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WASHINGTON FOREST EDUCATION

K-12 Learning Framework



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Improving the health of our forests benefits almost every aspect of our lives. Forests provide for strong rural economies and jobs. Forests enrich us through recreation and solitude. Forests protect our water supplies and provide important habitat for fish and wildlife. And, healthy forests reduce the risk of uncharacteristic wildfires that threaten communities and the forests we value.

”

Hilary S. Franz
Commissioner of Public Lands
Washington State Department of Natural Resources

20-Year Forest Health Strategic Plan: Eastern Washington Summary

Washington Forest Education K-12 Learning Framework

Adapted with permission from The Oregon Forest Literacy Plan developed by the Oregon Forest Resources Institute

Design: Joe Corpus



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FRAMEWORK

The Washington Forest Education K-12 Learning Framework's goal is to help students become forest-literate, so they:

- appreciate the importance of forests
- understand concepts related to the forests of Washington
- can communicate about forests in a meaningful way
- are able to make informed and responsible decisions about Washington's forests and forest resources

The following conceptual framework represents a common vision of forest literacy for K-12 students. Designed as a tool for educators, the framework presents concepts that help students understand the importance of Washington's forests and the role we all play in sustaining them. It recognizes and builds on the fact that Washington's ecology, history and economy are deeply rooted in the forests.

The conceptual framework is organized around four themes:

- What is a forest?
- Why are forests important?
- How do we sustain our forests?
- What is our responsibility to Washington forests?

Each theme is followed by topics and concepts that address the question posed by the theme. The conceptual framework themes are arranged so they build upon each other, enabling students to progress from a basic awareness to a deeper understanding of forests. Definitions for forest terms used in the framework may be found in the Glossary of Terms on page 21.

Individually and collectively, the themes and related concepts help students and educators explore Washington's forests and their connections to them.

Using the Framework

The conceptual framework offers educators guidance for developing curriculum or classroom lessons related to forests. It is designed to be flexible and to be used in a wide range of situations to increase forest literacy, including K-12 classroom instruction, nonformal formal education and curriculum materials on forest topics. It may also be used in a variety of content areas. Students may explore forest concepts through the lenses of science, social sciences, mathematics, language arts or the visual and performing arts. We invite you to use this conceptual framework to develop learning activities appropriate for your students and your setting.

THEME 1:

What Is a Forest?

The concepts within this theme provide students with a fundamental knowledge of Washington forests as ecosystems. Comprehending these concepts will lead to an understanding of the relationship between forests and humans.

A. Definition of a Forest

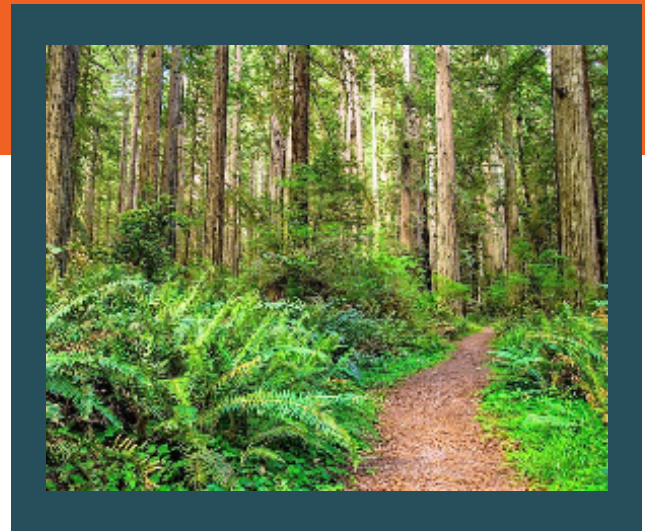
Identifying what constitutes a forest provides students with the basis for examining forests in a broader context.

1. Forests are ecosystems characterized by a dominance of tree cover and the presence of a wide variety of other organisms (e.g., other plants and animals).
2. Forests are comprised of trees that can differ in species, age and size and are affected by biotic factors (e.g., plants, animals and humans) and abiotic factors (e.g., soils, nutrients, moisture, sunlight and climate).
3. Urban forests include all the publicly and privately-owned trees within a city, town or suburb working together as an ecosystem.

B. Trees as Part of the Forest

One of the defining characteristics of forests is the type of trees in them. The following concepts help students appreciate the uniqueness of trees and comprehend how individual trees function and fit into a forest ecosystem.

1. A tree is a woody perennial plant usually 12 feet or more (4 meters or more) tall at maturity, with a single main stem and a more or less distinct crown of leaves.
2. Trees have life stages that include germination, growth, maturity, reproduction, decline and death.
3. As part of the forest ecosystem, trees have a number of various roles: supplying oxygen, providing habitat, holding soil, moderating temperature, capturing and storing carbon, and cycling water and nutrients.



