

# Chapter Three - Plants and Animals of Old Cedar-Hemlock Forests

## Introduction to Chapter Three

In their studies of the dynamics of this ecosystem and its physical characteristics, students have already been introduced to the plants and animals that live in old Cedar - Hemlock forests. In Chapter Three, they will learn more about the plants and animals that live here.

## Objectives of Chapter Three

1. In this chapter, students will become familiar with the types of plants and animals that live in old Cedar-Hemlock forests.
2. Students will understand that certain plants and animals require old forests.

**The complete version of this study unit includes six lesson plans:**

- Lesson One Habitat Needs
- Lesson Two Plants of Old Cedar-Hemlock Forests
- Lesson Three Making a Cedar-Hemlock Forest Plant Display
- Lesson Four Mountain Caribou - A Species That Needs Old Forests
- Lesson Five Other Wildlife Species That Need Old Cedar-Hemlock Forests
- Lesson Six Making a Mural of an Old Cedar-Hemlock Forest

*This abridged version of the study unit includes Lessons One, Two, Three and Six.*

# Lesson One – Habitat Needs

## Objective of Lesson

1. Students will understand that plants and wildlife have habitat needs.

## Materials Needed

None

## Teaching the Lesson

1. Recall the definition of habitat:

**"The natural surroundings needed by an animal or plant, including food, water, and a place to live".**

For a species to endure over time, reproductive requirements must also be met, for example, a choice of mates, and enough suitable nesting or denning areas.

2. Have students examine how their personal habitat needs are met, by drawing a simple map of their house. Label each room with the need that is met in that room, e.g. kitchen/ food, bedroom/ safe spot to raise the young of the family, hallway/ movement corridor, living room/ rest area.
3. With the students, develop the following table on the blackboard:  
*(table on next page)*

<b>Habitat Need:</b>	<b>Plant meets this need by:</b>	<b>Wildlife meets this need by:</b>
Water	Water in soil or whatever it is growing on (a rotten log, a branch, etc.)	Moving to a source of water (puddle, creek, lake)
Energy	Makes own from sunlight	Must find food
Nutrients	From soil, or nutrients dissolved in rainwater	Must find food
Appropriate physical surrounding (shelter, shade, etc.)	Seed must establish in suitable spot; if surroundings change too much once the plant is established, it may die	Moving to suitable physical surroundings
Reproductive success	Must have appropriate pollinators and conditions for seeds to sprout	Availability of mates (who are not closely related), safe place to rear young

4. Close the lesson with these points:

**Animals and plants live where they do because their habitat and reproductive needs are being met.**

**Some plants and animals require the features associated with old forests to meet their habitat needs.** For example:

- Mountain Caribou require Old Man's Beard lichen, which hangs from tree branches, as a winter food source. The amounts of lichen they need can only be found in old forests.
- In the early winter, before the snow is deep enough to lift them up so they can reach the tree-growing lichens, caribou need big trees to intercept the snow. Big, old trees intercept enough snow to keep shrubs such as Mountain Boxwood available as food.
- Reproductive success is needed if each species is to endure over time. Many species of wildlife depend on old forests to meet their habitat needs for reproduction. They need the cavities in the soft, easily quarried wood of dead or dying trees for dens or nesting sites. Owls, for example, need the tree cavities quarried by Pileated Woodpeckers. Pileated Woodpeckers need trees whose inner wood has been softened by fungus.

# Lesson Two - Plants of Old Cedar-Hemlock Forests

## Objectives of Lesson

1. Students will become familiar with names of common plants that live in Cedar-Hemlock forests.
2. Students will become familiar with the use of plant field guides.
3. Students will become aware that various plants have specific habitat needs.

## Materials Needed

1. Class set of handout titled "Some Common Plants of Old Cedar-Hemlock Forests".
2. Plant identification guides to keep in classroom. See recommended list in Appendix Two.

