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FOREST LITERACY FRAMEWORK

A GUIDE TO TEACHING AND
LEARNING ABOUT FORESTS





Learning is in our nature.

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10 REASONS WHY FORESTS MATTER!

Forests cover 31% of the world's land. They are home to 80% of land-based biodiversity and more than 300 million people worldwide. Forests produce oxygen, replenish and filter groundwater, secure soil, and regulate air temperature. Forests offer a place to educate and inspire future generations to connect to nature and become stewards of the natural environment.

When sustainably managed, forests provide solutions to some of our most pressing global challenges:

1. **Addressing climate change** by capturing carbon from the atmosphere and storing carbon long-term in wood products. Forests are also an emerging source of renewable biofuels.
2. **Helping recover species at risk** by providing habitat, including safe and diverse places for animals to live, migrate, and breed, and landscapes where a variety of plants can grow.
3. **Delivering additional ecosystem services** by supporting soil nutrient cycling, purifying air and water, mitigating droughts and floods, and more.
4. **Providing renewable supply chains** for products we use every day such as sustainably sourced paper, cardboard, and wood, utilizing forest certification as a proof point. Renewable forest products are part of a circular economy that minimizes the depletion of non-renewable resources.
5. **Sustaining communities and economies** by supporting diverse career opportunities, driving economic activity, and contributing to community vitality through employee engagement and support for local initiatives.
6. **Providing a place to learn and discover** to

understand our connection with the natural world and build the skills needed to grow.

7. **Contributing social and cultural benefits** by providing recreational spaces and sustaining traditional resource uses and places for spiritual renewal.
8. **Lowering rates of asthma and respiratory illness** in cities by purifying urban air.
9. **Lowering the temperature of urban heat islands** with shade and by transpiring moisture into the air.
10. **Developing new medicines** and sustaining traditional plant-based medicines.



As we grapple with environmental challenges like climate change and demand for resources, our forests are more important than ever.

WHY DO WE NEED A FOREST LITERACY FRAMEWORK?

It is important for diverse groups of people to understand the values and benefits of forests. By gaining forest literacy, people acquire the tools and knowledge they need to keep our forests sustainable over the long term, while continuing to benefit from them.

This Forest Literacy Framework provides a conceptual outline for those who educate young people (in formal or nonformal settings), create education policy or curricula, or advocate for forests. While this document does not outline specific lessons for teaching about forests, it does suggest sample activities and resources for exploring concepts with various audiences.

Critical thinking, complex systems relationships, and cross-curricular connections surround the tasks of teaching and learning about forests and trees. Forest literacy is a truly interdisciplinary endeavor, with connections to science, social studies, mathematics, health, business, and many other subjects.

This *Forest Literacy Framework* seeks to:

- Translate the complex language of forests, trees, forest practices, and sustainable forest management into concepts that are appropriate for K–12 learners.
- Focus, simplify, and prioritize the way that important forest concepts are conveyed.
- Create informed, engaged, and participatory constituents in the ever-evolving forest story.

FORESTS help provide solutions to many of the world’s most important sustainability challenges. From climate change to water quality and biodiversity, well-managed forests provide viable solutions to achieve measurable environmental, economic, and societal outcomes. This *Forest Literacy Framework* charts a pathway to understand the importance of forests as a sustainability solution.

WHAT WILL FOREST LITERACY LOOK LIKE?

We will have achieved forest literacy when every high school graduate possesses a working knowledge of the values and benefits of forests as outlined in this framework. As we pursue this ideal, any gains in forest literacy are progress.

A population that is forest literate will be characterized by:

- People who make informed decisions in support of healthy and resilient forests, as voters, consumers, policy makers, landowners, employees, and visitors to the forest.
- Voices from diverse populations contributing equitably to meaningful dialogue and decisions.
- More people participating in forestry and resource management post-secondary college, university, and technical programs.
- A growing and diverse workforce to support a green economy, including forest and conservation sectors.
- Collaboration and meaningful partnerships regarding forests at all levels of government, and organizations achieving sustainability as envisioned in the United Nations (UN) Sustainable Development Goals.



CONCEPTS OF FOREST LITERACY

Forest literacy refers to the knowledge and skills surrounding forests and related topics. The Forest Literacy Framework presents a conceptual structure to increase people's understanding of forests and empower them to take actions that benefit forests and all of us.

This framework represents a vision of forest literacy that was developed by educators, forest sector professionals, conservationists, and academic professionals in Canada and the United States. It embodies a shared aspiration for what everyone should know about our forests.

Designed as a universal tool, this framework presents key ideas that will help individuals understand the importance of forests and the role we all play in sustaining them. It recognizes that our two nations share ecology, history, and economy that are deeply rooted in forests. It also acknowledges that not all people agree on key concepts or approach the subject matter from a common experience. Diverse voices and perspectives enrich the conversation and enhance our collective ability to understand the forest and each other.

The conceptual framework is organized around four themes:

1. What is a forest?
2. Why do forests matter?
3. How do we sustain our forests?
4. What is our responsibility to forests?

Each theme includes topics and concepts that address its central question. The themes and concepts build on each other, **enabling individuals to progress from a basic awareness to a deeper understanding of forests**. Definitions of forest terms used in the framework may be found in the Glossary of Terms on page 33.

Individually and collectively, the themes and related concepts are designed to explore our forests and our connections to them.



The Forest Literacy Framework is a living document, with concepts that will evolve and change over time, as we continue to grow our understanding of forests through science and traditional Indigenous knowledge.

THEME 1

WHAT IS A FOREST?

The concepts within this theme provide a fundamental knowledge of forests as ecosystems. Comprehending these concepts will facilitate a fundamental understanding of the relationship between forests and humans, and how forests make a difference in our lives.

A. DEFINITION OF A FOREST

Defining what constitutes a forest is the first step in understanding forest resources:

1. Forests are ecosystems characterized by **tree cover** with different species, structure, composition, or age class. They commonly include streams, fish, and wildlife.
2. Forests are affected by **biotic factors** (e.g., plants, animals, humans) and **abiotic factors** (e.g., soils, nutrients, moisture, sunlight, climate).
3. Forests may be classified by the **dominant** tree species or combination of tree species present. Forests range in size from under an acre (hectare) to thousands of acres (hectares).
4. Forests can be public or private; geographically rural, suburban or urban; managed or unmanaged; and used for a wide variety of purposes.
5. Forests grow through natural **regeneration** or may be assisted through forestry practices (known as **silviculture**).
6. An urban forest is defined as all trees within a defined urban core boundary.

B. TREES AS PART OF THE FOREST

A key defining characteristic of any forest is the trees within it. The following concepts help people appreciate the uniqueness of tree species and comprehend how individual trees function and interact in a forest ecosystem.

1. A tree is a woody **perennial** plant usually 12 feet (4 meters) or greater in height at maturity, often with a single main stem, and a more or less distinct crown of leaves, needles, or scales.
2. Trees have life stages that include germination, growth, maturity, reproduction, decline, and death.
3. Trees can be identified based on seeds, leaves, flowers, bark, shape and other parts. They can be classified into family, genus, and species groups.
4. Trees are broadly classified as **deciduous** (a tree that has leaves or needles that die and drop after one growing season), or coniferous (trees that retain their green leaves, needles, or scales for two or more growing seasons).
5. Trees experience primary and secondary growth. **Primary growth** results in an increase in root length and tree height. **Secondary growth** results in the increasing diameter of roots, branches, and stems.
6. As part of the forest ecosystem, trees have various roles. These roles include supplying oxygen, producing food, providing habitat for wildlife, stabilizing soil, moderating temperature, capturing and storing carbon, and cycling water and nutrients.
7. Forest health is affected by many factors, including natural competition (for space, light, water/moisture, and nutrients), natural disturbance, human interventions, pests, disease, and more.

C. FORESTS AS ECOSYSTEMS

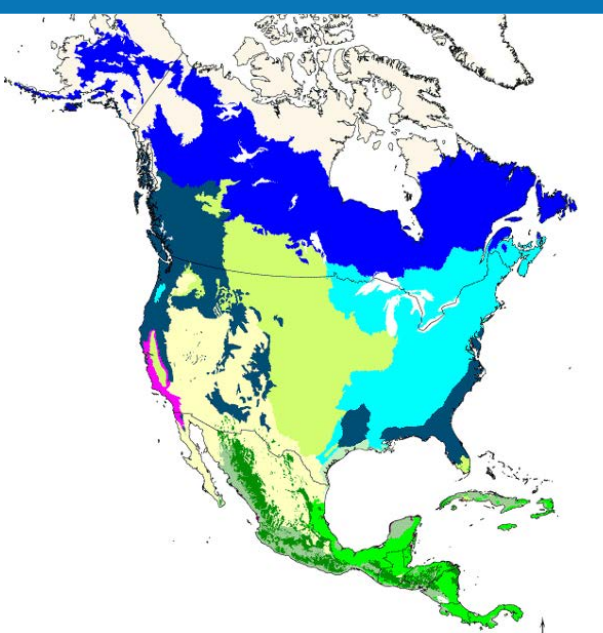
Trees and forests influence and are influenced by their surrounding environment. Understanding basic ecological principles and how they apply to forests helps people appreciate the characteristics of forest ecosystems.

