

Let's Get Growing in Containers!

Presented by
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About the Author

Lisa Taylor is the children's education program manager at Seattle Tilth, an organization that teaches ways to grow food organically, conserve natural resources, and support our local food systems. Lisa is author of *Your Farm in the City: An Urban Dweller's Guide to Growing Food and Raising Animals*.

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Resources

Local Experts and Information

The Garden Hotline (SPU & Seattle Tilth)
(206) 633-0224 help@gardenhotline.org
Seattle Tilth, www.seattletilth.org
WSU Cooperative Extension – see your county for resources.
<http://about.wsu.edu/about/statewide.aspx>
City Farmer, Canada's Office of Urban Agriculture, www.cityfarmer.org
Plant Maps, www.plantmaps.com/interactive-washington-last-frost-date-map.php Search first and last frost dates by zip code.

Resources for Children's and School Yard Gardening

California School Garden Network, www.csgn.org
Life Lab at the University of California, Santa Cruz – www.lifelab.org
The Edible Schoolyard, Berkley - www.edibleschoolyard.org
National Garden Association - www.kidsgardening.com
American Community Garden Association - www.communitygarden.org
Farm to School www.farm2school.org
Washington State OSPI <http://www.k12.wa.us>

Gardening and Composting Resources

"Your Farm in the City," Lisa Taylor & Seattle Tilth
"Maritime Northwest Garden Guide," Seattle Tilth
"Worms Eat My (and Our) Garbage," Mary Appelhof
"Kid's Herb Book," Lesley Tierra
"Growing Vegetables West of the Cascades," Steve Solomon
"Composting Yard and Food Waste at Home"
http://www.seattle.gov/util/groups/public/@spu/@conservation/documents/webcontent/spu01_001989.pdf
"Rodale's Color Handbook of Garden Insects," Anna Carr
"Rodale Book of Composting," Deborah L. Martin and Grace Gershuny
"Winter Gardening in the Maritime Northwest, Binda Colebrook
"Lasagna Gardening," Patricia Lanza (sheet mulching)
"Food Is Elementary," Dr. Antonia Demas (Uses garden produce and healthy commodities to make ethnic dishes with kids K and up)
"Math In The Garden," Jennifer M. White and the University of California Botanical Garden

Supplies and Plants

Local garden and hardware stores
Peaceful Valley Farm Supply, 1-888-784-1722 www.groworganic.com
Steuber's Distributing Company, Snohomish, (206) 632-8724
Drip Works, www.dripworks.com

Local nurseries

One Green World, www.onegreenworld.com

Raintree Nursery, www.raintreenursery.com

Weeks Berry Nursery, www.weeksberry.com

Thrift stores, garage and rummage sales

Look for OMRI, USDA, State or Independently Certified seeds and fertilizer

Tools for kids

www.burtonandball.com/shop/scripts/default.asp

www.fredshed.co.uk/bulldogtools.htm

www.shovelandhoe.com

www.terrebonnelimited.com

Seed Companies

Seeds of Change, www.seedsofchange.com

Territorial Seed, www.territorialseed.com

Renee's Garden, www.reneesgarden.com

Baker Creek Heirloom Seeds, www.rareseeds.com

Irish Eyes/Garden City Seeds, www.irish-eyes.com

Fedco Seeds, www.fedcoseeds.com

Uprising Seeds, www.uprisingorganics.com

Funding and Grants

There are many grants for money, supplies and materials to start school gardens. Search "school garden grants" or try one of these websites.

California School Garden Network, www.csgn.org/grants

New Hampshire Farm to School,

www.nhfarmtoschool.org/resources/schoolgrants

Garden ABC's, <http://gardenabcs.com/Grants.html>

Storybooks

"The Maybe Garden," Kimberly Burke-Weiner

"The Reason For A Flower," Ruth Heller

"The Carrot Seed," Ruth Krauss

"Tops and Bottoms," Janet Stevens

"Compost!" Linda Glaser

"Wonderful Worms," Linda Glaser

"The Turnip," Pierr Morgan

"Nature in the Neighborhood," Gordon Morrison

"Whose Garden is it?" Mary Ann Hoberman

"Bring Me Some Apples and I'll Make You a Pie: A Story About Edna Lewis," Robbin Gourley

Gardening with Children

Unit One

Objectives

- Review the principles of experiential, hands-on learning.
- Learn basic techniques for working with children in an outdoor, garden classroom.
- Learn basic organic garden principles.



SEATTLE TILTH CHILDREN'S GARDEN PHILOSOPHY

FOUNDATIONS

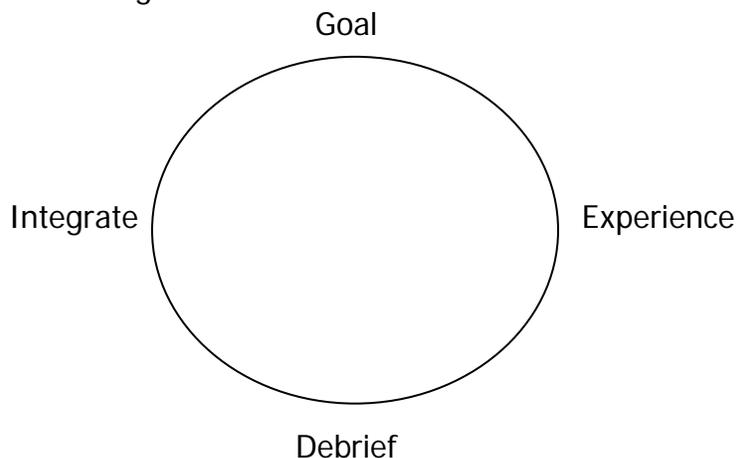
These are the underlying beliefs about teaching and learning that guide us in our work in the Children's Garden.

Objective: Gardening together helps us understand where our food comes from and teaches us how to care for plants, creatures and one another. This is a path to peace.

We hope children and their families will learn how to care for all life and where their food comes from. They will learn how to be in the garden as a partner with nature, helping the garden to grow. They will learn why we compost, about the importance of soil and about compost critters and food webs. We hope they will gain an understanding of the importance of insect life in the garden. Finally we hope they will have an understanding of how plants grow, plant parts and common edible plants.

The Experiential Learning Model

The Experiential Learning Model is a cyclical model for assessing learning as a result of doing. This is a model which can be applied to an entire experience -- a tour, a week-long camp, a volunteer stint -- and to each individual aspect of each station or exploration. The EL model starts simply with a stated goal for the experience. The goal leads to doing the activity. Following the activity is debriefing or a review of the experience with the intent to integrate learning into the next goal.



The Invitation to Garden

We start with an invitation to garden. We invite children and their families to participate -- to come help in the garden. This invitation shapes how we develop activities for everyone who comes to the garden. We commonly ask the group to wait to be invited before they pick or eat or use tools in the garden. We promise

to invite them to do many things. We use this invitation as a cue for the kids to start exploring or eating or digging and remind them to wait until we are ready to begin.

Inviting children to participate in activities allows us to stay positive when kids start to do things before the activity is ready. It is more respectful (and frankly feels better as an educator) to ask the child if they have been invited to do something yet rather than tell them to stop.

Positive Approach to Teaching

One of the most respectful ways to work with children is to honor them as a person, to cherish the gifts that they bring and to always speak to them in a positive and encouraging way. This does not mean that you are giving them license to do whatever they want to do. There are rules and there are times when we get to choose what we want to do and there are other times when we are doing what the group is doing. Rather, speaking to children in a positive way, helps them to build self-esteem, see their own capabilities and helps them to have ownership of their work and contributions. We try to speak to children the same way we speak to adults.

We believe that everyone wants to be loved and to feel as though they belong. Mysterious and inexplicable behavior is really a need for love and belonging. Phrase things in a positive way – rather than focusing on the NOs try to say what they CAN do. If we need a child to stop a certain behavior, we give them something they can do. Rather than “Please stop tickling me.” We might say, “I’m tired of the tickling game, if you pick out a book from the bin, I’ll read it to you.”

