



Welcome!

Welcome to the *SOLVE environmental service-learning* program. We are excited to partner with you on this significant project that will benefit schools, students and your community.

About SOLVE

SOLVE is a non-profit 501(c)(3) organization that brings together government agencies, businesses and citizen volunteers in programs and projects to improve the environment in Oregon. Established in 1969 by Governor Tom McCall and other community leaders, SOLVE annually provides resources to more than 170 Oregon communities. SOLVE supports projects which engage volunteers in cleanup of litter and illegal dumpsites, non-native invasive plant removal, native vegetation planting, and watershed maintenance and monitoring activities.

SOLVE's Mission:

“SOLVE brings Oregonians together to improve the environment and build a legacy of stewardship.”

SOLVE's Goals:

- Engage Oregonians of all ages in a spectrum of episodic and long-term volunteer experiences to improve Oregon's environment.
- Raise the awareness of volunteers to the impact of their work by incorporating education throughout SOLVE's activities.

The *SOLVE Service-Learning Project Plans* offer teachers, students, and informal educators:

- Five project plans of approximately 1-2 hours in duration, each with step-by-step instructions on how to complete a successful environmental service-learning project.
- Reflection activity ideas
- Additional resources to assist you with your project
- Intentional alignment to Content standards, the six Career-Related Learning Standards, and Essential Skills required by the Oregon Department of Education.

What is service-learning?

- Service-learning is a teaching and learning strategy integrating meaningful community service with academic study and reflective practice to enrich learning, build civic engagement, and strengthen communities.
- Service-learning is *not*; an episodic volunteer program, completing minimum service hours in order to satisfy a class or graduation requirement, service assigned as a form of punishment or one-sided: benefiting only students or only the community.



Benefits of service-learning include:

- Increased student engagement
- Improved academic achievement
- Increased student volunteerism
- Improved partnerships between schools and communities
- Important community needs are met

Important considerations:

- Choose the activity that best fits with your curriculum. Involving students whenever possible in project selection will increase opportunities for leadership development and additional learning.
- Connect with community resources. Some of the project plans may require an outside expert. For example, if you are unfamiliar with native plants a local watershed employee may need to provide education about plant identification. See the additional resources section for organizations to contact.

Curriculum Layout:

Each lesson lists:

1. Topic background
2. Content alignments
3. Learning objectives
4. Service objectives
5. Materials needed
6. Instructions
7. Suggested reflection activities
8. Additional resources
9. Content standards and essential skills that are addressed

Good luck and thanks for all you do for your students and to improve the environment in Oregon!



SOLVE Service-Learning Project Plans

Litter Cleanup

Background

Litter can cause many problems including:

- Reducing the visual appeal of a city, natural area, or park
- Harming wildlife
- Harms waterways, including water quality
- The presence of litter can cause others to litter an area more frequently
- Litter can cause a fire hazard if it is allowed to accumulate

Content Alignments

- Mathematics
- Science
- English Language Arts
- Social Science

Learning Objectives

- Students will gain an understanding of how litter can impact the health of the environment.
- Students will learn how to properly dispose of litter and recyclables.

Service Objectives

- Students will remove all the litter from their project site and dispose of it properly.

Materials Needed

- Garbage bags
- Hazardous Material container
- Gloves
- Tally sheet

Instructions

1. Introduce Students to the damage plastics and other materials found in litter can cause to the environment.
2. Make sure Students are aware of the common types of hazardous materials and how to properly handle and dispose of them.
3. Have Students spread out and cover the entire site, placing all the trash and recyclables they find along the way into garbage bags. To make sorting easier it may be preferable to have Students work in pairs, one volunteer collecting trash and the other collecting recyclables.
4. After all the trash and recyclables have been removed Students will tally the number of bags they collected and sort them into recyclables and trash.
5. Students can then share this tally with a local government agency or non-profit who is working to reduce litter. The tally should also be reported to SOLV for use in our reports.

Reflection Idea

Ask Students to think about the question: How much trash do you produce in a day? Then have Students discuss ways they can reduce the amount of trash they produce.



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Additional Resources

- Metro Recycling Hotline (Portland-Metro area only)
 - 503-234-3000
- Clackamas Dumpstoppers (Clackamas County Only)
 - 503-650-3333
- Washington County Waste Prevention (Washington County Only)
 - <http://www.co.washington.or.us/HHS/SWR/WastePrevention/>
- Oregon Adopt-A-Highway (Statewide)
 - <http://www.oregon.gov/ODOT/HWY/OOM/Adopt/aHwy.shtml>
- Oregon Department of Environmental Quality Illegal Dumping Page
 - <http://www.deq.state.or.us/lq/pubs/factsheets/sw/CombatIllegalDumping.pdf>



