LEAF

Learning, Experiences, & Activities in Forestry

The Wisconsin K-12 Forestry Education Program

9-12 UNIT

Wisconsin K-12 Forestry Lesson Guide

LEAF is a partnership program between

Wisconsin Department of Natural Resources - Division of Forestry

and

Wisconsin Center for Environmental Education
College of Natural Resources
University of Wisconsin-Stevens Point

LEAF - **L**earning, **E**xperiences, & **A**ctivities in **F**orestry

The Wisconsin K-12 Forestry Education Program

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LEAF was created to help promote forestry education in Wisconsin schools. In 2001, Wisconsin K-12 forestry education stakeholders evaluated the current status of and the needs for Wisconsin-based K-12 forestry education. A variety of programs existed, but voids were identified in delivery and dissemination of educational materials and services. To offer a more unified effort, stakeholders supported the development of a comprehensive program that would enhance existing efforts.

During the spring of 2001, legislation was written to establish the LEAF Program as a partnership between the Wisconsin Department of Natural Resources - Division of Forestry and the Wisconsin Center for Environmental Education at the College of Natural Resources, University of Wisconsin-Stevens Point. Funding for the program is provided through a surcharge on the sale of seedlings from Wisconsin Department of Natural Resources - Division of Forestry nurseries.

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A RATIONALE FOR FORESTRY EDUCATION IN WISCONSIN

Step into any Wisconsin school building and chances are you'll find students learning about rainforests. If you ask the students what they have learned, they might say something about the value of rainforests in sustaining biodiversity and the capturing of greenhouse gases. They might say something about the displacement of indigenous cultures, extinction, or the need to stop deforestation.

Ask the same students about Wisconsin's forests, and they might not have an answer. Although the understanding of global issues is indeed important, students first need to understand their own "backyard." This includes studying local ecosystems, local human systems (both economic and social), and how they are all interrelated.

Historically, Wisconsin's forests provided jobs for a growing immigrant workforce, building materials for a developing nation, and dollars for a fledgling state economy. Forests continue today as an important part of Wisconsin. Our forests cover 46 percent of the state. They provide habitat for wildlife, recreational opportunities for residents and visitors, and a basis for a major part of Wisconsin's economy. Our forests benefit each of us through the protection of Wisconsin's air and water quality, their beauty, and the products they provide. You might say that our forests are a basic human life support system, affecting the quality of life that we all enjoy.

Today, our forests face the greatest potential for change since 19th century logging. On the near horizon are changes in forest ecosystems, forest demands, and forest values. As our population continues to grow and the demands on our forests increase, Wisconsin's citizens will need to play an active role in sustaining our forests as ecosystems and human systems. To do this, our citizens need the knowledge and skills to make decisions and to understand the impact of their choices.

Why do students know more about rainforests? Organizations have done a good job of developing and marketing education materials and resources. Similar efforts related to Wisconsin forests have been incomplete until now.

LEAF is a long-term program designed to bring together existing efforts and provide the resources necessary to help schools infuse forestry education into their current curriculum. This guide is a key component of the LEAF Program, helping to increase forestry literacy in Wisconsin schools.

INTRODUCTION

The ***LEAF Wisconsin K-12 Forestry Lesson Guide*** provides educators with complete interdisciplinary units designed to present an overview of forestry in Wisconsin. Subject areas addressed in the lessons may include Agriculture Education, Language Arts, Mathematics, Science, Social Studies, and Visual Arts. The ***Wisconsin Model Academic Standards*** and ***H. Gardner's Multiple Intelligences Theory*** were referenced during the development of the guide. The standards, subject areas, and multiple intelligences that each lesson encompasses are listed in the appendix.

The ***LEAF Lesson Guide*** is based on principles outlined in the ***LEAF Conceptual Guide to K-12 Forestry Education in Wisconsin***. The ***Conceptual Guide*** has two main parts: a conceptual framework and a scope and sequence.

