TREE BEE TEACHER'S GUIDE

Tricks and tips to help educators incorporate
Tree Bee resources into their classroom.

Tree Bee.ca

FORESTS ONTARIO

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PURPOSE

The purpose of this guide is to:

- Inspire teachers to bring trees and forests into your classroom through a fun and interactive learning experience,
- Provide teachers with Tree Bee learning objectives,
- Provide teachers with Ontario curriculum links, and
- Address frequently asked questions.

ABOUT US

Tree Bee

Tree Bee is an education tool that encourages students to learn about tree identification and general forest knowledge. Tree Bee is a great opportunity to get kids excited about trees, forests and nature.

www.treebee.ca

Forests Ontario

Forests Ontario is dedicated to the renewal and stewardship of Ontario's forests. Forests Ontario is the voice for Ontario's forests. We are a provincial resource and trusted authority for those seeking to invest in the future of our forests - through donations, sponsorship, volunteerism, tree planting, community awareness events and forest management.

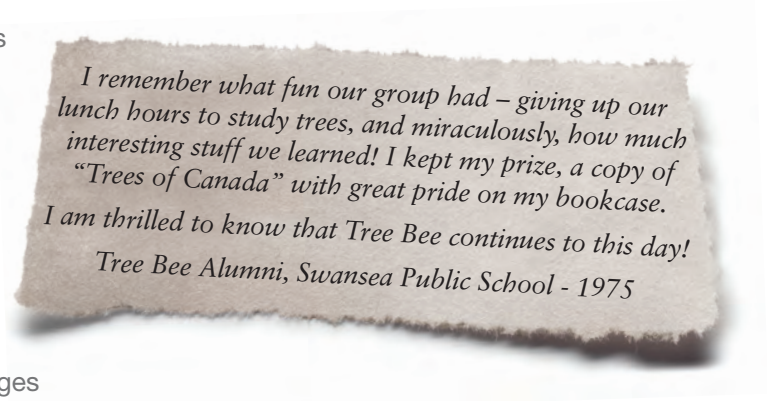
www.forestsontario.ca

TREE BEE TEACHER'S GUIDE

What is Tree Bee?

TD Tree Bee introduces communities to the trees in their own backyards Through online resources and activities, schools, families and forest enthusiasts are encouraged to get outside and explore.

Through Tree Bee, Forests Ontario provides educators with teaching resources including factsheets, lesson plans, tree identification drills, that can be used throughout the year to connect students with nature and foster a meaningful and lasting connection to our forests.



Where there is community support, Tree Bee can also feature a friendly competition during which students work collaboratively to identify tree species using images of prominent features such as leaves, bark, buds and fruit. Additionally, teams are challenged to answer a series of multiple choice questions related to forests and forest management.

Learning Objectives

Tree Bee is an engaging, interdisciplinary program which capitalizes on children's inherent fascination with nature. The key learning objectives of Tree Bee are:

1. To increase students' awareness of forest management and forest ecosystems
2. To increase students' knowledge of, and ability to, identify common tree species
3. To highlight the historical and current importance of forestry to Canada's economy
4. To develop students' understanding of the ecological goods and services provided by forests
5. To foster an appreciation for local and national green spaces
6. To engage students in cooperative learning opportunities and develop teamwork skills

Study Tip:

Have your students, independently or as a group, select a tree or forest fact which interests them to research. Students can create a report, design a poster or prepare a creative presentation on their topic to share with the class.

Ontario Curriculum Links

Tree Bee is an interdisciplinary program that links to the following grade 4, 5 and 6 Ontario curriculums.

CURRICULUM	YEAR	GRADE	OVERALL EXPECTATIONS	SPECIFIC EXPECTATIONS
Social Studies	2013	4	*People and Environments: Political and Physical Regions of Canada* B1. Application: assess some key ways in which industrial development and the natural environment affect each other in two or more political and/or physical regions of Canada B3. Understanding Context: Regions in Canada	B1.1 Analyse some of the general ways in which the natural environment of regions in Canada has affected the development of industry B1.3 Describe some key actions taken by both industries and citizens to address the need for more sustainable use of land and resources B3.1 Identify various physical regions in Canada and describe their location and some of the major ways they are distinct from and similar to each other
Science & Technology	2007	5	*Understanding Earth & Space Systems: Conservation of Energy and Resources* 1. Analyze the immediate and long-term effects of energy and resource use on society and the environment, and evaluate options for conserving energy and resources 3. Demonstrate an understanding of the various forms and sources of energy and the ways in which energy can be transformed and conserved	3.2 Identify renewable and non-renewable sources of energy 3.3 Describe how energy is stored and transformed in a given device or system

Every year at my own school, students who are no longer eligible to participate because they are in grade 7, ask if they can help coach and they come back to help the team prepare for the next competition.

Tree Bee Coach, St Monica Catholic School - 2013

Ontario Curriculum Links

CURRICULUM	YEAR	GRADE	OVERALL EXPECTATIONS	SPECIFIC EXPECTATIONS
Science & Technology	2007	6	*Understanding Life Systems Biodiversity* 2. Investigate the characteristic of living things, and classify diverse organisms according to specific characteristics	1.2 Assess the benefits that human societies derive from biodiversity and the problems that occur when biodiversity is diminished 2.3 Use scientific inquiry/research skills to compare the characteristics of organisms within the plant or animal kingdoms
Science & Technology	2007	6	3. Demonstrate an understanding of biodiversity, its contributions to the stability of natural systems, and its benefits to humans	3.1 Identify and describe the distinguishing characteristics of different groups of plants and animals and use these characteristics to further classify various kinds of plants and animals 3.2 Demonstrate an understanding of biodiversity as the variety of life on earth, including variety within each species of plant and animal, among species of plants and animals in communities, and among communities and the physical landscape that supports them 3.6 Identify every day products that come from a diversity of organisms

Study Tip:

Take a hike in a local park or your school yard!

Getting outdoors and interacting with nature is a lasting way to teach tree identification to students.

Engage students through interactive activities like a tree scavenger hunt or hand out tree keys and teach students to use them.

Tree Bee In Your Classroom

You decide how much, or how little, class time to dedicate to Tree Bee. Some teachers run Tree Bee as an extracurricular club or team while others choose to make regular use of Tree Bee resources in their classroom.