Litter Cleanup - Standards

Elementary Academic Content Standards	
English Language Arts	<p>Reading: Vocabulary EL.04.RE.09 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas. EL.05.RE.09 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas.</p> <p>Speaking and Listening: Listening EL.01.SL.08 Listen attentively. EL.01.SL.09 Ask questions for clarification and understanding. EL.02.SL.06 Give and follow three- and four-step directions. EL.03.SL.09 Answer questions completely and with appropriate elaboration. EL.04.SL.07 Ask thoughtful questions and respond orally to questions with appropriate discussion. EL.04.SL.09 Follow detailed directions and instructions. EL.05.SL.07 Ask relevant questions that seek information not already discussed.</p> <p>Writing EL.03.WR.08 Write appropriately for purpose and audience.</p>
Science (2009)	<p>Structure and Function 1.IE.1 Examine characteristics and physical properties of Earth materials. 4.IE.1 Identify properties, uses, and availability of Earth materials.</p> <p>Interaction and Change 4.2L.1 Describe the interactions of organisms and the environment where they live. 5.2L.1 Explain the interdependence of plants, animals, and environment, and how adaptation influences survival</p> <p>Scientific Inquiry K.3S.1 Explore questions about living and non-living things and events in the natural world. K.3S.2 Make observations about the natural world 2.3S.2 Make predictions about living and non-living things and events in the environment based on observed patterns.</p>
Social Sciences	<p>Civics and Government Understand participatory responsibilities of citizens in the community (voluntarism) and in the political process (becoming informed about public issues and candidates, joining political parties/interest groups/associations, communicating with public officials, voting, influencing lawmaking through such processes as petitions/initiatives. SS.03.CG.03 Identify ways that people can participate in their communities and the responsibilities of participation. SS.05.CG.05 Understand how citizens can learn about public issues. SS.05.CG.05.01 Identify and give examples of resources that provide information about public issues</p> <p>Geography Understand how people and the environment are interrelated. SS.03.GE.05 Understand how peoples' lives are affected by the physical environment. SS.05.GE.07.01 Understand how and why people alter the physical environment. SS.05.GE.07.02 Describe how human activity can impact the environment.</p>

Middle School Academic Content Standards	
English Language Arts	<p>Reading: Vocabulary EL.08.RE.08 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas</p> <p>Speaking and Listening: Listening EL.08.SL.08 Analyze oral presentations, including language choice and delivery, and the effect of the speaker's interpretation on the listener. EL.08.SL.09 Paraphrase a speaker's purpose and point of view, and ask relevant questions concerning the speaker's content, delivery, and purpose.</p>
Science (2009)	<p>Interaction and Change 6.2L.2 Explain how individual organisms and populations in an ecosystem interact and how changes in populations are related to resources.</p>



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	7.2E.1 Describe and evaluate the environmental and societal effects of obtaining, using, and managing waste of renewable and non-renewable resources. 7.2E.3 Evaluate natural processes and human activities that affect global environmental change and suggest and evaluate possible solutions to problems.
Social Sciences	Geography: Understand how people and the environment are interrelated SS.08.GE.07 Understand how human modification of the physical environment in a place affects both that place and other places. SS.08.GE.07.01 Understand how the process of urbanization affects the physical environment of a place, the cultural characteristics of a place, and the physical and human characteristics of the surrounding region. SS.08.GE.08.01 Understand how changes in the physical environment can increase or diminish capacity to support human activity.

High School	
English Language Arts	Reading: Vocabulary EL.HS.RE.08 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas Speaking and Listening: Listening EL.HS.SL.10 Formulate judgments about ideas under discussion, and support those judgments with convincing evidence. EL.HS.SL.11 Follow complex verbal instructions that include technical vocabulary and processes.
Science (2009)	Interaction and Change H.2L.2 Explain how ecosystems change in response to disturbances and interactions. Analyze the relationships among biotic and abiotic factors in ecosystems. H.2E.4 Evaluate the impact of human activities on environmental quality and the sustainability of Earth systems. Describe how environmental factors influence resource management.
Social Sciences	Civics and Government: Understand participatory responsibilities of citizens in the community (voluntarism) and in the political process (becoming informed about public issues and candidates, joining political parties/interest groups/associations, communicating with public officials, voting, influencing lawmaking through such processes as petitions/initiatives). SS.HG.CG.05.01 Identify the responsibilities of citizens in the United States and understand what an individual can do to meet these responsibilities. Geography: Understand how people and the environment are interrelated SS.HS.GE.07 Understand human modifications of the physical environment and analyze their global impacts and consequences for human activity. SS.HS.GE.07.01 Distinguish between renewable resources and non-renewable resources and the global consequences of mismanagement. SS.HS.GE.08.1 Identify and give examples of changes in human activity due to changes in the physical environment, and analyze the impact on both.

