



*"Like a Plant...but not."*

**Lesson Plan for Carlton Fifth Grade Students  
By Deanna M. Erickson**

Overview: Students will learn what lichen, moss, and fungus are as well as how they are important to the ecosystem and to humans.

Subject Areas: Science

Grade Levels: K-5, 6-8, 9-12

Topics: Biology, Ecology

Great Lakes Literacy Principles:

5. The Great Lakes support a broad diversity of life and ecosystems.

**Materials & resources:** Three large (approx. 2'x2') cardboard squares divided into four quadrants, plastic bags containing lichen, a fungus or a moss sample. Glue or stapler Note: I will provide the bags with samples and the cardboard squares.

**Stage 1 – Desired Results**

**Content Standard(s):**

- The North American Association for Environmental Education's *Excellence in Environmental Education: Guidelines for Learning (5<sup>th</sup>-8<sup>th</sup>)*

Strand 2.2: The Living Environment. A) Organisms, populations and communities- Learners understand that biotic communities are made up of plants and animals that are adapted to live in particular environments.

- Link features of internal and external anatomy with the ability of organisms to make or find food and reproduce in particular environments.

- Minnesota Academic Standards

5.4.1.1.1 *Structure and Function in Living Systems:* Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.

5.4.2.1.1 *Interdependence Among Living Systems:* Describe a natural system in Minnesota such as a wetland, prairie or garden, in terms of the relationships among its living and non-living parts as well as inputs and outputs.

Common Core English Language Arts

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<p><b>Understanding (s)/goals</b> Students will understand that:</p> <ul style="list-style-type: none"> <li>• Even small organisms like lichens, fungi and mosses play a role in an ecosystem and are connected to the living and non-living world around them.</li> <li>• Lichens, fungi and mosses, like all living things, have special parts and habits that help them to survive in the ecosystem in which they live.</li> <li>• Human beings rely on even these small strange organisms, and can affect their ability to function in the ecosystem.</li> </ul>	<p><b>Essential Question(s):</b></p> <ul style="list-style-type: none"> <li>• What are the most important parts of the forest? <i>Are</i> some parts more important than others?</li> </ul>
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<p><b>Student objectives (outcomes):</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>• Describe the differences between a vascular plant and a fungus, moss or lichen.</li> <li>• List at least two benefits to the forest from lichen, fungus and moss.</li> <li>• Identify at least two connections between lichen, moss, fungus and human beings.</li> </ul>
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**Stage 2 – Assessment Evidence**

<p><b>Performance Task(s):</b></p> <ul style="list-style-type: none"> <li>• Students will identify lichen, moss and fungus in the outdoors.</li> <li>• Students will describe the differences between lichen, moss and fungus and a vascular plant.</li> <li>• Students will be able to define an ecosystem.</li> <li>• Students will explain the how lichens, moss and fungus provide benefits to the forest ecosystem</li> </ul>	<p><b>Other Evidence:</b></p> <ul style="list-style-type: none"> <li>• Students will demonstrate their prior knowledge of plants by comparing a vascular plant and its parts to a lichen, moss or fungus.</li> <li>• Students know that humans also use the forest resources and will make wreaths from Lycopodium club moss (princess pine).</li> </ul>
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**Stage 3 – Learning Plan**

<p><b>Pre-Lesson: What is this thing?</b></p> <ol style="list-style-type: none"> <li>1. <b>Introductory activities (10 Minutes):</b> Divide students into three groups (note that they will be working in these groups throughout this lesson, so compatibility is important). In the middle of each of the three groups, set a potted plant. Ask: How do we know this is a plant? Have each group generate a short list. Students then share these with the whole class. Next, the groups of students must find each of the following on the plant: Roots, stems, leaves, flowers/fruit/seeds (if applicable). Rotate to each group to confirm that they know where these plant parts are located and what they look like.</li> <li>2. <b>Developmental activities (15-20 minutes):</b> Provide each group of students with the lichen, fungus or moss plastic bag and one Learning Square (see diagram below) of cardboard. Leave the plant in the middle of each group. Working together, students should each examine the plant-like object, while one student works as a scribe and</li> </ol>
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records the descriptive words (adjectives) about the object. Each group will then work through the rest of the Learning square, recording their observations and questions on the square itself. When they've completed each square, they should attach part or all of their sample to the circle in the center of the Learning Square.