1. Forest ecosystems consist of different types of **biotic** organisms (e.g., living things – producers, consumers, and decomposers) and abiotic components (e.g., non-living things – sunlight, soil, minerals, water) interacting within a given environment, space, and time.
2. Forests are interconnected with other terrestrial (e.g., rangeland) and aquatic (e.g., river, lake estuary) ecosystems, forming a larger system.
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 natural change, adaptation, ranging from gradual change (e.g., **succession**, climate adaptation) to abrupt change (e.g., fire, disease).
5. Natural and human-caused disturbance events are a part of forest ecosystems. Examples of natural events include wildfires, storms, ice damage, insects, disease, and volcanic activity. Examples of human-caused events include accidental fires, forest management, road construction, introduction of non-native species, and development.

D. FOREST CLASSIFICATION

Classifying and differentiating forests into biomes and types helps people understand the forests in their community, in their country, and around the world.

1. Forests are dynamic and always changing. Forces can include climate change, disturbance, species migration, and more.
2. Different forest **biomes** exist around the world. Examples include **tropical forests**, **temperate forests**, and **boreal forests**. In the United States, major forest biomes include temperate deciduous, tropical deciduous, temperate coniferous, and temperate rainforest. In Canada, the major biomes are boreal, montane, temperate deciduous, and temperate rainforest.
3. Many different forest types exist within a biome, typically distinguished by their dominant tree species. For example, there are oak-hickory forests, spruce-fir forests, loblolly pine forests, and many others. Forest types can be further broken down into more distinct natural communities that recur on the landscape, characterized by finer scale descriptions of vegetation, including shrubs and ground cover.
4. Across the globe, there is considerable variation in soil types, elevation, temperature, wind and precipitation patterns. These variations create the different forest types and associated plants and animals (**flora** and **fauna**) that, together with disturbance history and patterns, contribute to that region's biodiversity.
5. Humans are part of the forest ecosystem. They depend on and influence forest ecosystems and are also influenced by them.



BIOMES OF NORTH AMERICA



THEME 2

WHY DO FORESTS MATTER?

The concepts within this theme help people understand the importance of sustainably managed forests to humans, by making connections between forests and their own lives.

A. ENVIRONMENTAL IMPORTANCE

Forests are one of Earth's major life-supporting systems, providing a variety of critical **ecosystem services** that are critical to life:

1. Forests provide habitat for fish and wildlife.
2. Forests improve air quality by absorbing certain pollutants and releasing life-sustaining oxygen.
3. Forests **sequester** (collect) and store carbon from the atmosphere and are thus essential to the global carbon cycle. Forest products made from wood store carbon for that product's lifetime. Such carbon storage is an important strategy for mitigating global climate change, along with reducing fossil fuel consumption.
4. Forests filter sediment and toxins from surface runoff and are critical to the water cycle, due to their role in **evapotranspiration** at a very large scale.
5. Urban forests moderate temperatures by helping to reduce the urban heat-island effect. Trees reduce air temperature by altering wind speeds, creating shade, and blocking solar radiation. In addition, trees transpire moisture into the air and cool it.
6. Urban trees filter water and mitigate stormwater runoff.
7. Forests maintain soil through the development and retention of soils. In turn, soils contribute to forest health.
8. Forests are living laboratories that provide the opportunity to study ecosystems, conservation, and natural resource management.
9. Forests support other ecological systems, contributing to the health of waterways, oceans, and non-forested ecosystems all over the world.
10. Many forest products are reusable or recyclable, and they store carbon. Wood products can have a lower environmental impact than alternatives when evaluated from a full life-cycle perspective.

B. SOCIAL IMPORTANCE

Understanding how forests shape local communities and enhance our health helps people recognize the value of forests to society.

1. Historical perspectives on the contributory role of forests help build our understanding and personal connections to forests. They can also guide decisions to manage forests for future generations.
2. Forests have always been important to people who live on the land and within forest-dependent communities, including Indigenous Peoples.
3. Forests are the source of products that people use every day (e.g. paper, tissue, furniture, food, clothing, house framing, and more.)
4. Forests offer renewable materials, such as paper products, corrugated cardboard, cross-laminated timber, and biofuels to support global sustainability.
5. Individuals hold different values concerning forests and their uses, based on their personal experiences and connections with the forest.
6. Forests provide excellent playgrounds for outdoor recreation, including hiking, fishing, canoeing, camping, hunting, and more.
7. Trees in urban spaces promote healthy, active lifestyles and increase the amount of time that people spend in nature. Having more trees in an area is associated with lower rates of asthma and respiratory illness in urban populations.
8. When people spend more time in forests, it can improve their physical health, including their heart health, their brain and lung function, and their capacity to fight disease. Trees reduce skin cancer risk by providing shade.
9. The forest can contribute to improved mental health, reduce stress levels and promote an overall sense of security and wellbeing.

10. Forests play an important cultural and spiritual role to many people, including Indigenous Peoples.
11. Valued uses of forests include consumptive (e.g. hunting, berry picking) and non-consumptive (e.g., bird watching, hiking).

C. ECONOMIC IMPORTANCE

Forests provide many economic benefits to people by generating materials, creating jobs, providing investment opportunities, and creating and adapting to new market opportunities. Understanding the importance of working forests for economic livelihoods at various levels helps to increase people's understanding of the overall value of forests. Forests are a renewable resource. Sustainable harvest management and reforestation ensure that we will be able to enjoy the economic benefits of jobs, products, and revenue for generations to come.

1. Historically, Indigenous Peoples built and maintained sustainable forest-based economies, growing a rich body of traditional ecological knowledge in the process.
2. The forest sector generates diverse employment opportunities for foresters, scientists, harvesting professionals, truckers, factory workers, engineers, architects, wildland firefighters, carbon modelers, and many more.
3. The forest sector makes significant and sustainable contributions to the GDP in Canada and the United States.
4. Forests provide multiple economic benefits that include financial returns to owners and investors. They also provide ecosystem service benefits such as carbon storage, clean water, recreation, and tourism.
5. The forest sector is diverse and growing. It provides critical resources and products to the global marketplace, including lumber, plywood, engineered wood products, packaging, paper, and fabric.
6. Innovative new forest bioproducts include green chemicals, bioplastics, biofuels, wood and glass fiber, and carbon fiber made from trees. These products can be made from manufacturing leftovers, harvest residues, trees that were thinned from urban and



forest stands, or trees that were damaged or killed by fires, insects, and disease. Such sustainable use of forest products can offer solutions to global challenges.

7. Economic returns to forest landowners are important because they provide an income that allows the landowner to maintain the land as forest, rather than selling it for non-forestland uses (e.g., development).
8. Forests are essential to the growth and health of a green economy, defined by the United Nations as low carbon, resource efficient, and socially inclusive. Forests provide income for local, state/provincial, national, and international economies.
9. Urban tree cover provides green infrastructure that shades buildings and hard surfaces and manages runoff entering stormwater drainage systems. Green infrastructure mimics natural landscape features and can capture, retain, and reuse water on site. These are valuable economic benefits. Tree canopy can also filter particulate matter and pollutants, reducing municipal costs.
10. Companies increasingly find that sustainability is a core element to a successful business strategy, as consumers and investors are increasingly aware of the private sector's environmental, social, and governance impacts.

THEME 3

HOW DO WE SUSTAIN OUR FORESTS?

The concepts within this theme help people understand that our forests are sustained through a rich variety of agreements and collaborative partnerships that span private and public sectors. For people to become participating members of a society that values sustainably managed forests, they must comprehend the role forest management plays in meeting the environmental, social, and economic needs of society and understand how they too can participate.

A. FOREST OWNERSHIP

Understanding who owns our forests helps people identify the basis for different **forest management** decisions.

1. The size and scale of forest ownership can vary from a small patch of trees in a backyard or urban space to hundreds of thousands of acres (or hectares) in a national forest.
2. Forests, forest disturbances (e.g. fire, drought, pests and disease), and ecosystem functions do not follow ownership and administrative boundaries, such as political borders, city limits and private property lines. They extend across the landscape based on natural laws of ecology and biology.
3. Forests are managed under private (e.g., family, institutional) and public (e.g., municipal, state/provincial, federal) ownership. Each type of ownership may have different management objectives and may be subject to different laws and policies. In the United States, 56% of the forest is owned privately, whereas in Canada, only 4% is privately owned.
4. Many forest landscapes consist 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 the reasons that forests are managed helps people think critically about forest management methods and enables them to engage as knowledgeable voters, consumers, and environmental stewards. Sustainably managed forests achieve a variety of outcomes that make a positive difference to people and the environment.

