

Winter Ecology

Title: Winter Ecology

Subject: Science (Biodiversity, Systems, Behavioural Ecology)

Grade Level: Grades 4-6

*This activity could be carried out on snowshoe.

Overview:

The purpose of the following activity is to:

1. Allow students the opportunity to sharpen their observation skills and to develop a sense of wonder about the world around them.
2. Allow students to identify winter plants and animals and to learn about winter survival strategies.
3. Allow students to explore the outdoor environment.
4. Correspond with the "Curriculum Focus" as outlined in the Atlantic Canada Science Curriculum Foundation:

"By the end of grade 6, students will...be expected to observe and investigate their local environment and record the results"(p 21)

"Students must develop an understanding and appreciation of the vast array of living and non-living forms of matter... This understanding can be developed only if students have concrete experiences with phenomena and objects before they encounter explanations and abstract theories."(p 33)

Outcome:

Through this activity, students will:

1. Realize that life does not stop during winter.
2. Learn to recognize some winter plants and animals.
3. Learn how to use an identification key.
4. Learn about strategies used by local plants and animals to stay alive during winter.
5. Enhance their observation and analysis skills.

Description: (Teacher to student)

What happens to nature during the winter? Where is everyone? It seems awfully quiet out there, with no frogs calling, no snakes slithering around, no leaves rustling in the breeze. What does everyone do during the winter?

Today we are going to be talking about what animals do in the winter to stay alive. We'll be learning about the different methods that organisms use to stay alive during the winter, and then we'll be going outside to look for evidence of winter life.

We will also be using an identification key to identify winter trees. We will learn more about how to use the key once we are outside.

Materials:

Pencil
Copies of the worksheet (attached)
Hard surface to write on

Procedure:

Inside:

1. Explain that you will be going for a hike along the Washbrook to Baille Ard Trail. You will be looking for signs of winter life – both animals and signs that animals were there (food scraps, nibbled branches, burrowed holes, etc.) and plants. First you will be explaining a little about Winter Ecology and students will be answering a few questions on a worksheet (hand out worksheet to each student)
2. Give mini lecture on Winter Ecology. (lecture notes attached) There are questions throughout the lecture that students will answer out loud. The **bolded** questions with an asterisk* next to them are also in their worksheet. Students should write answers down, for later reference (these could be used as quiz questions)
3. Students are reminded to take a pencil and their worksheet outside with them. They might also want to bring a hard surface to write on.
4. Students will be looking for signs of winter life [some suggestions: tree galls (insects), stream bank (muskrats, mice, frogs burrowed in bank), burrowed holes (mice), woodpecker holes (as shelter for small songbirds

and insects)] They will be filling in the table with the animals they see and with hints that suggests there are animals there (even if they don't see them).

5. Once you arrive at Baille Ard Trail, students will be identifying trees. There is a Tree Identification Key attached that students will use. They will have to identify 5 different trees and write out the identification process (the steps of the key). Writing out the process ensures that they follow the steps instead of simply overhearing someone say "It's a Fir tree" or reading the signs on some of the trees. They can write out the steps on the back of the worksheet.
6. After you've completed the hike (and the students have completed as much of the table as possible, and each identified 5 trees), return to the classroom.

Lecture on Winter Ecology

“Ecology” is the study of organisms and relationships within their environment (“eco” means “home” – so ecology is the study of plants and animals in their homes). If we want to learn about ecology, we need to know about animals **and** plants **and** how they interact with one another (food webs, for example) **and** how they interact with their environment. **What are some non-living things that are important in ecology?** * (e.g. rocks, soil, water, temperature, wind, air pressure, weather patterns, etc.)

What are some animals that live in or near Washbrook in the summer? * (e.g. frogs & salamanders, garter snakes, green snakes, dragonflies, butterflies, mosquitoes, black flies, water skaters, blue jays, chickadees, crows, starlings, worms, fish, squirrels, muskrats, cats, dogs, humans)

What are some animals that live in or near Washbrook in the winter?*
(e.g. blue jays, chickadees, crows, starlings, squirrels, humans)

Is that it? Where is everyone?

