NGSS and Outdoor Education

A Toolkit for K-5 Teachers and Administrators in Central Oregon

CHILDREN'S FOREST
CENTRAL OREGON

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Background

Central Oregon and its amazing array of beautiful rivers, bountiful snowpack, diverse vegetation, and fascinating geology gives teachers and students unlimited opportunities for using the natural world as an outdoor classroom. Studies have shown that learning in the outdoors can increase enthusiasm for learning, promote teamwork, build social and emotional skills, and even increase standardized test scores.

The new Next Generation Science Standards (NGSS) advocate for three-dimensional learning, which is good news for outdoor and environmental education. First, all grade levels have an emphasis on understanding the impacts humans have on Earth's systems as well as the connections among living things and the environment. Second, a number of the scientific practices, disciplinary core ideas, and crosscutting concepts in NGSS can be more effectively addressed through exploration and investigation of the natural world than in the classroom. With the implementation of NGSS happening in school districts across Oregon, now is a great time to build outdoor education into your curriculum.

In 2011, CFCO was created to introduce and engage all students in Central Oregon to the wonder, science, and adventure of nature. One of our primary objectives is to provide all youth first-hand connections with nature by providing meaningful, inspirational, and interdisciplinary education programs. Together our network of partners offer over 30 different outdoor education programs that connect students to nature, engage students in science practices, and deliver content knowledge about local natural resources issues.

Goal of this Document

The Children's Forest of Central Oregon and our partners have developed this document to:

1. Provide teachers information about how outdoor education programs align with NGSS
2. Provide teachers and administrators a tool for creating a thoughtful, sequenced, and equitable series of outdoor education programs from Kindergarten through 5th grade
3. Provide teachers ideas and resources to engage students in deeper learning about life science, earth science, and environmental issues that compliments outdoor education programs
4. Establish a "bucket list" of outdoor experiences that every student in Central Oregon should experience

Guiding Principles and Beliefs

- **Teacher's Choice.** Teachers should have a breadth of outdoor education programs to choose from, but choices should be informed by thoughtful alignment to NGSS.
- **Scaffolding Learning.** With so many opportunities, the series of outdoor education programs that students experience should build upon each other, not replicate each other. Teachers should work together to provide a thoughtful progression of experiences for students across grade levels.
- **Providing Equitable Experiences.** Outdoor education programs should be offered equitably within grade levels at schools and also across schools and communities. Students at different schools might not be participating in the exact same programs, but their experiences should be comparable and age-appropriate.
- **Depth over Breadth.** Modeled after the Oregon Environmental Literacy Program (OELP), you will not find an exhaustive list of every opportunity to learn outdoors while addressing NGSS. Instead, we promote the best practice of utilizing essential questions to encourage a depth learning about each concept. We have identified what we feel are the most tangible ways to address NGSS and promote outdoor learning and environmental literacy in students.

The "Bucket List" for Outdoor Education in Central Oregon (K-5th)

Central Oregon's communities, school districts, and schools are all so unique. While we want every student to grow up connecting to the outdoors through educational experiences, we recognize that it is impossible for these experiences to be the same for every student. However, we do feel that there are some key experiences that every student growing up in Central Oregon should experience. Here's our list:

Experience	Programs/Activities	
☑ Get to know their schoolyard, nearby park, or natural areas and the diversity of life they hold	• Children's Forest NatureHoods Program • Plant Detectives or Habitat Explorers with The Envrionmental Center • See Grade Level Pages for tons of ideas for schoolyard exploration and learning	
☑ Experience an up-close encounter with wildlife to learn about adaptations	• Wildlife classes at High Desert Museum or Sunriver Nature Center • Travelling Trunk program with Sunriver Nature Center	
☑ Reflect streamside at one of our beautiful rivers and streams and learn about what it means to be a steward of our watersheds	• The Upstream Project and Student Stewardship Projects with Upper Deschutes Watershed Council • Spring-fed Rivers Stewardship Program with Trout Unlimited	
☑ Understand the importance of fire in Central Oregon	• Fired Up! at High Desert Museum • Outdoor School at Camp Tamarack • Changing Cycles with The Environmental Center	
☑ Discover the outdoors in winter time	• Project SNOW at Mt. Bachelor with Discover Your Forest • Check out snowshoes from The Children's Forest's Resource Co-op	
☑ Attend Outdoor School	• Camp Tamarack offers a 3-day Outdoor School Program • Other programs are available state-wide	

How to Use the Document

Grade Level Guides

Each grade level has a two-page guide for incorporating outdoor learning into NGSS. We believe that outdoor education programs should be just part of a unit of study, and that deeper learning of topics and questions should occur in the classroom as well as in the schoolyard or nearby natural areas. As such, for each grade we've focused on two to three NGSS Performance Expectations where classroom learning can be greatly enhanced by outdoor exploration and investigation. For each Performance Expectation, the guide proposes an "essential question" that helps provide focus and coherence for units of study.

In addition to essential questions, page 1 of each grade level guide provides a handful of schoolyard activities that align with NGSS and the suggested essential questions as well as ideas for incorporating math, english-language arts, social studies, and art. Page 2 of the Grade Level Guides lists the Outdoor Education Programs available in Central Oregon that align with NGSS for that grade level. Programs may be listed under more than one grade level when there is strong alignment to NGSS for those grade levels. It is essential that schools work together to create a thoughtful sequence of programs that don't replicate each other (see Outdoor Learning Map below).