1. A variety of individuals, companies, organizations, communities and government agencies manage forests. Forest management decisions may involve some or all of these entities working collaboratively with stakeholders to ensure mutually beneficial outcomes.
2. The type and intensity of forest management, depends on landowners, objectives, and forest type. Examples of management objectives might include conservation, recreation (hiking, hunting), or profit.

3. The types and methods of silvicultural (growth and management of trees) practices differ depending on the forest system. Some silviculture methods aim to mimic ecological conditions created by natural disturbances (e.g., fire, wind, natural succession) so that the resulting forest approximates historic conditions. In other systems, silvicultural methods might aim to maintain a high growth capacity, while maintaining habitat for species and providing other ecosystem services. As a result, harvesting plans and replanting may look very different in a boreal forest than in a temperate rainforest.
4. Forest managers prepare forest management plans based on landowner goals and objectives, the natural potential of the forest itself, laws, and available management tools (e.g., planting, harvesting, and using prescribed fire).
5. Sustainable forest management pays attention to natural processes. It involves goal-oriented decisions and actions to achieve a variety of desired outcomes, including ecological (e.g., wildlife habitat), economic (e.g., timber production), and social (e.g., recreation) outcomes. Many outcomes are interrelated and are often managed simultaneously.
6. Public demands and expectations for the forest, as well as unanticipated events (e.g. wildfire, pest infestation), affect decisions about forest resource use. Sustainable management must be based on scientific research, economic analysis, and public involvement.
7. Urban forest management, like all forest management, considers **canopy cover** in addition to species diversity, age distribution and inclusion of native vegetation to promote healthy and more resilient urban forest, that increase livability of communities and help to mitigate climate change.
8. Sustainable forest management involves respect for the rights of Indigenous Peoples. Forests are a renewable public resource that exists on Indigenous Peoples' territories, and they should be included in decision making and consulted as the original caretakers of the land.

C. FOREST MANAGEMENT POLICY

By understanding that many individuals and groups are involved in forest management, people will recognize that the responsibility of forest management is shared.

1. Governments play an important role in conserving, maintaining, and sustaining forest resources by enacting laws, creating policies, establishing agencies, creating public lands, and providing management guidelines and, in some jurisdictions, ongoing education for forest landowners.
2. Forest management includes actions employed over a long term to purposefully guide tree species composition, size, and age of trees in the forest. Forest management plays an important role in maintaining forest health and resilience.
3. Forest management ranges from **active management** (e.g., planting, thinning, harvesting) to **passive management** (e.g., stewarding **parks** and **wilderness** areas) to grow, restore, maintain, conserve, or alter forests.
4. Forest management is regulated by state/provincial and federal laws that sustain forestland for timber production and the other benefits forests provide, including clean water, wildlife habitat, and recreation. These laws must be compatible with other governing laws, including Species at Risk Act and Canadian Navigational Water Act in Canada and the Endangered Species Act and EPA Clean Water Act in the United States, among other laws.
5. Forest management plans are required on all provincial/



state or federal lands.

6. Government has a role in actively engaging organizations, businesses, communities, and individuals in forest management and policy decisions, especially for publicly owned and urban forests.
7. Businesses in the forest products sector (manufacturers, forest investment entities, harvesting professionals, etc.) also have legal and ethical responsibilities to manage natural resources to provide benefits to the public.
8. As human populations and global demand for forest resources increase, forest management methodologies and advances in research and technological systems help ensure that forest resources are maintained or improved to produce desired values and products.
9. Strategic urban forest improvement programs offer financial and other incentives (such as free-tree program or community tree planting opportunities) and other motivating factors. These programs are often part of long-term sustainable urban forest management plans.



D. PERSPECTIVES ON FOREST MANAGEMENT

Examining the different perspectives involved in forest management helps people understand the complexity of forest management decisions.

1. People have differing perspectives about forest management, that can be affected by politics, science, economics, values, perception, culture, and experience.
2. Forest management can be controversial because of these diverse perspectives, as well as the complex nature of forest ecosystems.
3. Ensuring that multiple perspectives are involved in decision-making can lead to more effective problem-solving, greater acceptance of solutions, and more sustainable outcomes for our forests.
4. Respecting Indigenous Peoples' rights and incorporating their traditional ecological knowledge are essential to ensuring a sustainable future for our forests.

E. FOREST MANAGEMENT CERTIFICATION

Understanding the process of sustainable forest management and the standards that govern third-party certification will help people to recognize the value of this system, as well as showing them the role they can play in promoting sustainability through purchasing practices.



1. Forest certification standards include measures to ensure social, economic, and ecological dimensions of sustainability. These measures include maintaining forest and ecosystem health (e.g. biodiversity, wildlife, water, soils), productivity, and diversity; and conserving a forested land base for the needs of present and future generations.
2. Many forest owners and operators choose to certify their operations by an objective standard for sustainable forest management. Third-party independent auditors certify the land and provide assurance that legal, sustainable forest practices are being followed.
3. Forests are certified on public lands, private lands, Indigenous and Tribal Lands, university lands, conservation lands, and community lands.
4. There are four main certification systems used in the United States and Canada: Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC), Canadian Standards Association (CSA), and the American Tree Farm System (ATFS). SFI, CSA, and ATFS are endorsed by an international organization called the Programme for the Endorsement of Forest Certification (PEFC).
5. Certified forests generate products that often carry a label to help consumers recognize the product as originating from a sustainable source. You can find SFI, PEFC, and FSC labels in North America and globally.
6. As a consumer, seeking out and purchasing products with a certification label ensures that those products were generated in a sustainable way that is beneficial to forests. It also helps to increase demand and generate economic incentives for more sustainable forest management in the future.
7. Certification standards continuously improve to reflect new knowledge and best practices in sustainability.
8. Forest management certification practices create a global space for collaboration and implementation of best practices across a greater landscape scale – that crosses political and ownership boundaries.



THEME 4

WHAT IS OUR RESPONSIBILITY TO FORESTS?

The concepts within this theme help people identify ways to become stewards of the forests to help sustain them for present and future generations. People can actively promote forest sustainability by observing, understanding, and experiencing forests first-hand, by choosing products that are sourced sustainably, and by taking appropriate actions in their communities, starting with the trees in their yard. It is critical for individuals to be engaged and educated to ensure that forests fulfill their role as one of our greatest solutions to global sustainability challenges.

A. OUR CONNECTION TO OUR FORESTS

Helping people see their personal connections to forests helps them understand how their actions impact forests.

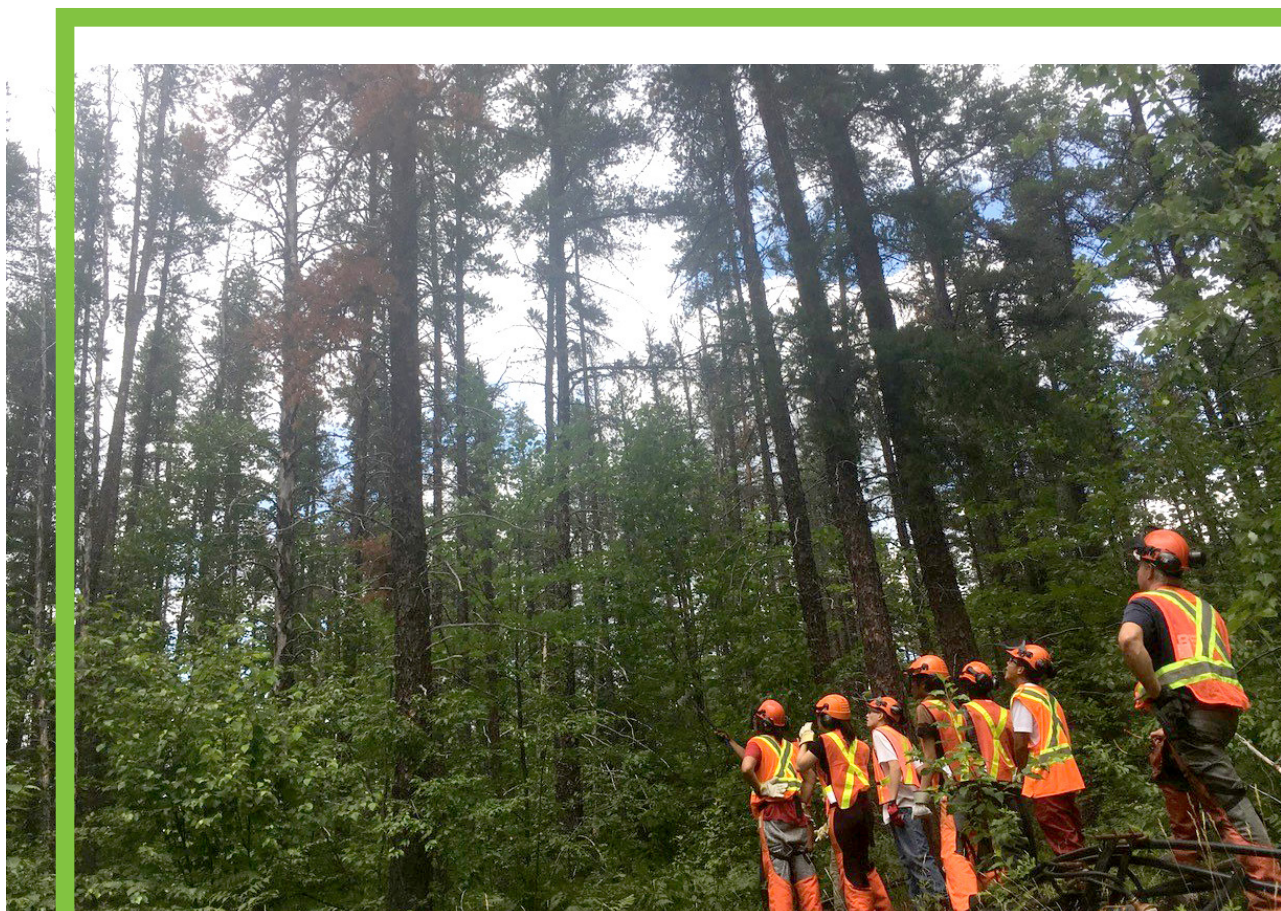
1. Everyone should have the opportunity to identify and explore their personal relationship with trees and forests.
2. Resources that we use and consume every day are connected to forests. We have the opportunity to choose products (e.g., renewable, legally sourced, certified) that support sustainability.
3. Individuals can connect with the forest by hiking and picnicking, volunteering for projects in and around forests, studying in or about forests, owning and managing forestland, and more.
4. Everyone is a stakeholder in the forest. Individuals can take action by becoming informed and active voters, attending public meetings, and participating in lifelong environmental learning.
5. Consumers should be aware of their purchasing options and should choose wood products with certification labels indicating that they are from well-managed forests.
6. By understanding objectives for and perspectives on forest management at local, national, and global levels, individuals will be better able to engage in conversations and actions supporting sustainable forest management and sustainable supply chains.