Each animal does something different to stay alive during the cold winter months. There are three main ways to deal with winter’s cold temperatures, snow and fierce winds. The first one is called **migration**. Animals that migrate leave the cold weather behind and head south for the winter. They’ll come back when temperatures warm up. The second one, **hibernation**, is when the animal sleeps through the winter. And the third, **adaptation**, is when animals stick around to tough out winter in Cape Breton.

In the autumn, the weather gets colder, days get shorter and leaves turn color and fall off the trees. Soon, winter is here. People live in warm houses and wear heavy coats outside. We buy our food from a grocery store, but what happens to the other animals?

MIGRATION

Cape Breton winters can be cold and snowy. In order to get through the winter, some animals "migrate." This means they travel to other places where the weather is warmer or where they can find food. Many birds migrate in the fall and return in the springtime. Because the trip can be dangerous, some birds travel in large flocks. Have you ever seen or heard a noisy flock of migrating geese? They form large “V”-shaped groups, which help them glide through the air more easily. Other birds fly alone, which gives them an advantage if they see

food – they can eat all of it, whereas they would have to share if there were other birds!

Other animals migrate, too. Some mammals, like certain deer, bats and whales migrate south in search of a better food source. Many fish migrate south, or into deeper, warmer waters. Earthworms move deeper into the earth, where the soil doesn't freeze. Even some insects migrate. The Monarch butterflies spend the summer in Canada and migrates as far south as Mexico for the winter.

How do animals know when it is time to leave for winter? Scientists are still studying this interesting cycle. The cycle is controlled by changes in the amount of daylight and the weather. Do you think a warm winter, like we've had this year affects migration patterns? Why?

Migrating can be dangerous. It is very tiring and animals need to build up enough energy (through food) to make the trip. They might run into bad weather. Each night, they have to find a new place to sleep and they have to find food in a strange place, and there are new predators that they have to be careful of. The benefit, of course, is that they do not have to deal with a Cape Breton winter, which can sometimes be quite harsh.

HIBERNATION

Some animals "hibernate" for part or all of the winter. This is a special, very deep sleep. The animal's body temperature drops, and its heartbeat and breathing slow down. It uses very little energy. In the fall, these animals get ready for winter by eating extra food and storing it as body fat. They use this fat for energy while hibernating. Some also store food like nuts or acorns to eat later in the winter. In Cape Breton, most bears, chipmunks, and some bats hibernate.

Like migration, hibernation has its risks. If an animal can not find enough food in the fall to fill up for the winter, it might starve during the winter. Or, if it is a particularly cold winter, the animal might freeze to death in its sleep. With enough food, though, a bear can go to sleep on a brisk fall day and wake up to spring, missing the coldest, harshest weather of the year.

ADAPTATION

Some animals remain and stay active in the winter. They adapt to the changing weather. Many make changes in their behaviour or bodies. To keep warm, animals may grow new, thicker fur in the fall. Snowshoe hares grow a different colour fur – white, to help them hide in the snow

Food is harder to find in the winter. Some animals: like squirrels, mice and beavers, gather extra food in the fall and store it to eat later. Some, like rabbits

and deer, spend winter looking for moss, twigs, bark and leaves to eat. Other animals eat different kinds of food as the seasons change. The red fox eats fruit and insects in the spring, summer and fall. In the winter, it cannot find these things, so instead it eats small rodents.

Animals may find winter shelter in holes in trees or logs, under rocks or leaves, or underground. Some mice even build tunnels through the snow, and to stay warm, they may huddle close together.

There are a few insects, like the winter stonefly, crane fly, and snow fleas, which are normally active in winter. Also, many fish stay active in cold water during the winter, as long as their stream hasn't frozen!

