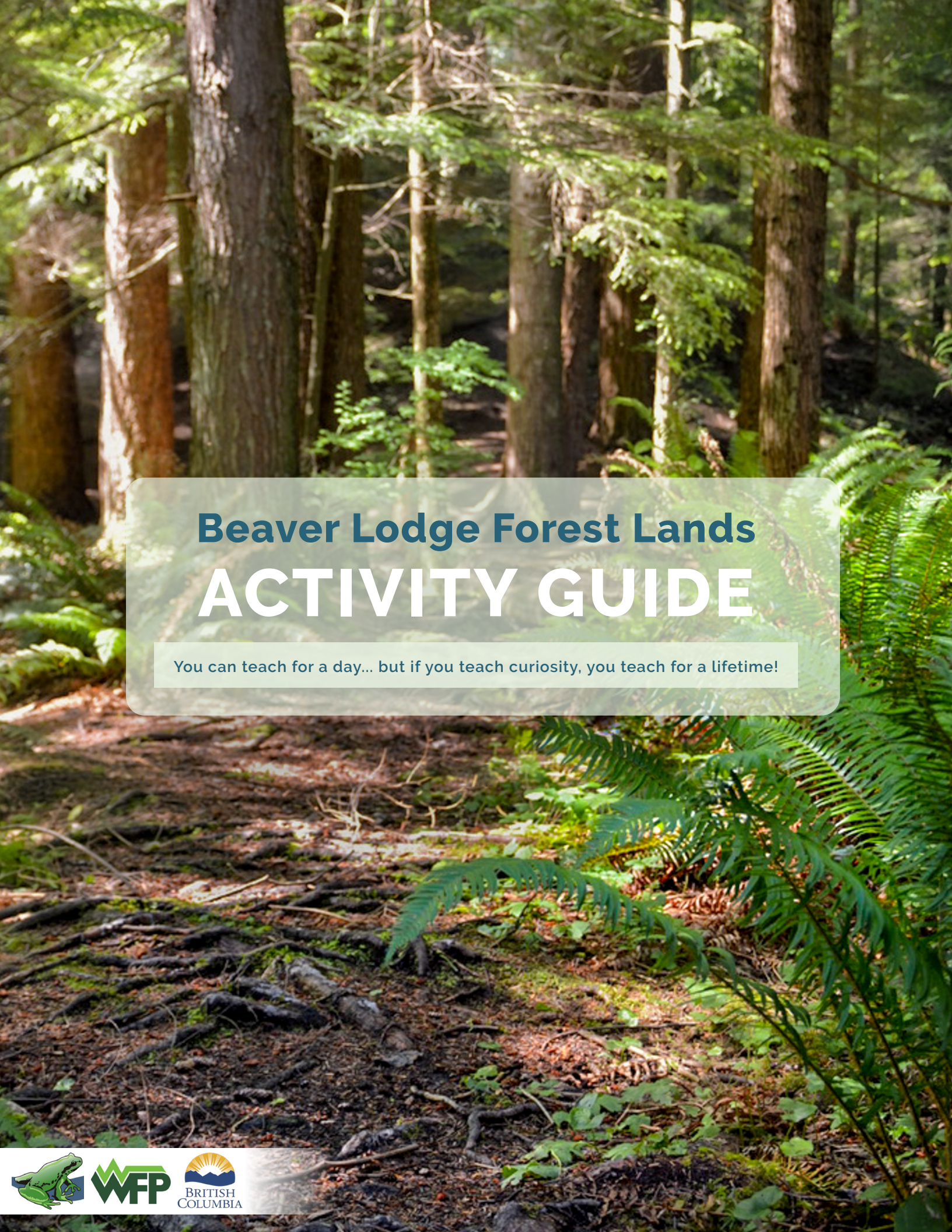


# Beaver Lodge Forest Lands

# ACTIVITY GUIDE

You can teach for a day... but if you teach curiosity, you teach for a lifetime!

WFP

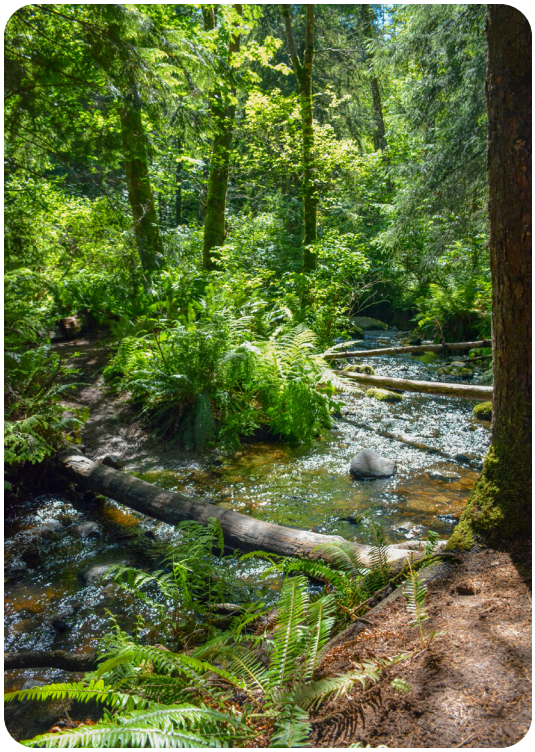
BRITISH COLUMBIA

## Preface

**The Beaver Lodge Forest Lands** (BLFLs) offer a unique opportunity to study the diversity of nature in a vast working forest... right at your door. This forested area which is held in trust and dedicated to research and forest management is a valuable learning resource. This Activity Guide was created to assist teachers and students in the study of integrated resource management.

Although the guide is intended for elementary grades, activities are easily adaptable to all grade levels. Extension ideas are provided within each activity to increase versatility. The 13 lesson plans have been designed to be used in conjunction with each other or as stand alone modules.

*We hope this guide will encourage an awareness and enjoyment of our local and diverse resources.*

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# Introduction

## History

In 1931, 1028 acres of forest land was given in trust to the province of British Columbia by the Elk Bay Timber Company. The purpose of the trust was to preserve the land for experimental and educational forestry opportunities. In 1993, provincial legislation was passed to ensure that the land, known as the Beaver Lodge Forest Lands (BLFLs), would be preserved as a working, experimental forest

## Who looks after the Beaver Lodge Forest Lands?

We do. A committee made up of private citizens, guided by the Ministry of Forests, Land & Natural Resources was created to manage the BLFLs. Through a committee process, the Beaver Lodge Land Resource Use Plan was developed. This planning document serves as ongoing guidance for management and land use decisions within the BLFLs - such as ***'how many trails & where?***' or ***'is camping OK?***', or ***'what level of resource extraction is acceptable?'***. Committee meetings are open to the public and anyone wishing to work on a sub-committee is welcome.

## Integrated Resource Management

Any forest is a complex puzzle of environmental, social and economic resources, each connected and dependent on the other. The BLFL Land Use Plan identifies its management priorities through sub-committees:

- Education and Research
- Environment
- Recreation
- Economy

Integrated resource management is the term commonly used to describe today's forest management techniques. Integrated resource management implies that **all** the resources within a forest be co-operatively managed for the greatest environmental, social and economic benefit.

*Welcome to the Beaver Lodge Forest Lands!*

Did you know the very first plantation in BC was in Beaver Lodge Forest Lands?!

INTEGRATED RESOURCE MANAGEMENT

*"...the management of two or more resources in the same general area, commonly includes water, soil, timber, range, fish, wildlife, and recreation."*

- Forestry Canada, Glossary of Terms

This resource kit was developed as a guide to understanding the wondrous diversity of a forest. The BLFL's present us with the opportunity to study, learn about, and enjoy nature within a working forest... right in our own back yard.

The activities and resources contained within were designed to assist educators and students to increase their awareness of the multi-resource forest. Although designed for Grades 4 – 6, activities are easily adaptable to younger or older students. Themes were selected to encourage awareness of the forest as a whole.

## Trail Code of Ethics

The BLFL's are ours to study and enjoy, but leave it as you found it so that others may enjoy it too.

- Protect yourself from unnecessary slips and falls by staying to existing paths. You will also help maintain the trails by not short-cutting switchbacks and corners.
- Please pack out everything you packed in.
- No smoking or open flame.

## The 3 C's of Trail Etiquette

**Common Sense**
plan your trip and if you encounter others on the trail, the most mobile yields the right -of-way. Cyclists, if you encounter horses, get off your bike and move to the lower side of the trail.

**Communication**
let others know of your presence and warn them of any dangers or adverse trail conditions.

**Courtesy**
treat all trail users with respect.

*Yours to enjoy .....treat it with respect!*

**LESSON PLANS INCLUDE:**

BACKGROUND

OBJECTIVES

SKILLS & APPLICATIONS

VOCABULARY

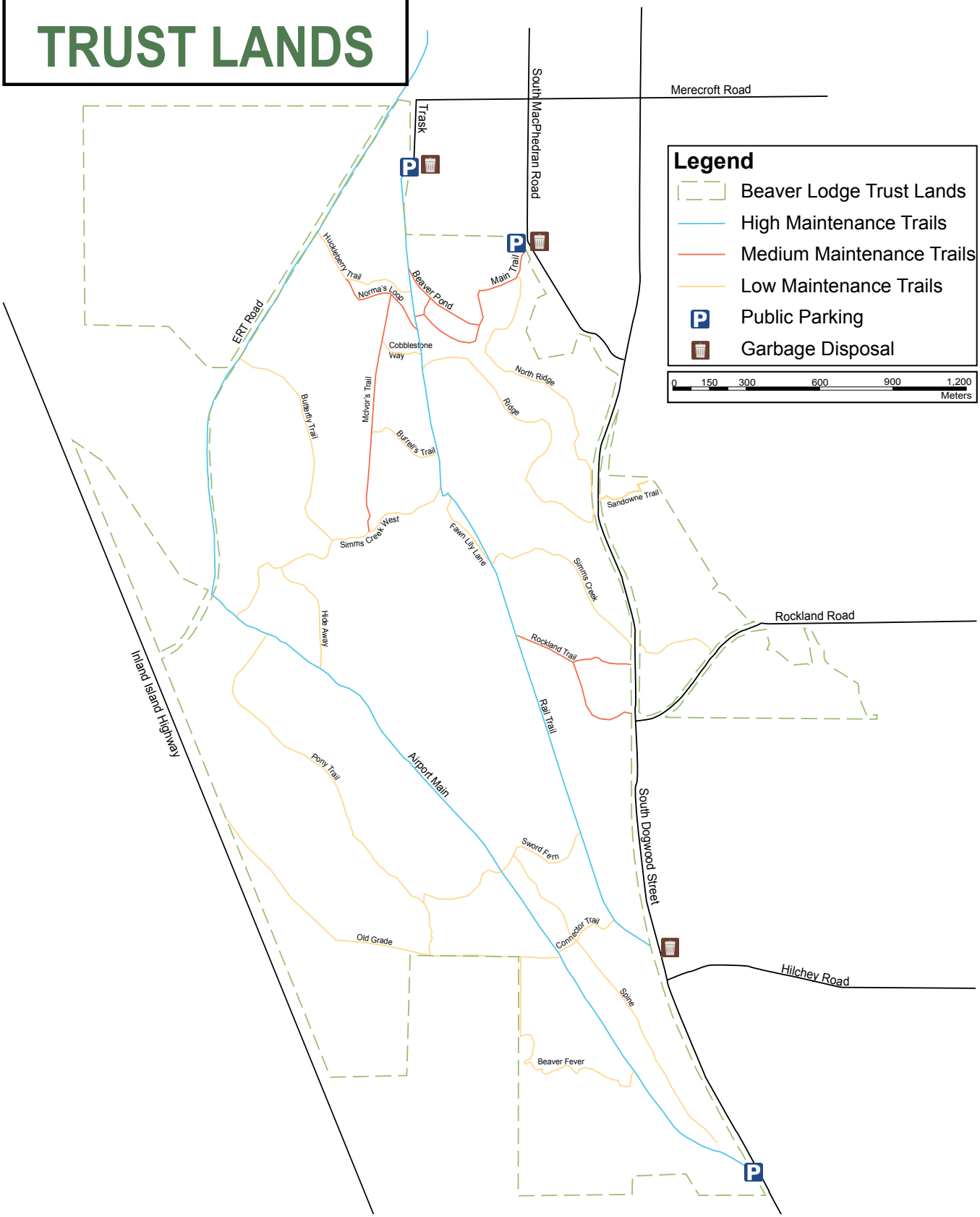
ACTIVITIES
Materials, Setting
Duration, Attachments

**SPECIAL CONSIDERATIONS**

Be prepared, dress for the weather!

Bear in mind, wildlife use this forest too. Bears and cougars feel threatened when surprised, so stay in groups.

# BEAVER LODGE TRUST LANDS



# Personal Values

## Background

People and societies differ in what they value, but all value things for their perceived significant characteristics. This lesson plan allows students to explore their personal values and attitudes. These values influence personal decisions and, ultimately, decisions society makes about land use. It is very important for each student to understand that their personal values are unique. Others may agree with some of their values, but many other people will not agree. To this end, it is equally important to recognize and accept that other people's values may be as valid and important as their own, especially when working in groups.

## ACTIVITIES:

**PRE TRIP**

1 Exploring Personal Values
2 Exploring Different Values

**FIELD TRIP**

3 Tag it with Value

**POST TRIP**

4 Now Picture It!

### LESSON PLAN OBJECTIVES

» understand that different people may have different values for the same things.

» understand that values are very personal, involving people's feelings.

### SKILLS & APPLICATIONS

Observing
Inferring
Communicating
Reasoning
Reflecting
Demonstrating responsible action

### VOCABULARY

Personal Values

TABLE OF CONTENTS

*Students will present and discuss a personal item that has great value to them.*

### MATERIALS

Each Student

- personal items students bring to class
- 8 index cards
- 8 lengths of string (40-50 cm long)

### SETTING

Classroom

### DURATION

Presentation

About 5 minutes per student, possibly spread over several days.

Value Cards

30 - 45 minutes

# ACTIVITY 1: Exploring Personal Values

TEACHER NOTE

*This activity may have to be done over several days. The recipe cards made in this activity will be used in Activity #3 - Tag it With Value.*

## Procedure

1. Have students bring to class an item they personally value very much.
2. Have students individually present their item to the class and explain why it is so valuable.
3. Keep a list of the key words (adjectives) that come from the presentations and write them out on the blackboard. Try to have a list of at least fifteen words. (Words should be along the likes of: beautiful, interesting, rare, special, important, old, soft, colorful, etc.)
4. After all the presentations are finished, have a short discussion about personal values and individual preferences.
5. Hand out eight recipe cards with one hole punch at the top to each student. Using the key words on the blackboard, have the students write a single, different key word on each of their eight cards. Have students put their initials on a bottom corner. Hand out eight strings and have students tie a piece of string to each card so that the cards can be hung from objects. (These will be used outdoors in the BLFLs.)

*Students explore values from a variety of perspectives.*

# ACTIVITY 2: Exploring Different Values

## Procedure

1. Hand out the sheet **Exploring Different Values**, and have the students work through the activity ranking their values. Rank 1 is most important, rank 16 is least important.

2. After students finish, give them the second heading of forester. Students must now complete the exercise from a forester's point-of-view.

3. Next, fill in the third heading as deer, and rank the elements from a deer's perspective.

## Follow-Up

Have students compare their three columns, and discuss results in class. Some ideas to focus on: Do most students agree on the number one choice for each perspective (discuss differences). Was it difficult to fill out the column under different perspectives. Did anyone have any special considerations when filling out any columns? Possibly add a fourth heading such as a housing developer or store owner.

### MATERIALS

Each Student

- one copy of "Exploring Different Values" (Attachment #1)

### SETTING

Classroom

### DURATION

45 minutes

*Students explore a forest environment and tag its features with different values.*

### MATERIALS

- the 8 labeled value (recipe) cards each student made in Activity #1: Exploring Personal Values

### SETTING

Anywhere in the BLFLs. The Main Trail is a recommended location.

### DURATION

1.5 - 3 hours

# ACTIVITY 3: Tag It With Value

## Procedure

1. Out on your chosen location, designate a fairly long portion of trail (up to 500 m) as the "value" trail. Try to include as many different habitats, features and variety as possible in your trail selection.

2. Each student is to bring out their eight value cards. Briefly review personal values and individual differences.

3. Students walk along the trail and look for features they can hang their value cards on. Students may change their minds and move their cards around. Give the students about half an hour to walk the trail and hang their value cards. Students may share card sites with other students if they wish, but may disagree and "tag it" with a different value!

4. Meet back at a pre-determined time and location.

## Follow-Up

Walk back along the trail and discuss the choices. Focus on features that were tagged with different values, or any other interesting tags. Try to include all students in this activity. Collect all the cards after the discussion.

*Students create a value mural for BLFL and then make some land-use decisions taking a variety of values into account.*

### MATERIALS

Each Student

- 8 1⁄2" x 11 " sheet of paper
- pencil crayons, paints, crayons

For the classroom

- 2 to 3 m roll of paper
- several big magazine pictures: a highway, stores, houses, school, parking lot, mall, gas station, etc.
- glue or tape

### SETTING

Classroom

### DURATION

1 - 1.5 hours

### EXTENSION

Play "mood" music to the class (ie. tropical forest, babbling brook) and have them paint a BLFLs picture or write a BLFLs poem.

# ACTIVITY 4: Now Picture It!

## Procedure

1. Have students discuss and list all the valuable aspects of the BLFLs. Focus on more concrete aspects such as trees, wildlife, creeks, wetlands, wildlife trees, hiking trails, forests, moss, insects, biking trails, deer, mushroom picking, bird watching, fishing, flowers, etc.
2. Assign a topic from the list to each student. Students are to draw and color an 8 1⁄2" x 11" picture of the topic they are assigned. Some topics, such as forests or trees can be drawn by more than one student to suitably represent the BLFL's habitats.
3. After the drawings are completed, have students gather around a large piece of roll paper and glue their pictures on the paper to form a **BLFLs Values Mura**l. There should be little or no extra space left on the roll of paper.
4. Looking at the mural, discuss the complexity of habitats, organisms and values.
5. Present a fairly large magazine picture of a highway to the students. Give them the task of deciding where this highway should go on the mural. It must be glued directly on top of some portion of their drawings.
6. When this is completed, pass out a photo of a shopping mall to be glued on to the mural. Pass out two or three pictures of houses, then a picture of a school, a grocery store or gas station, etc. until you decide enough of the mural has been covered up.

## Follow-Up

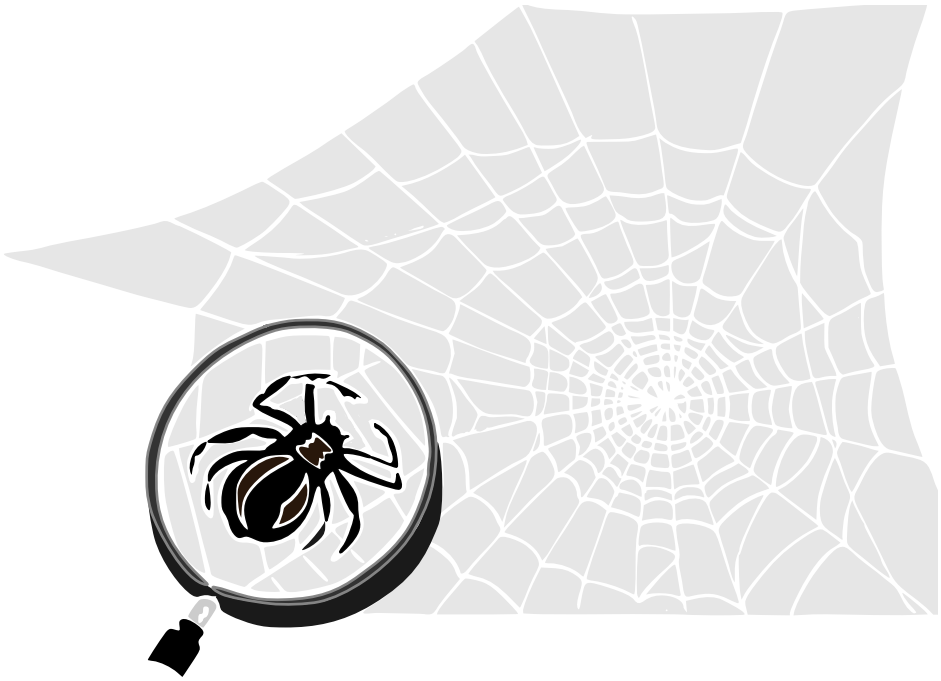
When you decide the activity has gone far enough, have students discuss what they are feeling. It is likely students will feel frustrated trying to make decisions with such a large group. There will likely be some sadness seeing their personal drawings being covered up. Have students discuss ideas that would allow better decision-making in groups.

# Attachment #1 - Exploring Different Values

Imagine that these elements are part of the region where you live. Which is most important? Number your order of importance: Rank **1** is most important, rank **16** is least important.

| | Elements | Ranking A [ Your Values ] | Ranking B | Ranking C |
|---|---|---|---|---|
| 1 | **Grazing Land** | | | |
| 2 | **Highway** | | | |
| 3 | **Farm** | | | |
| 4 | **Swamp** | | | |
| 5 | **Home** | | | |
| 6 | **Shopping Mall** | | | |
| 7 | **Forest** | | | |
| 8 | **Grocery Store** | | | |
| 9 | **Wilderness Park** | | | |
| 10 | **Tree Farm** | | | |
| 11 | **School** | | | |
| 12 | **Lake** | | | |
| 13 | **Wild Animals** | | | |
| 14 | **Computer Game** | | | |
| 15 | **Car** | | | |
| 16 | **Big Bushy Tree** | | | |

*Adapted from Protected Areas: Preserving our Future, Ministry of Environment, Province of British Columbia*



# Micro World

## Background

People tend to see the obvious (the macro) and not the hidden or tiny world (the micro) about them. In not seeing, it is unknown and therefore not understood, or cared for. These micro worlds support macro systems and thus require understanding and good stewardship.

## ACTIVITIES:

**PRE TRIP**

1 Take a Closer Look

**FIELD TRIP**

2 Seven Mini-Wonders

**POST TRIP**

3 Mini-Wonders Brochure

### LESSON PLAN OBJECTIVES

» realize that there is much more to the world than what is large and obvious

» realize that careful observation yields new discoveries

### SKILLS & APPLICATIONS

Cooperating
Describing
Drawing
Exploring
Interpreting
Observing
Organizing
Writing

### VOCABULARY

Macro
Micro

TABLE OF CONTENTS

*Using a simple game, students hone their observation skills.*

### MATERIALS

Each Student

- paper
- pen or pencil

Each Group

- tray of 10 miscellaneous numbered objects
- cloths to cover tray
- numbered list(s) of each tray's contents

### SETTING

Classroom

### DURATION

30minutes

# ACTIVITY 1: Take a Closer Look

## Procedure

1. Prepare trays and lists of their contents ahead of time. Cover the trays and keep the lists.
2. Ensure everyone has writing materials. Divide class into large groups (five to six). Give each group a covered tray that they can all see.
3. In each group, one student removes cloth and students try to memorize items on the tray. Shhh. After 30 seconds is up, the cloths are put back over the trays.
4. Students then write down all that they can remember.
5. After they have finished, remove the cloths and have them check out what they forgot with their own list or by passing their list onto their neighbor. Remind students to put their names on their lists.
6. Ask for a show of hands as to who got the most or how many items they missed. Discuss why they missed the other items and how they remembered so many?
7. Now, groups move to a new tray and this time they must remember two features (e.g. size, words, color, or location on tray) in order to check the item off.
8. Remove cloths. After one minute, cover trays. Repeat steps 4 and 5. Ask if it was harder to do the second time and what features stood out the most?
9. Repeat game until all groups have tried each tray.

## Follow-up

Discuss the importance of careful observation. Did taking more time for observation yield more detailed discoveries?

*Working in pairs, students make a miniature forest park.*

### MATERIALS

Each Pair

- clipboard
- paper
- pens or pencils
- 1 metre long loop of string
- 7 toothpicks
- Seven Mini-Wonders - (Attachment #1 & 2)

### SETTING

Aywhere in the BLFLs

### DURATION

1.5-3 hours

# ACTIVITY 2: Seven Mini-Wonders

## Procedure

1. At the trailhead, explain that students will be going for a walk to look at the characteristics of the Beaver Lodge Forest Lands (BLFLs).
2. Go for a short nature hike as a class. Working with a partner, students list all of the interesting features that they see as they walk along (e.g. a very big tree, evidence of past history like the logging stumps, a bird's nest).
3. At a wide point in the trail and where the forest looks accessible and open, stop and discuss their lists. Point out how many of their observations are on the macroscopic level.
4. Explain to the students that they will be creating a park for the microscopic world within the BLFLs.
5. Demonstrate the procedure to the students by forming a loop with the string on the ground. This is the micro- park's boundary. Then develop the park by putting the toothpicks beside seven of the park's most interesting features and discuss.
6. Remind students of safety considerations and send them a few metres off the trail to draw a map of their park and write descriptions of their Seven Mini-Wonders on Attachment #1 & 2.
7. After their park is developed, have groups trade partners to take one another on a guided tour of their Mini-Wonders Park.

## Follow-up

1. Discuss with the class the amazing micro-features that they found.
2. How do you think the micro and macro worlds interrelate? (e.g. leaves fall and decay into soil then big plants thrive on nutrients).