B. WORKING FOR THE FUTURE OF OUR FORESTS

Learning to take action to support the forest gives people pathways to involvement now and in the future.

1. Everyone has a responsibility to treat forests with respect and to be a conscientious steward of forests and forest resources.
2. Personal actions in the natural environment directly impact the health and resiliency of our forests. For example, how we treat trails and campgrounds, and how we hunt or use fire, can either help or harm forests. Landowners have a responsibility to manage trees and forests on their property in a sustainable way.
3. Choices that we make as consumers affect our ability to sustain forest ecosystems into the future. By choosing wood and wood fiber products certified by third-party labels, consumers support forest sustainability.
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, harvesting professionals, mechanics, and forest product manufacturers.
5. As individuals or as members of groups, we influence laws and policies affecting our forests. Individuals can have their say by voting, working with community officials, joining organizations that conserve forestland, and weighing in when public opinion is sought.



Our Forests, Our Future

USING THE FOREST LITERACY FRAMEWORK



“No matter where you live, forests are a vital part of our environment, economy and recreational resources. In addition to teaching reading, writing and math, it is critically important that we also teach students how to be contributing citizens and conscientious stewards of our forestlands.

Schools and communities have a responsibility to teach the next generation about the crucial role forests play in our lives. Sharing this knowledge with students will enable them to be educated users and future decision-makers for our country’s greatest renewable resource: forests.”

RANDY SCHILD

Superintendent Tillamook School District, Tillamook, Oregon

Using our forests as a context for teaching can enrich student learning and extend it beyond the classroom walls. Studies show that direct experiences in nature, in which students are actively involved in their own learning, can improve students’ overall academic performance, self-esteem, community involvement, and personal health. This engagement is more relevant than ever in a time where young people are spending more time indoors with electronic devices and less time connecting with nature.

For both educators and non-educators, this framework shows the key concepts to cover about forests within the K-12 curriculum, no matter the subject area or initiative. It can help students, teachers, natural resource and other professionals, and parents alike bring relevant, engaging content to your audience.

concepts. Explore the themes and ideas of the Forest Literacy Framework in two ways:

By Grade Level

Explore forest literacy for the grade band that you are working with, to understand which concepts are age appropriate and aligned with curriculum.

By Hot Topic

Explore forest literacy as it applies to important themes like climate change, public health and wildfires. These thematic overviews will continue to be developed and released on the PLT website.

FOREST LITERACY BY GRADE LEVEL

GRADES K-2

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

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

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

Giving students opportunities to be keen observers will provide them with a strong foundation for becoming good scientists and critical thinkers. Simple investigations 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 forests in particular.



KEY FOREST LITERACY PLAN CONCEPTS FOR GRADES K-2



The following concepts from the Forest Literacy Framework have direct connections to Next Generation Science Standards (NGSS) in the United States, to provincial science standards in Canada and to Social Studies standards in both countries. Note that many concepts also support English Language Arts, and Mathematics standards as well.

<i>Forest Literacy Framework Concept</i>	Subject	Topic	Core Idea	Standard (If Applicable)
Theme 1, A.1	Science	Organization for Matter and Energy Flow in Organisms	All animals need food to live and grow. Plants need water and light to live and grow.	NGSS: <u>K-LS1-1</u>
Theme 1, B.3	Science	Structure and Function	Plants have different parts that help them survive and grow.	NGSS: <u>1-LS3-1</u>
Theme 1, D.4	Science	Biodiversity and Humans	There are many different kinds of living things in an area.	NGSS: <u>2-LS4-1</u>
Theme 1, C.1	Science	Natural Resources	Living things need water, air, and other resources. They live in places that have the things they need.	NGSS: <u>K-ESS3-1</u>
Theme 2, B.3	Social Studies	Economics: Exchange and Markets	Skills and knowledge are required to produce goods and services.	See local standards
Theme 3, B.1	Social Studies	Civics: Civic and Political Institutions	All people play important roles in a community.	See local standards
Theme 4, B.2	Science	Human Impacts on Earth Systems	The things that people do can affect the world around them.	NGSS: <u>K-ESS3-3</u>

SAMPLE FOREST LITERACY ACTIVITIES

GRADES K-2

1. Read *Welcome to the Neighborwood* by Shawn Sheehy or another book that introduces children to forests and forest organisms. 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 other forest plants and different forest animals. [Theme 1, A. Definition of Forests]
2. Gather students by a tree and invite them to act out the different stages of a tree's life. For example, have them curl into a ball like a seed, kneel like a sapling, and stand with arms outspread like a mature tree. Encourage them to compare the tree's life stages to their own. See the activity "A Tree's Life" in PLT's [Explore Your Environment: K-8 Activity Guide](#) for more details. [Theme 1, B. Trees as Part of the Forest]
3. Challenge students to look closely at a tree in the schoolyard or other site and find as many different plants and animals as they can (including people) that live in and around it. Help students identify ways that these organisms benefit from the tree and that the tree benefits from them. [Theme 2, A. Environmental Importance]
4. Count the number of objects in the classroom that are made from trees and tree products. For dramatic play, provide costumes such as hard hats, boots, vests, cardboard "saws" and tree-planting tools for students to act out or mimic forest jobs. See the activity "Three Cheers for Trees" in PLT's [Environmental Experiences for Early Childhood](#) for more suggestions. [Theme 2, C. Economic Importance]
5. Help students plan and conduct an investigation of what plants need to thrive. For example, they might grow plants under different conditions, such as in the presence or absence of light, water, or soil. Encourage students to measure the height of the plants under each condition and compare the results. Help them make the connection from their investigation to trees and other forest plants. [Theme 3, B. Forest Management]
6. Work with students to carry out a tree planting project. Identify a suitable tree and location, and help students consider how the tree will get the light and water it will need to grow. For details, see the activity [Plant a Tree](#) in PLT's Learn about Forests toolkit. [Theme 3, B. Forest Management]
7. Read *A Walk in the Forest* by Maria Dek, which encourages children to discover the forest as a place for imaginative play and contemplation. After reading the story, take students to a forested area and invite them to close their eyes and open their ears. Create a class book depicting the various sounds students hear. [Theme 4, A. Our Connection to Our Forests]
8. Provide opportunities for students to observe a single tree at different times of the year. With each visit, direct students to sketch the tree and record other observations. At the end of the year, have each child draw pictures of the "adopted" tree in each season and a picture of themselves caring for the tree. Laminate the pictures to make a set of tree placemats for each child. For more details, see the activity "Adopt a Tree" in PLT's [Treemendous Science! e-Unit for Grades K-2](#). [Theme 4, B. Working for the Future of Our Forests]

REAL WORLD CONNECTIONS

Help students explore forests through read-aloud books, such as:

1. [Seed School: Growing up Amazing!](#)
By Joan Holub
2. [Welcome to the Neighborwood.](#)
By Shawn Sheehy
3. [Trout are Made of Trees!](#)
By April Pulley Sayre
4. [In the Woods.](#)
By David Elliott



FOREST LITERACY BY GRADE LEVEL

GRADES 3-5

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

Students this age 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 literacy activities at the intermediate level may focus on the following questions:

- What do forest organisms need to survive?
- How are forests and their inhabitants adapted to the climate and landscape?
- In what ways are forests important to the environment, economy, and society? How do forests contribute to our health?
- What can people do to take care of our forests?

