

## **Lesson Plan – The Forest Community and Ethnobotany Past and Present**

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\*This lesson plan assumes the presenter has some background knowledge of forest ecology.

**Grade level:** Third grade, at least in parts of New Jersey, is the level when children are taught about biomes, forest types, and ecosystems.

**Time:** About 1 ½ hours.

### **Objectives:**

1. Demonstrate, in the simplest of terms, how botanists sort plants according to the characters they share in order to determine who is more closely related to whom. Just like people, the more alike you look, the more closely related you are.
2. Introduce/Review the types of biomes that exist on Earth.
3. To teach students that a forest is a living community of different families of plants and animals, just like their community is made of different human families. Just as a human community needs people to perform different tasks (policemen, firemen, mailmen, etc.) to function properly, a forest community depends on the different organisms that make-up that community to perform different jobs that help make a forest a healthy, living community.
4. Provide students with examples of plants from Northeastern forests that were important to the Native Americans and provide us with products we use today.

### **NJ Dept. of Education - Core Curriculum Content Standards: Standard 5.5**

**(Characteristics of Life)** ([http://www.state.nj.us/njded/cccs/s5\\_science.htm](http://www.state.nj.us/njded/cccs/s5_science.htm))

Descriptive statement of 5.5 reads, " The study of science must include the diversity, complexity, and interdependence of life on Earth."

- Objectives 1 and 2 demonstrate the diversity of life on a community scale and worldly scale.

- Objectives 3 and 4 demonstrate the interdependence of organisms within the forest community including humans.

Goal of Standard 5.5 - B. Diversity and Biological Evolution

By the end of the fourth Grade students will

1. Develop a simple classification scheme for grouping organisms.

- Objective 1 of this lesson works to achieve this goal.

### **By the end of the lesson:**

1. Students should understand that individuals that are more closely related share more characteristics and therefore look more similar. They should be able to sort a set of given organisms (leaves, fruits) into similar groups by comparing shared characteristics.
2. Students should become familiar with the biomes of the world with emphasis on the biome where they live.
3. Students should view a forest as a living community whose members interact, and in many cases, depend on each other for their basic survival needs.
4. Appreciate how dependent the Native Americans were on the forest community for survival and that even today we too are dependent on plants for survival.

## Materials:

1. Leaves or fruit from three different plant families that can be used in an exercise to sort things based on similarities. Collect enough plant material for five or six sets so the children can work in groups and you keep a set for yourself. Keep it simple; find groups of **LEAVES** that are similar, but different. For instance collect:
  - a. Maple (*Acer*) leaves (Soapberry Family – Sapindaceae). I collected red (*A. rubrum*), silver (*A. saccharinum*), & sugar (*A. saccharum*). They are all palmately lobed, but the number of lobes or the shape of the lobes differs.
  - b. Oaks (*Quercus*) leaves (Beech Family – Fagaceae), I collected pin (*Q. palustris*), black (*Q. velutina*), chestnut (*Q. prinus*), & white (*Q. alba*).
  - c. Trees from the rose family (Rosaceae) that I collected didn't have lobes at all, but had teeth along the edge of the leaves and the teeth differ between examples. I collected apple (*Malus*), cherry (*Prunus*), shadbush (*Amelanchier*).

\*Leaves can be dipped in wax used for candle making to preserve if not used right away.

If **FRUIT** is used collect:

- a. Maple samaras.
- b. Oak acorns.
- c. Nuts from walnut (*Juglans*) and hickory (*Carya*) trees (Walnut Family - Juglandaceae). If you can, with outer husks intact.

\*Scientific names are included as a reference and were not mentioned to the students.

2. Lots of pictures of forests showing the creatures that make-up the community. Pictures to include:

- a. A photo of forest structure with canopy trees, understory trees, shrubs and saplings, herbs – this can be used to demonstrate the age structure and physical structure of a forest.
- b. A photo of a dead tree – very important to animals like woodpeckers as a source of food (insects) and shelter.
- c. A photo of logs on the forest floor – also home to many insects and amphibians like salamanders

\*If you lift up logs to photograph these critters be sure to roll the log toward you so that the log is between you and what ever is underneath and put log back exactly how you found it.