Career-Related Learning Standards	
Personal Management	CS.PM.04 Maintain regular attendance and be on time. CS.PM.05 Maintain appropriate interactions with colleagues.
Communication	CS.CM.01 Locate, process, and convey information using traditional and technological tools. CS.CM.02 Listen attentively and summarize key elements of verbal and non-verbal communication.
Teamwork	CS.TW.01 Identify different types of teams and roles within each type of team; describe why each role is important to effective teamwork. CS.TW.02 Demonstrate skills that improve team effectiveness (e.g., negotiation, compromise, consensus building, conflict management, shared decision-making and goal-setting).
Employment Foundations	CS.EF.06 Demonstrate dress, appearance, and personal hygiene appropriate for the work environment and situation. CS.EF.07 Explain and follow health and safety practices in the work environment.



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Essential Skills	
Write for a variety of purposes	Think critically and analytically
Demonstrate civic and community engagement	



SOLVE Service-Learning Project Plans

Invasive Plant Removal

Background

- Invasive plants out-compete native trees and shrubs and create mono-cultures, areas dominated by a single species, reducing the habitat available to local wildlife.
- Invasive plants often have shallow root systems which do little to reduce erosion or remove undesirable pollutants from runoff.
- Removal of invasive plants must be followed by planting of native plants in order to keep the invasive plants from returning.

Content Alignments

- Mathematics
- Science
- English Language Arts
- Social Science

Learning Objectives

- Students will learn the ways in which invasive plants can damage native plants, create mono-cultures, increase erosion, and destroy animal habitat.
- Students will learn how to identify invasive plants.
- Students will learn how to properly remove invasive plants using manual techniques.

Service Objectives

- Students will remove any invasive plants present at the site.

Materials Needed

- Gloves
- Shovels
- Loppers

Instructions

1. Provide an overview and definition of invasive plants.
2. Work with Students to identify the invasive plants which are present at the restoration site.
3. Explain ways in which invasive plants damage riparian areas.
4. Explain the benefits of manual invasive removal to Students in comparison with other techniques.
5. Demonstrate proper manual removal techniques for appropriate invasive plants. (Ideal dates for invasive plant removal depends on when the plants go to seed, contact a local watershed restoration professional for specific advice)
 - a. English Ivy – If ivy is on the ground pull up by hand when possible, and cut off vines as necessary. For ivy attached to trees cut ivy in a circle around the tree at shoulder height and then at knee height. Once the ivy is disconnected from the



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- ground the plant material higher up will slowly die away. Removing the cut material from the site will reduce chances of the plant re-rooting.
- b. Morning Glory – Pull out by hand. Removing the cut material from the site will reduce chances of the plant re-rooting.
 - c. Himalayan Blackberry – Cut using loppers until about one foot of stem remains. Using a shovel dig up the root under the stem, make sure you get the large woody part of the root known as a root ball.
 - d. Scotch Broom – Cut down stems as low to the ground as possible. Once the majority of the plant material is removed the plant will die away.
6. Supervise Students to ensure proper removal.
 7. If invasive plant removal will not be immediately followed with native planting seed or straw should be spread to reduce the chance of weeds invading as well as decreasing erosion.

Reflection Idea

Have Students survey their site before they begin their work, take a mental “picture” and then look at it again when the work is completed. This activity will give everyone a sense of accomplishment over time. Take time to reflect on the service experience as well as the importance of teamwork in completing the service project.

Additional Resources

- Alien Invasion: Plants on the Move Weed Curriculum
 - http://www.weedinvasion.org/weed_home.php
- Center for Invasive Species and Ecosystem Health
 - <http://www.invasive.org/>
- East Multnomah Soil and Water Conservation District
 - <http://www.emswcd.org/weeds>
- Oregon Department of Agriculture State Noxious Weed List and Quarantine
 - <http://www.oregon.gov/ODA/PLANT/WEEDS/lists.shtml>
- Oregon State University Extension Service
 - 503-655-8631
 - <http://extension.oregonstate.edu/>
- The Silent Invasion Invasive Plant Guide
 - <http://www.opb.org/programs/invasives/guide.php>
- Your Local Watershed Council or Soil and Water Conservation District
 - <http://www.oregonwatersheds.org/>
 - <http://www.oacd.org/>



