

Michael Serviss
Individual Lesson Plan

Title: Fun in the Forest (Forest Ecology exercises)

Location: Heiberg Forest, Tully, NY

Grade level: 6th grade

Length of program: 3-4 hours

Ideal time of year: Spring-Fall

Theme: Forests are diverse and exciting habitats which spark thought and creativity while helping us to make connections to the environment and biological relationships.

Program Description: Participants will explore the life histories of trees within the forest, including the identifiable characteristics which distinguish them from one another. They will then hike through the forest and experience how a forest obtains energy and provides habitat for other living organisms such as mammals, birds, insects and fungi. Evidences of the relationships between the trees and other living organisms will be explored. Human uses and management of forests for desired resources will also be addressed.

Materials:

Instructor information

First aid kit

Accident report forms

Pictures of leaves and fruits/seeds of common trees

Leafs, fruits and seeds from actual trees

Pictures of interactions between trees and other living organisms

Chart paper

Cardboard box (larger than shoe box)

Blindfolds or masks

Field guide to trees (or appropriate smartphone app- Leafsnap)

Paper and pencils

Clipboards

Hand lenses

Bug boxes

Art supplies (colored pencils)

Goals:

-Familiarize students with specific trees in Heiberg Forest

-Explore how trees obtain energy from the environment

-Introduce some organisms which live in the forest

-Develop knowledge of interactions between humans, organisms and the forest/trees

Objectives:

-80% of students will be able to identify at least two tree species by leaf, seed, bark or a combination of all three by the end of the program.

-75% of students will be able to explain how trees get their energy by the time of assessment.

-Students will be able to name at least three organisms which live in the forest by the end of the program.

- 90% of students will be able to describe at least two interactions between a tree/forest and another organism or humans by the end of the program.

Program Outline:

Pre-assignment:

-Crossword puzzle for “Get in Touch with Trees” activity in PLT. Link to content:
https://www.plt.org/stuff/contentmgr/files/1/e3fbfdab383fcb60e1db3e2dc4585be2/pdf/plt_activity_2_get_in_touch_with_trees_lo.pdf

-Vocabulary associated with Forests:

- Forest
- Species
- Photosynthesis
- Management
- Resource
- Recreation
- Habitat
- Land use
- Texture
- Seeds
- Bark
- Roots
- Leaves

Classroom:

-Introduction (5-10 minutes)

“Good morning! My name is _____ and I will be your guide to “Fun in the Forest” here at Heiberg Forest. Today we will spend a few hours exploring all of the fun things that you can find and do in the forest. We will learn about different types of trees and other living things which interact with the trees and live in the forest. We will also learn about how the forest is useful and why we value the trees which grow here! Prepare yourselves for a fun and exciting day of exploration and playing outside in the forest!”

-Interesting/exciting facts about trees/forests/Heiberg Forest (5-10 minutes)

Almost all of the land on which Heiberg Forest exists was once used as farmland. The landscape appeared vastly different less than 100 years ago, transforming from many individual crop farms with flat, plowed fields to the diverse forest which stands today. The forest systems which exist within Heiberg forest are a combination of natural succession of this farmland and intentional planting of certain species such as Norway spruce and red pine. These “artificial” stands are easily recognized as they usually have only one tree species and are often marked by signage.

Common tree species of Heiberg Forest and fun facts:

-sugar maple (*Acer saccharum*)

Sap used to make maple syrup. It can take up to 86 gallons of sap to make 1 gallon of maple syrup!

-red maple (*Acer rubrum*)

Similar to sugar maple but not used to make syrup. Seeds in spring rather than fall.

-American beech (*Fagus grandifolia*)

Beech nuts provide food for mammals. Trees can grow up from roots- “root suckers”

-black cherry (*Prunus serotina*)

Edible berry, used to be used to make cough drops! Scratch surface of new branch to smell a “bitter almond” scent

-pin cherry (*Prunus pensylvanica*)

Similar to black cherry but shorter life, smaller size and longer, narrower leaves.

-Norway spruce (*Picea abies*)

Planted in old fields to reclaim for forestry purposes. Stands harbor many fungi and bird species. Spruce tea can be made from leaves and spruce gum from sap.

-eastern hemlock (*Tsuga canadensis*)

Delicious and healthy tea (Vitamin C) can be made by simmering new growth in a pot with water.

-white ash (*Fraxinus americana*)

Important tree for making baseball bats and other wood commodities. Emerald ash borer a new concern for these trees, spreading from Michigan and Ohio to New York.

-red pine (*Pinus resinosa*)

Great timber and firewood

-yellow birch (*Betula alleghaniensis*)

Scratch the surface of new twigs to expose wintergreen scent and color beneath. Can be used as a toothbrush in a pinch!

-“A Forest of Many Uses” (PLT- Activity 32, part B- page 135) (50 minutes)

-Photos of interactions between trees/other organisms (10 minutes)

Show students photos of interactions between insects, birds, mammals, fungi and trees. For each example, ask if the interaction is beneficial to either organism and which one benefits (in some cases both). This will show the dynamics of the forest system and how some interactions are beneficial to all while others only benefit one of the organisms.