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.



KEY FOREST LITERACY PLAN CONCEPTS FOR GRADES 3-5



The following concepts from the Forest Literacy Framework have direct connections to Next Generation Science Standards (NGSS) in the United States, to provincial science standards in Canada and to Social Studies standards in both countries. Note that many concepts also support English Language Arts, and Mathematics standards as well.

<i>Forest Literacy Framework Concept</i>	Subject	Topic	Core Idea	Standard (If Applicable)
Theme 1, B.2	Science	Growth and Development of Organisms	Plants and animals have unique and diverse life cycles.	NGSS: 3-LS1-1
Theme 1, B.3	Science	Structure and Function	Plants and animals have structures that serve various functions in growth, survival, behavior, and reproduction.	NGSS: 4-LS1-1
Theme 1, C.3	Science	Cycles of Matter and Energy Transfer in Ecosystems	Matter cycles between the air and soil and among plants, animals, and microbes.	NGSS: 5-LS2-1
Theme 2, D.2	Science	Natural Resources	Some resources are renewable over time, and others are not.	NGSS: 4-ESS3-1
Theme 3, B.6	Social Studies	Economics: Economic Decision Making	Different choices have different benefits and costs.	See local standards
Theme 3, D.1	Social Studies	Geography: Human–Environment Interaction	Culture affects the way that people modify and adapt to the environment.	See local standards
Theme 4, B.2	Science	Human Impacts on Earth Systems	Individuals and communities are doing things to help protect Earth’s resources and environments.	NGSS: 5-ESS3-1
Theme 4, B.5	Social Studies	Civics: Process, Rules, and Laws	Policies help to address public problems.	See local standards

SAMPLE FOREST LITERACY ACTIVITIES

GRADES 3-5

1. Challenge students to identify the names of trees in the schoolyard, in a park, or along a street. First, have them pick two different trees and observe differences between the two, such as leaf type and shape; bark texture; fruits, flowers, or seeds; and shape of the overall tree. Then, show students how to use a free mobile app or tree guide to identify the species. See PLT's Family Activity [The Closer You Look](#) for more information. [Theme 1, B. Trees as Part of the Forest]
2. Lead an investigation of biotic (living) and abiotic (nonliving) components of ecosystems through a plot study comparing shady and sunny locations in the schoolyard or a nearby park. Use hula hoops or string tied in loops to create evenly sized plots. Then in each plot, have students tally the different organisms they find and measure the soil temperature and moisture. [Theme 1, C. Forests as Ecosystems]
3. Create a model of a forest food web by having students choose a forest animal, draw a picture of it on an index card, then 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. For more details, see the activity "Web of Life" in PLT's [Biodiversity Blitz](#) for Grades 3-5. [Theme 2, A. Environmental Importance]
4. Inspire students to go on an outdoor scavenger hunt for tree products. In advance, scout the area to determine what students might find. Then, put together a list of objects for them to look for, including a few challenging items. Encourage students to find as many items as they can. [Theme 2, C. Economic Importance]
5. Ask students to brainstorm different jobs that might be necessary to care for forests and to provide the things we need and want from them. Discuss the idea that people manage forests to provide plant and animal habitats; paper and wood products; places for recreation; and air, soil, and water protection. Then have students interview guest visitors to learn about their forest-related jobs. For more ideas, see the activity "My Green Future" in PLT's [Explore Your Environment: K-8 Activity Guide](#). [Theme 3, B. Forest Management]
6. Conduct a modeling simulation using math cubes or poker chips to explore what happens when trees compete for limited resources such as water, sunlight, carbon, and nutrients. Use the model to compare different forest conditions, such as overcrowding, drought, or wildfire, and how they affect forest management decisions. For details, see "Every Tree for Itself" in PLT's [Energy in Ecosystems](#) e-Unit for Grades 3-5. [Theme 3, C. Forest Management Policy]
7. Invite students to sit under a tree and use their senses to generate group lists of words the tree evokes, one list for each sense. Have students use the lists to write poems about trees and forests. Encourage them to try different poetry forms, such as haiku, cinquain, acrostic, shape poetry, or free verse. [Theme 4, A. Our Connection to Our Forests]
8. Encourage students to investigate their school site, inventorying natural habitats, trees, and wildlife present on the site and finding out how the grounds are maintained. Support them in making recommendations to improve their school site based on their findings. See "School Site Investigation" in PLT's [GreenSchools Investigations](#) for more information. [Theme 4, B. Working for the Future of Our Forests]

REAL WORLD CONNECTIONS

Have a look at these conservation research projects that offer real world connections to elevate student learning about forests.

Join [Nestwatch](#), a citizen science project developed by Cornell University in partnership with SFI. Students seek out and monitor bird nesting sites, and build birdboxes using downloadable plans. This is one of many excellent birding resources created by Cornell Ornithology.

Explore connections between sustainable **forest management** and conservation of important keystone species, using a fact sheet about the [Gopher Tortoise from the Alabama Forestry Foundation](#).

Consider how a changing forest can affect different wildlife habitat with [SFI's Species at Risk](#) video.



FOREST LITERACY BY GRADE LEVEL

GRADES 6-8

Middle school students are gaining a deeper sense of themselves as members of communities, including human and natural communities. They are becoming aware of how people's actions impact others. Friends and relationships consume a lot of their thoughts 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 personal opinions with evidence and to distinguish between opinion and fact. Forest literacy activities at the middle school level may focus on the following concepts:

- What social, economic and environmental benefits do forests provide?
- How do we sustain forests and preserve the benefits they provide?
- What can individuals do to ensure the well-being of our 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.

This is also a great age to start exploring green career opportunities!



KEY FOREST LITERACY PLAN CONCEPTS FOR GRADES 6-8



The following concepts from the Forest Literacy Framework have direct connections to Next Generation Science Standards (NGSS) in the United States, to provincial science standards in Canada and to Social Studies standards in both countries. Note that many concepts also support English Language Arts, and Mathematics standards as well.

<i>Forest Literacy Framework Concept</i>	Subject	Topic	Core Idea	Standard (If Applicable)
Theme 1, C.1	Science	Interdependent Relationships in Ecosystems	Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.	NGSS: MS-LS2-1
Theme 1, C.3	Science	Organization for Matter and Energy Flow in Organisms	Plants, algae, and many microorganisms use the energy from light to make sugars through the process of photosynthesis.	NGSS: MS-LS1-6
Theme 1, C.5	Science	Ecosystem Dynamics, Function, and Resilience	Ecosystems are dynamic in nature; their characteristics can vary over time.	NGSS: MS-LS2-4
Theme 2, A.4	Science	The Roles of Water in Earth's Surface Processes	Water continually cycles between land, ocean, and atmosphere via transpiration, evaporation, condensation, and precipitation.	NGSS: MS-ESS2-4
Theme 2, C.6	Social Studies	Economics: Economic Decision Making	Economic decisions affect the well-being of individuals, businesses, and society.	See local standards
Theme 3, C.1	Social Studies	Civics: Processes, Rules, and Laws	Rules and laws are a means of addressing public problems.	See local standards
Theme 3, E.4	Science	Developing Possible Solutions	There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.	NGSS: MS-LS2-5

