

Forest Ecology - Discovery Hike

Subject Area: Natural Sciences

Core Curriculum Content Standards: 3.3A, 3.4A, 5.1A, 5.5A&B, 5.10A&B, 6.6E

Session Description

This session introduces the students to the forest community and its importance as a multiple-value resource. The relationship of forests to watersheds, water quality, air quality, soil development, products, and recreation are stressed. Typical session activities include trail observation of forest trees and ecosystems, a forest-values survey, and a hike to one of the local forest management demonstration areas. Tree volume measurements are typically made to compare product vs. non-product values of forest trees and woodland areas.

Objectives

To give students a better awareness of, and an appreciation for, the multiple values of forest land.

To help students realize that the consumptive (product) uses of forest trees must be balanced by a concern for the non-consumptive values of woodland areas (i.e., flood prevention, erosion control, wildlife habitat, recreation, etc.).

Background Information

New Jersey has a surprising percentage of land area that is covered with trees and vegetation (over 50%). Yet this percentage is declining at an alarming rate due to accelerated "development" that is taking place across the state. To prevent the indiscriminate and wanton destruction of trees, forests, and woodland areas, New Jersey needs a citizenry that better understands and appreciates the many VALUES that even small pockets of woodlands can provide in our state. Many of these values are difficult to assess economically, so their import has gone unrecognized or unnoticed; and yet they relate to something that could be far more important than monetary value - the very **quality of life**. This session attempts to address the multiple values that are locked up in our treasured forest and woodland areas.

Materials

Map showing forested areas of New Jersey; Forest definition word cards; Sponge; Container with water; Coffee Filter; Picture of a home; Roll of adhesive tape or bottle of glue; Picture of a playground; Tire pressure gauge; Small fan; Balloons; Hand lens; Forest definition laminated sheet

Pictures of typical forest animals; Bag of "recreational" materials: trail marker, compass, tent stake, fishing reel, shotgun shell, forest trail map; Biltmore sticks?

Procedures

1. Assemble the group in a small open area surrounded by trees. Explain to them that since they are spending some time in a forest environment, this session is designed to familiarize them with that environment and help them realize its importance to them.
2. Ask the group to help introduce this activity by helping to **define a forest**. Have them help to fill in the blanks in the following sentence written on the laminated sheet: "**A FOREST IS A _____ OF _____ THINGS WHICH ARE _____; IN ANY FOREST, _____ ARE THE _____ LIFE FORMS, AND _____ THE _____ OF ALL OTHER LIFE FORMS BY CREATING THEIR OWN _____.**"
Distribute word sheets to the students in the group and have them work together to fit their word in the numbers blank space in the sentence. Word cards for the above sentence are: COMMUNITY, LIVING, INTERRELATED, TREES, DOMINANT, CONTROL, GROWTH, HABITATS. When the students have decided where the words go in the sentence, have the students arrange themselves in a line from first word to last word then have someone read the sentence to see if it makes sense. Highlight the meaning of each key word in the context of forest ecology.
3. Make comparisons, especially between the forest community, as defined, and human communities. Explain that most of the key words from the sentence above will be stressed throughout the session during a hike that will highlight the **values** of forest and woodland areas. Emphasize that many forest and woodland communities have values that also benefit human communities..
4. Seek out a water site near the beginning of a hike that you begin leading through the woods. From your backpack of supplies, pull out a SPONGE, soak it with water, wring it out in front of the students and, while doing so, explain that the forest, too, is **like a sponge**. Ask group to elaborate on the possible ways that the forest is like a sponge. Hopefully, in the process, they will have a chance to learn something about the **humus** layer of the soil, hold some in their hands, and possibly squeeze some water out of it (poured in by a pretend "rain" from a water container). From this will hopefully come an improved understanding of how forest humus layers can help retain and/or retard run-off water to prevent flooding in the lower reaches of watersheds. Possible follow-through questions for the students; 1) What is a "watershed"? 2) Do you have flooding problems in your community's watershed? 3) Where are your community's "sponge-land" areas? 4) What happens when forest or wooded sponge-land areas are eliminated or paved over?
5. Continue hiking the group to other stops making other comparisons between familiar objects and forest values - EXAMPLES:

A forest is like a LUNG (show Balloons)

Breathe in and out of the balloons for effect. Have group look at a leaf surface close-up with a magnifying glass showing stomata holes and cells which allow for exchange of carbon dioxide and oxygen.

Interpretation: Trees can take in a waste product of our human existence and technology (*carbon dioxide*) and convert into a valuable survival element (*oxygen*).

A forest is like a FILTER (show coffee filter)

Have the group look at a tree with leaves and talk about the tremendous surface area created by all the leaves.