*Students create a brochure of their micro-park to interest and educate people.*

### MATERIALS

Each Group

- BLFLs brochure (available at the Ministry of Forests, Lands and Natural Resource Operations, 370 South Dogwood St. 250-286- 9300)
- writing/drawing implements
- sheet of 11X17" plain paper
- glue
- *extra:* assortment of tourist and park brochures for more examples

### SETTING

Classroom

### DURATION

1.5-2 hours

# ACTIVITY 3: Mini-Wonders Brochure

TEACHER NOTE

*This is a creative endeavor, including history, maps, nature, and safety. Rather than directly copying brochures, students should use them as examples only.*

## Procedure

1. Give out sheets of paper. Show students how to fold a brochure out of an 11X17" piece of paper.
2. Students use their **mini-park map** and descriptions to make an informational brochure for tourists. In their same pairs, students write up descriptions, cut them out and mount them onto a brochure section. Their brochure should answer questions like, "When and why their park was created and who owns and cares for it?"
3. Display brochures.

## Follow-up

1. Review brochures and discuss the selling features (ie. beauty, rarity, provides habitat).
2. Are these mini-wonders important to the forest?
3. What would happen if your mini park wasn't protected?
4. Will you look at things more closely now?

## Extension

Encourage creativity by asking students to write answers to questions such as:

- If miniaturized how would you travel in your park?
- What are future developments (i.e. trails)?

# Attachment #1 - Seven Mini-Wonders

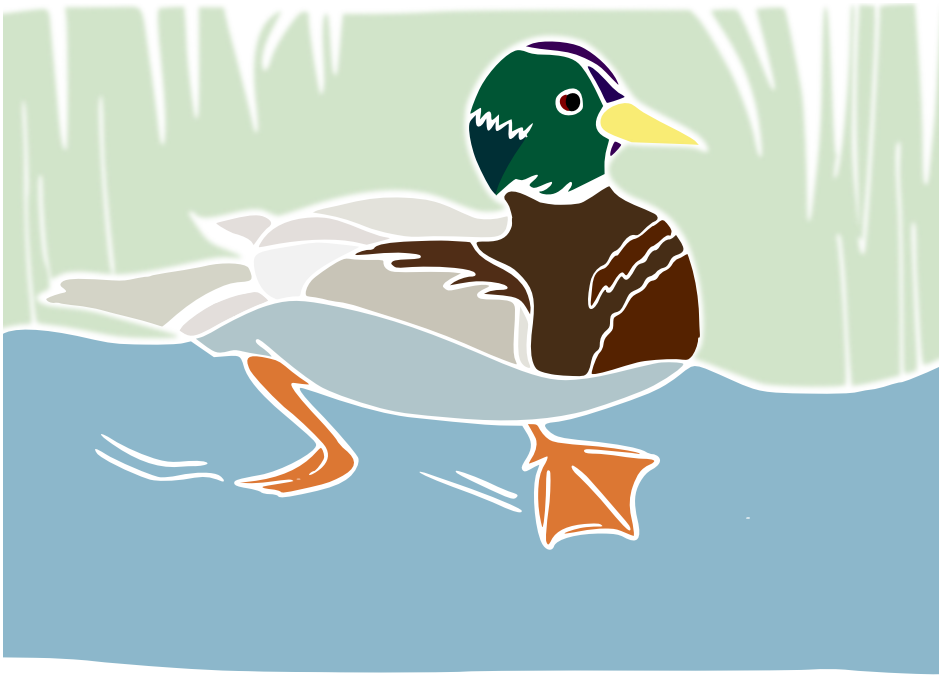
**Mini-Wonders Park Map**

**Legend**

# Attachment #2 - Park Features

Describe your micro-park (e.g. type of plants on ground, against a tree, flat, wet, etc.):

| Mini Wonder | Description |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |



# Adaptations

## Background

Adaptation is a genetically determined characteristic (behavioral, morphological, physiological) that improves an organism's ability to survive and successfully reproduce under prevailing environmental conditions. For example, the webbing of a duck's feet is a physiological characteristic which aids in propulsion when swimming.

### ACTIVITIES:

PRE TRIP
**1** Bat & Moth

FIELD TRIP
**2** Insect Detective

POST TRIP
**3** Litter-ly Life

### LESSON PLAN OBJECTIVES

- understand the term adaptations
- understand that animals have special features that help them to survive in their habitat
- recognize the wide variety (diversity) of life
- recognize the interaction of living and non-living things

### SKILLS & APPLICATIONS

Observing
Drawing
Communicating
Interpreting data
Performing experiments using tools

### VOCABULARY

Adaptation
Habitat

*TABLE OF CONTENTS*

*This activity will introduce the concept of adaptations by means of a fun game.*

### MATERIALS

Each Student

- Blindfold
- A bright, well-focused flashlight

### SETTING

Classroom

### DURATION

30-45 minutes

# ACTIVITY 1: Bat & Moth

## Procedure

1. Inside the classroom, move all the desks to the sides. Put a table or desk in the center of the room.
2. Pick one student to be the bat, who then sits on the table. All the other students are moths. The moths are then spread out around the edges of the classroom, as far from the bat as possible.
3. The bat is given a flashlight and blindfolded. The blindfolded bat will quickly click on the flashlight to try and catch a moth when it hears something. The light beam must hit the moth, but it can't be waved about. Make the room dark so the flashlight beam shows up better.
4. The teacher stands beside the bat to point to which moth will move and to verify when moths are caught. Moths sneak up one at a time.
5. When pointed to, the moth must sneak up as quietly as possible to try to touch the bat's table, where they are safe. (Once safe, moths go sit quietly against the wall until the other moths are done. If caught by the flashlight, moths must sit quietly where they get caught.)
6. Once all the moths have gone, play a second round, but add in a few variables such as:

    - Add two or three desks out in the opening for shelters. These are safety zones, but moths must not stay at a shelter more than a few seconds.
    - Have a moth crinkle a sheet of paper as it moves about.
    - Have one moth flap sheets of paper to simulate wings flapping.
    - Have one moth tap the floor every time it gets ready to move.

*continued*

## Follow-up

**1** Discuss all of the adaptations that the students tried.

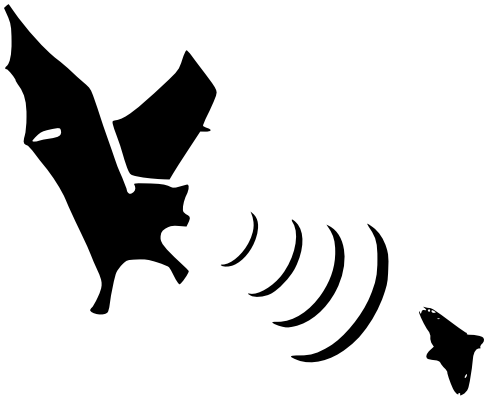
**2** What worked and what did not?

**3** Did any of the moths adapt their behavior to avoid being caught?

**4** What type of adaptations would a moth use to stay alive in real life?

- Plumose (feathery) antennae for improved reception!
- Cryptic coloration for camouflage
- Sucking mouth parts for feeding on nectar
- Large eyes for night vision
- Hairy bodies for insulation
- Come out at night to avoid predation

**5** What adaptations does a bat have in real life?



- Echo location (radar!) for finding prey in the dark
- Large ears for exceptional hearing
- Sharp teeth for grasping
- Large wings and tail which can form a pouch for catching insects

*Students collect insects in different habitats.*

# ACTIVITY 2: Insect Detectives

## MATERIALS

### Each Student

- Insect collecting jars
- Hand lenses/ jewelers loupes/ bug boxes

### Each Group

- butterfly nets
- 2 or 3 plastic bags (bread bag size)
- (Optional) Large white sheet or 5 to 10 m of large white roll paper
- Insect Adaptations (Attachment #1A & B)

## SETTING

Anywhere in the Beaver Lodge Forest Lands

## DURATION

2-3 hours

## Procedure

1. Quickly review animal adaptations, then discuss that insects have adapted to their habitats as well (ie: grasshoppers have strong jumping legs and spit out brown goo for defense; spiders make webs to catch prey, have biting mouthparts and long legs to move fast; butterflies have long, sucking mouthparts, can fly and migrate to warm locations). Showing students a few pictures of insects would be helpful.

2. Divide into groups of three or four, then hand out labeled collecting jars (grassy habitat and forest habitat) and hand lenses to each student.

3. Give half of the groups butterfly nets. They will do net sweeps, through any grassy open areas, collecting what they catch in the jar labeled grassy habitat (only one collecting jar should be used for each of the two habitats so that students can compare the insects from the two habitats).

4. The other half of the class will do ground explorations through the forest and collect their catch in the jar labeled forest habitat . The ground searchers can carefully lift rocks or pieces of wood and sort through leaf litter to look for insects. Make sure students return everything to the way it was before. Many insects, such as springtails, are very tiny and quickly hop or hide away. Students can be shown this ahead of time in the introduction. It is a great challenge to catch some of these little critters!

5. Define your search area. Send the students off for about 15 to 30 minutes, then trade habitats. Groups with nets will have to pass them to the groups without nets. Collect again for 15 or more minutes.

*continued*

6 Gather everyone in and go through each group's collections looking for tiny, colorful, unique, interesting and obvious adaptations, plus insect variety. Refer to **Attachment 1** for help in identifying insect adaptations.

7 Have each group present one or two interesting insects and their adaptations (students do not need to know the insect species to do this).

8 Return insects to their proper habitat.

9 Before leaving, collect one or two small bags of forest/ leaf/ soil litter for a Tullgren funnel experiment back in class. Try collecting leaf litter from different habitats.

**< Important**

## Extension

### Collecting Insects From Trees or Shrubs

If time permits, this short activity is interesting to do with the class. (This activity can be completed in 15 minutes.) All around the base of a reasonably large (3 - 6 m tall), bushy shrub or tree, spread out a white sheet or large white roll of paper to cover the ground. Have someone vigorously shake the bush and/or hit branches with a long stick to knock insects off. They will fall onto the sheet where they can be viewed and collected. A sunny location often works best.

MATERIALS

- a coat hanger
- wire cutters
- scissors
- an old light coloured pillowcase with a hem around the opening
- a needle and thread (optional)
- a pocket knife
- an old broom handle or hockey stick shaft
- some strong bendable wire

### Make Your Own Butterfly Nets

1 Bend the hanger into a circle. Unravel the twisted end and cut off the hook with the wire cutters.

2 Cut a small opening in the hem of the pillowcase and thread the hanger through until both ends stick out the hole.

3 Cut a deep notch, long enough for the wire ends of your hanger, on each side of the end of the broom handle.

4 Fit the hanger ends into the notches. Wrap some bendable wire tightly around the notches so that the net is held securely to the handle.

*This simple experiment will let students discover life on the forest floor that they do not normally see.*

### MATERIALS

*Day One*

- small sample(s) of forest floor litter/soil (from the previous field trip)
- large funnel
- large kitchen sieve to fit in
- funnel
- jar for funnel to sit in
- reading light
- a piece of black paper to wrap around jar
- a piece of damp paper towel

*Day Two*

- hand lenses (dissecting scopes would be optimal)
- petri dishes
- tweezers
- Insect Adaptations (Attachment #1A & B)

### SETTING

Classroom

### DURATION

*Day One*: Funnel Set-up 15 min
*Day Two*: Insect Viewing 1- 1.5 hrs

# ACTIVITY 3: Litter-ly Life

## Procedure

### Day One

1. You will set up a Tullgren funnel for each habitat you collected from in **Activity 2 - Insect Detectives**.
2. Wrap black paper around a jar and put a small piece of damp paper towel in the bottom of the jar.
3. Place the funnel in the jar, then put the kitchen sieve into the funnel.
4. Put the soil/litter into the funnel and turn a normal reading light on a few inches above the soil.
5. Overnight, the heat and light will drive the small animals through the bottom of the funnel and into the jar.

### Day Two

*Insect Viewing:* Using tweezers and hand lenses students examine, draw, and make notes about their insects. (Focus on body parts that indicate an adaptation to their habitat).

## Follow Up

1. Hold a class discussion about the variety of adaptations discovered.
2. Draw some of these features on the board to aid with the discussion.
3. Group insects by similar adaptations.

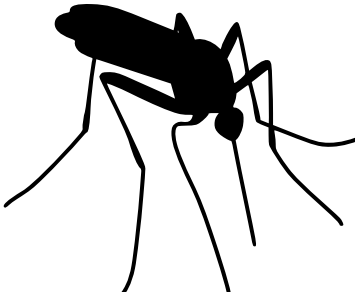
*continued*

## Extention

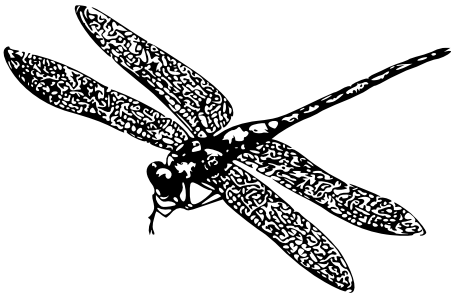
1. Have students try to identify some of their insects using an insect field guide.
2. Have students research and write a report, including labeled sketches, on the variety of insects and the special adaptations of their body parts. Focus on comparing the two local habitats sampled.
3. Build your own bug. Use styrofoam balls, pipecleaners and cardboard. Design its adaptations for an imaginary habitat.
4. Build a habitat for one of your common classroom insects.
5. Compare insect adaptations with the adaptations other animals have (i.e. the strong jaws of bears for crushing versus the strong jaws of ants.)

# Attachment #1 A - Examples of Adaptations

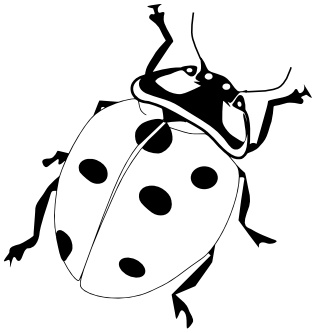
**Mosquito**
Piercing and sucking mouthparts to pierce the skin and withdraw blood



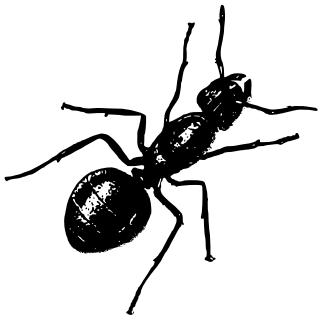
**Dragonfly**
Front arms are folded to form a net which captures insect prey.



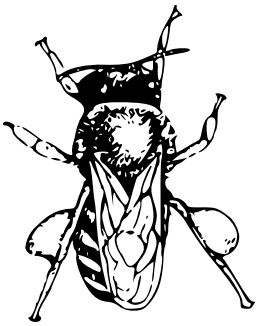
**Lady Bird Beetle**
Hard exoskeleton to protect against predation.



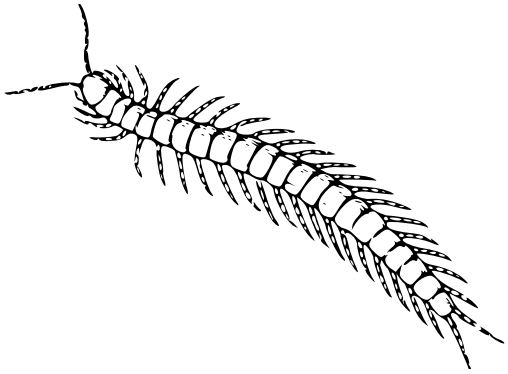
**Ant**
Strong mandibles (jaws) to grasp and carry prey



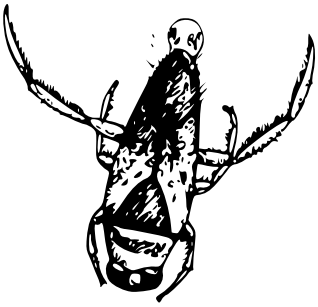
**Honey Bee**
Special hairs on the hind legs comb up pollen when the bee lands on a flower.



**Millipede**
Flat thin body to crawl and hide under leaf litter and in the soil.

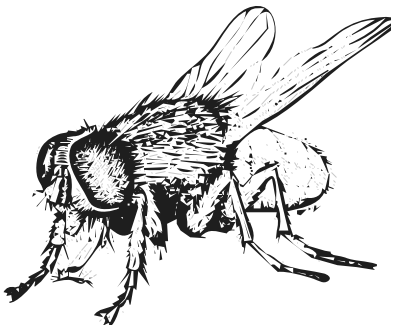


**Waterstrider**
Fine hairs on its legs and body are used to trap air so it can breathe under water.

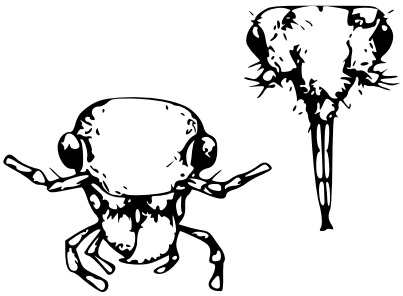


# Attachment #1 B - Examples of Adaptations

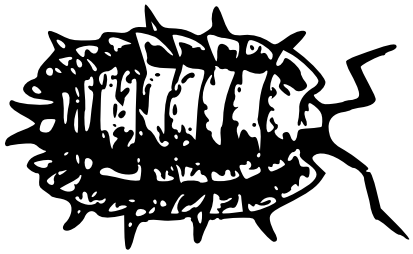
**Compound Eyes**



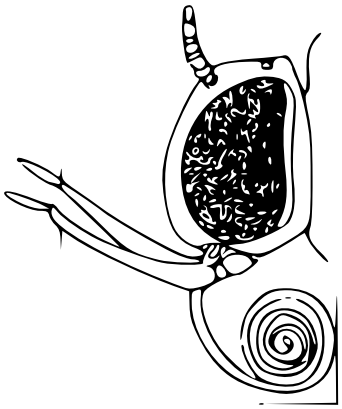
**Sucker and Chewers**



**Protective Hard Outer Casing + Segmented Body**

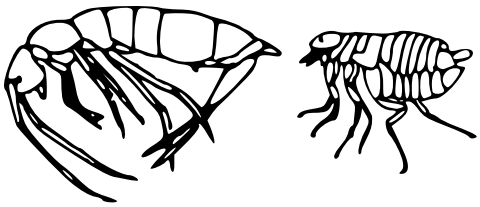


**Sucking Mouthparts**

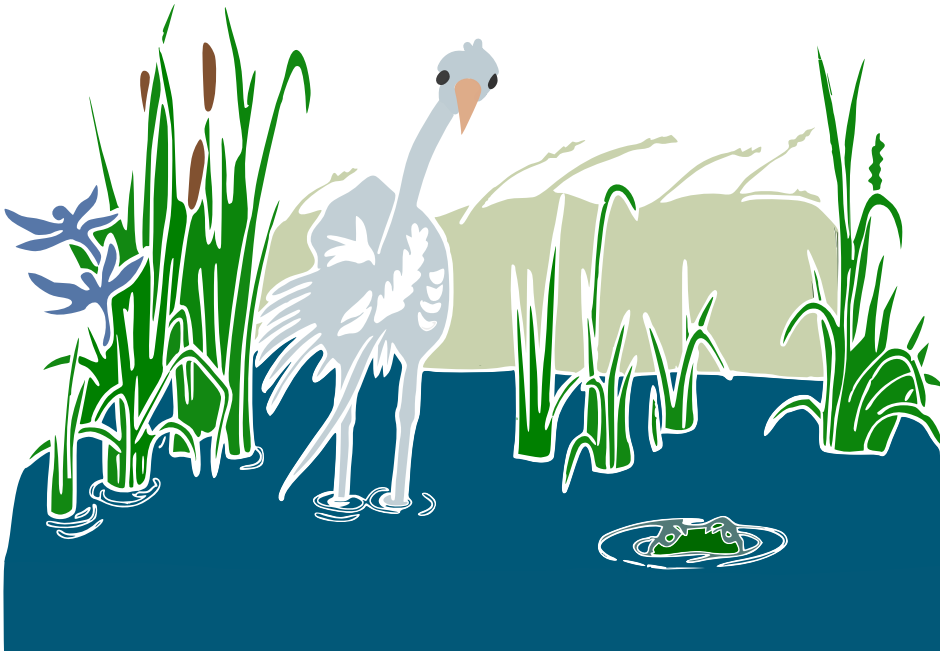


**Stinger**

**Jumping Legs**



**Sucking Mouth**



## ACTIVITIES:

PRE TRIP

1 The Circle of Life

FIELD TRIP

2 Wetlands Exploration

POST TRIP

3 Create a Classroom Food Web

# Wetlands

### Background

Wetlands provide abundant food, protection from predators and shelter from the elements for the coho salmon and cut- throat trout living in the Beaver Lodge Forest Lands (BLFLs). Numerous birds also depend on the wetlands for food, nesting spots and migration resting places. The high productivity of grasses, tender plants and numerous small animals, combined with the open area of the wetlands, provides an attractive place for wildlife of all kinds. In fact, the most likely spot to view wildlife in the BLFLs is at wetland sites.

Wetlands are continually producing new grass and rushes as others die. When the plants die they produce large amounts of dead material, called detritus, which is decomposed by bacteria, snails, small aquatic insects and insect larva. These animals provide the food for other predators such as frogs, salamanders, small fish and ducks. These small predators, in turn, provide food for larger predators. And so on...! Many organisms spend all or part of their life cycles in aquatic habitats and the interrelationships between

### LESSON PLAN OBJECTIVES

» identify the main components of an ecosystem

» understand the interrelationships between living and non-living things

» explain the role of producers, consumers and decomposers within an ecosystem

» describe some basic characteristics and values of wetlands

» identify a variety of organisms living in a wetland and their roles

» identify activities which affect the healthy maintenance of an ecosystem

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these organisms can be very complex. The wetlands are like a “bread basket”, providing abundant food for the organisms that live in or visit the area!

These organisms usually do one of three things which aid in maintaining the balance of the ecosystem. They are either producers, consumers or decomposers. A well-maintained ecosystem will have an adequate representation of producers, consumers and decomposers and the inorganic matter necessary for their survival (sun, water, air & soil).
Wetlands are valuable for far more than the wildlife they support. Wetlands also:

- act as giant sponges helping to control the impacts of flooding and increased runoff.
- recharge underground water supplies during rainy periods.
- filter organic wastes out of the water.
- create economic spin-offs through acting as nurseries for fish which are harvested in the commercial fishing industry.
- provide tremendous value for recreation and aesthetic enjoyment.

### SKILLS & APPLICATIONS

Recreation
Stewardship
Teamwork
Problem Solving
Data Collection
Classification

### VOCABULARY

algae
carnivore
crustacean
consumer
decomposer
detritus
ecosystem
herbivore
inorganic
larva
nymph
parasite
photosynthesis
producer
omnivore wetlands

*Students play a fast-paced game of tag which introduces the components of an ecosystem and their interrelationships.*

### MATERIALS

- Soft objects (nerf balls, bean bags, socks or crumpled paper)
- 3 hula hoops

Each Student

- Name tags  safety pins

### SETTING

Gym or playing field

### DURATION

Discussion

10-15 minutes

### ECOSYSTEM

*a community of organisms in relationship with each other and their inorganic environment*

# ACTIVITY 1: Circle of Life

TEACHER NOTE

*Students will need some background information to get the most out of this game. Define ecosystem for the students and lead a discussion on what components are required for an ecosystem to function smoothly.*

## Procedure

1. Divide the class into three groups; **decomposers, consumers and producers.** There should be twice as many consumers as decomposers and twice as many producers as consumers. For example, a class of 21 students would be split up as follows; decomposers - 3, consumers - 6, producers - 12. Each player must be labelled with a name tag stating which group they belong to.
2. Set a boundary for a large playing area. Within the playing area place two or three hula hoops which will act as safety zones. Divide the soft objects among the safety zones, placing them in the center of each hoop. These objects represent the inorganic components of the ecosystem (sun, water, air, soil). The number of objects should equal the number of producers.
3. Explain the game.

   The main goal of the game is to maintain the ecosystem while each group performs its role. The role of the:

   - **producers** is to get all of the inorganic objects out of the safety zones and hold onto them. While producers are inside the safety zone they cannot be tagged.
   - **consumers** is to get as many objects as possible from the producers by tagging them with two hands. The consumers then carry the objects.
   - **decomposers** is to get objects back from the consumers by tagging them with two hands. Then they return the objects to the safety zones.

*continued*

Players can only carry one object at a time. When they are tagged they must give up their object. Players can toss and pass objects to other members of their group. Producers are sent into the playing area first to start collecting objects. A few moments later, the consumers are sent into the playing area. A few moments later, the decomposers are sent in.

4 Play the game.

If it is not running smoothly you can adjust the number of players in each group or adjust the number of inorganic objects.

## Follow-Up

What is each group's role in maintaining the ecosystem and what would happen if one group was removed?

## Extension

1 Play the game again, this time have one student represent disease, pollution or fire. Have them enter the playing area last. If they tag a player and get their object it does not get recycled and placed back in the safety zone. Instead, it is placed outside of the playing area and is no longer in the game. How does this affect the ecosystem?

2 Play the game again, this time decrease the size of the playing area. This decrease in size could represent a natural disaster (fire or flood) or human activity (road building, housing development). What happens when the size of the ecosystem decreases?
Is it easier or more difficult to hold onto objects? Why?