Repeat the rules as often as needed. You may find yourself repeating “watch your feet, watch your feet” during your entire garden session, saying things in the positive tense will help everyone feel successful. If there is a simple reason why the rule needs to be followed, offer that too so kids can see why the rules make sense. Example: “We always wear our shoes in the Children’s Garden because we find glass in the soil every day.”

The Theory of Focus and Expansion

Students can’t focus and be still and attentive too long or they will fly apart. They express this by wiggling around, talking to their neighbor, tuning out, scuffling feet, looking bored, or being a distraction to others. Likewise, students cannot do whatever they want for as long as they want (self directed investigation) or you will never get them focused when you need them to be. Time with children must have a balance between focused time and expansive discovery time. There is a natural flow to lessons and learning times and stations and tasks in the garden; like breathing. This flow echoes the Experiential

Learning Model. We begin as a group or in a circle to learn what we will be doing next, then we do it, then we join together to think back and to introduce the next activity.

Likewise it is important not to stack focused activities or expansive activities. It may seem like the kids are loving building bughouses (expansive activity which is mostly self directed) and could do it all afternoon This would be great if that is all you have planned for the lesson. If you need to gather them to do anything else, it will be difficult for them to switch modes. A better plan would be to limit their time building bughouses. Keep them really focused on the activity and end the time after about 15-20 minutes. It is ok if they are disappointed and want more time – they will pursue that in their own gardens or look forward to another opportunity to work with bughouses later.

Rules

For our foundation principles to work we still need a few rules. We have three main rules that we consciously say to the kids – there are many more (which the kids already know that we agree to but don't really say). To establish rules for behavior in the garden, we clearly state our three rules at the beginning of each session and remind the children consistently during our time together.

Main Three Rules

- Wait to be invited (or ask) to pick or eat or use things in the garden
- Watch your feet, be careful and stay on the paths
- Walk in the garden

Tool Rules

- All tools should be held below the waist
- Tools should only be used for work, they aren't toys

Underlying Rules

- Respect and care for all living things in the garden
 - Be gentle with all plants, bugs, worms and each other
 - Treat books, tools, gloves, etc with respect
- Always wear shoes in the garden and park
- One person speaks at a time
- Kids use buckets or containers but not the garden hose

SPECIFICS

Child-Focused Curriculum

Children have ownership and do the work in the Children's Garden. It is our job to set up activities so that the children can do garden tasks. We plan activities

around what work the kids can do to advance the garden plan. Our measure of success: everyone is safe, has fun and some garden work is accomplished.

Give the kids the responsibility for putting their things in place or away for the day – have them sweep, do the dishes, clean tools and try to find ways that they do most of the work. When children participate in setting up activities and putting away tools, they have a greater sense of ownership. Let the kids participate in some of the decision-making or let them figure out how to accomplish a task that you have outlined. Find ways for the children to be doing as much as possible. It is the student's job to do the work; it is the teacher's job to facilitate the experience.

Make work fun. If children do the work, it will be messy. Plan for this. Make sure there are enough tools and space for the group – no one should have to share a tool. Teach them how to use each tool and repeat the tool rules each time. Have a signal to use to stop them and then just cut loose and have fun! Make a game or contest or race out of the task. See who can dig up the longest bindweed root. Build a compost pile with a relay /bucket brigade race. Collect the most slugs or snails. Rake the biggest pile of leaves and then jump in them!!

Garden Driven Curriculum

We let the needs of the garden and the weather drive our daily lessons. We document each session in the garden in a spiral notebook. We include information about the weather, staff and volunteers, number of kids and how well the plan went. These notebooks are a great resource about planting times and weather and what activities work well.

Connecting to Classroom Curriculum

Start thinking about what you already teach and find ways to move those lessons outside to the garden. Don't think of gardening as something to do when everything else (curriculum requirements) has been completed, think about the garden as a place to start teaching in your content areas.

Recess Mentality

When kids are outside, it is natural that some rowdiness will occur. Kids generally equate being outside with recess. Anticipate this and diffuse it by reviewing garden rules before going outside. Giving them an opportunity to run around before going to the garden can help them control their impulse to horse-around. Give them a big muscle activity that takes a lot of concentration or give them ideas about how to move their bodies – crabwalk, hopping, heavy steps, mouse steps, etc. After they have some time to release energy they should be able to come together as a group and focus on working in the garden. Remember to balance focus and expansion – with specific circle-up / focused times to help calm them down.

Organic Gardening Principles

Organic gardening practices are good for people and good for the earth. If you follow these practices you will have a garden that is healthy, safe and relatively carefree.

Build healthy soil

Good soil grows strong, healthy plants that resist disease and pest. Feed the life in the soil with organic material such as leaves, wood chips, compost or old garden plants.

Work with nature

Observe natural patterns and remember that you are *helping* the garden grow, not *making* the garden grow.

Right plant in the right place

Put plants where they will thrive. No good can come from putting something that likes full sun and sandy soil in a shady, dank corner of the garden.

Encourage biodiversity

Create plenty of habitat for creatures so that they can help keep the balance in your garden. Create a diverse garden ecosystem by incorporating plants of varying sizes with different colors of flowers and foliage.

Conserve resources; Water wisely

Preserve this precious resource by using it carefully and wisely. Make sure water is available when you need it and provide adequate amounts to promote healthy plant growth.

Learn as you grow

Gardening is the ultimate in experiential learning. With each season your skills will increase. Keep a journal so that you can keep track of all this learning!

Outdoor teaching techniques

Working outside

- Focus and expansion
- Routines and rituals in the garden/circle up
- Safety and rules – be safe, have fun and get some gardening done
- Outdoor classroom boundaries – visual & physical
- Letting off steam – recess mentality
- Small groups
 - 4-7 preschool
 - 5-10 elementary
- Group Identity

Planning your lessons

- Balance focused and expansive activities
- Using all the senses
- Miming to demonstrate steps
- Physical movements to learn concepts
- Games and songs
- Make it fun

Garden Time!

- 45 minutes – 1 hour experience with opening circle and closing reflection
- Divide projects into 2-3 stations (w/digging)
- 5-20 minute stations depending on the age and abilities of the group
- Tasks to accomplish – keep projects realistic
- Focus and expansion – can't say it too much
- Use volunteers or helpers to keep groups small

Be Flexible and Resilient

Be willing to adjust or change how much you have planned for the day. Have a few extras up your sleeve. Realize that sometimes a slug is just more interesting than what you had planned. Seize the teachable moment! Learn all you can about what the kids are interested in. Our slug and snail curriculum originated from a wet, cool spring morning in the garden when we couldn't walk because there were so many slugs crawling around. Rather than try to divert the kids to what we had planned, we made a game of slug collecting. We observed all we could about the slugs, made guesses about how they lived and what their body parts were for. We counted and grouped the slugs first by size and then by coloration and markings. Then we talked about what we should do with all the slugs. Since they eat the garden, should we kill them? (no, we never kill things in front of the children), return them to the garden? Or find a place where they could live but be out of the garden? As you may imagine, the last idea was the group decision – we found a wild place in the park and relocated the whole batch of 120 slugs! The catch and release program still survives in the Children's Garden.

Teaching as a Practice

There is a lot to learning the art of gardening and teaching. It's important to know that you are not required to be a garden expert to be an effective teacher in a children's garden. Teaching and learning go hand in hand. Your knowledge of the garden will grow each time you lead a group and your confidence as a teacher will likewise flourish. What do you do when the kids ask for the name of a plant that you don't know? We think it is as powerful (or more so) for the students to give the plant a descriptive name from their imagination as it is for

you to tell them the genus and species. "Fuzzy pillow leaf" is just as good as lamb's ear in our point of view. Chances are everyone will remember this plant the next time they see it. You needn't be perfect. Teaching is a practice.

As you continue your journey as a Garden Educator remember:

Don't Panic!

Monitor and adjust!

Learn as you grow!

Have fun!

Children's Garden Basics

Unit Two

Objectives

- Review basic requirements for a children's garden.
- Identify what plants to use in a garden for children.
- Learn when to plant and harvest vegetables.
- Differentiate ways to use the garden for learning.



Physical Requirements of Children's Gardens

Space and Layout of Garden

GO ORGANIC!