4. Trees compete with each other and with other plants growing near them for nutrients, sunlight, space and water.
5. The health and wellness of trees in a forest ecosystem depend on and are affected by many factors.

C. Forests as Ecosystems

Trees and forests influence and are influenced by their surrounding environment.

Understanding basic ecological principles and how they apply to forests helps students appreciate the characteristics of forest ecosystems.

1. Forest ecosystems support different energy roles (e.g., producers, consumers and decomposers) and nonliving components (e.g. sunlight, soil, minerals and water) interacting within a given environment, space and time.
2. Humans depend on and influence forest ecosystems and are themselves influenced by forest ecosystems.
3. Forest ecosystems include processes such as photosynthesis, energy flow and the cycling of nutrients, water, carbon and other matter.
4. Forest ecosystems are complex and dynamic, and continuously undergo change or adaptation, ranging from gradual change (e.g., succession and climate) to abrupt change (e.g., fire and disease).
5. Natural and human-caused disturbance events are a part of forest ecosystems. Examples of natural events include wind and volcanic activity. Examples of human-caused events include logging, road construction and development. Wildfire is a disturbance that can be both natural and human-caused. Fire is also used as a management tool.
6. Forests are interconnected with other terrestrial (e.g., rangeland) and aquatic (e.g., estuary) ecosystems, forming a larger system.
7. Washington's regions vary in soil types, elevation, temperature, wind and rainfall patterns. These variations create the different forest types and residents (plants and animals) that, together with disturbance histories, contribute to that region's biodiversity.

D. Forest Classification

Classifying and differentiating forests into biomes and types helps students make connections among the forests in their community, the forests in Washington and other forests in the world:

1. Trees can be classified into family, genus and species groups based on their reproductive parts and/or genetics. Trees can be identified by their leaves, seeds, cones, flowers, fruits and other characteristics.
2. Different forest biomes exist around the world. Examples include tropical forests, temperate forests and boreal forests. Washington is in the temperate forest biome.
3. Many different forest types exist within a biome, typically named by their dominant tree species. Common forest types in Washington include both spruce and hemlock, Douglas-fir, ponderosa pine, mixed conifer and hardwood.

THEME 2:

Why are Forests Important?

- Historical
- Environmental
- Social
- Economic



A. Historical Importance

Examining historical perspectives about forests provides students with an understanding of how forests have been important to humans throughout time:

1. Today, as in the past, forests continue to play a significant cultural, spiritual, and economic role in Native American societies.
2. In Washington's development toward becoming a state, forests provided basic resources, jobs for a growing workforce, resources for building the nation and dollars for a new state economy.
3. As multiple demands on forests increased, the practice of forest management evolved to conserve and preserve natural resources, and to improve society's use of forestlands. Forest management incorporated scientific principles and an understanding of competing interests.
4. Historical perspectives, which may include aesthetic, cultural, spiritual, economic and educational factors, form our understanding of forests and our personal connections to them, and guide decisions to ensure forests for future generations.

B. Environmental Importance

Examining the ecological services provided by forests helps students understand that forests are one of Earth's major life-support systems, along with fresh water, oceans and grasslands:

1. Forests affect air, water and soil quality.
2. Forests provide habitat for fish and wildlife.
3. Forests provide the opportunity to study ecosystems, conservation and natural resource management.

4. Forests sequester carbon from the atmosphere and are an essential component of the global carbon cycle. Forest products made from wood also store carbon.
5. Washington forests are important ecological systems, interconnected with other systems not only environmentally, but also socially and economically. Changes in the conditions and uses of Washington's forests may affect the conditions and uses of forests worldwide.

C. Social Importance

Understanding how forests shape the economic, social and cultural composition of local communities helps students recognize the value of forests to society:

1. Washington's forests provide basic resources that people use every day, like houses and paper.
2. Individuals hold different values concerning forests and their use, based on their experience and connection with the forest.
3. Forests influence the economic, social and cultural composition of both urban and rural communities.

D. Economic Importance

By exploring the products, jobs, government revenue and investment opportunities provided by the forest sector, students understand the importance of working forests for the economic livelihood of Washington and other parts of the country and the world:

1. Forests provide multiple economic benefits, including jobs and forest products, renewable energy and minerals, financial returns to owners and investors, and ecosystem service benefits such as carbon storage, clean water, recreation and tourism.
2. Forests provide income for local, state, national and international economies. Washington's forest industry constitutes the state's third largest employer and provides critical resources and products to the global marketplace, including softwood lumber, plywood and engineered wood products.
3. Forest products are an important component of Washington's green economy. They come from a renewable resource and store carbon, and most are reusable and recyclable.
4. Economic returns to forest landowners are important in preventing the loss of forests to non-forestland uses such as development.



