

Sphagnum, Syrup, and Salves, oh my! Learning about Boreal Plants

Grades: 5-7

Materials:

- Teacher Backgrounder
- Non-Timber Forest Products of the Boreal: Student Reader
- Lost in the Boreal: Student Worksheet

Keywords:

- Antiseptic
- Diuretic
- Ecosystem
- Edible
- Ethno-botany
- Famine
- Harvest
- Medicinal properties
- Non-timber forest product
- Sustainable
- Sustainable development
- Traditional Ecological Knowledge (TEK)



Labrador Tea (Ledum groenlandicum)
Photo: The Department of Fisheries and Oceans Canada

Objective:

Canada's Northern Boreal forest is one of the world's largest in-tact forest ecosystems. In fact, British Columbia's Boreal Forest is larger than the United Kingdom! Like all forests, the Boreal stores carbon, provides homes for millions of species, and contains a wide variety of living things that have been used by Aboriginal people and European immigrants for income, food, medicine, and social, cultural and spiritual purposes.

In this activity, students investigate and discuss Boreal **non-timber forest products (NTFPs)** and the economic, social, spiritual and historical significance of boreal forests.

Non-timber forest products (NTFPs): all of the plants and mushrooms in the forest other than timber that have cultural, spiritual, recreational, commercial and subsistence uses. Examples include meat (fish and game), berries, wild eggs, bark, plants for medicine, dye and handicrafts.

Procedure:

1. Read the *Teacher Backgrounder* provided with this lesson plan. This information is meant to supplement a teacher's understanding of our Boreal Forest, non-timber forest products, sustainable development, and traditional ecological knowledge (TEK).
2. As a class, brainstorm non-timber forest products. Consider the categories of food, medicine, transportation, art supplies, dyes, and natural species used for social and spiritual needs. Ask students to think about how these various species are used within their own family and culture.

Traditional Ecological Knowledge (TEK): The wisdom, knowledge, and teachings of long-standing traditions and practices of indigenous or local communities. In many cases TEK has been orally passed for generations from person to person.

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3. Read the following from the *Lost in the Boreal: Student Worksheet*:

Unbelievable but true! While camping with a few friends in the boreal forest, you have become lost. Fortunately it is summer and you are surrounded by the natural resources of the forest. But which species are useful and for what? More good luck: one of you has thought to pack a copy of *Our Life, Medicine Path: Non-Timber Forest Products of the Boreal*. Now you have the information you need to care for yourselves until you are rescued!

Ethno-botany: The relationship between plants and cultures; how plants have been or are being used, managed, and perceived in human societies.

4. Divide students into groups and give each group one or two copies of the *Non-Timber Forest Products of the Boreal: Student Reader*. Provide each student with a copy of the *Lost in the Boreal: Student Worksheet*. Have groups read through the Student Reader and answer the questions on their student worksheets.

Evaluation:

Ask students to share their answers with the rest of the class. For a more formal evaluation, mark for accuracy each *Lost in the Boreal: Student Worksheet*.

Extension Activity (drama):

In small groups, have students research a Canadian non-timber forest product of their choice. In the style of an infomercial or a shopping television channel, have them present their product. Ask them to consider:

- Where it grows naturally
- How to identify the product
- How it is harvested
- What it can be used for (list at least 3 products) and its benefits
- Things to be cautious of when harvesting/using this product
- Cultural uses or spiritual connotations

Extension (research project):

Explain the term Sustainable Development and discuss the *Three Pillars of Sustainability* from the *Teacher Backgrounder*.

Sustainable: Capable to keep something going in the long term.

Sustainable development: when referring to forestry, preserves biodiversity, conserves the productivity of forest ecosystems, and maintains the social and economical benefits of forests, while considering people's values and needs in forestry decision-making (Sustainable Forest Development Act, Government of Quebec, March 2013).

Ask students to write an essay answering the following questions:

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- What did you learn about the way the boreal forests can meet physical, economic, social, and cultural needs? What surprised you or interested you the most?
- Explain some sustainable harvesting practices of NTFPs. How do these practices impact sustainable forest management?

Fine Arts Extension:

Choosing an art technique of choice (collage, watercolour, etc), have students make a poster or small guidebook of non-timber resources in the Boreal. Be sure to include information on how to harvest these products in a sustainable manner (see *Teacher Backgrounder* or *Our Life, Medicine Path*, found at:

http://www.taigarescue.org/_v3/files/pdf/102.pdf).

