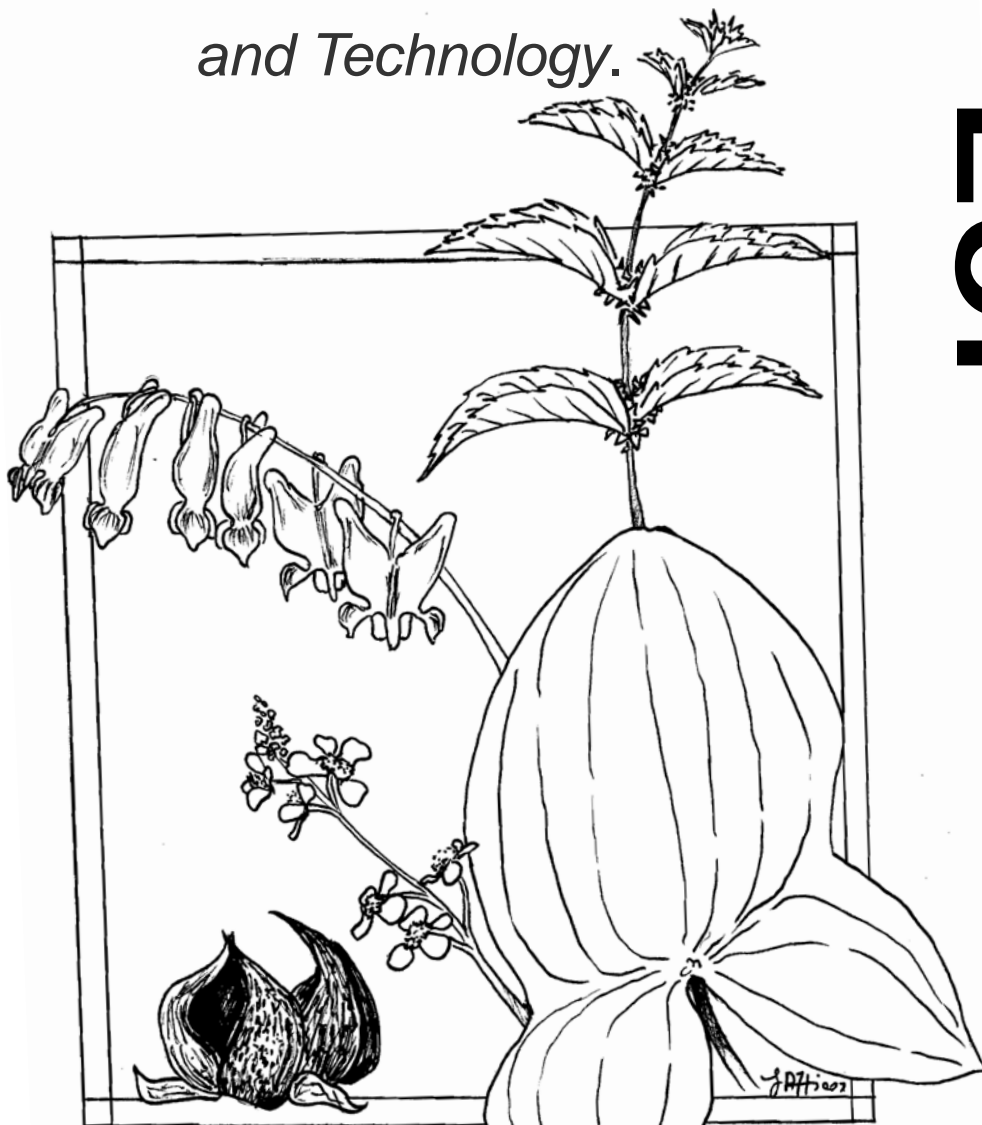


# Conservation and Use of Native Plants:

*Supplemental Curriculum Materials  
for Secondary Teachers and Students  
in Science, Social Studies, English,  
and Technology.*



*Richard Beal, Heidi Busa, Gary Lim, Catherine Landis,  
Carolyn Deary-Petrocci, Donald Leopold and KBB Sobering*