## Teaching the Lesson

1. Remind students that plants live where their habitat needs are met. Some plants are very specific regarding the living conditions they need, e.g. Western Yew, while others are able to tolerate a wider variety of conditions, e.g. blueberry.
2. Provide students with the handout titled "Some Common Plants of Old Cedar-Hemlock Forests. "
3. Familiarize students with the use of field guides. Using the field guides you've rounded up for the classroom, have the students practice looking up plants. Depending on how many sets of guides there are in the classroom, students can work in groups on the following assignment:

Choose five plants from the handout "Some Common Plants of Old Cedar-Hemlock Forests". For each of your chosen plants find out:

**Common name** -

**Latin name** - remember that, by convention, Latin names are always written in Italics or underlined, for example: *Ursus arctos* or Ursus arctos is a grizzly bear.

**Distribution as per a map** - e.g. all over BC? Only in the mountains of southeastern BC?

**Preferred habitat** - e.g. damp? shady? elevation? type of forest?

**General description and identifying features** - give a general description; describe what sets this plant apart from others like it; is there something distinctive that will help you remember the plant?

**General comments, facts of interest**: - e.g. did native people use it in some way? Is it edible? What part of the plant is edible?

Teacher's Reference Example

<b>Common Name:</b>	Devil's Club
<b>Latin Name:</b>	<u>Oplopanax horridus</u>
<b>Distribution:</b>	forests of British Columbia
<b>Preferred habitat:</b>	moist forests, especially along streams, low to mid elevation.
<b>General description and identifying features:</b>	shrub, 1-3 metres tall, armed with sharp spines along stem and on leaves, spike of red berries
<b>General Notes:</b>	grows in thickets that make bushwacking horrible. Indians had many medicinal uses for it.

4. Close the lesson with the following summary:
- Plants, like all living things, have preferred habitats. (Recall definition of habitat: "the natural surroundings needed by an animal or plant, including food, water, and a place to live".)
  - The plants on this list prefer habitats found in mature Cedar-Hemlock forests. They might need the dampness, the shade, or the old trees..... there is something about the old Cedar-Hemlock forest that they prefer. Some of these plants also grow elsewhere, but they reach their optimum size and numbers in old Cedar-Hemlock forests.

Name \_\_\_\_\_

## Some Common Plants of Old Cedar-Hemlock Forests

### Trees

Western Red Cedar	<i>Thuja plicata</i>
Western Hemlock	<i>Tsuga heterophylla</i>

### Shrubs

Douglas Maple	<i>Acer glabrum</i>
Western Yew	<i>Taxus brevifolia</i>
Devil's Club	<i>Oplopanax horridus</i>
Mountain Boxwood	<i>Paxistima myrsinites</i> (also called <i>Pachistima</i> )
Black Huckleberry	<i>Vaccinium membranaceum</i>
Oval-leaved Blueberry	<i>Vaccinium ovalifolium</i>

### Ground cover

Bunchberry	<i>Cornus canadensis</i>
Queen's Cup	<i>Clintonia uniflora</i>
Twinflower	<i>Linnaea borealis</i>
Prince's Pine	<i>Chimaphila umbellata</i>
Round-Leaved Violet	<i>Viola orbiculata</i>
One-Leaved Foam Flower	<i>Tiarella unifoliata</i>
Rattlesnake Plantain	<i>Goodyera oblongifolia</i>
One-sided Wintergreen	<i>Orthilia secunda</i>
Oak Fern	<i>Gymnocarpium dryopteris</i>
Lady Fern	<i>Athyrium filix-femina</i>
Red-stemmed Feathermoss	<i>Pleurozium schreberi</i>
Step Moss	<i>Hylocomium splendens</i>
Pipecleaner Moss	<i>Rhytidiopsis robusta</i>

### Fungi and Lichens

Shelf fungus	<i>Fomes</i> species
Root rot Fungus	<i>Armillaria</i> species
Green Old Man's Beard	<i>Alectoria sarmentosa</i>
Black Old Man's Beard	<i>Bryoria fuscescens</i>

# Lesson Three - Making a Cedar-Hemlock Forest Plant Display

## Objective of Lesson

1. Students will collect, press, mount and label specimens for a classroom plant display.

## Materials Needed

1. Class set of handout titled "Some Common Plants of Old Cedar-Hemlock Forests" from previous lesson.
2. Class set of handouts titled "Guidelines for Plant Collecting".
3. Multiple copies of the handout titled "Labels for Mounting Dried Plants".
4. Plant identification guides from previous lesson.
5. Materials for pressing plants: heavy books, newspaper, plain paper (reuse computer paper, blank side toward the plants so the ink doesn't rub off).
6. Materials for mounting and displaying pressed plants: stiff white paper, label for collector's information, glue, and tape.