3 Review the words of the song, "Circle of Life" and discuss its meaning.

*Adapted from: Ecosystem Jobs, Science Is...Pg. 204.*

*Students go on a field trip to a wetlands area of the Beaver Lodge Lands and dipnet for creatures.*

### MATERIALS

Each Student

- One dipnet
- Pencil
- Clipboard
- Wetlands Exploration (Attachment #1A & B)
- Rubber boots or waterproof shoes

Each Group

- Magnifying glasses
- Bug boxes/jeweller's loupes
- One white or light coloured dish pan or fish tub

### SETTING

Refer to Wetlands Map (Attachment #2)

### DURATION

1.5 - 3 hours

# ACTIVITY 2: Wetlands Exploration

## Procedure

Split your class into small groups and head to the wetlands site of your choice. Upon arrival at the wetlands site demonstrate the procedure to your students.

1. Fill the water basin half full of water (as clean as you can get it).
2. Place the water basin at least two metres from the edge of the water and preferably in the shade so the creatures don't overheat.
3. Collect creatures from the three main areas of the water;
   - From the bottom - sweep up some debris from the bottom of the water. If there are small rocks or twigs on the bottom, scoop a couple up and gently rub any creatures off into the water basin. Replace the rocks or twigs exactly as they were found.
   - From the plants - sweep the dipnets through some vegetation.
   - From in or on top of the water - sweep the dipnets through the water.
4. After each sweep carefully turn the dipnet inside out and gently sweep it through the water in the basin to deposit the creatures there. Try to minimize the amount of muck that gets added to the water. The clearer the water, the easier it will be to examine your catch.
5. Examine the catch closely. Use magnifying glasses and bug boxes. Identify the creatures with the aid of **Attachment #1 A & B - Wetlands Exploration**.
6. Answer the questions on the worksheet.
7. Very carefully release the catch and rinse out the water basin and dipnets.

*continued*

## Follow-Up

1. Was it easy or difficult to find creatures in the wetlands? Why or why not? (It should have been easy. If not, perhaps students didn't follow the collection techniques precisely enough, maybe it has rained a lot recently and there has been flooding which may have washed things away, the water could be polluted... If it was easy, then we know all of the essential components of an ecosystem are present.)
2. What are some of the organisms that you have collected? Refer to the Wetlands Exploration Sheet and collections in buckets.
3. Can you tell if they are a producer, a consumer or a decomposer? (Obviously plants and algae will be producers. Often, the body parts of an organism give away what role they perform in an ecosystem. For example, a snail has rasping mouthparts which scrape away at detritus so they are a decomposer. However, they also feed on live vegetation which makes them consumers as well. A dragonfly nymph has grasping legs and piercing mouthparts. They grasp onto other organisms with their legs, such as a tadpole, and pierce their skin with their mouth parts. Then, they suck the guts out of the organism. Yum! So, dragonfly nymphs are carnivores, consumers who feed on other consumers).
4. Did you observe any other wildlife or signs of wildlife at the wetlands? (Look for plants with beaver teeth markings, deer footprints, animal scat, wildlife trees with woodpecker holes, listen for a variety of bird calls, frogs...it should be easy to spot evidence of other wildlife).
5. Did you notice any evidence of human impact in this area? (Bank erosion, litter, damaged shrubs....)
6. How could you manage the area for some of the human impacts that you have noticed? (Provide garbage cans, stabilize banks, build bridges, educate users...)

## Extension

1. Compare the wetlands ecosystem with the forest ecosystem. Go for a walk in both areas with a simple comparative check- list. Observe things like light level, soil dampness, temperature and any other characteristics you come up with.
2. Conduct research projects on some of the animals that call the wetlands their home.

*Students discuss the complex interrelationships between the components of an ecosystem and create a visual food web.*

### MATERIALS

- Ball of wool

Each Student:

- Index cards
- Felt pens or coloured pencils
- Glue sticks

### SETTING

Classroom

### DURATION

*Discussion and illustrations*:
45 minutes

*Webbing Activity:*
20 minutes

# ACTIVITY 3: Create a Classroom Food Web

## Procedure

1. Discuss the wetlands exploration with the class. Have your students identify the essential components of a healthy ecosystem (sun, soil, water, air, producers, consumers and decomposers). Write these components down on the blackboard. Have your students identify some of the plants and animals that they saw, or saw signs of, on the wetlands exploration. Write these on the board underneath the appropriate heading, producer, consumer or decomposer.

2. Hand out one file card or piece of paper to each student. Have them choose one of the components to illustrate.

3. After the students have finished their illustrations have them glue them onto a prepared backdrop (bulletin board or poster board). It doesn't matter where they glue their cards. Sun, air, water and soil should be illustrated on the backdrop.

4. Tack one end of the yarn onto one of the cards, the students can then direct you to stretch the string to another card, it has to be an illustration of something that your first picture needs to survive or something that needs it (i.e. a snail needs plants, a bird eats a snail). Continue your discussion, stretching out yarn from one picture and tacking it to another picture of something that has a relationship with it. You decide when to stop. What you will end up with is a visual food web which demonstrates how everything in an ecosystem depends on each other for survival. It will also demonstrate how complex the relationships can become.

*continued*

## Follow-Up

**5** Pretend that you are going to remove one item from the food web. Follow, or pull on the yarn, what will be affected if this organism is removed?

**6** Brain-storm with your students why something may get eliminated from the food web.

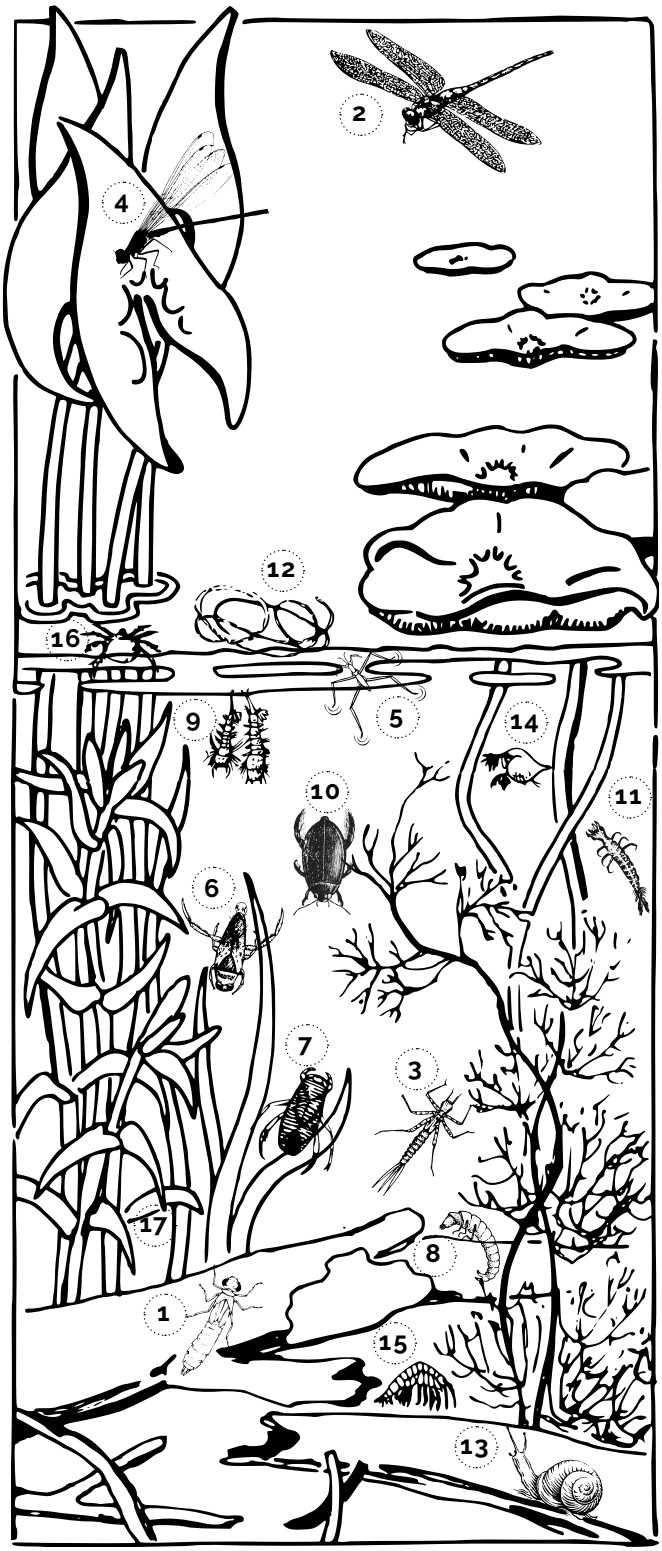
**7** What can you do to m ake sure an ecosystem remains healthy?

### OPTION

This activity can also been done using students instead of creating a bulletin board.

Simply have each student pin their card onto their shirt. Get them to stand in a circle, choose which creature to start with and then begin creating the food web with the yarn.

# Attachment #1 A - Wetlands Exploration




| What is it? | What Does It Eat |
|---|---|
| **1 Dragonfly Nymph** | • aquatic insects<br>• small fish<br>• tadpoles |
| **2 Dragonfly Adult** | • other flying insects |
| **3 Damselfly Nymph** | • aquatic insects including each other! |
| **4 Damselfly Adult** | • other flying insects |
| **5 Water Strider** | • small insects including each other |
| **6 Backswimmer** | • aquatic insects including each other<br>• small fish |
| **7 Water Boatman** | • algae<br>• microscopic animals |
| **8 Caddisfly Larva** | • algae<br>• plants<br>• larva<br>• worms<br>• crustaceans |
| **9 Mosquito Larva** | • algae<br>• microscopic animals |
| **10 Diving Beetle** | • insects including each other!<br>• small fish |
| **11 Diving Beetle Larva** | • insects<br>• small fish<br>• tadpoles |
| **12 Horsehair Worm** | • adults don't eat<br>• young are parasites |
| **13 Snail** | • live and dead plant matter |
| **14 Water flea** | • algae<br>• microscopic animals<br>• detritus |
| **15 Sideswimmer** | • algae<br>• detritus |
| **16 Water Mite** | • small insects<br>• worms<br>• detritus |
| **17 Plants & Algae** | • Photosynthesisers |

# Attachment #1 B - Wetlands Gallery

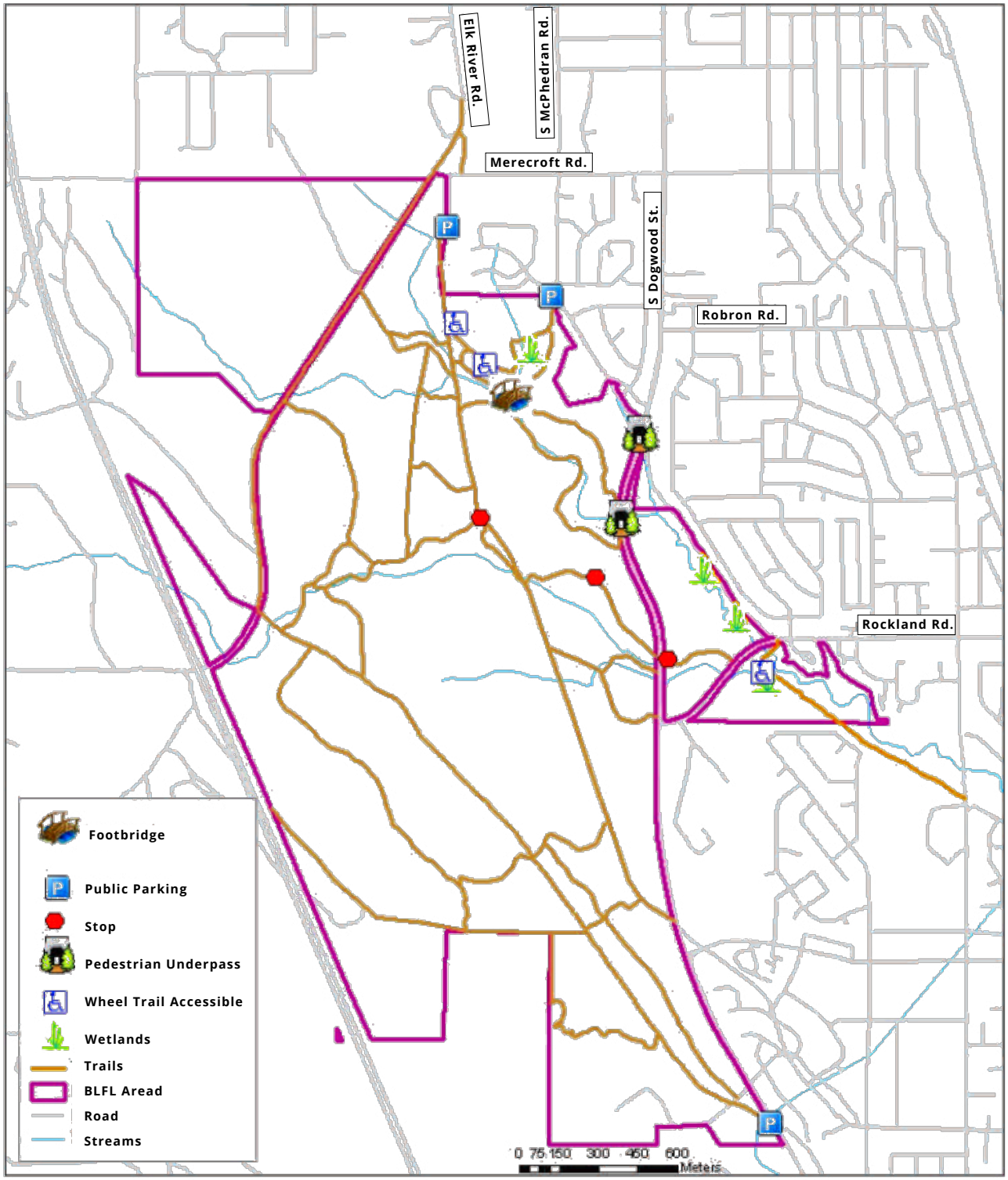
**1** Closely observe one of the producers, consumers, and decomposers that you found. Sketch them in detail.

| | | |
|---|---|---|
| PRODUCER | CONSUMER | DECOMPOSER |

**2** How has each of your organisms adapted to perform its role in this ecosystem?

| PRODUCER | CONSUMER | DECOMPOSER |
|---|---|---|
| e.g. large leaves to capture the sun's energy | e.g. spines on legs to help grasp prey | e.g. rasping mouthparts to scrape at food |
| | | |

# Attachment #2 - Wetlands Map



## ACTIVITIES:

PRE TRIP

1 "Oh Fish"

FIELD TRIP

2 Fish Habitat Exploration

POST TRIP

3 Fish Habitat Model

# Fish Habitat

### Background

Simms Creek, which runs through the Beaver Lodge Forest Lands (BLFL), supports a variety of salmonids (coho, chinook, pink, chum) and Cutthroat trout. In recent years, the number of coho adults returning to spawn varies from just one to three hundred. To increase fish populations and provide better habitat for fish, the creek has been stocked with coho and stream sections have been enhanced. To maintain a healthy population of fish, good habitat is essential. Fish habitat requires a well - established riparian zone, good stream features and good water quality.

**A well-established riparian zone will:**

- provide roots to keep the stream's banks from eroding and dumping silt into the system
- filter rain water run-off before it reaches the stream

### LESSON PLAN OBJECTIVES

» define habitat

» recognize the characteristics of good fish habitat

» understand how stream and riparian features affect fish

### SKILLS & APPLICATIONS

cooperating

designing

exploring

interpreting

observing

TABLE OF CONTENTS

- provide shade which keeps the temperature of the water down
- provide food for all aquatic organisms (plants drop litter and insects)
- provide protection from predators under overhanging plants

**Good stream features include:**

- pools, back eddies and under-cut banks to hide and rest in
- riffles (easily sloped runs that look like wash- board) to oxygenate the water. If these riffles have the right size of gravel, they are also good for spawning
- low-lying areas or smaller tributaries to hide in during floods

**Good water quality requires:**

- fast tumbling water to increase the oxygen content, to stay cool and resist warm water diseases, and to pass oxygenated water over fish's gills and through gravel to aerate eggs
- slow water to rest in and to provide cleaner water where sediment has settled out

**VOCABULARY**

silt
riffle
aquatic
habitat
enhancement
oxygenated
riparian zone
salmonid
spawning

*Students play an active game to learn what the important components of habitat are and the varying needs of fish in different stages of their life cycle.*

### MATERIALS

- 4 survey cones
- 1 white board with stand and felt pens
- 1 copy of the Salmonid Life Cycle (Attachment #1 )

### SETTING

Schoolyard or gym

### DURATION

1 Hour

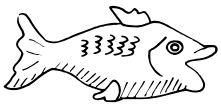
# ACTIVITY 1: "Oh Fish"

## Procedure

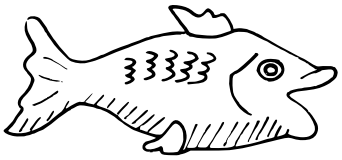
1. Define what a habitat is by discussing fish survival needs (food, clean and oxygenated water, shelter to hide from predators and the sun, and space for life cycle needs).
2. Assume there is enough space so you only have three components. Show students the hand signal for each component (Food = hands on belly. Shelter = hands forming a roof over their head. Water = hands over mouth).
3. Put 4 cones, forming a square, with cones 15ft apart
4. Play the game:
   - a. Four students line up on one side (adult fish) behind the cones and the rest of the class is on the other side (habitat). Everyone has their back turned to each other. Using habitat component hand signals, the four fish each decide what kind of habitat component they are looking for. Each student on the habitat side also chooses a hand signal to indicate which component of the habitat they represent. Hand signals stay the same for each round.
   - b. Once they have all of their hand signals decided, the teacher yells, "Oh Fish" and all students turn around to see what hand signal matches theirs. While holding the sign they have made, the fish run to the habitat side to "take" a component that matches theirs. The rest of the class stays put.
   - c. The fish take the component back to their side of the line where they become fish too. Count the number of fish that survived that year (one round) and put it on a graph on the white board (horizontal axis = year, vertical axis = number of surviving fish).

*continued*

**d** Students turn their backs, do a new hand signal and repeat the game. Fish that do not find a match go to the habitat side. Line up, turn around, get hand signals, and repeat again. Play for about ten rounds graphing the fish population after each round.

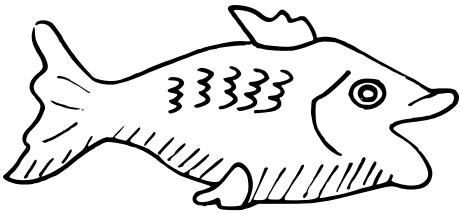


## Follow-Up



**5** Talk about the population graph and whether or not it is natural for a population to fluctuate.

**6** Play the game again, this time have one or two students represent disease, pollution, or predators. These students cross their hands and can touch any unmatched fish. The fish is then out of the game. How did these outside influences affect the fish population?



**7** What are some other variables that can cause these population fluctuations?

*Adapted from Project Wild "Oh Deer! game.*

## Extension

**1** Visit the Quinsam or Oyster River Hatcheries or have Department of Fisheries and Oceans staff visit class.

**2** Draw salmonid life cycle on board (or use **Attachment 1** as an overhead) and discuss the changing habitat needs of these fish at different stages in their life (e.g. fry will get swept downstream in floods, whereas adults will not. Fry need to hide from big fish and big fish need to hide from land animals so the size of hiding places changes).

*Students map a stream section and determine the components of fish habitat available in Simms Creek.*

### MATERIALS

- one copy of Route map (Attachment #2)

Each Group

- Simms Creek Fish Habitat Survey (Attachment #3)
- clipboard with drawing and writing equipment
- 20m tape measure

### SETTING

See Route Map (Attachment #2)

### TIME OF YEAR

It's best in spring and fall after a rain so the creek has water

### DURATION

2.5 Hour

# ACTIVITY 2: Fish Habitat Exploration

TEACHER NOTE

*Preview route first (Attachment #2) and establish safety rules for field trip with your group.*

## Procedure

1. Start at the south end, east side of South Simms Creek bridge on Dogwood Street (Stop 1 on **Attachment #2 - Route Map**). Looking down at the creek, review habitat components from Activity 1.
2. Proceed under the bridge as a group (watching out for trolls) - check out the stream side (riparian) vegetation of both sides of the bridge.
3. Define **(a) the riparian zone** (area along the stream side that is affected by moisture) and **(b) pools and riffles** (fast moving water with broken surface) within the stream.
4. Divide students into groups of four, and handout **Attachment #3 - Simms Creek Fish Habitat Survey.**
5. Groups measure out a 10-20m stream section and mark the start and end with a rock or stick. Overlapping sections are acceptable.
6. Groups draw a map of their section of stream as if they were looking down from above. Include any bends in the stream, logs, overhanging plants, pools, riffles, gravel beds, silted areas (very fine-grained sediment), boulders, dams, etc.
7. Complete the **Attachment #4 - Habitat Components Checklist** on the back of their assignment

*continued*

### SPECIAL CONSIDERATIONS

Please proceed with extreme care in the riparian zone and in the stream. All specimens must be returned and care must be taken not to damage anything. Before doing any instream work, check with the Department of Fisheries and Oceans to check that the timing will not harm spawning fish or eggs. For added safety and guidance, one adult supervisor per group is recommended.

*If there is no water in the creek, students can still complete this lesson plan.*

## Extension

After completing the stream study, take the students back up to the bridge, cross Dogwood Street and follow the Rail Trail. They will study the creek's physical changes (helpful for completing the next activity, the Fish Habitat Model).

Use the route map to stop at points marked.

- At Stop 2 the Creek has branched off and is much smaller with lower banks. ...while on the bridge, observe any changes in stream activity and riparian vegetation. Try to have a look for fish ...depending on the time of year you may see either fry or adults. What kind are they?
- At Stop 3 the Creek is in a steep gully. Note that fish really do make it through here. At this point though, the stream can dry up. Note any changes in the creekbed. Discuss what impacts they may have on fish habitat.

If time allows, end at the Simms East Trail Kiosk on the north side of Rockland Road just east of Dogwood Street. There are many manmade stream enhancement features here on both sides of the road (ie. anchored large woody debris, pools, riffles, gravel for spawning, settling ponds for urban run-off and streamside plants). Summarize all of the features they can see.

*Student groups make a clay model of good fish habitat including riparian and stream features that they studied in the field.*

# ACTIVITY 3: Fish Habitat Model

## Procedure

1. In groups of four, students make a landscape model of a stream out of clay. They decide on steepness of the banks and add tributaries, pools, riffles, and any other features that may provide fish with good habitat.
2. Using collected plant bits, groups add in all of the features that they noted in their field assignment map and check list.
3. Display proudly!

## Follow-Up

1. Discuss differences in models.
2. Many streams, including Simms Creek, have had stream enhancement work done to them (ie. spawning riffles made, banks stabilized by planting trees and shrubs). Why do they require our help? (Fish populations have been declining over the years through things like logging, housing and roadways. These all result in poorer habitat.)

### MATERIALS

Each Group

- one ice cream bucket of clay
- a wooden working surface (desktop size)
- cutting tools
- plastic to cover model (if you run out of time)
- bits of branches, twigs, leaves, moss, etc. for riparian features

### SETTING

Classrom

### DURATION

1-3 Hours

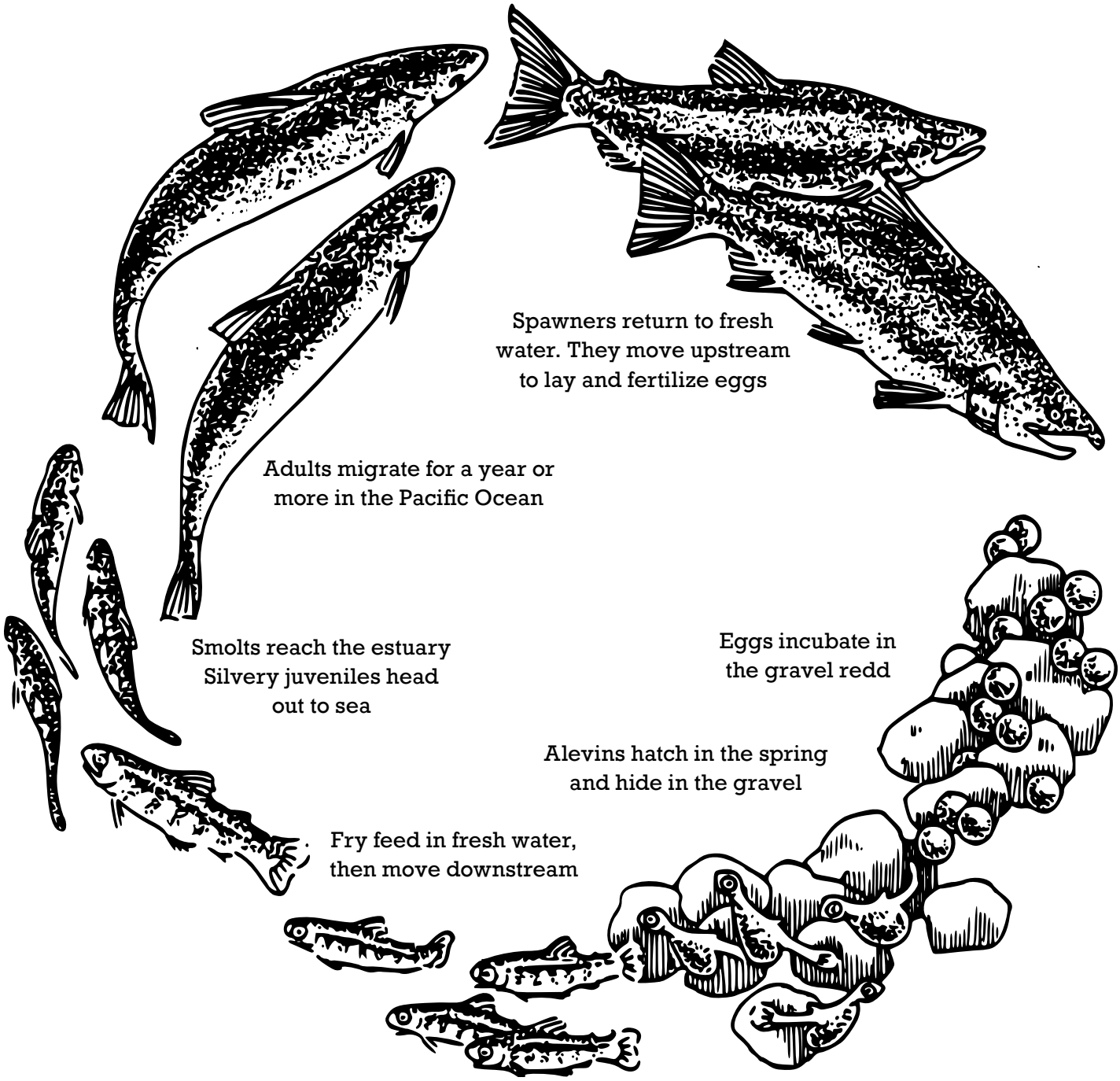
## Extension

Have students make points of interest (colored pins) on their models and make an informative sign to describe their importance (ie. riffles, logs).

