preserve them by packing them in layers with salt. Works especially well for sage and rosemary.
- Add them to sauces and starchy dishes like pasta and potatoes.
- Add them to vinegars for flavor.
- Grind them into pesto. See the pesto instructions in the *Good Curriculum* section, page 26.

You can find suggestions for plants that will work in your area from the Xerces foundation at [www.xerces.org](http://www.xerces.org).

## Further Investigation

Curriculum for grades 3-6 can be found at <http://pollinator.org/nappc/PDFs/curriculum.pdf>

# Herb Cultivation Chart

Name	Latin Name	Cold Tolerant*	Type of Plant	Water	Soil	Sun/Shade
<b>Basil</b>	Ocimum basilicum	No	Annual	Medium	Garden	Sun/Pt shade
<b>Bay</b>	Laurus nobilis	No	Tender perennial	Low	Any	Sun
<b>Bee Balm</b>	Monarda didyma	Yes	Perennial	Medium	Any	Sun
<b>Borage</b>	Borago officinalis	No	Annual	Low	Any	Sun
<b>Calendula</b>	Calendula officinalis	No	Annual	Medium	Garden	Sun
<b>Cardamom</b>	Elettaria Cardamomum	No	Perennial	High	Garden	Shade
<b>Chervil</b>	Anthriscus cerefolium	No	Annual	Medium	Garden	Pt shade
<b>Chives</b>	Allium schoenoprasum	Yes	Perennial	Low	Any	Sun
<b>Cilantro</b>	Coriandrum sativum	No	Annual	Medium	Garden	Sun/Pt shade
<b>Curry Tree</b>	Murraya koenigii	No	Perennial	Medium	Garden	Sun/Pt shade
<b>Dill</b>	Anethum graveolens	No	Annual	Medium	Any	Sun
<b>English Lavender*</b>	Lavandula angustifolia	Yes	Perennial	Low	Sandy	Sun
<b>Epazote</b>	Chenopodium ambrosioides	No	Annual	Low	Any	Sun
<b>Fennel</b>	Foeniculum vulgare	Yes	Biannual	Medium	Any	Sun
<b>Garlic Chives</b>	Allium tuberosum	Yes	Perennial	Low	Any	Sun
<b>Gem Marigold</b>	Tagetes Tenquifolia	No	Annual	Medium	Garden	Sun
<b>Ginger</b>	Zinziber oficianale	No	Perennial	High	Garden	Shade
<b>Horseradish</b>	Armoracia rusticana	Yes	Perennial	Low	Any	Sun
<b>Johnny jump-ups</b>	Viola tricolor	Yes	Annual	Medium	Garden	Pt shade
<b>Lemon Balm</b>	Melissa officinalis	Yes	Perennial	Low	Any	Sun/Pt shade
<b>Lemon Verbena</b>	Aloysia citrodora	No	Perennial	Low	Garden	Sun/Pt shade
<b>Lemongrass</b>	Cymbopogon citratus	No	Perennial	Medium	Sandy	Sun
<b>Lovage</b>	Levisticum officinalis	Yes	Perennial	Low	Any	Sun
<b>Marjoram</b>	Marjorana hortensis	No	Tender perennial	Low	Any	Sun
<b>Mint, all varieties</b>	Mentha species	Yes	Perennial	Low	Any	Sun/Pt shade
<b>Munstead Lavender</b>	Lavandula angustifolia	Yes	Perennial	Low	Sandy	Sun
<b>Nasturtium</b>	Tropaeolum majus	No	Annual	Medium	Garden	Sun
<b>Oregano</b>	Origanum vulgare	Yes	Perennial	Low	Any	Sun
<b>Parsley</b>	Petraoselinum crispum	Yes	Biannual	Medium	Garden	Sun
<b>Purslane</b>	Portulaca oleracea	No	Annual	Low	Any	Sun
<b>Rau Ram</b>	Persicaria odorata	No	Perennial	High	Garden	Sun/Pt shade
<b>Rosemary</b>	Rosmarinus officinalis	No	Tender perennial	Low	Sandy	Sun
<b>Rue</b>	Ruta graveolens	Yes	Perennial	Medium	Garden	Sun/Pt shade
<b>Sage</b>	Salvia officinalis	Yes	Perennial	Low	Sandy	Sun
<b>Scented geraniums</b>	Pelargonium graveolens	No	Tender perennial	Medium	Garden	Sun
<b>Sesame</b>	Sesamum Indicum	No	Annual	Medium	Any	Sun
<b>Sorrel</b>	Rumex	Yes	Perennial	Medium	Garden	Pt shade
<b>Summer savory</b>	Satureia hortensis	No	Annual	Low	Any	Sun
<b>Sweet woodruff</b>	Gallium odoratum	Yes	Perennial	Low	Any	Shade
<b>Tarragon</b>	Artemisia dracunculus	Yes	Perennial	Low	Any	Sun
<b>Thyme, all varieties</b>	Thymus vulgaris	Yes	Perennial	Low	Any	Sun
<b>Turmeric</b>	Curcuma longa	No	Perennial	Medium	Garden	Shade
<b>Violets</b>	Viola	Yes	Perennial	Medium	Garden	Pt shade
<b>Winter savory</b>	Satureia montana	Yes	Perennial	Low	Any	Sun
<b>Yarrow</b>	Achillea millefolium	Yes	Perennial	Low	Any	Sun

\*Cold tolerant means that the plant can survive winters with prolonged freezing

# Bees, Wasps, or Flies?



**Objective** Learners will observe insects in the pollinator plot and be able to distinguish between bees, wasps or flies.

**Materials** **“Bees, Wasps, or Flies?” Worksheet**, page 234  
Pencils  
Garden Journals  
Pollinator Plot in bloom



**Preparation**

- Plant a pollinator and herb plot, or use a plot that has a diverse array of flowering plants.
- Pass out the worksheet and discuss the differences between bees, wasps, and flies.

**Activity**

1. Arrange the learners around the pollinator plot so that each one has a place to sit quietly.
2. Have the learners take turns filling in the following sentence, “I notice...” asking them to focus on any insects or animals that they see in the garden. Ask them to describe the insect with as much detail as possible.
3. Have the learners observe the plot in front of them for three minutes and count how many insects they can see. They may have to stand, but they should stay in the same place.
4. Have the learners draw any insects for five minutes, using words as well, if necessary to describe what they see. They should include the color, shape, number of wings, number of legs if possible.

**Discussion** Have the learners discuss as a group which insects that they have observed.

- Are the insects bees, wasps or flies?
- Did they prefer specific flowers?
- Are there different kinds of bees? What are the differences?

**Further Exploration** Download this Native Bee poster <http://www.pollinator.org/NativeBees.htm> and use it to try to identify some of the bees you see in your garden. Where might they be living in your garden?

Use this planting guide to help you choose plants that attract pollinators:

<http://www.pollinator.org/guides.htm>

Create a mason bee house.

*\*Bee liners are paper straws that are made especially for mason bees.*

Examples of suppliers are <http://beediverse.com> or <http://crownbees.com>.

You can also make your own liners using these instructions:

[http://extension.oregonstate.edu/marion/sites/default/files/2012\\_mason\\_bee\\_liners.pdf](http://extension.oregonstate.edu/marion/sites/default/files/2012_mason_bee_liners.pdf).





# Insect Hotels



**Objective** Learners will create a habitat that attracts a wide variety of beneficial insects to the garden, including native mason bees.

**Background** Beneficial insects such as native bees, butterflies and ladybugs need a home, especially. Encourage insects to make your garden their permanent home by creating an insect hotel. Combine different materials to create a habitat and resources for a wide variety of insects and even birds. There are many different ways to make an insect hotel, but this design is very simple, using recycled materials with no need for tools or nails. Place it near a fence or wall, in a warm place. You will be using precut boards and bricks to create shelves, filled in with insect friendly materials.

**Here are some uses for various materials:**

- Straw or leaves are good for birds' nests and as places for hibernating lady bugs.
- Paper straws, hollow bamboo, or reeds are habitats for native bees.
- Pieces of yarn or wool are good for birds' nests
- Blocks of wood drilled with holes that are at least 4" thick and 5/16" in diameter
- Dead sticks or wood are good home for beetles, including ladybugs

**Materials**

4 2'x6' boards, 4' long	Straw
16 bricks with holes or honeycomb patterns	6-8 Empty cans, 16 oz.
8 cinder blocks	Hollow bamboo, cut into 6" lengths
Corrugated cardboard, cut into 6" lengths	Twine
Newspaper	Mason bee liners, optional*

**Preparation**

- Gather the materials, asking learners to bring in some of the recycled materials such as leaves, sticks and yarn.
- Look for pictures of insect hotels on the internet in order to see examples of different styles. Other search words are "insect houses" and "beneficial bug houses."

**Set Up**

1. Find a suitable place for the insect house. It should be south facing, level and preferably near a wall or fence.
2. Lay out the materials.
3. Explain the activity to the learners before going outside. Tie the bamboo sticks into bundles with the twine and place them in the tin cans.



## Activity

1. Level an area that is 4' long by 1' wide.
2. Place two of the cinder blocks on the ground lengthwise, 4' apart.
3. Place a board on top of the cinder blocks.
4. Create more shelves in the same way until the boards and cinder blocks are all used.
5. Create dividers in the shelves by using the bricks, holes facing forward.
6. Fill spaces with straw, leaves or other materials.
7. Stack cans in between some of the dividers and fill them with bundles of bamboo, reeds or mason bee liners.
8. Roll up the corrugated cardboard so that you have a round spiral of cardboard. Place it on one of the shelves.

## Discussion

Discuss the following questions

- Which insects do you think will live in which parts of the hotel?
- What are some signs that you will be able to tell that insects are living there?



# Tangy Herb Dip



**Objective** Learners will be able to choose a blend of herbs in order to create a simple low fat dip.

**Background** Use a creamy spread as a base to explore flavors of herbs. You can use the dip on vegetables, bread or crackers. Make it thicker or thinner according to your needs.

**Materials** **For each group:**  
1 medium sized bowl  
2 forks  
Measuring spoons and cups  
Knives for spreading dip

**Preparation**

- Wash all of the herbs and vegetables.
- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized.
- Make sure everyone has washed his/her hands.
- Divide the class into groups of no more than 8 learners.
- Remind learners of knife techniques and safety.
- Review the recipe so learners know what to do. Do not have learners read the recipe while cooking.
- Bring cream cheese to room temperature.

**Set Up**

1. Each group will make their own herb spread. Place the cream cheese, yogurt, garlic and salt on each table.
2. Give each table a different variety of herbs.

**Eating and Evaluating** Place all of the herb spreads at the front of the classroom. Have the learners try each one.

**Ask the following questions:**

- Which is their favorite?
- Which one is the most salty?
- Which herb has the best smell?



# Recipe Tangy Herb Dip

**Ingredients**

- 8 oz. low fat cream cheese
- ½ cup Greek nonfat yogurt
- ⅓ cup chopped mixed herbs
- 1 shallot or green onion, optional
- ¼ teaspoon garlic powder
- Salt and pepper
- Baguette, crackers or raw vegetables

**Method**

1. Put the cream cheese in a bowl and smash it with a fork. Stir in the yogurt.
2. Meanwhile, tear or chop the herbs and shallots (if using) into small pieces. Mix everything together with a fork until it is smooth. Add salt and pepper, starting with ¼ teaspoon. Add salt until the flavors come together. Serve on bread, crackers or with fresh raw vegetables.

**Suggestions for combinations of herbs:**

Lemon basil, lemon thyme and chives

Chives, thyme, and parsley

Basil, mint, and parsley

Basil, oregano, sage, and thyme

Cilantro and mint

Dill, thyme and chives

Suggestions for vegetables: carrots, peppers, cherry tomatoes cut in half, celery, cucumbers.





# Herb Tea



**Objective** Learners will be able to select a mixture of herbs and create an herbal tea.

**Background** Brewing your own fresh herbal teas provides a powerful way for learners to experience the aromas and uses of fresh herbs. Serve herbal teas either hot or iced. For iced tea, steep the tea first in boiling water and stir in any sweetener. Then pour the tea over a pitcher of ice and stir.