**SUNNY-ESF** Educational Outreach



Student and Community Engagement through the  
Conservation and Use of Native Plants: *Supplemental  
Materials for Teachers and Students in Science, Social Studies,  
English, and Technology*

*Richard Beal, Heidi Busa, Gary Lim, Catherine Landis, Carolyn Deary-Petrocci,  
Donald Leopold and KBB Sobering*

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Dear Colleague,

The State University of New York College of Environmental Science and Forestry's specialized mission focuses on environmental science, design, policy, management, and engineering. ESF has eight academic departments (Chemistry, Construction Management and Wood Products Engineering, Environmental and Forest Biology, Environmental Resources and Forest Engineering, Environmental Studies, Forest and Natural Resources Management, Landscape Architecture, and Paper Science Engineering). With its main campus in Syracuse, New York, ESF's regional instructional and research campuses are distributed across 25,000 acres in central and northern New York State, ranging from the Appalachian Mountains and Great Lakes basin to the St. Lawrence River and the Adirondack Highlands. ESF is one of the eight doctoral granting research institutions of SUNY and its sponsored research funding awarded per faculty member is the highest of all SUNY units (excluding the health science centers). Graduate students comprise approximately one-third of ESF's student body.

ESF has a ninety-year history in educational outreach to the community. Collectively, ESF faculty and staff members contribute more than 6,500 hours annually in service to New York schools, teachers, community groups, non-profit organizations, and other government and non-government agencies. ESF's Office of Educational Outreach and its Council coordinate numerous innovative community outreach programs ([www.esf.edu/outreach/](http://www.esf.edu/outreach/)). ESF's significant contributions to secondary education are derived from its strength as a major research institution in the natural and social sciences and its high academic rigor. The development of a series of new **Environmental Science Educational Units**, including *Student and Community Engagement through the Conservation and Use of Native Plants*, is an initial step toward expanding our educational outreach to the community--by making ESF's vast resources available to partnering high schools and students.

SUNY ESF **Environmental Science Educational Units** will fulfill an expressed need of New York State high school educators resulting from the newly implemented New York State Department of Education high school standards for Math, Science, and Technology (MST), as well as Social Studies. The new standards stress the essential roles of problem solving, critical thinking skills, and hands on experiences for high school teaching and learning. Moreover, the new standards promote the use of inquiry-based learning techniques and student research that promote in-depth understanding of both content and the process of self-directed inquiry. In fact, the use of "inquiry approaches" is acknowledged as one of the five guiding principles of best practices in Mathematics, Science, and Technology. The new SUNY ESF **Environmental Science Educational Units** are specifically designed to provide interesting and engaging topics in the Environmental Sciences that will enable teachers to cover the new state standards in MST and Social Studies. ESF faculty and staff worked in cooperation with a team of New York State teachers to ensure the utility of each lesson in the high school classroom environment.

Sincerely,

Rick Beal PH.D.

SUNY ESF Associate Director of Educational Outreach

## **Instructor Overview**

*Student and Community Engagement through the Conservation and Use of Native Plants* is a series of lessons designed to cover specific New York Department of Education standards for high school students. The lessons in the educational unit focus on the ecology, conservation, propagation, and profitability of Native Plants. The Unit is designed so that lessons can be used individually or as a whole. If the entire unit is completed, students will not only learn the science of native plants but how to start a business based on the propagation and sale of native plants, gaining valuable entrepreneurial skills in the process.

Ecological topics are particularly timely now; the human population is currently more than six billion, with projections of a population greater than twelve billion. Dependence on nonrenewable resources, such as fossil fuels, and continued pressure on our native environments creates sustainability challenges. The United States and other developed nations are facing problems related to the conservation of our native species and ecosystems.

### **Unit Objective:**

The ESF Environmental Science Educational Units will provide high school teachers with student-centered, interdisciplinary lessons that cover NYS MST standards and focus on the concepts of sustainability, conservation, and entrepreneurship.

### **Student Objectives:**

Upon completion of these activities, students should be able to understand the difference between native and non-native plants and their importance in the ecosystems where the plants are found. In an increasingly global world, many organisms are brought into countries where they were not originally found. Students should be able to understand why native plants are an important part of their local area and why it would be important to conserve and restore these species when they are threatened.