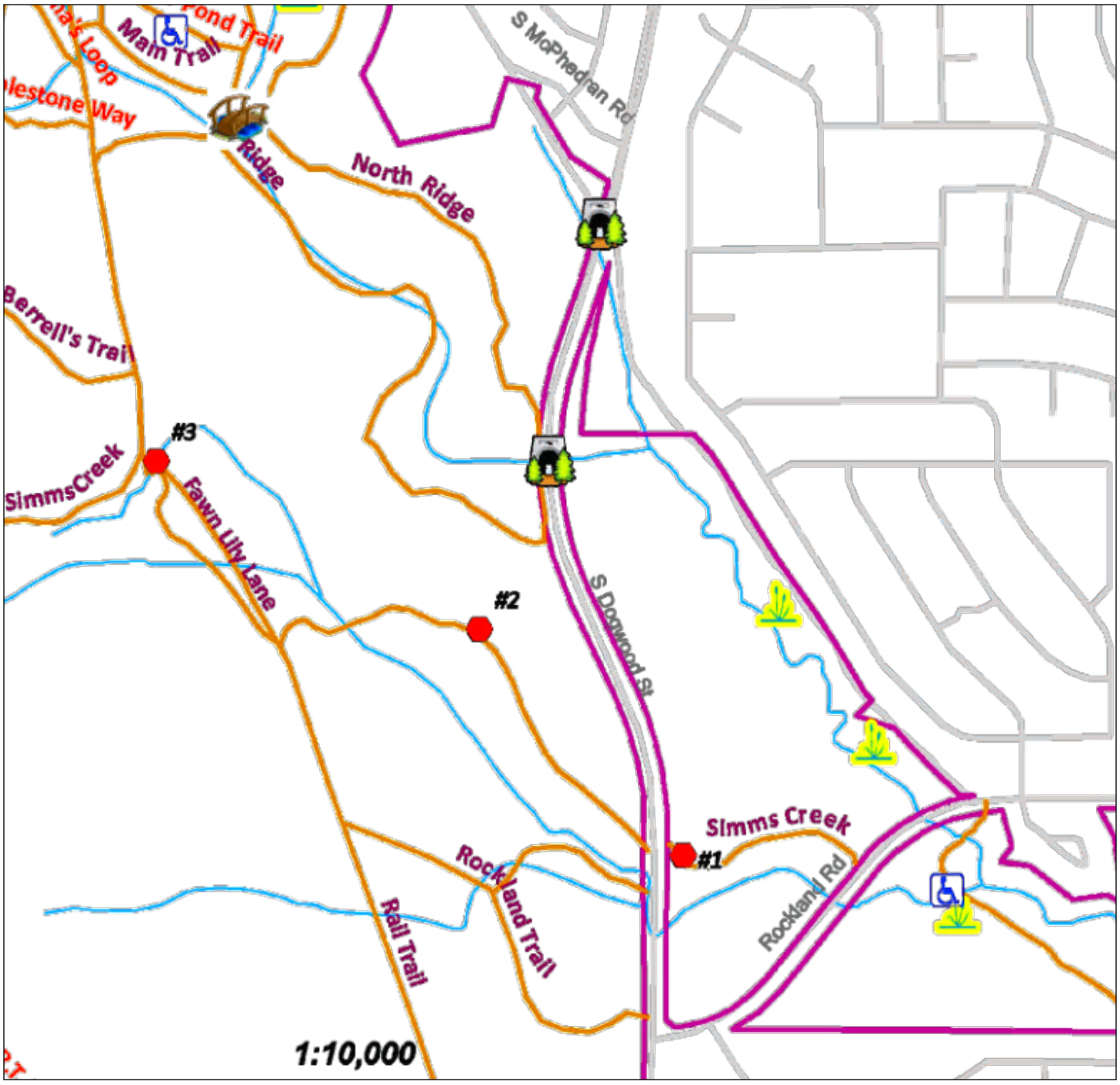
# Attachment #1 - Salmonid Life Cycle

*Taken from "Gently Down The Stream"*

## Life Cycle In Nature



# Attachment #2 - Route Map



# Attachment #3 - Simms Creek Fish Habitat Survey

**Student:**

**Map of Creek Section**

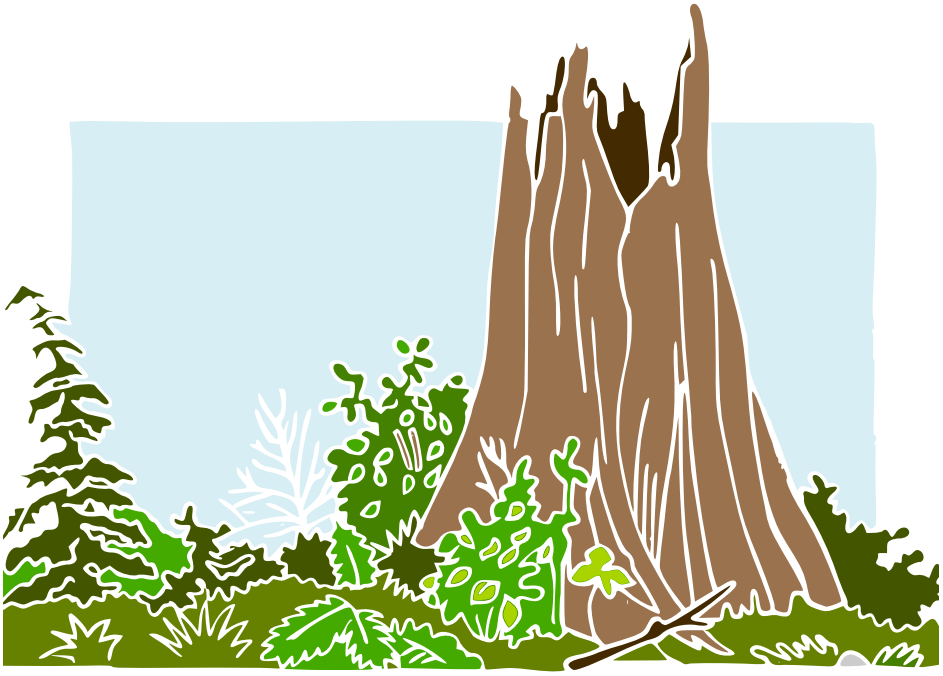
**Legend**

| | | | |
|---|---|---|---|
| pools | riffles | silt | gravel |
| logs or branches | overhanging plants | animal signs | wet area not instream |

# Attachment #4 - Habitat Components Checklist

**Check off components if you see them or evidence of them in your stream section; make sure you draw them on your map**

| HABITAT COMPONENT | RIPARIAN ZONE PROVIDES | CHECK OFF HERE |
|---|---|---|
| **Food** | Overhanging plants that drop insects and leaf litter (these feed aquatic insects too) | |
| **Shelter** | overhanging logs and plants for hiding spaces | |
| **Water** | shade for lower temperature | |
| **Space** | roots to stop bank erosion | |
| | **STREAM PROVIDES** | |
| **Food** | habitat for aquatic organisms that fish eat | |
| **Shelter** | deep dark pools | |
| | undercut banks to hide in | |
| | aquatic plants to hide in | |
| | back eddies and smaller streams (tributaries) to hide in during floods and fast water | |
| **Water** | riffles and falls for oxygen input | |
| | cool deep pools to retain water year round and to let sediment settle out of the water. This results in cleaner water. | |
| **Space** | streambed of gravel and oxygenated* water to spawn | |



## ACTIVITIES:

PRE TRIP

1 What is a Wildlife Tree?

FIELD TRIP

2 Wildlife Tree Scavenger Hunt

POST TRIP

3 Wildlife Tree Apartment

# Dead Trees

### Background

BC's forests contain many different habitats and communities. One of these communities centers around dead and dying trees, or wildlife trees (WTs). Within the forest ecosystem there are plants at many different stages of their life cycle. How long the life cycle takes depends on the plant species, plus effects from fire, wind, rain, lightening, snow, insects and other animals, including man.

A tree typically grows from a young seedling to a healthy mature tree, then dies and decays. The Wildlife Tree Committee of BC has defined nine stages of wildlife trees and identified the different animal species utilizing the trees for various purposes. Live trees may be used by smaller birds such as chickadees and wrens for insect and seed eating. Other birds such as hawks, robins, great horned owls and ravens use live trees for nesting. Mammals such as squirrels eat seeds from live trees. As trees die and decay other animals utilize them. Woodpeckers excavate nests and feed on insects in decaying trees. In subsequent years, other animals such

### LESSON PLAN OBJECTIVES

» understand what wildlife trees are

» identify wildlife trees

» understand the role of wildlife trees in the forest ecosystem

### SKILLS & APPLICATIONS

communicating

comparing

observing

researching

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as owls, kestrels, squirrels and some duck species use the old woodpecker holes for nesting or shelter. Raptors also use dead or dying trees for hunting perches. Other animals using WTs include salamanders, various insect species, bats, slugs, martens, ermine, weasels, raccoons, bears and many other bird species. In fact over 90 animal species (not including insects) have been identified as being partly or very dependent on WT's in BC.

It is important to understand that tree growth, death and decay is a process. The attachment, "The Nine Stages of a Wildlife Tree", diagrams a typical decay scenario. Every tree will, however, decay differently depending on the environmental factors at work.

### VOCABULARY

ecosystem

food web

midden

lichen

primary cavity nester

secondary cavity nester

wildlife tree

## SAFETY WARNING

Wildlife trees are often very unsafe to work around since they include dead trees, or snags. When logging old growth forest, WorkSafe BC will usually not allow loggers to work around snags, therefore they must be cut down. As a tree's roots and trunk decay, there is less strong wood holding up the tree. It will fall down some time. It may only take a slight breeze or a light push or vibration. Other danger occurs when only the top falls off, or when the top falls opposite to the bottom of the trunk (this can occur when a tree is pushed or knocked over).

**It is imperative that students do not touch, push, jump around or throw things near dead or dying trees.** The only safe WTs are stages 1, 8 and 9, and possibly class 2 and 7 trees as described in **Attachment #1 - The Nine Stages of a Wildlife Tree.**

*This activity introduces students to wildlife trees, wildlife tree stages and animals that depend on wildlife trees.*

### MATERIALS

Each Student

- The Nine Stages of a Wildlife Tree (Attachment #1).

### SETTING

Classroom

### DURATION

30-45 minutes

# ACTIVITY 1: What is a Wildlife Tree?

## Procedure

1. Divide students into groups of two or three and pass out a copy of **The Nine Stages of a Wildlife Tree** to each student.
2. Introduce wildlife trees (WTs) to students. Ask students
   - What are WTs? (Forests usually have trees at different stages of their life cycle, just as a town will have people at different life cycle stages; WT's are part of the forest ecosystem, important to many wildlife species; any standing dead or living tree with special characteristics that provide habitat for wildlife is a WT; at different stages of its life, shown in the nine-stage diagram, a tree offers food, shelter or water for different wildlife species.)
   - Where can people find WTs? (In most forests, especially old-growth forests, all stages are present. In previously logged second-growth forests, there are often proportionately more stage 1 and 2 trees; WTs can also be found in towns, along streets, in parks.)
3. In their groups, get students to discuss and write down what animals (birds, insects, mammals, amphibians) might be found using each WT stage.
4. After 15 minutes, discuss students' results and write responses on the board.

## Follow-up

1. Introduce primary and secondary cavity nesters and their importance. (Woodpeckers plus a few other smaller birds are primary cavity nesters. They are responsible for excavating nests to lay eggs in for one season. After that, other animal species, secondary cavity nesters, can use the holes for homes or shelter.)
2. Name some secondary cavity users. (Some owl and duck species, other birds, swallows, squirrels, martens, raccoons, mice, insects, spiders.)

*Students explore the BLFL's and discover wildlife trees.*

### MATERIALS

Each Group

- One copy of The Nine Stages of a Wildlife Tree (Attachment #1)
- One copy of the Wildlife Tree Scavenger Hunt (Attachment #2)
- Clipboard
- Pencils

### SETTING

The Main Trail is an ideal location for this activity. Walk in about 300 m (5 minutes) to the trail intersection and have students work back towards the parking area.

### DURATION

1.5 - 2 Hours

### SPECIAL CONSIDERATIONS

It is imperative that students do not touch, push, jump around or throw things near or at dead or dying trees.

# ACTIVITY 2: Wildlife Tree Scavenger Hunt

## Procedure

1. At the parking area, reiterate the importance and characteristics of WTs. Review the nine WT stages. Discuss SAFETY issues around WT's with your class. Students do not need to go close to the WT's to do this activity.
2. Walk along the trail showing students several WT examples.
3. Define the trail area your class is working in, your time allotment (45 minutes is recommended) and your meeting place.
4. Divide students into groups of two or three. Pass out one copy of **Attachment#1 - The Nine Stages of a Wildlife Tree** and the **Attachment #2 - Wildlife Tree Scavenger Hunt** sheet and go over the items for clarification.
5. Send students on the scavenger hunt.

## Follow-up

After regrouping, walk the trail to view and discuss student findings, focusing on interesting observations, creative answers and problem areas.

*Students make Wildlife Tree displays to reinforce the diversity of life that depends on them.*

# ACTIVITY 3: Wildlife Tree Apartments

### MATERIALS

Each Group

- Wildlife Tree Dependent Species in the BLFL (Attachment #3)
- 4 brown cardboard boxes (different sizes okay as long as they stack up)
- felt pens and paints
- student Scavenger Hunt lists
- from outdoor activity

### SETTING

Classroom

### DURATION

45-60 minutes

***Adapted from "Animal Inns Under Construction", Wildlife Trees of BC*

### Procedure

1. Review your findings from the BLFL. Divide students into five groups and pass out four brown cardboard boxes to each group.
2. Assign a **Wildlife Tree dependant Species** that could be found in the BLFL to each student (See **Attachment #2**). Each student is to draw and color a picture of their animal on one side of the box (some sides may need two drawings, or may be a nest or group, i.e. ants, birds, squirrels, bats). Make the drawings fairly large and colorful.
3. After drawings are completed, stack the boxes on top of each other to represent a WT. Discuss the variety between wildlife trees with your class.

### Follow-up

1. How would it affect the community or food web if a WT dependent species was taken out? (i.e. woodpecker).
2. What may happen if a big storm blew down most of the trees in the BLFL? Could animals move and adapt to other habitats or areas? Would they all die?
3. What might the BLFL look like in 10 years? 100 years? (There should be more WTs; more WT dependent species).
4. What can you do to ensure there are enough WTs for all the animals? (Learn about WT communities and try to protect WT's as an important resource).

### Extension

1. Create a wildlife tree food web. Adapt **Activity 3** from the **Wetlands** Lesson Plan in this guide.
2. Have guest speakers from forest companies and local naturalist societies discuss their concerns about wildlife trees.

# Attachment #1 - The Nine Stages of a Wildlife Tree

**Decay Class**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |

**Description**

| Live/ healthy | Live/ unhealthy | Dead; | Dead; | Dead; | Dead; | Dead; | Debris; |
|---|---|---|---|---|---|---|---|
| no decay;<br>(tree has valuable habitat characteristics such as large clusters or gnarled branches or horizontal, thickly moss-covered branches.*) | internal decay or growth deformities (including insert damage, broken tops);<br>dying tree* | needles or twigs may be present<br>roots sound. | no needles/ twigs;<br>50% of branches lost<br>loose bark<br>top usually broken<br>roots stable. | most branches/ bark absent<br>some internal decay<br>roots of larger trees stable. | no branches or bark<br>sapwood/ heartwood sloughing from upper bole<br>decay more advanced<br>lateral roots of larger trees softening<br>smaller ones unstable. | extensive internal decay<br>outer shell may be hard<br>lateral roots completely decomposed<br>hollow or nearly hollow shells. | downed trees or stumps. |

**Uses & Users**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nesting<br>(e.g. Bald Eagle, Great Blue Heron colonies, Marbled Murrelet)<br>feeding<br>roosting<br>perching | Nesting/ roosting[1]<br>strong PCEs[2] (woodpeckers)<br>SCUs[3]<br>large- limb and platform nests (Ospreys)<br>insect feeders | Nesting/ roosting<br>strong PCEs<br>SCUs<br>bats | Nesting/ roosting<br>PCEs<br>SCUs<br>insect feeders. | Nesting/ roosting<br>weak PCEs (nuthatches, chickadees)<br>SCUs<br>bats<br>insect feeders | Weaker PCEs<br>SCUs<br>insect feeders<br>salamanders<br>small mammals<br>hunting perches | Insect feeders<br>salamanders<br>small mammals<br>hunting perches<br>occasionaly used by weak cavity excavators such as chickadees. | Insect feeders<br>salamanders<br>small mammals<br>drumming logs for grouse<br>flicker foraging<br>nutrient source. | |

1 1 Large witches' brooms provide nesting/denning habitat for some species (e.g. fisher, squirrels).
2 2 PCE = primary cavity excavator
3 3 SCU = secondary cavity excavator

*This classification system does not recognize root disease trees explicitly. Such trees become unstable at or before death.*

*Taken from the "Wildlife/Danger Tree Assessor's Course Workbook"*

# Attachment #2 - Wildlife Tree Scavenger Hunt

Check off the items listed below as you discover them.
Be careful not to disturb dead or dying trees - they may fall over easily.

**FIND THESE:**

- ◯ Stage 4 wildlife tree
- ◯ Insect holes in a stage 7, 8 or 9 tree
- ◯ A tree with a broken top
- ◯ A nurse log (trees starting to grow on an old tree)
- ◯ A stage 1 wildlife tree
- ◯ A good place for a bat to roost
- ◯ A squirrel
- ◯ Woodpecker holes
- ◯ A hunting perch
- ◯ Moss growing on a log
- ◯ A deciduous wildlife tree
- ◯ Hear a woodpecker tapping on a tree
- ◯ A stage 8 wildlife tree
- ◯ A wildlife tree in a wet habitat
- ◯ Lichen
- ◯ A cavity that might be in use
- ◯ A stage 6 wildlife tree
- ◯ A squirrel midden
- ◯ Fungi
- ◯ Insects that could be food for birds

*Adapted from "Wildlife Trees of British Columbia" - BC Ministry of Environment*

# Attachment #3 - Wildlife Tree Dependent Species

**FIND THESE:**

- ◯ great blue heron
- ◯ wood duck
- ◯ common goldeneye
- ◯ barrow's goldeneye
- ◯ bufflehead
- ◯ common merganser
- ◯ turkey
- ◯ vulture
- ◯ osprey
- ◯ bald eagle
- ◯ northern kestrel
- ◯ red-tailed hawk
- ◯ golden eagle
- ◯ American kestrel
- ◯ merlin
- ◯ barn owl
- ◯ western screech-owl
- ◯ great horned owl
- ◯ northern pygmy-owl
- ◯ northern saw-whet owl
- ◯ Vaux's swift
- ◯ belted kingfisher
- ◯ Lewis' woodpecker
- ◯ pileated woodpecker
- ◯ hairy woodpecker
- ◯ downy woodpecker
- ◯ three-toed woodpecker
- ◯ northern flicker
- ◯ red-breasted sapsucker
- ◯ tree swallow
- ◯ violet green swallow
- ◯ chestnut-backed chickadee
- ◯ red-breasted nuthatch
- ◯ brown creeper
- ◯ clouded salamander
- ◯ California bat
- ◯ Keen's long-eared bat
- ◯ little brown bat
- ◯ long-legged bat
- ◯ Yuma bat
- ◯ deer
- ◯ mouse
- ◯ red squirrel
- ◯ marten
- ◯ ermine
- ◯ long-tailed weasel
- ◯ raccoon
- ◯ black bear

## ACTIVITIES:

PRE TRIP

1 School Ground “Ecosystems”

FIELD TRIP

2 Biodiversity Detectives

POST TRIP

3 Wanted, Biodiversity!

# Biodiversity

### Background

Biodiversity is the full variety of life in an area, including ecosystem diversity, species diversity, and genetic diversity. In a forest, this diversity includes all of the trees, shrubs, herbs, mosses, lichens, mammals, insects, birds, fungi and much more. Biodiversity is very complex. It takes into account everything!

British Columbia is rich with diversity. BC has 142 mammal species, 488 bird species, 22 amphibian species, 18 reptile species and 451 fish species. There are also about 2,850 vascular plant species, 1,000 bryophytes (mosses and liverworts), 1,600 lichen species and over 10,000 fungi species.

There are three levels of biodiversity:

- **Genetic diversity** is the genetic variation found among individuals of the same species. Genetic diversity is essential for populations to survive and evolve.

### LESSON PLAN OBJECTIVES

» understand that land has ecosystem and species diversity

» understand the terms biodiversity, ecosystem and species

### SKILLS & APPLICATIONS

communicating

comparing

interpreting

data mapping

observing

researching

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- **Species diversity** is the vast number of plants, animals, bacteria, fungi, etc. In the Beaver Lodge Forest Lands (BLFL), species diversity is comprised of numerous bird species, rodents, deer, bears, and numerous other species.

- **Ecosystem diversity** includes the variety of ecosystems and how they function. Ecosystem diversity is comprised of all the different types of ecosystems in an area. In the BLFL, ecosystem diversity is comprised of wetlands, second-growth forests, and third-growth forests.

Conserving species diversity and sustaining viable ecosystems are essential to the health of the planet.

**VOCABULARY**

biodiversity

community

ecosystem

genetic

lichen

species

*Students map the variety of "ecosystems" found in their schoolyard.*

### MATERIALS

Each Group

- Clipboards
- pencils

### SETTING

Outdoors on your school grounds and indoors throughout your school

### DURATION

1 Hour

***Ecosystem**: a community of organisms in relationship with each other and their inorganic environment*

# ACTIVITY 1: School Ground "Ecosystems"

## Procedure

1. Introduce the term **"ecosystem"** to the students. Have students come up with a variety of ecosystems, focusing on a forest environment, and list them on the board (i.e. wetland, older forest, urban edge, etc.).

2. Get students to imagine that their school grounds is a big community made up of different ecosystems, such as the parking lot, the library, the gymnasium, the playground and the field. In this community, all these ecosystems are distinctly different from each other, but they also have interactions with each other.

3. Group students in pairs. With a notebook and pencil, students travel around their school grounds looking for specific areas that have specific uses. Have students draw and label a map of all the ecosystems they can find. Look for and list the living (biotic) and non-living (abiotic) things in each ecosystem.

4. Back in class, list and discuss all of the ecosystems the students discovered. Other groups may borrow ideas for their maps.

5. For a few minutes, discuss the ecosystems 'interactions (i.e. students arrive by cars, cars stay in the parking lot, but students go to the playground). Students use both the playground and the field; both are activity areas; one is grass, the other gravel. The classrooms and field are both used by students, one for work, one for play; the classrooms are sheltered, the field is not.)