THE CONCEPTUAL FRAMEWORK

In the conceptual framework, four forestry themes are identified. Each theme encompasses additional concepts and subconcepts. Many individuals and organizations provided input in developing the framework. Initially, forestry education concepts and ideas were gathered from Wisconsin citizens who have interests in forests and from existing state and national forestry education activity guides. Educators and representatives from more than 20 different organizations then highlighted areas of importance within the gathered information. Existing conceptual frameworks, such as the ***K-12 Energy Education Program – A Conceptual Guide in Wisconsin*** and ***A Biodiversity Education Framework – Key Concepts and Skills***, were used as references for the structure of the conceptual framework.

THE SCOPE AND SEQUENCE

The scope and sequence developed for the LEAF Program designates which subconcepts are appropriate to be taught at what cognitive levels. A panel of educators representing grades K-12 determined age appropriateness of each subconcept. The ***Wisconsin Model Academic Standards*** and the educators' experience with student cognitive development were used as references. The ***Atlas of Science Literacy – Project 2061*** was also used as a guiding document for creating the structure of the scope and sequence.

THE FOUR THEMES

The concepts in this theme provide students with a fundamental knowledge of Wisconsin's forests and help students appreciate forests as ecosystems. Comprehending these concepts will lead to an understanding of the interrelationship between forests and humans.

CONCEPTS
- Definition of a Forest
- Classification of Forests
- Trees as Part of the Forest
- Forests as Ecosystems
- Biodiversity and Forests

Concepts in this section help students investigate the connection between Wisconsin's forests and their own lives. Recognizing these connections increases students' awareness and understanding of the importance of sustainable forests to humans.

CONCEPTS
- Historical Importance
- Current Importance
- Future Importance

These concepts help students understand the role humans play in sustaining Wisconsin's forests. For students to become participating members of a society that works toward sustainable forests, they must be able to comprehend the role forest management plays in meeting society's needs.

CONCEPTS
- Forest Owners
- Definition of Forest Management
- Reasons to Manage Forests
- Forest Managers
- Forest Management Decisions
- Forest Management Issues

Concepts in this theme help students identify ways to ensure Wisconsin's forests are sustained for future generations. For students to willingly and effectively take action regarding forest resource management, they must have a clear understanding of what forests are, why they are important, what is involved in their management, and how citizens affect each of these.

CONCEPTS
- Studying Forests
- Your Connection to Forests
- The Future of Forests

UNIT-BASED APPROACH

The ***LEAF Wisconsin K-12 Forestry Lesson Guide*** utilizes a unit-based approach to education. Lessons build upon one another to provide connectivity in the students' educational experience. The units are divided by grade levels and include: K-1, 2-3, 4, 5-6, 7-8, and 9-12. The K-8 units contain five or more lessons, a careers exploration, and three field enhancements. The 9-12 unit contains five classroom lessons and a careers exploration. When taught together as a unit, these lessons provide students a well-rounded understanding of forestry in Wisconsin. You may find that they are also effective when taught individually and integrated with other classroom material. Each unit is bound separately. A CD-ROM containing all six units is provided with each unit.

UNIT HIGHLIGHTS

CLASSROOM LESSONS

Each lesson includes an introduction, a step-by-step procedure for activities, and a conclusion. LEAF lessons contain two types of assessment: formative and summative. Formative assessment is woven throughout each lesson. Questions with answers are provided to help teachers follow the level of understanding of students. Summative assessment ideas are listed at the end of each lesson. Suggested activities have students apply what they have learned in a new way.