Narrow beds

Wide obvious paths – straw, wood chips, burlap sacks

Weedy areas for creature habitat

Water source close by

Space for people – circle up area, covered area

A place to dig

A place to run

Sticks and rocks and shady spots

What to Plant

Edible

Not deadly or poisonous

Durable – trampling and picking

Useful – for habitat, medicine or construction/crafts

Anchor garden with perennials for year-round interest

Tools – sturdy and kid sized

Shed or storage area

Digging fork-- boarder size

Spade – boarder size

Hand trowel

Leaf rake

Buckets and hoses

Brooms

Watering cans and small containers

Magnifier boxes

Collecting baskets

Small scissors

Floral tape

Art supplies

Markers, crayons, tape, staplers

Small wheelbarrow

Jute twine

Sticks and found objects

Teepees and tunnels

Burlap sacks

Optional: steel rakes and hoes

Things we all like to do in the garden

Digging

Planting seeds and starts

Watering

Harvesting

Saving seeds

Pulling out the weeds

Helping

Making bouquets

Hunting for bugs

Building bug houses

Sifting compost

Raking leaves and jumping in them

Cooking

Charming snails and collecting slugs

Singing songs

Reading about bugs and plants

Drawing

Finding a magic spot

Eating

Smelling

Feeling

Looking carefully
Listening to the wind in the leaves
Pressing flowers
Making plant collages
Painting prayer flags
Making garden spirits and shrines

Plants for Kids

Perennials

Agastache	Lamb's ear
Artichoke	Lavender
Berries	Lemon Balm
Cardoon	Lemon Verbena
Chamomile	Mint – especially flavored types
Chives	Monarda
Clove Currant	Oregano
Comfrey	Pineapple Sage
Culinary Sage	Roses
Dianthus	Rosemary
Fennel	Silver Shield Sorrel
Fruit Trees	Sweet Cicely
Honeysuckle	Thyme
Hyssop	Tulips
Jerusalem Sage	
Kiwi	

Annual Veggies and Flowers

Leaf

Basil
Broccoli
Cauliflower
Chard
Cilantro / Coriander
Collards
Garlic
Leeks
Lettuce
Onion
Spinach
Stevia

Flower

Arugula
Bachelor's Buttons
Bean blossoms
Borage
Brassica flowers
Calendula
Clover
Cutting flowers for bouquets
Daisies
Nasturtiums
Viola, Pansies, Johnny Jump Ups
Zinnia

Root

Carrots
Beets

Potatoes
Radishes

Fruit

Beans – snap
Beans – runner
Cucumbers – lemon
Peas
Peppers
Pumpkins
Squash
Tomatillos
Tomatoes

Others we like

Buckwheat
Burdock
Cleavers
Mullien
Phacelia
Rye
Oats
Barley
Wheat

A Few Poisonous Plants

Aconite
Anemone
Azalea
Buttercup
Calla Lily
Clematis

Daffodil
Delphinium
Four o'clock
Foxglove
Hyacinth
Hydrangea

Planting Times

Timing is critical for getting the most from your garden. Not all plants are planted at the same time. There are cool season crops that are planted March-May (and again in July-August for fall harvest) and warm season crops that are planted May-June. The most important things to know are your first and last frost dates. The following are recommendations – your site may be warmer or cooler – use these as a guide and keep track of planting and harvesting times in your garden journal.

First and last frost dates for Western Washington

	<u>Last Frost</u>	<u>First Frost</u>
Most cities	April 1-30	Oct 20-Nov 15

First and last frost dates for Eastern Washington

	<u>Last Frost</u>	<u>First Frost</u>
Ellensburg	May 10	Sept 15-Oct 11
Moses Lake	April 21	Oct 11
Pasco	April 8	Oct 5
Pullman	May 12	Sept 9-Oct 1
Spokane	May 8	Sept 15-Oct 11
Yakima	May 14	Oct 11

Recommended planting dates for Western Washington

Plant Name	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
arugula		p	p	p	p / h	P / h	p / h	p / h	h	h	h	
beans (bush)					p	p	h	h	h	h		
beans (pole)					p	p	h	h	h	h		
beans (runner)					p	p				h	h	
beets			p	p	p	P / h	p / h	p / h	h	h		
broccoli			p	p		h	p / h	p / h	h	h		
cabbage		h	p	p			p / h	p / h		h	h	
carrots			h	P / h	p	p	P / h	P / h	h	h		
cauliflower			p	p		h	p / h	p / h	h	h		
cilantro			P / h	P / h	p / h	p / h	p / h	p / h	p / h	h		
collards	h	h	p	p	p	h	p / h	p / h	h	h	h	h
cucumbers					p	p		h	h	h		
garlic							h				p	
kale	h	h	p	p	p / h	h	p / h	p / h	h	h	h	h
leeks	h	h		p	p	p			h	h	h	h
lettuce			p	p / h	p / h	p / h	p / h	p / h	h	h	h	
onions			p	p	p			h	h			
peas			p	p	p / h	h	p / h	p	p / h	h		
potatoes				p	p			h	h	h		
pumpkins					p	p			h	h		
radishes		p	p	p	p / h	h	p	p	h	h		
spinach		p	p / h	p / h	p / h	p / h	p / h	p / h	p / h	h		
summer squash					p	p		h	h	h		
Swiss chard	h	h	p	p	p / h	p / h	p / h	p / h	p / h	h	h	h
tomato starts					p	p		h	h	h		
herb starts	h	h	p	p	p / h	p / h	h	h	h	p / h	p / h	h
flowers			p	p	p	p / h	p / h	p / h	p / h	h	h	

**based on "The Maritime Northwest Garden Guide," a monthly planting calendar produced by Seattle Tilth, 2008.

Recommended planting dates for Eastern Washington – April LFD – Moses Lake and Pasco

Plant Name	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
arugula				p	p / h	p / h	p / h	p / h	h	h		
beans (bush)					p	p	h	h	h	h		
beans (pole)					p	p	h	h	h	h		
beans (runner)					p	p				h		
beets				p	p	p / h	p / h	p / h	h	h		
broccoli				p	p		h	h	h	h		
cabbage				p	p		h	h		h		
carrots				p	p	p	h	h	h	h		
cauliflower				p	p		h	h	h	h		
cilantro				p	p / h	p / h	p / h	h	h			
collards				p	p	p / h	h	h	h	h		
cucumbers					p	p		h	h	h		
garlic							h			p		
kale				p	p	p / h	h	h	h	h		
leeks					p	p			h	h		
lettuce				p	p / h	p / h	p / h	p / h	h	h		
onions				p	p			h	h			
peas				p	p	h	p / h		h	h		
potatoes				p	p			h	h			
pumpkins					p	p			h	h		
radishes				p	p / h	p / h		p	h	h		
spinach				p	p / h	p / h	p / h	p / h	h	h		
summer squash					p	p		h	h	h		
Swiss chard				p	p	p / h	p / h	p / h	p / h	p		
tomato starts					p	p		h	h	h		
herb starts				p	p	p / h	h	h	h	h		
flowers				p	p	p / h	h	p / h	h	h		

** based on first and last frost dates.

Recommended planting dates for Eastern Washington – May LFD – Ellensburg, Pullman, Spokane and Yakima

Plant Name	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
arugula					p / h	p / h	p / h	p / h	h	h		
beans (bush)					p	p	p	h	h	h	h	
beans (pole)					p	p	p	h	h	h	h	
beans (runner)					p	p	p				h	
beets					p	p / h	p / h	p / h	h	h		
broccoli					p		h	h	h	h		
cabbage					p		h	h		h		
carrots					p	p	h	h	h	h		
cauliflower					p		h	h	h	h		
cilantro					p / h	p / h	p / h	h	h			
collards					p	p / h	h	h	h	h		
cucumbers					p	p		h	h	h		
garlic							h			p		
kale					p	p / h	h	h	h	h		
leeks					p	p			h	h		
lettuce					p / h	p / h	p / h	p / h	h	h		
onions					p			h	h			
peas					p	h	p / h		h	h		
potatoes					p			h	h			
pumpkins					p	p			h	h		
radishes					p / h	p / h		p	h	h		
spinach					p / h	p / h	p / h	p / h	h	h		
summer squash					p	p	p		h	h	h	
Swiss chard					p	p	p / h	p / h	p / h	p / h	p	
tomato starts					p	p		h	h	h		
herb starts					p	p / h	h	h	h	h		
flowers					p	p / h	h	p / h	h	h		

** based on first and last frost dates.

To find more climate information about your location go to this great website. There are lots of interactive maps. This is your one-stop-shop for planting dates. Search for first and last frost dates by zip code.