Resources and study materials are currently available on the Tree Bee site (www.treebee.ca). New resources are uploaded to the website as they are completed, so check back often. In addition to Tree Bee resources, the following Focus on Forests lesson plans, activity sheets and factsheets are strongly linked to Tree Bee learning objectives:

- Canada's Forest Distribution (Lesson Plan)
- Construct a Tree (Lesson Plan)
- Let's Look at Trees (Lesson Plan)
- Not All Plants Are Created Equal (Lesson Plan)
- Seed Sort (Lesson Plan)
- Tree Bee Pocket Guide (Activity)
- Your Natural History (Lesson Plan)
- Weird Wood Products (Lesson Plan)

Any of the above resources can be found in Appendix A, or accessed through the Focus on Forests website free of charge to registered users. Visit www.forestsontario.ca to log in or create a user account.

Study Tip:

Flash cards are an effective study tool. Prepare a set for your students using images found online or have students make their own as an assignment.

Tree Bee Competition

The Tree Bee Competition is an optional program extension offered where community support exists. Schools and community groups are encouraged to start their own local competitions.

To find out more about organzing a Tree Bee competitions, please contact info@forestsontario.ca or call 1.877.646.1193.

Frequently Asked Questions

1 *What are the costs to participate in Tree Bee?*

There is no cost to access Tree Bee or Focus on Forests teaching resources for use by educators or community groups; however, fees associated with participation in regional events are at the discretion of local organizers. Please consider making a donation to Forests Ontario in support of our education programs.

2 *What is the format of a Tree Bee competition?*

The competition format will vary by location but generally speaking participants are divided into teams of 2 to 3 students, however these numbers may vary based on the competition. Competition testing consists of two components: 1) Tree identification and 2) Forest Literacy.

a) Tree identification

Teams are challenged to identify a number of trees using only images or samples of prominent features such as bark, buds, fruit, leaves or the tree silhouette. The number of trees selected is chosen by the competition organizer. Students are given a limited amount of time to select the corresponding tree species from a long list and match the slide number to the correct species.

b) Forest Literacy Quiz

Following the tree ID quiz, students have 15 minutes (or another amount of time chosen by the community organizer) to complete a multiple choice test focused on forest literacy. Again, the number of questions on the test is at the discretion of the local organizers.

Marking of tests and the announcement of the winning teams may take place following testing or at a later time.

3 *What are students tested on at a Tree Bee competition?*

Students will be tested on tree identification skills and forest literacy. Study materials, including a bank of possible multiple choice questions, are all accessible through the Tree Bee website. The tree identification portion will focus on common native and introduced Canadian tree species.

4 *How much preparation is required to attend a competition?*

There is no minimum preparation time required to participate, however students find the experience more rewarding when they can actively participate in the test. The structure of running Tree Bee as an extracurricular activity or club is particularly successful in preparing students. In these cases, teams tend to meet a minimum of once per week leading up to the competition.

5 *How can I prepare my students to participate in a Tree Bee competition?*

It is encouraged that you speak with your local Tree Bee organizer to confirm what tree species students may be asked to identify. A bank of Forest Literacy questions is available through the Tree Bee website for preparation.

Why Tree Bee?

Simply put, because kids love trees! Tree Bee resources draw on students' inherent fascination with nature and foster a sense of stewardship in participants that, as we have often heard from program alumni, continues into adulthood. Additionally Tree Bee resources enable educators without expertise in forests or forest management to weave important environmental and economic concepts into their classroom. Forests and forestry are an important aspect of the Canadian economy, history and identity which should be reflected in classrooms across the country.

My years in Tree Bee were most definitely great fun, but I also learned a great deal. Besides learning about tree identification and forestry education I learned what it felt like to be confident. Being a member of the [Tree Bee] club helped me to grow out of my shy shell and discover a "sport" at which I thrived.

Tree Bee Alumni, St Monica Catholic School - 2005

Bring Forests into Your Classroom

Forests Ontario is a registered, non-profit organization committed to the re-greening of Ontario through forest restoration efforts. Our education and awareness programs enable educators to bring forestry into their classrooms and to create stewards to protect our forests for the future. Our two leading education programs are Focus on Forests and the Ontario Envirothon – read more to find out if they are a good fit for you and your students.

Focus on Forests is Canada's leading forest education program that engages youth and educators in learning more about our forests. We achieve this goal through the development free curriculum-linked resources and videos, the delivery of immersive programs and outreach activities. Printed resources are available in French and English for grades K-12. Visit www.focusonforests.ca to create a free Focus on Forests user account and access our resources!

The **Ontario Envirothon** is a unique program for students in grades 9- 12 that encourages participants to learn about the natural world through direct experiences in the outdoors. Working in teams of 5, students participate in workshops and tests and are mentored by professionals from the natural resources sector. The objective of the Ontario Envirothon goes beyond learning about the environment, and shows students how to make positive changes and lead by example within their own communities. For more information visit www.ontarioenvirothon.ca.

Tree Bee Partners

Forests Ontario would like to thank our Tree Bee partners whose generous support enabled us to develop the Tree Bee website and associated online resources:

York Region

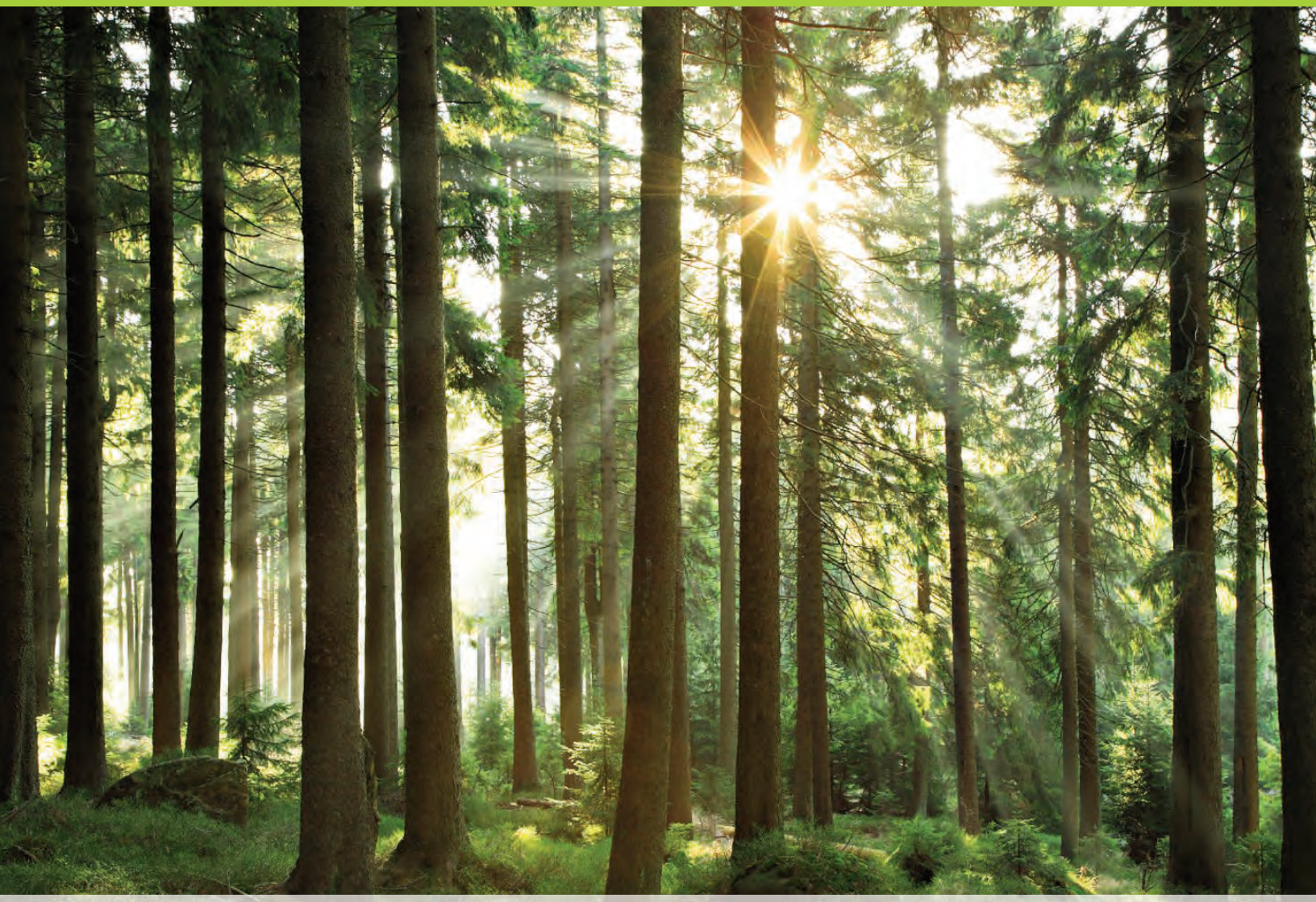
TD

Not All Plants are Created Equal

Nº. 2

PRIMARY/JUNIOR

Science | English/Language Arts | Fine Arts



LESSON SUMMARY

To give students the opportunity to discover that trees are specialized plants by observing and comparing different trees and familiarizing students with the characteristics of trees in order to assist with tree identification.

FORESTS ONTARIO

Focus on Forests

Activity Information

Estimated Duration: 2-3 hours if all sections are covered

Materials: Materials will vary for each activity, paper, pencil, activity sheets, tree identification books, 2 –m long pieces of yarn in 10 different colours, black crayons, modeling clay, construction paper, clear candle wax, poster paint.

Setting: Indoors/Outdoors

Key Vocabulary: Woody, and non-woody plants, bark, knot, crown, roots.

Teacher Background

Plants are living things with no means of locomotion and usually no means of digestion. They live by using organic and inorganic materials from their environment to make food. They may be woody or non-woody, perennial or annual. Examples of non-woody plants are ferns, bunchberry and dandelions. Trees are largely woody perennial plants anchored by roots. They manufacture their own food.

ACTIVITY

Activity #1

Step 1 Choose two distinct outdoor areas containing a variety of trees and small, non-woody plants. Divide the class into pairs. Separate the partners, and send on the first designated are, the other to the second area.

Step 2 Have each student choose one tree and one non-woody plant on the forest floor. Observe both closely. Ask them to show how the tree and plant are similar and how they are different. If done in springtime, take special note of any tree flowers that are in bloom. Compare any wild flowers found on the forest floor to the tree flowers. So they have similar parts? Record observations on the activity sheet through sketches and/or detailed written descriptions.

Step 3 Regroup and share observations. Make note of the similarities and differences between non-woody plants and trees. Create a summary chart to show comparisons.

Step 4 Have partners switch areas. Using each other's notes, see if they can locate the plants studied. Were any details missed that could have helped identify the chosen plants?

Step 5 Regroup and discuss the question. Are trees plants?

Activity #2

Step 1 Take your students to a woodlot or forest. Organize them into groups of three to five and give each group a 2m-piece of coloured yarn. Have them search for the tree with the roughest bark. When they've found this tree, have them tie their yarn around it.

Step 2 Have 10 different colours of yarn and repeat this step for each of the following tree characteristics:

- The tallest tree
- Shortest tree
- Tree with the lowest/highest branches
- Most/least branches
- Smoothest bark
- Thickest trunk
- Thinnest trunk
- Biggest bump 9burl) on the trunk
- Straightest trunk

Step 3 When finished, regroup and take the whole class to examine the various trees with yarn. Have the class choose one tree out of each category that best represents the chosen characteristic.

Activity #3

Step 1 Take your students on a bark walk. Ask them to find the tree with the most interesting bark. Then have them find the youngest tree and the oldest tree and examine the bark. Do the cracks in the bark run up and down or sideways? Are they long or short ridges? Record as many words as possible to describe the bark of each tree (texture, colour). Build a list of descriptive words and use the vocabulary to write poems (e.g. describing the tree with the most interesting bark or contrasting the old and young trees). Alternatively, try one of these other ways to investigate the characteristics of bark.

Step 2 Bark rubbing quilt: Provide students with paper and crayons. Have them select a tree and make a rubbing of the bark. Either tape the rubbings together to form a paper quilt (use construction paper to form a border), or use them separately to decorate the classroom walls.

Step 3 Bark patterns on modelling clay: Rub bark with colourless candle wax. Press modelling clay into the bark for a few seconds, then carefully remove it. Mould the patterned clay into a small dish and let it dry for one week. Have another group take the bark patterns in clay and try to find the tree it came from. Name the tree species.

Step 4 Wax rubbings: Place heavy paper against the tree bark. Rub the paper with colourless candle wax. Put the paper on a flat surface and brush over the rubbing with poster paint to create a negative picture of the bark pattern.

Step 5 Discuss Nicknames and how they are used: Have each student give a tree a nickname reflecting the characteristics of the bark. Repeat this with several different trees. Some examples of nicknames might be: "elephant tree" (American beech), "cornflake tree" (black cherry) or "shaggy bark" (shagbark hickory).

Notes

Identifying Trees by their Bark

Tree bark can be differentiated according to colour, texture, hardness and bark patterns. Probably the easiest tree to identify by its bark is the white birch. The creamy white bark peels easily into large sheets, revealing the pinkish-orange inner bark underneath. Sugar maples have dark grey bark that forms long, irregular vertical ridges (called fissures).