*continued*

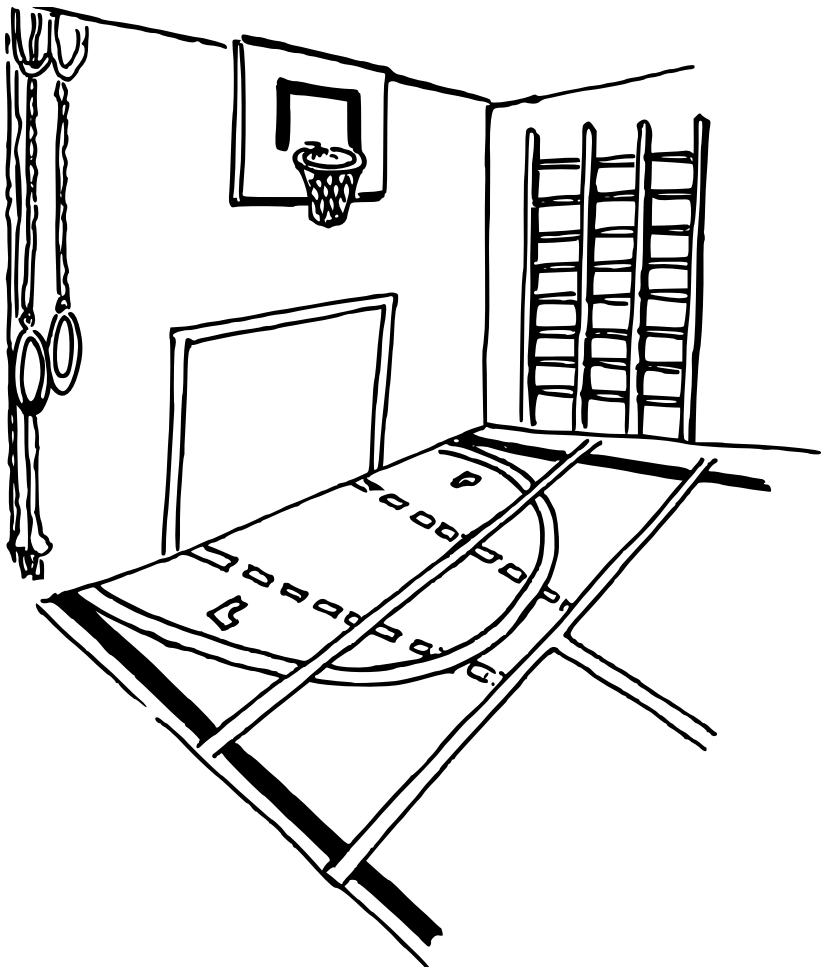
## Follow-up

1. Could a school function without all of the ecosystems that were discovered?

2. Refer back to the forest ecosystems and discuss how they interact with each other. Focus on plants, animals, water, light, weather, heat, soil, nutrients.

3. Compare students' use of school ground "ecosystems" with a cougar's use of forest ecosystems (i.e. large space to run and play, shelter from the elements, etc.).

4. Have students try to define the term -"biodiversity" and give examples. Discuss species diversity, ecosystem diversity, and genetic diversity.



*Students explore two different ecosystems and species diversity within each ecosystem.*

### MATERIALS

- one copy of the Biodiversity Clues (Attachment #1) cut up and put in an envelope.

Each Group

- Notebooks
- Pencils

### SETTING

The Main Trail is recommended but most other locations will work equally well. The more diverse the area the better.

### DURATION

2-3 Hours

# ACTIVITY 2: Biodiversity Detectives

## Procedure

1. Go out to the start of the Main Trail in the BLFL. Introduce the Biodiversity Detectives hunt by telling students that they will be comparing diversity within two different ecosystems.
2. As a group, move along the trail and show students examples of different ecosystems. (If you are at the Main Trail, the start has a wetland/riparian ecosystem right at the trail head. About 50 m down the trail is a second-growth forest ecosystem, then there is another wetland ecosystem and finally a forest ecosystem.) Inform the students that they have to hunt for all three of their **clues** in two different ecosystems, making sketches and notes about what they find.
3. Divide students into groups of three, have each group pick three clues out of the envelope.
4. Designate your search area. About 300 m along the Main Trail is a trail intersection. This may be a good location to walk your class to, then have them work back along the same trail. That intersection can also be your meeting place. Allow about 45 minutes. Stay on the trail. Go! If a group finishes quickly you can give them another clue to discover or have them look for their clues in another ecosystem.
5. Regroup, then lead the students back along the trail discussing the ecosystem and species diversity they encountered.

## Follow-up

1. Were you surprised at the diversity of life?
2. Were the three clues you looked for easy to find in both ecosystems?
3. Were the individual items you found in each ecosystem similar or different?
4. Why is it important to maintain biodiversity?

*Students make "Wanted" posters of a variety of species found within the Beaver Lodge Forest Lands.*

### MATERIALS

Each Student

- A sheet of poster paper
- Pencil crayons or paints

### SETTING

Classroom

### DURATION

2-3 Hours

WANTED

draw picture here

**BIODIVERSITY**

**WHAT**: Pileated woodpecker
**WHERE**: Beaver Lodge Forest Lands
**WHY**: Pileated woodpeckers are primary cavity excavators. This means that they make nest holes in dead trees. After the woodpeckers use the nest for one year, other animals can use the old nests for nests and shelter. Woodpeckers also eat many insects, keeping insect populations in balance, etc.

# ACTIVITY 2: Wanted: Biodiversity

## Procedure

1. Discuss what students found interesting and surprising about the biodiversity they encountered in the BLFL.

2. Discuss the three different types of biodiversity that they encountered (ecosystem, species, and genetic). For added visual effect and participation, draw the Main Trail on the board and roughly map the ecosystems on it with the students' input.

3. Discuss the ecosystems, focusing on what differences and similarities they have.

4. Have each student pick an animal or plant they found or could be found in one of the ecosystems they discovered. Research its role and importance to the biodiversity in the BLFL. Each student will make a **Wanted - Biodiversity** poster, where they will draw a picture of their animal or plant, then below the picture write some important biodiversity information about the organism. See the example on side of page.

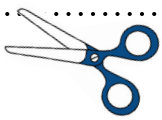
5. Put posters up around the class for everyone to view

## Follow-up

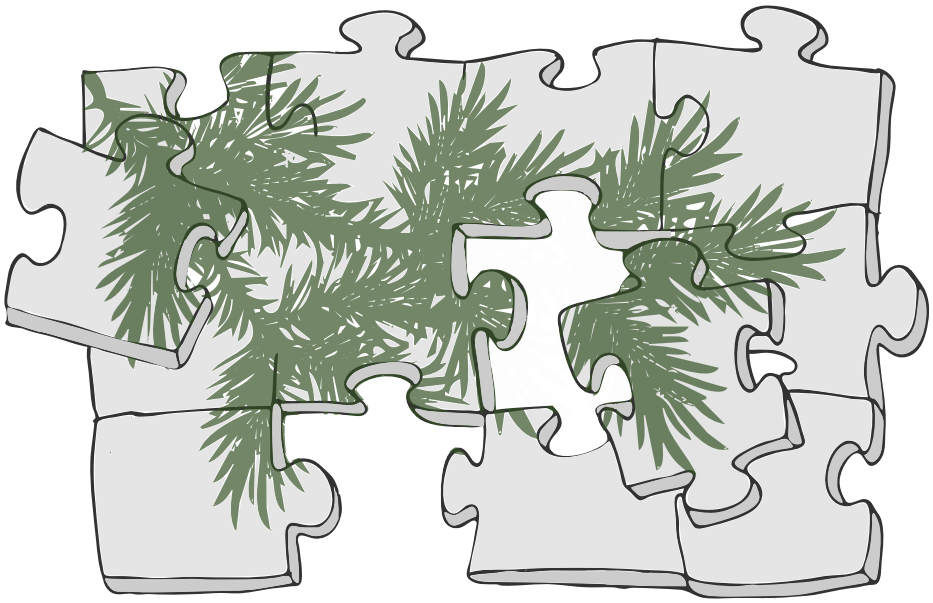
Discuss the importance of maintaining biodiversity in the Beaver Lodge Forest Lands.

# Attachment #1 - Biodiversity Clues

| | | |
|---|---|---|
| Find 3 different kinds of animals | Find 3 different kinds of seeds | Find 3 different kinds of trees |
| Find 3 different kinds of holes made by animals | Find 3 different sized leaves from the same plant | Find a very wet place, a dry place and a damp place |
| Find 3 different signs of an animal having eaten something | Find 3 different shapes of biodiversity - ex. square, triangle | Find 3 different signs that animals were using trees |
| Find 3 different kinds of leaves | Find 3 different kinds of “baby” plants | Find 3 different kinds of fungi |
| Find 3 different kinds of animal homes | Find 3 different kinds of leaf stalks | Find 3 different things growing on a tree |
| Find 3 different plants with different colors | Find 3 different kinds of spider webs | Find 3 different kinds of shrubs |
| Find 3 different kinds of insects | Find 3 different kinds of lichens | Find 3 different kinds of herbs |
| Find 3 different kinds of flowers or things with spores or seed | Find a bright place, a shady place and a very dark place | Find 3 different kinds of leaves with different textures |



***Adapted from “Backyard Biodiversity and Beyond”*



# Classification

## Background

Many people are naturally curious and interested in the world around them (especially children!). Being able to identify things in the natural environment gives a person a deeper understanding, awareness of, and respect for nature as a whole.

The simplest method of classifying living organisms is to use a **dichotomous key.** A dichotomous key allows for two choices of categories in which to place an organism. If the organism does not have the characteristics of one choice, it usually will have the characteristics of the other. You continue selecting between two choices for the organism until you have successfully identified it or "keyed it out".

### ACTIVITIES:

**PRE TRIP**

1 Leaf Hunt

2 Keying Out Friends

**FIELD TRIP**

3 What Is It?

**POST TRIP**

4 Make Your Own Field Guide

### LESSON PLAN OBJECTIVES

*Students will be able to:*

- recognize and describe differences among living organisms
- follow and develop their own simple dichotomous key
- understand the need for keys
- follow a simple dichotomous key for five tree species of the Beaver Lodge Forest Lands
- identify some common coniferous tree species
- follow alternative methods for classifying trees

### SKILLS & APPLICATIONS

classifying living things
observing
organizing
using tools to assist in conservation

### VOCABULARY

silhouette
dichotomous key
lichen
crown

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*Students do a leaf collection and classify the leaves according to their visual characteristics.*

### MATERIALS

Each Student

- a collection of leaves from home or school
- pencils and paper

### SETTING

Classroom or outdoors

### DURATION

45 minutes

### SPECIAL CONSIDERATIONS

Never strip leaves from trees or plants as it could be damaging.

Collect them from the ground instead.

# ACTIVITY 1: Leaf Hunt

## Procedure

1. Have students place their leaves on their desk or table tops. Ask for words that will describe each leaf (i.e. sharp, pointy, scaly, smooth, rough, green, brown, hairy, needle-like) and write them on the board.
2. Arrange students, and their leaves, in groups of three or four. Now, using the words from the blackboard, see if the students can arrange their leaves into groups (i.e. all of the needle-like leaves together). Have the students name and label their leaf groups (i.e. Smoothies, Bright Greens, Teeny Ones).
3. Get three of the group members to close their eyes while the other group member mentally picks out one of the leaves.
4. Now for the leaf hunt! The three group members have to try and guess which leaf the fourth group member is thinking of. They can ask "Yes" or "No" questions about the leaf (does it have sharp edges? Is it long and skinny?) until they can figure out which group it is in.
5. Students take turns playing this guessing game.

## Follow-up

Discuss the variety of distinguishing characteristics.

## Extension

Introduce common terminology used in tree identification:

**Leaf:** lobed, toothed, oval, elongated

**Branches**: alternate, opposite

**Bark:** furrowed, smooth

*Students will create their own dichotomous keys and use them to key out their classmates.*

### MATERIALS

Each Student

- Keying out Friends (Attachment #1A & B)
- pencils

### SETTING

Classroom

### DURATION

45 minutes

# ACTIVITY 2: Keying Out Friends

## Procedure

1. Hand out one **Attachment #1A & B - Keying out Friends** worksheet to each student.
2. Explain what a dichotomous key is and why it is useful.
3. Work through the **"Stick Friends"** key together with the class.
4. Split the class into groups of six. They will now be developing a key for their **"Real Friends".** Have them develop their own key for their group and then present it to the class.

## Follow-up

1. Was it easy or difficult to follow a dichotomous key?
2. How could the key you developed help out someone who was new to the class?
3. Would a dichotomous key have helped you to classify your leaves from the Leaf Hunt?
4. Why is it important for people to be able to identify things?

## Extension

Show students an actual dichotomous key (ask your librarian).

*Students will visit the BLFL and use visual clues plus a dichotomous key to identify five tree species within the forest. They will then collect some information needed to create their own field guides back in class.*

### MATERIALS

Each Student

- What is It? (Attachment #2A & B)
- clipboard
- blank paper
- pencil
- peeled crayon

Each Group

- a map of the trail you'll be following

### SETTING

Anywhere in BLFL

### DURATION

1-1.5 hours

# ACTIVITY 3: What Is It?

## Procedure

1. Split the class up into small groups or partners and hand out materials.
2. Go to one of the "What is It?" activity trail sites in the BLFL. Every tree species can be found at either of the indicated trail sites.
3. Explain to the students what they will be doing.

   **Part A**: Students will use their worksheets to identify the tree species.

   **Part B:** Students will record information about the trees they are identifying and do bark and leaf rubbings to add to their field guides later.
4. Find a fairly open site and demonstrate Parts A and B to the whole class. When you feel confident that the students can follow their keys, allow them to spread out and try to find and correctly identify the rest of the trees on their sheets. Remind them that they have to collect information and do bark and leaf rubbings for each tree.

   **Hint:** Students will need to know the difference between a deciduous and a coniferous tree. An easy way to remember which is which, is to tell them that a ***deciduous tree, decides to drop leaves*** and a ***coniferous tree, contains them***. They also need to know alternate versus opposite branching and lobed versus toothed leaves.

## Part A - Tree Identification

Use the visual clues on **Attachment #2A - What is It?** to identify a tree. To aid in confirming that your identification is correct, work through the **Attachment #2B - 5 Tree Dichotomous Key** on the back of the page. Were you right? If so, you can check off the tree as being found in the BLFL!

## Part B - Field Guide Information Gathering

After correctly identifying each tree, the students should record some information about the tree. Have them write down information that is useful to them individually (i.e. choose their own descriptive words that will help them remember what species the tree is).

Students can do bark and/or leaf (needle) rubbings by putting paper over the trunk or a bough and rubbing a peeled crayon sideways over top of the paper. This will create a nice imprint that can later be added to their field guides. **Make sure they label each rubbing with the tree species name.**

### HINT

One of these trees is not found in the BLFL! (Garry Oak)

?

### HINT

Different characteristic features will have to be considered at different times of the year.

If the deciduous trees have no leaves, students will have to rely on branch or bud information.

Cones can be picked up from the base of the tree and used to aid in identification.

## Follow-up

1. What are the species of trees that you have identified?
2. Which way of identifying was most accurate - visual clues or key-ing out?
3. Look around you, which species seems to be the most dominant? Would it be the same in 100 years?
4. Why would this information be useful to someone working in this forest?

## Extension

1. Take a closer look at trees, ferns, mosses or shrubs. Have students create their own keys for them based on their visual characteristics. Bring along some field guides and have students check to see if they have identified them correctly.
2. Make a BLFL flag. Use one of the classified trees as the flag's emblem.

*Students will create information cards about the tree species they identified. These cards will then be compiled into their own personal field guides.*

### MATERIALS

Each Student

- 6 index cards
- colored pencils
- bark and leaf rubbings from field trip
- glue stick

### SETTING

Classroom

### DURATION

45 min - 1 hour

# ACTIVITY 2: Make Your Own Field Guide

## Procedure

1. Discuss the variety of tree species that were found in the BLFL. Write the names of the species and a description of their distinguishing characteristics on the blackboard (bark, needles, cones, colour). Were there any other factors that helped to distinguish one species from another (where it was growing, how tall it was, was it in a sunny or shady spot)?

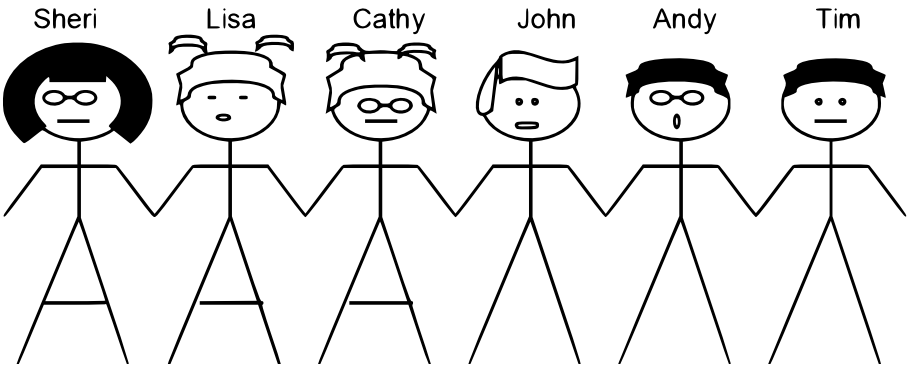
2. Give each student six file cards. They are going to make themselves a **"Field Guide to the Five Main Trees in the BLFL"**. Discuss the important information which would be included on a card and design the format of the card on the blackboard. Have them format their cards the same as the example on the board.

| | |
|---|---|
| **Tree's Name:** _____ | **Student's Name:** _____ |
| **Bark:** | **Leaf**: |
| (color, texture, cracks, rubbing) | (outline, color, rubbing) |
| **Buds**: | **Branches:** |
| (color, size, description) | (alternate, opposite) |

3. The students can then fill in their cards, using the information on the blackboard and from their field notes as a guideline. Small squares of the bark and leaf rubbings collected in the field can be cut and glued onto the appropriate cards.

4. When all five cards are completed students can make themselves a cover and staple them all together. Each student will now have their very own field guide for use the next time they visit the BLFL. Maybe they could take their families on an outing and teach them what some of the tree species are!

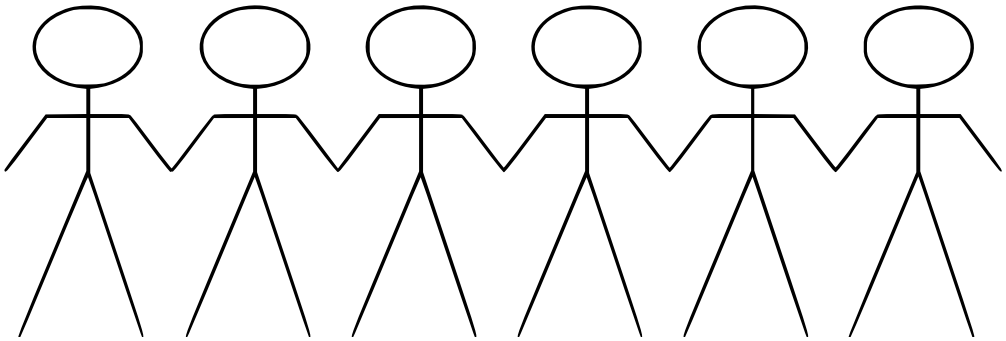
# Attachment #1 A - Keying Out Friends




Stick Friends

| | Column A | Column B |
|---|---|---|
| 1a | Boys | 2 |
| 1b | Girls | 3 |
| 2a | Glasses | Andy |
| 2b | No Glasses | 4 |
| 3a | | |
| 3b | | |
| 4a | | |
| 4b | | |
| 5a | | |
| 5b | | |
| 6a | | |
| 6b | | |
| 7a | | |
| 7b | | |

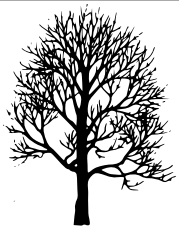
# Attachment #1 B - Keying Out Friends



Real Friends

| | Column A | Column B |
|---|---|---|
| 1a | | |
| 1b | | |
| 2a | | |
| 2b | | |
| 3a | | |
| 3b | | |
| 4a | | |
| 4b | | |
| 5a | | |
| 5b | | |
| 6a | | |
| 6b | | |
| 7a | | |
| 7b | | |

# Attachment #2 A - What Is It?

| Tree | Silhouette | General Description | Found In BLFL? |
|---|---|---|---|
| **Douglas-fir** |  | • large, up to 70 m. tall<br>• pyramid-like crown<br>• branches spreading to drooping<br>• young bark: smooth, grey brown<br>• mature bark: dark brown, thick ridged | |
| **Western Hemlock** |  | • large, up to 60 m. tall<br>• crown has drooping leader<br>• downsweeping branches, “feathery” foliage<br>• young bark: dark-brown<br>• mature bark: reddish-brown, rough, scaly, furrowed | |
| **Sitka Spruce** |  | • large, up to 70 m. tall<br>• main branches horizontal, branchlets drooping<br>• young bark: grey, smooth<br>• mature bark: reddish-brown to grey-brown, thin, scaly | |
| **Bigleaf Maple** |  | • large, multi-stemmed, up to 35 m. tall<br>• young bark: smooth, green<br>• mature bark: grey-brown, ridged, often covered with mosses, lichens and ferns | |
| **Garry Oak** |  | • heavy-limbed tree, up to 10 m. tall<br>• mature bark, light grey with thick furrows and ridges | |
| **Red Alder** |  | • up to 25 m. tall<br>• young bark, thin, grey and smooth with white patches of lichen<br>• mature bark, becomes scaly at base | |

****Hint - One of these tree species is not found within the BLFL's.*

# Attachment #2 B - 5 Tree Key

A dichotomous key for 5 main tree species within the Beaver Lodge Forest Lands.

**1** **A**. Deciduous, leaves broad, seed enclosed in a fruit.....2

**B**. Coniferous, leaves needle-like or scaly, seeds enclosed in a cone.....4

**2** **A**. Alternate branching.....3

**B**. Opposite branching, maple-like leaves, fruits 2-winged seeds ..... **Bigleaf Maple**

**3** **A**. Leaves lobed, oak-like, fruits acorn.....**Garry Oak**

**B**. Leaves toothed, fruit cone-like, up to 2 cm. long, flowers in catkins.....**Red Alder**

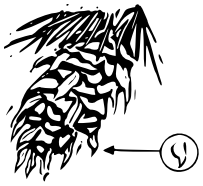
**4** **A**. Needles 4-sided, stiff, sharp-pointed,
cones reddish-brown with thin wavy, toothed scales.....**Sitka Spruce**

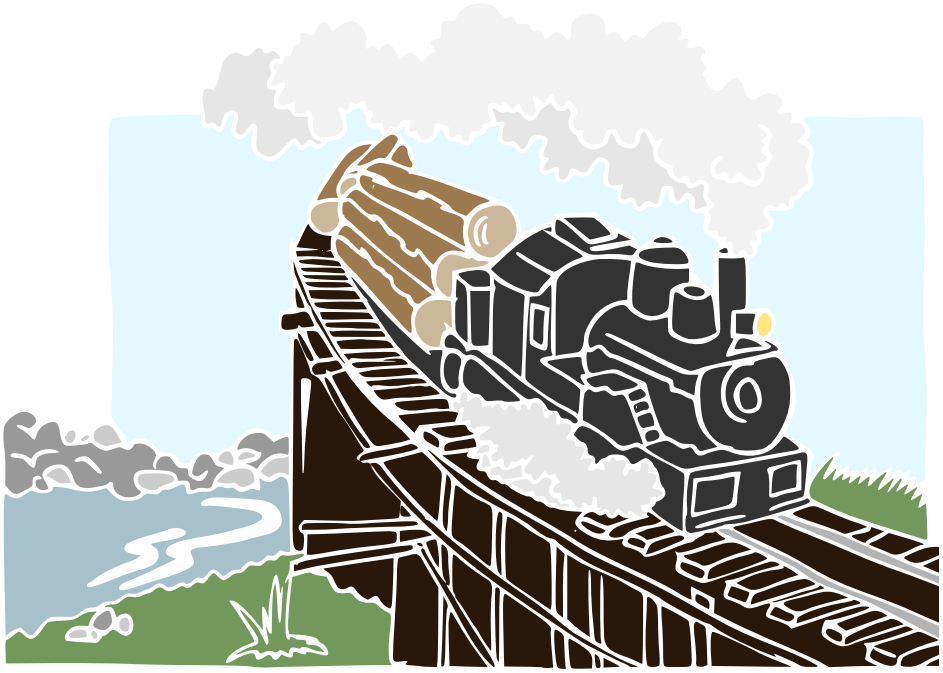
**B**. Needles flat.....5

**5** **A**. Needles yellowish-green, 2-3cm. long with pointed tips, 2 white stripes on lower surface, cones 5-10cm. long, 3-pronged bracts extending beyond scales.....**Douglas Fir**

**B**. Needles yellowish-green on top, whitish on bottom, of unequal length,
5 - 20 mm. long, cones about 2 cm. long.....**Western Hemlock**

## Seed Casings

| Bigleaf Maple | Garry Oak | Red Alder | Sitka Spruce | Douglas Fir | Western Hemlock |
|---|---|---|---|---|---|
|  |  |  |  |  |  |



# Economic Value

## Background

It is important to know the components of a forest in order to make proper land-use decisions. Many aspects of forest ecology and forest values are researched before decisions are made. One obviously important value is the economic value of a forest - how many dollars is it worth? This is important to know so that workers can be paid and logging companies can make a profit while logging using environmentally sound methods.

Timber cruising involves measuring a few trees, then applying the results to a whole forest. A few of the things that are often measured in a cruise plot are tree height, trunk diameter, the number of trees in a certain area (called a fixed-area plot) and the tree species. Plots may be circular or square. This lesson plan will use a square plot because simpler mathematical concepts are used.

There are options to introduce advanced mathematical concepts in this lesson plan. Some extra time may be devoted to those concepts or they may be presented in the simpler form, which adequately addresses the needs of the activity.

