



# Wisconsin Forestree . . .

## Bridging the Gap Between Environment and Economy

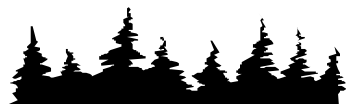
-- a product of the Central Wisconsin Environmental Station --

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# The Wisconsin Forestree Initiative

Wisconsin's forests have a proud heritage of providing for a prosperous local economy. In 1848, as Wisconsin became a state, the timber industry was responsible for attracting an ever-growing workforce. From the toils of their labor came the building materials necessary for the construction of prosperous industries and communities throughout the United States. Settlement patterns in the pineries of Northern Wisconsin were a direct consequence of the forest industry. Towns like Drummond, Laona, Stevens Point, Wausau, and Rhinelander sprouted overnight as a need for goods and services to support logging and mill working developed.

As the state continued to grow over the next half-century, so did the need for lumber. The timber industry's boom was about to bust as the great white pineries disappeared. By the early 1900's, the supply of these large trees had run out. Layoffs at the logging camps and sawmills drastically affected the prosperity of the communities that depended on the timber industry. An abandonment of countless dwellings resulted and the very land that had supported them was barren.

As these great industries suffered from a lack of raw material, a new era emerged. For the first time, we began to understand that our forests can truly be a renewable resource. Abandoned lands were replanted and we began to manage our forests with production and the future in mind. Additional research over this past century has provided an understanding of the important ecological benefits these managed forests provide. Forests protect our soils and watersheds. They provide habitat for a diversity of plants and animals, strengthening the links that keep an ecosystem strong.

Today our forests yield a renewable commodity used to provide consumers a variety of wood products and to employ over 97,000 workers in the second largest industry in the state. Recreational use of Wisconsin's forests continues to grow and diversify. Both the forest and tourism industries are important and interrelated components of Wisconsin's economy and environment.

Over the past few decades, the average citizen of Wisconsin has become removed from the land as we have evolved into a more urban and technological society. With this removal has come a lack of understanding of the historic importance of the timber industry, of the continued need for forest products, and of how sound management practices can provide for a balance between forest economic and ecological benefits. High-visibility forest issues such as the spotted owl, mountain clearcuts, tropical deforestation, and the Yellowstone and Los Alamos fires, coupled with this lack of understanding, have precipitated a growing segment of the population that is anti-timber industry. As we look to the future health of our economy and our environment, the importance of helping educate the public that these may exist in harmony is imperative.

Throughout the last year, the Central Wisconsin Environmental Station has developed this ten-lesson, multidisciplinary forest education unit entitled *Wisconsin Forestree... Bridging the Gap Between Environment and Economy*. It is a comprehensive unit that contains all of the background information and activities necessary to accurately teach the material. It is a multidisciplinary unit involving science, math, social studies, language arts, and art activities. The lessons are designed to maintain a logical progression, allowing students to consistently expand upon the knowledge they have acquired. This Unit conveys a balanced and comprehensive understanding of forest economy and ecology in Wisconsin and has the potential to help thousands of Wisconsin's middle school students and teachers better understand the relationships between people, forests, and forestry practice.

# Acknowledgments

## Wisconsin Forestry Content Reviewers

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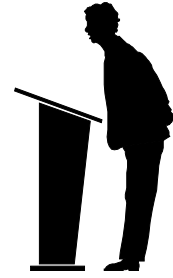
Patricia Marinac for coordinating Wisconsin Forestry with the Wisconsin Model Academic Standards.

Heather VanDalsen for her involvement in the writing of the Wisconsin Forest History Story.



# Unit Layout

## Working with Wisconsin Forestry



### Unit Design

Wisconsin Forestry was developed as a “Unit-Based” curriculum. Many other curriculum materials offer a variety of activities developed to work as individual classroom lessons in a specific subject area. Curriculums from Project Learning Tree and Project WILD are developed in this fashion. WI Forestry is designed to be taught as an entire ‘Unit’ with each lesson building off of and supporting previous lessons. It is multi-disciplinary, meaning that it contains math, science, social studies, art, and history lessons. The lessons can be taught either by one teacher or in teaching teams involving the appropriate teacher for each subject. WI Forestry is also Wisconsin-specific, dealing with the history, people, trees, forests, landscape, and issues that affect our region. Each of these qualities helps WI Forestry to be a comprehensive and powerful teaching tool for forestry educators throughout the state.

