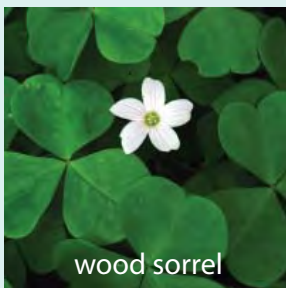
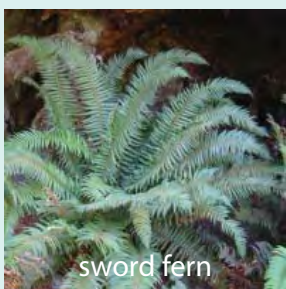


## Planning and Planting a Garden for the Northwest Environment



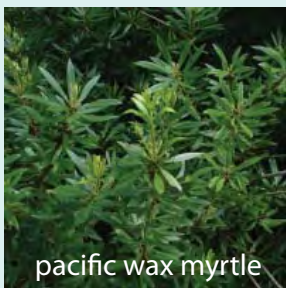
wood sorrel



sword fern



vine maple



pacific wax myrtle



twinflower

Creating a garden is the next logical step to the plant and garden studies many teachers already include in their ecology curriculum. A focus on native and other plants suitable to the northwest environment can provide students with knowledge and practices that can ultimately enhance the quality of our water, soil, salmon and other living organisms, and our own health.

### Before You Begin: Logistical Considerations

First, assess your school grounds. Check with the school groundskeeper to choose the appropriate area and to discuss and coordinate your goals in the context of any school or district landscaping policies. Realize that school grounds staff want to be sure that your project can be maintained over the summer and into the future and does not create problems once established. Here are some questions to ask to help structure your garden project:

- Is there already a garden area for students to use?
  - If yes, is it already in use by another teacher or grade level?
  - If no, can you use it to plant annuals or perennials?
- Are there planted beds that need care or renewal?
- Is there a natural area that needs restoring?
- Is there an existing native plant or natural area that can be used as an outdoor classroom?

### Pick Your Project

The scale of your project will depend on how much time you have to commit to it. Consider these ideas or your own variations of them:

- Cultivate a small raised bed or corner of the school grounds.
- Create a native plant learning center at the school.
- Use an existing, nearby natural area as an outdoor classroom.
- Create a new garden that is replanted every year.
- Establish a permanent native plant garden for teaching purposes.
- Improve and maintain an existing area.

Regardless of the size of the garden, at the end of the project, students will come out with a better understanding of natural systems and their connection to the earth.

**Native Garden Project, St. Luke School, Shoreline** - Paula Konrady, a seventh-grade teacher at St. Luke School, created a native plant garden with her students on the school grounds. Her project goals were to teach students about the hazards of chemical use in the environment, safer alternatives to pesticides, and natural methods of planting and maintaining the garden. Students researched, designed, and planted the garden, building healthy soil with compost, removing undesirable plants, and planting native ones in their place. Students now maintain the garden, which has enhanced the school grounds and provides a natural setting to be enjoyed by the school community for years to come.



“I was able to tie the garden project directly to the environmental unit taught in my seventh grade science classes. The hands-on experience was very satisfying for my students. They learned the value of using natural products and appreciated this once they realized the devastation that chemicals cause to wildlife, the environment and ultimately to themselves” - Paula Konrady

## Know Your Soil

Knowing what type of soil you have will help you to better care for your garden. A quick way to test soil is to dig up a small moist sample from an area that has been least disturbed.

- Clay soil will form a ribbon up to two inches long. Water and nutrients have a hard time moving through the tightly packed particles of clay soil.
- Sandy soil will not form a ribbon. Water flows right through the large particles of sandy soil, carrying nutrients with it.
- Loamy soil, which is considered the ideal soil condition, will form a ribbon one inch long.

Improve your soil by

- amending it annually with good-quality compost to restore the natural array of beneficial organisms and provide them with food and habitat.
- adding a layer of organic materials such as leaves, wood chips, compost or grass clippings around your plants (keeping it about an inch away from the stems). Mulch feeds the soil, conserves water and prevents weeds.

Healthy soil is full of beneficial bacteria, fungi, and other organisms that work together to keep disease and pests under control and protect the health of plants. Get more information about soil and composting at [metrokc.gov/soils](http://metrokc.gov/soils).