Beech trees have thin, smooth bluish-grey bark. White oak bark is pale grey and rather scaly. White ash bark has a distinctive diamond-shaped pattern. Evergreen bark is full of resin, a substance that sticks to hands and clothing. The bark of most evergreens changes colour and thickens as the tree ages. Young eastern white pine has thin smooth bark, often greyish-green in colour. As the tree matures, the bark becomes a dark greyish-brown and develops long fissures.

Identifying Trees by their Twigs and Buds

During the winter, twigs and buds can be used to identify trees. As with the leaves, it is important to notice how the buds are arranged on the twig (opposite, alternate, or whorled). Note also the size, colour, stickiness and hairiness of the buds.

Identifying Trees by their Silhouettes or Shapes

General shape or outline of a tree may also be used to differentiate between the tree species. Pine trees generally have branches at right angles to their trunks. In sheltered areas, their overall shape is oval. This shape can be contorted by the prevailing winds, often giving a bent and sculpted look (this is especially noticeable in the white pine). The shape of a balsam fir tree, however, is almost symmetrical. Firs have branches that tend to bend downward and tapered trunks that give an overall steeple appearance to the silhouette.

The silhouettes of deciduous trees can be equally distinctive in summer or winter. Weeping willows have drooping branches. In direct contrast are the poplars with their tall, slim outline. Oaks tend to have short sturdy trunks with a few large branches. Maples also have few large branches but have larger spreading limbs that support wide, full crowns.

Extensions

Back in the classroom, have students create tree awards (certificates, plaques. Ribbons) for each of the categories (e.g. Honorary Certificate Awarded to the Tree with the Smoothest Bark – The American Beech or Gold Medal Awarded to the Tree with the Softest Needles - The White Pine).

Encourage students to generate their own lists of tree characteristics and use them as outlined in this activity. Notice which characteristics can be used to identify certain species.

Write a story about one of the trees describing how it got its nickname.

The Tree Detective Game:

Advance Preparation: So to the area that you are going to take the students to and do bark rubbings for each of the different types of trees found there. Make photocopies of the rubbings (sufficient to have 1 or 2 per student). (If possible laminate them for further use.)

Discuss how police use fingerprints when searching for clues.

Explain to students that trees too have fingerprints, although not as specifically refined as those of humans.

When in the area, give students a blank piece of paper and a crayon and a clue sheet (rubbing). They then do rubbings and attempt to find the species that their rubbing came from. Once they have found a match, give them a tree identification book or identification sheets so they can identify their tree. If correct, give another clue card and repeat the procedure.

Evaluation – Back in the classroom, put out the various clue cards and number them. Have students match the numbered card with a bark type. For example, #1 – white birch, #2 – balsam fir and #3 – black cherry.

Let's Look at Trees

Nº. 6

PRIMARY

Science | Fine Arts

LESSON SUMMARY

Students will go on an outdoor adventure to compare the physical characteristics of trees, shrubs and other plants.

FORESTS ONTARIO

Focus on Forests

Focus on Forests is a program of Forests Ontario.

Activity Information

Grade Level	Primary
Estimated Duration:	One class period (for outdoor activity)
Materials:	Toilet paper rolls or paper towel rolls (optional: binoculars, magnifying glass)
Setting:	Outdoors
Key Vocabulary:	Photosynthesis, roots, stems, leaves, pistil, stamens, deciduous, coniferous, forest, canopy

Teacher Background

There are many types of plants – shrubs, trees, bushes, etc. Each one has an important role to play, either as habitat for a species, as a source of food or as a way of creating oxygen for other plants, animals and people. Trees are more important than people often give them credit for; they are much more than a decorative green plant or a place for a tree house.

Trees provide shelter for people, animals, and other plants. Trees also produce large amounts of oxygen, absorb carbon dioxide and help regulate the gases in the atmosphere. We all need oxygen and clean air to survive.

Humans breathe in oxygen (O_2). When we breathe out, carbon dioxide (CO_2) is released. Plants do the opposite. Through photosynthesis, plants produce O_2. They take in CO_2 and release O_2, cleaning the air by removing poisonous CO_2.

There are many different types of plants. If you envision a garden, you might find flowering plants, ornamental grasses, shrubs and trees. They are similar because they all use photosynthesis and have some sort of root system, but they differ in their appearance. Some trees have needles, like White pine. Some trees have leaves, such as maple and poplar. Some trees look the same all year, such as fir and pine. These are called "coniferous" trees. Others, called "deciduous" trees, are affected by the change of seasons, dropping their leaves in the fall and growing buds in the spring. The following are some basic parts of a plant:

- **Roots** anchor plants and absorb water and nutrients needed for growth.
- **Stems** carry water and nutrients from the roots to the leaves.
- **Leaves** are the food-making factories of green plants (photosynthesis). This is where CO_2 and water, in the presence of chlorophyll (the green pigment) and light energy, are changed into glucose (a type of sugar). This energy rich sugar is the source of food used by most plants.
- **Flowers** perform the reproductive function of plants. Flowers have some basic parts. The female part is the pistil. The pistil is usually located in the centre of the flower and is made up of three parts: the stigma, the style and the ovary. The stigma is the sticky knob at the top of the pistil. It is attached to the long, tube-like structure called the style. The style leads to the ovary, which contains the female egg cells called ovules. The male parts are called stamens and usually surround the pistil. The stamen is made up of two parts: the anther and the filament. The anther produces pollen, the male sperm cells. The filament holds the anther up.

  During the process of fertilization, pollen lands on the stigma, a tube grows down the style and enters the ovary. Male sperm cells travel down the tube and join with the ovule, fertilizing it. The fertilized ovule becomes the seed and the ovary becomes the fruit.

What do plants need to grow? They need air, light, water, space, correct temperature, nutrients and time.

Teacher Preparation

Find a local forested area (schoolyard, nature trail, or park) which will serve as your lesson destination. Look for one with several species of trees (deciduous, coniferous) and shrubs. If there are no trees nearby, contact a local nursery; many will lend potted coniferous or deciduous trees for educational activities.

Ask your students to bring in a toilet paper roll or paper towel roll from home. They can then decorate and design their own "Super Eye Spyer" telescopes.