### Lesson Design

There are ten lessons in the Wisconsin Forestry Unit encompassing fourteen 50-minute class periods. Each lesson addresses a specific aspect of forestry in our State. Throughout each lesson, a set of classroom activities is used to convey the lesson concepts and achieve the student objectives. Each of the ten lessons are presented in the following format:

#### **Nutshell**

This section summarizes the lesson.

#### **Concepts**

This list illustrates the main points that the lesson conveys.

#### **Objectives**

The activities in the lesson are designed to teach the students the objectives listed in this section. After completion of the lesson, students should be able to fulfill all of the objectives in this list.

#### **Teaching Site and Preparation**

These sections list the site requirements and the preparation needed to make the activities work smoothly and effectively. Many activities require rooms with access to large wall space or overhead projectors. Lessons may also require you to have a good understanding of the background information or the rules of a specific game.

#### **Materials**

A list of all of the necessary activity materials (overheads, handouts, markers, butcher paper, etc.) will be listed in this section.

#### **Vocabulary**

The terms and definitions for important vocabulary will be listed in this section. A master list is also supplied at the end of the Unit and can be used for handouts and/or overheads for your students.

#### **Lesson Time**

Details the classroom time required to teach the lesson.

## **Background Information**

This information supports, accentuates, and expands on all of the information that goes into each activity. The background information for each lesson is extensive and in many cases covers more information than needed for the activity. The additional information is provided to enable you to expand on lessons and answer difficult questions that the students may pose.

## **Activities**

This is the heart of the lesson. The activities section outlines the actual process that you will take your class through. Each activity will have a step-by-step description narrated in a question and answer format that mimics the possible interactions that you may have with your class.

## **Conclusion**

This section reviews the concepts presented in the lesson and ties in to the next lesson in the sequence.

## **Student Log Books**

Each lesson in WI Forestry concludes with the Student Log Book section. The log book is designed for students to take notes, write vocabulary definitions, formulate questions, expand on concepts, and to complete homework assignments in. It is their personal forestry journal. Log books can be made by stapling loose-leaf paper together, using old notebooks, or designing them with construction paper and markers. Small, journal-style notebooks can also be purchased.

The log book should be used as a tool to keep students active with the lessons. At the beginning of each lesson, have the students open their log books and record the day of the week, date, teacher name, and name of the lesson that they will be working on. Log books can be used in a variety of formats and may also be used to assess the progress of your students throughout the lessons.

## **Seeds to Grow**

This section details suggested extension activities for some of the lessons.

## **The Big Picture**

The WI Forestry Unit has two field companions designed to better facilitate both you and your student's learning. The Central Wisconsin Environmental Station (CWES) offers both a Wisconsin Forestry Field Experience for students and the Wisconsin Forestry Teacher Institute for forestry educators.

The field experience is designed to work hand-in-hand with the teaching of the Unit. The first six lessons within the Unit add to the knowledge base of the students and prepare them for the more difficult lessons that involve greater background information along with teamwork, compromise, and critical thinking. After the completion of these lessons, an on-site field experience is available at CWES. The field experience promotes teamwork, gives students practical experience in the science of forestry, and provides insight into many principles in forest ecology. This experience better prepares students for the completion of the Unit.

The Teacher Institute is conducted in early summer on-site at CWES and is designed to prepare teachers to utilize the WI Forestry Unit. Teachers work through each lesson in the Unit, participate in Field Experience activities, meet natural resource professionals, and receive additional support materials and possible extension activities for the Unit.



## Why Get Hung Up in the Classroom this Year?



Bring your class to the Central Wisconsin Environmental Station for the WI Forestree Field Experience. Your students will learn to identify native trees, use modern equipment to test and measure forest attributes, estimate the monetary value of an acre of timber, assess the biologic diversity of two forest stands, and determine a forest's habitat suitability for different animal species.