Many herbal teas are considered useful for medicinal purposes. Thyme, oregano and rosemary have antibacterial and antifungal properties. They are often used to soothe sore throats. Fennel and ginger are used for digestion complaints. Basil is used to reduce inflammation. Refer to *A Kid's Herb Book* by Lesley Tierra for more herb activities.

**Materials** **For the class:**  
Induction burner  
Large pot

**For each table:**  
1 large pitcher for each group to hold the leaves  
Tongs or strainer  
Large pitcher with ice if making iced tea  
Ladle  
Cups



**Preparation**

- Wash all of the herbs and vegetables.
- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized
- Make sure everyone has washed his/her hands.
- Divide the class into groups of no more than 8 learners.
- Review the recipe so learners know what to do. Do not have learners read the recipe while cooking.

**Set Up** Each group will make their own herbal tea blend. Place a large pile of selected herbs in the middle of each table.

**Eating and Evaluation** Use the suggestions to set up different flavors or make your own. Place all of the tea at the front of the classroom. Have the learners try each one.

**Ask the following questions:**

- What do they feel when they drink each one?
- Which is their favorite?
- Which one would they like to drink before bed time?
- Which one would they like to drink in the morning?
- Which herb has the best smell?

# Recipe Herb Tea

**Ingredients** Herb sprigs, loosely packed  
8 cups boiling water  
2 tablespoons honey

- Method**
1. Choose which herbs you want in the tea, and place them in a 2 quart glass pitcher, loosely packed. The pitcher should be at least half full with herbs.
  2. Cover the herbs with boiling water and let it steep for 5 minutes. Add the honey and stir.
  3. Strain the tea into a pitcher, or remove the sprigs with tongs and put them in a bowl for compost.
  4. Let the tea cool and pour over another pitcher filled with ice if you would like.

**Suggested Combinations:**

**Calming Tea:** Rose geranium, lavender, fennel

**Cold Care Tea:** Sage, rosemary, thyme, oregano

**Refreshing Tea:** Spearmint, peppermint

**Lemon Tea:** Lemon balm, lemon basil, lemon verbena, and/or lemon thyme

**Minty:** Spearmint, basil, Thai basil

**Indian Tea:** Coriander seeds, fennel seeds, basil seeds



# Herb Salt



**Objective** Learners will be able to preserve fresh herbs using salt and create their own herb blends

**Background** Salt naturally preserves the flavor of fresh herbs up to six months. Create endless combinations of herbs to season potatoes, pasta, soups and sauces. Use herb salts as a present for family members, or pack them in bags to sell at a garden fundraiser. Herb gardens are usually very productive in the fall, so herb salts and dried herbs are one way to extend garden flavor throughout the year.

If you live in a humid climate, consider drying the herbs in a dehydrator. Cover the tray with plastic wrap before spreading the herbs on the tray and putting in the dehydrator. Use the lowest setting and dry for 1-2 days. Use snack bags or spice jars to keep the herb salts for up to 6 months.

**Materials** **For each group:**

- 1 sheet pan
- 4 pairs of scissors
- 1 large bowl

**Preparation**

- Pick herbs when they are fresh, preferably in the morning. Harvest them before they flower for best flavor. They can be harvested several times throughout the year.
- Wash and dry all herbs.
- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized.
- Make sure everyone has washed his/her hands.
- Divide the class into groups of no more than 8 learners.
- Review the recipe so learners know what to do. Do not have learners read the recipe while cooking.



# Recipe Herb Salt

## Ingredients

Scant ½ cup kosher salt

About 2 cups loosely packed, pungent fresh herbs such as oregano, sage, rosemary, thyme, savory, or small amounts of lavender

1 package of cheesecloth

## Method

**1.** Strip all of the leaves off the woody stems of the herbs. Chop the herbs coarsely, or rip them into small pieces.

**2.** Toss the herbs with the kosher salt. Transfer to a sheet pan and spread out the mixture. Cover the pan with cheesecloth, so no dirt or foreign matter will fall into the herbs.

**3.** Leave near an open window for a couple of days to dry, stirring occasionally. Store in clean, dry jars.

### Suggested combinations

**Italian:** Fennel seeds, oregano, basil, thyme, rosemary

**Provençal:** Lavender, thyme, oregano, rosemary

**French:** Tarragon, parsley, chives

**Poultry:** Sage, rosemary, thyme, chives, parsley





the 1990s, the number of people with a mental health problem has increased in the UK (Mental Health Act 1983, 1990).

There is a growing awareness of the need to improve the lives of people with mental health problems. The Department of Health (1999) has set out a vision of a new mental health system, which will be based on the following principles:

- (i) People with mental health problems should be treated as individuals, with their own needs and wishes.
- (ii) People with mental health problems should be given the opportunity to participate in decisions about their care and treatment.
- (iii) People with mental health problems should be given the opportunity to live in their own homes and communities.

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# Edible Perennials and Permaculture Techniques



**M**ost people imagine traditional annual vegetable gardens when thinking about a school garden. However, perennials can be a valuable supplement or beginning garden. If you do not have the time to dedicate to a vegetable garden, but would like to add more edible activities to your school, consider planting edible perennials. They range from vegetables (asparagus, rhubarb), to condiments (horseradish), to fruit (trees, and berries). While most edible perennials produce less food per plant, they have several advantages over annual vegetable plants:

- Long-lived perennials add interest to existing landscapes.
- Perennials can live for years with little care.
- Many perennials produce in early spring during a time when the traditional vegetable garden does not offer much interest.
- They typically require less care, less water and are not as fussy about soil requirements.
- Some edible perennials can tolerate partial shade and often form the undergrowth of a forest.
- Many perennials are native plants that can be incorporated into lessons about native peoples.
- They can provide habitat and refuge for birds and wildlife.

#### **Soil preparation and fertility**

One way to think about edible perennials is by soil type requirements. Those that are more domesticated such as raspberries, strawberries and asparagus often need richer soil and more water. Those that are natives or wild such as service berries, sand cherries and sunchokes will grow in most soils, and need watering once a week. Plan your gardens according to soil type and all of the plants will thrive.

Your perennial garden does not have to be located within the annual school garden plots. Use the Planning a Perennial Garden Checklist to help you find other possible locations in your schoolyard.

#### **Planting and thinning**

Edible perennials can be planted either in the fall or early spring. Fall is a great time to plant because perennials will have time over the winter to establish strong root systems. However, only consider fall planting if there is a consistent water source so that they can be watered once or twice per month. Spring planting should be early, before the weather becomes hot. Many edible perennials can be planted 2-4 weeks before the last frost date.

One method of planting edible perennials, is to plant them in a community (or guild) of plants that support each other. This planting technique is part of an agricultural and ethical system called Permaculture. Natural biomes contain plants that play specific roles, making the ecosystem resilient. Some plants are nitrogen fixers, increasing soil fertility. Others have long taproots that bring nutrients from deep in the soil up towards the surface. Plants with large leaves provide shade and reduce evaporation, keeping the soil moist. In addition, the different heights of plants in a forest serve different functions. For more information about Permaculture, its values and design principles, read *Permaculture: A Design Manual* by founder Bill Mollison





or *Gaia's Garden: A Guide to Home-Scale Permaculture* by Tobey Hemenway. Jayne Cobb, head of the edible school garden committee for greater Sarasota, Florida has contributed these introductory lessons.

### Watering

Water less often but for a longer amount of time. Deep watering encourages a strong root system that can survive short times of drought. Some edible perennials, such as asparagus, prefer wetter soils. Consider making swales or depressions, planting these in a low area so that they will naturally receive more water during rainstorms.

## Permaculture Words

**A healthy forest ecosystem contains these seven layers of plants that support each other's growth as well as the lives of countless birds, insects, bacteria and fungi. Many edible perennials can be grown together to mimic a natural forest ecology.**

### Canopy

(Large fruit and nut trees)

These are large trees over 30 feet tall such as pecan, oak or nitrogen fixing such as locust. They provide shade and protect plants from heavy rainfall and extreme weather. They also provide leaves as natural mulch in the fall.

### Low trees

(Dwarf fruit trees)

These are small fruit trees such as sour cherries, dwarf apples, and plums. In most school gardens, this might be the tallest layer unless there is plenty of space. They will also offer protection to the smaller plants, and leaves as well.

### Shrubs

(Woody plants up to 10 feet tall)

Currants, berries, Nanking cherries, pomegranates, hazelnuts and almonds or nitrogen fixing shrubs such as Siberian pea tree offer protection for birds and can also be nitrogen fixing.

### Herbaceous

(Plants that die back with cold winters)

Herbs, rhubarb, asparagus, Jerusalem artichokes provide mulch and protect the soil.

### Rhizosphere

(Root vegetables)

Plants with long taproots such as horseradish, sweet potatoes, jicama, dandelion, burdock root help bring nutrients up from the lower levels of soil and provide habitat for soil organisms.

### Ground Cover

(Spreading ground covers)

Strawberries, alpine strawberries, kinnikinnik, and low growing herbs protect the soil and soil organisms.

### Vertical (Vines)

Kiwi, sweet potatoes, passion fruit, and grapes provide more space for growing.



# Observing Nature's Plant Communities



**Objective** Learners will have a beginning understanding of the ways plant guilds (communities) work together so that all the plants benefit.

**Background** When we think of agriculture, we typically think of annual plants that are grown in rows or groups. We expect that gardens and farms will be lush and growing during the spring through fall and empty throughout the winter. This agriculture system reduces soil fertility over the long term because the soil is exposed during the winter when it may dry out and harm beneficial soil organisms.

Some parts of the world have traditional agriculture systems that look very different. They are productive forests—where each level from undergrowth, to shrubs, small trees and very large trees—contributes to the health of the entire system.

For example, archaeologists now recognize the Amazon rainforest not as a primitive wilderness, but as a carefully tended productive agricultural system. Archaeologists estimate that 10-12% of the Amazon was managed by humans. This system provided native populations with food and medicine in the form of starch roots, nuts, fruits and palm products.

For more information about agriculture and society in the Americas before the arrival of Europeans, read *1491: New Revelations of the Americas Before Columbus* by Charles C. Mann.

This lesson was written by Jayne Cobb, Slow Food Leader and Montessori teacher in Sarasota, Florida.

**Materials** Large popsicle stick plant markers. One for every two learners in the group. Identify by color or number.

**Preparation** Young Learners: Have a story of the 3 sisters in Native American culture ready to share. One source is *In the Three Sisters Garden: Native American Stories and Seasonal Activities for the Curious Child* by JoAnne Dennee. Introduce the idea of polyculture versus monoculture.

- Have separate picture cards ready of corn, beans, and squash.
  - Field of corn
  - Field of squash
  - Field of beans
- Have a picture card ready of corn beans and squash growing together.

**Older Learners:** Use the same story and pictures, however give factual information about more complex guilds. Introduce concepts in nitrogen fixing and dynamic accumulators.

## Activity

1. Present information on plant guilds or plant communities using the card materials to make a distinction between the 3 sister's plant guild and plants growing on their own.
2. Ask each learner to connect with a partner and take the group into an outdoor natural environment. (Not a cultivated garden. Could even be a park nearby)
3. Clearly identify limits in outdoor space, marking where the learners can roam.
4. Ask each partnership to find two or three plants, shrubs, ground covers, or trees that are growing close to each other.
5. Once the natural "guild" is found, encourage learners to closely observe their plant community. (2 to 5 minutes)
6. Ask learners to mark their "guild" and return to a central location.
7. When everyone has gathered, take a tour of each marked location. Inquire as to ways these plants might benefit each other. Do you notice any plants that are providing shelter or shade for other plants? Are there any plants that are holding the soil and preventing it from washing away? Are there any plants that dropped their leaves for mulch? Encourage learners to notice that these natural systems do not need help from humans. They rely on each other and the natural weather patterns like rain and wind to survive.

## Discussion

If you were to plant a garden for food, what kinds of plants might benefit each other?  
What kinds of food could you grow in a food forest?  
If the food crop had its own system for holding water in the soil, would you need to water the garden?  
Would you have to fertilize?  
What kinds of edible plants make good protection and shade?  
What kinds of plants have long roots?

## Further Exploration

Design a simple guild system with learners. Consult plant hardiness zones and information on microclimates before you begin. It is helpful to communicate with members of your community that have a working established guild. Look for permaculture groups in your area.