ACTIVITY

Step 1 Take your students to your chosen outdoor destination. Find a suitable area to sit down around a generously sized tree that has several identifiable characteristics. Discuss the different parts of a tree:

Deciduous	**Coniferous**
Has leaves	Has needles all year around
Leaves drop in fall, grow in spring	Has cones
Often considered a hardwood	Often considered a softwood
Maple, poplar, oak	Evergreen trees, fir, pine

This is a hands-on activity. Have your students feel the bark of the tree, the needles from pine or spruce trees, the keys from maple trees, etc. If you have magnifying glasses or binoculars, have the students take a closer look at the parts of the trees.

Step 2 Once your students understand some of the characteristics of trees, move to an area where there is an example of a shrub. Ask your students how trees and shrubs grow differently. Some examples: shrubs have multiple stems, while trees have one trunk; shrubs grow out in the open, while most trees do not need as much sun; shrubs do not grow as tall as trees. Can they see anything else?

Step 3 Explain to your students that they are going to take another look at the trees. Tell them to lie on their backs and use their paper roll telescope to look into the canopy (the crowns of the trees). What do they see? Is there more than one kind of tree? What are the differences? How can you tell them apart? Are there any animals using the trees? What are the signs?

Step 4 Return to the classroom and ask each student to draw a plant that they saw during their outdoor adventure. Explain that their picture must clearly show the characteristics of either a tree or a shrub.

Evaluation

Using the illustrations of the plants drawn during the outdoor adventure, have each student label the major parts of their plant. The students can then put all the illustrations together to create a picture of a forest or wooded area.

Extensions

Ask your students to look around their yards or local communities to compare the number of trees versus shrubs. This could be done by creating a bar graph comparison. They should observe the trees and shrubs and try to determine the different types of species that depend on those trees and shrubs (e.g. are there birds, moths, bugs, squirrels, etc.? What about other plants?)

Construct A Tree

Nº. 9

PRIMARY/JUNIOR

Science | Fine Arts | Health and PE

LESSON SUMMARY

To give students the opportunity to identify the parts of a tree and demonstrate how they fit together.

FORESTS ONTARIO

Focus on Forests

Focus on Forests is a program of Forests Ontario.

Activity Information

Estimated Duration: 30 minutes

Materials: Plant part cards, masking tape

Setting: Indoors

Key Vocabulary: Germination, pressure.

Teacher Background

To make Construct-A-Tree cards, write the name of the tree part on squares or rectangles cut from construction paper. If you wish, you may illustrate them with a quick sketch. Consider adding other tree parts (e.g. flowers, buds, cones, seed).

For a class of 30, the following number of cards per tree part are required to construct a well-proportioned tree:

Roots – 3
Trunk – 3
Branches – 4
Leaves – 20

ACTIVITY

Step 1 Prepare the required number of plant-part cards for your class and tape one to the back of each student.

Step 2 When all the cards have been taped on, have students ask each other questions that can be answered only by "yes", "no" or "maybe" (e.g. Do I make food for the tree? Do I carry water up from the roots?).

Step 3 When they correctly guess the name of their tree part, have them stick their card on their front side.

Step 4 When all the tree parts have been identified, ask students to assume the role of their tree part and work together in three different groups to construct three different trees. What, if any, differences are there amongst the trees?

Step 5 Then challenge the group to work together to create one large, flat tree lying on the floor.

Step 6 Photograph the students' tree(s). Display the photo and have each student write a short description of his/her part in the experience.

Step 7 This activity could be used as an introduction to Tree Part Puzzles. Both activities combined take about one hour.

Extension

Build several trees of differing shapes, sizes and types (evergreen, deciduous). Note the similarities and differences among these trees. Build a tree as it might be observed in the various seasons.

Devise some interesting growing conditions for small groups to portray (e.g. an old cedar growing out of a small crack in a rocky ridge; a maple with fence wire wrapped tightly around it, a windswept shoreline pine, etc.). Have the other groups guess what the growing conditions might be.

Create deciduous and evergreen trees out of arts-and-crafts materials (tubes, straws, paper, modeling clay). Create trees as they appear in different seasons.

Seed Sort

Nº. 10

PRIMARY/JUNIOR

Science | Fine Arts

LESSON SUMMARY

The internal part of a seed will be observed, as will how the seed germinates.

FORESTS ONTARIO

Focus on Forests

Activity Information

Estimated Duration: N/A

Materials: Seeds, metric rulers, magnifying glasses, woolen socks or mittens, flannel blankets, small containers, masking tape.

Setting: Indoors/Outdoors

Key Vocabulary: Seeds, seed dispersal, fruit, berry, nut, cone, pod.

Teacher Background

Tree flowers produce fruit. Fruit encases seeds. Even maple keys, acorns, and pine cones are kinds of fruit.

Tree seeds are dispersed in a variety of different ways. The prickly fruit that holds the seeds of the beech tree stick onto things and are sometimes called "hitchhikers".

Red oak and black walnut, on the other hand, may bounce when they land. Eastern hemlock and red pine seeds may be referred to as "flyers" because of the lightness and ability to travel on air currents.

Black cherry and mountain ash seeds carried in the stomach and intestines of the animals that eat them. Witch hazel and locust have still another method. Their seeds are shot from the bean-like pods, as if from a slingshot, when they ripen.

Sycamore seeds fall lightly to earth like parachutes. Basswood and maple keys twirl like helicopters.

ACTIVITY

Step 1 Ask students to bring in seeds saved from fruits and vegetables at home or left over from gardening, or take your class on a seed hunt in a nearby meadow. Collect seeds using one of the following methods:

- Have students walk through the meadow wearing an old pair of big wool socks or mittens over their shoes. Remove and examine the socks or mittens. They should be covered with various types of seeds
- Gently drag an old flannel blanket over part of the meadow. Remove and examine seeds sticking to the blanket.

Step 2 Give students a small container in which they can place seeds, or wrap pieces of wide masking tape around their wrists (sticky side out so seeds will stick to it).

Step 3 Observe the various seeds. Discuss their similarities and differences.Question and discuss how each seed was dispersed.

Step 4 Have your students stand in scatter formation holding their seeds. On the count of three, have them disperse their seeds by throwing them up into the air. What happens to the seeds? Have them record distances traveled by the different seed types. Discuss findings.

Step 5 In small groups, encourage your students to devise their own classification systems and sort their seeds according to these systems. Their ideas might include sorting by size, shape, colour, texture, or dispersal method (e.g. hitchhikers, bouncers, flyers, helicopters).

Step 6 Have your students make a chart for each classification system and draw an example of each seed type.

Extension

Dissect a variety of tree fruits (e.g. maple keys, chestnuts, pine cones) in the classroom. Use a magnifying glass to examine the similarities and differences among the seeds and seed casing.