The Field Experience was piloted with four separate Wisconsin Schools from April 26 to May 10, 2000. Ken Wochos, a sixth grade science teacher from Pier School in Fond du Lac, said, "I've been teaching for 26 years and this field trip was by far the best trip I've ever done with any class. I'll see you next spring."

### A Little More About Us

Since 1975, the Central Wisconsin Environmental Station (CWES) has served as a model residential environmental center, conducting quality outdoor and environmental education programs for school groups and summer camps. Nearly a quarter of a million K-12 youth and more than 12,000 teachers from throughout Wisconsin have participated in these programs.

Throughout the last 25 years, CWES has trained more than 800 UW-Stevens Point students and 500 K-12 teachers to become environmental educators.

We are a 300-acre field station located 18 miles east of Stevens Point, Wisconsin, on glacial Sunset Lake amid towering pines and oaks. We are operated by the UW-SP College of Natural Resources, the largest college of natural resources in North America. Its forestry and environmental education programs have been internationally recognized for excellence.



For more Information on the Wisconsin Forestree Field Experience write to:

**The Central Wisconsin Environmental Station**  
**Attn: Wisconsin Forestree Field Experience**  
10186 County Road MM  
Amherst Junction., WI 54407

fax- (715) 824-3201  
phone- (715) 824-2428  
<http://www.uwsp.edu/cnr/cwes>

The Station's primary purpose is to provide practical environmental education and natural resource experiences for university students. These students are studying to become leaders in the fields of soils, forestry, water science, wildlife, and natural resource management. CWES also serves as a center for environmental education outreach, helping to support and model excellence in natural resource and environmental education.

# Please Return Me !!!

The hardworking folks at the Central Wisconsin Environmental Station refuse to stop working on educational materials for Wisconsin's forestry educators. We have plans to further supplement and enhance this Wisconsin Forestree Unit. Possible additions may include a teacher's forestry reference library on CD-ROM, a Wisconsin Forestree home page, and a virtual field experience. By filling out the information below and returning this letter to the Central Wisconsin Environmental Station, you can assure that you receive all of the new materials as they become available. Thank you.

Teacher Name \_\_\_\_\_

Mailing Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please send this letter to:  
Central Wisconsin Environmental Station  
10186 County Road MM  
Amherst Junction, WI 54407

# Master Vocabulary List

## Lesson 1 – The Science of Forests and Trees

- ✿ **Leaf litter** – This first layer of a forest is found on the forest floor and is comprised of dead and decaying matter also known as humus.
- ✿ **Forb Layer** – The second layer of a forest; it contains herbaceous plants (plants that have no woody parts) like ferns, wildflowers and vines.
- ✿ **Shrub Layer** – This layer is home to plants with woody stems that are not trees such as raspberries and poison ivy.
- ✿ **Understory** – This layer is comprised of immature trees and smaller shade tolerant trees. These trees are waiting for a break in the canopy so that they can take advantage of the space and sunlight created when a mature tree dies or is harvested.
- ✿ **Canopy** – The tallest layer of a forest; it consists of mature trees that partially or completely block out direct sunlight with their foliage.
- ✿ **Individual** – a single tree.
- ✿ **Species** – a population of individuals with similar characteristics that usually only interbreed among themselves. Species groups are usually given a scientific, Latin name (for example: *Acer* = Maple, *Quercus* = Oak, *Pinus* = Pine).

## Lesson 2 – A Competitive Edge

- ✿ **Tree characteristics** – the identifying traits (physical, biological, or chemical) of a tree.
- ✿ **Disturbance** – a natural or human caused event that causes forest change.
- ✿ **Disturbance regime** – the intensity, duration, and frequency of a disturbance.
- ✿ **Tree establishment** – growing of a tree onto a piece of land.
- ✿ **Tolerance** – a tree's ability to handle natural and/or human influences upon its environment; usually refers to a tree's tolerance to shade.
- ✿ **Germination** – the sprouting of a tree seedling from a seed.
- ✿ **Nutrients** – the elements found in the forest floor and soil that trees require for growth.
- ✿ **Moisture** – the amount of water present.
- ✿ **Competition** – the interactions formed between trees while acquiring their essential needs for growth and reproduction.
- ✿ **Maturity** – a period of time in a tree's life-span when it reaches near maximum size and slows in growth.
- ✿ **Succession** – the change in forest structure and/or composition through time.
- ✿ **Primary succession** – forest establishment that starts on bare rock or a land surface with no plant material.
- ✿ **Secondary succession** – forest establishment that starts from seed beds, roots, or other types of tree reproduction.
- ✿ **Steady-state** – a period of time in forest aging when forest growth slows and the changes in composition and structure are minimal. This is the old-growth forest, the last stage of forest succession