## Resources

*Integrated Forest Gardening* by Wayne Weiseman, Daniel Halsey and Bryce Ruddock

For a beginning guild design, consider *Integrated Forest Garden's* suggestion, the "Salsa Garden Guild" on page 259. This is fast growing, suitable for many biomes, zones 3-9, and it relates to animal cultures such as bees, beetles, butterflies, and other pollinators.

*Perennial Vegetables: From Artichokes to Zuiki Taro, A Gardener's Guide to Over 100 Delicious, Easy-to-Grow Edibles* by Eric Toensmeier and Elayne Sears

*Edible Landscaping with a Permaculture Twist: Have Your Yard and Eat it Too* by Michael Judd and Matthew Von Herbulis

*Gaia's Garden: A Guide to Home-scale Permaculture* by Toby Hemenway

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# Mimicking Forest Systems

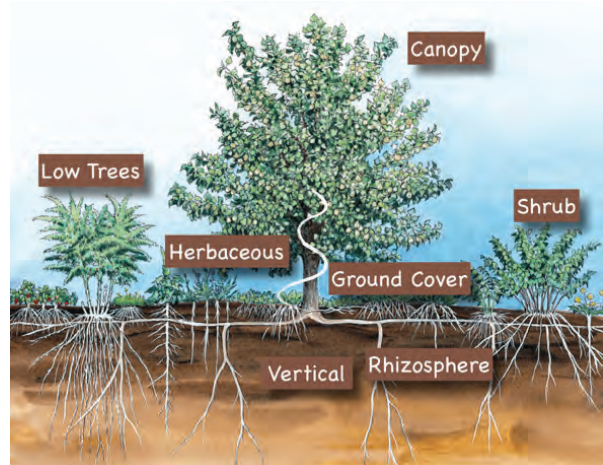


## Objective

To introduce the learner to the manner in which a food forest system works. Permaculture concepts such as stacking function are also introduced.

## Background

Bill Mollison, an Australian first developed the principals of permaculture in the late 1970's. He described it as "working with, as opposed to working against, nature." Permaculture advocates observe the way plants grow in a community, or guild, and then derive principals that guide the design of agricultural systems. This lesson was written by Jayne Cobb, Slow Food Leader and Montessori teacher in Sarasota, Florida.



## Materials

1. A set of laminated cards with the following words printed in large type: Low trees, Herbaceous, Vertical, Ground Cover, Rhizosphere, Canopy and Shrub. Use yarn or string to make a necklace for each card so that it can hang around the learner's neck.
2. Information as a separate hand out or on the backs of the cards that give food forest examples of each layer. Ex. Rhizosphere: Carrots, ginger, horseradish
3. Short stool. (optional)
4. (Optional) Food forest costumes:

**Canopy:** A pair of green gardening gloves that have felt leaves glued to the finger tips. A hood or drape for the head and shoulders that is also covered in felt leaves.

**Low Trees:** A short cape that can be tied about the shoulders covered in felt leaves.

**Shrub:** Same as low tree

**Herb (Herbaceous):** Same as Low tree

**Ground cover:** Long narrow cape with leaves glued to the cape. A tie is at the neck

**Root (Herbaceous):** A shoe cover that has brown yarn for roots glued to it.

**Vining (Vertical):** Long green felt strip - leaves glued to it like a vine.

5. Background information on the mutually beneficial aspects of a food forest. Inquiry questions for each layer.

**6. Extension preparation:** Picture cards could be made and laminated. Each card is an example of species in layers. Color codings could quickly separate the various layers For example: for the herbaceous layer cards: fennel, mint, comfrey, parsley and basil.

## Preparation

- Put stool in the center of the room.
- If using costumes have ready.
- Lay out necklaces.
- Have support materials ready.

## Activity

**1.** Sit in a circle and explain to learners that we will be making discoveries about a food forest. Note that there are 7 different layers and you will need a student to portray each layer. Each student of 7 learners will have a part. Advise the students that you will do the exercise multiple times should you have more than 7.

**2.** Learners are advised that like plants they can move very gently as if blowing in wind, however their feet stay motionless on the ground.

**Canopy:** Gloves are donned and the child stands on the stool with outstretched hands.

**Low Trees:** A short cape is donned and the learner stands with hands on hips next to the canopy

**Shrub:** A short cape is donned and the learner kneels under the canopy.

**Herbaceous:** A short cape is donned and the learner sits on the floor.

**Ground cover:** A Long narrow cape with leaves tied around the neck and the learner lays on the floor. (If activity is done outside, provide a towel)

**Rhizosphere:** A cover that has brown yarn for roots is used to cover shoes.

## Discussion

**Discuss the following questions:** What yield will I get from this guild? What will it produce? Which plants or layers might shade and protect other plants? What plants might shelter wildlife? Which layer might drop leaves for mulch? What plants might fertilize the soil? What layer might hold water in the guild? What layer might prevent soil erosion?

## Further Exploration

Design a simple guild system with learners. Consult plant hardiness zones and information on microclimates before you begin. It is helpful to communicate with members of your community that have a working established guild.

## Resources

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# Planning a Perennial Garden



**Objective** Learners will understand the microclimates of their schoolyard and match them to cultivation requirements of perennials.

**Background** Gardens are intimately tied to the specific landscape in which they are located. Often learners do not know anything about the local environment of their schoolyard. This activity will help them to figure out the best location for a perennial garden in their school, as well as how to design a garden.

**Materials** **For each group:**  
Graph paper  
Pencil  
Clipboard  
2-3 copies of the **Garden Site Checklist**, page 238.

**For the discussion:**  
Map of the school grounds, retrieved from Google Maps or a landscape master plan  
Pencil or marker

- Activity**
1. Divide the learners into groups of 5-8. Assign a volunteer or teacher to each group.
  2. Give each group 2 Garden Site checklists, pencil and clipboard.
  3. Explain the purpose of the activity. Each group will take one portion of the schoolyard and look for a site that is best for a perennial edible garden that requires rich soil and one that requires average soil.
  4. Before you start, have the learners reorient themselves to the schoolyard. Where is north? Where does the morning sun come up? Which direction is the sunset?
  5. Send the learners out for 15 minutes to different sections of the schoolyard. Have each group pick 1 or 2 places that they think will make a good garden. Fill out the checklist for each site.
  6. Gather together again for the discussion.
  7. Decide as a group which sites are the most favorable. Mark them on a map of the school grounds. Add anything that needs to be changed to make the site work for a garden.
  8. Give the potential site list to the principal, facilities manager and school garden committee for approval. Include any items such as soil amendments or mulch that will be needed to make the site successful.

# Planting a Perennial Garden



## Materials

Plants (use the **Edible Perennial Chart**, page 200 to help with choices)  
1 sheet Coroplast (plastic corrugated sheet)  
Metal landscape stakes  
Permanent markers  
1-2 shovels for large shrubs  
10 small trowels  
1-2 bags pea gravel  
Garden journals  
Pencils

## Preparation

1. Before class, prepare the area you would like to use as your perennial bed by digging and loosening the soil, as well as removing all weeds. If you have heavy clay, consider adding something like Clay Busters to help break up the soil.
2. Cut the sheet of Coroplast into rectangles (3" x 8"). Make sure that the tubes run vertically. Ease a metal stake in between the corrugations so that you have a sign.
3. Bring all of the supplies outside. Keep the trowels to one side.
4. Hook up a hose or other watering source.

## Activity

1. Place the plants around where you think they will look best. Arrange taller plants towards the west or north, so that they will not shade the shorter plants in the morning. Make sure that plants with similar water requirements are together. Raspberries and blackberries will need support, either a short fence or near stakes.
2. Give the learners trowels and show them how to remove plants from their pots: Place the pot on its side on the ground and slowly roll the container back and forth to loosen the soil. Grasp it by the base and slide it out of the pot. Gently pull the roots apart so that the roots will grow out and not in a circle.
3. Place the plant into the hole and pat the soil around it. It should be level with the ground, not sitting above it.
4. Place mulch around the plants. Water them thoroughly.
5. Give each learner a sign and a sharpie. Have them write the name of the plant on the sign and place it next to the plant.



# Edible Perennial Chart

Name	Latin Name	Cold Tolerant*	Type of Plant	Water	Soil	Sun/Shade	Harvest
<b>Almond</b>	Prunus dulcis	No	Tree	Medium	Garden	Sun	Fall
<b>Apple</b>	Malus domestica	Yes	Tree	Medium	Garden	Sun	Fall
<b>Apricot</b>	Prunus armeniaca	Yes	Tree	Medium	Garden	Sun	Summer
<b>Artichoke</b>	Cynara scolymus	No	Plant	Low	Garden	Sun	Spring/Fall
<b>Asparagus</b>	Asparagus officinalis	Yes	Plant	High	Garden	Sun	Spring
<b>Avocado</b>	Persea americana	No	Tree	Medium	Garden	Sun	Summer
<b>Banana</b>	Musa x paradisiaca	No	Large shrub	High	Garden	Sun	Summer
<b>Blackberry</b>	Rubus	Yes	Vine	Medium	Any	Sun	Summer
<b>Currants, clove scented</b>	Ribes odoratum	Yes	Shrub	Low	Lean	Sun/Pt shade	Summer
<b>Currants, golden</b>	Ribes aureum	Yes	Shrub	Low	Lean	Sun/Pt shade	Summer
<b>Currants, red</b>	Ribes rubrum	Yes	Shrub	Medium	Garden	Sun	Summer
<b>Currants, white</b>	Ribes album	Yes	Shrub	Medium	Garden	Pt Shade	Summer
<b>Elderberry</b>	Sambucus nigra	Yes	Large shrub	Low	Any	Sun	Late Sum
<b>Fig</b>	Ficus carica	No	Tree	Low	Any	Sun	Summer/Fall
<b>Filbert</b>	Corylus maxima	No	Large shrub	Medium	Garden	Sun	Fall
<b>Gooseberry</b>	Ribes grossularia	Yes	Shrub	Medium	Garden	Sun/Pt shade	Summer
<b>Grape</b>	Vitis vinifera	Yes	Vine	Low	Garden	Sun	Fall
<b>Guava</b>	Psidium guajava	No	Tree	Medium	Garden	Sun	Winter/Spring
<b>Horseradish</b>	Amoracia Rusticana	Yes	Plant	Low	Any	Sun	Fall
<b>Jerusalem Artichoke</b>	Helianthus tuberosus	Yes	Tall Flower	Low	Any	Sun	Fall
<b>Jostaberry</b>	Ribes nigrolaria	Yes	Shrub	Medium	Garden	Sun/Pt shade	Summer
<b>Kinnikinnick</b>	Arctostaphylos uva ursi	Yes	Groundcover	Low	Lean	Sun	Fall
<b>Lemon</b>	Citrus limon	No	Tree	Medium	Garden	Sun	Winter
<b>Lime</b>	Citrus aurantifolia	No	Tree	Medium	Garden	Sun	Winter
<b>Lychee</b>	Litchi chinensis	No	Tree	Medium	Garden	Sun	Summer
<b>Mango</b>	Mangifera indica	No	Tree	Medium	Garden	Sun	Summer
<b>Orange</b>	Citrus sinensis	No	Tree	Medium	Garden	Sun	Winter
<b>Papaya</b>	Carica papaya	No	Tree	Medium	Garden	Sun	Spring
<b>Passionfruit</b>	Passiflora edulis	No	Vine	Low	Garden	Sun	Winter
<b>Pawpaw</b>	Asimina triloba	Yes	Large shrub	Medium	Any	Sun/Pt shade	Fall
<b>Peach</b>	Prunus persica	Yes	Tree	Medium	Garden	Sun	Late Sum
<b>Pineapple</b>	Ananas comosus	No	Plant	Medium	Garden	Sun	Summer
<b>Plum</b>	Prunus cocomilia	Yes	Tree	Medium	Garden	Sun	Late Sum
<b>Pomegranate</b>	Punica granatum	No	Large shrub	Medium	Garden	Sun	Fall
<b>Raspberry</b>	Rubus ideaeus	Yes	Shrub	Medium	Garden	Sun	Sum/Fall
<b>Rhubarb</b>	Rheum palmatum	Yes	Plant	Medium	Garden	Sun	Spring
<b>Sand cherry</b>	Prunus pumila	Yes	Shrub	Low	Lean	Sun	Summer
<b>Service berry</b>	Amelanchier Alnifolia	Yes	Large shrub	Low	Any	Sun/Pt shade	Summer
<b>Sour cherry</b>	Prunus cerasus	Yes	Tree	Medium	Garden	Sun/Pt shade	Early Sum
<b>Strawberry</b>	Fragaria virginiana	Yes	Groundcover	Medium	Garden	Sun	Varies
<b>Strawberry, alpine</b>	Fragaria vesca	Yes	Groundcover	Medium	Garden	Pt shade	Varies

\*Cold tolerant means that the plant can survive winters with prolonged freezing

# Homemade Jam



**Objective** Learners will be able to distinguish between jam and jelly as well as to make simple jams.

**Background** Jam uses the fruit pulp while jelly uses only the juice. Many different kinds of jam can be made from edible perennial berries. Mix them together or leave them separate. Good choices are rhubarb, strawberries, raspberries, currants, gooseberries, blackberries and jostaberries. Fruits with more pectin like raspberries, currants and gooseberries will set up more firmly, but they are all delicious.