Plant Maps

<http://www.plantmaps.com/interactive-washington-last-frost-date-map.php>

Season Activities Calendar

January	February	March	April	May	June
Seeds/Planting					
seed saving	seed saving	seed saving	seed saving	seed saving	seed saving
seed catalog	seed catalogs				
	sow indoors	sow indoors	sow outdoors	sow outdoors	
		transplant	transplant	transplant	transplant
	cover crop	cover crop	cover crop	cover crop	cover crop
Compost					
worms	worms	worms	worms	worms	worms
			harvest WB	harvest WB	harvest WB
			rebed WB	rebed WB	rebed WB
		soil testing	soil testing	soil testing	
		make compost	make compost	make compost	make compost
		mulch	mulch	mulch	mulch
Gardening					
		dig/make beds	dig/make beds	dig/make beds	dig/make beds
design/planning	design/planning	planning			
		making paths	making paths	making paths	
			trellises	trellises	trellises
				watering	watering
		weeding	weeding	weeding	weeding
harvesting	harvesting	harvesting	harvesting	harvesting	harvesting
					flowers
cloche	cloche	cloche	cloche	cloche	
		plant perennials	plant perennials	plant perennials	
	pruning	pruning	pruning		
Cooking					
					sun tea
				salad	salad
greens	greens	greens	greens	greens	greens
Other					
journals	read books	fruits/veg of the month			
plant collages	garden flags				
publish books	art/crafts				
insect study	bughouses				

July	August	September	October	November	December
Seeds/Planting					
seed saving	seed saving	seed saving	seed saving	seed saving	seed saving
sow outdoors	sow outdoors				
	transplant	transplant			
cover crop	cover crop	cover crop	cover crop		
Compost					
worms	worms	worms	worms	worms	worms
harvest WB		harvest WB	harvest WB		
rebed WB		rebed WB	rebed WB		
		soil testing	soil testing		
make compost	make compost	make compost	make compost		
mulch	mulch	mulch	mulch	mulch	mulch
Gardening					
dig/make beds	dig/make beds	dig/make beds	dig/make beds		
planning	planning	planning			design/planning
	making paths	making paths	making paths		
			rake leaves	rake leaves	
watering	watering	watering	watering		
weeding	weeding	weeding	weeding	weeding	
harvesting	harvesting	harvesting	harvesting	harvesting	harvesting
flowers	flowers	flowers	flowers		
		cloche	cloche	cloche	cloche
		divide perennials	divide perennials		
		plant perennials	plant perennials		
		pruning	pruning	pruning	
Cooking					
sun tea	sun tea	sun tea			
salad		salad	salad		
greens	greens	greens	greens	greens	greens
	fruit	fruit	fruit		

Anywhere Garden

Unit Three

Objectives

- Learn the basics of planting and maintaining an edible container garden.
- Identify plants that are well suited for containers.
- Plant a container garden with herbs, flowers and vegetables.



Container Garden Basics

Almost anything can be grown in a container; you may need a very large container. Starting a container garden is easy and can be created even if you don't have soil for gardening. Here are the most important things to know.

Placement

- Sun – vegetables, flowers and herbs need 6-8 hrs of sun
- Out of the wind
- Easy to access for harvesting
- Water source close by

Soil

Potting soils are specially formulated to promote drainage while holding water. Fill the container with potting soil (do not add rocks at the bottom, this wrecks the drainage). Fill to about 2-4 inches from top rim of container.

Good Commercial Brands of Potting Soil for Edibles

- Cedar Grove Potting Soil
- Whitney Farms Premium Potting Soil
- Black Gold Organic Potting Soil
- E.B. Stone's Organic Potting Soil

Basic Potting Soil Recipe from the Maritime NW Garden Guide:

1 part coco coir
1 part perlite
1 part sand or pumice
1 part compost

Container size

Look for containers that are 12"-24" inches tall and 12"- 24" inches in diameter. Containers that are smaller than four gallons will be difficult to keep watered.

Choosing a container

Containers are made of almost anything. Any container with drainage holes that will hold soil can be a home for plants. Use non-toxic (food quality) materials.

Here are some choices:

- Plastic – inexpensive, lightweight, will fade and crack in sun
- Black plastic nursery pots – inexpensive or free, long lasting and warm up quickly
- Terra cotta – expensive and heavy, will crack and crumble in weather if left outside in winter
- Glazed-clay pots – expensive and heavy, long lasting and beautiful.

- Half whiskey barrels – reasonably priced, recycled product, lasts for several seasons, large planting area.\
- Be creative – large brightly colored plastic tubs, wheelbarrows, 5 gallon buckets and kiddie wading pools make great places to grow vegetables.

Planting your container

Most vegetables, herbs and flowers will grow in containers. Look for dwarf, compact or bush varieties that have been specially selected to thrive in small spaces.

Seeds

You can direct sow seeds in a large container. Sow as you would in a garden bed. Try growing carrots, beets, onions or cilantro from seed in a container.

Transplanting starts

Almost all starts should be planted to the same depth as they are in their container. Tomatoes are the only exception; their stems can be buried more deeply.

Spacing

Give your plants plenty of space to grow. This means you will only be putting 2-4 plants per container. Vegetable, herb and flower plants typically need 6" to 12" inches of space. Thin seedlings as you would in a garden bed.

Watering

Vegetables, herbs and flowers are mostly made of water so they need consistent water as they grow. Containers dry out quickly so you will need to water more frequently – every 2-3 days. Check the moisture of your containers by digging down in the soil a few inches with your fingers. Soil should feel damp but not soggy. Here are some tips:

- Try and water first thing in the morning to conserve water and, so your containers don't dry out in the middle of the day
- Watering Wands with shower heads and a shut-off valve work for everyday watering, especially if you have hanging baskets or hard to reach containers
- Watering cans with removable spray nozzles (roses) are great for watering a few containers and for fertilizing
- Patio drip irrigation kits can be set on a timer to water regularly for vacations or sunny spots that dry out quickly
- Visit www.gardeners.com for more watering ideas

Feeding your plants

Plants in containers can't get nutrients from the soil so you will need to provide their needs. Liquid fish fertilizer is a great option. Dilute with water according to the directions and give to plants every 3-4 weeks.

Which fertilizer should you get?

The numbers on the front of fertilizer boxes and bottles can be confusing. These stand for Nitrogen, Phosphorous and Potassium.

- Nitrogen promotes green leafy growth
- Phosphorous assists in the formation of roots, buds and flowers
- Potassium aides in the absorption of nutrients and trace minerals.

For most vegetables, look for fertilizer with numbers that are similar such as 3-4-2. For lettuce, onions, and other leafy greens look for a high nitrogen formula such as 5-1-1.

Organic Liquid Fertilizers for Edibles

- Fox Farm Tiger Bloom
- Grow Big Organic Liquid Fertilizer
- Earth Juice Fertilizer
- Alaska Fish Fertilizer
- Neptune's Harvest
- Age Old Organics Liquid

VEGETABLE AND HERB VARIETIES FOR CONTAINERS

Vegetable/Herb	Varieties or traits to look for	Minimum Container Size Needed
CUCUMBER	Any bush or semi-bush variety	Shallow, wide 3 - 5 gallon container
EDIBLE FLOWERS	Calendula, marigolds, petunias, nasturtium, pansies, alyssum and violas	8" deep or more
EGGPLANT	All kinds with smaller fruit	3 gallon container
GREENS	Kale, chard, lettuce, spinach, mustard greens, pac choi, radicchio and arugula	Window boxes or any container at least 8 inches deep
MELON	Look for compact or bush varieties	Shallow, wide 5 gallon container
ONIONS	All types	8"-10" deep or more
PEPPERS	Any sweet or hot pepper variety	3 gallon container
STRAWBERRIES	Any kind	Any container at least 8" deep
SUMMER SQUASH	Bush varieties	Large container 3 – 5 gallons
TOMATOES	Determinate or bush varieties and ones with fruit on the small side	5 gallons
ANNUAL HERBS	Basil, cilantro, dill, chamomile, chervil, lemongrass and shiso	8'-10" deep or more
PERENNIAL HERBS	Rosemary, thyme, hyssop, sage, lavender, mint, oregano, marjoram, catnip and verbena	The larger the container, the better they will grow. Try a 5-10 gallon container planted with 3 different herbs to start.