THEME 3:

How do we sustain our forests?

The concepts within this theme help students understand that Washington forests are sustained through a rich variety of agreements and partnerships that span private and public sectors as well as all levels of government. For students to become participating members of a society that works toward sustainable forests, they must be able to comprehend the role forest management plays in meeting society's needs.

A. Forest Ownership

Understanding who owns Washington forests helps students identify the basis for different forest management decisions.

1. The size and scale of forest ownership can vary from hundreds of thousands of acres in a national forest to an individual patch of trees in an urban forest.
2. Washington forests are managed under private (e.g., family and industrial) and public (e.g., state and federal) ownership. Each type of ownership may have different management objectives.
3. Forests – as well as fire and other disturbances - cross natural boundaries such as watersheds, and administrative boundaries, such as city limits and private property lines.
4. Many forests are made up of a variety of ownerships, a mix of management objectives and a blend of forest ecosystems.

B. Forest Management

People manage forests for a variety of ecological, economic and social outcomes. Understanding these outcomes helps students think critically about forest management methods:

1. Forest management is a long-term process that can lead to changes in tree species composition, size and age, as well as in forest health and resilience.



2. Forest management ranges from active management (e.g., planting, thinning and harvesting) to passive management (e.g., set asides and wilderness areas) to grow, restore, maintain, conserve or alter forests.
3. Forest management includes the use of natural processes and goal-oriented decisions and actions to achieve a variety of desired outcomes, including ecological (e.g., wild-life habitat), economic (e.g., timber production) and social (e.g., recreation) outcomes. Many of these outcomes are interrelated and can be managed for simultaneously, while others may be incompatible.
4. In Washington, forest management in most private and state forests are regulated by the Washington State Forest Practices Act and Habitat Conservation Plans (HCPs), federal forests are regulated by federal law and Tribal forests are regulated by the individual tribal laws. The rules are designed to protect public resources such as water quality, wildlife and fish habitat while maintaining a viable natural resource industry.
5. As human populations and global demand for forest resources increase, forest management and advances in research and technological systems can help ensure forest resources are maintained or improved to produce the desired values and products.

C. Forest Management Decisions

Understanding why and how forests are managed helps prepare students to participate in forest management decisions. By understanding that many individuals and groups are involved in forest management, students will recognize that the responsibility of forest management is shared:

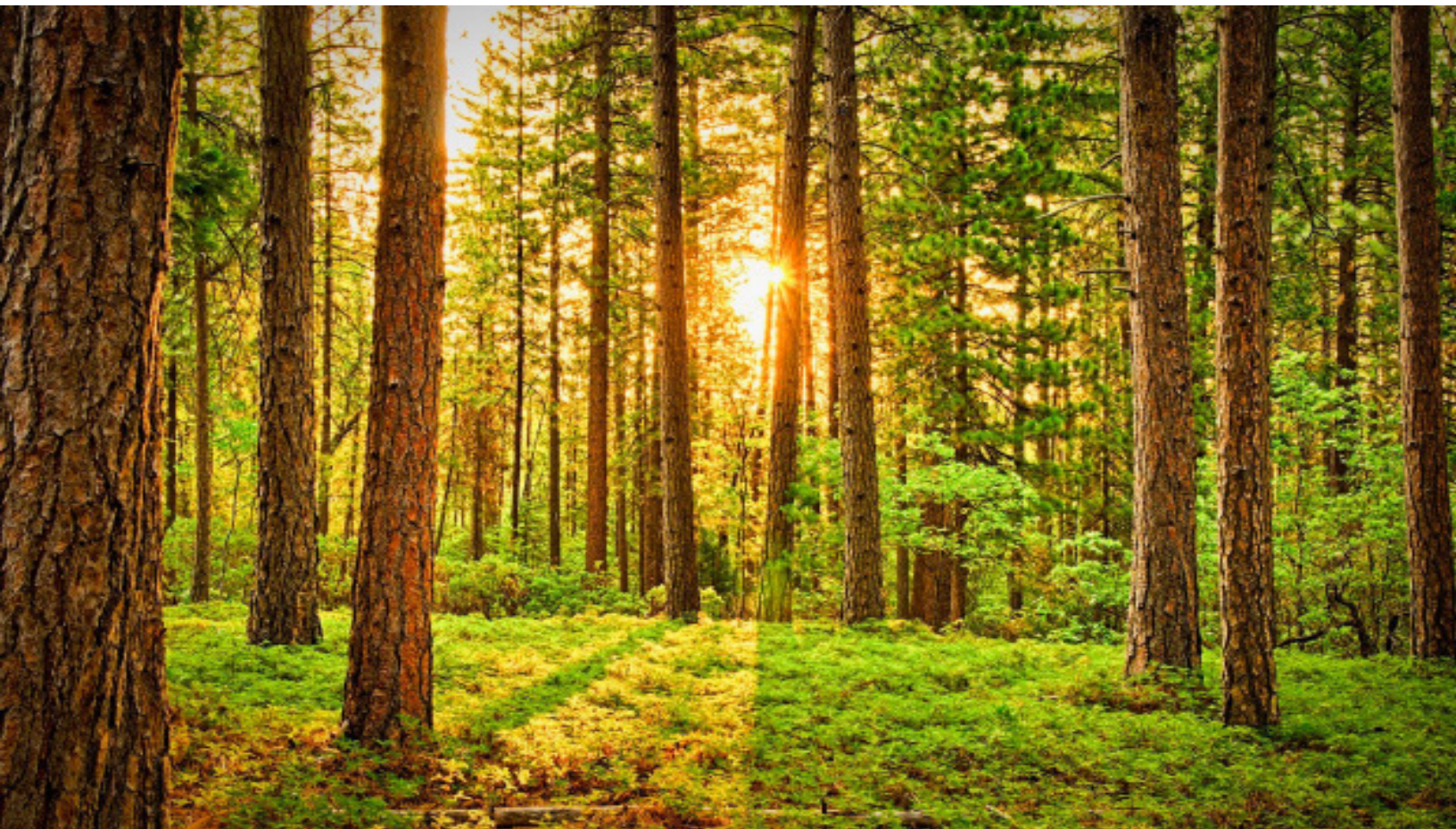
1. A variety of individuals, companies, organizations and government agencies manage forests. Forest management decisions may involve some or all of these entities working collaboratively to ensure mutually beneficial outcomes.
2. Forest-resource professionals aim to meet economic, social and environmental needs.
3. The type and intensity of forest management, including harvest, is dependent on the purposes for which the forest is managed, as well as forest type, ownership, size and location.
4. Washington foresters and forest managers prepare forest management plans based on landowner goals and objectives, capabilities of the forest site, laws and available tools (e.g., planting, harvesting and using prescribed fire).
5. The public empowers governments to conserve, maintain and sustain forest resources by enacting laws, creating policies, establishing agencies, creating public lands and providing management guidelines for forest landowners.
6. Government has a role in actively engaging organizations, businesses, communities and individuals in forest management and policy decisions, especially for publicly owned forests.
7. Sustainable management of forests takes into account social, economic and ecological dimensions of sustainability. It includes maintaining forest health, productivity and diversity, and conserving a forested land base for the needs of present and future generations.

8. Changing public demands and expectations for the forest, as well as unanticipated events (natural disasters, weather events, economic fluctuations, etc.), affect decisions about forest resource use. Sound management based on scientific research, economic analysis and public involvement is required.

D. Forest Management Perspectives

Examining the different perspectives involved in forest management helps students understand the complexity of forest management decisions:

1. People have differing perspectives about forest management, which can be affected by politics, science, economics, values, perception and experience.
2. Forest management can be controversial, because of diverse perspectives as well as the complex nature of forest ecosystems.
3. Issues related to forest management include the effects of timber harvest, carbon sequestration and climate change, forestland uses, wildfire, threatened or endangered species and others.
4. Making sure multiple perspectives are involved in decision-making, especially with regard to Washington's public forests, can lead to more effective problem-solving and result in more sustainable outcomes for Washington's forests.



THEME 4:

What is our responsibility to Washington forests?

The concepts within this theme help students identify ways to develop a sense of stewardship for Washington forests to help sustain them for present and future generations. Students can be active participants in promoting forest sustainability by studying, observing and experiencing forests firsthand, and by taking appropriate action in their communities.

A. Our Connection to Washington's Forests

Helping students see their personal connections to forests helps them understand how their actions impact forests:

1. Everyone should have the opportunity to identify and explore their personal connection with forests.
2. Resources we use and consume every day are connected to Washington's forests.
3. There are many ways individuals can connect with forests in Washington, including hiking and picnicking in forests, volunteering for projects in and around forests, becoming informed and active voters, attending public meetings and making wise consumer choices.



B. Working for the Future of Washington's Forests

Learning to take action to support Washington's forests in a variety of ways gives students pathways to involvement now and in the future:

1. Everyone has a responsibility to treat forests with respect and to become a conscientious steward of Washington's forests and forest resources.
2. Personal behaviors directly impact the health and resiliency of our forests. For example, the products we buy, how we treat trails and campgrounds, and how we hunt or use fire can either harm or help forests.
3. Choices we make regarding the use of forest resources affect our ability to sustain forest ecosystems into the future.
4. A variety of professionals and skilled trade workers are needed to sustain our forests, including foresters, biologists, soil scientists, engineers, lawyers, information technology professionals, land managers, investors, environmental educators, communications specialists, logging operators, mechanics and wood products manufacturers.