Interpretation: Tree leaves can attract and provide a large surface area for "bad air" (contaminated with particulate matter) and release "good" air that is healthier for animals and us to breathe.

A forest is like a HOME (show picture of house)

Have group pick out typical habitat features along the hike: hollow log, hole in ground, nesting site, etc.

Interpretation: The countless tiered niches and microclimates of a forest provide homes and breeding and nesting sites for innumerable forms of wildlife.

A forest is like a FAN or AIR CONDITIONAER (show small fan)

Have the group decide whether it is hotter or cooler in the forest than it is on the playground of there school on a typical day.

Interpretation: Shade and tree-transpiration help to cool the planet – something not to overlook in the face of the problems associated with **global warming**.

A forest is like an ADHESIVE (show adhesive tape roll or bottle of glue)

Show group a bare slope, road, or trail where topsoil has been obviously eroded away.

Interpretation: The roots and clay content of forest soil help to bind it together to prevent erosion of topsoil layers.

A forest is like a PLAYGROUND (show picture of playground)

Show group a trail marker on one of Stokes Forest hiking trails; along with other items that might suggest other forest recreation activities: tent stake, compass, fishing reel, shotgun shell, picnic bag, etc.

Interpretation: Many State Forests, including Stokes, were initiated - at least in part - for the purpose of providing recreational opportunities for the public.

A forest is like a GAUGE (show tire-pressure gauge)

Have group sample the variety of tree types and sizes in a small area with the aid of the instructor for species identifications.

Interpretation: A forest - through the health and variety of its life forms - can help to measure (or "gauge") the condition of the surrounding environment, indeed, even the "**pressure**" that humans are placing on that environment. The health of the forest is an indicator of the health of the environment we live in.

A forest is like a VARIETY STORE (show picture of a store)

Have group brainstorm about all the products that come from forests. Then have them look at a large tree and estimate how far its lumber would go in building their house.

Interpretation: A forest supplies us with many of the products that we need to support us at our standard of living, though these products place a great demand on our forest and woodland areas.

Since the product values of forests represent a **consumptive** use of forestland, it is important to let the students then weigh the value of growing trees for product harvest against the value of leaving them stand to achieve other purposes (i.e, habitats, recreation, flood and erosion protection, etc.) To better understand the consumptive strain we place on forestland, have them use tree-measuring (Biltmore) sticks on a designated tree to compare its board-foot volume with that needed to produce the framing on a typical 2-3 bedroom house (about 15,000 board-feet). Generally, the wood from about 10-15 mature Stokes Forest trees would be needed for such a home. Multiply this number of trees by the number of houses in a typical community, and the consumptive demand is dramatized. To

add "insult to this injury", point out that trees and wooded areas are commonly *removed* to provide *space* for building houses.

Ask group to think of some forest or wooded area near their community and then decide what its greatest value might be to them. If using the forest for **PRODUCTS** is not mentioned, remind them that forest products have to come from **somewhere**; ask if they know which parts of the country supply us with large volumes of such products as a) Construction lumber 2) Furniture 3) Paper. Suggest also that since most of the forest products we do use **do not come from New Jersey forests**, perhaps we could show our concern for those distant forests by using our forest products carefully and wisely. Ask the group to name some forest products that they could probably use less wastefully in their home or school.

Summary and Wrap-up

Summarize by having the group reiterate some of the **key values** of forest and woodland areas: i.e., "adhesive", "filter", "gauge", "habitat", "products", "recreation", and "sponge", etc. If possible, have them rank - individually, or as a group - these values in their **order of importance** for A) Stokes Forest, and B) A forest or woodland area in or near their home community. This ranking, of course, will be very subjective, but will hopefully get the group thinking about why forest and woodland areas are **most important** to them!

Conclude by explaining that in the final analysis, the **tangible, monetary product values** of the forest must be balanced against the **intangible, social, aesthetic, life-sustaining non-product values**. In a small state like New Jersey, it is possible to manage forests to have BOTH, but it takes carefully planning, enforcement, and management. Stokes Forest is a fairly good example of the "multiple-use" concept of forest management, where selective and small-area harvesting of trees is balanced by the preservation of certain areas for other values. Similar practices need to be initiated on woodlands owned by *private* landowners, since much of our state's woodland acreage is under private ownership.

Remind the group that the forested and wooded areas of New Jersey are disappearing at an alarming rate each year, and that it is up to we citizens to **HELP KEEP NEW JERSEY GREEN!!!**

Follow Up Back at School

Have students assess the various values of a local woodland area and then rank these values, in order of priority.

Global Extensions

Have students research the impact that deforestation and desertification are having on some other country of the world; have them determine the resulting influence that such activities are having on the overall "quality of life" in those countries (i.e., what values are being sacrificed that we largely take for granted.

Revised 2005 by R.W. FitzGerald