SAMPLE FOREST LITERACY ACTIVITIES

GRADES 6-8

1. Guide students to select a tree native to their region and write a research report about it. Encourage students to use field guides to find a specimen of the tree in their neighborhood or a nearby forest and map its location. The report should also include a description of environmental conditions where the tree grows, the tree's growth habit, animals that use the tree, and any commercial uses of the tree. [Theme 1, B. Trees as Part of the Forest]
2. Lead students on a field study of three different environments, such as a lawn, a stand of trees, and a pond or creek. Direct students to measure the level of sunlight, soil moisture, temperature, wind, water flow, and numbers of plants and animals in each environment, and observe how nonliving elements affect living elements in an ecosystem. See the activity "Field, Forest, and Stream" in PLT's [*Explore Your Environment: K-8 Activity Guide*](#) for details. [Theme 1, C. Forests as Ecosystems]
3. Share with students a podcast, video, or journal article describing a scientific study on the effects of climate change on forests. Ask students what conclusions they might draw from the study and whether they notice any weaknesses in the study. Invite students to design an infographic that shows how forests are impacted by climate change and what role forests can play to mitigate or lessen it. For more information, see PLT's [*Carbon & Climate*](#) e-unit for grades 6–8. [Theme 2, A. Environmental Importance]
4. Challenge students to design an app, digital game, or board game that details the steps involved in bringing a favorite tree product to market. Suggest that they base their creation on a familiar app or game, such as The Game of Life. For inspiration, you might first read excerpts from *Chocolate: Sweet Science & Dark Secrets of the World's Favorite Treat* by Kay Frydenborg. [Theme 2, C. Economic Importance]
5. Present a hypothetical scenario in which a community acquires a 100-acre parcel of forest land and challenge students to develop a plan for it that balances the environmental, economic, and social uses of the forest. To begin, brainstorm as a group a list of ways that the community might use the forest (for example, for clean water and air, hiking, camping, or tourism), and then have teams create visual representations of their plans based on the list. For more information, see the activity "If You Were the Boss" in PLT's [*Green Jobs: Exploring Forest Careers*](#). [Theme 3, B. Forest Management]
6. Direct students to conduct an inventory of the trees on the school property and create a detailed map showing each tree's location and scientific name. Invite students to make a recommendation to the school council or principal based on their findings, such as where more shade is needed or where more trees could be planted. For details, see PLT's [*Teaching with i-Tree*](#), available at plt.org. [Theme 3, C. Forest Management Policy]
7. Invite students to develop a survey to find out what people think about the trees in their community. For example, students might ask how people interact with the street trees in the neighborhood, how the trees make them feel, or how they believe they benefit from the trees. Encourage students to analyze the data and share their findings with their city's urban forester or others. See PLT's [*Discover Your Urban Forest*](#) for grades 6–8 for more ideas. [Theme 4, A. Our Connection to Our Forests]
8. Take students to a nearby forest or park to look for evidence of human impact. Discuss what students could do to reduce any negative impacts they observe, and then assist them in developing a service-learning project around one of the ideas. For example, the group might partner with a local organization to plant trees, remove invasive species, collect litter, repair trails, or create interpretive signs. [Theme 4, B. Working for the Future of Our Forests]

REAL WORLD CONNECTIONS

Ground classroom work and discussions in real world conservation projects. Check out these articles that make great connections between forestry and related elements like water and wildlife:

[The Health of the Fraser River](#)

(Canadian Geographic)

[Working Forests at Work for Birds](#)

(ABC/SFI collaboration)

[Conservation Through Forest Certification to Help Species at Risk](#)

(SFI)

[The Power of Sustainable Forests](#)

(TED Talk by Kathy Abusow, SFI)



FOREST LITERACY BY GRADE LEVEL

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 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 different types of forests?
- How do people manage forests to achieve desired forest outcomes and ensure the sustainability of our forests?
- What role do foresters and natural resource professionals, governments, private companies, and individuals play in managing and sustaining our forests locally and globally?
- What career opportunities are available in the forest and conservation sector?

At this level, forests can become the focus of more and more sophisticated research, in which students 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, locally and globally.



KEY FOREST LITERACY PLAN CONCEPTS FOR GRADES 9-12



The following concepts from the Forest Literacy Framework have direct connections to Next Generation Science Standards (NGSS) in the United States, to provincial science standards in Canada and to Social Studies standards in both countries. Note that many concepts also support English Language Arts, and Mathematics standards as well.

<i>Forest Literacy Framework Concept</i>	Subject	Topic	Core Idea	Standard (If Applicable)
Theme 1, C.4	Science	Ecosystem Dynamics, Function, and Resilience	A complex set of interactions can keep ecosystems relatively stable over long periods of time. Extreme fluctuations in conditions can challenge the functioning of ecosystems.	NGSS: <u>HS-LS2-6</u>
Theme 2, A,3	Science	Cycles of Matter and Energy Transfer in Ecosystems	Photosynthesis and cellular respiration are important components of the carbon cycle, in which carbon is exchanged among the biosphere, atmosphere, oceans, and geosphere through chemical, physical, geological, and biological processes.	NGSS: <u>HS-ESS2-6</u>
Theme 3, C.5	Social Studies	Civics: Civic and Political Institutions	Institutions help to address social and political problems at the local, state, tribal, national, and international levels.	See local standards
Theme 3, B.5	Science	Human Impacts on Earth Systems	We must responsibly manage our natural resources in order to ensure the sustainability of human societies and the biodiversity that supports them.	NGSS: <u>HS-ESS3-3</u>

<i>Forest Literacy Framework Concept</i>	Subject	Topic	Core Idea	Standard (If Applicable)
Theme 3, E.6	Social Studies	Economics: Exchange and Markets	Incentives can influence what is produced and distributed in a market system.	See local standards
Theme 4, B.1	Science	Designing Solutions to Engineering Problems	When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	NGSS: <u>HS-ESS3-R</u>
Theme 4, B.2	Science	Ecosystem Dynamics, Functioning and Resilience	Anthropogenic changes in the environment can disrupt an ecosystem and threaten the survival of some species.	NGSS: <u>HS-LS27</u>

SAMPLE FOREST LITERACY ACTIVITIES

GRADES 9-12

1. Lead students in conducting a tree survey of the school grounds, identifying the genus of each tree and measuring the diameter at breast height and the height of each tree. The activity “Monitoring Forest Health” in PLT’s [Green Jobs: Exploring Forest Careers](#) includes details for these and other monitoring activities. [Theme 1, B. Trees as Part of the Forest]
2. Study the process of succession, first by reading about the reestablishment of ecological communities following the eruption of Mount St. Helens in 1980 (see “Mount St. Helens—A Story of Succession” from PLT’s [Focus on Forests Secondary Environmental Education Module](#)). Then have students conduct an investigation by roping off three areas on or near the school grounds that represent different stages of succession and observing them at regular intervals over the school term. [Theme 1, C. Forests as Ecosystems]
3. Challenge students to explore the connection between forests and water through a soil filtration experiment using 2-liter plastic bottles or other simple materials. Students can compare the absorption rates of forest soil and other types of soil, and the quantity and quality of water that runs off the various soils. Encourage students to research their community’s drinking water to find out what watershed it comes from and how its source might depend on forests. [Theme 2, A. Environmental Importance]
4. Show videos depicting real-life people in different forestry jobs using [PLT Canada Day In The Life](#) videos highlighting 12 different career opportunities. Invite students to explore forest-related careers by conducting internet research or through informational interviews. Encourage them to find out what education, experience, skills, and personal qualities are required or helpful for their chosen career. [Theme 2, C. Economic Importance]

5. Using the U.S. Forest Service's ***Climate Change Atlas***, have students analyze data on how climate change is affecting forests in the Eastern United States. Direct them to look at current and possible future distributions of tree and bird species and to create posters or other visual representations to communicate both their findings and the implications for forest management. For more, see the activity "Atlas for Change" in PLT's ***Southeastern Forests and Climate Change*** activity guide. [Theme 3, B. Forest Management]
6. Explore the role of prescribed burns in managing fire-prone forest ecosystems. Have students conduct a wildfire safety assessment of their home or school and make recommendations for increasing wildfire safety. [Theme 3, B. Forest Management]
7. Examine together the U.S. statistics for the UN Sustainable Development Goals. Direct students to identify connections between forests and each of the 17 goals, and areas where progress is or isn't being made toward sustainability in the United States. Students might also interview forest landowners or forest managers to find out what challenges they face in meeting sustainability goals at the local level. [Theme 3, C. Forest Management Policy]
8. Invite students to carry out a project to deepen their connection with forests. For example, they might conduct an opinion survey to determine the community's view on forests and forest management issues. Or they might create an interpretive trail that goes through a local forest, working with government agencies and businesses to plan the trail, and researching and creating signs or a brochure. See PLT's ***GreenSchools Investigations*** for suggestions for planning and carrying out community projects with students. [Theme 4, A. Our Connection to Our Forests]
9. Help students take a leadership role in the community



by planning and presenting a Forest Day with a nearby elementary school classroom. Have students identify forest-related topics that would help younger children understand the importance of trees and sustainably managed forests. Then assist them in designing fun and interesting activities for the elementary students, using PLT's ***Family Activities*** available at plt.org as a possible starting point. [Theme 4, B. Working for the Future of Our Forests]

REAL WORLD CONNECTIONS

Ground classroom work and discussions in real world conservation and education projects. Encourage students to deepen their understanding of forests and forest management by exploring resources such as:

[Go Inside the Carbon Vault: Why it's Critical to Know What's Beneath the Boreal Forest](#)
(Treehugger)

[Estimating Carbon Sequestration in Wetlands](#)

(Ducks Unlimited Canada – National Boreal Program)

[Project Showcase: Managing Our Forests for Carbon](#)

(American Forests)

[Why Use the SFI Logo](#)
(SFI)

FOREST LITERACY HOT TOPIC

PUBLIC HEALTH

Forests and trees supply an abundance of ecosystem services that help in creating healthy living environments and in restoring degraded ecosystems.