IMPORTANT NOTE: Organizations may offer programs to more grade levels than are listed in this guide. In an effort to reduce duplication across grade levels, we've listed programs where we feel there is the strongest alignment to NGSS Performance Expectations.

Creating an Outdoor Learning Map for your School

Below is a suggested approach for how schools might use this guide to create a thoughtful, sequenced, and equitable series of outdoor learning opportunities for their students using the Outdoor Learning Map.

Step 1:
Establish a team of leaders with representation from each grade level band. This team should collectively create a vision for the school in regards to outdoor learning and consider questions such as:

- *What are our priorities for outdoor learning for our students?*
- *Do we want to ensure that all students participate in all the experiences on the "Bucket List"?*
- *Is there anything else we believe our students should experience?*
- *What assets do we have in our schoolyard, neighboring parks, or nearby natural areas?*
- *Has there been any conflicts or duplication in the past related to outdoor learning that we need to address?*

Step 2:
Grade level teams meet to review the Grade Level Guides and identify priorities for units of study and outdoor education programs that align with these units. We recommend prioritizing 1-2 field trips that can be landmark events throughout the schoolyear and planning complimentary schoolyard (or other teacher-led) activities that promote a greater depth of learning for these topics.

Step 3:
Grade level teams share their priorities with the school. Schools may utilize the Outdoor Learning Map (page 19) to create a visual for their school's sequence of outdoor learning experiences. Discuss and resolve any conflicts that arise that might cause duplication, rather than scaffolding learning.

Kindergarten

Essential Questions

- What do plants and animals (including humans) need to live in their environment? (K-LS1-1, K-ESS3-1)
- How can plants and animals (including humans) change the environment to meet their needs? (K-ESS2-2)
- What can we do to reduce the impact of humans on our local environment? (K-ESS3-3)

Schoolyard/Classroom Activity Ideas

- "Guided" free time outside – give students one item or set of items to look for outside
- Lay the foundation for outdoor learning with sit spots or sensory awareness skills
- Identify aspects of the environment that have been changed by plants and animals (i.e. bird nest, hole in a tree, rock cracked by tree roots, etc.)
- Identify sources of basic needs in your schoolyard for different species
- Maintain sources of basic needs in your schoolyard (make bird feeders to provide food or birdbaths to provide water, make bat boxes or bird houses for shelter)
- Have students identify which areas of the school yard are most impacted by humans, then brainstorm ways to reduce these impacts

Lessons and Resources

- NatureHoods Curriculum - childrensforestco.org/curriculum
- CFCO K-1st Curriculum Kit - childrensforestco.org/curriculum
- Project WILD – Beautiful Basics, Everybody Needs a Home, Habitracks, What's That, Habitat?
- Project Learning Tree – The Shape of Things, Sounds Around, Get in Touch with Trees, Trees as Habitats
- Growing Up Wild – What's Wild?, Who Lives in a Tree?

Interdisciplinary Connections

MATH	ELA	SOCIAL STUDIES	ART
Count different habitat features in the schoolyard (number of trees, cones or berries for food, etc.) Find natural items that represent different numbers (i.e. flower with 5 petals, pine needle clusters of 3, etc.)	Compose informative texts using drawing, dictating, or writing that describe the human impacts in the schoolyard Label parts of a picture of a habitat as "food", "water", "shelter" and space	Compare the habitat of the schoolyard to that of the students' homes or other locations Distinguish between the things we may want and the basic needs all living things have	Draw the sources for the basic needs of a specific species Use natural things collected by students (leaves, bark, etc.) to make a picture of a "perfect" habitat

Kindergarten - Outdoor Education Programs

PROGRAM	ORGANIZATION	NGSS PE			SCIENCE & ENGINEERING PRACTICE	DISCIPLINARY CORE IDEA	CROSSCUTTING CONCEPT	DESCRIPTION
		K-LS1-1	K-ESS3-1	K-ESS3-3				
NatureHoods – "Bear" Necessities	Children's Forest of Central Oregon	**	*		Investigation	LS1.C, ESS3.A	Patterns	Wildlife tracking, habitat needs game and investigation, habitat survey of trees and logs, habitat mapping activity
The Upstream Project	Upper Deschutes Watershed Council	**	**	**	Models	LS1.C, ESS3.A, ESS3.C	Systems, Cause and Effect	Healthy steam feature model, macroinvertebrate investigation, structure and function of stream organisms, discussion of human impacts on streams, pollution model
Student Stewardship Project	Upper Deschutes Watershed Council			**	Designing Solutions	ESS3.C	Systems, Cause and Effect	Riparian planting or noxious weed pull to improve riparian habitat
Life In Cold Blood	Sunriver Nature Center	**	*		Arguing from Evidence	LS1.C, ESS3.A	Patterns	Presentation about what different herps need to survive, live observation of native reptiles and amphibians, observation of herp habitats
Birds of Prey	Sunriver Nature Center	*	**		Arguing from Evidence	LS1.C, ESS3.A	Systems	Presentation about what different birds of prey need to survive, live observation of native raptors, observation of raptor habitats
Life in a Pond	Sunriver Nature Center	*	**	*	Arguing from Evidence	LS1.C, ESS3.A	Systems	Aquatic invertebrate investigation, live observation of amphibians, presentation about the organisms in pond ecosystems and their needs for survival
H20 Aquatic Insects	High Desert Museum	**	**	**	Models	LS1.C, ESS3.A, ESS3.C	Systems	Macroinvertebrate investigation, metamorphosis game, identification of insect parts, designing a bug, discussion of human impacts on streams