Do not skimp on the sugar or the jam will not set properly. If you wish to make a low sugar jam, you will need to add pectin or apples.

For food safety reasons, we do not recommend canning in a classroom environment. These jams should be eaten in class with yogurt, pancakes or biscuits. If you have access to a kitchen, such as a home economics classroom, canning may be possible.

## Materials

### For each group:

Measuring cups  
Cutting boards  
Paring knives (for some fruit)

### For the class:

Induction burner  
Large pot  
Potato masher  
Wooden spoon  
Ladle  
Heat proof bowl or container

## Preparation

- Wash all of the fruit and drain it in a colander.
- Make sure everyone has washed his/her hands.
- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized.
- Divide the class into groups of no more than 8 learners with one adult per group.
- Remind learners of knife techniques and safety. For more information, see page 46 of the *Slow Food USA Good Curriculum*.
- Review the recipe so learners know what to do.
- Do not have learners read the recipe while cooking.

This recipe does not require much preparation. If you have a large group of learners who need to stay busy, pair it with a more labor intensive recipe like biscuits, crepes or lefse (potato pancakes).

## Discussion

- Have the learners compare the jam with the fresh fruit. Which is their favorite?
- What is pectin and its purpose in jam?
- Is the flavor of the jam stronger or more mild than the flavor of the fresh fruit?
- Why do people make jam?





# Recipe **Homemade Jam**

## Ingredients

- 6 cups fruit
- 4 cups sugar
- ½ cup water
- 2-3 tablespoons fresh lemon juice (for low pectin fruit, or to taste)

## Method

1. Refer to the Pectin chart to see if your fruit is low in pectin. If so, make sure to add the lemon juice, and you may have to boil the jam for a longer amount of time.
2. If you are using rhubarb, strawberries, or other large fruit, cut it into ½” pieces and remove any pits or seeds. Otherwise, just rinse and drain the fresh fruit.
3. Put all of the fruit into a large pot and add just enough water to cover the bottom of the pan. Cover tightly and bring to a high heat. When the fruit is steaming, turn it down to low and let simmer for 5-10 minutes, or until the fruit is soft. Mash with a potato masher.
4. If you are using fruit with a lot of seeds like currants, put it through a food mill. Save the pulp and discard the seeds. It is not necessary for strawberries, raspberries and blackberries. These fruits are fine with the seeds.
5. Measure the cooked fruit pulp. For every 1 cup of pulp, you will need ¾ cup of sugar.
6. Place the sugar and the pulp into a large pot. Bring to a boil and simmer for approximately 5-10 minutes. Add the lemon juice to taste. Do not let it boil over.
7. The bubbles will begin to thicken. Test the jam by placing a drop on a cold plate. It should stand up and not run on the plate when you tip it slightly. Or, let the jam drop from the spoon back into the pan. When it is thick enough for the drops to come together and fall from the spoon in a sheet, then it is ready.
8. Let cool before serving. It is extremely hot.



## Pectin Chart

### High Pectin Fruits

*No added pectin necessary*

Black currants  
Crab apples  
Cranberries  
Gooseberries  
Plums (unripe)  
Quinces  
Red and white currants  
Citrus fruits  
Cooking apples

### Medium Pectin Fruits

*Needs lemon*

Apricots  
Cranberries  
Grapes (unripe)  
Loganberries  
Medlars  
Morello cherries  
Plums (ripe)  
Raspberries  
Blackberries  
Blueberries

### Low Pectin

*Needs lemon or add high pectin fruit*

Wild blackberries  
Cherries  
Figs  
Grapes (ripe)  
Melons  
Nectarines  
Peaches  
Pears  
Rhubarb  
Strawberries

# Sunchoke Salad



## Objective

Learners will be able to prepare and cook sunchokes so that they will be eaten in a sunchoke salad.

## Background

Jerusalem artichoke, (*Helianthus tuberosus*), is the tuber of a variety of perennial flower in the aster family. The flowers look like small yellow sunflowers. Also marketed as sunchokes, these gnarly little tubers look a lot like ginger root. Perhaps the most important root cash crop to originate in North America, the tuber has a potato-like texture often recommended as a potato substitute for diabetics.

Sunchokes store their carbohydrates in a form of inulin, a starch that is not utilized by the body for energy, unlike sugar. They are recommended as a potato substitute for diabetics, since they are filling but not absorbed by the body, and because they also show indications of assisting in blood sugar control. High in iron, potassium and thiamine, low-fat sunchokes also feed the healthy bacteria (*lactobacilli*) in the intestinal tract. However, they can cause flatulence in some people and first tastings should be in small amounts. For this reason, they are always cooked before eating.

Harvest the roots in the fall, after the first frost. They quickly dry out, so harvest them as needed throughout the winter. Discard tops in the compost pile, after cutting into short lengths.

## Materials

### For the sunchoke group:

Collander  
Plastic bags (to store extra sunchokes)  
For the salad group:  
Measuring cups  
Chopping boards  
Paring knives (for some fruit)  
Large mixing bowl

### For cooking:

Induction burner  
Large pot  
Slotted spoon

## Preparation

- Keep one table for sorting through the roots and saving some to replant. Do not cook on this table.
- Wash and scrub all of the sunchokes that you are going to eat.
- Make sure everyone has washed his/her hands

## Set Up

If you have just harvested the sunchokes, make sure to trim them outside and remove as much dirt as possible. Split the class into two groups. Have one group sort through the roots, picking out the biggest, while the other group prepares the salad ingredients. Save some tubers for replanting.

## Eating and Evaluation

What do the sunchokes (Jerusalem Artichokes) taste like?  
Can you think of other ways to eat them?

## Recipe Sunchoke Salad

### Ingredients

- 1 lb sunchokes
- ½ red pepper
- ¼ red onion
- ¼ cup parsley
- 2 tablespoons fresh mint
- 1 tablespoon cider vinegar
- 2 tablespoons olive oil salt and pepper

### Method

1. As soon as the sunchokes are clean, boil them whole for 20 minutes, until they are tender. Rinse in cold water and let cool. Remove the peels with a small knife or with your fingers.
2. Cut the pepper and onion into thin slices. Slice the sunchokes and toss them with the pepper strips, red onion, parsley, mint, vinegar, and oil.
3. Season with salt and pepper to taste.



# Potato Horseradish Pancakes



## Objective

Learners will be able to make vegetable pancakes seasoned by horseradish and be able to identify the plant.

## Background

Horseradish (*Armoracia laphathifolia* and *A. rusticana*), is most likely from Russia or Hungary. It is related to the mustard family, hence its biting flavor and aroma. At one time, horseradish was referred to as “German mustard.”

Used for thousands of years, horseradish is one of the five symbolic bitter herbs celebrated in the Jewish Passover Seder.

Harvest roots in the spring or fall, making sure that the roots are crisp and well formed.

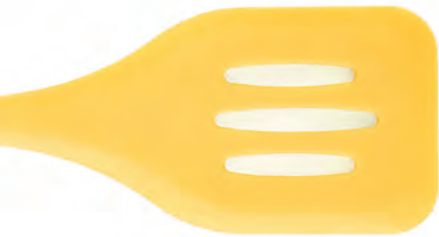
## Materials

### For each group:

Peelers  
Measuring cups  
Measuring spoons  
Chopping boards  
Graters  
Large mixing bowl  
Colander  
Wooden spoon

### For the class:

Nonstick frying pan  
Induction burner



## Preparation

- Wash all of the ingredients and drain in a colander.
- Make sure all of the desktops and/or counters are cleared of materials, cleaned and sanitized.
- Make sure everyone has washed his/her hands.
- Divide the class into groups of no more than 8 learners with one adult per group.
- Remind learners of knife techniques and safety. For more information, see page 46 of the *Slow Food USA Good Curriculum*.
- Review the recipe so learners know what to do. They should not read the recipe while cooking.

## Set Up

1. Each table should have the ingredients in the middle of the table ready to go.
2. Do not pass out the chopping boards and tools until after the learners have listened to the instructions.

## Eating and Evaluation

How is the spiciness of the horseradish different from that of a hot pepper?  
Where do you feel it?

## From the Garden

Consider mixing other root vegetables such as rutabaga, sweet potato, parsnip or golden beets in with the grated potato.



# Recipe Horseradish Potato Pancakes

## Ingredients

4" piece of horseradish root  
4 baking or russet potatoes, scrubbed clean  
1 medium onion, grated  
Juice of ½ lemon  
2 tablespoons all-purpose flour or corn flour  
2 large eggs, lightly beaten  
½ teaspoon lemon zest  
¼ cup chopped fresh chopped chives  
¾ teaspoon kosher salt  
½ teaspoon freshly ground pepper  
2 tablespoons vegetable or olive oil  
1 tablespoons butter (optional)  
Salt to taste  
1 cup plain Greek yogurt for garnish

## Method

1. Peel and grate the horseradish. Peel and grate the potatoes. Grate or mince the onions.
2. Rinse the grated potatoes in cold water with the lemon juice. Drain the potatoes and squeeze dry with paper towels.
3. Toss grated potatoes, horseradish, onions, and flour in a large bowl to mix well. Stir in eggs, lemon zest, chives, salt, and pepper until well combined.
4. Heat olive oil and butter in a large, heavy non-stick skillet over medium-high heat until hot. Spoon about 2 tablespoons of mixture into the hot oil for each cake. Fry about 4 minutes on each side until nicely browned. Drain on paper towels. (You will need to fry the potato pancakes in batches.)
5. Mix together the yogurt and ½ teaspoon of salt. Season cakes with additional salt, if desired, and serve with a dollop of yogurt.