Hike:

-“Get in Touch with Trees” activity (PLT- Activity 2-page 20) (45 minutes)

(Alternative: If weather is inclement, prepare different bark, leaf, seed and other tree part samples for students to evaluate in the classroom. Teachers may also adapt PLT Activity 68 “Name That Tree” on page 288. Note 60 minute preparation time for alternative plan.)

-“Trees as Habitats” activity part 1 (PLT- Activity 22-page 102) (25 minutes)

(Alternative: Use variation on page 104 with classroom objects if weather is inclement.)

Return to classroom:

-“Trees as Habitats” activity part 2 (PLT Activity 22-page 102) (25 minutes)

-Wrap-up and questions (10 minutes)

Post assignment: Students may be assigned any of the “Reading Connections” at the end of any of the PLT activities and be asked to write a summary or report. They may also listen to the “Earth and Sky” radio show in class for any of the activities, found on the PLT website:

<https://www.plt.org/environmental-curriculum-resources-for-teachers?guide=10338>

Suggested assessment:

Short Quiz:

1. Write a simile to describe the bark texture of your favorite tree:
Answer: The bark of a beech is as smooth as a baby's skin. Or: The bark of a black cherry is like burnt corn flakes.
2. The elements of a habitat include:
 - a. Food
 - b. Water
 - c. Shelter
 - d. Space
 - e. All of the above (Correct answer)
3. Describe the interaction between a tree or forest and one of the following organisms:
 - a. Bird (Answer: Branches and trunk provide habitat for nests and mating, birds eat fruit/seeds, etc.)
 - b. Insect (Answer: Many insects live in the wood or under the bark of a tree. Some are beneficial, such as pollinators, some are detrimental and hurt the tree, etc.)
 - c. Mammals (Answer: Many eat the fruits and seeds of trees and trees provide them with habitat and protection, etc.)
 - d. Fungi (Answer- Fungi help to decompose dead trees and can cause disease in living trees as well. Some fungi help trees to grow by giving them nutrients, etc.)
4. What is a resource? Name one resource provided by forests.
Answer: A resource is the supply of a beneficial good or service. Any resource related to recreation, forest products (paper, wood, etc) or wildlife habitat is acceptable.
5. Include a well defined picture of the leaf of a tree which was identified during the program and ask the student to which tree the leaf belongs. Answers will vary based on leaf choice.

Background information:

The forest is both a functioning ecosystem and a habitat for other organisms. As an ecosystem, the forest's trees use carbon dioxide, water and sunlight to photosynthesize and create energy for themselves. They take up water and nutrients from the soil to obtain the ingredients for photosynthesis. As a result, they create oxygen for the atmosphere and energy in the form of sugars to keep themselves alive and functioning. This cycle is extremely important for maintaining the air we breathe every day and keeping the forest healthy. Forests also provide us with the wood we use to build our homes, many fruits which we eat regularly and other materials such as cork and medicines. Therefore, sunlight, water, soils, trees and forests are an important part of our everyday lives!

The life histories of trees are varied by species and in some cases by individual tree. Each species has a different tolerance to shade, growth rate and length of life. Some trees can live to be thousands of years old, while others only 20 or 30 years.

Many living organisms interact and depend on forests for survival. Many birds eat fruits and nuts from trees as well as make nests in tree branches. Some of them hunt for animal food in the forest as well. Without the forest, many birds which call the forest home would not be able to survive.

Mammals, such as deer, squirrels, chipmunks and mice also call the forest home. Some use the forest for protection and nesting and others for hunting and gathering.

Insects are abundant in the forest as well, often relying on trees for nutrition and habitat. Ants, bees, wasps, caterpillars/ butterflies and worms are all important components of forest ecosystems.

Fungi are also abundant in forests. Many grow on living or dead trees, logs or in the soil on the forest floor. Many varieties of fungi, including mushrooms, obtain nutrition from trees and their leaf litter. They also play an integral part in the decomposition of dead wood and plant material in the forest.

Please also see the background information for Project Learning Tree's Activities 2, 22 and 32 to aid with the program.

NYS Standards:

Elementary Science Curriculum

Standard 1- Mathematical Analysis- Key ideas 1,2,3

Mathematical communication of abstract ideas, reasoning skills used to reach mathematical conclusions, critical thinking skills used to applied mathematics.

Standard 1- Scientific Inquiry- Key idea 1

Identify, research and explain natural occurrences through investigation.

Standard 2- Information systems-Key idea 1

Retrieve, process and communicate information.

Standard 4- Physical Setting- Key idea 3

Characteristics of matter (texture, etc.)

Standard 4- Living Environment- Key ideas 1,2,3,4,5,6,7

Compare and contrast the features of living things, Evolution and inheritance, Reproduction and development, Life sustaining functions, Interactions of organisms, Human impact on environment.

Standard 6- Interconnectedness- Key ideas 1,2,3,4,5,6

Systems (forests) perform certain functions, Forest models help us identify those functions, Growth and size can be differentiated by incremental powers, Stability and change of the system, Patterns of change used to predict future outcomes.

Standard 7- Interdisciplinary Problem Solving- Key idea 1,2

Problem solving surrounding management of forest systems, Working together to process information and present results.

Social Studies Curriculum

Geography- Environment

Geography of forest determines which species may be there, seasonal effects of geography

History- Culture

Management of a forest system is driven by cultural beliefs and desires.