* addresses the performance expectiation, but is not the primary focus of the program
** the performance expectation is the primary focus of the program

1st Grade

Essential Questions

- What are some ways plants and animals meet their needs so they can grow and survive? (1-LS1-1)
- How are plants and animals similar or different from their offspring? (1-LS3-1)
- How does the amount of daylight change with the time of year? (1-ESS1-2)

Schoolyard/Classroom Activity Ideas

- Have each student "adopt-a-plant" in the schoolyard, draw or describe it's adaptations, and discuss how their adaptations help it grow and survive in Central Oregon
- Design a plant or animal that could grow and survive in the schoolyard or other habitat
- Observe young and old plants of the same species and record similarities and differences
- Use sundials or trace shadows of students to make observations about how the sun moves through the sky throughout the day
- Go outside at the same time of day and mark or make note of how high the sun is above the horizon. Repeat this weekly or monthly to show how the height of the sun changes throughout the year

Lessons and Resources

- NatureHoods Curriculum - childrensforestco.org/curriculum
- CFCO K-1st Curriculum Kit - childrensforestco.org/curriculum
- Wildlife Tracking Kit (CFCO Resource Co-op) – selection of skulls to observe adaptations
- Growing Up Wild – Ants on Parade, Spider Web Wonders, Hiding in Plain Sight
- Project Learning Tree – Looking at Leaves, Tree Factory, To Be a Tree
- Sundial lessons - http://www.eyeonthesky.org/lessonplans/14sun_sundials.html, https://www.crayola.com/lesson-plans/human-sundial-lesson-plan/

Interdisciplinary Connections

MATH	ELA	SOCIAL STUDIES	ART
Measure the size of parts (leaves, stem, seeds, etc.) of young and old plants of the same species Measure the length of shadows using a sundial at different times of day	Read texts about biomimicry and write about ways that humans have solved problems based on animal adaptations	Explain how seasonal changes (i.e. amount of sunlight) influence activities in the school and community Compare the ways that people in the past and present tell time	Draw or create a sculpture of an animal that could survive in a given environment Use sidewalk chalk to trace shadows at different times of day and decorate them

1st Grade - Outdoor Education Programs

PROGRAM	ORGANIZATION	NGSS PE			SCIENCE & ENGINEERING PRACTICE	DISCIPLINARY CORE IDEA	CROSSCUTTING CONCEPT	DESCRIPTION
		1-LS1-1	1-LS3-1	1-ESS1-2				
NatureHoods – Roots and Tails	Children's Forest of Central Oregon	**			Investigation	LS1.A	Structure and Function	Adaptation scavenger hunt, plant/leaf observation, animal skull/track investigation, bird calls and bird beak activities
The Up-stream Project	Upper Deschutes Watershed Council		*		Investigation	LS3.A	Structure and Function	Macroinvertebrate investigation, observation of structure and function of aquatic organisms, interactive game studying life cycles
Plant Detectives Outdoor Day	The Environmental Center	**	*		Models	LS1.A, LS3.A	Patterns, Structure and Function	Seed investigation and modeling, modeling the structure and function of parts of a tree, observing life stages of trees, exploratory hike observing patterns in nature
H2O Aquatic Insects	High Desert Museum		*		Models	LS3.A	Patterns	Macroinvertebrate investigation, life cycle activity, metamorphosis game, identification of insect parts
Batty About Bats	High Desert Museum	**	*		Models	LS1.C, ESS3.A	Systems	Presentation about the types of bats, how scientists study the health of a bat, life cycles of bats, bat adaptations, echolocation games, build and explore a bat cave, conduct a bat count
Reptiles and Amphibians	High Desert Museum	**	*		Analyzing Data	LS1.C, ESS3.A, ESS3.C	Patterns	Live observation of reptiles and amphibians, compare and contrast adaptations, habitat inquiry activity, hands-on activity about human impacts on reptiles and amphibians
Nature's Innovations	High Desert Museum	**			Designing Solutions	LS1.A	Structure and Function	Students will utilize engineering skills to design solutions to a problem, modeled after designs in nature
Wild Weather	High Desert Museum			*	Models	ESS2.D	Patterns	Hands-on experiments about storms, lightning, and high and low pressure systems

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2nd Grade

Essential Questions

- What is diversity in an environment and why is it important? How does the diversity of plants and animals compare among different habitats? (2-LS4-1)
- What role do animals play in seed dispersal or pollinating plants? (2-LS2-2)
- How does land change and what are some things that cause it to change? (2-ESS2-1)

Schoolyard/Classroom Activity Ideas

- Go on a "Schoolyard Safari" and count how many types of different plants and animals you can find (or focus on one group, like trees)
- Compare the diversity between two habitats, like wet and dry areas
- Do a seed search of your schoolyard and make predictions about how they are be dispersed
- Make observations of flowers in the spring and how many or what types of pollinators visit them
- Record class data on Project Budburst about when plants are flowering
- Survey the schoolyard (or local streams) for evidence of how wind and water has changed the land and design solutions for reducing erosion