# Worksheets



# Ark of Taste Information Form

What is the name of your special food? \_\_\_\_\_

## What kind of food is it?

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Bread and oven-baked salted products | <input type="checkbox"/> Fresh and dried fruit                                    | <input type="checkbox"/> Pulses (e.g. dried beans or peas)                            |
| <input type="checkbox"/> Breeds, animal                       | <input type="checkbox"/> Grape varieties  | <input type="checkbox"/> Salt   |
| <input type="checkbox"/> Cacao                                | <input type="checkbox"/> Herbs and spices   | <input type="checkbox"/> Tea  |
| <input type="checkbox"/> Cakes and biscuits                   | <input type="checkbox"/> Honey and bee related products                           | <input type="checkbox"/> Vegetable and fruit preserves (e.g. jams, sauces, juices...) |
| <input type="checkbox"/> Cereals and flours                   | <input type="checkbox"/> Oils   | <input type="checkbox"/> Vegetables   |
| <input type="checkbox"/> Cheeses and dairy products           | <input type="checkbox"/> Pasta  | <input type="checkbox"/> Vinegar  |
| <input type="checkbox"/> Coffee                               | <input type="checkbox"/> Preserved fish (e.g. botargo, in oil and salted fish...) | <input type="checkbox"/> Other  |
| <input type="checkbox"/> Fish                                 |   |   |

Describe what your food looks like: \_\_\_\_\_

\_\_\_\_\_

Describe what it tastes and smells like: \_\_\_\_\_

\_\_\_\_\_

What is the story about your food? (What is its importance in your family?) \_\_\_\_\_

\_\_\_\_\_

Where does it come from? \_\_\_\_\_

\_\_\_\_\_

Is it endangered, at-risk, or underappreciated? \_\_\_\_\_

\_\_\_\_\_

How do you grow or make it? \_\_\_\_\_

\_\_\_\_\_

Is it made or grown in small amounts? \_\_\_\_\_

\_\_\_\_\_

Photographs or drawings: Do you have a photo or drawing of your special food? \_\_\_\_\_

\_\_\_\_\_

Name and Contact Information (Of the learner submitting the application) \_\_\_\_\_

\_\_\_\_\_

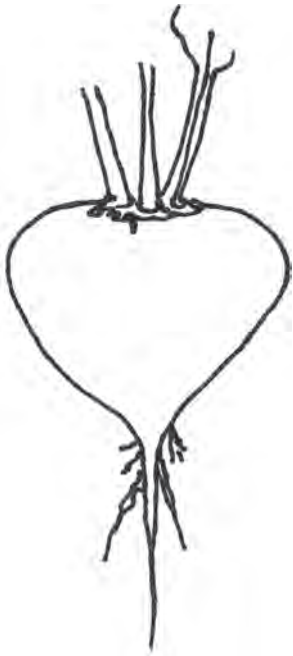
Why is this food important to you? \_\_\_\_\_



# Roots or Tubers?

## Tap Roots

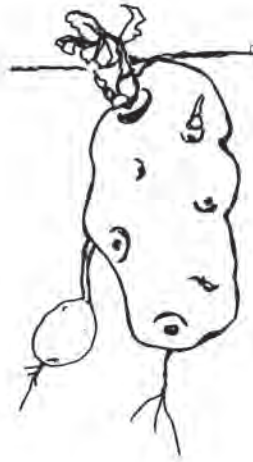
- Have a core
- Are the main support of the plant
- Have side (lateral) roots



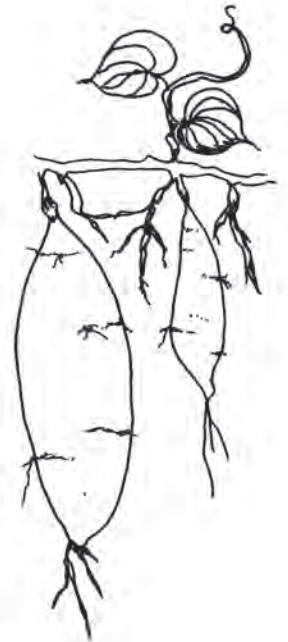
Beet-Tap root

## Tubers

- Are starchy and fleshy
- Are underground storage
- Stem tubers have eyes and are part of the plant stem
- Root tubers are the thick part of a fibrous root



Potato-stem tuber



Sweet Potato-Root tuber

List plants that are tap roots:

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List plants that are tubers:

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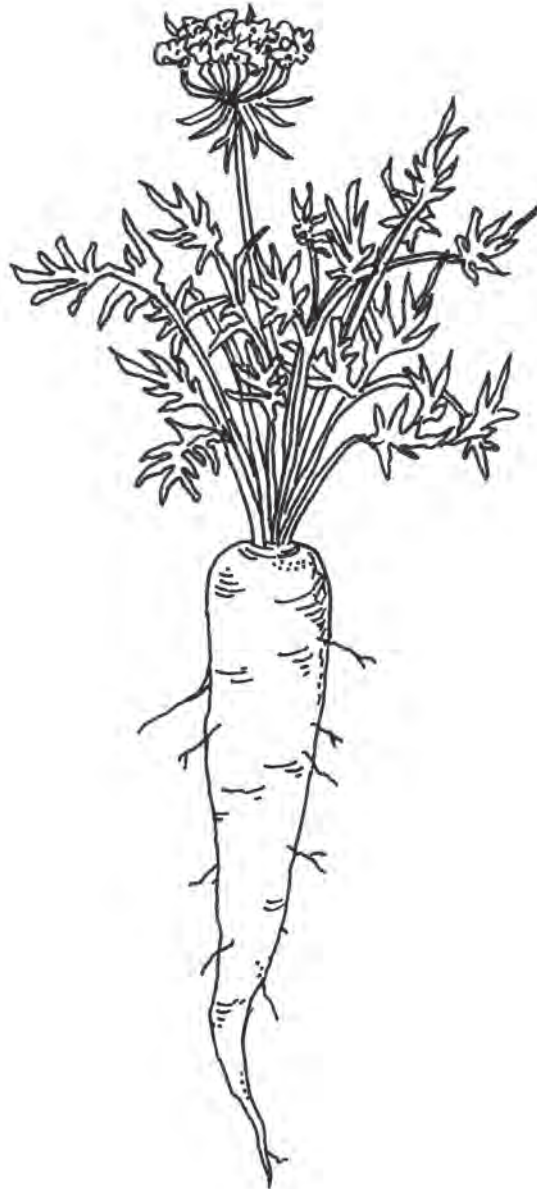
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# Carrot Worksheet

*Daucus carota*



carrot seed



carrot seedling



Thumbelina carrot



Nantes carrot

ILLUSTRATIONS: Barbara Feige

# Carrot Worksheet

*Daucus carota*

**Part of Plant** Root

**Plant Family** Parsley/Apiaceae

**Languages** **Spanish** *zanahoria* **Italian** *carota* **French** *carrotte*

**Origin** Afghanistan

**Planting** A semihardy vegetable, plant carrots in early spring or late fall in warm winter areas. Thin plants to 4" apart.

**Cultivation Tips** Carrots are slow to germinate and need regular moisture. They will not sprout in hot weather. They grow best in sandy or loose soil, so that the roots can grow straight and long. Grow by either broadcasting as in a square foot garden or by planting in rows. Try a mix of varieties to see which type grows best in your area.

**Harvest** Harvest mid to late season, when tops of the carrot root are visible.

**History** Wild carrots probably come from Persia and central Asia 5000 years ago and were originally either purple or white. Domesticated carrots were first developed 1100 years ago in Afghanistan. The Dutch bred the first modern orange carrots.

**Uses** Carrots can be steamed, sautéed, roasted or puréed. They are commonly used in soups, stews, and as a side vegetable. Raw grated carrots are good in salads. Carrot juice is popular as a good source of beta carotene, precursor to Vitamin A

# Beet Worksheet

*Beta vulgaris*



ILLUSTRATIONS: Barbara Feige



Candy Striped Beets



Sugar Beets



Beet seeds

# Beet Worksheet

*Beta vulgaris*

**Part of Plant** Root and leaves

**Plant Family** Beet/Chenopodiaceae

**Languages** **Spanish** *betabel* **Italian** *barbabietolo* **French** *beterave*

**Origin** Mediterranean

**Planting** A semi hardy vegetable, plant beets in early spring or late fall in warm winter areas. Thin plants to 4" apart.

**Cultivation Tips** Grow by either broadcasting as in a square foot garden or by planting in rows. Try yellow beets and candy striped (chioggia) beets. If beets lack flavor, supplement soil with trace minerals and fertilizer. Water well.

**Harvest** Harvest mid to late season, when tops of the beet root are visible.

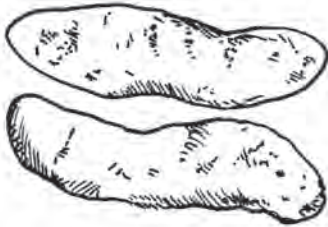
**History** Beets were first mentioned 2800 years ago in Mesopotamia. Both leaves and roots are edible. In the 1700's, the white beet was developed and used to make sugar, a major commercial crop in the United States.

**Uses** Usually eaten cooked in soups and salads. Beets can be cooked by steaming or roasting. You can also eat it grated raw in salads. Often paired with walnuts, garlic and feta or goat cheese. Beets can be easily pickled, especially with turnips, as an addition to Middle Eastern meals. Beet powder can be used as a coloring for desserts or pastas. Beet juice is high in antioxidants and carotenes.



# Potato Worksheet

*Solanum tuberosum*



Russet



New



Fingerling



Yukon Gold

ILLUSTRATIONS: Barbara Feige

# Potato Worksheet

*Solanum tuberosum*

**Part of Plant** Stem Tuber

**Plant Family** Nightshade/Solanaceae

**Languages** **Spanish** *papa* **Italian** *patata* **French** *pomme de terre*

**Origin** Peru

**Planting** A tender vegetable, plant in the spring, after the last frost date. Cut seed potato into pieces so that each piece has at least 3 eyes. The eyes are sprouts; at first they look like indentations with a small white knob at the center. Plant the potato in the bottom of a raised bed or trench. Another planting method is to place them in the middle of a round cage or fence, covered with 6" of compost. As they grow, mulch them with alternating layers of straw and compost.

**Cultivation Tips** As the potato vine grows, cover it with soil or mulch. Lift the edges of the raised bed or dig gently for potatoes to harvest. Potatoes are actually a tuber that is part of the stem.

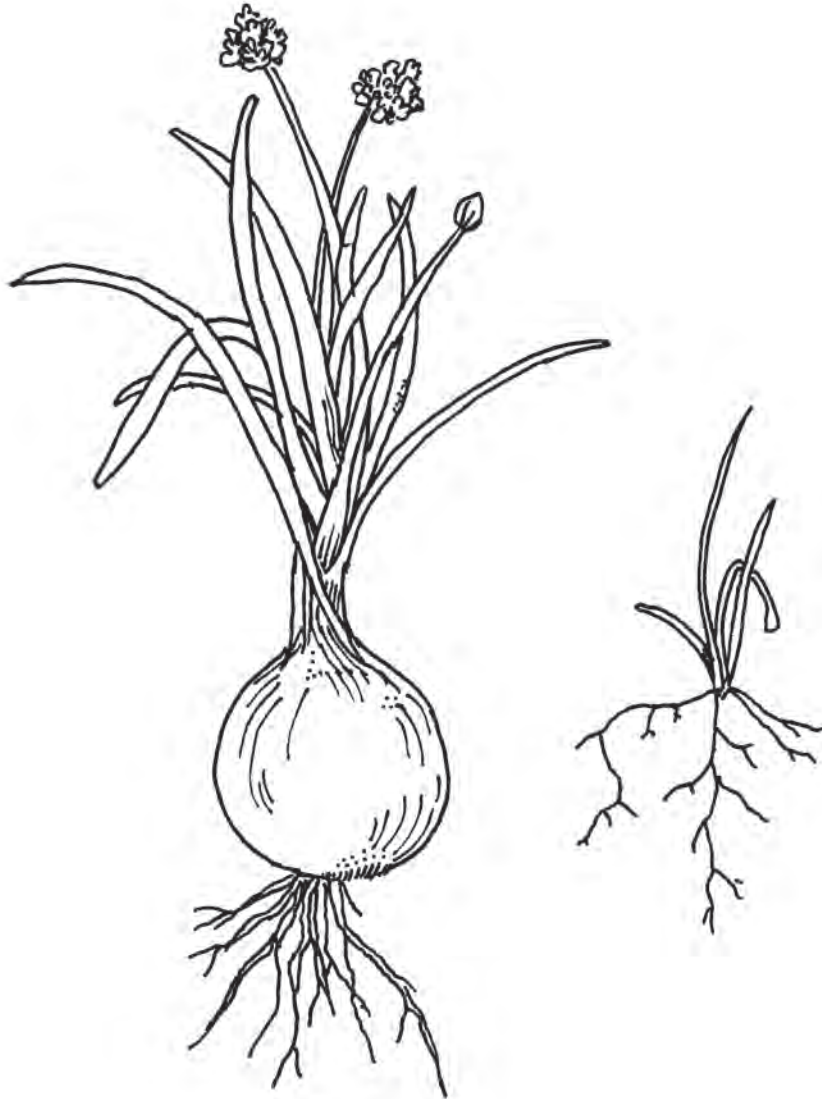
**Harvest** Potatoes may be harvested after they have bloomed, until the top vines begin to die, usually July until the first frost. Use a spading fork to loosen the earth and find the potatoes. If you have grown them in a cage, remove the cage and dig through the mulch with your hands. Be careful, or you may damage the potatoes with your gardening tool.

**History** Potatoes are the fourth most commonly grown food crop. They were first domesticated in Peru 7,000-9,000 years ago. They are adaptable to many climates and soil types. They grow in northern wet climates that are difficult for grains and were widely adopted in Europe in the 16th century. However, they are susceptible to potato blight, and a crop failure caused the great Irish famine of the 19th century. Irish farmers were forced to be dependent on potatoes for a primary source of nutrients due to various political, social and economic reasons so when this monocrop failed, they starved.