- d. Photos of mammals of the forest – children love pictures of animals.

3. The website <http://www.nativetech.org/plants/index.php> is a great resource for a list of Northeastern plants used by Native Americans. You can also find books by searching your library database using the keywords, “ethnobotany, North America”. I decided what examples to use based on what plant photos I had and what plant samples I could bring in. Here are a few examples of what I brought in:

- a. Sweet (*Betula lenta*) or yellow birch (*B. alleghaniensis*) twigs – these have a wintergreen odor when scratched with your fingernail and all students were allowed to smell this. These oils are high in vitamin C and twigs were boiled by Native Americans to make a tea. Today these oils are used to make root beer. I brought in root beer to pass out to the class.
- b. Blueberries (*Vaccinium*)
- c. Red osier dogwood (*Cornus sericea*) branches – in the fall and winter they are a vibrant red color. Native Americans used these to make dyes.
- d. Smooth sumac (*Rhus glabra*) or staghorn sumac (*R. typhina*) fruit clusters – used by Native Americans to make “Indian Lemonade”

- e. Bee balm (*Monarda*) branches and leaves when crushed have a strong spicy odor and passed around for smelling. Native Americans used this plant as medicine for fevers and stomachaches and to flavor meat. Today we use the oils from these plants as a source of antiseptic in toothpaste and mouthwash. I brought in a bottle of mouthwash as visual aid.
  - f. Milkweed (*Asclepias*) capsules filled with seeds and fluff – American Indians used the fluff attached to the seeds to start fires and in WWII we used the fluff to stuff life jackets and flight suits used by the soldiers.
  - g. Phragmites (*Phragmites*) reeds – Used by Native Americans as a source of grain to make flour and the reeds were used to make baskets.
- \*\* I also brought in Hershey kisses and passed those out at the end. Although not a tree from Northeastern US, chocolate comes from the fruit of the cocoa tree (*Theobroma*) of the rainforests of Central & South America. I was trying to bribe the children into liking plants. ☺

### **Procedure:**

1. Introduce or review what a biome is and what the major world biomes are, describe the temperate forest biome last. Introduce or review the terms deciduous and coniferous.
2. Pass out the leaves or fruits. Briefly go over the major characters so the children know how to look at the material. As a class, sort the material into the three families represented. Give students examples of traits they may have inherited from their parents.
3. The previous exercise introduces the idea of how forest communities are made up of different plant families. Forest communities are also made up of all age classes and they all serve different functions. The pictures or visual aides you have access to should determine what kinds of forest functions you highlight.
4. Show pictures of the animals that live in the forest including current residents as well as those that are no longer present.
5. Native Americans were also an integral part of the forest community. Here present the plants used by Native Americans and those still used today.
6. Wrap up the lesson by making the students aware of the environmental issues facing our forests today. Let them know that we are part of the forest community. Although we don't live in the forest, our actions affect the forest. Avoid doom and gloom, but let them know how much forest has been lost since pre-colonial times. We need forests not just for the products we use, but also for clean water, clean air, recreation, etc. so what is remaining should be conserved.
7. End with helping the students become aware of how many plant products they use everyday by asking questions like, "How many of you have a house made of wood?" "Who had cereal for breakfast today?" "Who is wearing jeans (clothes made of cotton)?" "Who got to school today by car or bus (fossil fuels – prehistoric plants)?"

### **Reference material:**

- The Audubon Society Nature Guides: Eastern Forests by A. Sutton & M. Sutton. 1985. Alfred A. Knopf Inc., New York, NY.
- Forest Ecology 4<sup>th</sup> ed. by B.V. Barnes & S.H. Spurr. 1998. Wiley, New York, NY.
- A Naturalist's Guide to Forest Plants: An Ecology for Eastern North America 1<sup>st</sup> ed. by D.D. Cox. 2003. Syracuse University Press, Syracuse, NY.
- Plant Communities of New Jersey: A Study in Landscape Diversity by B.R. Collins & K.H. Anderson. 1994. Rutgers University Press, New Brunswick, NJ.