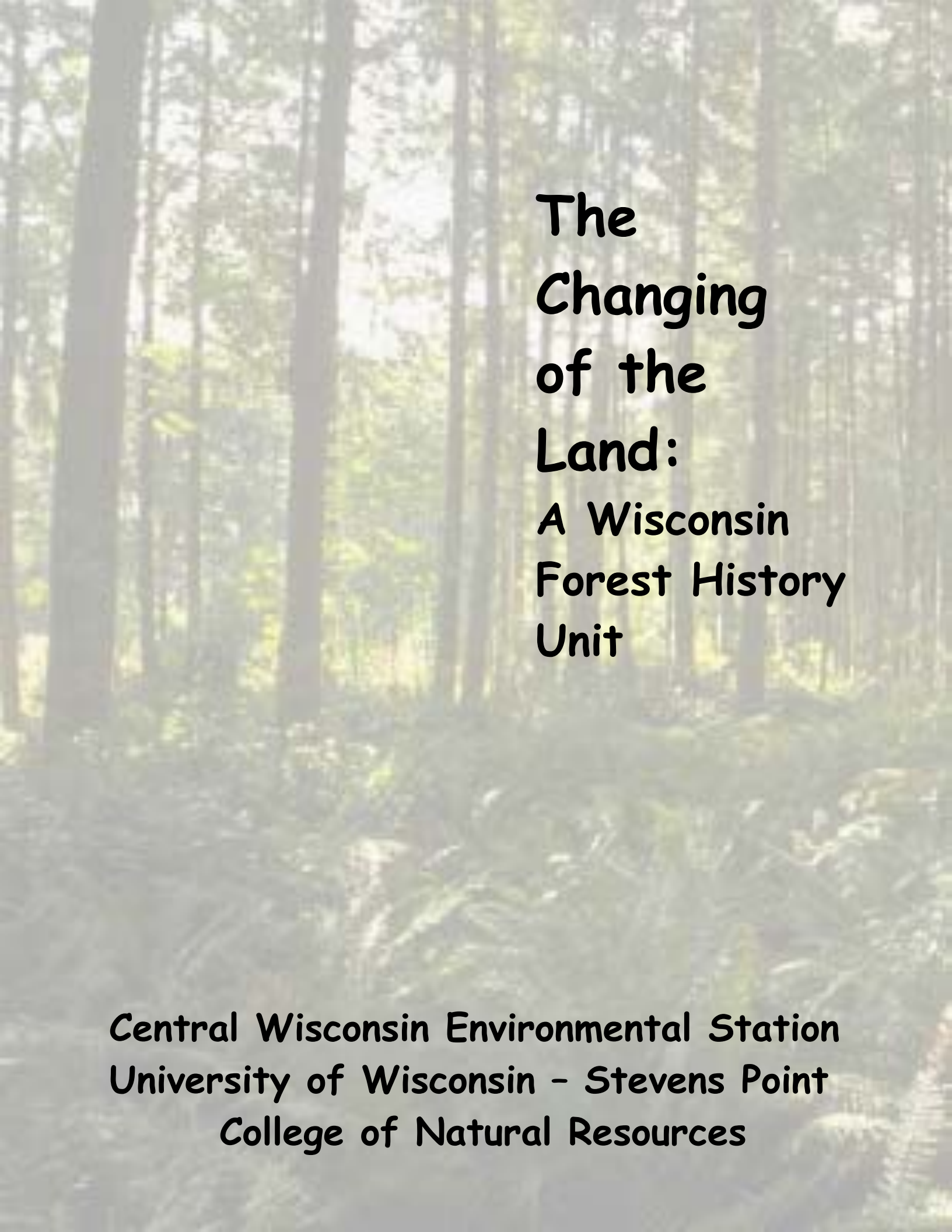

The Changing of the Land:

A Wisconsin Forest History Unit

Central Wisconsin Environmental Station
University of Wisconsin – Stevens Point
College of Natural Resources

The Changing of the Land:

A Wisconsin Forest History Unit

A Product of the Central Wisconsin Environmental Station

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Much more than just trees were needed for the early logging that took place in Wisconsin. The focus of this lesson will be on the need for transportation of logs, the people involved in the logging process, and company towns that sprung up in Wisconsin. Students will conduct experiments to help them understand the importance of wood characteristics, design a company town, and discover how difficult the language barrier could be for new immigrants.