Invasive Plant Removal - Standards

Elementary	
English Language Arts	<p>Reading: Vocabulary EL.04.RE.09 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas. EL.05.RE.09 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas.</p> <p>Speaking and Listening: Listening EL.01.SL.08 Listen attentively. EL.01.SL.09 Ask questions for clarification and understanding. EL.02.SL.06 Give and follow three- and four-step directions. EL.03.SL.09 Answer questions completely and with appropriate elaboration. EL.04.SL.07 Ask thoughtful questions and respond orally to questions with appropriate discussion. EL.04.SL.09 Follow detailed directions and instructions. EL.05.SL.07 Ask relevant questions that seek information not already discussed.</p>
Science (2009)	<p>Structure and Function K.IP.1 Compare and contrast characteristics of living and non-living things. K.IL.1 Compare and contrast characteristics of plant and animals. K.IE.1 Gather evidence that the sun warms land, air, and water. 1.IL.1 Compare and contrast characteristics among individuals within one plant or animal group. 1.IE.1 Examine characteristics and physical properties of Earth materials. 2.IL.1 Compare and contrast characteristics and behaviors of plants and animals and the environments where they live. 4.IE.1 Identify properties, uses, and availability of Earth materials. 5.IL.1 Explain that organisms are composed of parts that function together to form a living system.</p> <p>Interaction and Change 1.2L.1 Describe the basic needs of living things. 2.2L.1 Describe life cycles of living things. 3.2L.1 Compare and contrast the life cycles of plants and animals. 4.2L.1 Describe the interactions of organisms and the environment where they live. 4.2E.1 Compare and contrast the changes in the surface of Earth that are due to slow and rapid processes. 5.2L.1 Explain the interdependence of plants, animals, and environment, and how adaptation influences survival 5.2E.1 Explain how the energy from the sun affects Earth's weather and climate.</p> <p>Scientific Inquiry K.3S.1 Explore questions about living and non-living things and events in the natural world. K.3S.2 Make observations about the natural world 2.3S.2 Make predictions about living and non-living things and events in the environment based on observed patterns.</p>
Social Sciences	<p>Civics and Government Understand participatory responsibilities of citizens in the community (voluntarism) and in the political process (becoming informed about public issues and candidates, joining political parties/interest groups/associations, communicating with public officials, voting, influencing lawmaking through such processes as petitions/initiatives. SS.03.CG.03 Identify ways that people can participate in their communities and the responsibilities of participation. SS.05.CG.05 Understand how citizens can learn about public issues. SS.05.CG.05.01 Identify and give examples of resources that provide information about public issues</p> <p>Understand how people and the environment are interrelated. SS.03.GE.05 Understand how peoples' lives are affected by the physical environment. SS.05.GE.07.01 Understand how and why people alter the physical environment. SS.05.GE.07.02 Describe how human activity can impact the environment.</p>

8th Grade	
English Language	Speaking and Listening: Listening



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Arts	EL.08.SL.08 Analyze oral presentations, including language choice and delivery, and the effect of the speaker's interpretation on the listener. EL.08.SL.09 Paraphrase a speaker's purpose and point of view, and ask relevant questions concerning the speaker's content, delivery, and purpose.
Science (2009)	Interaction and Change 6.2L.2 Explain how individual organisms and populations in an ecosystem interact and how changes in populations are related to resources. 6.2E.1 Explain the water cycle and the relationship to landforms and weather 7.2L.2 Explain the processes by which plants and animals obtain energy and materials for growth and metabolism. 7.2E.1 Describe and evaluate the environmental and societal effects of obtaining, using, and managing waste of renewable and non-renewable resources. 7.2E.3 Evaluate natural processes and human activities that affect global environmental change and suggest and evaluate possible solutions to problems. 7.2E.4 Explain how landforms change over time at various rates in terms of constructive and destructive forces.
Social Sciences	Geography: Understand how people and the environment are interrelated SS.08.GE.07 Understand how human modification of the physical environment in a place affects both that place and other places. SS.08.GE.07.01 Understand how the process of urbanization affects the physical environment of a place, the cultural characteristics of a place, and the physical and human characteristics of the surrounding region. SS.08.GE.07.02 Understand how clearing vegetation affects the physical environment of a place and other places. SS.08.GE.08 Understand how changes in a physical environment affect human activity SS.08.GE.08.01 Understand how changes in the physical environment can increase or diminish capacity to support human activity. SS.08.GE.08.03 Predict how changes in an ecosystem (not caused by human activity) might influence human activity. Geography: Understand the geographic results of resource use and management programs and policies

High School	
English Language Arts	Reading: Vocabulary EL.HS.RE.08 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas Speaking and Listening: Listening EL.HS.SL.10 Formulate judgments about ideas under discussion, and support those judgments with convincing evidence. EL.HS.SL.11 Follow complex verbal instructions that include technical vocabulary and processes.
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Social Sciences	Civics and Government: Understand participatory responsibilities of citizens in the community (voluntarism) and in the political process (becoming informed about public issues and candidates, joining political parties/interest groups/associations, communicating with public officials, voting, influencing lawmaking through such processes as petitions/initiatives). SS.HG.CG.05.01 Identify the responsibilities of citizens in the United States and understand what an individual can do to meet these responsibilities. Geography: Understand how people and the environment are interrelated SS.HS.GE.07 Understand human modifications of the physical environment and analyze their global impacts and consequences for human activity. SS.HS.GE.07.01 Distinguish between renewable resources and non-renewable resources and the global consequences of mismanagement. SS.HS.GE.08.1 Identify and give examples of changes in human activity due to changes in the physical environment, and analyze the impact on both.