Like the other ways of dealing with winter, there are benefits and drawbacks. Animals who live here during the winter have to deal with winter storms and cold temperatures, but once spring rolls around, they are the first to eat the new food. Their energy levels are high, because they are not just ending a big trip (like migrators) or just coming out of a long sleep (like hibernators).

If you had to choose between migrating, hibernating or adapting, which would you rather do? Why? *

Follow-up activities:

Students can later be quizzed on winter survival methods - migration, hibernation, adaptation – and the benefits and drawbacks of each method.

Students can be re-tested on tree identification. Samples can be brought into the classroom and students can identify using the same identification key.

Students can be asked to write about the systems that one organism is a part of (what are the many things that a chickadee rely on – weather, trees as shelter, berries for food, people for feeding them seeds, water to drink, provide food for foxes and owls, etc.) This gets students thinking in terms of systems and interrelationships.

WINTER ECOLOGY

Worksheet

1. What are some non-living things that are important in ecology?
2. What are some animals that live in or near Washbrook in the summer?
3. What are some animals that live in or near Washbrook in the winter?
4. If you had to choose between migrating, hibernating or adapting, which would you rather do? Why?

WINTER LIFE

Animal	Did you see the animal?	Did you see signs that the animal lives here during winter? Explain what the signs were
Squirrel		
Hare		
Chickadee		
Crow		
Snow flea		

add more animals here →

WINTER ECOLOGY

Tree ID key

Identification keys are a way to identify what you are looking at. Keys are used to identify insects, wildflowers, fish, snails & slugs, and much more. We will use a key to identify trees.

An identification key is a lot like a “Choose Your Own Adventure” Story. You pick a tree, then you follow the key through until you get to the end, and you have your answer. This is why they are called keys – you start at step 1, and you are given a key to move to the next step. Always follow the directions you are given. You don’t need to go from step 1 to step 2 to step 3 – sometimes you are told to skip ahead to step 5. If you think you might have made a mistake, just start again with step 1. You should write down the steps you took to get to the answer, just like a math problem! Once you get an answer (when you’re told which tree it is), find a different tree and start again at step 1.

Find a tree, then...

1. Look closely at the tree’s branches. Does the tree have needles?

1a. If the tree has needles, go to 2

1b. If the tree does not have needles, go to 5

2. Look closely at the needle length.

2a. If the needles are shorter than 3 cm, go to 3

2b. If the needles are longer than 3 cm, it is a **Pine** tree

3. Keep looking at the needles. Pick one needle off the tree and try to roll it between your thumb and index finger. Does it roll or just lie flat?

3a. If the needles are flat and do not roll, go to 4

3b. If the needles are round or squared off and roll between your fingers, it is a Spruce tree

4. Look at the base of the needle (where it attaches to the tree).



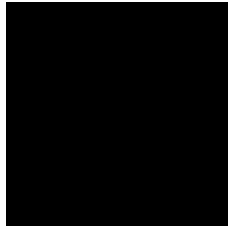
Is there a tiny little stem?

4a. If the needle has stem, it is a **Hemlock** tree

4b. If the needle has no stem, it is a **Fir** tree

5. Look at the branch patterns and the way they grow. There are two ways for them to grow.

“Alternate” is when the buds grow one here, then another, then another. It looks like this:



“Opposite” is when the branches grow opposite from one another. It looks like this:



5a. If branches are alternate (go to 6)

5b. If branches are opposite, it's a **Maple** tree

6. Look at the shape and size of the buds on the alternate branches.

6a. If buds are smaller than a cm, go to 7

6b. If buds are longer than a cm., and if there are a few golden leaves clinging to the tree, it's a **Beech** tree

7. Look at the bark on the trunk of the tree. Is it white and peeling off or is it golden and only flaking off a little?

Another test: if you break a small piece off the branch off, does it smell like wintergreen? (Only one piece needs to be broken off – it can be passed around)

7a. If it has white bark and does not smell like wintergreen, it is a **White Birch** tree

7b. If it has golden bark and smells like wintergreen, it is a **Yellow Birch** tree