### Lesson 3 - Forests of Wisconsin

- ✦ **Deciduous forests** – forests composed of trees that survive winter in a dormant (inactive) state; losing their leaves in the fall and regaining them once again in the spring.
- ✦ **Coniferous forests** – forests composed of trees that have cones and needles. Most coniferous trees in Wisconsin, with the exception of tamarack trees, keep their needles throughout the winter season.
- ✦ **Mixed coniferous and deciduous forests** – a forest in which both coniferous and deciduous trees are present.
- ✦ **Boreal forest** – a forest composed of mostly cold-tolerant coniferous trees. A boreal forest occurs when cold temperatures stop the growth of most or all deciduous trees, leaving only coniferous trees.
- ✦ **Oak woodland** – a dense stand of trees very similar to a deciduous forest, but containing mostly oak tree species.
- ✦ **Oak savanna** – a forest composed of a mixture of widely spaced oak trees and prairie grasses. It can be visualized as intermediate to a prairie and an oak woodland.
- ✦ **Oak-pine barrens** – a forest composed of jack pine and/or oak trees usually of a similar age and height (even-aged). These barrens are dependent on fire disturbances and sandy soil to maintain the oak and jack pine composition and the even-aged structure.

### Lesson 4 - Wisconsin Forest History

\*No vocabulary for this lesson

### Lesson 5 - Forest Utility

\*No vocabulary for this lesson

### Lesson 6 - Forest Value

- \ **Value** – the worth that someone places on something.
- \ **Economic value** – a forest's worth in financial terms.
- \ **Aesthetic value** – the worth of a forest in terms of its natural beauty.
- \ **Recreational value** – the worth of a forest in terms of its use for leisure.
- \ **Educational value** – the worth of a forest in terms of its instructional benefit.
- \ **Egocentric value** – the worth of a forest in terms of an individual's personal connection to it (e.g. I value this forest because I played here as a child).
- \ **Ecological value** – the worth of a forest in terms of preserving the ecosystem.
- \ **Cultural value** – the worth of a forest in terms of the way a person was raised to believe in it.

### Lesson 7 - Natural Resource Careers: A Game of Life

\*No vocabulary for this lesson

## Lesson 8 - Forest Management

- 🦋 **Acre** – the most common unit of measurement used by foresters in Wisconsin. A football field is about 1.2 acres in size.
- 🦋 **Cutting rate** – the rate of timber harvesting that produces a sustainable harvest.
- 🦋 **Cutting (Harvesting) method** – timber harvesting method used to encourage the re-growth of specific trees (clearcutting, shelterwood cutting, and selection cutting).
- 🦋 **Dot grid** – a grid composed of squares and dots that foresters use to measure area on a map.
- 🦋 **Ecosystem management** – use of ecological concepts to predict the effects of management actions on the ecosystem and to guide management planning and actions for use into the future. This type of management occurs over large areas of land through long periods of time.
- 🦋 **Multiple-use management** – the practice of managing forest resources for a variety of benefits including water quality, timber yield, wildlife habitat, recreation, and wilderness.
- 🦋 **Sustainable harvest** – forest management practices that ensure the constant and continuous production of forest resources through time.
- 🦋 **Sustainable forestry** - the practice of managing forest ecosystems to provide ecological, economic, and social benefits for present and future generations.