Lessons and Resources

- NatureHoods Curriculum - childrensforestco.org/curriculum
- CFCO 2nd-3rd grade Curriculum Kit - childrensforestco.org/curriculum
- Stream Tables (CFCO Resource Co-op)
- Project WILD - Schoolyard Safari
- Project Learning Tree – The Forest of S.T. Shrew, Forest, Field, and Stream
- Project Budburst, Budburst Buddies
- Finding Erosion in Our Schoolyard - http://ngss.nsta.org/Resource.aspx?ResourceID=391

Interdisciplinary Connections

MATH	ELA	SOCIAL STUDIES	ART
Measure seeds or patches of erosion using standard length units Create a bar graph of the number of types of plants and animals in the schoolyard	Produce a report about a local plant or animal after reading a number of books Record observations in writing about the differences between two habitats or evidence of erosion in the schoolyard	Identify ways that students can have an impact on their local community, including plants and animals Practice making maps using the schoolyard	Sketch examples of seeds found in the schoolyard, or design a seed that can be dispersed by animals Create a map of the schoolyard and where erosion occurs

2nd Grade - Outdoor Education Programs

PROGRAM	ORGANIZATION	NGSS PE					SCIENCE & ENGINEERING PRACTICE	DISCIPLINARY CORE IDEA	CROSSCUTTING CONCEPT	DESCRIPTION
		2-LS2-2	2-LS4-1	2-ESS1-1	2-ESS2-1	2-ESS2-2				
NatureHoods – Plants and Pollinators	Children's Forest of Central Oregon	**	**				Investigation, Models	LS2.A, LS4.D	Structure and Function	Adaptation scavenger hunt, pollinator habitat investigation, pollination and migration games, seed investigation, milkweed planting, citizen science
Plants and Pollinators	Discover Your Forest	**	**				Investigation, Models	LS2.A, LS4.D	Structure and Function	Comparative study of two habitats and the diversity of pollinators, observation of flowers and insect anatomy,
Habitat Explorers Outdoor Day	The Environmental Center	*	**				Investigation	LS2.A, LS4.D	Cause and Effect	Investigate the biodiversity of different habitats, observe adaptations in different environments, games modeling seed dispersal and camouflage
Upstream Project	Upper Deschutes Watershed Council		**	**	**	**	Investigation, Models	LS4.D, ESS2.A, ESS2.C	Stability and Change, Systems	Stream and riparian habitat scavenger hunt, macroinvertebrate investigation, hands-on models of stream behavior and watersheds, water cycle simulation
Student Stewardship Project	Upper Deschutes Watershed Council				**		Designing Solutions		Stability and Change, Systems	Riparian planting or noxious weed pull to improve riparian habitat
H2O Aquatic Insects	High Desert Museum		**				Investigation	LS4.D	Systems	Macroinvertebrate investigation, metamorphosis game, identification of insect parts, stream health survey
Reptiles and Amphibians	High Desert Museum		**				Analyzing Data	LS4.D	Systems	Live observation of reptiles and amphibians, compare and contrast adaptations and habitat, habitat inquiry activity
Desert Dwellers	High Desert Museum		**				Investigation	LS4.D	Systems	Comparative study of the plants and animals of four different habitats
Erosion!	High Desert Museum			**	**	**	Investigation, Models	ESS2.A	Stability and Change, Systems	Stream tables models to learn about weathering and erosion, observation of landforms and how they change over time.

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3rd Grade

Essential Questions

- How do the characteristics of a species help it survive? (3-LS4-3)
- What happens to organisms when their environment changes? (3-LS4-4)
- What are similarities and differences between the life cycles of different organisms? (3-LS1-1)

Schoolyard/Classroom Activity Ideas

- Research a local animal to learn about their characteristics, observe the habitat around your school, and develop a hypothesis if the animal could survive there
- Play the "thicket game" to explore how camouflage and the environment are connected
- Investigate an area that has experienced recent change to the environment (development, fire, etc.) and develop an argument for how has the change impacted organisms that live or lived there
- Create habitat for wildlife, birds, or insects (bird houses, feeders, pollinator habitat) at your school and observe changes in the organisms found in your schoolyard
- Study the life cycles of several different types of plants to see how they are similar and different

Lessons and Resources

- CFCO 2nd-3rd grade Curriculum Kit - childrensforestco.org/curriculum
- Cornell Lab of Ornithology Habitat Connections Curriculum – included in CFCO's Birding Kit
- Project WILD - Thicket Game
- National Wildlife Federation's – http://www.nwf.org/Garden-For-Wildlife/Create/Schoolyards.aspx
- NSTA's Outdoor Science: A Practical Guide – Animal Habitat Survey and How Birds React to Environmental Change - included in CFCO's Birding Kit
- Project Budburst, Budburst Buddies

Interdisciplinary Connections

MATH	ELA	SOCIAL STUDIES	ART
Create scaled bar graphs that show the number and kinds of species in different habitats Practice measuring lengths of different plant parts	Write a story about an environmental change and how it impacts different organisms Write a report about an animal species, it's characteristics, and it's ideal habitat	Identify how people or other living things might be affected by an event, issue or problem Identify how people have adapted to and have changed the environment	Draw or map the ideal habitat for a particular organism Draw the life cycle of a plant or animal