## Pick Your Plants

### Native plants

These are indigenous to our area of Washington State and have adapted to our environment of wet winters and dry summers. They are more resistant to pests and problems than many tender exotic or imported plant species. As a result, when planted in the right location (i.e. shade plants in the shade), they thrive without chemical pesticides and fertilizers. Reducing the use of hazardous garden products contributes to everyone’s health.

## Other Suitable Plants

Plants from environmental conditions similar to the Northwest also do well in our locale. Garden experts recommend a number of drought-tolerant, noninvasive and pest-resistant plants that are appropriate to our environment and add color, scent, or other interest to local gardens. Perennial herbs such as lavender and rosemary, for example, thrive in our climate and can provide interesting lessons tied to food and culture.

The key principle for any garden is to select the right plant for the right place. Matching plants to the soil, light and moisture conditions of your garden will enable them to thrive with a minimum amount of maintenance.

Questions? Call the Natural Lawn & Garden Hotline at 206-633-0224 or email [info@lawnandgardenhotline.org](mailto:info@lawnandgardenhotline.org).

## Decide Student Learning Outcomes

Know what your focus will be for student learning. Multiple learning outcomes may be achieved simultaneously and may include gaining knowledge about

- plants, ecosystems, climate, soil, and their interrelationships.
- how to plan and research.
- setting up and testing science experiments.
- restoration and how humans can solve difficult environmental problems.
- growing edibles and learning about the food cycle, nutrition and sustainable growing practices.
- habitats.
- ethnobotany, studying how Native Americans or other cultures use plants.

## Plan and Plant the Garden

Once logistical considerations are addressed and learning outcomes are established, begin planning the garden with students. Activity ideas are included for each step below.

### 1. Understand the characteristics of a garden.

- Have students list the characteristics of a garden. Take them to visit several gardens around or near the school so they can make observations about gardens in general.
- Show a slideshow of various gardens (vegetable, shade, native) as an aid to understanding function, design and maintenance.
- Have students write about or draw their dream garden.
- Have students research a variety of plants: native/nonnative, sun/shade, evergreen/deciduous, plants that are considered weeds, plants with different nutrient needs, etc.
- Ask students to think about short and long-term care and maintenance requirements of a garden.

### 2. Relate plants to the ecosystem in which they live: explore the site and discover what plants need to survive in your garden space.

- Do a mapping exercise with your students. Take them to a garden near school and have them make a map of where different plants are growing. They could do a leaf rubbing or draw the plant and note environmental conditions where plants seem to thrive. What does the soil look like? Do they find living organisms when they dig into the soil? What kinds? Is there a lot of sun? Shade? How dry or wet is it? What is the soil like? Does it drain well? Is it sand or clay? Will it need compost to improve its quality before planting? What is climate and how does it affect plants? What are microclimates?
- Conduct an inquiry exercise. Students could begin a science experiment at this stage by asking and answering questions about plants such as why do they grow where they do? Indoor experiments could be set up to test any variety of environmental influences including soil type, moisture level, presence of worms, light level, use of chemicals on plants, etc. Their findings could then be used in the actual planting of the garden. Alternatively,

experiments could be designed at this stage and implemented once the garden is started.

- If studying Native Americans, conduct a unit on plants of early Washington. What did the Native Americans use and how?

### 3. Plan for the new site

- Once the students have adequately identified site features, they can research which plants will thrive in their garden space. Use the resources below for Pacific Northwest native plant and garden design. Have students draw a map of the garden design. If the garden space can be set up for science experiments, students can designate areas to be used for each experiment. If the garden space will be set up for other kinds of learning (e.g. as a place to do outdoor drawing activities, or as a native herb garden to teach about foods native people ate), students can allocate space for those activities.
- Break students into small groups and have each group take responsibility for one section of the garden or one type of experiment.

**Healthy Habitat Project, Kent Elementary School, Kent** - Nancy Reidel's fifth grade classroom at Kent Elementary decided to restore a raised bed that was overgrown with ivy and grass. The class chose the theme of a bird-friendly garden. Students formed groups, each with a specific role.

- Researchers identified appropriate plants for the garden.
- Accountants identified the cost of each plant to purchase.
- Journalists wrote progress reports on the project.