**Uses** Potatoes must be eaten cooked. They may be fried, roasted, sautéed, steamed, boiled or stewed. They can be used in many dishes because they take on the flavor of the rest of the ingredients.

# Onion Worksheet

*Allium cepa*



Shallots



Leeks



Scallions



Onion Seeds

# Onion Worksheet

*Allium cepa*

**Part of Plant** Fleshy leaf base

**Plant Family** Lily/Liliaceae

**Languages** **Spanish** *cebolla* **Italian** *cipolla* **French** *oignon*

**Origin** Iran or India

**Planting** A hardy crop, plant onion seeds as soon as the ground can be sorked in the spring. Or, in short season climates, plant onion sets (small bulbs) early in the spring.

**Cultivation Tips** Cut off any onion flowers to provide more energy to the bulb. Onions prefer well drained, enriched soil. Easy varieties include bunching, shallots, cipollini.

**Harvest** Mid summer through fall. Onions can be thinned and harvested young; leave some to mature into larger bulbs.

**History** Wild onions are found throughout the world. They have been eaten more than 5000 years. Ancient Egyptians, Indians and Romans all enjoyed onions. Egyptians believed the onion was a symbol of eternity. Romans thought onions could cure vision problems, induce sleep and heal mouth sores.

**Uses** Onions are used as a background flavor in almost any savory dish. When fresh, to reduce the sharp flavor, soak them in vinegar or lime before serving. They can cooked with almost any method, and are especially delicious caramelized.

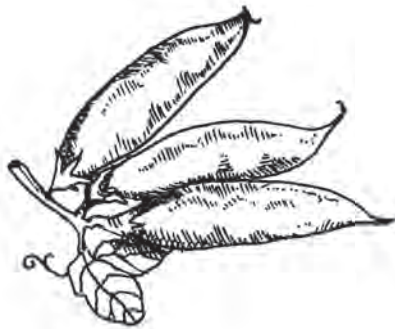


# Pea Worksheet

*Pisum sativum*



English Peas



Snow Peas



Pea seeds

# Pea Worksheet

*Pisum sativum*

**Part of Plant** Seed

**Plant Family** Legume/Fabaceae

**Languages** **Spanish** *chícharo* **Italian** *pisello* **French** *pois*

**Origin** Near East

**Planting** A hardy vegetable, plant in the early spring, as soon as the ground is soft. For successive harvests, plant a few rows every two weeks until mid May. Plant again in August for a fall harvest.

**Cultivation Tips** Soak the seeds 8-12 hours for better germination rates. Plant 3” apart. Look for varieties that do not need a trellis (short vines). For hot climates, look for heat resistant, short varieties: Wando, Oregon Sugar Snap.

**Harvest** June, September

**History** Peas, along with wheat, form one of the first farming products of the Near East and were grown at least 9,000 years ago. They were popular in Egyptian, Roman and Medieval cooking. They were used dried to make thick soups and porridges, like split peas are used today.

**Uses** Combine fresh peas with pasta, potatoes and other grains as well as parsley and mint. Use dried split peas to provide protein in soups. Fresh young pea greens can be added to salads.

# Tomato Worksheet

*Lycopersicon esculentum*



Cherry tomatoes



Pear tomatoes



Brandywine Tomato



Tomato seeds

# Tomato Worksheet

*Lycopersicon esculentum*

**Part of Plant** Fruit

**Plant Family** Nightshade/Solanaceae

**Languages** **Spanish** *tomate* **Italian** *pomodoro* **French** *tomate*

**Origin** Mexico

**Planting** A very tender plant, start seeds inside using warming mat, 10-12 weeks before last frost date. As they grow, transplant them into larger pots. Bury the plant when transplanting so that you only have 2 sets of leaves showing. The root system will be stronger. Transplant outside after all danger of frost has passed, burying the stems if the plant is leggy.

**Cultivation Tips** Best varieties for short seasons include cherry tomatoes, small salad tomatoes and plum tomatoes. Try interesting heirloom varieties as opposed to hybrids, and you will be able to save the seeds. Tomatoes thrive on well composted soil, but not high in nitrogen. Minimize overhead watering. Support plants by tying to a sturdy trellis, create a tripod from 8' bamboo poles, or a round cage made from 10 gauge concrete reinforcing wire. Prune suckers and low branches.

**Harvest** Late August-first frost

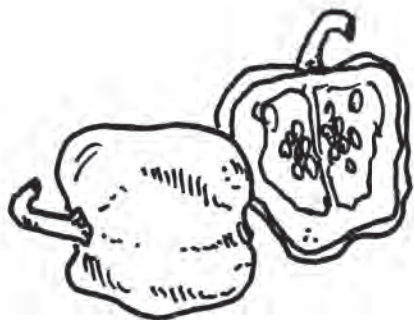
**History** Wild cherry tomatoes from the Andes region were the ancestors of the cultivated Mexican tomato. Both were described by early Spanish conquerors as being used in salsas. Tomatoes first traveled to Spain and then Italy, in the late 16th century. An early Italian cookbook from 1692 describes the first known Italian tomato sauce.

**Uses** Use cooked tomatoes in sauces, to add an acidic and slightly sweet flavor. Use them fresh in pasta and bean salads to help create a sauce. Roast them, halved, in a slow oven until soft and caramelized.



# Chili Pepper Worksheet

*Capsicum annuum*



Bell peppers



Serrano peppers



Banana peppers

# Chili Pepper Worksheet

*Capsicum annuum*

**Part of Plant** Fruit

**Plant Family** Nightshade/Solanaceae

**Languages** **Spanish** *chile* **Italian** *pepperoncino* **French** *piment*

**Origin** Latin America

**Planting** A very tender plant, start seeds inside using warming mat, 10-12 weeks before last frost date. As they grow, transplant them into larger pots. In short season areas, plant smaller peppers or jalapeños. Plant them about 1 foot apart.

**Cultivation Tips** Large peppers require staking. They can be harvested green, or all chiles will turn a warm color when they are ripe.

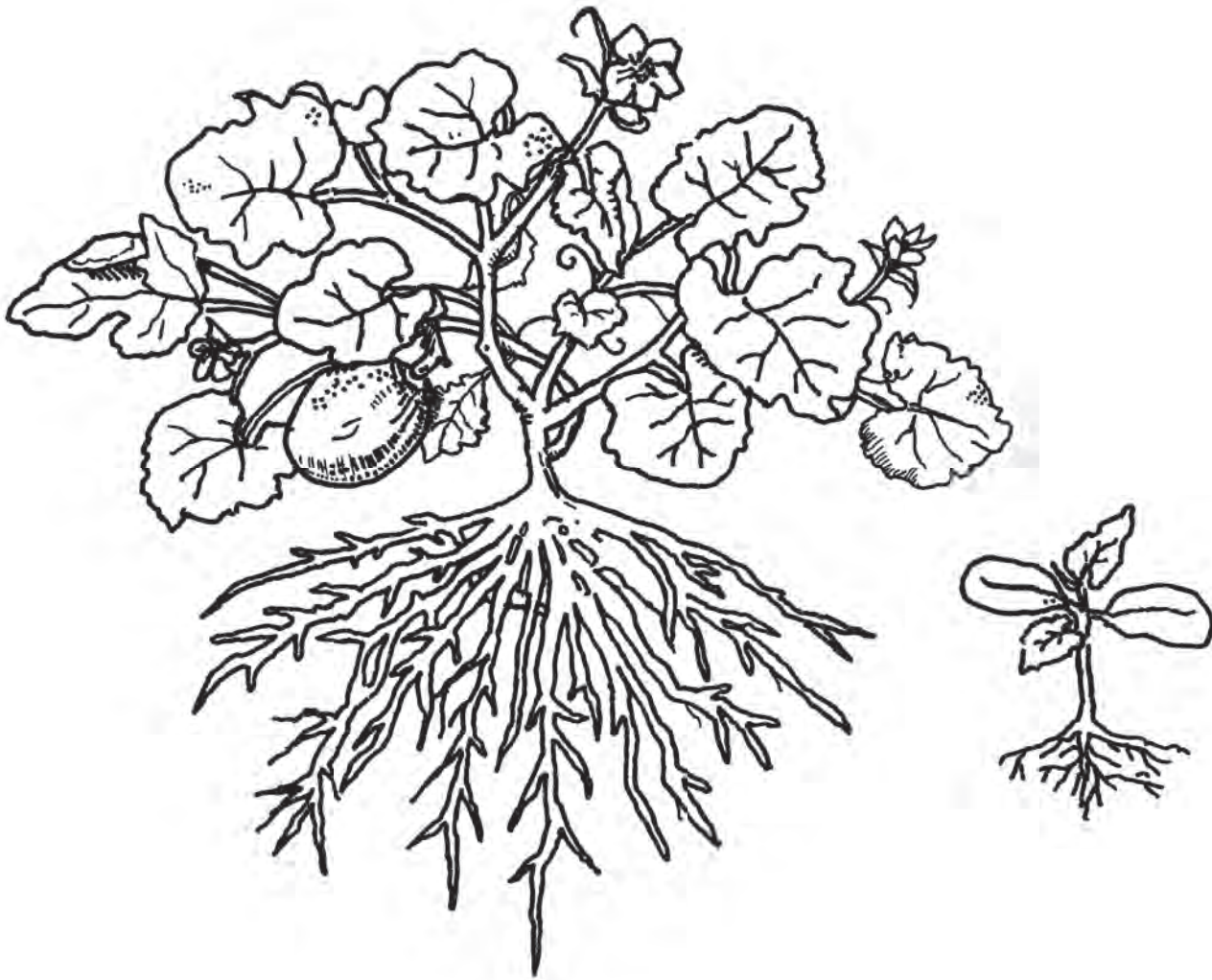
**Harvest** September-October

**History** All chili peppers (as opposed to black pepper) are descended from the Americas. Most are related to *Capsicum annuum*, first domesticated at least 6000 years ago in Mexico. Two other types were independently domesticated in the Amazon and Andes. Chili peppers have spread throughout the world after Columbus sailed to the Americas.

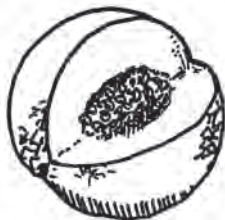
**Uses** Fresh chili peppers are used in sauces, stews, salads and salsas. Dried chiles are ground into powder or soaked and ground into a paste. These can be used as a spice, sauce, or condiment.

# Melon Worksheet

*Cucumis melo*



Horned melon



Cantaloupe



Watermelon



Melon seeds

# Melon Worksheet

*Cucumis melo*

**Part of Plant** Fruit

**Plant Family** Cucumber/Cucurbitaceae

**Languages** **Spanish** *melon* **Italian** *melone* **French** *melon*

**Origin** Middle East/Egypt-Iran

**Planting** A tender fruit, plant melons directly in ground after all danger of frost has passed. In northern climates, grow only short season varieties. Start indoors 4-6 weeks before date of last frost. Transplant into hollow, bowl shaped mounds, 3 plants to a mound 18" in diameter. Leave 2 ft of space between mounds. Plant in a hot location or near a wall. Red mulch may be effective for warmth.

**Cultivation Tips** Leave melons on the vine as long as possible to develop sweet flavor. Minimize overhead watering to reduce chance of mildew.

**Harvest** September, before first frost

**History** Melons were first cultivated by Arabic civilizations and did not appear in Europe until the 13th century. China developed cooking varieties. True cantaloupes are ribbed, like the French charentais. Our "cantaloupe" is a netted melon.

**Uses** Best used fresh, with compatible flavors such as honey, mint, orange water and salty, cured ham. Also good for agua fresca.



# Cucumber Worksheet

*Cucumis sativus*



Japanese cucumbers



Garden cucumbers



Cucumber blossom



Cucumber seeds

# Cucumber Worksheet

*Cucumis sativus*

**Part of Plant** Fruit

**Plant Family** Cucumber/Cucurbitaceae

**Languages** **Spanish** *pepino* **Italian** *cocomero* **French** *concombre*

**Origin** India

**Planting** A tender vegetable, plant cucumbers directly in ground after all danger of frost has passed. Cucumbers can be planted in bowls, or in trenches. Sow seed ½” deep, about 8-12” apart. Try Armenian, lemon, white and Japanese for more diversity.