3rd Grade - Outdoor Education Programs

PROGRAM	ORGANIZATION	NGSS PE					SCIENCE & ENGINEERING PRACTICE	DISCIPLINARY CORE IDEA	CROSSCUTTING CONCEPT	DESCRIPTION
		3-LS1-1	3-LS4-2	3-LS4-3	3-LS4-4	3-ESS3-1				
Changing Cycles Outdoor Day	The Environmental Center			**	**		Analyzing Data	LS2.C	Cause and Effect	Investigation about the impacts of environmental change (fire, disease, invasive species) on biodiversity, mapping of forest and environmental changes
Life in Cold Blood	Sunriver Nature Center	*	*	**			Arguing from Evidence	LS4.C	Patterns	Presentation and observation of adaptations of different herps and their environments
Life in a Pond	Sunriver Nature Center	**		*			Models	LS1.B	Systems	Presentation about the lifecycles of freshwater insects and amphibians, live observation of aquatic invertebrates and amphibians
The Upstream Project	Upper Deschutes Watershed Council		*	**	**	**	Investigation, Designing Solutions	LS2.C, LS4.C, LS4.D	Cause and Effect	Stream and riparian habitat scavenger hunts, macroinvertebrate investigation and data analysis about stream health, study of human impacts on stream organisms, games about fish migration and human impacts, optional riparian planting
Stream-fed Rivers Stewardship	Trout Unlimited			**	**		Designing Solutions	LS2.C, LS4.C, LS4.D	Cause and Effect	Service-learning program with observation/investigation of riparian areas and human impacts to streams, journaling, disucssion about potential solutions to human impacts, and hands-on restoration project
Project SNOW	Discover Your Forest		**	**	**		Investigation	LS4.C, LS4.D	Systems	Snow pit analysis and learning about the connections between snowpack and plants/animals, winter camouflage game, investigating winter tracks, study of winter homes/shelter
Desert Dwellers	High Desert Museum			**	**		Investigation	LS2.C, LS4.C	Systems	Comparative study of the plants and animals of four different habitats

* addresses the performance expectiation, but is not the primary focus of the program
** the performance expectation is the primary focus of the program

4th Grade

Essential Questions

- How do internal and external structures support the survival, growth, behavior and reproduction of plants and animals? (4-LS1-1)
- How has earth's landscape changed over time? (4-ESS1-1)
- How do natural forces cause landscape changes? (4-ESS2-1)
- How does the use of natural resources affect people and the environment? (4-ESS3-1)

Schoolyard/Classroom Activity Ideas

- Take hand lenses out into the school yard or local park to have students explore the different inner and outer structures of plants/bug/feathers/etc. and collect flowers/fruits/seeds to dissect
- Make observations of wildlife (bird beaks, fur/feather color, etc.) and construct arguments for how their structures help them survive
- Use stream tables to simulate and investigate the effects of water, wind, and ice on the landscape and explore how slope and other factors affect erosion
- Research local dams or biomass energy sources and learn about their impacts on the environment

Lessons and Resources

- CFCO 4th-5th grade Curriculum Kit - childrensforestco.org/curriculum
- Project WILD – Seeing is Believing
- Project Learning Tree – Tree Factory
- Bird Beak Buffet
- Project Budburst – Operation Flower Dissection, Root Roundup
- There Goes the Schoolyard
- Stream Tables and Soil Studies Kit – CFCO Resource Co-op

Interdisciplinary Connections

MATH	ELA	SOCIAL STUDIES	ART
Recognize and draw a line of symmetry across diagrams of animals' bodies Express measurements of areas affected by erosion in a larger unit in terms of a smaller unit	Write an opinion piece with supporting evidence on which type of energy source is least impactful to the environment Conduct a short research project on landforms in Central Oregon and how they were formed	Identify conflicts involving use of land, natural resources, economy, and competition for scarce resources Explain how people in Oregon have modified their environment and how the environment has influenced people's lives	Draw a magnified view of different parts of a plant or organism Create a map of areas of the schoolyard or nearby park that experience erosion

4th Grade - Outdoor Education Programs (page 1)

PROGRAM	ORGANIZATION	NGSS PE					SCIENCE & ENGINEERING PRACTICE	DISCIPLINARY CORE IDEA	CROSSCUTTING CONCEPT	DESCRIPTION
		4-LS1-1	4-LS1-2	4-ESS1-1	4-ESS2-1	4-ESS3-1				
Project SNOW	Discover Your Forest	**		**			Arguing from Evidence	LS1.A, ESS1.C	Systems, Patterns	Observation of plant/animal adaptations for high elevation environment, investigation about origin of the Cascades
Lava Lands Tours	Discover Your Forest	**		**			Arguing from Evidence	LS1.A, ESS1.C	Systems, Patterns	Observation of plant/animal adaptations for multiple environments, observation of rock types
Upstream Project/ Stewardship Project	Upper Deschutes Watershed Council				**	**	Investigation, Models	ESS2.A, ESS3.A	Cause and Effect	Build models using stream tables to study watershed formation and erosion, investigation of health of riparian zones, data collection on water quality, study of impacts of dams on fish habitat and river systems
Stream-fed Rivers Stewardship	Trout Unlimited				**		Designing Solutions	ESS2.A, ESS3.B	Cause and Effect	Service-learning program with observation/ investigation of riparian areas and human impacts to streams, journaling, disucssion about potential solutions to human impacts, and hands-on restoration project
Life in Cold Blood	Sunriver Nature Center	**					Arguing from Evidence	LS1.A	Structure and Function	Presentation about the anatomical structures unique to herps and their function in various environments, observation of life herps and their habitat
Birds of Prey	Sunriver Nature Center		**				Arguing from Evidence	LS1.D	Systems	Presentation about the importance of raptor's senses on their ecological niche, observation of live raptors and their habitat
Life in a Pond	Sunriver Nature Center	**					Arguing from Evidence	LS1.A	Systems	Presentation about the adaptations of freshwater animals and their specialized structures, observation of live amphibians and aquatic invertebrates
Desert Waters	High Desert Museum				**		Models	ESS2.A	Cause and Effect	Build models using stream tables to study erosion and deposition, watershed activity, design solutions to erosion