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Career-Related Learning Standards

Personal Management	CS.PM.01 Identify tasks that need to be done and initiate action to complete the tasks. CS.PM.02 Plan, organize, and complete projects and assigned tasks on time, meeting agreed upon standards of quality. CS.PM.04 Maintain regular attendance and be on time. CS.PM.05 Maintain appropriate interactions with colleagues.
Communication	CS.CM.01 Locate, process, and convey information using traditional and technological tools. CS.CM.04 Read technical/instructional materials for information and apply to specific tasks.
Employment Foundations	CS.EF.02 Select, apply, and maintain tools and technologies appropriate for the workplace CS.EF.06 Demonstrate dress, appearance, and personal hygiene appropriate for the work environment and situation. CS.EF.07 Explain and follow health and safety practices in the work environment.
Teamwork	CS.TW.02 Demonstrate skills that improve team effectiveness (e.g., negotiation, compromise, consensus building, conflict management, shared decision –making and goal-setting).

Essential Skills

Think critically and analytically

Demonstrate civic and community engagement



SOLVE Service-Learning Project Plans

Native Tree and Shrub Planting

Background

Native trees and shrubs provide numerous benefits:

- Resistance to pests and diseases
- Easy care, requiring less water
- Provide food, and shelter for native wildlife
- Reduce the amount of polluted runoff to waterways
- Require little long-term maintenance if they are properly planted
- Produce long root systems to hold the soil in place and reduce erosion
- Protect water quality by shading the stream to reduce temperature
- Moderating floods and droughts

Content Alignments

- Mathematics
- Science
- English Language Arts
- Social Science

Learning Objectives

- Students will learn how to properly plant native species.
- Students will learn how planting native plants improves wildlife habitat and water quality, and reduces erosion.

Service Objectives

- Students will plant native trees and shrubs at a restoration site

Materials Needed

- Gloves
- Water
- Shovels
- Native plants
- Flagging tape

Instructions (These instructions are for potted plants)

1. Identify the native trees and shrubs the Students will be planting and explain the role they play in a healthy riparian area. Explain the many environmental benefits gained by planting native trees and shrubs (See *Native Plant* activity for additional information).
2. If requested by the restoration site partner, flag plants with flagging tape for future identification.
3. Demonstrate to Students how to properly prepare and plant the native trees and shrubs.
 - a. Using a shovel, scrape all the grass and other vegetation from a radius of two or more feet from where the plant will be placed.



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- b. With the shovel, make a planting hole the depth of the soil in the container and at least two times as wide as pot containing the plant. A wide hole gives trees a better chance at survival.
 - c. Remove roots and large rocks from the soil taken out of the planting hole.
 - d. Carefully remove the plant from the plastic container without yanking the plant by the stem. The plant can be loosened by squeezing the container. You may need to turn it on its side or upside down.
 - e. Unwind the roots if they are wound around the container, so that they dangle down. It is okay if you break some of the roots, it is very important that the roots become straightened out.
 - f. Stand the plant in the hole so that the stem where it emerges from the root mass will be exactly at the surface when the hole is backfilled. The roots should dangle down and not bend. Spread the roots out within the hole. Add loose soil to the bottom of the hole if needed to keep the plant at the proper height.
 - g. Backfill the hole with the soil you removed when digging the hole. Tamp gently with hands or feet after backfilling. When finished, the soil surface should be just above the level where the plant roots begin.
4. Supervise Students and ensure that all plants are planted properly.

Reflection Idea

In small groups have Students discuss the following questions: In 10 years how will the restoration area we have planted changed? In 10 years how will we have changed? After 5 minutes have the small groups report out to the larger group.

As we planted the trees and shrubs why was it important to straighten the roots, keep the root collar even with the ground, and pack the dirt firmly after backfilling the hole?

Additional Resources

- Arbor Day Foundation
 - <http://www.arborday.org>
- Local Native Plant Nurseries
- Natural Resources Conservation Service
 - <http://www.nrcs.usda.gov/feature/backyard/treptg.html>
- Oregon Association of Nurseries buyers Guide
 - <http://www.nurseryguide.com>
- Oregon Flora Project,
 - (541) 737-4338
 - <http://www.oregonflora.org>
- Oregon State University Extension Service - Gardening with Native Plants West of the Cascades
 - <http://extension.oregonstate.edu/catalog/html/ec/ec1577/>
- SPROUT (Sustainable Plant Research and Outreach)
 - 503-584-7252
 - <http://www.sproutoregon.org>
- Your Local Watershed Council or Soil and Water Conservation District
 - <http://www.oregonwatersheds.org/>
 - <http://www.oacd.org/>