Students will:

- differentiate between native and invasive plant species
- list the characteristics that make a plant suitable for its ecological community
- describe the implications of removing or replacing native plants
- observe natural and cultural (human-influenced) communities along with the plants and animals that make up these groups
- observe soil and water characteristics of these communities
- discuss some of the factors that distinguish one plant community from another
- explain why native plants are important to an ecosystem
- explain why/how invasive species can disrupt an ecosystem
- describe and give examples of the biotic and abiotic factors in an ecosystem
- research the characteristics of an invasive species of plant
- share findings in the form of a questionnaire, brochure, or PowerPoint presentation
- identify native plant alternatives to the invasive species
- understand the meaning of conservation and restoration and be able to distinguish between the two terms

- identify places in need of restoration around their school such as lawns, or a polluted stream or wetland
- apply concepts of restoration and knowledge of native plants and habitats to design a simple restoration project
- learn the kinds of questions that must be answered, steps taken, and challenges encountered in restoring land
- define the terms needed to complete the propagation process
- research and outline the process needed to propagate the plants they have selected
- determine which method of propagation would most effectively meet the needs for cost and ease of propagation
- describe the difference between propagation by seed (sexual) compared to propagation by stem cutting (asexual)
- describe how using native plants helps the environment
- list the features and (more importantly) the benefits of plant products they intend to market and sell
- define groups of customers who would find their products most interesting or attractive
- list what goes into pricing a product for sale, learn how to decide on the eventual price at which it will be offered for sale and where to sell it
- define competitive advantage as it relates to their products, list what those advantages are, and explain why they are important
- define product differentiation and its important
- create an action plan for bringing their product(s) “to market”, complete with target customer, unique selling proposition, pricing, and distribution

Mapping Native Plants  
To the New York State Learning Standards for MST and Social Studies at the  
Commencement Level

<b><u>MST Standards For Lessons</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>	<b><u>5</u></b>	<b><u>6</u></b>
<b><u>MST Standard 1</u></b> <b><u>Analysis, Inquiry, and Design</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>	<b><u>5</u></b>	<b><u>6</u></b>
<b><u>Mathematical Analysis</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>	<b><u>5</u></b>	<b><u>6</u></b>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>						
<b><u>Scientific Inquiry</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>	<b><u>5</u></b>	<b><u>6</u></b>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>						
<b><u>Engineering Design</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>	<b><u>5</u></b>	<b><u>6</u></b>
<u>Key Idea 1</u>						
<b><u>MST Standard 2</u></b> <b><u>Information Systems</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>	<b><u>5</u></b>	<b><u>6</u></b>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>						
<b><u>Standard 3</u></b> <b><u>Mathematics</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>	<b><u>5</u></b>	<b><u>6</u></b>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>						
<u>Key Idea 4</u>						
<u>Key Idea 5</u>						
<u>Key Idea 6</u>						
<u>Key Idea 7</u>						
<b><u>Standard 4</u></b> <b><u>Physical Setting</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>	<b><u>5</u></b>	<b><u>6</u></b>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>						
<u>Key Idea 4</u>						
<u>Key Idea 5</u>						

<u>Standard 4</u> <u>Living Environment</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>						
<u>Key Idea 4</u>						
<u>Key Idea 5</u>						
<u>Key Idea 6</u>						
<u>Key Idea 7</u>						
<u>Standard 5</u> <u>Technology</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>		<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>Key Idea 4</u>						
<u>Key Idea 5</u>						
<u>Key Idea 6</u>						
<u>Key Idea 7</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>Standard 6-</u> <u>Interconnected-</u> <u>ness: Common</u> <u>Themes</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>						
<u>Key Idea 4</u>						
<u>Key Idea 5</u>						
<u>Key Idea 6</u>						
<u>Standard 7-</u> <u>Interdisciplinary</u> <u>Problem Solving</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>					<u>X</u>	
<u>Skills and</u> <u>Strategies for</u> <u>Interdisciplinary</u> <u>Problem Solving</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
<u>Working</u> <u>Effectively</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>Gathering and</u> <u>Processing</u> <u>Information</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>Generating and</u> <u>Analyzing Ideas</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>Common Themes</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>Realizing Ideas</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>Presenting Results</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	