- 3. Closing activities (10 Minutes):** Each group will now share their object with the rest of the class. They should share their descriptions, comparisons to a plant, and questions. Once each group has shared, they will have a chance to guess what the object is. Record the student's guesses, but do not confirm or deny their answers. Inform them that we will be looking at these little things much more closely when Deanna visits for our outside lesson next week. Have students display their learning squares somewhere in the room.

Figure 1. Learning Square

<b>Describing words: texture, smell, color (inside, outside).</b>	<b>List three ways this thing is like a plant.</b>
<b>List three ways this thing is NOT like a plant</b>	<b>List three questions you have about this thing.</b>

**Main Lesson: What kind of plant is that?**

- 4. Materials & resources:**
- 5. Introductory activities (10 Minutes):** Before class, the instructor must hide the "Freaky Facts" outdoors in the area the lesson will take place. Each fact type (fungus, lichen, moss) should be tied with a different colored yarn. Review the Learning squares from the pre-lesson, especially taking note of the questions students have about the objects.

Begin by asking a willing student to read the following poem:

**Little Things**

by Ebenezer Cobham Brewer

Little drops of water,  
Little grains of sand,  
Make the mighty ocean  
And the pleasant land.

Thus the little minutes,  
Humble though they be,  
Make the mighty ages  
Of eternity.

The author seems to say that big things like the ocean and land are made up of smaller things, like drops of water and grains of sand. Tell students that today we're going to be taking a look at the forest. Have students list the little things that make up a forest on the chalk board. Draw a circle around all the little things that make up the forest, then have students draw lines to connect anything they think is connected in the forest. Using this diagram, introduce the concept of *ecosystem*. Then focus everyone's attention on three little things they might not have even thought of: lichen, moss and fungi. Take a moment to introduce the three "mystery objects" from their learning squares. How do they connect in the forest?

- 6. Developmental activities (1 hour, 10 minutes):** Inform students that our goal today is to determine how important lichen, moss and fungi are in the Carlton school forest. In order to do that, we will be scouring the forest making observations: where do these plant-like things grow? How many of them are out there? How do they seem to be affecting the forest? Have students make hypotheses about each of these questions. Write the hypotheses on the board.

Before heading outside to make observations, get the students organized into the same three groups they worked in during the Learning Squares pre-lesson. Explain to each group that there are 5 Freaky Facts about their object (lichen, fungi or moss) hidden in the forest. Their job is to look for both the 5 Facts and to find as many specimens of lichen, fungi or moss as they can. When they find the facts, they should take them down and keep them. When they find a lichen, moss or fungi, they should record where they find it and what it's growing on. They should also keep track of the total number of specimens they find. Each group will have a clipboard and a data sheet to do this.

After bundling everyone up, head to the school forest. With the entire group, find one example of lichen, fungi and moss. To look for fungus, teach students how to gently roll over logs. Students will then divide into their three groups with one adult per group. They are to stay close to the main school forest trail, the Maple Loop, but should look for their specimens and Freaky Facts in areas off the trail as well. When the instructor calls everyone in, students and adults should gather in the trail node. If the weather is not terribly cold, this section of the activity should take around 35 minutes.

Back in the classroom, students should prepare to present their findings including number of specimens found and where they found them, and the Freaky Facts. They should also describe any ideas they have as to why these tiny plant like organisms are important. If the group has everyone speak in their presentation, they will receive applause! When students have finished their presentations, review the difference between these organisms (non-vascular) and vascular plants.