Native Tree and Shrub Planting - Standards

Elementary Academic Content Standards	
English Language Arts	<p>Reading: Vocabulary EL.04.RE.09 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas. EL.05.RE.09 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas.</p> <p>Speaking and Listening: Listening EL.01.SL.08 Listen attentively. EL.01.SL.09 Ask questions for clarification and understanding. EL.02.SL.06 Give and follow three- and four-step directions. EL.03.SL.09 Answer questions completely and with appropriate elaboration. EL.04.SL.07 Ask thoughtful questions and respond orally to questions with appropriate discussion. EL.04.SL.09 Follow detailed directions and instructions. EL.05.SL.07 Ask relevant questions that seek information not already discussed.</p>
Science (2009)	<p>Structure and Function K.IP.1 Compare and contrast characteristics of living and non-living things. K.IL.1 Compare and contrast characteristics of plant and animals. K.IE.1 Gather evidence that the sun warms land, air, and water. 1.IL.1 Compare and contrast characteristics among individuals within one plant or animal group. 1.IE.1 Examine characteristics and physical properties of Earth materials. 2.IL.1 Compare and contrast characteristics and behaviors of plants and animals and the environments where they live. 4.IE.1 Identify properties, uses, and availability of Earth materials. 5.IL.1 Explain that organisms are composed of parts that function together to form a living system.</p> <p>Interaction and Change 1.2L.1 Describe the basic needs of living things. 2.2L.1 Describe life cycles of living things. 3.2L.1 Compare and contrast the life cycles of plants and animals. 3.2E.1 Identify Earth as a planet and describe its seasonal weather patterns of precipitation and temperature. 4.2L.1 Describe the interactions of organisms and the environment where they live. 4.2E.1 Compare and contrast the changes in the surface of Earth that are due to slow and rapid processes. 5.2L.1 Explain the interdependence of plants, animals, and environment, and how adaptation influences survival 5.2E.1 Explain how the energy from the sun affects Earth's weather and climate.</p> <p>Scientific Inquiry K.3S.1 Explore questions about living and non-living things and events in the natural world. K.3S.2 Make observations about the natural world 2.3S.2 Make predictions about living and non-living things and events in the environment based on observed patterns.</p>
Social Sciences	<p>Civics and Government Understand participatory responsibilities of citizens in the community (voluntarism) and in the political process (becoming informed about public issues and candidates, joining political parties/interest groups/associations, communicating with public officials, voting, influencing lawmaking through such processes as petitions/initiatives. SS.03.CG.03 Identify ways that people can participate in their communities and the responsibilities of participation. SS.05.CG.05 Understand how citizens can learn about public issues. SS.05.CG.05.01 Identify and give examples of resources that provide information about public issues</p> <p>Geography Understand how people and the environment are interrelated. SS.03.GE.05 Understand how peoples' lives are affected by the physical environment. SS.05.GE.07.01 Understand how and why people alter the physical environment. SS.05.GE.07.02 Describe how human activity can impact the environment.</p> <p>Social Science Analysis</p>



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Define and clarify an issue so that its dimensions are well understood
 SS.03.SA.01 Identify an issue or problem that can be studied.
 SS.05.SA.01 Examine an event, issue, or problem through inquiry and research.

Middle School Academic Content Standards

English Language Arts

Reading: Vocabulary
 EL.08.RE.08 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas
Speaking and Listening: Listening
 EL.08.SL.08 Analyze oral presentations, including language choice and delivery, and the effect of the speaker's interpretation on the listener.
 EL.08.SL.09 Paraphrase a speaker's purpose and point of view, and ask relevant questions concerning the speaker's content, delivery, and purpose.

Science (2009)

Interaction and Change
 6.2L.2 Explain how individual organisms and populations in an ecosystem interact and how changes in populations are related to resources.
 6.2E.1 Explain the water cycle and the relationship to landforms and weather
 7.2E.1 Describe and evaluate the environmental and societal effects of obtaining, using, and managing waste of renewable and non-renewable resources.
 7.2E.3 Evaluate natural processes and human activities that affect global environmental change and suggest and evaluate possible solutions to problems.
 7.2E.4 Explain how landforms change over time at various rates in terms of constructive and destructive forces.

Social Sciences

Geography: Understand how people and the environment are interrelated
 SS.08.GE.07 Understand how human modification of the physical environment in a place affects both that place and other places.
 SS.08.GE.07.01 Understand how the process of urbanization affects the physical environment of a place, the cultural characteristics of a place, and the physical and human characteristics of the surrounding region.
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 SS.08.GE.08 Understand how changes in a physical environment affect human activity
 SS.08.GE.08.01 Understand how changes in the physical environment can increase or diminish capacity to support human activity.
 SS.08.GE.08.03 Predict how changes in an ecosystem (not caused by human activity) might influence human activity.
Geography: Understand the geographic results of resource use and management programs and policies

High School Academic Content Standards

English Language Arts

Reading: Vocabulary
 EL.HS.RE.08 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas
Speaking and Listening: Listening
 EL.HS.SL.10 Formulate judgments about ideas under discussion, and support those judgments with convincing evidence.
 EL.HS.SL.11 Follow complex verbal instructions that include technical vocabulary and processes.