4th Grade - Outdoor Education Programs (page 2)

PROGRAM	ORGANIZATION	NGSS PE					SCIENCE & ENGINEERING PRACTICE	DISCIPLINARY CORE IDEA	CROSSCUTTING CONCEPT	DESCRIPTION
		4-LS1-1	4-LS1-2	4-ESS1-1	4-ESS2-1	4-ESS3-1				
Rockin Geology	High Desert Museum			**			Models	ESS1.C	Patterns	Presentation and activities about rock types, volcanoes, and local geologic landscape
Birds of Prey	High Desert Museum	**					Arguing from Evidence	LS1.A	Systems	Comparison activity of raptors vs non-raptors, owl pellet dissection, study of bird eggs, live animal
Rock and Roll Outdoor Day	The Environmental Center				**		Investigations, Models	ESS2.A	Patterns, Cause and Effect	Build models using stream tables to study erosion and deposition, active games about erosion, observation and designing solutions to mitigate the effects of erosion and flooding, building models about Earth's processes
Kokanee Karnival	Kokanee Karnival Youth Education Program	**	*				Investigations, Models	LS1.A, ESS2.A, ESS3.A	Systems, Stucture and Function	Water quality testing, stream flow measurement, fish dissection, life cycle game, promoting safe and responsible angling and community stewardship.
Traveling the Oregon Trail	High Desert Museum	Addresses Social Studies standards								Students learn about geography and critical decision-making skills, while simulating an experience on the Oregon Trail

* addresses the performance expectiation, but is not the primary focus of the program
** the performance expectation is the primary focus of the program

5th Grade

Essential Questions

- How does matter cycle through the environment? (5-LS2-1, 5-PS3-1)
- Where do plants get what they need for growth? (5-LS1-1)
- How do Earth's systems interact and affect one another? (5-ESS2-1)
- How can humans use science to protect the Earth's resources and environment? (5-ESS3-1)

Schoolyard/Classroom Activity Ideas

- Create a food web of organisms in their schoolyard and identify them as producers, primary consumers, secondary consumers, or decomposers
- Research plants in the schoolyard to learn about their needs for sun, water, and nutrients
- Find examples of the geosphere, biosphere, hydrosphere, and atmosphere in the schoolyard
- Investigate different soils throughout the schoolyard and how they impact the types of plants that can be found
- Design a plan for improving your schoolyard or nearby natural area so that it protects Earth's resources

Lessons and Resources

- CFCO 4th-5th grade Curriculum Kit - childrensforestco.org/curriculum
- Sharing Water Video and Curriculum - childrensforestco.org/curriculum
- Oregon Forests Resources Institute – Lessons Plans (Web of Life, Forests and Water, The Nature of Trees, etc.)
- Oregon Forests Resources Institute – learnforests.org – Forest Fact Breaks (Photosynthesis, Ecosystems, Sustainability, etc.)
- Project Learning Tree – We Can Work It Out, Nature's Recyclers, Soil Stories, Web of Life
- Children's Forest Resource Co-op – Plant Studies, Wildlife Tracking, Birding, Soil Studies Kits
- Children's Forest NatureHoods Project funding

Interdisciplinary Connections

MATH	ELA	SOCIAL STUDIES	ART
Measure and record soil percolation (time for water to drain/be absorbed)	Create a presentation that incorporates multimedia components to display the schoolyard food web Write a mock newspaper article documenting an action the community has taken to protect local resources or the environment	Identify characteristics of a local environmental problem, suggesting possible causes and results Propose a response or solution to a local environmental problem and support why it makes sense, using support from research	Draw a food web using detailed drawings of organisms and abiotic factors Draw an example of how humans have made a positive impact on the local environment