Other Extensions Activities:

- Have students put together a cookbook using NTFPs from their area.
- Students can research recipes for making antiseptics from blueberry leaves or pine. Using a well sourced recipe, try out some in class.
- Ask students to compare the effectiveness of insect repellent made from the juice of Labrador tea leaves against commercial repellents.

Answer Key: *Lost in the Boreal*

1. Bearberry
2. Lodgepole pine
3. Bearberries and Blueberries
4. Paper birch; birch page
5. Sphagnum peat moss
6. Mushroom
7. a. Labrador tea
 b. long, slender leaves
8. Bearberry
9. Sphagnum peat moss
10. a. Lodgepole pine pitch
 b. It was boiled, mixed with animal fat, and used as a poultice
11. Labrador tea

Thank you to the **Taiga Rescue Network** for the use of their valuable resource, *Our Life, Medicine Path: Non-Timber Forest Products of the Boreal*, and the **Canadian Forestry Association's** Teaching Kit *The Boreal Forest: A Global Legacy*, from which this lesson plan was adapted. To view the documents in their original forms, please visit: http://www.taigarescue.org/_v3/files/pdf/102.pdf or http://www.hww.ca/pdf/Boreal_Kit_EN.pdf

Student Reader

Key Words

Antiseptic: A substance that inhibits the growth and reproduction of disease-causing micro-organisms.

Diuretic: A substance or drug that tends to increase urination.

Ecosystem: A community of organisms together with their physical environment, viewed as a system of interacting and interdependent relationships.

Edible: Safe to be eaten as food.

Ethno-botany: The relationship between plants and cultures; how plants have been or are being used, managed, and perceived in human societies.

Famine: Most commonly a shortage of food accompanied by malnutrition, starvation, and increased mortality.

Harvest: 1(*noun*): a crop or yield of one growing season; 2(*verb*): to catch, take, or remove for use.

Medicinal properties: Having medical value; maintaining or restoring human health.

Non-timber forest product: all of the plants and mushrooms in the forest other than timber that have cultural, spiritual, recreational, commercial and subsistence uses. Examples include meat (fish and game), berries, wild eggs, bark, plants for medicine, dye and handicrafts.

Sustainable: Capable to keep something going in the long term.

Sustainable Development: In a forestry context, management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things, while providing environmental, economic, social and cultural opportunities for present and future generations.

Traditional Ecological Knowledge (TEK): The wisdom, knowledge, and teachings of long-standing traditions and practices of indigenous or local communities. In many cases has been orally passed for generations from person to person.

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Species Backgrounder:

Used with permission from the **Taiga Rescue Network's** *Our Life, Medicine Path: Non-Timber Forest Products of the Boreal*. To view the document in its original form, please visit: <http://www.taigarescue.org/v3/files/pdf/102.pdf>

Bearberry or Kinnickinnic (*Arctostaphylos uva-ursi*)

- Small evergreen shrub, indigenous to all major Boreal regions (northern North America, Scandinavia and Russia)
- Traditional medicine and food source for many boreal communities
- Good source of carbohydrates (berries), added to meats and stews
- Tea steeped from dried leaves treats bladder and kidney ailments
- Salve/ointment made from leaves treats rashes and other skin conditions
- **Use with caution: not by pregnant women, children, or patients with kidney disease**



Photo: Matt Lavin

Birch (*Betula sp.*)

- Main species are Paper Birch (across North America) and Silver Birch/European White Birch (northern Europe to parts of Asia Minor)
- Birch sap made into a medicinal tonic and sweet syrup (much like maple syrup)
- Bark can be removed in strips and made into water containers and woven baskets
- North America's indigenous peoples have long used birch bark to build canoes and wigwams (temporary shelters). The Cree people are known for their *birch bark biting art*: elaborate designs bitten into very thin layers of birch bark.