- 7. Closing activities (1 hour):**

In preparation for the holiday season, the students will now be using princess or ground pine, a *Lycopodium* club moss, to make wreaths. *Lycopodium* is similar to all the forest dwellers we talked about earlier in the lesson as it is a non-vascular plant, closely related to ferns. Students will return to the forest to gather materials for their wreaths. Prior to collecting, review the role of little things in the forest. Discuss with students the principle for collecting wild plants for eating or craft projects:

**“Consider conservation and respect the landscape.** Some plants are easily over-harvested, while others are weedy and almost impossible to exterminate. Try to understand the life cycle of the plant you are harvesting and never collect more than appropriate, or more than you will consume. Only harvest in areas where the plants are abundant, and be sure not to collect where plants are rare or protected.” ([www.doitgreen.org](http://www.doitgreen.org))

Encourage students to supplement their wreaths with pine cones, pine needles, dry leaves and bark. After spending 10 minutes gathering materials in the forest, return to the classroom to create the wreaths. Wreaths will be constructed on wreath forms with decorations attached with glue and wire. As students are crafting the wreaths, ask each of them to point out the plant parts in their wreaths, and describe which ones are vascular and which are non-vascular.

**Lesson Conclusion:** For the conclusion, the diagram of an ecosystem should still be on the board from the lesson introduction. Using the diagram, review the concept of ecosystem. Ask students to get into pairs. They will have 3 minutes to decide what the most important part of the forest is. Ask them to share their conclusions. Guide students towards the idea that each part has a role to play, that, while different, is equally important: this is what makes a healthy ecosystem.

## Appendix 1: Freaky Facts!

### Lichen Freaky Facts

1. Lichens are actually two different organisms. Fungus is the part of the lichen you can see. Inside, like a slime sandwich between the fungi walls, is algae. Algae make food for the fungus, while the fungus provides shelter for the algae.
2. Lichens play an important role in making soil over much of the earth. They live on rocks and slowly break the rocks down into soil.
3. For many years, in different parts of the world, lichens have been used as natural dyes for wool and fabric. They are often boiled with wool or cotton to create colors. Some lichens make the color purple!
4. Lichen can be used to make deodorant!
5. Caribou, reindeer, flying squirrels, and mountain goats all eat lichen.

### Fungi Freaky Facts

1. The mushroom part of a fungus produces the spores, which are like seeds. The rest of the fungus exists as tiny threads underground.
2. Fungus helps plants! Tiny fungus fibers wrap themselves around the roots of plants and help them absorb more food and water. In exchange, the plants let the fungus grow inside their roots.
3. Fungus is not an animal or a plant, but is in its own kingdom of living things. Some scientists believe it is more closely related to animals than to plants!
4. People all over the world eat fungi, but if you want to eat wild mushrooms you need to have lots of training. Some mushrooms are deadly poisonous!
5. Fungi break down dead plants and animals into soil. It can also break down harmful chemicals, like diesel fuel, in the environment and stop them from polluting water or soil.

### Moss Freaky Facts

1. Moss was used by boat-builders to fill in cracks between the boards of a boat. In the same way, moss was used to pack the walls of stone houses, particularly near the chimney to keep out the wind.
2. Mosses hold lots of water, which keeps the soil moist and provides a nice place for other plants to grow.
3. Invertebrates, animals without backbones like insects, hide in mosses.
4. Moss holds soil together, which keeps it from washing away (eroding) in a rain storm.
5. Unlike regular plants, mosses have no vascular system - the plant equivalent of blood vessels in animals that in plants transports water.

### Appendix 2: Data Collection Sheet

Group Names:

Date:

Make slash marks showing the number of specimens you find:

Describe the places you find the specimen growing:

Growing on (for example, soil or a tree):

Wet or dry area?

Specimen #1:

#2

#3

#4

#5

#6

#7

#8

#9

#10