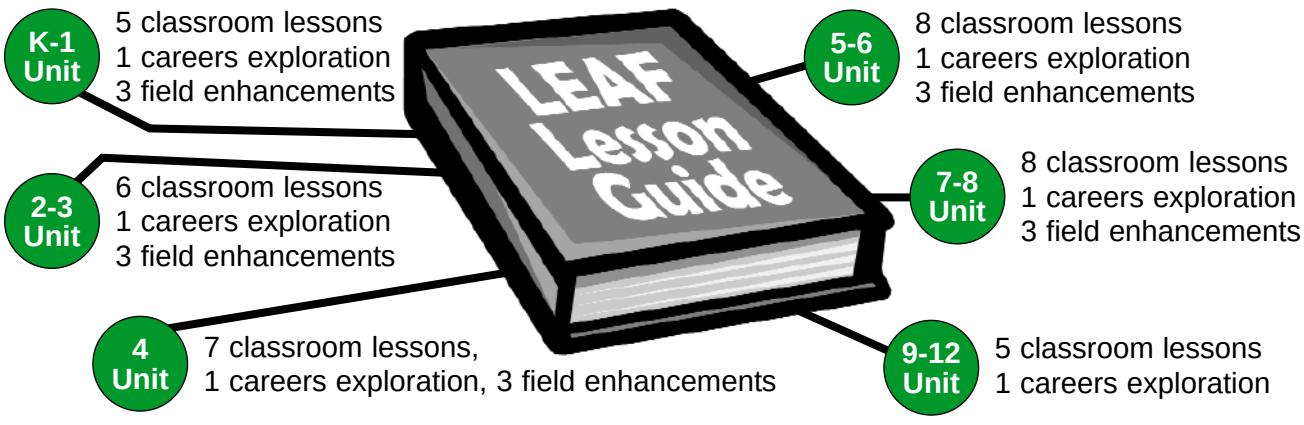
CAREERS EXPLORATION

There are hundreds of interesting and exciting forestry-related careers. In each K-8 lesson you will find a career profile of a forestry professional working in Wisconsin. Use these profiles to help students explore careers by reading them aloud, copying and handing them out, or creating a bulletin board. At the end of each K-8 unit is a careers activity that utilizes all of the career profiles from the unit. The 9-12 unit features a career activity and profiles of college students in Wisconsin pursuing careers in natural resource-related fields.

FIELD ENHANCEMENTS

Take your students outside for some hands-on learning and fun with forestry field enhancements. Each K-8 unit contains three field enhancements that can be done in your schoolyard or school forest. These activities are designed to enhance the classroom lessons by adding tactile elements and exploration.

UNIT OVERVIEWS



UNIT OVERVIEWS

K-1 UNIT

LESSON 1 - TREE HARDWARE
Students are introduced to the parts of a tree and its life stages through songs, games, and role-playing.

LESSON 2 - WHAT'S IN A FOREST?
Students learn about living and nonliving parts of a forest by playing a game and creating artwork.

LESSON 3 - MY FAVORITE FOREST USE
Students discover the value of forests by studying *Tree Spy* collages and singing a song.

LESSON 4 - FOREST PRODUCT TIME MACHINE
Students explore historical uses of forest resources and compare them to present-day goods by surveying pictures and creating drawings.

LESSON 5 - ANIMALS NEED FORESTS TOO
Students find out what forests do for animals and play a game to search for basic needs.

CAREERS EXPLORATION
Students learn about forestry-related careers, participate in a matching exercise, and draw their favorite career.

FIELD ENHANCEMENT 1 - ALL ABOUT MY TREE
Students adopt a tree and record their observations to create a class scrapbook.

FIELD ENHANCEMENT 2 - SENSING THE FOREST
Students use all of their senses to discover the living and nonliving parts of a forest.

FIELD ENHANCEMENT 3 - SEARCHING FOR BASIC NEEDS
Students examine the needs of animals and evaluate if their playground can support various critters.

2-3 UNIT

LESSON 1 - TO BE A TREE
Students use their knowledge of tree parts to learn basic tree identification skills. Basic needs and life stages of a tree are also emphasized through a game and drawing activity.

LESSON 2 - WHAT MAKES A FOREST?
Students discover how living things are influenced by nonliving things through a matching activity, song or skit, and creating a class mural of Wisconsin forests.