**Cultivation Tips** Easy to grow and not fussy about soil. They can be trained to grow up a trellis. Bushmaster and Spacemaker are good for containers. Minimize overhead watering to reduce mildew problems.

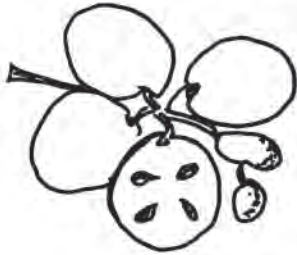
**Harvest** August-mid September, about 50-70 days after germination. Harvest continually for best production.

**History** One of the oldest vegetables, cucumbers have been cultivated for over 4000 years. Cucumbers were first grown in India and were used in ancient Persia, Greece and Rome. They were introduced to Haiti by Christopher Columbus.

**Uses** Primarily used raw or pickled, in cold soups or salads. Compatible flavorings include fresh herbs like dill, mint, parsley and cilantro. Commonly paired with yogurt.

# Fruit Types

Berry—grape



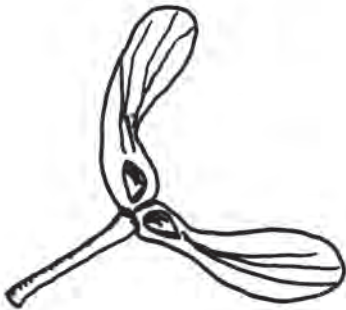
Agregate Drupe—raspberry



Achene—sunflower



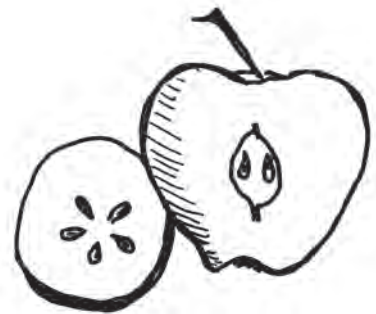
Schizocarp—maple



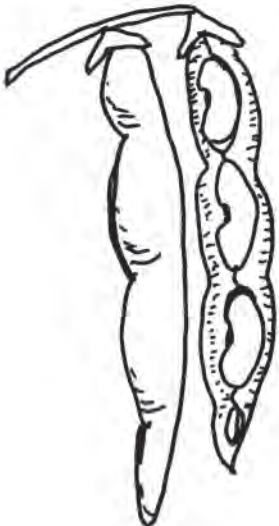
Drupe—cherry



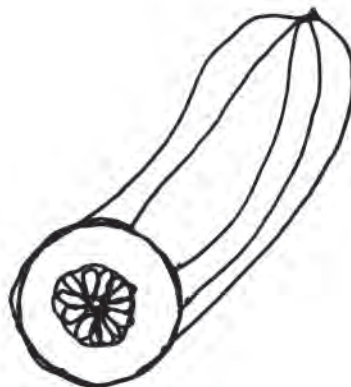
Pome—apple



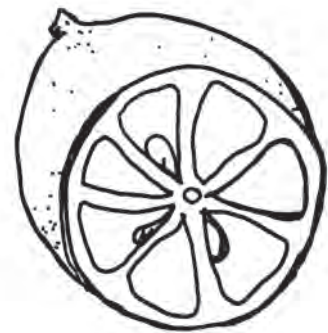
Legume—bean



Pepo Berry—cucumber



Hesperidium—lemon



# Fruit Types

Berry—grape

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Agregate Drupe—raspberry

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Achene—sunflower

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Schizocarp—maple

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Drupe—cherry

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Pome—apple

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Legume—bean

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Pepo Berry—cucumber

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Hesperidium—lemon

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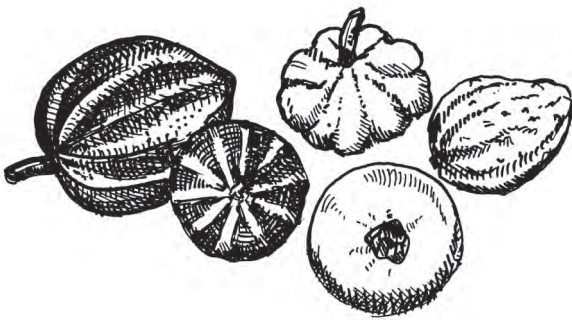
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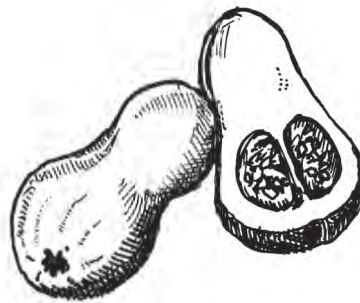


# Winter Squash Worksheet

*Curcubita*



Acorn, Dumpling, Jack B Little, Hokkaido, Red Kuri



Butternut Squash



Squash seeds

# Winter Squash Worksheet

*Curcurbita*

**Part of Plant** Fruit

**Plant Family** Cucumber/Cucurbitaceae

**Languages** **Spanish** *calabaza* **Italian** *zucca* **French** *courge*

**Origin** North America

**Planting** A tender plant, sow directly outside after last frost date. Plant inside deep furrows or concave mounds, with mulch around the edges. Smaller varieties may be planted on fences or trellises.

**Cultivation Tips** Minimize overhead watering and do not overwater. Winter squash is often planted as mulch around corn and beans as part of the three sisters. Good short season varieties include: delicata, acorn, and dumpling.

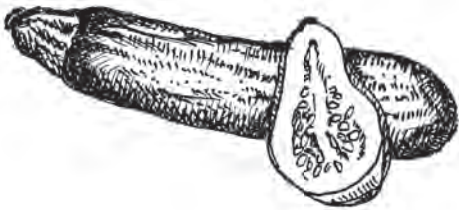
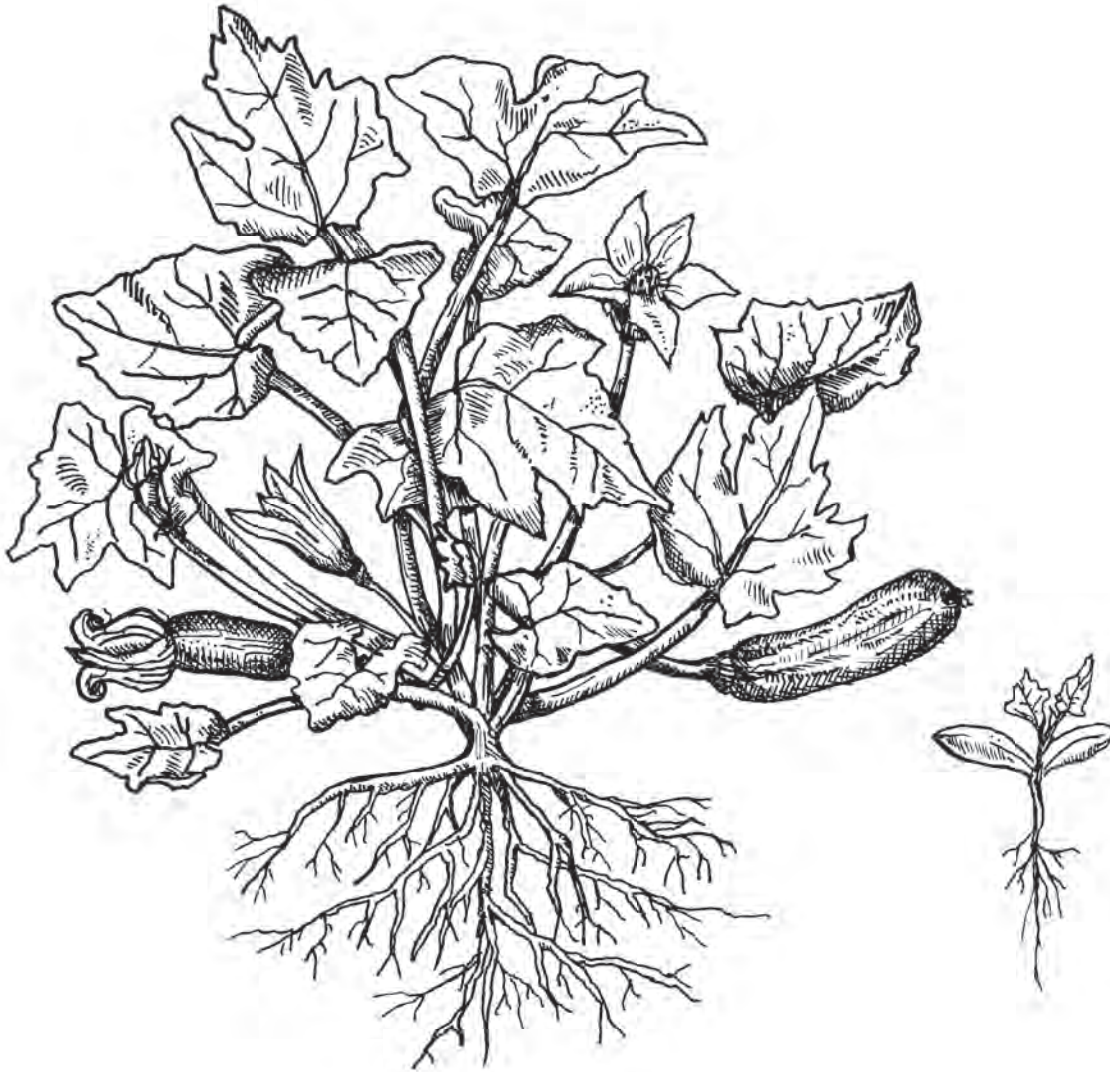
**Harvest** Harvest squash after vines begin to wither, but before the first frost: late September-October.

**History** Winter squash seeds have been found in Ecuador that are 12,000 years old. Native to the Americas, they were grown from Ecuador to New England and provided an easy source of calories.

**Uses** Winter squash can be boiled, roasted, steamed or puréed. It is used in both sweet and savory dishes, such as pies, breads, stews and soups. Seeds provide protein, minerals and fiber.

# Summer Squash Worksheet

*Curcubita pepo*



Zucchini



Crookneck, Pattypan and Calabacita



Summer Squash seeds

# Summer Squash Worksheet

*Curcubita pepo*

**Part of Plant** Fruit

**Plant Family** Cucumber/Cucurbitaceae

**Languages** **Spanish** *calabacita* **Italian** *zucchini* **French** *courgette*

**Origin** North America

**Planting** A tender vegetable, plant directly outside after last frost. Plant inside deep furrows or concave mounds, with mulch around the edges. Try zucchini rampicante on fences or trellises.

**Cultivation Tips** Minimize overhead watering and do not overwater. Harvest some male flowers (those without fruit) for frying or stuffing. Pick often, do not let summer squash grow large. Good varieties include: zucchini, patty pan, round and yellow.

**Harvest** late July-early September

**History** Like winter squash, summer squash is native to the Americas. However, the varieties we know were developed in Italy in the late 1800s. Summer squash are fruit that are not yet ripe, that is why the seeds are small and the peel is soft.

**Uses** Sauté in garlic and olive oil until browned and softened. Add to scrambled eggs. Grate and make into patties with eggs and breadcrumbs. Stuff with grains and flavorings and bake.



# Bees, Wasps or Flies? Worksheet

Use this sheet to help you decide whether you see bees, wasps or flies pollinating your flowers.

## Bees



Round  
4 wings  
Eyes on side  
Collect pollen in pollen baskets  
or hair on legs or abdomen

## Wasps



Cinched waist  
4 wings  
Eyes on side  
Not hairy  
Striped

## Flies



Flat  
2 wings  
Eyes in front  
Not hairy, don't collect pollen

Draw your favorite pollinator with the flower that it likes.