All students assisted in tearing out the ivy and preparing the site with compost in preparation for planting. Students learned how to build healthy soil and raise healthy plants without the use of chemical fertilizers and pesticides and created a healthy habitat for birds, butterflies and other insects.



## Integrate Classroom Lessons with the Garden Project

### 1. Conduct science experiments to explore solutions.

- Have students research and describe common garden problems and the standard method for dealing with that problem. Examples include pests and insecticides, weeds and herbicides, sick plants and fertilizers, poor versus good drainage, poor soil versus soil with compost. Problems could also be environmental, such as salt or car wash chemicals on driveways washing into gardens.
- An example of an experiment might be testing a weed control method against a control. Non-pesticide weed control options might include experimenting with various types of mulch (compost, bark mulch, leaf mold) or spraying vinegar on small annual weeds.
- Have students detail how they could use a science experiment to find safer alternatives to hazardous chemicals. Set up the experiment in the new garden or in pots in the classroom with plants that will ultimately go into the garden.
- Follow the scientific method to compare hazardous chemicals and their safer alternatives. This can be set up as a single variable or multivariate experiment.

### 2. Evaluate your efforts. How did it go?

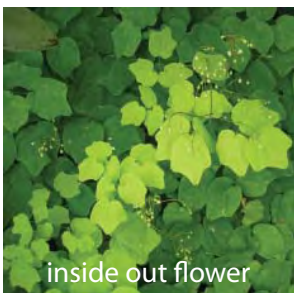
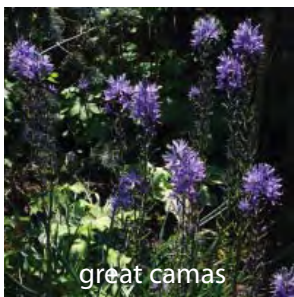
Have students compare the results of the experiment and discuss how a person's choice of garden products can affect plants and the natural environment.

Example: Did both methods of weed control effectively get rid of unwanted plants? Was one better than the other? Students should explore the benefits and disadvantages of each method of weed control. Does mulch have negative effects on the environment? What about herbicides?



# Match your native garden project with the GLEs

Garden projects meet many of the grade level expectations (GLEs) associated with the state Essential Academic Learning Requirements.



## EALR 1 – Understanding systems

- 1.1 *Properties of substances* - Study soil to understand nutrients and plant needs.
- 1.2.1 *Structure of systems* - Study the relationship of plants to soil and climate.
- 1.3.8 *Living things need energy and matter.*
- 1.3.10 *An organism's ability to survive is influenced by the organism's behavior and the ecosystem in which it lives* - Consider soil, temperature, moisture, sun exposure, climate and microclimate to put the right plant for the right place.

## EALR 2 – Investigating systems through scientific inquiry

Consider these actions for relating this EALR to school gardens:

- Research native versus nonnative plants.
- Experiment with plants in sun versus plants in shade.
- Experiment with fertilizer versus no fertilizer or explore how plants respond to different fertilizers.
- Observe effects of a household hazardous product on plants.
- Test insecticides versus safer alternative.

## EALR 3 – Application of scientific concepts to develop solutions

- 3.1.1 *Understanding problems* - Use the experiments described in this resource guide as a basis for understanding concepts related to plants and soil.
- 3.1.2 *Define and come up with solutions to a problem.*
- 3.1.3 *Analyze solutions* - Students can use their findings from the garden to determine and analyze solutions to environmental problems such as household hazardous waste and invasive species.
- 3.2.4 *Understand how humans depend on the natural environment and can cause changes in the environment that affect humans' ability to survive* – Find and read articles about the effects of pesticide exposure on children.

**Chemicals and Plants Project, Kellogg Middle School, Shoreline** - At Kellogg Middle

School, Anne Marie Culver's eighth-grade science classes used existing raised beds to test how hazardous materials affect the growth of plants. Students designed and carried out their own experiments and reported on the results at their school science fair. The goal was to have them design an experiment with a single variable and to see first-hand the effects of household chemicals on plant life.