<b>Learning Standards for Social Studies</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Standard 1 History of U.S. and New York State</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>						
<u>Key Idea 4</u>						
<u>Key Idea 5</u>						
<b>Standard 2 World History</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>						
<u>Key Idea 4</u>						
<b>Standard 3 Geography</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<b>Standard 4 Economics</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<u>Key Idea 1</u>						<u>X</u>
<u>Key Idea 2</u>						<u>X</u>
<b>Standard 5 Civics Citizenship and Government</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<u>Key Idea 1</u>						
<u>Key Idea 2</u>						
<u>Key Idea 3</u>						
<u>Key Idea 4</u>						

# ESF in the High School

## Teacher's Guide

## Lesson 1

### Introduction: The Importance of Native Plants

#### Lesson Description:

This lesson is an introduction to the characteristics of native plants and their importance within an ecological community.

**Concepts Introduced:** native plant, ecological community, invasive species

**Process Skills Emphasized:** interpreting information

**Technology Used:** none

#### MST Standards:

##### Intermediate Level: Standard 4: The Living Environment

Key Idea 3 – Major Understanding 3.2a

Key Idea 7 – Major understanding 7.1c, 7.2a, 7.2b

##### Living Environment Core: Standard 4

Key Idea 1 – Major Understanding 1.1 a-f

Key Idea 3 – Major Understanding 3.1g

Key Idea 6 – Major Understanding 6.1 d-g, 6.2a-b, 6.3a-c

Key Idea 7 – Major Understanding 7.1a-c and 7.2a-b

#### Learning Outcomes:

Students will:

- differentiate between native and invasive plant species
- list the characteristics that make a plant suitable for its ecological community
- describe the implications of removing or replacing native plants in an ecological community

#### Time Requirement:

This lesson can be completed within a 40 minute class period.

#### Instructional Strategies:

Have students read the passage and answer the questions; follow with a class discussion.

**Assessment:** Assess students during the class discussion and/or ask them to write down answers to be passed in afterwards.

**Key Terms:** native plant, ecological community, invasive species

**Prerequisite Knowledge:** Students should have a basic knowledge of the interactions between plants and animals within an ecological community.

**Equipment Needed:** none

**References:** Leopold, Donald J., **Native Plants of the Northeast: A Guide for Gardening and Conservation.** Timber Press, Portland, Oregon. 2005.

**Handouts:** Native Plants Reading, Student Question sheet

**Websites:** none

## **The Importance of Native Plants**

**Introduction:** This lesson serves as an introduction to the characteristics of native plants and their importance within an ecological community.

**Learning Outcomes:**

When you finish this lesson, you will be able to:

- differentiate between native and invasive plant species
- list the characteristics that make a plant suitable for its ecological community
- describe the implications of removing or replacing native plants in an ecological community

**Skills Required:** ability to interpret information

**New Terms:** native plant, ecological community, invasive species

**Quest:**

You are about to discover native plants! You will be exploring why these plants should be preserved and the important role they play in their ecological communities.

**Materials:** see handouts below

**Procedure:** Please read the passage: “Native Plants - What Are They and Why Should We Care?” After you have read the passage, answer the questions on the worksheet.

**Assessment:** You might be asked to hand in the answers so that your teacher may assess your understanding.

**Handouts:** Reading Sheet, Question Sheet

## Native Plants -What Are They and Why Should We Care?

As we look around our yards, communities, old fields, wetlands, and woodlands, we can see many different types of plants. Some of these are **native plants** – plants that naturally occurred in the Americas before the first European settlers (Leopold 2005).

Native plants have existed in their habitats for hundreds to many thousands of years and are adapted to survive in the particular environmental conditions that exist in that area. Native plants are well suited to the light, temperature, soil, pH, and moisture conditions of the area that they live in, which is why they have thrived there for so long.