Science (2009)

Interaction and Change
 H.2L.2 Explain how ecosystems change in response to disturbances and interactions. Analyze the relationships among biotic and abiotic factors in ecosystems.
 H.2E.4 Evaluate the impact of human activities on environmental quality and the sustainability of Earth systems. Describe how environmental factors influence resource management.

Social Sciences

Civics and Government: Understand participatory responsibilities of citizens in the community (voluntarism) and in the political process (becoming informed about public issues and candidates, joining political parties/interest groups/associations, communicating with public officials, voting, influencing lawmaking through such processes as petitions/initiatives).
 SS.HG.CG.05.01 Identify the responsibilities of citizens in the United States and understand what an individual can do to meet these responsibilities.



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	<p>Geography: Understand how people and the environment are interrelated</p> <p>SS.HS.GE.07 Understand human modifications of the physical environment and analyze their global impacts and consequences for human activity.</p> <p>SS.HS.GE.07.01 Distinguish between renewable resources and non-renewable resources and the global consequences of mismanagement.</p> <p>SS.HS.GE.08.1 Identify and give examples of changes in human activity due to changes in the physical environment, and analyze the impact on both.</p>
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Career-Related Learning Standards

Personal Management	<p>CS.PM.01 Identify tasks that need to be done and initiate action to complete the tasks.</p> <p>CS.PM.02 Plan, organize, and complete projects and assigned tasks on time, meeting agreed upon standards of quality.</p> <p>CS.PM.04 Maintain regular attendance and be on time.</p> <p>CS.PM.05 Maintain appropriate interactions with colleagues.</p>
Communication	<p>CS.CM.01 Locate, process, and convey information using traditional and technological tools.</p> <p>CS.CM.04 Read technical/instructional materials for information and apply to specific tasks.</p>
Employment Foundations	<p>CS.EF.02 Select, apply, and maintain tools and technologies appropriate for the workplace</p> <p>CS.EF.06 Demonstrate dress, appearance, and personal hygiene appropriate for the work environment and situation.</p> <p>CS.EF.07 Explain and follow health and safety practices in the work environment.</p>
Teamwork	<p>CS.TW.02 Demonstrate skills that improve team effectiveness (e.g., negotiation, compromise, consensus building, conflict management, shared decision-making and goal-setting).</p>

Essential Skills

Think critically and analytically	Demonstrate civic and community engagement
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SOLVE Service-Learning Project Plans

Site Maintenance – Weeding, Watering, Mulching

Background

In order to continue to develop, restoration sites must be maintained for at least the first five years following restoration. Specific maintenance activities depend on the needs of the site but may include:

- Continued removal of invasive plants
- Periodic watering during the dry months (for the 1st and 2nd year, this should not be constant irrigation)
- Adding mulch around the plants to protect from weeds, provide nutrients, and help the ground around the plant retain moisture

Content Alignments

- Mathematics
- Science
- English Language Arts
- Social Science

Learning Objectives

- Students will learn that restoration sites need upkeep. They will also learn why these sorts of activities help the plants and the site as a whole.
- Students will learn how to remove weeds, mulch plants, and appropriately water restoration sites.

Service Objectives

- Students will maintain the restoration site as necessary

Materials Needed

- Buckets
- Pruners
- Gloves
- Mulch

Instructions

- As directed by site partner, property owner or restoration professional, complete needed tasks.
- Explain benefits of each task to Students:
 - Weeding: removes unwanted plants from restoration areas. Unwanted plants compete for nutrients, water and sunlight with native plants. Removing them increases the survival rates for beneficial plants.
 - Mulching: keeps weeds down and helps retain moisture near the plant for a longer period of time. Some mulch includes compost that can give extra nutrients to the plant as well.
 - Watering: All plants need water to survive! Eventually the roots of these native plants will be strong and long enough to reach water on their own, but in the first



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years after being planted they need more assistance. Constant irrigation is not needed; watering 3-4 times over the summer should be enough in most cases.

Reflection Idea

Have Students answer the following question: What would happen if the new plants were not maintained?

Additional Resources

- Center for Invasive Species and Ecosystem Health
 - <http://www.invasive.org/>
- Oregon Department of Agriculture State Noxious Weed List and Quarantine
 - <http://www.oregon.gov/ODA/PLANT/WEEDS/lists.shtml>
- Oregon State University Extension Service
 - 503-655-8631
 - <http://extension.oregonstate.edu/>
- Your Local Watershed Council or Soil and Water Conservation District
 - <http://www.oregonwatersheds.org/>
 - <http://www.oacd.org/>