"Many students in my class expressed their satisfaction with carrying out an experiment that was designed by them and not the teacher. Also, the project had obvious, real-world connections. Every student could see how the information they gained could be useful to them in the future."  
-Anne Marie Culver

## Plant Picks for Children's Gardens and School Gardens

### Favorite Plant Picks from a School Gardener

Liesl Zappler, certified arborist, garden consultant, and former public schools gardener, offers these suggestions for school gardens. Keep in mind that the fruits and vegetables may require harvesting and other attention during times when school is not in session.

**Full-sun Perennials**

aster



- black-eyed Susan
- burnet
- centaurea montana
- crocosmia
- daisy
- dianthus
- echinacea purpurea
- gaillardia
- hollyhock
- iris
- kniphofia
- lamb's ear
- lavender
- lemon thyme

**Full-sun Perennials Cont.**

- liatris
- lily- day, calla
- oriental poppy
- sedum

**Part-shade Perennials**

bleeding heart



- columbine
- forget-me-not
- foxglove
- fuchsia
- geum
- lily - day, calla
- peony
- wallflower

**Full-shade Perennials**

- astilbe (better if moist)
- coral bells
- hellebore
- hosta
- ferns - tassel, deer



**Fruits and Vegetables**

- artichoke
- bird house gourds
- blueberries
- corn - Indian
- hardy banana
- tri-colored Swiss chard

**Full-sun Shrubs**

- hebe
- rockrose
- rosemary

**Part-sun Shrubs**

- heather
- hydrangea
- Indian plum
- mock orange

**Full-shade Shrubs**

- sarcococca

**Favorite Trees**

- Japanese maple - coral bark
- mountain hemlock
- pinus - red, shore, bristle cone
- sequoias - giant, coastal, weeping
- smoke tree

**Favorite Vines**

- hops
- passion vine

## Seattle Tilth's Plants for Kids

Lisa Taylor is the Children's Garden Coordinator at Seattle Tilth ([seattletilth.org](http://seattletilth.org)). Lisa's choices for a children's garden are plants that children can feel, smell and eat. "If we are excited about the things growing in the garden, we are more likely to care for it and visit it more often."

### Perennials

agastache  
artichoke  
berries  
cardoon  
chamomile  
chives  
clove currant  
comfrey  
culinary sage  
dianthus  
fennel  
fruit trees  
honeysuckle  
hyssop  
Jerusalem sage  
kiwi  
lamb's ear  
lavender  
lemon balm  
lemon verbena

### Perennials Cont.

mint – especially flavored types  
monarda  
oregano  
pineapple sage roses  
rosemary  
silver shield sorrel  
sweet cicely  
thyme  
tulips

### Annuals

arugula  
bachelor's buttons  
bean blossoms  
borage  
brassica flowers  
calendula  
clover

### Cutting flowers for bouquets

daisies  
nasturtiums  
red dead nettle  
viola - pansy,  
Johnny jump-up  
zinnia

### Be Aware of these Poisonous Plants

*Although many insects and animals can eat plants without any ill effects, that doesn't mean the plants are safe for human consumption.*

aconite  
anemone  
azalea  
buttercup  
calla lily

### Poisonous Plants Cont.

clematis  
daffodil  
delphinium  
four o'clock  
foxglove  
hyacinth  
hydrangea  
iris  
ivy  
mistletoe  
morning glory  
nightshade  
periwinkle  
poison hemlock  
rhododendron  
spurge  
sweet pea  
wisteria

## Some Suggestions for Your Native Plant Garden from "Yard Talk" Hosts Greg Rabourn and Doug Rice

Use the online Native Plant Guide [dnr.metrokc.gov/wlr/pi/go-native/index.aspx](http://dnr.metrokc.gov/wlr/pi/go-native/index.aspx) to match these plants to your site conditions. Keep these guidelines in mind:

- Choose well-shaped plants to start with to avoid the need for later pruning.
- Use arborist tree mulch instead of beauty bark to improve soil structure, keep out weeds, and conserve water.
- Ensure that your plants are weeded and watered over the summer.