In addition to tangible products, forests help to support human health by purifying water; protecting drinking water resources; binding toxic substances; maintaining soil fertility; controlling erosion; and alleviating floods, droughts, and noise. Forests also help to mitigate climate change and to regulate infectious diseases. Woodlands and trees have a positive impact on air quality through deposition of pollutants to the vegetation canopy, reduction of summertime air temperatures, and decrease of ultraviolet radiation. Forests also provide recreational, cultural, spiritual, and aesthetic services.



KEY FOREST LITERACY PLAN CONCEPTS FOR PUBLIC HEALTH

Forest literacy activities may help to address questions such as:

- How do trees and forests influence the access to clean air and water
- How does interaction with trees and forest influence human physical, mental and spiritual health?

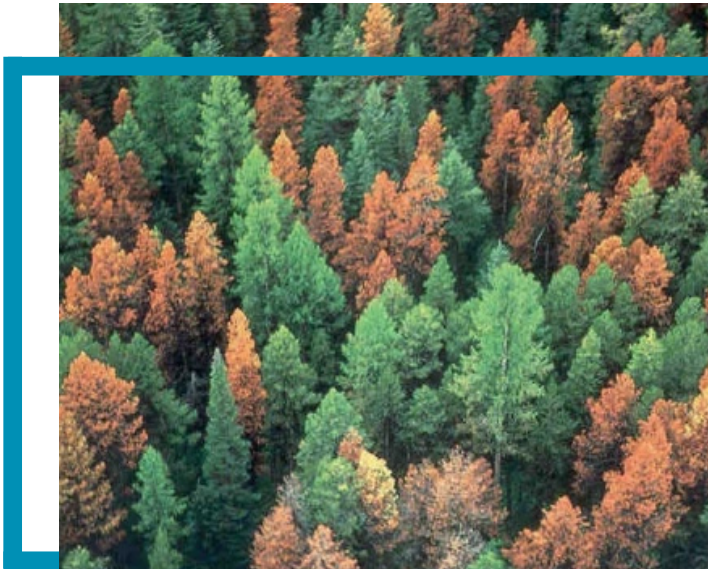
Grade Level	Concepts
K-2	Theme 2, B.6
3-5	Theme 2, A.2 Theme 2, A.4 Theme 2, B.8
6-8	Theme 2, A.5 Theme 2, B.9 Theme 3, B.5
9-12	Theme 1, B.6 Theme 2, B.10 Theme 3, C.4

FOREST LITERACY HOT TOPIC

CLIMATE CHANGE

Climate change is one of our most pressing global challenges, and sustainably managed forests are among our most important tools for addressing it.

Sustainably managed forests also produce wood products that store carbon for extended periods—often decades. Storing carbon reduces how much carbon is released into the atmosphere where it contributes to climate change. Climate change is increasing the severity and frequency of wildfires and many forested areas are now experiencing prolonged fire seasons. Climate-smart forest management standards require a number of practices that help reduce the threat of climate change, such as ensuring forests remain healthy, requiring harvested areas to be forested, and requiring practices that reduce the chances of wildfire.



KEY FOREST LITERACY PLAN CONCEPTS FOR CLIMATE CHANGE

Forest literacy activities may help to address questions such as:

- What role do forest play in the cycling of carbon?
- How can we manage forests to increase carbon storage and climate resiliency?
- How are forest products part of the solution for mitigating climate change?

Grade Level	Concepts
K-2	Theme 1, B.6
3-5	Theme 1, C.3
6-8	Theme 2, A.3 Theme 2, C.9 Theme 3, B.7
9-12	Theme 2, A.10 Theme 2, C.4

FOREST LITERACY HOT TOPIC

URBAN FORESTS

Urban forests provide key ecosystem services, like purifying water and air, that are essential to healthy human communities.

Research shows that being close to trees and green spaces is linked to improvements in physical and mental health. Urban forests can serve as easily accessible living laboratories for environmental education. Urban forests also absorb heat—helping to keep our communities cool in ways that reduce the effects of climate change. Planting trees near buildings can cut air conditioning and heating costs, which saves energy and reduces emissions linked to climate change.



KEY FOREST LITERACY PLAN CONCEPTS FOR URBAN FORESTS

Forest literacy activities may help to address questions such as:

- What and where are urban forests?
- What ecosystem services and other benefits do urban forests provide?
- How do we manage urban forests to increase the livability of our communities?

Grade Level	Concepts
K-2	Theme 1, A.6 Theme 3, A.1
3-5	Theme 2, A.6 Theme 2, B.7 Theme 2, B.8
6-8	Theme 2, A.5 Theme 2, C.10 Theme 3, B.7
9-12	Theme 3, A.2 Theme 3, C.5 Theme 3, C.8

FOREST LITERACY HOT TOPIC

GREEN JOBS

Green jobs help instill a passion for the outdoors.

Many different careers are made up of green jobs that exist in the forest, conservation, and parks sectors. These include jobs in ecosystem and wildlife management, forest management, Indigenous forest-based programs, recreation and interpretation, education, conservation and research, as well as in state and national parks. Many youth use green jobs as a springboard for a career in forestry.

KEY FOREST LITERACY PLAN CONCEPTS FOR GREEN JOBS

Forest literacy activities may help to address questions such as:

- What green jobs are there in the forest, conservation, and parks sectors?
- How do green jobs help to sustain forests?
- How do forests contribute to the growth and health of a green economy?



Grade Level	Concepts
K-2	Theme 4, B.4
3-5	Theme 2, C.2
6-8	Theme 2, C.1 Theme 2, C.5
9-12	Theme 3, B.4 Theme 3, C.6

FOREST LITERACY HOT TOPIC

WILDFIRE

Vigorous and healthy forests are more likely to withstand the effects of wildfire.

Wildland fire can have many environmental benefits, like enabling fire-adapted pinecones to release their seeds. Smaller fires can also remove excess grass, brush, and trees that can fuel larger and more severe wildfires. But many forested areas are now experiencing prolonged fire seasons as climate change increases the severity and frequency of wildfires. More than a billion acres are at risk of fire each year in the U.S., according to the U.S. Forest Service.

KEY FOREST LITERACY PLAN CONCEPTS FOR WILDFIRE

Forest literacy activities may help to address questions such as:

- What role does wildfire play in forest ecosystems?
- In what ways does climate change affect the frequency and intensity of wildfire?
- How can we manage forests to maximize the benefits and minimize the negative effects of wildfire?



Grade Level	Concepts
K-2	Theme 4, B.2
3-5	Theme 1, C.4 Theme 1, A.5
6-8	Theme 1, D.1 Theme 3, B.6
9-12	Theme 3, B.3 Theme 3, B.4

FOREST LITERACY HOT TOPIC

INDIGENOUS

CONNECTION TO LAND

Indigenous Peoples have a deep connection with forests.

Indigenous Peoples have lived in and relied upon forests since time immemorial for food, shelter, medicine, and spiritual connection. Today, many Indigenous Peoples and communities continue to live in and utilize forested areas in ways that are rooted in their time-honored values and traditions, including a deep commitment to sustainability. Many have also entered into agreements, known as treaties, with non-Indigenous governments, to share lands and resources, and to ensure that their continued relationships with forests will be protected. This makes Indigenous Peoples important partners when determining forest management objectives, practices, and outcomes.



KEY FOREST LITERACY

PLAN CONCEPTS FOR

INDIGENOUS

CONNECTION TO LAND

Forest literacy activities may help to address questions such as:

- What does it mean to be in relationship with the forest?
- What role(s) do Indigenous Peoples play in sustainably managing forests?
- In what ways does sustainable forest management affect Indigenous Peoples' rights and traditional practices?

Grade Level	Concepts
K-2	Theme 4, B.1 Theme 4, B.2
3-5	Theme 3, D.1 Theme 3, D.4 Theme 4, B.2
6-8	Theme 3, D.3 Theme 3, E.4 Theme 2, C.6
9-12	Theme 3, B.1 Theme 3, B.5

GLOSSARY OF TERMS

Abiotic: A nonliving factor or element in the environment, such as light, water, heat, rock, or gases.

Active management: Attaining desired forest objectives to enable future conditions using silvicultural operations and forest management practices.

Aquatic habitat: An area in the environment where water is the principal medium and species are adapted to aquatic conditions.

Biological diversity, Biodiversity: The variety and abundance of life forms, processes, functions, and structures of plants, animals, and other living organisms. The biodiversity of species, communities, gene pools, and ecosystems extends from local to regional to global spatial scales.

Biome: A complex of communities characterized by a distinctive type of vegetation and maintained under the particular climatic conditions of the region.

Biotic: An environmental factor related to or produced by living organisms.