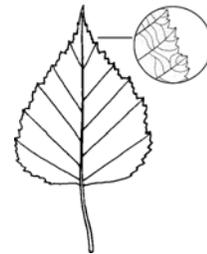


Photo: Natural Resources Canada

Blueberry/Bilberry/Blaeberry (*Vaccinium sp.*)

- Members of *Vaccinium* species are found throughout boreal forests
- Yummy and edible!
- Medicinal properties include reduction of blood sugar - used to aid in the treatment of diabetes.
- Tea made from the leaves is **antiseptic** and **diuretic** used to treat urinary tract infections
- Fruit is a mild laxative and treats varicose veins
- Fruit and leaves used to make inks and dyes



Photo: Hagerty Ryan, U.S. Fish and Wildlife Service

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Labrador Tea (*Ledum groenlandicum*)

- Member of the heath/heather family
- Found in wetlands throughout boreal forests
- Leaves make tasty tea rich in vitamin C
- Tea also used externally to treat a skin problems and internally to treat headaches, asthma, stomach aches and kidney problems
- Ointment made from dried leaves used to treat burns and scalds
- Recognized as an insecticide - leaves can be made into a strong tincture to kill mosquitoes, lice and fleas



Photo: The Department of Fisheries and Oceans Canada

Pine (*Pinus sp.*)

- Many pine species are found throughout boreal forests
- Turpentine (a type of varnish) can be obtained from components of all pine species, although trees from warmer areas generally produce higher amounts
- Pitch (taken from resins) can be used for waterproofing and as a wood preservative
- First Nations peoples in British Columbia used the wood from lodgepole pine for poles for lodges
- Pitch of the lodgepole was used as a **poultice** (spread on a cloth over the skin) for rheumatic pain and all kinds of aches in muscles and joints- it was boiled & mixed with animal fat
- **Consumption without full knowledge of possible side effects is not recommended** (Visit: <http://www.for.gov.bc.ca/hfd/library/documents/treebook/index.htm> for complete information)
 - Russia's dwarf Siberian pine makes edible pine nuts
 - Inner bark from the Scots pine (northern Europe/ Russian Boreal) has been ground up and used to make bread in times of famine
 - In the spring long ribbons or "noodles" of the sweet succulent inner bark (cambium layer) was stripped off and eaten fresh sometimes with sugar, or stored



Photo: Natural Resources Canada

Sphagnum Moss (*Sphagnum sp.*)

- The entire plant is **antiseptic**
- Tar extracted from the decaying moss is valuable as treatment for eczema and psoriasis
- Thoroughly dried sphagnum can absorb 16 times its weight of water
- Excellent dressing for wounds (said to have saved thousands of lives during World War I)
- Used as potting material and soil conditioner



Photo: Karora, Wikimedia Commons

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- Potential as a non-timber forest product should be limited to small-scale development : over harvesting is leading to the destruction of many natural bogs, a delicate ecosystem that takes centuries to develop

Lost in the Boreal: Student Worksheet

Used with permission from the Canadian Forestry Association's Teaching Kit

Name: _____

Date: _____

Unbelievable but true! While camping with a few friends in the boreal forest, you have become lost. Fortunately it is summer and you are surrounded by the natural resources of the forest. But which species are useful and for what? More good luck: one of you has thought to pack a copy of *Our Life, Medicine Path: Non-Timber Forest Products of the Boreal*. Now you have the information you need to care for yourselves until you are rescued!

1. It's very hot and you have been hiking through the forest. You and your friends have developed some nasty rashes. What is the name of the boreal bush whose leaves can be used to make a salve that will soothe your rash?

2. Supplies are running low and everyone is getting hungry. You have managed to snare a few snowshoe hare and voles, which you'd like to eat on sandwiches. List the species of tree with inner bark that can be ground into flour for making bread.

3. One of your friends (not you, of course) has developed hemorrhoids. What species can help him seek relief, and what part of the plant is needed?

4. After having your backpacks stolen by a wild animal you decide to make baskets for gathering food and medicinal plants. What part of which species can be used to make baskets? (Hint: You can also make temporary shelters using this material!)

5. Ouch! You have cut yourself on a rock. Which species used by soldiers in World War I would you pick to dress your wound?

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6. If you were in the Arkhangelsk region of Russia's boreal, what other common food besides berries could you eat? Is this food also available in the Canadian boreal forest?

7. a) The bugs are driving you crazy! a) Which plant carries leaves that can be used to create a tincture for killing mosquitoes, lice and fleas?

b) Describe the plant for your friends so that they can recognize it.

8. One of your friends has kidney disease. Which plant should this person steer clear of?

9. Someone in the group has had a flare-up of a skin condition known as eczema. What plant do you require and what must you do with it to procure a treatment?

10. Your group has been in the bush so long that you are developing scurvy (a softening of the gums and cartilage due to Vitamin C deficiency). To solve your problem, which leaves should you harvest to make herbal tea?