5. As individuals or as members of groups, we can influence laws and policies affecting Washington's forests.

Forest Education by Grade Level

The learning framework offers educators guidance for developing curriculum or classroom lessons related to forests. It is designed to be flexible and to be used in a wide range of situations to increase forest literacy, including K-12 classroom instruction, nonformal education and curriculum materials on forest topics.

This framework may also be used in a variety of content areas. Students may explore forest concepts through the lenses of science, social sciences, mathematics, English language arts or the visual and performing arts.

Following are some grade-specific ideas for implementing forest education with your students. They include sample classroom activities and key connections between the conceptual framework and Washington state science (NGSS) learning standards.

We hope they will inspire you to incorporate forest education into your teaching in other ways. We encourage you to peruse the framework for concepts that fit your instructional goals, and to craft instructional activities that suit your students and your setting.

GRADES K-2

Primary students are active explorers and are naturally curious about their world. They learn best through direct discovery in hands-on experiences that engage the five senses. During the primary years, students develop the ability to approach the world logically, with an increasing capacity to use abstract reasoning.

Students in urban and suburban areas may never have seen a forest firsthand and may have preconceived notions about forests based on stories or movies. Forest education activities at this level should aim to introduce students to trees and forests, focusing on:

- **What is a forest?**
- **Who lives in forests?**
- **What can we do to help forests?**

Giving students opportunities to be keen observers will provide them with a strong foundation for becoming both good scientists and critical thinkers. Simple investigations both inside and outside the classroom will help them learn to analyze results and apply their understanding to new situations. Collecting and categorizing natural objects, and other hands-on activities, will help acquaint them with the natural world in general – and with Washington's forests in particular.



SAMPLE FOREST EDUCATION ACTIVITIES

- Allow students to explore various forest-related objects at a sensory station, including small twigs, leaves and needles, pieces of bark and wood, nuts and cones. Challenge students to sort the objects by different attributes, such as size, shape or color, and graph the results. Make and label leaf rubbings.
- Read aloud *Sounds of the Forest* by the Oregon Forest Resources Institute (available at LearnForests.org), which introduces students to the forest through sounds they might hear. After reading the story, invite students to vocalize each of the sounds during a second reading. Create a class book with students describing these and other forest sounds.
- Use a felt board to create a model of a forest. Start by building a tree from various tree parts (trunk, branches, leaves) and then add pictures of different forest animals. Encourage students to tell a story about the forest.
- Read *E is for Evergreen: A Washington Alphabet Book* by Marie and Roland Smith. Challenge students to identify key features of each Washington place mentioned in the book, and an animal or plant that might live there.
- Count the number of objects in the classroom made from trees. For dramatic play, provide costumes such as hard hats, boots, vests, cardboard “saws” and tree planting tools for students to act out different forest jobs.
- Walk students through a treed area on the school grounds or in a nearby park or forest. Invite them to use their senses of sight, sound, smell and touch at different stops on the walk, and to draw or communicate what they observe.
- “Adopt” a tree on your school grounds to observe at different times of the year. At each visit, direct students to sketch or describe the tree in their science journal and record other observations. At the end of the year, have them draw the “adopted” tree in all four seasons, and then laminate their illustrations to make each child a set of tree place mats.

KEY WASHINGTON FOREST EDUCATION LEARNING FRAMEWORK CONCEPTS FOR GRADES K-2

The four themes from the Washington Forest Education Learning Framework have direct connections to the Next Generation Science Standards and can also be used to teach toward numerous Common Core English Language Arts, Mathematics and Washington state Social Studies standards. The table below shows some of the standards that can be addressed but is not an extensive list.

Concept	Science (NGSS)	Social Studies
Theme 1, A.2	K-ESS2-1	G2
Theme 1, C.2	K-ESS2-2	G2
Theme 2, A.2	K-ESS2-1	E2
Theme 3, C	K-ESS3-1	G2
Theme 4, B.3	K-ESS2-2	E1

GRADES 3-5

Students in the intermediate years are interested in the natural world, in how things are put together, and in how things work. This is a time when their intellectual capabilities expand greatly as they move from a focus on the here-and-now toward abstract thinking.

Students of these ages work well in groups and enjoy doing collaborative projects. They enjoy problem-solving, sharing ideas and voicing opinions. They also want to be responsible members of the local community. Forest education activities at the intermediate level may focus on:

- **What do forest organisms need to survive?**
- **How are forests and their inhabitants adapted to the Washington climate and landscape?**
- **In what ways are forests important to Washington's environment, economy and people?**

Using trees and forests as the focus, students can practice posing questions for investigations, reasoning about the conclusions and implications, and managing multiple variables. Engaging students in a variety of activities will deepen their understanding of the forest ecosystem on which we all depend.