Lesson 3 – The Logging Process…52

The lumbering era of Wisconsin was an exciting time. This lesson will show the sequence of turning a raw material (trees) into a finished product (lumber). Students will hear the adventures of a northern Wisconsin tree, do an activity that will demonstrate why log stamps were so important, and put in order all of the people that were involved in turning a tree into lumber.

Lesson 4 – Lumberjack Life…65

The logging days were a colorful time in history for those who lived in the lumber camps. The men worked long hours during the winter months. Secluded in camps, far from town, a unique language and creative entertainment were born. Students will learn about life in a lumber camp by hearing tall tales told by lumberjacks, playing lumberjack games, and using lumberjack lingo.

Lesson 5 – Farming the Cutover and Wisconsin Ghost Towns…79

Following the sound of the axe and the saw was the aftermath of the forests' removal. The great forests of the northwoods had been reduced to slash and bare soil. In this lesson, students will learn about attempts made to farm the cutover land and the ghost towns that resulted from loss of resources. They will learn about the trials of farming through a "reader's theater" piece, write letters from the perspective of an inhabitant of the cutover land, and read about three of Wisconsin's ghost towns.

Lesson 6 – The Peshtigo Fire…95

The Peshtigo fire took more lives than any other fire in American history. Part of its cause was irresponsible use of the forests surrounding Peshtigo, Wisconsin. Students will color code a navigation route, create a mileage "key," and figure out the shortest route to Peshtigo, Wisconsin from their school. They will then act as travel agents and generate a "trip tic" to Peshtigo. Finally, they will read letters from a nine-year-old survivor of the fire.

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The Changing of the Land Initiative

Wisconsin schools are mandated to teach Wisconsin History and Environmental Education as part of the fourth grade curriculum. More specifically, Wisconsin's Model Academic Standards in Social Studies state that "students need to understand their historical roots and how past events have shaped their world. In developing these insights, students must know what life was like in the past and how things change and develop over time. Reconstructing and interpreting historical events provides a needed perspective in addressing the past, present, and future." Furthermore, Wisconsin's Model Academic Standards in Environmental Education state that by the end of fourth grade, students should be able to "apply ideas of the past, present, and future to specific environmental issues."

It is often difficult to thoroughly cover all of the standards in the classroom. In addition, environmental education is often a topic in which adequate training had not been provided and which is, therefore, often overlooked. The Changing of the Land: A Wisconsin Forest History Unit will help fourth grade students and teachers in Wisconsin meet state standards.

The purpose of this curriculum is to have every fourth grade student in Wisconsin understand and appreciate the great logging legacy of their state. Much of Wisconsin has been shaped by the logging that took place and still takes place here. History lessons are often dull to students who cannot see a connection between the material they are learning and their own lives. This forest history curriculum is meant to bring the history of Wisconsin's forests alive as students meet ordinary people throughout history through stories, learn about how forestry shaped the communities around them, and think about what needs to be done to protect the future of their forests.

Wisconsin forests and forestry are ideal curriculum topics. The State's forest resources helped determine much of its settlement, infrastructure development, and economy. Forestry can be used as a framework that will take students back to pre-European settlement days and then lead them to the present. Finally, it easily lends itself towards looking at how the past has shaped our present and at forest management strategies to create a sustainable future.

Finally, this curriculum is aimed at teaching every student. It incorporates multicultural views of Wisconsin's logging history in order to present an accurate and rich portrayal of the past. The activities students do to help them understand history incorporate language arts, mathematics, science, and art. In addition, it incorporates many teaching methods in order to appeal to students with many different learning styles. It is our hope that each and every student will become connected with the history and environment of their state through these lessons!

How To Use This Curriculum

There are a lot of forestry curricula out there. How do you choose the right one? How do you get the most out of the limited time you have to teach your students? You are lucky to be a fourth grade teacher and have The Changing of the Land: A Wisconsin Forest History Unit at your fingertips!

As a fourth grade instructor it is your job to teach your students Wisconsin state history. You have also been instructed to infuse environmental education into the curriculum. There are many worthy environmental education curricula, but most are meant to be used as separate lessons. The Changing of the Land is different because it is a unit-based curriculum. You do not need to pick and choose which lessons to teach to augment your history lessons. It stands alone.

Use this curriculum as a portion of your Wisconsin state history for the year. It gives a complete look at the history of Wisconsin's forests from before statehood to today. Each lesson builds on what students have learned in the previous lessons. There are reading passages that can be used in your language arts time block, and vocabulary lists that can be used for spelling tests while you are teaching the curriculum.