Teacher Backgrounder

Non-Timber Forest Products

Forestry and forest management does not just mean timber harvesting as many people may believe. **Non-timber forest products (NTFPs)** is a term given to commodities that come from the forest that do not have timber value. Examples of NTFPs include:

- **Meat (fish and game)**
- **Berries**
- **Plants for medicine, tools, dyes and handicrafts**
- **Wild eggs**
- **Mushrooms**
- **Bark**

For generations, forest-dependent peoples have used NTFPs for food, medicine, tools, and handicrafts. The variety and abundance of NTFPs contribute to sustainable forest management and help strengthen local economies.

Timber or Wood?

Non-timber forest products can include things made from wood. **Wood** is a hard structural tissue found on trees and woody plants. **Timber** is often used to explain wood in the stages from felling (**cutting**) to final product. It is similar to the term **lumber**. There are many ways to harvest wood from a tree and because not all of them require cutting the entire tree down, wooden products like boxes or artwork are usually considered non-timber.

Sustainable Development in Forestry (Sustainable Forest Management)

Sustainable development, when referring to forestry, preserves biodiversity, conserves the productivity of forest ecosystems, and maintains the social and economical benefits of forests, while considering people's values and needs in forestry decision-making (Sustainable Forest Development Act, Government of Quebec, March 2013).

Achieving Sustainable Development

To better understand how important NTFPs are for sustainable forest management, we can consider the *pillars of sustainability*:

1. **Ecological Sustainability:** NTFPs play a significant role in conserving and restoring ecological diversity and recognizing the value of these products can influence ecosystem protection. Some forest management and practices are beginning to place a greater emphasis on conserving and managing the whole ecosystem, including non-timber species.
2. **Social/Cultural Sustainability:** Harvesting non-timber forest products can be a recreational, cultural, economic, educational, and physically healthy activity. .

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NTFPs are a way to share and preserve **traditional ecological knowledge** in aboriginal and forest-dwelling communities where knowledge has been lost. Some products are used in traditional healing or to communicate with the spirit world.

3. **Economic Sustainability:** NTFPs contribute to both the formal (included in a country's gross national products) and informal (not taxed or government-regulated) economies. Examples of NTFPs in the formal economy: berry jams sold by a business to the public/grocery stores. Examples of NTFPs in the informal sector: berry jams sold by an individual at a market.

The Boreal's indigenous and forest-dwelling communities have a long history with NTFPs. Regions where boreal forests exist, such as Russia, Canada, Scandinavia, and Scotland all use non-timber forest products as a sustainable, viable, and potentially profitable alternative to industrial timber harvesting. Please visit the Taiga Rescue Network for more details on other countries' historical and current use of NTFPs (website at the end of this Backgrounder).

NTFPs in Canada

Although a major source of income, NTFPs in Canada are far more than maple syrup. Non-timber forest products like British Columbia's mushroom trade and birch syrup, contribute hundreds of millions of dollars to the province each year (Going Wild! Teaching Guide, Sierra Club BC).

Protecting Traditional Ecological Knowledge (TEK)

A large portion of what science, forest guides, health and other organizations know about NTFPs is derived from traditional indigenous uses, and those who share their ethno-botanical knowledge often negotiate complicated agreements to ensure they receive a fair share of the economic benefits gained by what they share. **Intellectual property rights** (similar to a copyright or patent) require one individual to act as the knowledge holder. While this is a good start, intellectual property rights should include knowledge considered collective to communities.

Developing Appropriate Harvest Methods

Follow the Taiga Rescue Network's guidelines to avoid over-harvesting:

- Don't uproot plants
- Only take a limited amount of material from each plant, leaving it with the resources necessary to survive and reproduce
- Harvest a limited number of plants or animals within a given area: **less than 10% of a species population is a standard guideline**
- Don't harvest the most robust plants, as these produce the strongest and most viable offspring
- Take care not to damage the ecosystem.

Remember, humans share the forest with thousands of other species who all depend on its resources for survival.

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Sources and More Information

Canadian Forestry Association: *The Boreal Forest: A Global Legacy.*
http://www.hww.ca/pdf/Boreal_Kit_EN.pdf

Sierra Club BC: Going Wild! *Teaching about Wild Products from BC's Coastal Rainforests.*
www.sierraclub.bc.ca/going-wild

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