# Woody Herbs Worksheet

Perennials



**Rosemary**  
*Rosmarinus officinalis*



**Garden Sage**  
*Salvia officinalis*



**Thyme**  
*Thymus vulgaris*



**Oregano**  
*Origanum vulgare*



**Spearmint**  
*Mentha spicata*

# Woody Herbs Worksheet

Perennials

**Part of Plant** Leaves

**Plant Family** Mint/Lamiaceae

Languages	Herb	Spanish	Italian	French
	rosemary	<i>romero</i>	<i>rosmarino</i>	<i>roumarin</i>
	sage	<i>salvia</i>	<i>salvia</i>	<i>sauge</i>
	thyme	<i>tomillo</i>	<i>timo</i>	<i>thym</i>
	oregano	<i>orégano</i>	<i>origano</i>	<i>origan</i>
	spearmint	<i>hierba buena</i>	<i>mento</i>	<i>menthe</i>

**Origin** Southern Europe and the Mediterranean

**Planting** Woody perennials such as rosemary, thyme, sage, oregano and mint are easy to grow and prefer sandy, well drained soil. Plant early in the spring and mulch with gravel or wood chips in order to reduce mud splashing on the leaves.

**Cultivation Tips** Bees love herb flowers. Allow the herbs to bloom, but cut off dead flowers in order to encourage new growth. Water during dry winter months.

**Harvest** Late spring through fall. Herbs can be dried by hanging in a cool, dark place. Harvest in the morning for best flavor.

**History** Rosemary, Thyme and sage have been used in European and Mediterranean cooking since Greek times. Thyme was burned by the Greeks as an incense. Smelling rosemary is considered to enhance memory.

**Uses** Woody herbs are usually eaten cooked because of their strong flavor. Use in soups, pastas, stews, meats and with potatoes or beans. Fresh chopped mint brightens up peas, salads, pilafs and beans.

# Tasting Worksheet

Name of food you are tasting \_\_\_\_\_

Type \_\_\_\_\_



Yuck! Not good OK Like Yum!

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Type \_\_\_\_\_



Yuck! Not good OK Like Yum!

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\_\_\_\_\_

\_\_\_\_\_

Type \_\_\_\_\_



Yuck! Not good OK Like Yum!

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\_\_\_\_\_

Type \_\_\_\_\_



Yuck! Not good OK Like Yum!

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\_\_\_\_\_

Type \_\_\_\_\_



Yuck! Not good OK Like Yum!

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\_\_\_\_\_

Type \_\_\_\_\_



Yuck! Not good OK Like Yum!

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# Garden Site Checklist

Look for a place that you think would make a good garden. Check off all of the items that apply to your space in the first part of the checklist. Then, look at Part 2 and check the box for the kind of plants that are best for your space. Use the Edible Perennial Chart (page 200) and the Herb Cultivation Chart (page 180) to choose plants that would like the conditions you have checked.

## Part 1 Your Space

*All spaces must have*

- Does the location have sprinklers or a hose bib nearby?
- Is your space on school property?
- Does your space get at least 4 hours of sun in a day?
- Is it safe from traffic?
- If there are existing plants or lawn, do you have permission to move or remove them?
- Is it far away from sports fields?

*Soil and ground conditions*

- Is it low lying, so that water runs into it?
- Is it on the top of a hill or berm?
- Is the space flat?
- Is the soil easy to dig in?
- Is the soil hard to dig in?
- Is the soil dry?
- Is the soil moist?
- Is the soil wet?
- Is the soil mostly clay?
- Is the soil mostly sand?
- Is the soil a typical soft, crumbly garden soil?

*Surrounding area*

- Are there trees or buildings in the north?
- Are there trees or buildings in the west?
- Are there trees or buildings in the east?
- Are there trees or buildings in the south?
- Does the space get full sun all day, with no nearby trees or buildings?
- Is it windy?

## Part 2 Your Plants

- If you checked low lying, wet soil, sand or garden soil, and trees on the south and west, *then* plants that have high water needs, can grow in shade or part shade, and like rich or garden soil will grow well in your space.
- If you checked on top of a hill, dry, hard soil and either trees in the north or full sun all day, *then* plants that have low water needs, like any or lean soil and full sun will grow well in your space.
- If you checked flat, easy to dig in, moist, garden soil and either trees in the north or west, *then* plants that have medium water needs, like garden soil and full sun will grow well in your space.

# Resources



## Recommended Books

*1493: Uncovering the New World Columbus Created* by Charles C. Mann  
*All New Square Foot Gardening* by Matthew Bartholomew  
*Anansi and the Talking Melon* by Eric A. Kimmel  
*Bean and Plant* by B. Watts  
*Botany for All Ages: Discovering Nature Through Activities for Learners and Adults*  
by Jorie Hunken  
*Botany for Gardeners* by Brian Capon  
*Buffalo Bird Woman's Garden: Agriculture of the Hidatsa Indians* by Gilbert Wilson  
*Carrots Love Tomatoes: Secrets of Companion Planting for Successful Gardening* by Loius Riotte  
*Catching Fire: How Cooking Made Us Human* by Richard Wrangham  
*Edible Landscaping with a Permaculture Twist: Have Your Yard and Eat It Too* by Michael Judd  
and Matthew Von Herbulis  
*Eye to Potato* by Ellen Weiss  
*Carlos and the Squash Plant* by Jan Romero Stevens  
*The Family Kitchen Garden: How to Plant, Grow and Cook Together* by Karen Liebreich  
*Gaia's Garden: A Guide to Home-scale Permaculture* by Tobey Hemenway  
*Garden Insects of North America* by Whitney Cranshaw  
*The Growing Classroom: Garden-based Science* by Roberta Jaffe  
*Herbs and Spices: The Cooks Reference* by Jill Norman  
*How Plants Work: The Science Behind the Amazing Things Plants Do* by Linda Chalker-Scott  
*How to Grow a School Garden: A Complete Guide for Parents and Teachers* by  
Arden Bucklin-Sporer and Rachel Pringle  
*How to Grow More Vegetables* by John Jeavons  
*Integrated Forest Gardening* by Wayne Weiseman, Daniel Halsey and Bryce Ruddock  
*I Am a Seed* by Jean Marzolla  
*A Kid's Herb Book: For Learners of All Ages* by Leslie Tierra  
*Lasagna Gardening* by Patricia Lanza  
*Laws Guide to Nature Drawing and Journaling* by John Muir Laws  
*Living Sunlight, How Plants Bring the Earth to Life* by Molly Bang and Penny Chish  
*Managing Cover Crops Profitably* by SARE  
*Passover: Celebrating Now, Remembering Then* by Harriet Ziefert  
*The Passover Seder* by Emily Sper  
*Perennial Vegetables: From Artichokes to Zuiki Taro, A Gardener's Guide to Over 1  
Easy-to-Grow Edibles* by Eric Toensmeier and Elayne Sears  
*Permaculture: A Designer's Manual* by Bill Mollison  
*Plan and Build a Raised Garden Bed* by Jeanne Gruner  
*Rodale's Basic Organic Gardening* by Deborah L. Martin  
*The Secret Life of Backyard Bugs: Discover Amazing Butterflies, Moths, Spiders, L  
and Other Insects* by Judy Burris

## Recommended Seed Companies and Garden Resources

*Seeds* by Ken Robbins  
*A Seed is Sleepy* by Dianna Hutts Aston  
*Small Scale No Till Gardening Basics* by Anna Hess  
*Starting From Seed* edited by Karan Davis Cutler  
*Soil: Lets Look at a Garden* by Angela Royston  
*Soil (Geology Rocks!)* by Rebecca Faulkner  
*The Tiny Seed* by Eric Carle  
*Tops and Bottoms* by Janet Stevens  
*The Vegetable Gardener's Bible* by Edward C. Smith  
*Weedless Gardening* by Lee Reich  
*When the Storm God Rides: Tejas and Other Indian Legends* by Florence Stratton  
*Why We Eat What We Eat: How the Encounter Between the New World and Old Changed the Way Everyone on the Planet Eats* by Raymond Sokolov

### [www.acornnaturalists.com](http://www.acornnaturalists.com)

Develop and sell resources that encourage outdoor activity. Buy magnifiers, journal supplies and science activities.

### [www.botanicalinterests.com](http://www.botanicalinterests.com)

Small seed company with extensive growing information on the package. They also offer fundraisers for schools.

### [www.cooksgarden.com](http://www.cooksgarden.com)

Cooks Garden is one of the first seed sources for market garden seeds, especially European and French varieties

### [www.gardners.com](http://www.gardners.com)

Gardener's Supply Company offers seed starting supplies, pots,

### [www.growitalian.com](http://www.growitalian.com)

Grow Italian imports seeds from Italy. Look for unusual Italian varieties of vegetables and greens. They have an excellent garden newsletter.

### [www.groworganic.com](http://www.groworganic.com)

Peaceful Valley Farm Supply has seed starting supplies, organic fertilizers, cover crops, seeds and trees. Visit the website for great instructional videos.

### [www.highmowingseeds.com](http://www.highmowingseeds.com)

They offer 100% organic seeds since 1996, with over 600 heirloom, open-pollinated and hybrid varieties of vegetable, fruit, herb and flower seed.

### [www.johnnysseeds.com](http://www.johnnysseeds.com)

An employee owned company that sells and develops a large variety of seeds and plants

### [www.reneesgarden.com](http://www.reneesgarden.com)

Renée's Garden offers organic, gourmet and cottage garden seeds from around the world. Packages include good growing information.

### [www.nativeseeds.org](http://www.nativeseeds.org)

Native Seeds/SEARCH conserves and distributes the diverse varieties of agricultural seeds and their wild relatives from the American Southwest and Northwest Mexico.





[www.rareseeds.com](http://www.rareseeds.com)

Baker Creek carries one of the largest selections of seeds from the 19th century, including many Asian and European varieties.

[www.seedsavers.org](http://www.seedsavers.org)

Seed Savers Exchange is a non-profit organization dedicated to saving and sharing heirloom seeds. They offer all types of heritage seeds and old varieties

<http://www.southernexposure.com/>

Southern Exposure Seed Exchange offers more than 700 varieties of vegetable, flower, herb, grain and cover crop seeds. They emphasize seeds that grow well in the Southeast.

[www.territorialseed.com](http://www.territorialseed.com)

Territorial Seeds is a family owned business since 1979 producing seeds in the west.

<http://www.underwoodgardens.com>

Terroir Seeds specializes in heirloom varieties. They do not buy or sell genetically engineered seeds.

## Websites

California School Garden Network Curriculum Database

<http://www.csgn.org/curriculum>

Center for Ecoliteracy—resources for ecological education

<http://www.ecoliteracy.org/ecological-education>

Cornell Design for Composting Bins

<http://cwmi.css.cornell.edu/designscompostingsystems.pdf>

Do the Rot Thing Composting Activities from Central Vermont Solid Waste Management

[http://www.cvswwmd.org/uploads/6/1/2/6/6126179/do\\_the\\_rot\\_thing\\_cvswwmd1.pdf](http://www.cvswwmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswwmd1.pdf)

Eat.Think.Grow—school garden curriculum

<http://eatthinkgrow.org>

Edible Schoolyard—curriculum database and school garden resources

<http://edibleschoolyard.org>

The Farmers Almanac—first and last frost dates as well as long term weather predictions

<http://www.almanac.com>

Kids Gardening—resources and curriculum for school gardens from the National Gardening Association

<http://www.kidsgardening.org>

Life Lab—videos, curriculum, and resources for school gardens

<http://www.lifelab.org/for-educators/schoolgardens/>

National Gardening Association's Pest Library

<http://garden.org/pestlibrary>

National Gardening Association's Weed Library

<http://garden.org/learn/library/weeds/>

National Phenology Network—citizen science project tracking timing of life cycle events

<https://www.usanpn.org>

Nature Journaling curriculum and videos for nature journaling

<http://www.johnmurlaws.com/cnps-curriculum>

Slow Food International Taste Education

<http://www.slowfood.com/what-we-do/food-and-taste-education/taste-education-resources/>

Slow Food USA School Gardens—resources and curriculum for school gardens

<http://gardens.slowfoodusa.org>

U.C. Davis Integrated Pest Management Program

<http://www.ipm.ucdavis.edu>

Whole Kids Foundation Resources—curriculum and resources for school gardens

<https://www.wholekidsfoundation.org/resources/>

Xerces Society for Invertebrate Preservation

<http://www.xerces.org>









Slow Food USA®

# About

Slow Food USA

We grow community around school gardens to cultivate the next generation of healthy eaters of good, clean and fair food. Slow Food USA aims to reconnect youth with their food by teaching them how to grow, cook and enjoy real food. Through increased confidence, knowledge gain and skill building, we want to empower children to become active participants in their food choices. By becoming informed eaters, today's children will help make a positive impact on the larger world of food and farming well into the future.