## ACTIVITIES:

PRE TRIP

1 Indoor Cruise Plots

FIELD TRIP

2 Now We're Cruising!

POST TRIP

3 What is it Worth?

### LESSON PLAN OBJECTIVES

- understand that people measure trees in forests to determine a dollar value
- conduct a simplified timber cruise
- understand forest economic values

### SKILLS & APPLICATIONS

measuring
observing
collecting and interpreting data
communicating
controlling variables using tools
using science in your community

### VOCABULARY

average
circumference
coniferous tree
cruise plot
diameter
deciduous tree
economic values
habitat

TABLE OF CONTENTS

*Students will practice performing simplified cruise plots in the classroom. This is intended as practice before doing the "real thing" in the field.*

### MATERIALS

- Cruise Plot Example (Attachment #1)
- orange traffic cone

Each Group

- Cruise Plot Tally Sheet (Attachment #2)
- Measuring tape (3 m or longer)

### SETTING

Classroom

### DURATION

45 minutes

### SUGGESTION

Invite a Forestry Professional to class to discuss our practices

# ACTIVITY 1: Indoor Timber Cruise Plots

## Procedure

1. Inform students that they will be measuring some trees in the Beaver Lodge Forest Lands (BLFL). Introduce circumferences, discussing why it is important to know how big around a tree's trunk is (more wood in bigger circumference trees = more value). Tree circumferences are measured at about 1.3 m above the ground height (for trunk bottom flair and consistency considerations). (Demonstrate this by measuring on a cone so that students can understand the effect of trunk flair.) Measure 1.3 m height on an average height child so students know roughly how high up a tree trunk they should measure. On this same child, measure their head, arm and chest circumferences and tell students what they are.

2. Referring to the **Attachment #1 - Cruise Plot Example** draw the cruise plot concept on the board (this is an overhead view). Draw several different sized circles for tree trunks. Draw a large square amongst your trees. This square represents the plot perimeter. Mention that the size of the square will be 10 m x 10 m when outside in the BLFL.

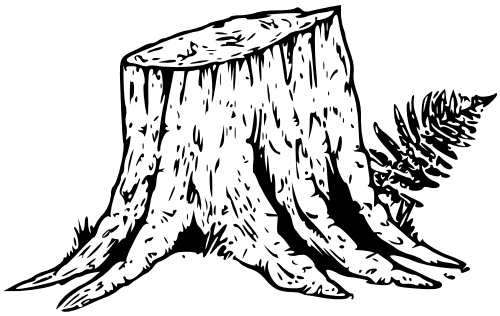
3. Demonstrate a practice plot indoors: Place four or five students around an open spot in the classroom. They are "trees" and should stay motionless.

4. Put markers a few metres apart at four corners amongst the "trees". (The plot size in the field will be 10 m x 10 m. You do not have to use that size now, but show how long 10 m is so students can visualize the size.) Decide which "trees" are inside or outside of the plot. If a tree is more than half-way out, then it is not considered inside the plot. If half or more of the tree is inside the plot, then consider the tree inside the plot. Demonstrate this by moving a "tree" to different locations inside, outside and on the edge of the plot.

*continued*

5 Using a measuring tape, measure the circumference of one or two “trees”. Demonstrate recording this information on **Attachment #2 - Cruise Tally Sheet**.

6 Have students practice doing a plot.



## Follow-up

Why would people go out and measure trees in a forest? (To determine the economic value of an area and to help make informed decisions regarding land use.)

## Extention

In their small groups, have students try to brainstorm how to estimate a tree’s height. Introduce **Attachment #3 - Three Methods for Determining Tree Heights**. Students can practice these methods outside.

*Students conduct simplified cruise plots in the BLFLs.*

### MATERIALS

Each Group

- 4 plot corner markers (anything colorful, fairly small, heavy, such as a beanbag, piece of wood, colored rock, small ball)
- 10 m long rope or string
- Measuring tape at least 3 m long
- 2 copies of Cruise Plot Tally Sheet (Attachment #2)
- Clipboard
- Pencils
- 4 orange safety vests

### SETTING (suggested only)

Walk in on Main Trail, about 300 m from the McPhedran Rd parking lot to the trail intersection, take the right-hand trail (Beaver Pond Trail) for 100 to 150 m. *(Lesson can be done in any treed area)*

**DURATION** 2-3 Hours

# ACTIVITY 2: Now We're Cruising!

## Procedure

1. Walk to the "Now We're Cruising!" location. As a group, walk off the trail several metres to a place where your group can conduct and view a short demonstration plot.

2. Review your classroom exercises, then establish a 10m x 10m plot.

3. Have one student stand at each corner and look towards another corner. Have the students determine "in" or "out" trees along the plot borderline. Point out coniferous versus deciduous trees. Students will be measuring coniferous trees only.

4. Count all of the trees inside the 10m square.

5. Measure the circumference of the "in" trees. Record one or two trees on a tally sheet for demonstration. **All "in" trees are measured and recorded on the tally sheets. "Out" trees are not measured.**

6. Define the forest area you want students to stay in (for safety concerns). Divide into groups of five or six . Hand each group four corner markers, a 10 m rope, tape measure (for measuring tree circumferences), tally sheets, clipboard, pencil and vests. The four students on the plot corners wear the vests.

7. Separate groups by 50 to 100 m if possible, using both sides of the trail. Pick representative forest sites to do the plots in (not openings). After each group completes one plot, do a second plot mid-way between other plot locations, letting all students try all duties. Try not to measure the same trees in two different plots.

*continued*

## Follow-up

1. Would you enjoy doing cruise plots for a living?
2. How will this information be useful?

### SPECIAL CONSIDERATION

It is important that students do not measure, touch or approach dead trees. These trees are very dangerous and must be avoided.

## Extension

Students use one of the three tree height measuring techniques **(Attachment #3)** and determine the height of one or two of the trees in their plot.

*Students determine a dollar value for the timber within the BLFL.*

### MATERIALS

- Calculator
- Tree Height Graph (Attachment #4)
- Tree volume table (Attachment #5)
- BLFL Summary and calculation sheet (Attachment #6)

### SETTING

Classroom

### DURATION

Teachers Preperation

45 min

Class

30 minutes

*You will be surprised by the value!*

# ACTIVITY 3: What Is It Worth?

TEACHER NOTE

*This activity is intended as a follow-up to the Simplified Cruise Plots in the BLFL, included in this Lesson Plan. Some of the longer calculations in this follow-up activity can be completed before class, by the teacher, or worked through during class with the students.*

## Procedure

1. Before class, the teacher should make a copy of **Attachments #4, #5 and #6.**
2. Work through the calculations, as an individual or with the class, using the information gathered in the field and recorded on the **Cruise Plot Tally Sheets.**
3. Briefly discuss the various habitats in the BLFL that do not have trees (wetlands, roads, etc.). The BLFL total about 500 ha, but subtract 100 ha of land containing non -productive coniferous forest, leaving about 400 ha of forest.
4. Introduce the concept of volume to your class. Mention that a telephone pole has about 1 m3 of wood in it. Show your desk and calculate a rough volume for it. (The standard teacher's desks have a volume of about 0.63$m^3$ .) Inform the class of the average volume of wood ineach tree in the BLFL that was determined using their data.
5. Determine the economic value of the BLFL using **Attachment #6 - BLFL Timber Cruise Plot Summary and Calculation sheet.**

*continued*

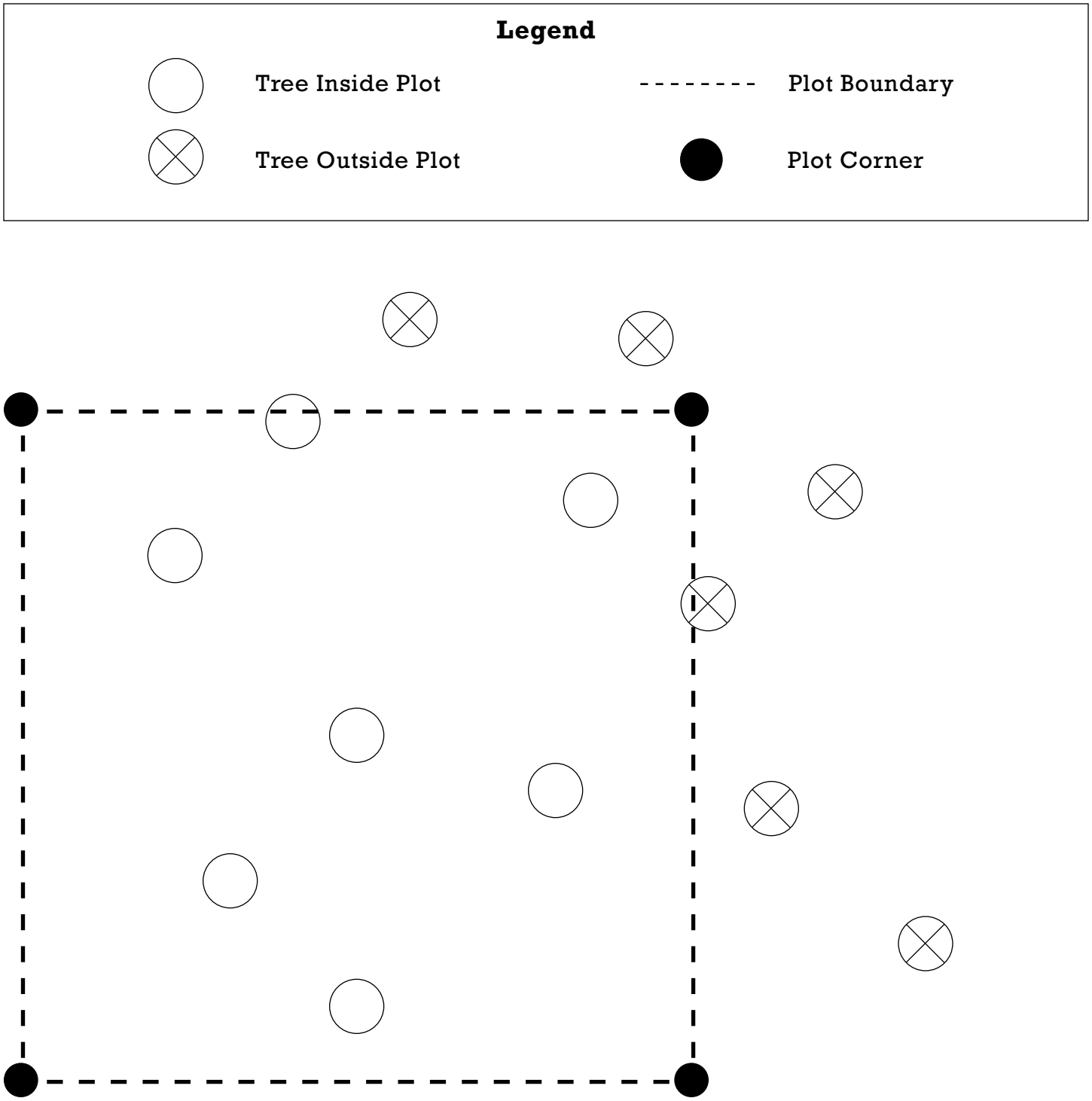
## Follow-up

**1** Discuss with your class the following: Does the dollar value of the BLFL surprise you? Discuss this value in terms of jobs in Campbell River. What other values does the BLFL have besides logging values? (ie: fisheries, hiking trails, bird watching, animal habitat, biking trails, wetlands, wildlife trees, education purposes, etc.)

**2** In small groups, have students research information and write a short report on the value of the BLFL. Use topics such as the following:

- Discuss the number of workers and different types of jobs and agencies that would be involved when deciding whether to log or protect the BLFL (Ministry personnel, Department of Fisheries and Oceans personnel, Campbell River community planners, foresters, school district personnel, computer technicians, surveyors, mappers/drafters, fallers, machine operators, logging companies...).
- Determine the number of logging truck loads of logs the BLFL represents. (Hint: find out how many logs a logging truck can hold, or how many m3 of wood a truck can carry. Students can look at photographs to get an idea. Based on tree sizes in the BLFL, an estimate of 30 logs per load is reasonable .)
- Is it worth logging some of the BLFL, all of it, or none of it? Discuss why you made your decision in terms of all the different values the BLFL has.

# Attachment #1 - Cruise Plot Example



# Attachment #2 - Beaver Lodge Forest Lands Cruise Plot Tally Sheet

Student Initials _____ Date_____

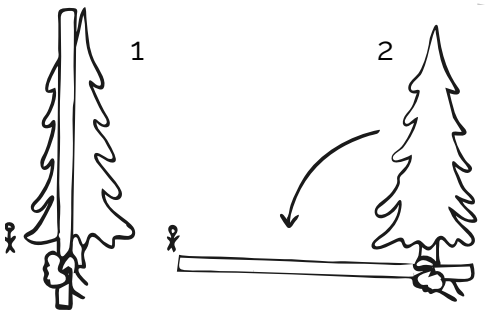
Plot Size 1/100 (ha)

| | Tree Species | Circumference (cm) |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |

**Tree Height Information**

# Attachment #3 - Three Methods of Determining Tree Heights

## 1 Right-angle Method




For this method, you must be able to see the tree's top and bottom, plus the ground area to one side of the tree.

**A.** Have a friend stand at the base of the tree you want to measure. Facing the tree, hold a 50 - 100 cm long stick straight up and down at arms length in front of your eye.

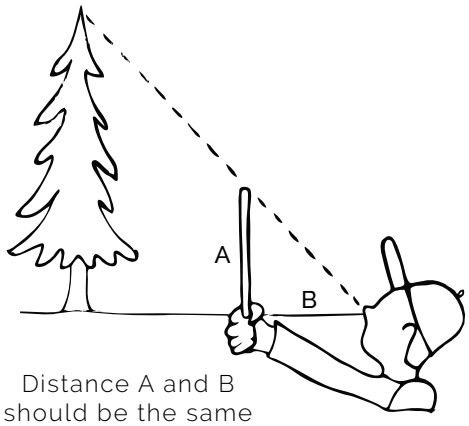
**B.** Back up until the top of the stick matches the top of the tree, the bottom of the stick matches the bottom of the tree.

**C.** Pivot the stick to the side until it appears flat along the ground, keeping the stick's bottom still lined up with the tree's bottom.

**D.** Have the friend walk away from the tree, at a right-angle to you and the tree, until the friend is at the top of the stick.

**E.** Measure the distance from your friend to the tree. This is the tree's height.

## 2 Equal Distances Method



Distance A and B should be the same

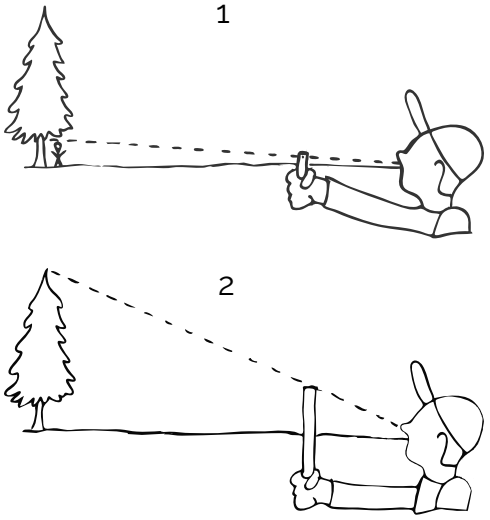
**A.** Stand 50 m or more back from the tree you want measured. Hold a 50 -75 cm long stick vertically in your fist, keeping your arm straight out in front of you so your fist is at eye level.

**B.** Have a friend measure the distance from your fist to your eye.

**C.** Adjust the stick so that the stick length above your fist is equal to the distance from your fist to your eye.

**D.** Facing the tree, keeping your arm straight out, walk backwards or forwards until the base of the tree lines up with the top of your fist and the top of the stick lines up with the top of the tree. Stop there, measure the distance between you and the tree. This is the tree's height.

## 3 Proportional Method




**A.** Get a friend to stand at the base of the tree you want to measure.

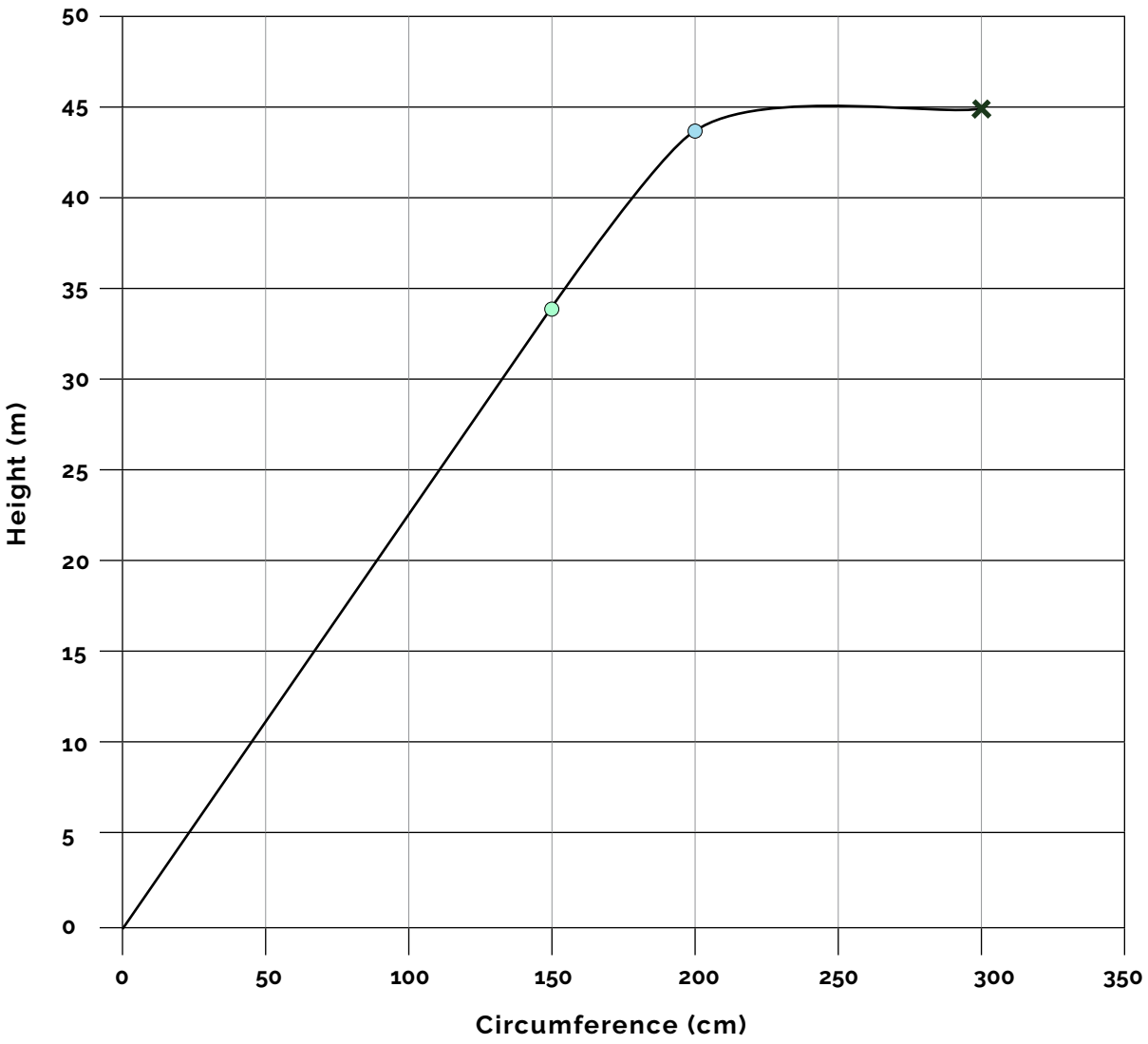
**B.** Stand 50 m or more away from the tree. As steady as possible, hold out a straight stick (metre stick) vertically at arms length and carefully position the top of the stick at the top of your friend's head. With your direction, have a second person put a pencil mark on the stick at the position where your friend's feet line up with the stick.

**C.** Staying in the same position, raise the stick vertically until the top of the stick lines up with the tree's top.

**D.** Have the person mark the stick where bottom of the tree lines up with the stick.

**E.** Measure your friend's height. The two marks on the stick show proportionately how much taller the tree is than your friend. Example: If the tree is 25 times as tall, then multiply your friend's height times 25. This is the tree's height.

# Attachment #4 - Height vs. Circumference Curve




1. Find the circumference of your tree on the x- axis (labelled Circumference).
2. From that circumference value make a straight line with your finger up to the purple graph line.
3. Mark an x in pencil on that position on the graph line.
4. From that x mark, draw a straight line with your finger to the left towards the y-axis (labelled Height).
5. The height value can then be estimated according to the position on the y-axis.
   Example: A 150 cm tree will be about 34 m tall.

# Attachment #5 - Tree Volume Table

| Tree Height (m) \ Tree Circumference (cm) | 100 | 120 | 140 | 160 | 180 | 200 | 220 |
|---|---|---|---|---|---|---|---|
| **55** | 1.52 | 2.1 | 2.86 | 3.74 | 4.73 | 5.84 | 7.06 |
| **50** | 1.33 | 1.91 | 2.6 | 3.4 | 4.3 | 5.31 | 6.42 |
| **45** | 1.19 | 1.72 | 2.34 | 3.06 | 3.87 | 4.78 | 5.78 |
| **40** | 1.06 | 1.53 | 2.08 | 2.72 | 3.44 | 4.25 | 5.14 |
| **35** | 0.93 | 1.34 | 1.82 | 2.38 | 3.01 | 3.72 | 4.5 |
| **30** | 0.8 | 1.15 | 1.56 | 2.04 | 2.58 | 3.18 | 3.85 |
| **25** | 0.66 | 0.96 | 1.3 | 1.7 | 2.14 | 2.65 | 3.21 |

1. Find your tree's height in the first (bold) column on the left.
2. Find your tree's circumference in the top (bold) row on the right.
3. Follow the row beside your tree's height measurement to the right until you meet the column which is under your tree's circumference measurement. The value you stop at is the tree's volume in cubic metres.
4. For example, if your tree's height is 45m and circumference is 160cm, then the tree's volume will be 3.06 cubic metres.

# Attachment #6 - Beaver Lodge Forest Lands Timber Cruise Plot Summary and Calculation Sheet

**1** Average number of trees per plot = _____

**2** Average tree trunk circumference = _____ (cm)

**3** Number of trees per hectare ( #1 x 10) = _____

**4** Average tree height = _____ (m)

**5** Average tree volume = _____ (m3)
(use numbers from #2 and #4 above. Look up in Attachment#4)

**6** Productive land area in the BLFL = 403 (ha)

**7** Total Number of trees in the BLFL = _____

**8** Dollar value of one cubic metre of wood = $ 85

**9** Dollar value of one tree (#5 x #8) = $ _____

**10** Dollar value of the BLFL (#7 x #9) = $ _____

## ACTIVITIES:

PRE TRIP

1 The Forest Management Cycle

FIELD TRIP

2 Mini Silviculture Plots

POST TRIP

3 The Survey Says.....!

# A Growing Forest

### Background

Before any logging occurs, foresters and planners begin the **forest management cycle.** Then, utilizing all available knowledge about a potential logging area, a plan is developed outlining the future of the land using Integrated Resource Management (IRM). This covers fisheries concerns, wildlife, recreation, plants, economic, forests, soils and any other concerns that might be pertinent to the land area. Foresters have to consider all IRM values when planning to log in an area. In addition to IRM principles, foresters will plan ahead to determine:

How an area will be logged; when an area will be logged; what type of forest is growing there now; what species will be replanted; how good the site is for growing trees and what financial value the forest has in that area.

**Silviculture** is the science and art of growing and caring for a forest. Carefully tending to a young forest can help trees stay healthy

### LESSON PLAN OBJECTIVES

- have an understanding that much planning occurs before an area is logged
- recognize some of the problems that occur in young forests
- understand the basics of the forest management cycle, including silviculture
- realize there are differences between young forests and older forests
- have a better understanding of some forestry occupations

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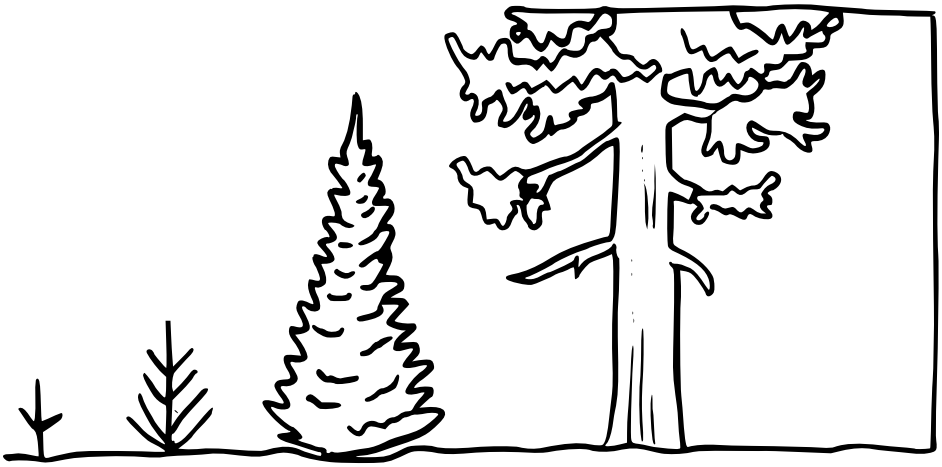
and grow bigger faster. These trees can then be harvested sooner than if they were not cared for. Foresters tend to the forest much the same way people tend to their gardens, but trees are the crop instead of carrots or peas.

The **Forest Management Cycle (Attachment 1)** is a continuous series of activities that considers all aspects of the forest over a period of several years.