LESSON 3 - FOREST ENERGY FLOW
Students learn about energy flow in the forest by role-playing producers, consumers, and decomposers.

LESSON 4 - FORESTS ARE IMPORTANT TO ME!
Students explore forest values and discover what forest products come from Wisconsin using a checklist. Creative writing and an art project help students examine why they value forests.

LESSON 5 - DECISIONS, DECISIONS
Students are introduced to the concept of forest management by creating a plan for their schoolyard. A card game and song highlight some of the people involved in forest management.

LESSON 6 - I CAN BE A FOREST STEWARD
Students find out what it means to be a forest steward and make decisions about good stewardship activities through an *I Spy-like* picture and board game.

CAREERS EXPLORATION
Students learn about professionals in Wisconsin with forestry-related careers, match jobs and duties, and draw themselves in a career that interests them.

FIELD ENHANCEMENT 1 - I CAN BE A FORESTER
Students get a taste of what foresters do by collecting and discussing data.

FIELD ENHANCEMENT 2 - OBSERVING FOREST INTERACTIONS
Students explore living and nonliving forest features on a hike and spend time observing and drawing parts of a forest.

FIELD ENHANCEMENT 3 - FOREST ENERGY SCAVENGER HUNT
Students follow the flow of energy in a forest by going on a scavenger hunt.

4 UNIT

LESSON 1 - NATIVE AMERICANS AND THE FOREST
Students read the journal of an early explorer to learn what Wisconsin forests were like before European settlement and how Native Americans used the forests.

LESSON 2 - FORESTS BUILT OUR STATE
Students explore the importance of forests to early settlers and learn how forests played a role in settling Wisconsin through a mapping activity.

LESSON 3 - HELP WANTED – LUMBERJACKS
Students examine the steps and people involved in an 1800s logging process by following a tree from Northern Wisconsin to a house in Iowa.

LESSON 4 - BROKEN DREAMS
Students experience what it was like to farm in Wisconsin during the "cutover" by role-playing and studying letters, photographs, and documents.

LESSON 5 - I SAW IT ON THE 6 O'CLOCK NEWS
Students learn about 150 years of events in Wisconsin that have led to the forests of today by participating in a live newscast.

LESSON 6 - FORESTS ARE IMPORTANT TO YOU AND ME
Students discover reasons why Wisconsin forests are important to our quality of life through guided imagery, brainstorming, and an interactive media presentation.

LESSON 7 - SUSTAINING OUR FORESTS
Students are introduced to the sustainability and stewardship of forests by listening to a fable, brainstorming, reading situation cards, and creating an art project.

CAREERS EXPLORATION
Students learn about professionals in Wisconsin with forestry-related careers, play career bingo to learn about skills used in each profession, and describe and draw themselves in a career.

FIELD ENHANCEMENT 1 - UNLOCKING A FOREST'S PAST
Students uncover a forest's history by becoming detectives, collecting data, and making predictions about a forest.

FIELD ENHANCEMENT 2 - ARE FORESTS IMPORTANT TODAY?
Students find out why forests are ecologically, economically, and socially valuable by searching in a forest and playing scavenger hunt bingo.

FIELD ENHANCEMENT 3 - CARING FOR THE FUTURE OF FORESTS
Students learn what a tree needs to grow, how to choose an appropriate site, and how to properly plant a tree by putting one in their schoolyard.

5-6 UNIT

LESSON 1 - ME AS A TREE
Students learn about a tree's functions, basic needs, life stages, and role in the forest community by comparing trees and humans.

LESSON 2 - WHAT MAKES A FOREST?
Students explore parts of forest ecosystems and forest layers through an interactive game and discussion.

LESSON 3 - FORESTS ARE ALWAYS CHANGING
Students examine forest succession, disturbances, and renewability by completing a sustainability worksheet and role-playing.

LESSON 4 - ECOSYSTEM EXTRAVAGANZA
Students are introduced to forest functions such as photosynthesis, energy flow, and the cycling of matter through reading and creating a diagram. The roles of producers, consumers, and decomposers in forests are also examined.