Site Maintenance – Weeding, Watering, Mulching - Standards

Elementary Academic Content Standards	
English Language Arts	<p>Reading: Vocabulary EL.04.RE.09 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas. EL.05.RE.09 Understand, learn, and use new vocabulary that is introduced and taught directly through informational text, literary text, and instruction across the subject areas.</p> <p>Speaking and Listening: Listening EL.01.SL.08 Listen attentively. EL.01.SL.09 Ask questions for clarification and understanding. EL.02.SL.06 Give and follow three- and four-step directions. EL.03.SL.09 Answer questions completely and with appropriate elaboration. EL.04.SL.07 Ask thoughtful questions and respond orally to questions with appropriate discussion. EL.04.SL.09 Follow detailed directions and instructions. EL.05.SL.07 Ask relevant questions that seek information not already discussed.</p>
Science (2009)	<p>Structure and Function K.IP.1 Compare and contrast characteristics of living and non-living things. K.IL.1 Compare and contrast characteristics of plant and animals. K.IE.1 Gather evidence that the sun warms land, air, and water. 1.IL.1 Compare and contrast characteristics among individuals within one plant or animal group. 1.IE.1 Examine characteristics and physical properties of Earth materials. 2.IL.1 Compare and contrast characteristics and behaviors of plants and animals and the environments where they live. 4.E.1 Identify properties, uses, and availability of Earth materials. 5.IL.1 Explain that organisms are composed of parts that function together to form a living system.</p> <p>Interaction and Change 1.2L.1 Describe the basic needs of living things. 2.2L.1 Describe life cycles of living things. 3.2L.1 Compare and contrast the life cycles of plants and animals. 3.2E.1 Identify Earth as a planet and describe its seasonal weather patterns of precipitation and temperature. 4.2L.1 Describe the interactions of organisms and the environment where they live. 4.2.E.1 Compare and contrast the changes in the surface of Earth that are due to slow and rapid processes. 5.2L.1 Explain the interdependence of plants, animals, and environment, and how adaptation influences survival 5.2E.1 Explain how the energy from the sun affects Earth's weather and climate.</p> <p>Scientific Inquiry K.3S.1 Explore questions about living and non-living things and events in the natural world. K.3S.2 Make observations about the natural world 2.3S.2 Make predictions about living and non-living things and events in the environment based on observed patterns.</p>
Social Sciences	<p>Civics and Government Understand participatory responsibilities of citizens in the community (voluntarism) and in the political process (becoming informed about public issues and candidates, joining political parties/interest groups/associations, communicating with public officials, voting, influencing lawmaking through such processes as petitions/initiatives. SS.03.CG.03 Identify ways that people can participate in their communities and the responsibilities of participation. SS.05.CG.05 Understand how citizens can learn about public issues. SS.05.CG.05.01 Identify and give examples of resources that provide information about public issues</p>

Middle School Academic Content Standards	
English Language	Speaking and Listening: Listening



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Arts	EL.08.SL.08 Analyze oral presentations, including language choice and delivery, and the effect of the speaker's interpretations on the listener. EL.08.SL.09 Paraphrase a speaker's purpose and point of view, and ask relevant questions concerning the speaker's content, delivery, and purpose. Speaking and Listening: Analysis EL.08.SL.11 Evaluate the credibility of a speaker (e.g., hidden agendas, slanted or biased material).
Science (2009)	Interaction and Change 6.2L.2 Explain how individual organisms and populations in an ecosystem interact and how changes in populations are related to resources. 6.2E.1 Explain the water cycle and the relationship to landforms and weather 7.2L.2 Explain the processes by which plants and animals obtain energy and material for growth and metabolism. 7.2E.1 Describe and evaluate the environmental and societal effects of obtaining, using, and managing waste of renewable and non-renewable resources. 7.2E.3 Evaluate natural processes and human activities that affect global environmental change and suggest and evaluate possible solutions to problems. 7.2E.4 Explain how landforms change over time at various rates in terms of constructive and destructive forces. 8.2E.2 Describe the processes of Earth's geosphere and the resulting major geological events. 8.2E.3 Explain the causes of patterns of atmospheric and oceanic movement and the effects on weather and climate.
Social Sciences	Geography: Understand how people and the environment are interrelated SS.08.GE.07 Understand how human modification of the physical environment in a place affects both that place and other places. SS.08.GE.07.02 Understand how clearing vegetation affects the physical environment of a place and other places. SS.08.GE.08 Understand how changes in a physical environment affect human activity SS.08.GE.08.01 Understand how changes in the physical environment can increase or diminish capacity to support human activity. SS.08.GE.08.03 Predict how changes in an ecosystem (not caused by human activity) might influence human activity.

High School Academic Content Standards

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Science (2009)	Structure and Function H.IE.2 Describe the structure, function, and composition of Earth's atmosphere, geosphere, and hydrosphere. Interaction and Change H.2L.2 Explain how ecosystems change in response to disturbances and interactions. Analyze the relationships among biotic and abiotic factors in ecosystems. H.2E.4 Evaluate the impact of human activities on environmental quality and the sustainability of Earth systems. Describe how environmental factors influence resource management.
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SOLVE

	SS.HS.GE.08.1 Identify and give examples of changes in human activity due to changes in the physical environment, and analyze the impact on both.
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