Why are native plants important? These plants are part of an ecological community. Native plants determine what birds, insects, animals, and other plants can also live within the community, as they provide shelter, food, and places to breed for a variety of other organisms. Plants and animals within a community play a variety of roles. If one component of the community changes, other changes will occur throughout the community; any change that impacts these plants will have an impact on other parts of the community.

Humans have removed native plants from their habitats in several ways. As humans have cleared land for farms, homes, and businesses, some plants and the animals that depend on them have lost their natural habitats. This loss of habitats has caused some native plants to become threatened or endangered.

Humans have also introduced new species into plant communities, either purposefully, as food sources or ornamental plants for landscaping, or accidentally, with seeds or other plant parts being transported as humans travel throughout the world. These new plant species can be put into situations where they can successfully compete with the native species and can even dominate the habitat where the native species were once predominant. The introduced species is then known as an **invasive** species, a species that has become a problem and has seriously disrupted the community that once existed in that area.

Aesthetically, native plants provide attractive surroundings for us to enjoy. Many of these plants are found in limited areas and their beauty may not be accessible or understood by most people. If these plants are replaced with other aggressive species, their natural beauty will be lost.

Additionally, some of these unique plants may have uses that are already well known or are yet to be discovered. Some native plants may provide useful and delicious food sources for humans or animals. Flowers, seeds, bark, roots, sap, and other plant products can provide medicinal benefits or cures for various diseases and disorders. Such possibilities will be lost forever if invasive plants are allowed to replace our native plants.

The amazing attribute about native plants is that they are very well adapted to their native habitat. Homeowners who choose native plants spend less time, energy, and money to maintain their landscaping. Using native plants allows homeowners to use less water and fertilizer, because these plants may be already in the ideal conditions to grow well. Using native plants around the house is definitely the most effortless choice! Ecological communities that nurture native plants retain the unique characteristics that meet the needs of its various plants and animals. Native plants existed for thousands of years prior to the disturbances caused by humans.

Name : \_\_\_\_\_

- 1.) What is a native plant?
  
- 2.) What conditions determine where a plant can live?
  
- 3.) Why are native plants important within their community?
  
- 4.) How have humans removed native plants from their natural communities?
  
- 5.) What is an invasive species?
  
- 6.) How have many “invasives” been introduced through gardening?
  
- 7.) Should people replace/restore/preserve native plants? Why or why not?

## Observing Plant Communities

**Lesson Description:**

In this lesson, students will study the concept of ecological communities and observe plant communities on the school grounds.

**Concepts Introduced:** ecological communities, native species, biological diversity

**Process Skills Emphasized:** observation, investigation, presenting data

**Technology Used:** The Internet may be used for reference or plant identification; hand lenses are optional.

**MST Standards:**

**Intermediate Level: Standard 4 The Living Environment**

Key Idea 3 – Major Understanding 3.2a

Key Idea 7 – Major understandings 7.1c, 7.2a, 7.2b

**Living Environment Core: Standard 4**

Key Idea 1 – Major Understandings 1.1 a-f

Key Idea 3 – Major Understanding 3.1g

Key Idea 6 – Major Understandings 6.1 d-g, 6.2a-b, 6.3a-c

Key Idea 7 – Major Understandings 7.1a-c and 7.2a-b

**Learning Outcomes:**

Students will be able to:

- observe natural and cultural (human-influenced) communities along with the plants and animals that make up these groups
- observe soil and water characteristics of these communities
- discuss some of the factors that distinguish one plant community from another

**Time Requirement:**

This lesson requires a minimum of one class period for going outside to investigate various areas. Large areas of natural land are not necessary for this exercise; even a crack in the sidewalk supports a unique community of organisms (such as silvery bryum moss). School lawns, gardens, or landscaped areas are worth investigating, but ideally you will also have access to patches of woodland, meadow, and water (stream or wetland).

**Background information:** An *ecological community* is a group of plants and animals sharing a common environment. Members of a community interact with one another through such processes as pollination, herbivory (plant eating), decomposition, predation, etc.