LESSON 5 - WE ALL NEED TREES
Students learn about the values of forests and their impact on the environment by categorizing values and writing and producing a commercial.

LESSON 6 - WHAT IS MANAGEMENT?
Students discover what's happened in Wisconsin's history that led us to modern forestry and about management techniques by creating a timeline and reading a "choose your own adventure" type story.

LESSON 7 - WHO OWNS IT?
Students observe how management goals of landowners impact forest ecosystems by studying a plat map and answering questions. They also learn about the roles individuals and groups play that affect forest management.

LESSON 8 - WHOSE JOB IS IT?
Students learn about stewardship and how their choices affect the future of forests by participating in a mock school board meeting.

CAREERS EXPLORATION
Students become aware of careers that are forestry-related by listening to descriptions of them and playing charades.

FIELD ENHANCEMENT 1 - WOOD'S WORTH
Students make their own tree scale stick and use it to calculate the number of products that can be made from individual trees. They also go on a scavenger hunt to explore many ways that forests are valuable.

FIELD ENHANCEMENT 2 - STUDYING FOREST LAYERS
Students observe the structural layers of a forest and draw a color-coded picture. They also embark on two exploration activities to discover which animals can be found in each of the forest layers.

FIELD ENHANCEMENT 3 - COMPETITION IN A FOREST
Students learn how trees compete for their basic needs through observation and a simulation.

7-8 UNIT

LESSON 1 - DISCOVERING WISCONSIN'S FORESTS
Students are introduced to the types of forests in Wisconsin and factors that affect their distribution through data comparison, a mapping activity, and video research.

LESSON 2 - BIODIVERSITY AND THE FOREST CONNECTION
Students analyze three ecosystems to determine their interconnections and create a Venn diagram. They also discuss the value of Wisconsin's forests in terms of biodiversity.

LESSON 3 - HOW FORESTS ARE MANAGED
Students explore forest management plans, multiple use, and sustainability through a simulation, video, and game.

LESSON 4 - FOREST MANAGEMENT ISSUES
Students examine forest management, factors that influence decisions, effects, and conflicts through brainstorming, discussion, and issue analysis.

LESSON 5 - MANY FORESTS, MANY VALUES, MANY REASONS
Students assess forest values and discover how forests shape the economy, environment, and society using games, story analysis, and brainstorming.

LESSON 6 - MAKING BROADER CONNECTIONS
Students make connections between forests of Wisconsin and forests worldwide and discuss challenges to Wisconsin's forests by tracing the life cycle of a product and playing *Forest Jeopardy*. They also participate in a sustainability simulation to learn about demand.

LESSON 7 - KEY STRATEGIES FOR OUR FUTURE
Students learn how science, technology, and collaboration are key to sustaining Wisconsin's forests by analyzing articles. They then make predictions about the future by creating a *Fantasy Future Forest*.

LESSON 8 - SUSTAINING OUR FORESTS – CITIZENS' ROLES
Students discover how people in Wisconsin practice good forest stewardship and debate their own choices through jigsaw readings and dilemma cards.

CAREERS EXPLORATION
Students learn about professionals in Wisconsin with forestry-related careers and examine the skills, education, and experience necessary for each type of job.

FIELD ENHANCEMENT 1 - TREE IDENTIFICATION
Students are introduced to dichotomous keys and tree identification vocabulary to identify common Wisconsin trees.

FIELD ENHANCEMENT 2 - FOREST MAPPING
Students work in groups to map features of a forest plot using data collection, tree identification, measurement, and ageing.

FIELD ENHANCEMENT 3 - FOREST DIVERSITY
Students study and collect data on three components of diversity that can be found in Wisconsin forests.

9-12 UNIT

LESSON 1 - THE FOREST ODYSSEY
Students learn about forest ecosystem functions and processes by reading an Aldo Leopold essay, doing research, and creating an original science-based essay as a class.