Garden Indoors

Unit Four

Objectives

- Identify the key elements for successful indoor gardening.
- Learn how to plant seeds.
- Make a pot for starting seeds out of newspaper.



Indoor Growing Basics

Setting up an indoor growing area

Growing seeds indoors is fun and easy. You will need supplemental light and a space where plants can grow for a few months. Prepare for mess. Seedlings become leggy and weak when there is insufficient light. These plant starts will be targets for pests and diseases. Keeping lights close to the seedlings will ensure that you grow compact plants that will be healthy and vigorous. Cool florescent bulbs are perfect for indoor growing. Inexpensive 4' shop lights can be found a garage sales or thrift stores. Hang the lights from hooks in the ceiling. Make sure lights can be adjusted higher or lower as plants grow.

Tips for indoor growing

- Hang lights 2-3" above potting soil or plant starts
- Set lights on a 12-hour timer
- Use fresh potting soil or sterile seed starting mix
- Sanitize recycled pots in a mild bleach solution
- Use a small fan for air circulation
- If seedlings become leggy, lights are not sufficient – start again
- Keep seeds moist until they sprout, then water daily

Indoor projects

Teacup succulent gardens

Plant cuttings from indoor succulents like aloe vera, Christmas cactus or jade plant in cute tea or coffee cups purchased at Goodwill.

Sprouts

Growing and eating sprouts is fun. Sprout alfalfa, cover, radish, broccoli or mung beans. If you are adventurous try sprouting some sunflower seeds, wheat or oats.

Planting seeds

All seeds are planted to a depth of 2-3 times the thickness or diameter of the seed. Large seeds such as peas, beans or nasturtiums go in a small hole. Small seeds such as carrots, mustard and lettuce can be scattered on the top of the soil and then covered with a thin layer of soil.

How to plant a seed in a pot:

- Fill the pot to the top with potting soil
- Pat the bottom of the pot to settle the soil
- Level off the soil
- Make a hole or place seeds on the soil
- Cover seeds with a sprinkle of soil and pat the soil gently
- Water carefully and keep the soil moist until seeds sprout

When to start seeds for transplanting

Most plant starts that you see at the store are already 1-2 months old when you buy them. You can get a jump on the planting season and save some money by starting some vegetables, flowers and herbs from seed indoors. These starts will be transplanted later to the garden. Generally you will sow seeds about 4-8 weeks before transplanting. Plan to start most things about a month before it is warm enough to put them outside in the garden.

Recommended planting dates for Western Washington

Plant Name	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
arugula		s										
beans (bush)				s								
beans (pole)				s								
beans (runner)				s								
beets												
broccoli		s										
cabbage		s										
carrots												
cauliflower		s										
cilantro		s										
collards		s										
cucumbers				s								
garlic												
kale		s										
leeks	s	s										
lettuce		s										
onions	s	s										
peas		s										
potatoes												
pumpkins				s								
radishes												
spinach		s										
summer squash				s								
Swiss chard		s										
tomato starts		s										
herb starts		s										
flowers			s									

**based on "The Maritime Northwest Garden Guide," a monthly planting calendar produced by Seattle Tilth, 2008.

**Recommended sowing dates for starting indoors to
transplant dates for Eastern Washington – April LFD – Moses
Lake and Pasco**

Plant Name	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
arugula			s									
beans (bush)				s								
beans (pole)				s								
beans (runner)				s								
beets												
broccoli			s									
cabbage			s									
carrots												
cauliflower			s									
cilantro			s									
collards			s									
cucumbers				s								
garlic												
kale			s									
leeks		s										
lettuce			s									
onions		s										
peas			s									
potatoes												
pumpkins				s								
radishes												
spinach			s									
summer squash				s								
Swiss chard			s									
tomato starts		s										
herb starts		s										
flowers			s									

** based on first and last frost dates.

Recommended sowing dates for starting indoors to transplant for Eastern Washington – May LFD – Ellensburg, Pullman, Spokane and Yakima

Plant Name	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
arugula				s								
beans (bush)				s								
beans (pole)				s								
beans (runner)				s								
beets				s								
broccoli				s								
cabbage				s								
carrots												
cauliflower				s								
cilantro				s								
collards				s								
cucumbers				s								
garlic												
kale				s								
leeks			s									
lettuce				s								
onions			s									
peas				s								
potatoes												
pumpkins				s								
radishes												
spinach				s								
summer squash				s								
Swiss chard				s								
tomato starts			s									
herb starts			s									
flowers				s								

** based on first and last frost dates.

Wonderful Worms

Unit Five

Objectives

- Learn about worms and other decomposers.
- Learn how to setup and maintain an indoor worm bin.
- Make a mini worm bin or Worm Condo.



Kids love worms

Keeping a small worm bin is easy and extremely rewarding. Red worms are great recyclers of organic waste. Their castings (or poop) make the finest compost a gardener can find. Recycling kitchen scraps in a worm bin reduces waste and provides endless opportunities for learning. Children love to search through the compost and find many interesting things both living and non-living. This is a great way to explore nature in a microcosm.

Worm bins

A worm bin is a closed system for composting kitchen scraps. A worm bin is a shallow (12"-24" deep) box that has a tight fitting lid, drainage holes and some air circulation. This bin is filled with red worms and moist bedding such as dry leaves, shredded newspaper or cardboard. Vegetable and fruit scraps are buried in the bedding and the worms convert it into compost. Presto!

Instant worm bin

Start a small indoor/outdoor worm bin with materials that you can buy right "off the shelf." This worm bin uses two Rubbermaid tubs and some 1" louvered vents. Tub A. will hold the worms and Tub B. will catch any liquid that drains out of Tub A.

You'll need

2 – 14 gallon Rubbermaid tubs
6-8 aluminum 1" louvered vents
¼" drill bit
1" drill bit
Newspaper (and leaves)
Water
A handful of soil
Red worms

Make your bin

- Use a ¼" drill bit to make 8 drainage holes in the bottom of Tub A.
- Use a 1" drill bit to make 3 holes equally spaced along the side Tub A. near the top
- Push louvered vents into holes
- Nest Tub A. into Tub B.
- Fill Tub A. with moist bedding and a starter batch of worms
- Bury 1-2 pounds of food scraps each week
- Make sure bedding stays moist
- Replace bedding when there isn't enough to completely bury food

Bedding the worm bin

When we bed a worm bin, we are creating a home for the worms to do their important job of making soil for the garden. Worm bin bedding (in the Children's Garden) has three main ingredients: newspaper, leaves, and water. In a tub, tear newspaper into strips. Then add an equal amount of leaves if you have them. Next soak the pile with water till gloppy. Have the kids mix it all around and then move it into the worm bin. This is messy good fun. If you are using newspaper only, add a couple handfuls of soil as a microbe and grit source.

Worm Bedding

- Newspaper
- Cardboard
- Soil paper towels or napkins
- Fall leaves
- Clean sawdust or shavings

Feeding your bin

Worms can eat one pound of food waste, per one square foot of surface area, per one week. This is the rule of one. If your bin measures 1' by 2' that equals 2 square feet of surface area. This means you can give your worms up to 2 pounds of food each week. In the first couple months of running your worm bin you will feed it smaller amounts – until your worm population increases. Completely bury all food scraps in the bedding and stagger burial sites so your worms have time to eat each deposit.