Have groups of students investigate the different ways that seeds travel and present a report to the class.

Have Junior students find one example of a seed that uses each of the following basic methods of seed dispersal:

- Hitchhiking
- Bouncing
- Flying
- Animal express
- Slingshots
- Parachutes
- Helicopters

Have students design and create their own fruit using classroom materials (e.g. a paper clip and paper strip make a great maple key).

Make tree seed crafts.

Weird Wood Products

N°. 41

PRIMARY/JUNIOR

Science | English/Language Arts | Fine Arts

LESSON SUMMARY

Students will explore the importance of plants to other living things by investigating a particular thing made from trees.

Ontario Wood

FORESTS ONTARIO

Focus on Forests

Activity Information

Estimated Duration: Two class periods (one for discussion and research; one for presentations)

Materials: Pencils, clipboards

Setting: Indoors

Key Vocabulary: Pulp, deciduous, coniferous

Teacher Background

Have you ever really thought about where certain products come from? Just sit down, look around and reflect on how something is actually made. It's not the result of a magic trick – that bookshelf or chair did not just appear. Many things originated from trees. What about the book on that bookshelf? Same thing: the pages are made from pulp, which came from a tree.

There are many products in our lives that originate from nature, whether plants or animals. Many of the medicines we take come from trees and other plants. The Rosy periwinkle flower is the source of a cancer drug; a form of aspirin comes from the willow tree. Much of the food we eat comes from plants and animals.

Teacher Preparation

Photocopy the Weird Wood Products Research Sheet – one copy per student.

ACTIVITY

Step 1 Ask your students to look closely around the classroom and identify those things that began their lives as trees (give them about one minute). Tell them to look at structures, furniture, things hanging on walls, etc. Some hints:

- Seats on chairs
- Desk tops
- Chalk board
- Cupboards, shelves
- Posters
- Pencils, rulers, books

Step 2 Once you have established that there are many things that originated as a tree, break the class into teams. Ask each team to choose a product that is made from a tree. You can make suggestions from the **Products from Canada's Trees** chart or from the **Ontario Trees and Their Uses** list below:

Ontario Trees and Their Uses

Hardwoods/Deciduous

Sugar maple	furniture to maple syrup
Red maple	furniture
Black walnut	fine furniture
Black cherry	fine furniture
Red oak	cabinets, flooring, furniture, decorative work
Beech	flooring, plywood, furniture supports
White ash	tool handles, baseball bats, hockey sticks, furniture
White birch	plywood, veneer, toys, clothes pins

Softwoods/Coniferous

Black spruce	pulp, newsprint, fine papers, kraft paper
White spruce	lumber, newsprint, fine papers, Christmas trees, kraft paper
Jack pine	pulp, newsprint, lumber
White pine	furniture, window and door framing, lumber
Red pine	telephone poles, lumber, pilings

Step 3 Explain to the teams that they will be completing a research project on their chosen product, from tree to product completion. Distribute copies of the Weird Wood Products Research Sheet for the students to use to guide their research and help them to prepare a brief presentation.

Step 4 As a class, students will discuss, compare and contrast how each of the products was created.

Evaluation

Have your students design a poster about one "weird" wood product, illustrating how this product originated from a plant and how humans depend on this particular plant.

Extensions

Have students conduct a more global investigation and look at plants in the rainforest. What kind of products and services do those forests provide? Students can learn about plants that provide medicines, as well as plants that provide other products.

Download a copy of our Weird Wood Flashcards have have students discover some of the ways they consume wood and wood by-products.