We all belong to such communities, and depend on them for clean air and water, as well as food and livelihood. *Native plant communities* are those that existed in an area before European settlement and include forests, wetlands, grassland, and others. Having lived in North America for thousands of years, re-colonizing after the comings and goings of ice sheets over millennia, these plants have adapted to living with each other and the local soils and climate, insects and microbes. Such communities provide habitat, contributing to the diversity of life (biological diversity), and the richness of our plant and animal heritage.

### **Instructional Strategies:**

- 1.) Have students brainstorm to identify three or four different communities around the school grounds (for example, lawn, old field/meadow, woodland, stream, school garden).
- 2.) Instruct students to observe each of these communities and use the data form to record community traits. Sketches and/or written observations are fine.
- 3.) Give students a time limit for each site before moving to the next area.
- 4.) Have students return to class and share observations of the various areas. Even if the students do not know how to identify the many species present, they should be able to recognize differences among the plants that suggest how many different species are in the area. Observations might include topics such as, which community has the most species? Which the least? Are there dominant and subordinate species? Which offers the most habitat, food for wildlife, and water? Which ones are the wettest, and which most dry? What are the community structures, such as fallen logs and rotten stumps, and habitat implications?

### **Assessment:**

This exercise is designed to give students a chance to practice their powers of observation and communicate their findings as accurately as possible. It also asks them to start thinking of the landscape in terms of communities—i.e., to “see ecologically.” Good answers in this exercise accurately describe the communities and the details of plants or animals present. Sketches and maps that provide supporting information are appropriate media and can increase response quality.

Within these general guidelines, emphasis of points would be at the discretion of the instructor and could include:

- answers to the questions on Handout 1
- quiz
- discussion participation
  - o completeness/correctness of information, detail included
  - o presentation
  - o creativity

**Extensions/Options:** In addition to taking notes on the various ecological communities around the school, students could map those areas in order to give an ecological picture of the property. They could also take further steps to list and identify native, introduced, and invasive species in these communities.

Students can also graph the amount of biodiversity versus community (biodiversity may be subdivided by plants, animals etc.).

If there are few native plant communities growing around the school, speculate on why that might be. Why do we landscape our schools, homes, and churches, with introduced species of plants?

**Key Terms:** ecological community, native plants, biological diversity

**Prerequisite Knowledge:**

What are natural plant communities, and why are they important?

**Equipment Needed:** Handouts, pencil or pen, fair weather. Hand lenses are useful to detect and observe small creatures.

**References:**

Ecological Communities of New York State by Carol Reschke. 1990. New York Natural Heritage Program. Available at: <http://www.dec.ny.gov/animals/29392.html>. *This publication lists hundreds of ecological communities within New York State, including various plants and animals. Good basic reference with listings from salt marsh to sewer.*

Newcomb's Wildflower Guide by Lawrence Newcomb. *An excellent reference for herbaceous plants and certain shrubs.*

Native Plants of the Northeast: a Guide for Gardening and Conservation by Donald J. Leopold. *Dr. Leopold's introduction includes useful discussion of natural plant communities.*

**Handouts:** Handout 1 – Observing Natural Communities

**Websites:**

New York State D.E.C. Natural Heritage program. <http://www.dec.ny.gov/>

USDA plant database. <http://plants.usda.gov/index.html>. *Good source of information about plants. Site includes photos, place of origin, degree of invasiveness, wetland status, and more.*

## **Observing Plant Communities**

**Introduction:**

What is an ecological community? How do communities differ one from another? What are native plants, and why are they important? What are some examples of plant communities? Which animals are associated with some of those communities?

**Learning Outcomes:**

When you finish this lesson, you will be able to:

- observe natural and cultural (human-influenced) communities along with the plants and animals that make up these groups
- observe soil and water characteristics of these communities
- discuss some of the factors that distinguish one plant community from another

**Skills Required:** observing, writing, sketching, interpreting data

**New Terms:** ecological communities, native species, introduced species, canopy, understory, ground cover.

**Quest:**

We all belong to ecological communities, which are groupings of plants and animals that share a similar environment. Our neighbors in this respect are not only the people next door, but all the living organisms around us. What are the ecological communities right around your school? In this exercise you will investigate some of these areas and compare them to each other.