Worm Food

- Fruit and vegetables either cooked or raw
- Bread and grains
- Coffee grounds and filters
- Tea bags
- Egg shells

Do not feed to the worms

- Meat
- Fish
- Poultry
- Dairy products
- Pet wastes
- Evergreen leaves
- Coated paper or magazines
- Sawdust or shaving from treated or painted wood
- Citrus peels

Harvesting your worm compost

When the bedding has been digested and there is a thick layer of dark soil at the bottom of your bin it is time to harvest. Stop feeding your bin for a little while. Dig out the finished compost and spread it out on flattened cardboard or a tarp. Pick out any food that hasn't decomposed and put it back in the bin. Children have a lot of fun separating the worms from the soil. Put the worms back in the bin and spread ½" – 1" of the finished compost around plants in the garden. Refill your bin with fresh moist bedding and keep going!

Exploring the worm bin with children

Invite the children to come stand around the worm bin. This is a magic box. This is where all of our left over plants are changed into compost. Open up the bin and let the children peer inside. Lead them over to the tarp with the worm bin sample. Pass out magnifying glasses and bug boxes. Encourage the children to explore the castings or compost. They will not only find worms but other insects and rotting food scraps. Look for worm egg sacs or cocoons.

At the end of this station, invite each child take a small handful of worm castings and find a plant in the garden they want to feed. Tell and show them how to put the compost around the base of the plant. Demonstrate.

Open up a discussion on the "helpers in the garden." The worms represent a very critical cycle in the garden. Worms decompose plants to make soil to feed the plants. The plants die and provide more food for the worms.

Worm Bin Exploration Prompts

- Find and identify critters
- Why do we use a worm bin?
- How do worms eat?
- What do they eat?
- Describe worm reproduction – find worm egg sacks
- Show worm diagram – talk about worm digestion
- Use magnifying boxes – empty and put away
- Make a slide show using magnifying boxes
- Feed some compost to plants
- Feed some plants to worm bin

Worm Facts

Worms are the ultimate recyclers, turning leftover food scraps and plant materials back into nutrient rich humus that is mixed with garden soil to help plants grow. Worm poop is referred to as castings. Compost made from this is called vermicompost. Worms love to eat all fruits, vegetables, and plant matter. All meat, dairy and oily food should not go into the worm bin. These products

take a long time to disintegrate, and create bad smells and encourage rodent invasion. Worms eat their weight in food everyday.

The worms in worm bins are red wiggler worms or *Eisenia fetida*, not regular earthworms or night crawlers. Red worms digest organic matter, as opposed to soil, are smaller than the common earthworm. They like it where it is cool, moist, and dark.

Worms have no eyes or ears but use the skin on their body to feel. They don't have teeth and grind up their food in a gizzard. Worms have five enlarged blood vessels that work like five hearts in their body. They have a single digestive tract that runs the length of their body.

The band around the worm's body is called the clitellum. When a worm is pregnant, the area gets swollen. Worms lay cocoons that contain from two to twenty baby worms. Worms produce these cocoons at least twice a week. The cocoons look like little tiny golden teardrops or lemons. They are about one millimeter long or about the size of a short-grain of rice. If they are squeezed too hard premature baby worms will come out and will not live. All worms can lay cocoons. Red worms are hermaphroditic – each worm has both male and female parts.

Worm Reproduction

(Loose excerpts from Mary Applehof's excellent book, Worms Eat My Garbage.)

Worms are hermaphroditic, having both ovaries and testes. The band 1/3 of the way down from the worm's head is the clitellum. The presence of the clitellum indicates that the worm is sexually mature. Worms, attracted by glandular secretions, find each other and lie with their heads in opposite directions; their bodies are closely joined (almost entwined). Their clitella secrete large quantities of mucus that forms a tube around each worm. Sperm from each worm move down a groove into receiving pouches of the other worm. The sperm, in a seminal fluid, enter the opening of sperm storage sacs where they are held for some time.

After the worms separate, the clitellum secretes a second substance, a material containing albumen. The albuminous material hardens on the outside to form a cocoon or egg sac in which eggs are fertilized and from which baby worms hatch. As the adult worm backs out of the hardening balloon, it deposits eggs from its own body and the stored sperm from its mate. The sperm fertilize the eggs inside the egg sac that closes off at each end as it passes over and off the worm's head. It takes at least three weeks development in the cocoon before one of several baby worms hatch. A red worm can be producing cocoons when it

is 4-6 weeks old. A mature worm can deposit 2-3 cocoons per week for 6 months to a year.

Worm Bin Critters

(Loose excerpts from Mary Applehof's excellent book, "Worms Eat Our Garbage".)

Collembola is a close relative of the springtail but doesn't have a springing tail. This tiny insect, often white, is less than 1/16 of an inch long. Along with springtails, they are members of a group of animals, which are primitive insects. Thousands of collembola live in worm bins where they eat molds and decaying matter.

Red Worm, *Eisenia fetida*, is a long, thin soft-bodied animal. Its body is made up of little rings called segments. It has neither legs nor eyes; when a worm senses light, it slithers away to a protected spot. Worms eat bacteria, fungi, protozoa, and decaying organic matter

Pot Worm is a skinny, white worm also known as a pot worm or an enchytraeid (en kee tray' id). It is about an inch long, but is so thin that they look like a piece of thread. They move like an earthworm, they are related to earthworms. They don't have red blood like an earthworm. They eat well-decomposed material. White worms "finish off" the job of decomposition.

Pill Bug or **Roly Poly** is an isopod, which means that they have 7 pairs of legs that look very similar to each other. The flattened plates on its body make it look like an armadillo, It is about 1/2 inch long. It rolls up in a ball if it is disturbed or in danger. It eats vegetation and leaf litter.

Ant is an insect with 6 legs and 3 body sections – head, thorax, and abdomen. It is an important decomposer because it breaks material down into smaller particles. Ants create tunnels, and assemble soil particles into clumps. People find ants a nuisance in their homes, so it is best to keep them from setting up residence in a worm bin.

Fruit Fly is a small fly. It sometimes is a nuisance. It doesn't bite, sting or make annoying buzzing sounds. It never harms earthworms. People consider the fruit fly a pest because it sometimes invades worm bins. If it is warm and humid, and fruit and yeast are present, then fruit flies will lay eggs that will hatch. One way to help keep fruit flies from being a nuisance is to completely bury food waste deep in the worm bin bedding.

Mite is a tiny arthropod. It could take 25 mites to cover an inch long line. Its body is so round and fat it is hard to see its 8 jointed legs. Thousands of mites

live in a worm bin. They are important decomposers. Some mites eat plant material, such as mold and soft tissues of leaves. Other mites eat manure of other organisms.

Centipede is a fierce hunter! It is known as a predator because it preys on earthworms and eats them. They have a pair of poison claws – no danger to humans! – to help keep prey from getting away. Centipedes move quickly on 15 pairs of legs. They have only 1 pair of legs on each of their body segments that stick out to the sides. Centipedes are about 1 – 2 inches long.

Sow Bug or **Potato Bug** is an isopod. It has 7 pairs of legs. It is related to crayfish and lobster. It breathes with gills, so it must live in a damp, moist place. Its ½ inch long body is oval and flat, with a series of flattened plates like its close relative the roly-poly. The sow bug can't roll up in a ball. It eats vegetation and leaf litter.

Millipede has so many legs you would have a hard time counting them. Its name means "thousand legs," but it doesn't have that many. Each segment has 2 pairs of legs the point toward the ground. The millipede is not fierce but quite timid. It rolls up in a spiral to avoid danger. It is a vegetarian. It eats soft, moist, decaying plants. It is thick-skinned, slate gray in color and 1-2 inches long.

Slimy Creatures

Snail Facts

The body of a snail has a foot and head and a visceral mass, which is inside the shell. The visceral mass contains the mantle cavity where the heart and single kidney sit. The body of the snail, near the shell mouth is an opening called the pneumostome. This leads into the mantle cavity that has the function of a lung. The head usually has two pairs of tentacles. The upper are the eyestalks, while the lower pair helps with smelling and feeling. Snails probably don't see shapes but are very sensitive to light.

The mouth has a tongue called a radula. In the top of the mouth is a hard ridge and food is mashed between the radula and this ridge. The front teeth of the radula wear very fast but the radula grows from the backend. The digestive system begins with the mouth, and follows with the esophagus, crop, stomach and intestine. The intestine is folded in loops and ends in the anus. This is situated in the front of the mantle cavity.