### SKILLS & APPLICATIONS

measuring

estimating

observing

collecting

interpreting data

### VOCABULARY

area

browsing

diameter

plantable spot

silviculture

survey

thinning

average

coniferous tree

plot reforestation

spacing

tending

weed

*Students will get an introduction to forest management before going out in the field to do silviculture plots.*

### MATERIALS

Each Student

- The Silviculture Game (Attachment 2)
- Silviculture Word Find (Attachment 3)

### SETTING

Classroom

### DURATION

45 minutes

# ACTIVITY 1: The Forest Managment Cycle

## Procedure

1. Hand out a copy of **Attachment #1 - Forest Management Cycle** or draw it on the board before class. Discuss with students the information contained in the BACKGROUND section, emphasizing that much planning is involved in forestry, there is a series of steps that foresters follow, and young forests are cared for in much the same way as your family garden is cared for.
2. Hand out a copy of **Attachment #2A- The Silviculture Game** to each student. (Attachment #2B - Answers)
3. Inform students that they are foresters put in charge of caring for a young forest. Students look at the pictures and then answer the questions beside each picture. They can write directly on their handouts.
4. Complete the six cartoons, then briefly discuss each one with your class. Refer back to your introductory information and the forest management cycle. Begin a class discussion, possibly by asking students with parents that work in the forest industry what occupations their parents have, then figuring out where their occupations fit into the management cycle

## Follow-up/Extensions

1. Hand out a copy of **Attachment #3 - Silviculture Word Find** game to each student. Explain how to complete it and GO!
2. Call the local BC Ministry of Forests, Lands & Natural Resources office to arrange for a guest speaker to come to your classroom to talk about forest management and planning. Local forest companies are also possibilities for guest speakers.

*Students conduct simplified silviculture plots in the Beaver Lodge Forest Lands.*

# ACTIVITY 2: Mini Silviculture Plots

## MATERIALS

### Each Student

- copy of Sample Plot Card (Attachment 4)

### Each Group

- clipboard
- a 4 m length of string
- clipboard
- forestry flagging tape
- copy of Mini Silviculture Plots (Attachment 5)

## SETTING

Outdoors - Call the Ministry of Forests, Lands, & Natural Resource Operations' office to find out what area in the Beaver Lodge Forest Lands (BLFLs) to do this activity in. You will want a young forest, planted less than five years ago. Your class can spread out and be monitored in younger stands. Also try to choose an area that has an old

## Procedure

1. Briefly review the important points from Activity 1. Inform students they will be doing forestry plots in a young forest. Most or all of the coniferous trees in the site you are in may be planted trees. Students will measure out a circle about eight metres in diameter, then look for problems with the forest similar to the six cartoons they looked at previously. Review the potential problems with the students: not enough trees planted; too many trees crowded together; lots of competition with tall weeds.
2. Walk to the activity location.
3. Do a sample plot with your class. Look for an area where your class can stand around and watch. Your practice plot should have some trees missing (openings), have "weed" plants growing in it, and/or have coniferous trees crowded together.
4. Stretch out your four metre length of string. Have a student hold one end of the string over a fixed point - this will become the plot center. You will then do a circle sweep around the center point. Mark your circle edge in about eight locations by tying a small piece of forestry flagging tape on a plant or by putting the tape on the ground. The finished plot will then be about eight metres in diameter and have a fairly obvious ribboned boundary.
5. Pass out a Sample Plot Card (Attachment 4) to each student. Inform students that they will be mapping tree locations in their own plot (Attachment 5) after watching this demonstration. The circle at the top of the page represents the eight metre circle you just established on the ground. Now pick a point along the edge of the eight metre plot that will represent the top of the circle on your plot card. The first ribbon you hung on your circle is a suitable choice, or perhaps a stump located on the edge.

*continued*

**6** Tell students that the target forest you are aiming to grow is a coniferous forest. Ideally in a young planted forest, trees should be spaced about two to three metres apart. You can use your four metre string to estimate distances (i.e. folded in half equals two metres). Trees often grow in "clumps". As a group, choose trees within the plot that you would decide to keep and continue to let grow. These should be healthy trees spaced two to three metres apart. Demonstrate to the students by marking these trees with a "T" in your circle on your sample plot card. You will add up all the "T's" and note on the plot card.

**7** Look in your plot for any areas that could have more coniferous trees planted in them. These are called "plantable spots" where the ground is mostly mineral soil, not rock or rotten wood. Plantable spots must be two to three metres from other coniferous trees. Mark these as "P's" in your circle. Again, use the string to measure for plantable spots. Add up all the "P's" and note on the plot card.

**8** Look in your demonstration plot for weed plants that are competing for nutrients, water or light. To be considered a serious problem, weeds must generally be as tall as the coniferous trees. Weed plants may need to be removed for the benefit of young coniferous trees. On your plot card, mark the weed area with a dotted line with a "W" inside the area. Estimate the percentage of the plot covered by weeds and record this on the plot card.

**9** After completing your plot, look for anything else that may pose a problem for tree growth. Examples would be an excessive amount of logging slash, deer eating the foliage tips (browsing) or a wet area within your plot. Make notes on this in the "notes" section on your card.

**10** Divide students into groups of four. Give each group a four metre string, some flagging tape and a clipboard. Point out a separate direction to each group, assign each group a distinct plot number (i.e. 1, 2, 3, 4...) to record on their card and have them take 20 steps in that direction. This will be their plot location. Assist each group as they complete their plots. Do a second or third plot as you see fit, continuing to assign each plot a distinct number.

*continued*

forest nearby to visit on the way back to school. The McPhedran trail is a good location. Visit the sites ahead of time and choose a location to do your plots in. Be prepared to be flexible when making decisions in these plots, since there is some subjectivity involved.

### DURATION

3-4 Hours

Try to have all students involved in decision- making. Only one plot card needs to be filled out for each group, but all students should be encouraged to fill out the cards as a type of mapping exercise.

**11** Remove all the ribbons that your class put out in the forest and collect the plot cards.

## Follow-up

**1** Have each group discuss the general problems they found in the plots they completed. As a class, decide if there is a perceived problem in the area you did plots in. For example, you may decide there is a major problem with weeds restricting coniferous tree growth, or that more coniferous trees should definitely be planted.

**2** Explain to your class that by doing several spread out plots, foresters can apply that small amount of information to the whole area that plots were conducted in. Management decisions, such as what your class just decided upon, can then be made. Inform students that managing the forest, doing plots, tree planting, spacing and weeding are real forestry occupations.

## Extension

Briefly visit an old forest on your way back to school and walk in it to look for similar problems, plantable spots and crowded trees. You will probably find trees will be spaced much farther apart than two or three metres and have few weed problems. There still may be some trees crowded together. Have your students look for signs of what happens to a forest “naturally” (ie - disease, fire, wind damage, inadequate light, etc.).

*Students apply the information they collected doing the survey plots from the previous activity in the BLFLs.*

### MATERIALS

Each Group

- compiled information from the outdoor plots

### SETTING

Classroom

### DURATION

45-60 minutes

# ACTIVITY 3: The Survey Says... !

## Procedure

1 **Before class**, add up all of the "Ts", "Ps" and percent of weed area recorded for each individual plot that students completed. Make sure you are not tallying from the same plot more than once.

2 Calculate an average value per plot for each of the number of "Ps", "Ts" and percent area covered with weeds.

3 Present these three numbers to your class, then inform them that the size of the plots they measured out in the field using the four metre long string was actually about 1/200th of a hectare. Therefore, to figure out how many trees would need to be planted (P), how much area weeded or how many well-spaced trees (T) there are per hectare, multiply the averages you calculated by 200. This is how foresters communicate this information, on a per hectare basis.

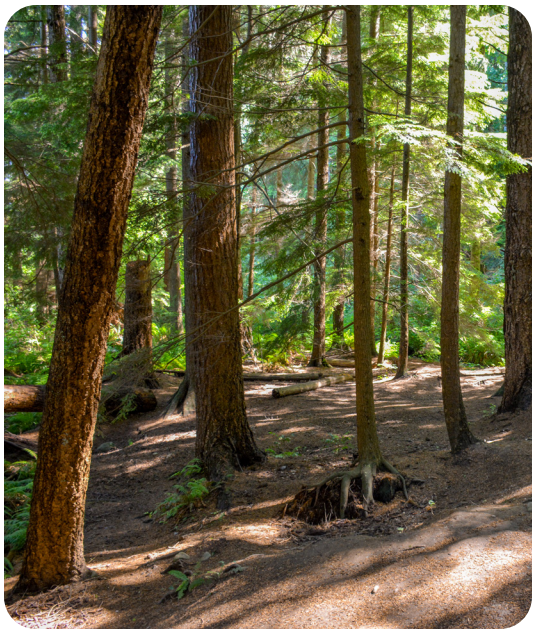
   You can work through the formula with your class if you wish: 22 area of a circle = $\prod r^2$ ( or 3.14 x 16 ) = 50.2$m^2$. Your four metre string was the radius. A hectare is 100 m by 100 m = 10,000 $m^2$. 50.2 / 10,000 ≈ 1/200.

4 Inform your class that in a young forest (less than ten years old), the target number of well-spaced trees is usually 1200 per hectare (or about six per plot on average). If you have less you may need to plant more trees. If you have more trees, which is generally the case, some trees will be cut down when the trees are between eight and fifteen years old. This is called pre-commercial thinning or spacing. Excessive weed areas may have to be treated if that is the reason there are much less than 1200 trees per hectare.

*continued*

5 Have students form the same groups they had outside. Tell them the forest area that their plots represent is five hectares in size. Based on class calculations, what actions would they prescribe for the area you surveyed. Such as: How many trees per hectare should be planted? Are there many trees that will need to be removed (spaced) at a later date? Should the area be treated for weeds? Any other problems that should be managed for or monitored?

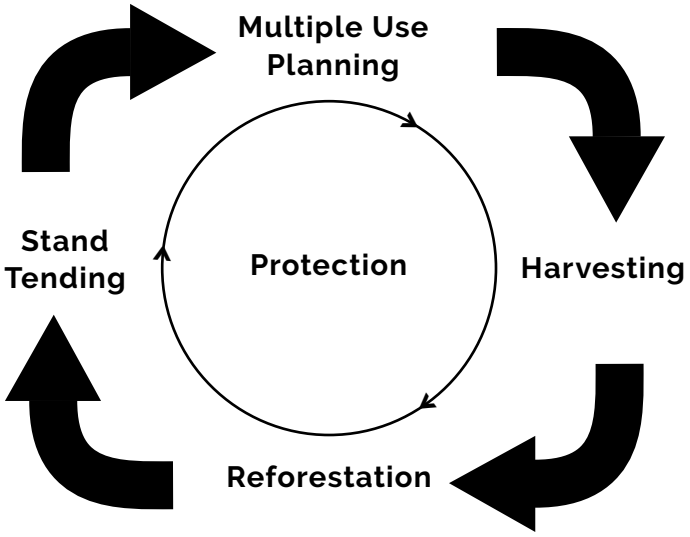
6 Have each group briefly present their answers to the class. Hold a class discussion to answer any questions.



## Extension

Contact your local B.C. Ministry of Forests, Land & Natural Resources office to arrange a tree planting activity with your class.

# Attachment #1 - The Forest Management Cycle




**Definition of Terms**

**Multiple Use Planning**: focuses on IRM principles. Plans are studied by the public, Ministry of Forests, Lands & Natural Resources, Ministry of Environment and Fisheries and Oceans Canada.

**Harvesting**: the cutting and removal of trees from a forested area.

**Reforestation**: preparing logged areas and then replanting areas that do not have enough trees.

**Stand Tending**: to help the young forest grow well. Includes weeding, spacing, pruning, thinning and fertilizing.

**Protection**: from the dangers to a young forest. Includes fire, disease, insect and other animal damage.

# Attachment #2 A - The Silviculture Game

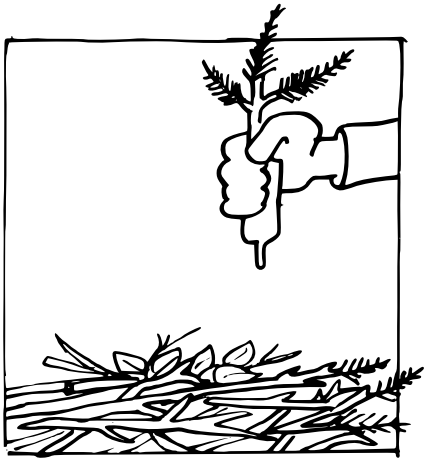
**In this activity you are foresters at work. You have six tasks to do. The cartoons will show you there is something preventing you from doing your job. Look at the cartoons and use them to help you decide what you need to do to complete your assigned tasks.**

**1** You must, by law, ensure this logged site will have a good crop of new trees (Note the number of natural seedlings growing after two years).

- Has nature provided enough of a crop?
- How can you solve this problem?

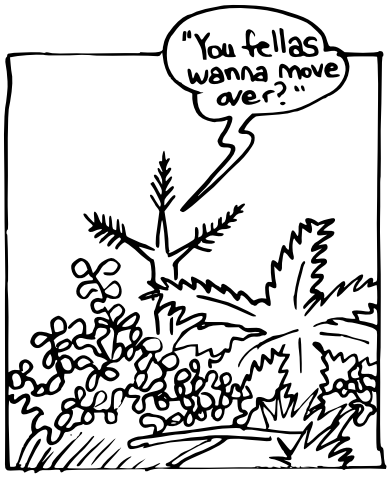
**2** You must plant seedling trees so they'll grow. It's the law.

- What is preventing you from proper planting?
- How can you solve this problem and get these seedlings planted in the soil?



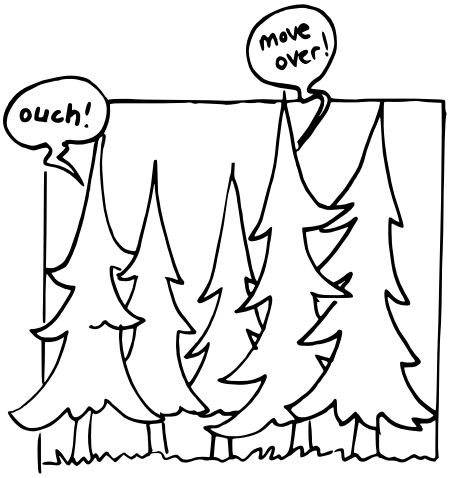
**3** You must, by law, ensure that the new seedlings growing on your clear cut survive and grow.

- What is stopping these seedlings from growing freely?
- How can you solve this?



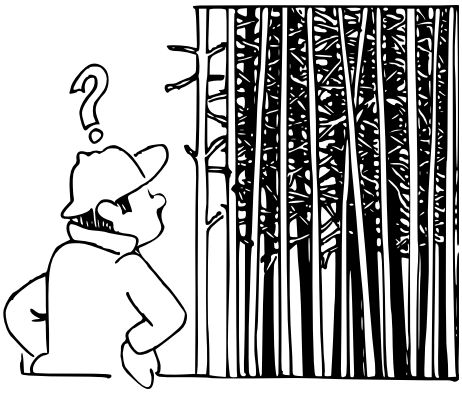
**4** You must ensure that each young tree has enough space to grow up healthy.

- What is slowing these young trees growth?
- How can you solve this problem?




**5** These trees are too thin for their age. We want them to grow as large as possible.

- What is stopping these trees from growing to their potential?
- How can we get better growth in this area?



**6** Branches cause knots in wood. Wood without knots is more valuable and has more uses. We want to grow as much knot free wood as possible.

- What is causing knots in this tree?
- How can we get all the new layers of wood to be knot free?

*Adapted from the Forest Education Resource Package, Canadian Forest Products Ltd.*

# Attachment #2 B - The Silviculture Game Answers

1 **Reforestation**

- Not enough trees
- Plant more trees!

2 **Site Preparation**

- Branches and debris cover soil
- Rake, tidy and burn debris

3 **Brushing and Weeding**

- Crowding
- Competition by weeds
- Do some weeding!

4 **Juvenile Spacing**

- Too Crowded
- Competition with each other
- Take out some trees

5 **Commercial Thinning**

- Too crowded
- Remove some trees

6 **Pruning**

- Branches

# Attachment #3 - Silviculture Word Find

Circle the words you find using the list below. Words in the puzzle may be in any direction.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | E | R | E | F | O | R | E | S | T | A | T | I | O | N | B | F | R |
| I | A | R | H | A | R | V | E | S | T | I | B | W | P | T | Q | E | Y |
| L | N | V | M | L | Z | O | P | A | S | S | M | S | D | A | O | R | I |
| V | T | V | P | R | O | T | E | C | T | P | C | U | N | E | E | T | P |
| I | A | I | E | R | R | Y | R | I | A | A | M | V | Y | R | R | I | P |
| C | L | O | T | N | N | Z | V | O | L | C | E | A | B | E | P | L | E |
| U | I | L | E | R | T | H | I | N | N | I | N | G | E | S | E | I | N |
| L | D | Q | L | O | E | O | N | I | L | N | E | A | R | E | O | Z | U |
| T | E | N | D | I | N | G | R | O | S | G | N | U | H | E | X | E | R |
| U | E | B | E | A | B | E | O | Y | I | I | E | A | T | K | E | N | P |
| R | W | I | R | E | G | E | N | E | R | A | T | I | O | N | A | N | T |
| E | A | N | O | O | N | E | A | G | N | I | L | A | C | S | U | N | O |
| L | O | N | S | I | T | E | P | R | E | P | A | R | A | T | I | O | N |

fertilize
protect
tending
reforestation
green
prune
thinning
silviculture
harvest
tree
roads
site preparation
inventory
spacing
weed
regeneration

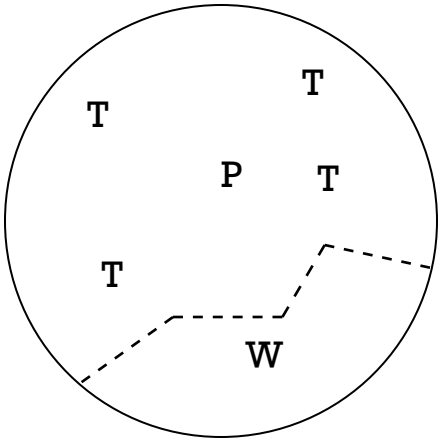
*Adapted from the Forest Education Resource Package, Canadian Forest Products Ltd.*

# Attachment #4 - Sample Plot Card

**Plot:** # 8

**Name/s:** Sarah and Jill

**Notes:** There has been some browsing on some of the coniferous trees.
Lots of clumps of trees.




**Total T's:** 4

**Total P's:** 1

**Area with W:** 25%

## Definitions of Plot Symbols

**T** well-spaced coniferous tree. 2 to 3 metres apart. You may have to pick one healthy tree out of a clump of trees. Try to get as many T's as possible.

**P** plantable spot, with no healthy coniferous trees within 2 to 3 metres. Mostly composed of mineral soil, not rocks or wood debris.

**W** weed area that is usually as tall as the coniferous trees. These weeds compete for light, water and nutrients. Draw in the weed area with a dashed line and put a W inside the area.

# Attachment #5 - Mini-Silviculture Plots

Plot: _____

Name/s: _____

Notes: _____

_____

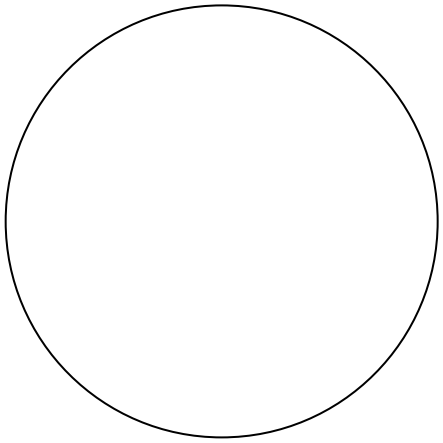
_____

_____

Total T's: _____

Total P's: _____

Area with W: _____%



Plot: _____

Name/s: _____

Notes: _____

_____

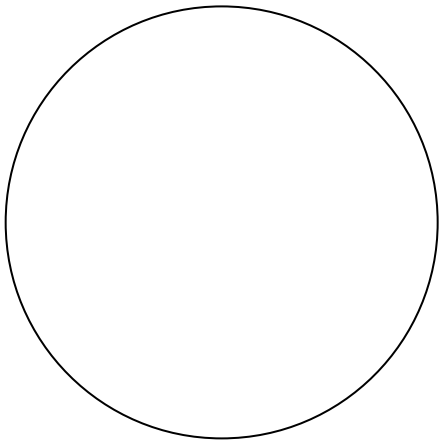
_____

_____

Total T's: _____

Total P's: _____

Area with W: _____%



Plot: _____

Name/s: _____

Notes: _____

_____

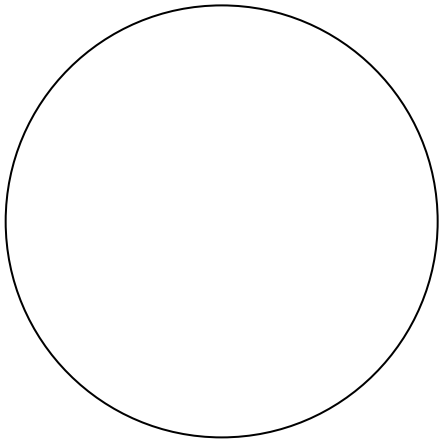
_____

_____

Total T's: _____

Total P's: _____

Area with W: _____%



# Natural Resources

## Background

Forests have many natural resources. Historically, First Nations cultures had many uses of forest plants including building materials, food, medicine, clothing and basic needs. Presently, resources that are harvested include trees for the forest industry, salal for floral markets and mushrooms for food. This lesson plan focuses on non-timber resources.

Seventy-five percent of the plant-derived drugs currently in use today were originally discovered by forest dwelling people. Some local examples are the Yew tree for the ovarian cancer drug Taxol and Foxglove for the heart drug Digitalis. Less than 90% of the 250,000 plants identified as having medicinal properties are used as drugs today. It is therefore important that we maintain all natural habitats on earth in order to maintain unknown "aides" to mankind and to maintain gene pools (thus ensuring diversity).

***This lesson plan links well with the Campbell River Museum's tours and class visits.*** Contact the museum for current information on school programs.

## ACTIVITIES:

PRE TRIP

**1** Shopping in the Forest

FIELD TRIP

**2** Settling in the BLFLs

POST TRIP

**3** Living in the BLFLs

### LESSON PLAN OBJECTIVES

- organize + interpret information
- recognize that there are and have been, many uses for forest plants
- identify some natural forest resources
- understand pioneering life without any of the modern day conveniences
- recognize the value of plants to mankind and thus, instill stewardship

### SKILLS & APPLICATIONS

designing
drawing
identifying
writing
observing
communicating

### VOCABULARY

lichen
natural resource
scurvy
sinew
tallow
medicinal
antibiotic
cambium

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*Students will prepare a shopping list of useful items found in an "alternate" store, the forest.*

### MATERIALS

Each Student

- Beaver Lodge Forest Lands' Useful Plants List (Attachment #1)

### SETTING

Classroom

### DURATION

30 minutes

# ACTIVITY 1: Shopping in the Forest

## Procedure

1. As a class, discuss what a natural resource is.

2. Ask this question: If you went to the shopping mall, what could you buy? Make a list on the blackboard under the heading: "Mall" (e.g. shoes, clothes, food, toys).

3. Then, put the next heading: "Forest" and ask them the question: If a forest was a shopping mall, what would you "buy" (find useful)? Let them think of a few answers first, then hand out the Useful Plants list (Attachment 1).

4. You may do this as a class discussion or as a group effort. Using **Attachment #1,** students add to their "Forest" list (e.g. medicinals, salad greens, clothing from woven spruce tree roots, berries). The answers should coincide with the "Mall" list (i.e. food should be opposite food).

An example would be:

| Mall | | Forest |
|---|---|---|
| mattress | » | bundled moss |
| shoes | » | woven lichen |
| candy | » | maple sap syrup |
| fruit | » | berries |
| hat | » | woven spruce roots |
| meat | » | fish, venison (deer meat) |
| medicine | » | devil's club |
| perfume | » | rose petals |
| mosquito repellent | » | vanilla-leaf leaves |
| kitchen utensils | » | carved hemlock tree wood |

*continued*

## Follow-up/Extensions

1. If you were to live in this forest in the “olden” days, are there any things for your basic survival that you cannot “buy” in the forest? (metal items: woodstove, gun, axe, nails and matches).

2. Discuss uses for wildlife (clothing, sinew ropes, tallow for candles, fat for soap and candles, feathers for bedding, bones for needles, etc.).

3. Clarify that the “forest” items listed on the board are all natural resources.

*Students familiarize themselves with natural resources in the forest through choosing a site to settle a family in the year of 1910.*

### MATERIALS

Each Group

- Pioneer Site Map Worksheet (Attachment #2)
- clipboard
- writing materials

### SETTING

Anywhere in the Beaver Lodge Forest Lands

### DURATION

1.5-2 hours

# ACTIVITY 2: Settling in the BLFLs

TEACHER NOTE

*Students may choose to be pioneers or First Nations. Adjust the activity as appropriate. Students may not know how to identify all of the plants on their list. Refer to Pojar and MacKinnon's "Plants of Coastal BC". Licorice ferns are arboreal, usually on deciduous trees.*

## Procedure

1. Divide students into groups and describe the assignment (Attachment 2): The year is 1910. Each group is a pioneer family newly arrived to this area looking for land to settle on. They have found a wonderfully productive forest four kilometres from the boat docks. This forest is full of natural resources for basic survival so they decide to build a home and settle amongst its trees.
2. Walk into the forest until you are well away from urban effects. Select a fairly flat and dry area. Students should look for a suitable site within that area.
3. Staying on the trail, groups head out to choose a site. Once a site is chosen, students move off the trail to fill in their Pioneer Site Map Worksheet .
4. When they are done, take them for a longer walk to look for animal signs (e.g. nibbled plants and water). Have them try to find useful plants that were not in their site (not checked off on their shopping lists).