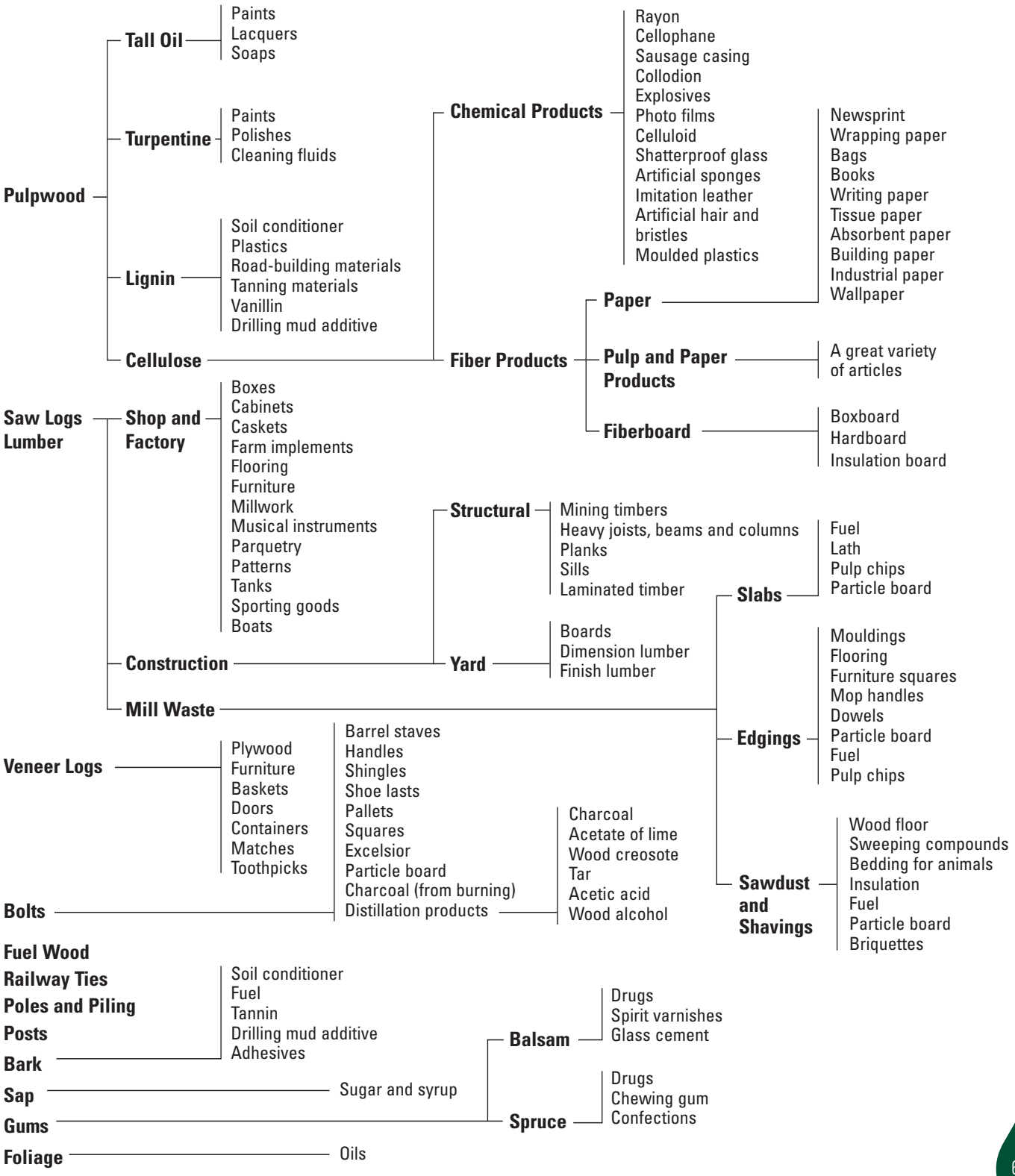
WEIRD WOOD PRODUCTS

Research Sheet

Student Names:
Our product made from trees is:
Our product is used for:
The kinds of trees that our product comes from are:
The parts of the tree used to make our product are:
Our product **looks like** / **does not look like** it comes from a tree (circle one).
How our product is made:
If there were no trees, we would suggest using the following to make our product: (If your product could not be made, please state that.)

PRODUCTS FROM CANADA'S TREES

Excerpted from A Forestry Manual for Ontario Secondary School Teachers by G.A.R. Morrison



Your Natural History

N°. 70

JUNIOR/INTERMEDIATE

English | Language Arts | Social Studies

LESSON SUMMARY

Students will research and discover the forest history of their region.

FORESTS ONTARIO

Focus on Forests

Activity Information

Estimated Duration: Variable

Setting: Indoors or Outdoor Classroom

Key Vocabulary: Pre-settlement conditions, natural history, exploration/settlement, development

Background

Our history is affected by our environment and our interaction with nature. As a relatively young country, Canada has a close connection with its wilderness and the ways in which nature has shaped us. Many First Nation communities place special value on their natural surroundings. Early European explorers overcame formidable environmental challenges to map and settle remote reaches of the country. Human activity has greatly altered the landscape, and history lessons are incomplete without analysis of the effects of nature on our history and the impact we have on nature through time.

In this lesson the students will consider the changes that have occurred in their local environment over the course of history. This lesson will create a local context to history and make the material tangible for students. Consider using the outdoor classroom as a venue to compare the state of their surroundings with historical conditions.

This lesson can be incorporated into existing history curricula involving early Canadian discovery, exploration and colonization, and/or First Nations studies.

Teacher Preparation

Research your area to find out what pre-settlement conditions were like where you live. Did your area used to be open plains, dense forest or wetlands, for example? What is the settlement history in your area? What were the human uses of the area prior to European settlement? What First Nations communities were present, and how did they use the land and interact with it? When was the area discovered by Europeans and when was it settled? Who were the early explorers/settlers in your area? What changes occurred to the natural landscape as a result of settlement and human development?

This information might be available through local, municipal or regional resources or archives, or through provincial or federal sources (e.g. Ontario Ministry of Natural Resources *Pre-Settlement Landscape and Vegetation Modeling and Mapping project*). There may be history books specific to your region which could provide this information. Local First Nations representatives might also be helpful in gathering information. Historical photos are a great resource to provide visual context.

If you live in a highly developed urban area, the contrast will be very dramatic. If your school is in a remote rural community the changes might be more subtle.

Activity

Introduction

With your class, discuss the information gathered above. This can be incorporated into an existing unit such as early European exploration and settlements or First Nations studies for example. You can use historical figures to illustrate the challenges faced by the interactions with nature and the ways these people overcame natural elements, benefited from nature or helped protect or preserve the environment.

Note: Depending on the grade level you may decide to:
1) Synthesize and present the information yourself,
2) Provide the materials to the students to read and explore on their own or,
3) Encourage them to research and collect the resources independently.

The length of the lesson will vary depending on how much work the students are required to do.

Synthesis

If available, using the outdoor classroom the students will create a comparison chart based on the information discussed above and what they see around them.

- Are there elements of their outdoor classroom that are representative of what early explorers would have seen (e.g. native trees, wildlife, etc)?
- How does the neighbourhood surrounding the school compare to pre-settlement conditions (natural vs. built environment, planted vs. natural vegetation)?

The students will complete a worksheet answering a variety of questions such as:

- What challenges would early communities have faced in your area (cold winters, food shortage, difficult shipping/trading routes, etc)
- What caused the area to change? Is there a history of resource extraction (forestry, mining) in the area that caused population increase or landscape changes? Is your community a transportation hub (ocean harbour, Great Lakes, navigable river)? Is there a lot of agriculture in your area?
- How did the pre-existing conditions affect the way your community has developed?
- How would your life be different if you were in an early colonial or pre-settled First Nations community?
- How would you change your outdoor classroom to make it more like the historical conditions?

Evaluation

The students will be evaluated on their successful synthesis of above information with well thought-out comparisons and analyses. Consider developing a series of questions that students are required to answer at the completion of the lesson (i.e. Name 2 new things you learned about the history in your schoolyard).

If students are expected to conduct independent research (option 3 above) they will be evaluated on the number and quality of sources collected.

Canada's Forest Distribution

Nº. 89

JUNIOR/INTERMEDIATE

Geography

LESSON SUMMARY

Students will learn about Canada's forest regions and unique characteristics through guided research.

FORESTS ONTARIO

Focus on Forests

Activity Information

Grades: Junior/Intermediate

Estimated duration: 2 class periods (1 for research and 1 for creating a map and discussion)

Materials:

- Computer lab if resources allow
- Encyclopaedias or other resource books
- Map of Canada
- Pencil crayons

Setting: Indoor

Key Vocabulary: Forest region, forest distribution, map, ecotones, geography, economy

Curriculum Links

Social Studies: Grade 4

B3.1 identify various physical regions in Canada (e.g., landform, vegetation, and climatic regions), and describe their location and some of the major ways in which they are distinct from and similar to each other (e.g., the location of the Western Cordillera and the Appalachian regions and the characteristics of the mountains in each region; characteristics of boreal forest and tundra regions; similarities and differences between agricultural areas in the Niagara region, the Annapolis Valley, and the western plains; climatic differences between the rainforest of Vancouver Island and arid areas such as the Canadian badlands)

Social Studies: Grade 4

3.3 identify factors (e.g., availability of water or food, amount of light, type of weather) that affect the ability of plants and animals to survive in a specific habitat.