SAMPLE FOREST EDUCATION ACTIVITIES

- Create a food-web model of the forest ecosystem by having students choose a forest animal, draw a picture of it on an index card, then do some research and write on the card what that animal eats and what eats it. Arrange the completed cards on a bulletin board display, connecting them with yarn or string to show the food web.
- Challenge students to look for evidence of wildlife in and around the school grounds. Even in urban and suburban areas students may find bird nests, chewed leaves or nuts, webs or tracks.
- Ask students to sit quietly outside – at a nearby nature area or in a landscaped area of the school grounds. Invite them to observe for a few minutes what they see, smell, touch and hear, writing down adjectives to describe their observations. Direct students to use these descriptors to write a poem, such as a haiku, acrostic or cinquain poem.
- Read *Explore the Forest* by the Oregon Forest Resources Institute (available at LearnForests.org), a publication for third- and fourth-grade students about Oregon's forests, much of which applies to Washington's forests. There is a teacher's guide as well. Have students use a T-chart graphic organizer to identify ways forests impact the environment and people.
- Do a simple plot investigation to find out the differences between a shady and a sunny location. Use hula hoops or lengths of string tied together at the ends to create evenly sized plots. In each plot, students count the number of plants, and measure the soil temperature and moisture.

KEY WASHINGTON FOREST EDUCATION LEARNING FRAMEWORK CONCEPTS FOR GRADES 3-5

The following concepts from the Washington Forest Education Learning Framework have direct connections to Washington's Science (NGSS) standards and can also be used to help meet various English Language Arts, Mathematics and Social Studies standards (Common Core).

Concept	Science (NGSS)	Social Studies
Theme 1, A.2		G2
Theme 1, C.5	3-LS1-1 3-LS4-2 4-LS1-1	G2
Theme 2, A.2 Theme 2, A.3	4-ESS3-1	E2 H4
Theme 2, D.2	4-ESS3-1	E4
Theme 3, C		G2
Theme 3, D	5-ESS3-1	SSSI
Theme 4, B.3	5-ESS3-1	E1

GRADES 6-8

Middle school students are gaining a deeper sense of themselves as members of communities – both human communities and natural communities. They are becoming aware of how people's actions impact others, and friends and relationships consume a lot of their thought and energy.

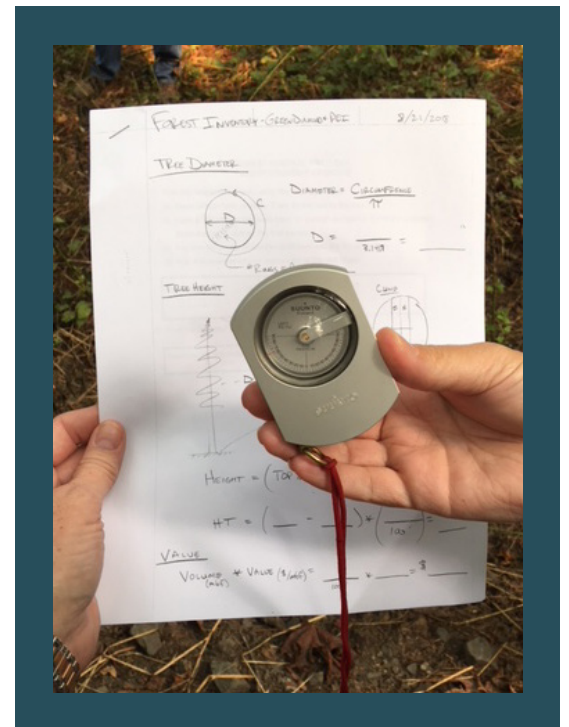
Students this age understand that problems have multiple solutions and are able to see different perspectives on an issue. They should also be able to back up personal opinions with evidence and to distinguish between opinion and fact. Forest education activities at the middle school level may focus on:

- **What social, economic and environmental benefits do forests provide?**
- **How do human activities affect forests?**
- **What can we do to protect Washington's forests?**

Forests can become a meaningful context for middle schoolers to design and conduct investigations, use evidence to analyze results, and examine issues from various perspectives. Activities such as these will help students gain a deeper appreciation of the interconnected relationships between people and the environment.