## Teaching the Lesson

1. Have students prepare for collecting specimens of plants by reviewing the handout titled "Guidelines for Collecting Plants"
  - Students should do this assignment in pairs or small groups.
  - Since most of these plants also grow in forest types other than Cedar-Hemlock, finding specimens should be fairly straightforward. Other types of forest plants could be collected as well.
  - Assign the collecting activity for homework over a weekend, or take the students out on a field trip to do the collecting.

*Note: Collections should not be taken from an area with park status, nor should they be taken from private property without the owner's permission.*

2. Press the collected plants. For each plant:
  - Lay the plant on a piece of white paper and cover with another sheet of white paper. (ink from the newspaper may rub off on the damp plants, don't use newspaper next to the plants.)
  - If the plant is big, bend the stem to make it fit. Make a note of how tall the plant was before it was bent.
  - Put a few sheets newspaper on top of and below the plant.

- Place on a flat surface, under a heavy book. Do not stack plant/paper "sandwiches" more than three or four plants deep.
- After four days, check to see whether the plants are dry. Thick parts, e.g. stems, may take a few more days.

3. Mount and label the dried plants.

- Lay the plant flat on a piece of stiff white paper. Place small dabs of glue at strategic points and leave the plant to dry. *Dried plants are very fragile!*
- Fill in the information on the labels provided and glue to a corner of the mounting paper.

4. Construct a Classroom Display

- Choose as many different specimens as possible from all of the students' collections. Where students have mounted more than one specimen of a particular plant, choose the specimen that best shows the features of the plant.
- Give the display a suitable title, e.g. "Plants of a Cedar - Hemlock Forest". If the students have collected many plants which are not typical of the Cedar-Hemlock forest, adjust the title accordingly.

**Completed Collecting Label - Sample for Teacher's Reference**

<b>Common Name:</b> Green Old Man's Beard
<b>Latin Name:</b> <u>Alectoria sarmentosa</u>
<b>Collected By:</b> Jennifer Student and Ryan Kid
<b>Date Collected:</b> September 22, 2001
<b>Name of Place Collected:</b> beside the cabin at the Demonstration Forest, near Revelstoke.
<b>Description of Setting:</b> Hanging from a branch of a Western Hemlock tree
<b>Notes:</b> lots of it was on the tree.

Name \_\_\_\_\_

## Guidelines for Collecting Plants

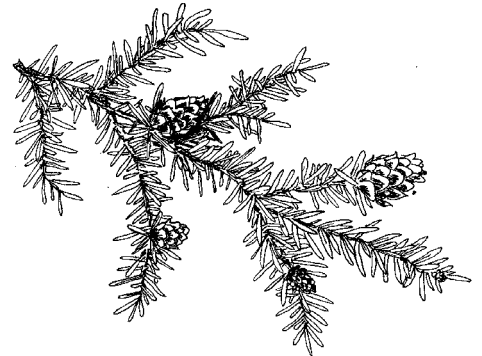
Work with another student. One of you can collect the plant and label the collecting bag, while the other copies down information about the site.

### *Collecting Notes*

- *Collections should not be taken from an area with park status, nor should they be taken from private property without the owner's permission.*
- *Never take a plant if there are only a few of them in that area.*

### Equipment Needed

1. Small knife and scissors - to take snippets of plants. Ripping the stem damages the remaining plant.
2. Plastic bags and masking tape - place each specimen in bag and tape a number on the bag to correspond with the notes in your book. Use the bag to hold samples of cones, bark, or seeds that you'll want to add to your display or that you think are important for helping to identify the plant.
3. Notebook and pencil - to keep track of the information you'll need for labels.
4. Plant field guide - It's usually easier to identify your plant by looking at a live plant in its native habitat.