5th Grade - Outdoor Education Programs

PROGRAM	ORGANIZATION	NGSS PE					SCIENCE & ENGINEERING PRACTICE	DISCIPLINARY CORE IDEA	CROSSCUTTING CONCEPT	DESCRIPTION
		5-PS3-1	5-LS1-1	5-LS2-1	5-ESS2-1	5-ESS3-1				
Outdoor School	Camp Tamarack	**	*	**		*	Investigation, Models	LS2.A, LS2.B, ESS3.C	Systems, Energy and Matter	Design a model of the web of life, learn about plants needs for life, investigate the impacts of fire on forests, study water quality, and design solutions to restore a nearby lake
Fired Up!	High Desert Museum				**	**	Models, Investigation	ESS2.A, ESS3.C	Systems	Build a forest model to investigate the effects density and slope on fire behavior, fire triangle activities, forest survey in burned and unburned areas, tree ring study, observation of plant adaptations to fire
Upstream Project/ Stewardship Project	Upper Deschutes Watershed Council				*	**	Investigation, Designing Solutions	ESS3.C	Systems	Water quality data collection, riparian area transects, restoration project analysis, discussion of influence of geography, climate, and biosphere on local watersheds, optional student stewardship project
Stream-fed Rivers Stewardship	Trout Unlimited				*	**	Designing Solutions	LS2.A, ESS3.C	Systems	Service-learning program with observation/ investigation of riparian areas and human impacts to streams, journaling, disucssion about potential solutions to human impacts, and hands-on restoration project
Birds of Prey	Sunriver Nature Center	**		**			Arguing from Evidence	LS2.A	Systems	Presentation about raptors' roles as apex predators and their role in the food web, observation of live raptors and their habitat
Life in a Pond	Sunriver Nature Center	**		**			Models	LS2.A	Energy and Matter, Systems	Presentation about the food chains and food webs in freshwater ecosystems, observation of live amphibians and aquatic invertebrates
Moving through the Chain	The Environmental Center	**	*	**			Models	LS2.A, LS2.B	Energy and Matter, Systems	Develop models of food chains and food webs of local ecosystems, observation of decomposition process
Project SNOW	Discover Your Forest				**		Investigation, Models	ESS2.A, ESS2.C	Systems	Snow pit analysis, snow/water equivalency experiment, watershed mapping

* addresses the performance expectiation, but is not the primary focus of the program
** the performance expectation is the primary focus of the program

Outdoor Learning Map for Schools (page 1)

	Essential Question and NGSS Alignment	Outdoor Education Program (Field Trip) - 1st and 2nd choice	Schoolyard/Classroom Activities
Kindergarten			
Unit 1			
Unit 2			
1st Grade			
Unit 1			
Unit 2			
2nd Grade			
Unit 1			
Unit 2			

Outdoor Learning Map for Schools (page 2)

	Essential Question and NGSS Alignment	Outdoor Education Program (Field Trip) - 1st and 2nd choice	Schoolyard/Classroom Activities
3rd Grade			
Unit 1			
Unit 2			
4th Grade			
Unit 1			
Unit 2			
5th Grade			
Unit 1			
Unit 2			

Outdoor Education Programs - Quick Reference Guide

Program	Organization	Length (Days)	Location	Cost	Grades					
					K	1	2	3	4	5
Outdoor School	Camp Tamarack	3	Camp Tamarack							X
NatureHoods – "Bear" Necessities	Children's Forest of Central Oregon	4	Schoolyard, nearby park	Free	X					
NatureHoods – Roots and Tails	Children's Forest of Central Oregon	4	Schoolyard, nearby park	Free		X				
NatureHoods – Plants and Pollinators	Children's Forest of Central Oregon	4	Schoolyard, nearby park	Free			X			
Plants and Pollinators	Discover Your Forest	2	Public land sites (varies)	Free			X			
Newberry National Volcanic Monument	Discover Your Forest	1	Lava Lands	Free					X	
Project SNOW	Discover Your Forest	1	Mt. Bachelor	Free				X	X	X
H2O Aquatic Insects	High Desert Museum	1	HDM or school	$165-$200	X	X	X			
Reptiles and Amphibians	High Desert Museum	1	HDM or school	$165-$200		X	X			
Batty About Bats	High Desert Museum	1	HDM or school	$165-$200		X				
Wild Weather	High Desert Museum	1	HDM or school	$165-$200		X				
Nature's Innovations	High Desert Museum	1	HDM or school	$165-$200		X				
Erosion!	High Desert Museum	1	HDM or school	$165-$200			X			
Desert Dwellers	High Desert Museum	1	HDM or school	$165-$200			X	X		
Birds of Prey	High Desert Museum	1	HDM or school	$165-$200					X	
Rockin Geology	High Desert Museum	1	HDM or school	$165-$200					X	
Desert Waters	High Desert Museum	1	High Desert Museum	Free					X	
Traveling the Oregon Trail	High Desert Museum	1	HDM or school	$165-$200					X	
Fired Up!	High Desert Museum	1	High Desert Museum	Free						X
Kokanee Karnival	Kokanee Karnival Program	4-7	Multiple locations	Free					X	
Life in Cold Blood	Sunriver Nature Center	1	Nature Center or classroom	$100-$180	X			X	X	
Birds of Prey	Sunriver Nature Center	1	Nature Center or classroom	$100-$180	X				X	X
Life in a Pond	Sunriver Nature Center	1	Nature Center or classroom	$100-$180	X			X	X	X
Plant Detectives Outdoor Day	The Environmental Center	1	Skyliner Lodge, Shevlin Park	Free		X				
Habitat Explorers Outdoor Day	The Environmental Center	1	Skyliner Lodge, Shevlin Park	Free			X			
Changing Cycles Outdoor Day	The Environmental Center	1	Skyliner Lodge, Shevlin Park	Free				X		
Rock and Roll Outdoor Day	The Environmental Center	1	Skyliner Lodge, Shevlin Park	Free					X	
Moving through the Chain Outdoor Day	The Environmental Center	1	Skyliner Lodge, Shevlin Park	Free						X
Spring-fed Rivers Stewardship Program	Trout Unlimited	4	Fall River, Metolius River	Free				X	X	X
The Upstream Project	Upper Deschutes Watershed Council	1-4	Deschutes, Tumalo, Whychus	Free	X	X	X	X	X	X
Student Stewardship Projects	Upper Deschutes Watershed Council	1-4	Deschutes, Tumalo, Whychus	Free	X		X	X	X	X