LESSON 2 - A HISTORY OF SUCCESSION
Students explore how Wisconsin's forests have changed due to human and natural influences through a teacher presentation, readings, and a video. Current changes in Wisconsin's forests are discussed using a Wisconsin Land Cover Map.

LESSON 3 - FOREST BIODIVERSITY: TREE CASE STUDIES
Students study how Wisconsin's climate and natural history influence forest biodiversity. They use case studies to develop insights into the question, "What is a healthy level of forest biodiversity?" In groups, they create an original poster and presentation.

LESSON 4 - THE FOREST MARKETPLACE
Students identify factors that influence the supply of and demand for forest resources using basic economic principles. Using veneer as an example, students use graphs to describe markets in different geographic regions and examine the relationship between Wisconsin's forest resources and those of the rest of the world.

LESSON 5 - FOREST SCIENCE AND TECHNOLOGY
Students analyze the environmental impacts associated with wood, concrete, and steel by creating life cycle analyses. They study the roles that forest management, technology, and consumption play in sustaining forests and develop proposals to reduce the environmental impact of wood use.

CAREERS EXPLORATION
Students learn about job opportunities in natural resource fields by creating a resume from the education and experiences of college students in Wisconsin.

LESSON FORMAT

Lesson Number and Title

BIG IDEAS
The subconcepts covered in the lesson as defined by the *LEAF Conceptual Framework*.
(Subconcept Number)

OBJECTIVES
Knowledge and skills students acquire as a result of doing the activity.

SUBJECT AREAS
List of subjects addressed in the lesson.

PROCESS SKILLS
Student skill sets that can be applied in a variety of career fields.

LESSON/ACTIVITY TIME
Total time required to complete the lesson and breakdown of time required for each lesson component.

TEACHING SITE
Recommended location for teaching.

MATERIALS LIST
Items needed to complete the activity. Listed as per student, group of students, class, or teacher.

TEACHER PREPARATION
Necessary preparation needed before teaching the lesson.

RECOMMENDED RESOURCES
Additional books, websites, or materials that will enhance the lesson.

NUTSHELL
Brief summary of the lesson.

BACKGROUND INFORMATION
Information that supports, accentuates, and expands on the information addressed in the Procedure.

PROCEDURE
INTRODUCTION
A short discussion or activity that sets the mood for the rest of the lesson.

ACTIVITIES
Step-by-step instructions for the process involved in teaching the concepts.

CONCLUSION
A wrap-up and review of concepts of the lesson.

SUMMATIVE ASSESSMENT
Culminating questions or activities that have students apply learned information or skills to new situations.

REFERENCES
List of materials used in creating the lesson.

VOCABULARY
Key terms used or introduced in the activity.

KEY TO SYMBOLS USED THROUGHOUT THE LESSONS
 Teacher Page

 Student Page

 Teacher Key

OTHER LEAF OPPORTUNITIES

LEAF offers many opportunities beyond this ***Wisconsin K-12 Forestry Lesson Guide***. Some of these include:

- School forest support
- Supplemental activities and lessons
- Special trainings for landowners, foresters, nature center staff, and others
- Courses: on-line and face-to-face
- Consulting

To learn more, visit our website at www.uwsp.edu/cnr/leaf or call us at (715) 346-4956

"Many people,
other than the authors,
contribute to the making of a book,
from the first person
who had the bright idea of
alphabetic writing
through the inventor of movable type
to the lumberjacks who
felled the trees that
were pulped for its printing.
It is not customary to acknowledge
the trees themselves,
though their commitment is total."

— Forsyth and Rada —

"Forests are great!
You should teach
about them."

— LEAF Staff —

"The true teacher defends his pupils
against his own
personal influence."

— Bronson Alcott —

"It is difficult to realize how great a
part of all that is cheerful
and delightful in the recollections
of our own life
is associated with trees."

— Wilson Flagg —