**Materials:** Worksheet (data form), clipboard or notebook to write on, pencil or pen; hand lenses optional.

**Procedure:**

- 1.) Brainstorm to identify three or four different communities around the school grounds (for example: lawn, old field/meadow, woodland, stream, school garden).
- 2.) Observe each of these communities and use the data form to record community traits. Sketches and/or written observations are fine.
- 3.) Adhere to the time limit for each site before moving to the next area.
- 4.) Return to class and share observations of the various areas. For example, which community has the most species? Which the least? Are there dominant and subordinate species? Which offers the most habitat, food for wildlife, and water? Which ones are the wettest, and which most dry? What are the community structures and habitat implications?

**Extensions:**

- 1.) Identify the dominant plants you found in each community. (For example: lawn grasses, Scots pine, European buckthorn, daffodils, common reed, goldenrod, Norway maple, sugar maple, etc.)

Are these plants native or introduced? To answer this question, use the USDA database <http://plants.usda.gov/index.html>, or a field guide such as Newcomb's Wildflower Guide.

You can also graph the amount of biodiversity versus community (biodiversity may be subdivided by plants, animals etc.).

2) Peruse *Ecological Communities of New York State* by Carol Reschke. Available at: <http://www.dec.ny.gov/animals/29392.html>. Do any of the communities you found match ones in this classification?

**Assessment:**

This exercise will give you a chance to practice your powers of observation and accurately communicate your findings. It also asks you to start thinking of the landscape in terms of communities—i.e., to “see ecologically.” Good answers in this exercise accurately describe the communities and the details of plants or animals present. Sketches and maps which provide supporting information are appropriate media and can increase response quality—they are encouraged!

Within these general guidelines, you could be graded on:

- answers to the questions on Handout 1
- quiz
- discussion participation
  - o completeness/correctness of information, detail included
  - o presentation
  - o creativity

**Handouts:** Handout 1 – **Observing Ecological Communities**

Name \_\_\_\_\_ Date \_\_\_\_\_

### Handout 1: Observing Ecological Communities

Use a separate sheet of paper for your observations and drawings.

**1. Canopy/Light.** Does this community have open or closed canopy? (Canopy refers to cover by the highest levels of plants, such as the branches of trees.) Is the area shaded as in a forest, or open like a meadow? Describe the canopy at this site.

**2. Soil.** Check the soil. Rub a small amount between forefinger and thumb. Is it gritty (sandy), or sticky (clay)? A smooth-textured, floury feel between your fingers would suggest an intermediate (silty) soil.

How wet is the soil—is it saturated and muddy, or dry?

Do you notice leaf litter at the soil surface?

**3. Water.** Observe if the water is standing (like a pond) or running (like a stream). How can you tell? List some characteristics such as clarity, depth, and size of the water body.

**4. Plants.** What kind of plants do you observe—trees, shrubs, grasses, or herbaceous plants? (Note - not all wildflowers are herbaceous plants.) To tell a tree from a shrub: trees are generally single stemmed woody plants, greater than three meters tall when mature. Shrubs have multiple stems, and are usually less than three meters tall. Herbaceous plants do not have woody stems.

If you can identify any of the plants in this community, write down their names. Extension: Use *Newcomb's Wildflower Guide* or other field guides to find names of plants. Consider small, pocket field guides that fold up and are easy to carry. These sources will also identify native and non-native plants.

**5. Animals.** List any animals you observe or animal signs such as tracks, scat, spider webs, or a feather. If you don't know an animal's name, try to draw it, or describe it in words.

Examples could be ants, moths, earthworms, domestic cats, starlings (birds).

### **Questions for Discussion**

- 1.) What makes each community unique? Base your answer on characteristics such as light, soil, water, plants, and animals.
  
- 2.) Which communities had the greatest diversity of plants and animals (composition)? Which seemed to have the best habitat?
  
- 3.) Did the communities seem to be made up primarily of animals or plants?
  
- 4.) Can you identify which area had the greatest number of native plants?
  
- 5.) Can you think of ways to improve the habitat around your school?