### Trees

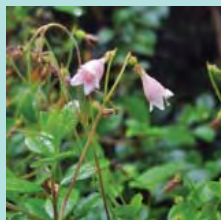
shore pine  
silk tassel  
(Oregon white oak)  
vine maple

### Shrubs

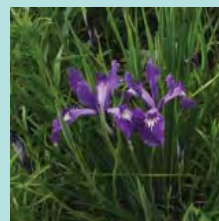
evergreen huckleberry  
mock orange  
oceanspray  
Pacific ninebark  
Pacific wax myrtle  
red flowering current  
red osier dogwood  
salal  
serviceberry

### Groundcovers

beach strawberry  
bleeding heart  
great camas  
inside out flower  
kinnikinnik  
Oregon oxalis  
sword fern  
twinflower



buttercup  
calla lily  
clematis  
daffodil  
delphinium  
four o'clock  
foxglove  
hyacinth  
hydrangea  
iris



ivy  
mistletoe  
morning glory  
nightshade  
periwinkle  
poison hemlock  
rhododendron  
spurge  
sweet pea  
wisteria

## Useful Websites

### **Great Plant Picks** • [greatplantpicks.org](http://greatplantpicks.org)

This site lists outstanding plants for the Pacific Northwest as selected by local experts. Perennials, bulbs, shrubs, and trees included are easy to grow without a lot of maintenance. While the list contains only four native plants, the plants generally are drought tolerant and pest resistant.

### **Kids Gardening** • [kidsgardening.com](http://kidsgardening.com)

Sponsored by the National Gardening Association, this site is dedicated to providing information and support to teachers and parents that want to integrate gardening into the classroom. Teachers can download lesson ideas, sign up for a free quarterly newsletter, learn about grant opportunities, find pen pals on a variety of garden topics, or register gardens. Several Washington schools are registered.

### **King County Native Plant Guide** • [dnr.metrokc.gov/wlr/PI/Go-Native/index.aspx](http://dnr.metrokc.gov/wlr/PI/Go-Native/index.aspx)

King County's website on native plants is a comprehensive planning tool that includes an interactive plant guide that lets you select plants appropriate to your conditions, explains the steps in planning and planting a native plant garden, and provides resources for finding and learning more about plants and for applying for grants.

### **Landscape Naturally** • [seattle.gov/util/Directory/Conservation\\_Index/index.asp](http://seattle.gov/util/Directory/Conservation_Index/index.asp)

This City of Seattle resource includes a wealth of information on every aspect of natural garden care. Check out the linked documents on choosing the right plant for the right place, avoiding hazardous pesticides, growing good soil, smart watering, natural weed control, and salmon-friendly gardening.

### **The Native Way** • [historylink.org/wfpa/6-activity1-the\\_native\\_way.pdf](http://historylink.org/wfpa/6-activity1-the_native_way.pdf)

This document describes plants used by Native Americans in Washington. It includes a list of native plants and a description of their cultural, medicinal and other uses.

### **School Gardens - University of California Cooperative Extension** • [cesandiego.ucdavis.edu/School\\_Gardens](http://cesandiego.ucdavis.edu/School_Gardens)

Find practical suggestions here for starting and maintaining a successful school garden.

### **School Native Plant Gardens and Nature Areas** • [stanford.edu/~rawlings/nora.htm](http://stanford.edu/~rawlings/nora.htm)

The California Native Plant Society has interesting ideas for school lessons that relate plants to the ecosystems in which they live.

## Grants

### **Green Team Mini-Grants** • [metrokc.gov/dnrp/swd/elementaryschool/documents/GreenTeamGrant.pdf](http://metrokc.gov/dnrp/swd/elementaryschool/documents/GreenTeamGrant.pdf)

Grants of up to \$500 are available to support classroom or school projects that promote habitat stewardship. Applications are accepted on a rolling basis.

### **King County Grant Exchange** • [dnr.metrokc.gov/wlr/pi/grants.htm](http://dnr.metrokc.gov/wlr/pi/grants.htm)

This site lists grants available from King County Water and Land Resource Division. Grants for habitat restoration are available.

### **Youth Garden Grants** • [kidsgardening.com/YGG.asp](http://kidsgardening.com/YGG.asp)

Grants of \$250 are available for the purchase of gardening materials and supplies from National Gardening Association, which also provides an activity package to recipients.

This document will be provided in alternate formats upon request.

206-296-4466, Toll Free 1-800-325-6165, ext. 6-4466, TTY Relay: 711  
[www.metrokc.gov/dnrp/swd](http://www.metrokc.gov/dnrp/swd)

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