The blood system in Gastropods is open, with blood spaces but no veins. The pigment is usually colorless. The heart consists of a single thin walled ventricle and a single thin walled auricle. The blood takes oxygen from the lung and

transports it to the auricle, and then to the ventricle and then to the blood spaces.

Locomotion

Snails and slugs move by contracting and relaxing muscles in the foot. There are two sets of muscle fibers and each set performs a different task. When moving forward one set contracts pulling the snail from the front and pushing it off toward the back. At the same time the second set pulls the outer surface of the sole forward.

Both halves can move separately, creating a sort of pedal-like locomotion. Glands produce mucus, which allows snails to move over rough or sharp material and crawl on vertical surfaces. It is also used for protection and navigation. Snail trails are broken and slug trails are continuous.

Snail Reproduction

Most snails are hermaphroditic. Snails need a partner to mate. Each snail has two sets of sex organs – male and female. Two snails exchange sperm into holding sacs under the mantle or shell. After about two weeks the eggs are laid. The eggs look like little clear or white pearls and are laid in clusters or separately under rocks, bricks, burlap sacks, mulch, cardboard or fallen leaves. After a few weeks tiny snails are born. They have a transparent shell. Most species of snail reach maturity in a year.

The Shell

The most eye-catching part of the snail is the shell. It consists of several layers: A thin outer layer called periostracum made of an organic substance called conchiolin. A thick inner layer called ostracum made of inorganic calcium carbonate. Most shells are coiled in a clockwise direction. The oldest part of the shell is the apex. From the apex the shell grows downward. Every 360 degrees turn is called a whorl. The seam where two whorls meet is called the suture. This can be shallow or deep. The mouth of the shell is called the aperture, it can be round, semicircular, trilobate, or auriculate.

Snail Life

Snails eat a large variety of mostly decomposing plants. Fruits, especially strawberries are favorites too. Sometime they eat carrion if they find it. Snails have a lot of enemies. Birds, especially the blackbird and the song thrush, eat the smaller species. Rats, mice, hedgehogs, moles and rabbits have snails on their menu. Beetles eat them sometimes too and people often rid them from gardens. In the winter and in dry periods snails crawl under rocks, wood and leaves, and seal their shell with several layers of mucus. This is called aestivation in the summer and hibernation in the winter.

Slug Anatomy

Slugs are similar to snails with a leathery mantle taking the place of the whorled shell and the main body or foot more exposed.

Mantle: Also called the pallium, the mantle is a fleshy lobe that, in other gastropods, secretes materials for making a shell. In most slugs this anatomical feature is vestigial; however, it can serve as a key identifier for many species.

Keel: A prominent ridge that runs along the back of some slug species. Also called the carina.

Pneumostome: A small hole or slit on the slug's right side, leading to the slug's single lung.

Tentacles: Erroneously called antennae, these are two pairs of stalks – short sensory tentacles for feeling or smelling and longer optic tentacles tipped with tiny, light-sensitive eyes.

Mouth: Located below the eyes on the underside of the head; equipped with a tongue like, rasping radula and a jaw.

Anus: Under a flap on the right side of the mantle; channels waste from the intestine and kidney.

Love Spur: Reproductive protrusion that is located under a flap on the side of the mantle.

Worm Condo

Students will experience making a suitable habitat for composting worms.

Students will make a miniature worm bin.

Students will learn how to care for red worms.

Materials

- Pint sized cartons
- Red worms (three for each habitat)
- Newspaper for bedding
- Spray bottle with water
- A pinch of soil per student
- Colored markers

Each student decorates the outside of their carton with permanent markers.

Make sure they all have names. Tear newspaper into tiny, thin strips and stuff into the box. Dampen newspaper strips with the spray bottle. Fill box with lots of paper and add a sprinkling of soil. Toss together. Add 3 worms and some pieces of left over vegetable or fruit scraps.

Care for your worms

Discuss care of worms with students. The paper must remain moist like a rung out sponge. Damp like the outside of the worm's body. Worms like darkness, so when not observing them, keep the top closed, avoid drastic hot or cold temperatures, feed them little scraps every few days.

The worms will probably survive a week or two in this habitat before needing to be moved to a larger worm bin. Seattle Tilth has a diagram describing how to build your own worm bin or you can make a classroom bin out of a plastic rubber maid tub. www.nwcleanair.org/pdf/aqPrograms/outdoorBurning/Worm%20Bin-OTS.pdf Contact the Garden Hotline (206) 633-0224 for more information.

If keeping a worm bin doesn't fit into your lifestyle, you can release your worms into an outdoor compost pile or your garden beds or containers.

Culinary Adventures

Unit Six

Objectives

- Review the techniques for working with children in the preparation and cooking of vegetables and fruit from the garden.
- Prepare, eat and clean up a healthy delicious snack or salad made from fresh garden produce.



Cooking With Children

Helpful items for cooking kits

Kid-safe plastic knives

Kid-sized knives

Tupperware

Metal Mixing bowls

Mixing spoons

Measuring cups

Measuring spoons

Cutting boards

Cheese (veggie) graters

Vegetable peelers

Colander

Small strainer

Ladle

Tongs

Potato masher

Salt and pepper

Various dry herbs

Olive oil

Vinegar

Clean jars for shaking and mixing salad dressings

Eating utensils, cups, bowls, plates (reusable or disposable), table clothes

Plastic trays, aluminum foil, plastic wrap

Dish soap, dish tubs, dishcloths and clean, dry towels, drying rack

Other nice things to have

Aprons

Garlic press

Rubber spatula

Metal spatula

Veggie scrub brushes

Salad Spinner

Electric spice mill

Blender

Crockpot

Propane camp stove

Skillets

Saucepans with lids

Stockpots with lids

Scissors are great for snipping herbs or salad greens

Ice cream maker for sorbet

Electric skillet or burner for hot cooking

Some things to keep in mind

- Always make sure the area that your cooking area is cleared of clutter
- Clean and sanitize area as much as possible
- Teach children correct hand washing procedures
- **Always wash hands before cooking for others and eating**

I like to empower the students with a few knife skills so they feel like a chef. If you are letting students use knives, give them instructions on how to use them safely and expectations of how they are to act when holding and using knives. You may choose to create some rules for working with knives; these are mine:

- 1) **Only one person should hold the knife at a time-** *if they need to pass the knife to someone else, I suggest placing on the table and sliding it to the person.*
- 2) **The only time you should be holding the knife is if you are chopping something-** *if there is no chopping or cutting happening, the knives should be at rest on the table.*
- 3) **Notice where the tip is pointing-** *a knife should not ever be pointed at another person or yourself.*

Any electric skillet or hot cooking device can also be a safety issue. Make sure students are aware of where they are standing and what they are doing if they are using or even close to these tools.

The Food \$ense program of WSU King County Extension has their CHANGE curriculum online to download for free in pdf form. These are garden based nutrition lessons with classroom friendly recipes: <http://king.wsu.edu/nutrition/change.htm> It is great to use graphic recipes like the ones designed by WSU extension. It breaks down each recipe into simple tasks that can easily be divided between small groups of students.

Cooking with Groups

You can organize your cooking project so that each group makes their own snack or each group prepares some part of the whole. When each group makes a complete snack, it is fun to do taste testing so everyone can taste the different creations. When groups are preparing separate parts of a recipe the students can see how one aspect can contribute to the bigger whole.

Create mini-kitchens for groups of 3-4 students. These will include all the utensils, bowls, cutting boards and produce that each team will need to make the recipe. Before we eat, we always clean up each mini-kitchen and set a table so we can sit down to serve everyone family style.

Recipes

Vinaigrette Dressing

Shake, whisk or blend

3 parts oil

1 part acid such as vinegar or lemon juice

Add herbs and spices to taste:

Minced garlic

Minced shallots

Dijon mustard

Thyme

Basil

Rosemary

Oregano

Dill

Salt and pepper to taste

Lemon or cucumber water

Make 6-12 thin slices lemon or cucumber

Put lemon or cucumber slices in the bottom of a pitcher

Mash lightly with a wooden spoon

Fill pitcher with cold water and ice

Let stand 20-30 minutes

Drink with garnish of mint or lemon wedge

Cucumber dill dip

Adapted from www.cdktichen.com

1 cucumber, peeled and grated

1 pound soft tofu

1 tsp dry dill weed

2 Tbs lemon juice

¼ C chopped parsley

½ tsp garlic powder

Salt and pepper to taste

Combine all ingredients and blend smooth with a food processor, blender or immersion blender. Chill ½ hour.