Outdoor Education Programs - Contact Information

Organization	Contact Information
Camp Tamarack	camptamarack.com Charlie Anderson, Director charlie@camptamarack.com (541) 633-9847
Children's Forest of Central Oregon	childrensforestco.org Katie Chipko, Executive Director katie@childrensforestco.org (541) 383-5592
Discover Your Forest	discoveryourforest.org Karen Gentry, Education and Volunteer Programs Director karen.gentry@discovernw.org (541) 383-4771
High Desert Museum	highdesertmuseum.org Erica Pelley, Associate Curator of Education epelley@highdesertmuseum.org (541) 382-4754 ext. 320
Kokanee Karnival Youth Education Program	kokaneekarnival.org director@kokaneekarnival.org
Sunriver Nature Center	sunrivernaturecenter.org office@sunrivernaturecenter.org (541) 593-4442
The Environmental Center	envirocenter.org Jackie Wilson, Sustainability Educator jackie@envirocenter.org (541) 385-6908 ext. 15
Trout Unlimited	deschutes.tu.org Darek Staab, Program Manager dstaab@tu.org (541) 480-6976
Upper Deschutes Watershed Council	restorethedeschutes.org Kolleen Miller, Education Director kmiller@restorethedeschutes.org (541) 382-6103 ext. 33

Resources for Field Trips and Outdoor Learning

Resource	Organization	Details
Funding for Transportation or Substitutes	Children's Forest of Central Oregon	School Engagement Fund childrensforestco.org/school-engagement-fund
	Oregon Forest Resources Institute	Bus Transportation http://learnforests.org/resource_article/online-reimbursement-form **Forests/Forestry must be the primary focus of the field trip
Kits and Field Equipment	Children's Forest of Central Oregon	Resource Co-op childrensforestco.org/resource-coop Birding, Plants, Wildlife, Soil Studies, Aquatic Investigations, Forest Ecology, Insects, Stream tables *Free*
	High Desert Museum	Travelling Trunks https://www.highdesertmuseum.org/traveling-trunks/ Water Cycle, Skulls and Pelts, Oregon Trail, Biomimicry, Water Quality with Vernier Probes *$25 for 2 weeks*
	Sunriver Nature Center	Travelling Trunks http://www.sunrivernaturecenter.org/index.php/visit-the-nature-center/our-programs/school-programs Birds of Prey, Herpatology, Native Plants, Life in a Pond *$100-$120 (includes 30 minute presentation)*
Field Trip Locations	High Desert ESD	Skyliner Lodge http://www.hdesd.org/about/skyliner-lodge/ *Free for educational programs*
	Children's Forest of Central Oregon	Map of sites in Central Oregon http://www.childrensforestco.org/places/
Inclusion Assistance	Bend Park and Recreation District	BPRD can provide Therapeutic Recreation staff to assist with students with special needs. Please provide at least 1 month notice. Email katie@childrensforestco.org.
Curriculum	Children's Forest of Central Oregon	childrensforestco.org/curriculum
	Oregon Forest Resources Institute	Lesson plans, videos, and publications http://learnforests.org/
Grant/Project Funding	Children's Forest of Central Oregon	NatureHoods projects http://www.childrensforestco.org/naturehoods Up to $1,000 grants for schools and community groups for habitat improvements, outdoor classroom spaces, or accessibility improvements for schoolyards and parks

Field Trip Planning Timeline and Tips

4-6 months in advance

- Contact program provider (organization offering the field trip) to schedule dates for your field trips. Some providers may be able to accomodate your trip with less notice, but popular trips often fill-up well in advance
- Contact your transportation department to reserve a bus for your field trip dates and get a cost estimate

2-4 months in advance

- Apply to the School Engagement Fund if you need funding for transportation or substitutes
- Reserve kits from the Resource Co-op if you need field equipment

1 month in advance

- Send permission slips home
- Recruit parent chaperone volunteers
- If you are teaching on the field trip, review curriculum with grade level team and determine responsibilities
- Connect with program provider to discuss program adaptations and accommodations for students with special needs

2 weeks in advance

- Confirm reservation with transportation department
- Meet with school nurse to compile a list of medical issues, allergies, and necessary medications for all students attending. If students have severe allergies and epi-pens, find out if the student can self-administer or if you need to do it.
- Make list of student groups (if you are splitting the group) and divide emergency contact/medical information into groups

1 week in advance

- Discuss field trip behavior rules with your students
- Give students a list of required items of the field trip
- Confirm itinerary with parent chaperones
- Make nametags for students

Day before

- Review field trip behavior rules with your students
- Pack items on the teacher packing list (below)

Tips:

- Work collaboratively with other grade levels at your school to provide a sequence of field trips that build upon each other (and don't duplicate each other)
- Communicate with the program provider in advance with any information about goals for the field trip, background knowledge the students have, and information about students with special needs.
- Choose parent chaperones wisely. Field trips require extra eyes and ears. Depending on the site, recruit one chaperone for every 5-10 students. The ideal chaperone is one who is engaged, responsible, and caring. Be sure that chaperones understand that they are there to manage their entire group, not just to spend time with their son or daughter.