SAMPLE FOREST EDUCATION ACTIVITIES

- Read *Into the Forest, a student reader* from the Oregon Forest Resources Institute (available at LearnForests.org). Challenge students to design a board game that highlights things people can do to care for forests, following a format similar to a game they know (such as Life).
- Explore forest careers by showing several *Find Your Path* videos (available at LearnForests.org). Direct students to research a forest-related career that interests them, finding out what education, skills, experience and personal interests are required or helpful.
- Show the 2-minute videos *Forest Fact Break: Green Building* and *Forest Fact Break: Sustainability* (available at LearnForests.org). Discuss the relationship between buildings, sustainability and the forest. Identify some of the criteria for green building, then have students design a home that meets those criteria. Ask: What would happen if you couldn't use any wood products in your building?
- Study the Carbon and Climate Fact Sheet from the Oregon Forest Resources Institute (available at LearnForests.org). Have students design an infographic that shows both how forests are impacted by climate change and also how forests can help lessen it.
- Read *New Found Land* by Allan Wolf or another book on the Lewis and Clark expedition. Examine the impact the expedition and subsequent western migration had on the native people, forests and other ecosystems.
- Have students select a native Washington tree and write a research paper about it. The report should include the region in which the tree grows, its growth habits, animals that use the tree, and its commercial uses.
- Conduct an inventory of the trees on the school property and make a detailed map showing each tree's location. Help students identify the scientific name of each tree using a tree identification book or internet resource. Invite students to write a recommendation about the number and location of trees based on their findings. Utilize i-Tree applications and curriculum to understand the benefits of trees (available at itreetools.org).
- Visit a nearby forest or park and look for evidence of human impact, both positive and negative. Discuss what students could do to reduce negative impacts, and then develop a service-learning project around one of the ideas. For example, you might partner with a local organization to have students plant trees, remove invasive species, collect litter, repair trails or make interpretive signs.



KEY WASHINGTON FOREST EDUCATION LEARNING FRAMEWORK CONCEPTS FOR GRADES 6-8

The following concepts from the Washington Forest Education Learning Framework have direct connections to Washington's Science (NGSS) standards and can also be used to help meet various English Language Arts, Mathematics and Social Studies standards (Common Core).

Concept	Science (NGSS)	Social Studies
Theme 1, B.4	MS-LS2-1	
Theme 1, C.3	MS-LS1-6	
Theme 2	MS-LS2-4	H3
Theme 2, D.2	MS-LS2-1 MS-LS2-4	C3
Theme 3		SSSI-4
Theme 3, C.7	MS-ESS2-3	E1

GRADES 9-12

High school students are able to use sophisticated reasoning with difficult concepts, particularly when the learning context is familiar to them. Using forests as a context for learning is beneficial for students this age, as it provides them with a “real world” basis for applying new knowledge.

Many high school students still have difficulty proposing explanations based on logic and evidence instead of on their prior conceptions of the natural world. Providing many opportunities to collect evidence and develop explanations based on that evidence can help them develop this skill. Forest literacy activities at the high school level may explore:

- **What factors contribute to the biodiversity of Washington's forests?**
- **How do people manage forests to achieve desired forest outcomes and ensure the sustainability of our forests?**
- **What role do governments, private companies and individuals play in managing Washington's forests?**
- **What can individuals do to help sustain forests?**

Forests can become the focus of more and more sophisticated research, in which students can use data to drive their decisions. Forests can also provide a meaningful context for high school students to examine the implications of issues on a variety of levels, both locally and globally.

SAMPLE FOREST EDUCATION ACTIVITIES

- Conduct a tree survey of the school grounds, identifying the genus and measuring the diameter at breast height (DBH) and total height of each tree.
- Investigate the rate at which water is absorbed into various types of soil, and the amount and quantity of water that runs off the soil. Plan and conduct the investigation using a soil filtration model made from a 2-liter plastic bottle (one side cut out, to resemble a canoe), a block or board to raise one end, and various soil materials.
- Interview forest landowners to learn about the choices they must make in managing their forests, as well as any changes and challenges they face.
- Study the *Find Your Path* booklet (available at LearnForests.org), and then have students research various forest-related careers to find out what education, experience, skills and personal qualities are required or helpful.
- Check out PLT's Green Jobs: Exploring Forest Careers. This guide helps youth discover careers in sustainable forestry and conservation. Green Jobs: Exploring Forest Careers includes four hands-on instructional activities that help youth research different forest sector careers to learn what it takes to perform these jobs, and practice managing and monitoring forest resources. Designed to be flexible, the activities can be used as individual, stand-alone lessons, or all together as a cohesive unit of instruction (available at www.PLT.org).
- Conduct a wildfire safety assessment of students' homes or the school, and have students make recommendations for increasing wildfire safety.
- Read about the impacts of and solutions for, climate change on Northwest forests (for example, see Section 7 of the State of Knowledge Report Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers). Create posters or other graphic representations to communicate the information.
- Develop and conduct an opinion survey to determine the community's views on forest and forest management issues. Tally and analyze the results.
- Develop an interpretive trail for the community that goes through a local forest. Students learn about the local ecosystem; research interesting facts about plants, animals or historical figures; work with government agencies and businesses; and create signs or a brochure for the trail.
- Monitor a nearby forest stream and riparian zone for local organizations or landowners. Challenge students to map the area using GPS units, take ongoing water quality samples, keep photo journals, analyze their results and develop a multimedia presentation of findings.
- Tour a working forest, a mill or secondary wood products facility.