## Lesson 9 - Forestry Issues Investigation

- 🦋 **Problem** – a situation or experience that is difficult to deal with.
- 🦋 **Issue** – an issue occurs when there are at least two different viewpoints based on a problem.
- 🦋 **Belief** – a belief is something that a person thinks is true about an issue.
- 🦋 **Persuasion** – involves verbally motivating people to take action.
- 🦋 **Consumerism** – involves putting economic pressures on a business or industry in attempt to force a change in how they do business.
- 🦋 **Political action** – involves trying to persuade an elected official or government agency to conform to your same values.
- 🦋 **Legal action** – taking legal action, such as a lawsuit, or taking out a legal restraint, such as an injunction, to prevent a person or organization from carrying out an undesirable environmental behavior.
- 🦋 **Ecomanagement** – involves physically maintaining or improving the existing ecosystem.

## Lesson 10 - The Wisconsin Forestry Summit

\*No vocabulary for this lesson



# Master Materials List



## Lesson 1 - The Science of Forests and Trees

Large easel paper or butcher paper, pictures of a forested area, **Forest Layer Worksheet**, and **Four Common Wisconsin Trees Handout**

## Lesson 2 - A Competitive Edge

Day 1 – Overhead projector, pencils ,vocabulary list taken from the master vocabulary list, 4 dice, **Disturbance cards**, **Tree Limit Cards** (1 or 2 for each group), **Competition Rules**, and **Forester’s Record Worksheets**

Day 2 – Completed **Forester’s Record Sheets**, **Forest Timeline** (must be made), and **Tree Silhouette Cutouts** for all six tree species

## Lesson 3 - Forests of Wisconsin

Copies for each student of the:  
**Natural Divisions Information Chart Handout**, **Landforms of Wisconsin Map**

Overhead transparencies of the:  
**Natural Divisions of Wisconsin Map**, **Wisconsin Tension Zone Map**, **Landforms of Wisconsin Map**, **Wisconsin Glaciation Map**, **Wisconsin Continental Divide Map**, **Current Land Use Map**, and **Forest Type Pictures**

## Lesson 4 - Wisconsin Forest History

Day 1 – **Wisconsin Forest History Passage**, history pictures as overhead transparencies, and copy of **Questions and Answers for Reading Sheet**

Day 2 – **Forest History Timeline** (must create), colored construction paper, markers/pens/colored pencils, glue, scissors, old magazines (optional), and masking tape

## Lesson 5 - Forest Utility

Chalkboard and chalk, list of Wisconsin forest products (found in the activity portion of the lesson), copies of **Jobs in Wisconsin Worksheet** for each student, calculators for each two students

## Lesson 6 - Forest Value

Chalkboard and chalk, **Forest Value Category Worksheet** for each student

## Lesson 7 - Natural Resource Careers: A Game of Life

One large piece of paper and pencil/marker for each student group, chalkboard and chalk, overhead projector (optional), transparency of resume template (optional), sample or real job announcement bulletins, copies of real sample resume (optional), copy of **Some Key Job Titles Sheet**, set of the **Game of Life Cards** for each student group,, and **Search and Screen Committee Evaluation Checklist**

## Lesson 8 - Forest Management

Day 1 - Forest Area - calculators, rulers, transparent dot grids for students, forest area worksheets for students. Harvesting Methods – all 5 **Harvesting Methods Overheads**. Sustainable Harvest – **Sustainable Harvest Worksheet 1 and 2** as worksheets for students and as overhead transparencies

Day 2 - Forest Management Simulation – calculators, rulers, red/green/blue/brown colored pencils, transparent dot grid handouts, **Shady River State Forest Map** as handouts, **Worksheets 1-2** as handouts and teacher copy for reference, **Management Objectives for Wildlife, Recreation and Forestry** as handouts, **Best Management Practices and Rules for Map Drawing** as handout

Day 3 - Decision and Discussion – calculators, **Worksheet 3** as handout, **Who owns Wisconsin's Forests Pie Chart** as an overhead transparency

## Lesson 9 - Forestry Issues Investigation

Chalkboard and chalk, copies of the article for every two students, copies of the **Forestry Issues Investigation Worksheet** for every two students, paper and pencils

## Lesson 10 - The Wisconsin Forestry Summit

List of summit questions, overheads of all supporting pictures and quotes, chalkboard/chalk or large easel pad and pen