Science: Grade 6

3.6 identify everyday products that come from a diversity of organisms (e.g., traditional pain relievers are derived from the bark of the white willow tree; tofu is made from soybeans; silk is made from silkworm cocoons; nutritional supplements, shampoos, toothpastes, and deodorants contain pollen collected by bees)

Learning Goals

1. Students will become familiar with the names and characteristics of Canada's forest regions.

2. Students will be able to indicate their location on a map and identify the forest region.

3. Students will learn about some of the many items produced from wood and wood by-products.

Teacher Background

It seems hard to believe that 10 000 years ago most of Canada was covered with ice. As the ice receded, the land that emerged was quickly colonized by plants and trees. The exceptional ability of trees to migrate and adapt to new soils and climatic conditions accounts for the transformation of the land.

Today, there are eight recognized forest regions in Canada: the **Boreal, Deciduous, Great Lakes-St. Lawrence, Acadian, Subalpine, Montane, Columbia**, and **Coast** forest regions. Each region has its own characteristic mix of tree species that thrive under certain growing conditions. The distribution and growth of tree species is heavily influenced by such factors as topography, climate, and soil conditions. Soil conditions include composition, type, depth and moisture regime. Different trees require different soil conditions. Jack pine, for example, usually grow well in dry, sandy soils, whereas tamarack prefer moist, to wet, peaty soil. Forest managers need to know this information when managing their forests as it is important in determining the right harvesting practice, and regenerating the forest afterwards.

The different forest regions have within them a variety of tree species that are harvested for different purposes. Tree species such as pine and spruce are used in the pulp industry, making paper and paper products – and even sometimes to create food flavouring! Hardwoods like maple, ash or oak provide high quality wood materials often used in flooring or cabinetry. Different woods possess different qualities which make them ideal for specific purposes.

While Canada has plenty of forest resources within its borders, access is limited in some cases due to geography. Costs to access a resource may often outweigh any benefits.

Did you know? 80% of Canada's forest land is found in the Boreal.

Teacher Preparation

Before beginning this activity, if resources allow, you will need to arrange a class period in either the computer lab or library for students to complete their individual study. If you will be working in a library it is recommended that the most relevant resources be pulled in advance.

For the second class period, provide each student with a copy of a map of Canada (see the end of this lesson plan) and pencil crayons to complete the forest region labelling task.

Activity

Day One

1. Indicate to the students that they are to find the locations of the different forest regions of Canada. Students should make note of the characteristics of each forest region as well as determine what products or materials can be made using trees from each region. Students should be made aware that they will be required to create a forest region map the next day in class.
2. Students should be given one full guided study period to collect the information needed to complete day 2 tasks.

Day Two

1. Start by getting students to discuss the different forest regions that they learned about during the guided study period. What are the names or each forest region? What characteristics or trees define them? This can be done as a class or in small groups.
2. Provide each student with a copy of Canada's Forest Distribution Map.
3. The map requires students to include a legend to denote the various forest regions. Brainstorm with the class what is contained in a legend and how they can effectively display the required information. Encourage students to create borders for each forest region.
4. Consider discussing forest "ecotones" with the class. Ecotones are the transition areas found between two types of ecosystems. Explain how forest regions are not clearly defined on the land and that there is a gradual shift of species from one region to another. However regions are used to describe the general area of a forest type.
5. After students have completed their maps review as a group. The teacher should lead the students through a discussion of the characteristics of each region as well as products that are made using common tree species. For more information about wood products you can download a copy of the Weird Wood lesson plan or Weird Wood Flashcards from www.forestsontario.ca
6. Once you have discussed wood products shift the discussion towards the economy and forests centering on the impact of human use on forests. How does the geography of Canada benefit its economy? What economic disadvantages are there with Canada's geography? Discuss the distribution of natural resources to the location of populations.
7. Students should then hand in their maps so they can be displayed in the classroom.

Red Maple

Distinguished by the red leaf stem and bright red colour in the fall

Fun Fact: Red Maple sap is about half as sweet as Sugar Maple sap, but can still be used to make syrup

Red Oak

Leaves have sharp lobes that are deeply notched; the tree provides a lot of shade

Fun Fact: The bitter acorns, when consumed in large quantities, can be toxic

White Ash

Compound leaf with seven to nine leaflets making up one leaf

Fun Fact: The strong wood is commonly used for baseball bats

White Pine

Needles are arranged in bundles of five—think of the number of letters in the word 'WHITE'

Fun Fact: Ontario's provincial tree

Black Spruce

Single needles attached to the twig

Fun Fact: One of the most common trees in Canada—found in all provinces and territories

Tamarack

Needles are short and arranged in tight bundles of 15-60 needles

Fun Fact: The only coniferous tree that sheds its needles every fall

Sugar Maple

Leaves have five pointed lobes with deep, round notches between them

Fun Fact: The leaf was used as inspiration for the maple leaf on Canada's flag

Pocket Tree ID Guide

treebee.ca

144 Front Street West, Suite 700
Toronto, ON M5J 2L7
T: 416.646.1193

www.forestsontario.ca

White Birch

Leaves are triangular; bark is white and paper-like

Fun Fact: First Nations Peoples used the bark to make canoes

Trembling Aspen

Leaves are dark green on one side and lighter on the other, and shake in the breeze, making the tree look like its trembling

Fun Fact: Reproduces by growing new, genetically identical trees out of its roots

White Cedar

Leaves are flat scales and the tiny cones and seeds are an important food source for squirrels and birds

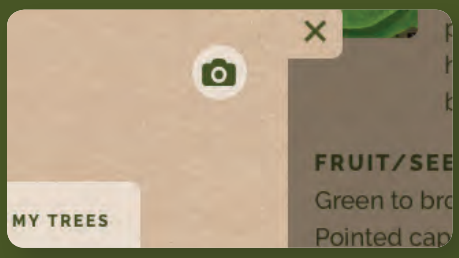
Fun Fact: Some eastern white cedars in Ontario are more than 700 years old

INTRODUCING

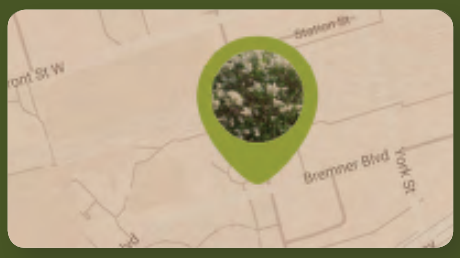
TreeBee.ca

Identity Tree Step-by-step

Take a Photo



Add it to Your Map



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FORESTS ONTARIO