**KEY WASHINGTON FOREST EDUCATION
LEARNING FRAMEWORK CONCEPTS FOR GRADES 6-8**

The following concepts from the Washington Forest Education Learning Framework have direct connections to Washington’s Science (NGSS) standards and can also be used to help meet various English Language Arts, Mathematics and Social Studies standards (Common Core).

Concept	Science (NGSS)	Social Studies
Theme 1, C.4	HS-LS2-2HS	
Theme 2, A.2	HS-ESS3-1	H1.11-12.1
Theme 3, C.6		E3.11-12.5
Theme 3, C.7	HS-ESS3-3	G2.11-12.4
Theme 3, D.3	HS-LS1-5HS	G3.11-12.4



GLOSSARY

Abiotic (adj.) – a nonliving factor or element in the environment, e.g., light, water, heat, rock and gases. PLT

Active management – attaining desired forest objectives and future conditions using silvicultural operations and forest management practices.

Administrative boundary – the border of a geographic area under the jurisdiction of a governmental or managerial entity.

Aquatic ecosystem – all living and non-living elements of a water-based environment, and the relationship between them.

Biome – a complex of communities characterized by a distinctive type of vegetation and maintained under the climatic conditions of the region. PLT

Biotic (adj.) – an environmental factor related to or produced by living organisms. PLT

Boreal forest – the northernmost broad band of mixed coniferous and deciduous trees that stretches across northern North America, Europe and Asia. PLT

Carbon sequestration – the process of capturing and storing atmospheric carbon dioxide in a carbon sink, a fixed molecule in soil, oceans or plants.

Consumer – an organism that obtains energy by feeding on other organisms and their remains. PLT

Crown – the top branches of a tree. PLT

Decomposer – a plant or organism that feeds on dead material and causes its mechanical or chemical breakdown. PLT

Ecological service – a function of forests and other healthy ecosystems that benefits living organisms, such as purifying air and water, maintaining biodiversity, decomposing wastes, generating soil and pollinating plants.

Economic (or financial) return – income or profit from an investment or the sale of land, timber or other property.

Ecosystem – the interacting system of a biological community and its nonliving environment: also, the place where these interactions occur. PLT

Energy flow – the flow of energy through an ecosystem according to the laws of thermodynamics. PLT

Forest management – the practical application of scientific, economic and social principles to the administration of a forest. PLT

Forest product – any item or material derived from forests for commercial use, such as lumber, paper, mushrooms or forage for livestock.

Habitat – an area that provides an animal or plant with adequate food, water, shelter and living space in a suitable arrangement. PLT

Harvest – see “Timber harvest.”

Natural boundaries – borders of an area that follow natural geographic features such as a river or ridge.

Passive management – managing a forest area by letting nature take its course.

Perennial – a plant that lives for several years, and when mature usually produces seeds each year. PLT

Photosynthesis – the process by which green plants and some other organisms manufacture simple sugars in the presence of sunlight, carbon dioxide and water. PLT

Producer – an organism that synthesizes organic compounds from inorganic substances via photosynthesis (by green plants or other organisms with chloroplast) or chemosynthesis (by anaerobic bacteria). PLT

Renewable resource – a naturally occurring raw material or form of energy that has the capacity to replenish itself through ecological cycles and sound management practices. PLT

Silviculture – the science and art of cultivating forest crops based on the study of the life history and general characteristics of forest trees. PLT

Succession – the gradual replacement of one community by another. PLT

Sustainable forest management – managing forests to meet the needs of the present without compromising the ability of future generations to meet their needs. PLT

Temperate forest – a forest with moderate year-round temperatures and distinct seasons that is characterized by conifers, broadleaf evergreens and deciduous trees. PLT

Terrestrial ecosystem – all living and non-living elements of a land-based environment, and the relationship between them.

Timber – a forest stand containing trees of commercial size and quality suitable for sawing into lumber. PLT

Timber harvest – removal of trees from a forest to restore ecological health or to obtain income from the wood products.

Tropical forest – a forest that grows in tropical climates with high year-round temperatures and generally high annual rainfall.

Wilderness – (1) a natural environment that has not been significantly modified by human activities; (2) land designated by the U.S. Congress for preservation and protection in its natural condition.

Working forest – a forest, either public or private, that is actively and sustainably managed for the production of forest products while protecting natural resources.

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