Upscale Spinach Salad

1 bunch spinach, washed and torn into bite sized pieces

¼ red onion sliced very thin

1 crisp apple, cored and cut into small chunks

1 handful of raisins

1 handful of roasted sunflower seeds

soft goat cheese (optional)

Toss spinach, onion, apple and raisins in vinaigrette dressing. Sprinkle to top with sunflower seeds (and goat cheese).

Appendix: Garden Songs

A collection of songs that are fun to sing and play.
Reproduced here for educational purposes only.



Dirt Made My Lunch

By The Banana Slug String Band

Chorus

G C

G

Dirt made my lunch, dirt made my
lunch.

C G

Thank you dirt, thanks a bunch

C

G

For my salad, my sandwich, my milk,
and my munch.

D

G

Thanks Dirt, you made my lunch.

Lunch Made My Dirt

From Hidden Villa tape

G C

G

Lunch you made my dirt, lunch you
made my dirt

C G

Worms and bugs with my apple
cores flirt

C

G

If it wasn't for them I'd have to eat
my shirt

D

G

Thanks lunch, you made my dirt

Itsy Bitsy Spider

-- traditional

G D7

G
The itsy bitsy spider climbed up the
water spout

G D7

G
Down came the rain and washed the
spider out

G D7

G
Out came the sun and dried up all
the rain

G D7

G
And the itsy bitsy spider climbed up
the spout again

G D7

G
The great big spider climbed up the
water spout

G D7

G
Down came the rain and washed the
spider out

G D7

G
Out came the sun and dried up all
the rain

G D7

G
And the great big spider climbed up
the spout again

The Garden Song

By Dave Mallet

G C G
Inch by inch, row by row
C D G
Gonna help this garden grow
C D G Em
All you need is a rake and a hoe
A D
And a piece of fertile ground
G C G
Inch by inch, row by row
C D G
Someone bless these seeds I sow
C D G Em
Someone warm them from below
A D G
Til the rains come tumbling down.

2. G C G
Pulling weeds, picking stones
C D G
We are made of dreams and bones
C D G Em
Gotta need to grow my own
A D
For the time is close at hand
G C G
Grain for grain, sun and rain
C D G
Find my way thru nature's chain
C D G Em
Tune my body and my brain
A D G
To the music of the land.

3. G C G
Plant your rows straight and long
C D G
Temper them with prayers and song
C D G Em
Mother earth will make you strong
A D
If you give her love and care
G C G
That old crow watching hungrily
C D G
From his branch in yonder tree
C D G Em
In my garden I'm as free
A D G
As that feathered thief up there.

I'll Rot Away

Words by

The Banana Slug String Band

G

1. In the ground where all the plants
are found

C G

I'll rot away

G

I'll rot for a while in your compost
pile

D G

I'll rot away

CHORUS

G

I'll rot away like compost

C G

I'll rot away in the garden

G

**Back to the ground where all the
plants are found**

D G

I'll rot away

G

2. My nose and my toes they will
decompose

C G

I'll rot away

G

My ears & my knees will be food for
the trees

D G

I'll rot away

CHORUS

G

3. My eyes and my thighs will be
food for the flies

C G

I'll rot away

G

When I die I guess I'll fertilize

D G

I'll rot away

CHORUS

G

4. Feed the garden with my head I
won't need it I'll be dead

C G

I'll rot away

G

When you eat a pea, you'll be eating
part of me

D G

I'll rot away

CHORUS

The Insect Song

By Tickle Tune Typhoon

C F C
I am an insect in the life
C G7 C
And this is what I look like
C
Two antennae
F
Compound eyes
G7
One, two, three,
C
Four, five, six legs
C
Two sets of wings
F
So I may fly
G7
My thorax
C (G) C
And my ab-do-men
G C
And this is what I look like

(Revved UP)

C
Two antennae
F
Compound eyes
G7
One, two, three,
C
Four, five, six legs
C
Two sets of wings
F
So I may fly
G7
My thorax
C (G) C
And my ab-do-men
G C
And this is what I look like

Bridge

C
Instead of bones
F C
My body grows
C G7 C
An exoskeleton
C
Its hard and strong
C F C
And seals me in
C G7 C
Protecting my organs.

Let's Make Tea

Words by Joan Goodnight

To the tune of Frere Jacques--

G

Hold and pick it,

G

Hold and pick it,

G

Use two hands,

G

Use two hands.

D7

G

Hold the stem with one hand,

D7

G

Pick it with the other hand,

G

D7 G

Let's make tea!

G

D7 G

Let's make tea!

Slimy Shake

By Sam O'Brien and
Lisa Taylor

A7

The worms in the ground, they
wiggle around
Can you wiggle wiggle wiggle?
wiggle wiggle wiggle

D7

The worms in the ground, they
wiggle around

A7

Can you wiggle wiggle wiggle?
wiggle wiggle wiggle

E7

D7

The worms in the ground, they
wiggle around

A7

Can you wiggle wiggle wiggle?
wiggle wiggle wiggle

A7

The slugs in my yard, make a
squishy sound
They go squish squish squish --
squish squish squish

D7

The slugs in my yard, make a
squishy sound

A7

They go squish squish squish --
squish squish squish

E7

D7

The slugs in my yard, make a
squishy sound

A7

They go squish squish squish --
squish squish squish

A7

Oh the snail in its shell, likes to hear
us hum

We go hum hum hum --hum hum
hum

D7

Oh the snail in its shell, likes to hear
us hum

A7

We go hum hum hum --hum hum
hum

E7

D7

Oh the snail in its shell, likes to hear
us hum

A7

We go hum hum hum --hum hum
hum

Wiggle, wiggle, wiggle one more
time!

Roots, Stems, Leaves

By S. Van Zandt

Chorus

C

Roots, stems, leaves, flowers, fruits
and seeds

G

C

Roots, stems, leaves, flowers, fruits
and seeds

C

Roots, stems, leaves, flowers, fruits
and seeds

G

C

Roots, stems, leaves, flowers, fruits
and seeds

C

That's six parts, that's six parts, six
plant parts

G

C

That plants and people need.

Magic Penny

By Malvina Reynolds

Chorus

G
Love is something if you give it away
D G
Give it away, give it away
G
Love is something if you give it away
D G
You end up having more

D G
You end up having more . . .
D G
And it will roll right back to you
D G
Yes it will roll right back to you

C G
It's just like a magic penny
D G
Hold it tight and you won't have any
C G
Lend it, spend it and you'll have so
many
A D
They'll roll all over the floor, for

Love is something

C G
Money's dandy and we like to use it
D G
But love is better if don't refuse it
C G
It's a treasure and you'll never lose it
A D
Unless you lock up your door, for

Love is something . . .

C G
So let's go dancing til the break of
day
D G
And if there's a piper we can pay
C G
For love is something if you give it
away

This Little Light Of Mine

-- traditional

C
This little light of mine, I'm gonna let it shine
F C
This little light of mine, I'm gonna let it shine
C Em Am
This little light of mine, I'm gonna let it shine
C G C F C
Let shine, let it shine, let it shine

C
This little dream of mine, I'm gonna let it shine
F C
This little dream of mine, I'm gonna let it shine
C Em Am
This little dream of mine, I'm gonna let it shine
C G C F C
Let shine, let it shine, let it shine

C
This little heart of mine, I'm gonna let it shine
F C
This little heart of mine, I'm gonna let it shine
C Em Am
This little heart of mine, I'm gonna let it shine
C G C F C
Let shine, let it shine, let it shine

C
All around the world, I'm gonna let it shine
F C
All around the world, I'm gonna let it shine
C Em Am
All around the world, I'm gonna let it shine
C G C F C
Let shine, let it shine, let it shine