## Follow-Up

1. Did you find all of the items on your shopping lists?
2. Are you satisfied that you chose the best possible site to build?
3. Could you live in the forest without cutting any trees down?

*Students write about what two typical days of pioneer life in the BLFLs would be like.*

### MATERIALS

Each Student

- Useful Plants List (Attachment #1)
- field notes and drawings
- writing and drawing
- implements

### SETTING

Classroom

### DURATION

1 hour minimum

### SPECIAL CONSIDERATION

The Ministry of Forests, Lands, and Natural Resource Operations discourages the collection of native plants for personal and business use. Collection is discouraged in order to maintain diversity within this forest and to minimize the impact of human use.

# ACTIVITY 3: Living in the BLFLs

TEACHER NOTE

*This activity can be a written exercise and/or an oral storytelling.*

## Procedure

**1** Explain the following to your students; "You have been living in your cabin in the BLFLs for two years. The forest is your only resource (there are no hospitals or shopping malls). You have spent all of your money on matches, clothing, cooking pots, woodstove and pipes, cutting/carving knives, an axe and a sharpening stone. You do not have wheels, electricity, indoor plumbing, or beds."

**2** Students make a drawing of their cabin in the BLFLs. Stress creativity.

**3** Have each student use the information their group gathered and the Useful Plants list to describe what they might do as a pioneer on two typical days with the headings:

5 Jan 1992, Today it was so cold...

2 Aug 1912, Today it was so hot....

Hints: Include all of the work done and how your family coped. Think of things like:

- What might the house look like inside?
- What foods have you stored away for the winter?
- Your daughter has an eye infection.
- How to store food for the winter; you need storage bins and a cool place.

**4** Mount and display diary descriptions and drawings.

*continued*

## Follow-Up

1. Did the forest have enough resources to meet your needs?

2. Are the forest resources important to protect?
   Why or Why not?

## Extension

1. Discuss the many uses of western red cedar trees in native culture (weaving clothing, baskets, tablecloths, mattresses, mats, boat sails and coffins. Carving and building art, canoes and homes).

2. Students research a medicinal plant (e.g. yew, periwinkle, foxglove)

# Attachment #1 - Beaver Lodge Forest Lands Useful Plants List

*Disclaimer:* Although the plants described below were reportedly used for food or medicine, please be aware that many plants, including medicinal ones, are poisonous. Do not use this guide as a means as identifying anything you intend to put in your mouth, swallow, or use for the treatment of ailments.

**Note: This list is a mixture of Interior and Coastal aboriginal uses along with present day uses.**

| Small Plants | Uses | Native or Present Day Uses |
|---|---|---|
| **Lichens** | E, O | Hairy strands for weaving cloth and making dyes. |
| **Licorice fern** | F, M | Root used as a sweetener or for sore throats. |
| **Mosses** | E, B, P | Dried for mattresses, pillows, and insulation. Presently used for floral arranging and hanging baskets. |
| **Sword fern** | F, E, P | Roots were eaten and leaves tied together to make a mattress. |
| **Vanilla-leaf** | E | Fragrant dried leaves hung indoors to repel biting insects. |
| **Medium Plants** | | |
| **Cattails** | E, B | Leaves woven into clothing, hats, or mats for bedding or floor coverings. Fluffy seeds were used for stuffing pillows, diapers, and wound dressings. |
| **Devil's club** | B, M | Light-weight wood made into fishing lures. Cure-all for everything from colds to hair lice. |
| **Huckleberry** | F, O, P | Brightly colored berries used for fish bait, jams or eaten fresh. Traditionally dried into cakes. |
| **Oregon grape** | F, O, M, P | Berries for jellies were traditionally dried for winter storage. Yellow dye from woody tissue. Medicine for liver and eye problems. |
| **Salal** | F, O, M, P | Berries eaten fresh, as jams, or dried for winter food. Also used as a purple dye. Leaves used as a food flavoring. leaves also put on burns or sores. Presently used for floral arrangements. |
| **Salmonberry** | F, P | Berries and early spring shoots eaten. |
| **Wild rose** | F, B, O, M, P | Fruit (rose-hip) eaten fresh, stored or made into a jelly. Rose-hips are high in vitamin C content thereby preventing scurvy. Leaves applied to bee stings, fragrant leaves flavored food. Hardwood is used for arrows and handles. |

| Large Plants | Uses | Native or Present Day Uses |
|---|---|---|
| **All Trees** | | All trees were used for fuel (warmth and cooking) and carpentry (e.g. houses, carts, toys) |
| **Black Cottonwood** | F, E, B, O, M | Ate inner bark and cambium (slimy tissue between wood and bark). Inner bark woven. Water sieved through wood ashes used in soap making. Roots were twisted into ropes. Fragrant sap in buds was used as a glue for making baskets watertight, affixing arrowheads or made into a soothing lotion. |
| **Douglas Fir** | B, O, E | Pitch used as a glue, pitchy wood used for torches |
| **Hemlock** | F, B, O, M, E | Inner bark edible. Carveable wood made into bowls, spoons, combs, etc. Black dye colored fish nets. Pitch used with deer fat to prevent sunburn. |
| **Big Leaf Maple** | F, B, M, E | Sap makes a syrup. Wood for snowshoe frames and paddles. Bark was an antidote for poisoning. |
| **Red Alder** | B, O, M, E | Edible inner bark has reddish-orange dye. Carveable wood. Strong antibiotic: used for skin infections and wounds. |
| **Sitka Spruce** | F, E, M, B | Inner bark eaten fresh or dried. Young shoots have a high Vitamin C content. Fibrous roots used for weaving. Pitch used as a medicine for gum boils and toothaches. |
| **Willow** | E, B, M | Inner bark made into fishing lines and nets. Young branches stuck into streams created small dams to hold fish. Chewed for headache relief |

B = building materials
E = essentials for daily living
F = food
M = medicine
P = present day use
O = other

# Attachment #2 - Pioneer Site Map and Shopping List

Choose a forested area. Your building site is the size of your classroom. Describe its major features (e.g. flat, wet, dark). How will the cabin be situated (facing what direction)? Are there large trees nearby to build a cabin? Is there fresh water nearby?

**Cabin Site Map**

**Legend**

# Shopping List

| Use | Plant | Check If Found |
|---|---|---|
| Food | huckleberry | ☐ |
| | sword fern | ☐ |
| | Sitka spruce | ☐ |
| Medicinals | red alder | ☐ |
| | wild rose | ☐ |
| | licorice fern | ☐ |
| Essentials for Daily Living | hemlock | ☐ |
| | moss | ☐ |
| | vanilla leaf | ☐ |

# Recreation

## Background

Local residents enjoy walking, jogging, horseback riding, mountain biking, wildlife viewing and nature appreciation within the Beaver Lodge Forest Lands (BLFLs). It is a true multi-resource use forest! The managers of the BLFLs have to plan for forestry, fish and wildlife habitat protection and enhancement, urban development, water management and recreation!

To truly enjoy the outdoor environment students must learn to be prepared for the "outdoor experience".

## ACTIVITIES:

**PRE TRIP**

1 In my Free Time

**FIELD TRIP**

2 Finding Your Way

3 BLFL's Map Game

**POST TRIP**

4 Rail Grades & Beaver Dams

### LESSON PLAN OBJECTIVES

- identify the key parts of a map
- read and follow a map
- make a simple map
- orient their position outdoors with the use of a map
- identify potential hazards while recreating in the outdoors
- plan for a safe, enjoyable and responsible outing

### SKILLS & APPLICATIONS

map reading
personal safety
problem solving
recreating
creating
personal responsibility
writing clear instructions

### VOCABULARY

landmark
legend
orient

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*Students play a fun and simple game, similar to musical chairs, and learn what their classmates like to do in their free time.*

**MATERIALS**

None

**SETTING**

classroom, gymnasium or school yard

**DURATION**

20 minutes or longer

*Kids love this game!*

# ACTIVITY 1: In My Free Time

## Procedure

1. Students form a circle with one person standing in the middle.
2. The person in the middle says, "In my free time I like to _____". They fill in the blank with whatever they like to do, walk, watch t.v., play road hockey, bike ride, etc.
3. Everyone standing in the circle who also likes to do the same activity, plus the person in the middle, then has to leave their spot and run across the inside of the circle to another empty spot, left by someone else who just moved.
4. The last person left without a spot then gets to be the person in the middle. Now it's their turn to tell everyone what they like to do in their spare time! Students switch spots, a new person ends up in the middle and so on.
5. Play the game as long as desired.

## Follow-Up

1. Discuss all of the different activities that students like to do. Introduce the idea that outdoor recreation is very popular and get the students to give some examples of outdoor recreation activities that they participate in.
2. Ask them if anyone visits the BLFLs. What do they do there? What kinds of other recreational opportunities exist there?
3. Discuss with your students what kinds of things they need to be aware of if they are going to go on an outing in the BLFLs (they should tell someone where they are going and when they expect to return, they should carry a map, they should be aware of wildlife concerns, they should be dressed appropriately and whatever else the students come up with).

*Students write step by step instructions for a short trail which their partner is to follow without the aid of a map.*

### MATERIALS

Each Student

- paper
- pencil
- clipboard

### SETTING

Anywhere in the Beaver Lodge Forest Lands

### DURATION

45 minutes

# ACTIVITY 2: Finding Your Way

## Procedure

1. Individually, students must choose two points, a short distance apart, and write down step by step instructions on how to get from one point to the next. They must list at least five landmarks along the way (i.e. old stump, mossy rock, wet spot, etc.). They are not to identify the second point or tell exactly how far away their destination is. No sketching!
2. Once they have completed their directions they are to give them to someone else to have them look for the second point.

## Follow-Up

1. What were some of the problems in writing out your directions?
2. What were some of the problems in using other people's directions to find your way?
3. Were any words a problem (big, small, near, far...)?
4. Which directions were the easiest to follow?
5. Would a map work better?

## Extension

Try the same activity but draw a map this time!

*Students will learn to read and follow a map, identify landmarks, create symbols for them and build a legend.*

### MATERIALS

Each Student

- Beaver Lodge Forest Lands Map Game (Attachment #1)
- clipboard
- pencil

### SETTING

Begin at the Merecroft Road Trail Head, follow route on Attachment #1

or:

This activity can be done anywhere in the BLFLs if you are willing to sketch your own map to photocopy for your class

### DURATION

45 minutes

# ACTIVITY 3: BLFL's Map Game

TEACHER NOTE

*Preview the trail prior to taking your class on the field trip. Any major changes can be noted on the map before you photocopy it.*

## Procedure

1. Take your class to the McPhedran Road, Main Trail Head. Divide them into pairs or small groups. Each group should have a pencil and a clipboard.
2. Hand out one map/group for the **Attachment #1 - BLFLs Map Game.**
3. Discuss the main features of a map with the class (North arrow, legend, symbols, scale). Make sure everyone understands what the symbols represent.

   *Teacher Note: You will notice the legend is incomplete, read on!*
4. Teach your students how to orient the map to the area around them. The map reader must know his/her position on the map. They then identify the position of a distant object and turn the map so that it corresponds with the ground. Do this until you are comfortable that everyone is oriented.
5. Explain how to play the Map Game. The goal of the map game is to visit each numbered location (1-10), orient the map, identify one or two landmarks, create symbols for the landmarks and draw them onto the map accurately. Then the symbols must be added to the legend. The landmarks can be manmade but, they don't have to be. The locations do not have to be visited in numerical order.
6. Start at location #3 and work through orienting the map, identifying landmarks, creating symbols for them and adding them to the legend with the class.

*continued*

7 Students play the map game!

8 Meet back at a pre-determined time and location.

### SPECIAL CONSIDERATION

Emphasize the importance of staying together so that no one gets lost!! It is important that there is additional adult supervision on this activity.

## Follow-Up

1 Did you have any problems following the map?

2 Were there any features not on the map that you thought should have been?

3 Do you think anyone has ever been lost in a forest this size before? What would you do if you did get lost in here? The video “Lost in the Woods” is an excellent resource for this topic

4 Were you comfortable on your outing today (warm enough, dry enough, comfortable shoes, thirsty, hungry, etc.)?

5 If you decide to visit the BLFLs in your free time what are some of the things you need to think about before you go? (Make sure someone knows where you are going and when you’ll return, wear clothing appropriate for the weather and conditions, carry a map and know how to use it, be aware of wildlife concerns, bring water and a snack if you plan on going for a long outing, know some basic first aid, stick to well-marked trails, etc.)

## Extension

1 Introduce the concept of scales and pacing. Have students pace the distance between locations and write them in on the map.

2 Teach students how to orient the map using a compass and the North arrow. Have them take bearings at each location and record where the bearing is pointing to.

*Students design a board game with an outdoor recreation safety theme.*

# ACTIVITY 3: Rail Grades & Beaver Dams

### MATERIALS

Each Group

- cardboard
- rulers
- colored pens
- bingo chips
- dice

### SETTING

Classroom

### DURATION

1 hour + playing time

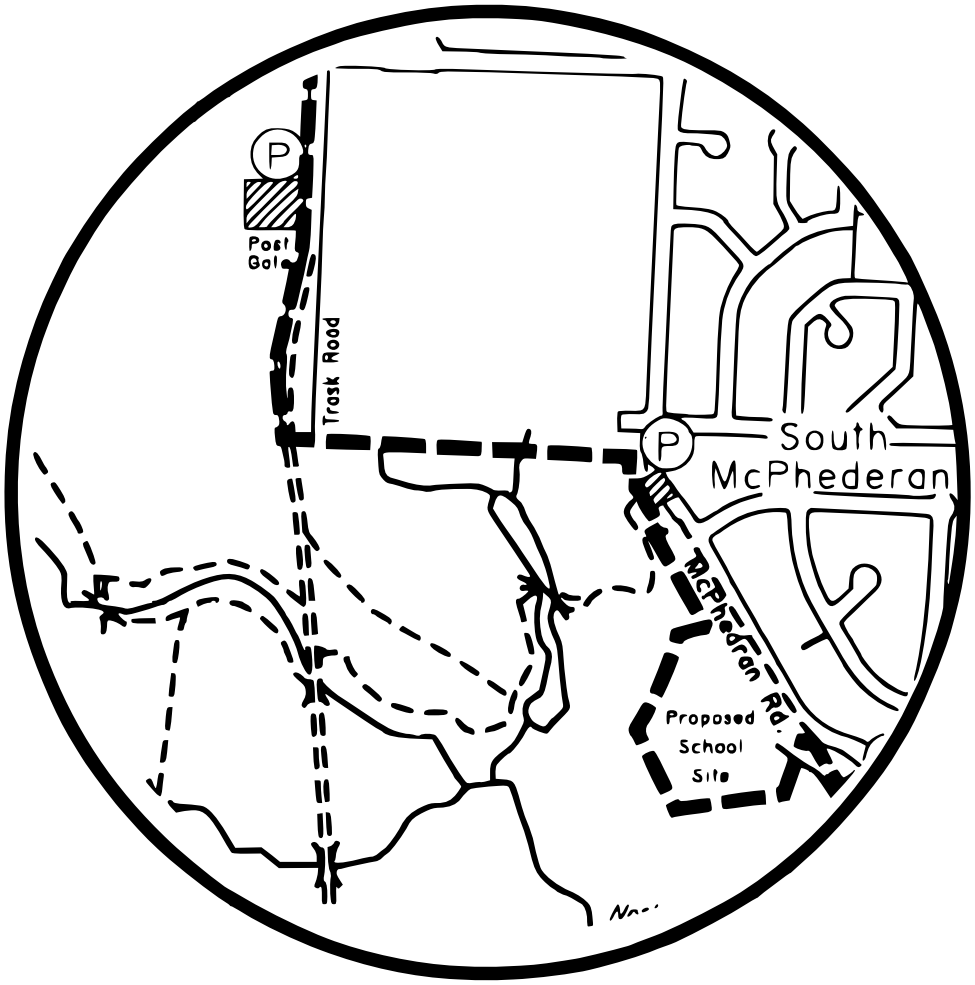
### Procedure

1. As a class review the kinds of recreational opportunities in the BLFLs and what they have learned about being prepared for recreating in the outdoors. You may want to write their responses on the board.
2. Split the students into small groups. Tell each group that they have been selected to create a new board game called "Rail Grades and Beaver Dams". It is a spin-off of Snakes & Ladders. In this game a family of busy beavers must reach their lodge in the middle of the BLFLs. On the way they encounter circumstances which are beneficial to their journey (i.e. they remembered to bring a map, they have a snack, there's a sign to follow, etc.). Every time they land on a beneficial square they can slide along a rail grade which will take them to a square closer to their lodge at the end of the game. They also can land on problem squares (i.e. the trail is washed out, they forgot a map, need a snack but didn't bring one, didn't bring a jacket and it's getting cold, etc.). Every time they land on a problem square they have to slide along a beaver dam which takes them back, closer to the beginning of the game.
3. Have groups create their board games. Allow for creativity. The idea is to get them thinking about recreating safely in the outdoors.
4. Play the game!

### Extension

1. Make the game using other recreational users and situations they may encounter.
2. Play the game with another class.
3. Make survival kits. Brainstorm a list of items essential for survival and get students to collect them from home. Store them all together in an airtight coffee can.

# Attachment #1 - Beaver Lodge Forest Lands Map Game




**Legend**

| | |
|---|---|
| Trail - - - - - - - - - - - - | |
| | |
| | |
| | |
| | |
| | |

# Multiple Use

## Background

Integrated resource management is defined as managing a resource, in this case, the Beaver Lodge Forest Lands (BLFLs), with all things considered - including water, fish, wildlife, recreation, wilderness, tourism, heritage, energy and minerals, timber and forage values. This is a multiple use concept where there are many "users" of a resource. Within the BLFLs there is evidence of all the above considerations except for energy and minerals. It is management of these obvious features that students will look for in their field trip.

When humans use a natural setting, they will cause change. The Ministry of Forests, Lands & Natural Resource Operations manages the BLFLs to minimize human impact. The best examples of human impact (change) are on the edges of the BLFLs. This is where housing, sewers, water lines, power poles, cars and concrete change into a forest.

### ACTIVITIES:

**PRE TRIP**

**1** What I Want Is...

**FIELD TRIP**

**2** Assessing Human Impact

**POST TRIP**

**3** People In or Out!

### LESSON PLAN OBJECTIVES

» identify multiple uses in the BLFLs

» understand that there are resource use conflicts

» explore solutions and compromises

### SKILLS & APPLICATIONS

analyzing
cooperating
debating
exploring
observing
problem solving

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There are:

- ditches and culverts to divert water.
- settling ponds to clean up dirty water.
- plants purposely put in (hydroseeded) to stop soil erosion.
- informative signs to guide the public safely and to ensure stewardship of the BLFLs.

Within the forest, there are bridges and well-defined trails. All of this takes money. The upkeep of the BLFLs has and is being paid for by the people of BC. The BLFLs is your forest. Stewardship, responsible care of a resource, is a goal for all users of this forest.

**VOCABULARY**

impact

multi-use

natural resource

stewardship

Integrated Resource Management (IRM)

*Students will explore conflicts of multiple use.*

### MATERIALS

Each Student

- BLFLs Multiple Use (Attachment #1)

### SETTING

Classroom

### DURATION

30-45 minutes

# ACTIVITY 1: What I Want Is...

## Procedure

1. Distribute **Attachment #1** and read their assignment: "There was a Beaver Lodge Forest Lands meeting called asking for input from any concerned citizens and government agencies. This is who showed up. The secretary wasn't very attentive and mixed up who said what. Match each group to the correct want."
2. When done, check answers.

## Follow-Up

1. Discuss multiple use of the BLFLs. Have students think of other users not mentioned (artists, mushroom pickers)
2. Discuss all of the varied concerns and look for conflicts (i.e. horses crossing streams and fishermen wanting no crossings, the City wanting land for housing and the Nature Society wanting land for nature, walking club wanting no bikes or horses on the trails).
3. How could a BLFLs manager satisfy all of these wants? (designate high, low and no use areas, have certain uses only for trails, post signs to educate public and make them aware of the rules, build and maintain trails carefully, allow off trail use only for research and education, build bridges over streams, say no to some groups like the City wanting land for housing and the nature society wanting no people use). Have students explore compromises

## Extention

If a deer could talk, what might it want?
(i.e. lots of small trees to eat, not being chased by dogs)

*Students look for impacts (changes) to the BLFLs.*

### MATERIALS

Each Group

- writing implements
- clipboard
- Human Impacts in the BLFLs (Attachment #2)

### SETTING

BLFLs, any main trail with an information sign at the start

### DURATION

1.5 hours - field

# ACTIVITY 2: Assessing Human Impact

TEACHER NOTE

*The forest edges have the most features. Remember that the urban areas used to be forested.*

## Procedure

1. Students are divided into groups of three or four. Pass out their assignment **(Attachment #2)**. Their task is: "The Nature is for Nature Society wants no people allowed in the BLFLs. They feel that humans have been, and are, destroying this forest. They have threatened to put up a blockade at every trail entrance. You are newspaper reporters who are investigating their claims. It is your task to note all of the impacts that you see and to determine their purpose."

2. At the trailhead, discuss the information sign's description of history and point out how housing and logging has changed this forest. Lead into discussing multiple use and IRM management of this forest (ie. managing for all values).

3. Go for a walk looking for any changes made by humans. Discuss why a feature is there and its purpose (e.g. big boulders under the large bridges for erosion control, bridges to keep people and their pets out of fish habitat, culverts to divert water and keep trails dry, boulders or cement blocks in the middle of trails to keep out vehicles). Have students note purposeless items too like garbage and vandalism.

*continued*

## Follow-Up

1. How do the features you found fit into these integrated resource management categories? (bridges for fish, ditches and culverts for controlling water, designated trails for people's recreation while the forest remains intact wilderness for wildlife, informative signs about history, logging areas that have been reseeded or planted, forage is food for wildlife and the variety of plant life within the BLFLs supplies that).

2. How can nature destroy this forest? (fire, wind)

3. What evidence did you see of negative human impact? (bluntly cut forest's edge for housing can cause a situation for the wind to easily blow trees down, mucked up trails, tire tracks going off on a wildlife trail, garbage on trails and in streams, vandalized signs).

## Extension

1. Students individually write a newspaper article about their findings by answering the question: "Are humans caring for, or destroying, this forest?"

2. Students can take cameras out in the field and photograph features and users for a hallway display titled "Multiple-Uses of the BLFLs".

3. Make a class pledge for caring for your forests (stewardship). Display pledge.

*Students debate whether humans should be allowed to use the BLFLs.*

### MATERIALS

- field notes
- writing implements

### SETTING

Classroom

### DURATION

1 hour

*This Lesson Plan links well with Economic Value and Personal Values*

# ACTIVITY 3: People In or Out!

TEACHER NOTE

*Use another class as judges and hold simultaneous debates.*

## Procedure

1. There are many people that agree and disagree with the "Nature is for Nature" Society. Divide class into four groups. Designate two groups for human use in the BLFLs and two groups against.
2. In their groups, students have 15 minutes to prepare their arguments. Each student on the panel should have a point to make.
3. Send one "for" and one "against" group to other classroom. Half of other class come to your class as judges. Each classroom debates the issue and lists important points from each side.
4. Judges confer and vote on which side wins.
5. In each classroom, groups switch sides and debate again (switch for and against teams).

## Follow-Up

1. Are the judges biased?
2. Can you really keep people out of the BLFLs?
3. Can this issue be solved so that both sides are happy?
4. Clarify that the BLFLs is their forest. How can they take care (stewardship) of the BLFLs? (educate public by posting signs, model responsible stewardship to peers such as: staying on trails, picking up litter, no cutting or marking trees).

## Extension

1. In the past, people have thought of natural resources as infinite. Nature was something to conquer instead of something to live in harmony with. Discuss how attitudes change over time and how today's forest managers are trying to integrate all concerns (IRM).

2. Students cut out newspaper articles about conflicts over resource use (e.g. sports fishermen want to catch more fish, man caught poaching, bear hunters stopped by environmentalists' roadblock). Discuss problems and ways to solve them (e.g. enhance fish stocks by putting money from fishing licences towards supporting local hatcheries or for the case of a land use issue: designate areas for specific uses like farming and housing). Mount and display under the heading, "Managing the World's Resources".

# Attachment #1 - Beaver Lodge Forest Lands Multiple Use Match It Game!

Match the best want to each group:

| Group | | In the Beaver Lodge Forest Lands | |
|---|---|---|---|
| **A** | Fishermen's Association | **1** | We want to make our own narrow, trails with many jumps and turns |
| **B** | City of Campbell River | **2** | We do not want horses or mountain bikes mucking up the trails |
| **C** | Mountain Biking Club | **3** | We do not want anybody walking through the streams or polluting the water |
| **D** | Horse Riding Group | **4** | We want students to go off the trails to study nature |
| **E** | Nature is for Nature Society | **5** | We want to provide forestry jobs. Let us log it |
| **F** | A Timber Logging Company | **6** | We want wide trails that go over hills and through streams |
| **G** | School District #72 | **7** | We want forestry land for nature. No people allowed. |
| **H** | Step It Up in Nature Walking Club | **8** | We want land to build houses. |

# Attachment #2 - Human Impacts in the BLFL

List the human made items and features that you found in this forest.
Note if they help manage for: Wildlife, Fish, Water, Plants for Food and Shelter, Wilderness, Heritage, Tourism, and Recreation.

| Impact | What Purpose does it Serve? |
|---|---|
| Information sign | Informs and educates people about history, recreation, and safety |
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