### In the Field

1. Take a snippet of the plant that includes several leaves, flowers, cones, or other parts of the plant that you will need to identify it. If at all possible, don't take the entire plant. Place each plant in a labelled plastic bag.
2. Take along a sample of the label you will use when mounting the specimen. Make sure you record this information in your notebook at the time of collection. Make notes describing the habitat the plant is growing in... shady? damp? streamside?
3. Don't collect mushrooms for this display; they will just turn into slime. A bracket fungus could be brought into the classroom attached to a chunk of wood.

## Pressing Your Plants



1. When you return from the field trip, your plants will be slightly wilted. This is fine, because they will be easier to arrange on your pressing paper. Arrange the plant in its normal shape before you place the top piece of white paper over it.
2. Sometimes the distinctive parts of a plant will not press well, for example, cones or bark samples. Let these dry in the air, then put them in a bag and attach to the display sheet later on.
3. Give the plants at least four days to dry. Many plants will need more time, especially to dry the thick parts of the stems.

## Labels for Mounting Dried Plants

<i>Common Name</i>
<i>Latin Name</i>
<i>Collected By</i>
<i>Date Collected:</i>
<i>Name of Place Collected:.</i>
<i>Description of Setting:</i>
<i>Notes:</i>

<i>Common Name</i>
<i>Latin Name</i>
<i>Collected By</i>
<i>Date Collected:</i>
<i>Name of Place Collected:.</i>
<i>Description of Setting:</i>
<i>Notes:</i>

<i>Common Name</i>
<i>Latin Name</i>
<i>Collected By</i>
<i>Date Collected:</i>
<i>Name of Place Collected:.</i>
<i>Description of Setting:</i>
<i>Notes:</i>

<i>Common Name</i>
<i>Latin Name</i>
<i>Collected By</i>
<i>Date Collected:</i>
<i>Name of Place Collected:.</i>
<i>Description of Setting:</i>
<i>Notes:</i>

# Lesson Six - Making a Mural of an Old Cedar-Hemlock Forest

## Objective of Lesson

Students will use their knowledge of old Cedar-Hemlock forests to construct a mural of the forest.

## Materials Needed

1. Paper, paint, various items to add realism to the mural; e.g. samples of bark, moss and lichen to glue on, etc.

## Teaching the Lesson

3. Have the students construct a mural of an old Cedar-Hemlock forest. Display it in the hallway outside your classroom so the rest of the school can learn from the project.

Students should design the mural as a class, then break up into groups to construct the mural. Be sure they demonstrate:

- forest structure
- as many old tree and old forest attributes as possible
- appropriate plants and animals, interacting with each other

## Ideas to Make the Mural More Interesting

- Glue samples of pressed plants to the mural, e.g., on the painting of a cedar tree, attach a small sample of bark or pressed needles.
- Attach twigs with *Alectoria* lichen hanging from them (Green Old Man's Beard Lichen)
- Design special cut-aways or fold-outs or lift-up flaps to show the insects inside a standing dead tree, or the ecosystem of bugs, salamanders, etc. inside a rotten log.
- Show what goes on beneath the soil, for example, show the underground tunnels of a Western Red-Backed Vole with his dried, stored truffles, or the mycelia of a fungus surrounding tree roots, with mushrooms appearing at the surface.
- Have a Pileated Woodpecker eating Carpenter Ants from inside a young cedar tree - design a pivot point for the woodpecker and a string to pull so he will peck at a hole in the tree when you pull at the string.
- Surround the mural with copies of wildlife mini-reports, Mountain Caribou booklets, pressed plants, food chains, or poems that the students have produced.
- Label each item on the mural, or number each item, and provide a key on the side.

## **Additional Activity for Lesson Six**

Review the food chains and food webs made by the students in Chapter One, Lesson Three. Now that the students have worked with the concept of old forests and are more familiar with the ecosystem, can they add more plants or animals to their food chains, or find more ways to web the chains?