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

Climate change: A change in the state of the climate that can be identified (through statistically significant data) by changes in the mean and/or variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural processes, but current climate change is being driven by persistent anthropogenic changes in the composition of the atmosphere and in land use.

Conifer: A tree that bears its seeds in a cone and is generally evergreen.

Crown: The top branches of a tree.

Deciduous: Tree that has leaves or needles that die and fall off after one growing season.

Decomposer: A plant or organism that feeds on dead material and causes its mechanical or chemical breakdown.

Ecosystem: The interacting system of a biological

community and its nonliving environment; also, the place where these interactions occur.

Ecosystem services: Components of nature that may be directly enjoyed, consumed, or used to yield human well-being.

Evapotranspiration: The process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants.

Evergreen: A tree that retains its green leaves, needles, or scales during the winter and for more than two growing seasons.

Forest: An ecosystem characterized by extensive tree cover usually consisting of stands varying in characteristics such as species, structure, composition, age class, and commonly including streams, fish, and wildlife. They are commonly managed to sustain multiple products, services and values.

Forest cover: The dominant tree species or combination of tree species present. Forests can be classified according to their cover type.

Forest health: The perceived condition of a forest based on its age, structure, composition, function, vigor, presence of unusual levels of insects or disease, and resilience to disturbance.

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

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

Forestry: The profession embracing the science, art and practice of creating, managing, using and conserving forests and associated resources for human benefit and in a sustainable manner to meet desired goals, needs and values.

Habitat: (1) A unit area of environment. (2) The place,

natural or otherwise, described by its climate, food, cover, and water, where an individual or population of organisms normally lives and develops.

Passive management: Managing a forest area by letting nature take its course.

Perennial: A plant that lives for several years, and that usually produces seeds each year after reaching maturity.

Photosynthesis: The process by which green plants manufacture simple sugars in the presence of sunlight, carbon dioxide and water.

Producer: An organism that synthesizes organic compounds from inorganic substances via photosynthesis (by green plants) or chemosynthesis (by anaerobic bacteria).

Reforestation: The reestablishment of forest cover either naturally or by seeding or planting of seedlings.

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.

Riparian zone: The area that surrounds wetlands, lakes, rivers, or streams, forming a transition zone between aquatic and upland habitats.

Silviculture: The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis.

Stand: A contiguous group of trees that are relatively uniform in age, composition, and structure, and that are growing on a similarly uniform site. The “stand” is a typical scale for forest management planning of sufficiently uniform quality.

Succession: The gradual replacement of one community by another.

Sustainable forestry: To meet the needs of the present without compromising the ability of future generations to meet their own needs by practicing a land stewardship ethic that integrates reforestation and the managing, growing, nurturing, and harvesting of trees for useful products and ecosystem services such as the conservation of soil, air and water quality, carbon, biological diversity, wildlife and aquatic habitats, recreation and aesthetics.

Timber: Trees of commercial size and quality suitable for sawing into lumber.

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

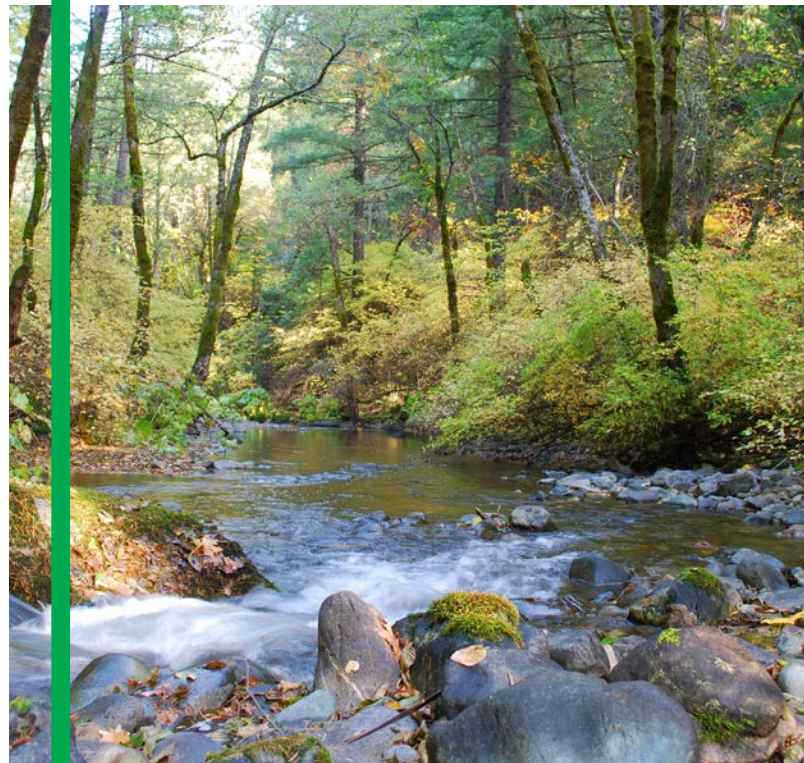
Traditional Ecological Knowledge (TEK): The knowledge base learned and shared by indigenous and local peoples over many hundreds of years through direct contact with the environment.

Tree cover: The degree to which trees dominate a given geography, often expressed as a percentage of the spatial extent (eg. “the tree cover in that urban space was nearly 40%”).

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

Urban forest: The total woodlands, groups of trees, and individual trees located in an urban area, including forests, street trees, and trees in parks and gardens.

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.



ACKNOWLEDGMENTS

This **Forest Literacy Framework** was jointly developed by PLT and PLT Canada (initiatives of SFI, Inc.) with input from the Advisory Panel below.

Project Learning Tree® (PLT) is an award-winning environmental education program designed for teachers and other educators, parents, and community leaders working with youth from preschool through grade 12. For over 40 years, PLT has provided educators with high-quality professional development, hands-on activities, and a state and local network to help teach youth about trees, forests, and the environment. For more information, visit www.plt.org.

PLT Canada fosters community interest in the benefits of environmental education and responsible management of Canada's natural resources. We are committed to using the outdoors to engage students in learning about the world around them—in urban, suburban, rural, and Indigenous communities—and using trees and forests

as windows on the world to inspire action. PLT Canada has high-quality hands-on activities in both French and English to help teach youth about trees, forests, and the environment. For more information, see pltcanada.org.

PLT and PLT Canada are initiatives of the Sustainable Forestry Initiative® Inc. (SFI), a sustainability leader that stands for future forests. Through these and other initiatives, SFI supports getting youth outdoors and into nature in ways that inspire them to become environmental stewards and future forest leaders, and to introduce them to green careers. Learn more at www.forests.org.

This guide was inspired by an original Forest Literacy Plan from Oregon Forest Resource Institute.



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The panel represents a diverse mix of public and private interests, plus federal, state, and provincial, and we thank them for contributing their expertise.

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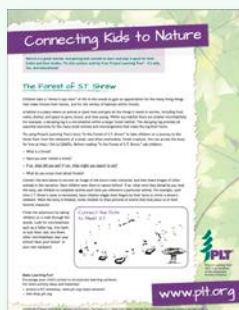
APPENDIX

NATURE IS A GREAT TEACHER!

Try these PLT family-friendly activity ideas to connect the children in your life to forests, nature, and the great outdoors.



The Closer You Look



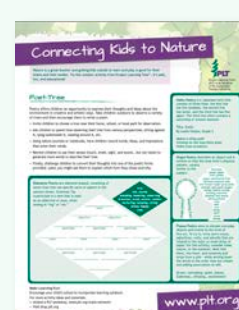
The Forest of S.T. Shrew



Adopt a Tree



Web of Life



Poet-Tree



We All Need Trees



Every Tree for Itself

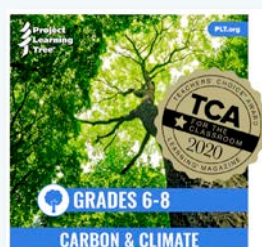
AWARD WINNING RESOURCES



Environmental Experiences for Early Childhood



Energy in Ecosystems e-unit for grades 3-5



Energy in Ecosystems e-unit for grades 6-8

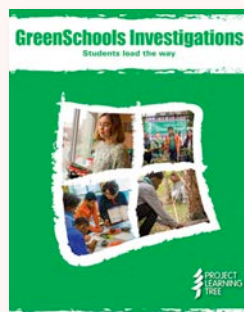
GUIDES & RESOURCES



Guide to Green Jobs in Canada



Explore Your Environment: K-8 Guide



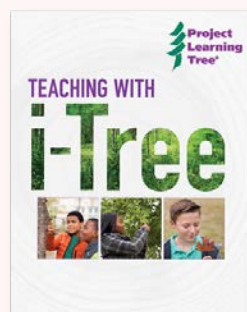
GreenSchools Investigations



Green Jobs: Exploring Forest Careers



Green Jobs Quiz



Teaching with i-Tree



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