Everyone designs his/her classroom and instruction differently, and The Changing of the Land leaves plenty of flexibility for how you teach. You could spend a few days doing nothing but The Changing of the Land, or you could spend two weeks on the lessons, doing one lesson each day. The choice is yours. We invite you to use it as it best suits your students needs and your teaching style. Enjoy teaching The Changing of the Land: A Wisconsin Forest History Unit!

The Changing of the Land Field Experience

But wait…that's not all! Bring your fourth graders to the Central Wisconsin Environmental Station for The Changing of the Land Field Experience. The Central Wisconsin Environmental Station is located in Amherst Junction, about twenty miles east of Stevens Point, Wisconsin. It is a residential environmental center that is part of the University of Wisconsin at Stevens Point. This three-hundred acre field station on glacial Sunset Lake serves university students, K-12 students, and teachers by providing quality environmental education instruction and programming.

The Changing of the Land program at the Central Wisconsin Environmental Station is a one-day field experience that will bring Wisconsin's forest history alive for your students. They will hear from people of Wisconsin's past, learn how to age trees, and make plans for a sustainable future. For more information, please contact the Central Wisconsin Environmental Station at 715-824-2428 or visit our website at http://www.uwsp.edu/cnr/cwes.

Do you need more Changing of the Land: A Wisconsin Forest History Unit CD's? If you would like to order one for yourself or a fellow educator, please e-mail us at cwes@uwsp.edu with the following information:

Name
School
Address
Number of copies

If you do not have access to e-mail, please mail your request to:
Central Wisconsin Environmental Station
10186 County Road MM
Amherst Junction, WI 54407

The Changing of the Land
Lesson Layout

In a Nutshell
This section is a brief description of the lesson. It tells you what the lesson is about and what your students will do in the lesson.

Concepts
Concepts are the big ideas.
They are the broad concepts that your students should understand after taking part in the lesson.
Concepts are placed in the order that they come across in the lesson.
They are not "things" that the students achieve.

Objectives
Objectives are measurable things that the students should achieve by the end of the lesson.

State Standards
This section lists the Wisconsin Model Academic Standards that the lesson covers for English Language Arts, Mathematics, Science, Social Studies, and Environmental Education at the fourth grade level. A thorough description of how each lesson addresses each standard is included in the following section of the introduction.

Total Estimated Time
This is a time estimate of how long the entire lesson would take for you to teach in your classroom. It includes the lesson introduction, all of the lesson activities, and the lesson conclusion.

Materials
Includes everything that you, the teacher, will need to teach the lesson.

Teacher Preparation
This includes anything you, the teacher, will need to accomplish before teaching the particular lesson. It includes items that will need to be prepared as well as worksheets that might need to be copied for your students.

Background Information
The Changing of the Land: A Wisconsin Forest History Unit is for every fourth grade teacher in Wisconsin. Do not worry if you are lacking background in forest history. The background information given in each lesson provides you with more information than you will need to teach these lessons. It will help you feel completely prepared to teach and answer questions that your students might pose.

Activity Introduction
This section suggests how you can begin introducing the concepts of your lesson and get your students really interested. It often consists of a really cool questions or very brief game or activity. It is like a "grabber" to get your kids into learning the topic of that particular lesson. Introductions are no more than ten minutes.

Activity
Each lesson is broken up into several activities. This is the meat of the lesson. There is a suggested amount of time given with each activity to help you plan it into your schedule.

Conclusion
The conclusion provides a method for tying the entire lesson together. It takes no longer than ten minutes.

Extension Activities
These are activities that provide non-essential information but still add to the understanding of the lesson. You can pick and choose what extension activities to do.

Evaluation
This section will be used to determine whether students learned the concepts and have achieved the objectives for the lesson. They are not in the form of a typical test format. It is hoped that the evaluation methods in this curriculum will address students of all learning styles.

Resources
These are resources that you might find useful for additional activities or information in your classroom.

References
These are the materials the author of the lesson got information from in order to develop the lesson.

Inserts
These are materials that you will need to teach the lesson including worksheets, readings, etc.

Wisconsin's Model Academic Standards

Lesson 1
English Language Arts
C – Oral Language
C.4.1 – Students will present information on Native American forest use to the class.
C.4.2 – Students will process information given by their peers about Native American forest use
C.4.3 – Students will participate in discussions about succession, Native American forest use, and how fire was used to manage forests.
D – Language
D.4.1 – Students will learn vocabulary having to do with the subjects in Lesson 1.
Social Studies
A – Geography: People, Places, and Environments
A.4.4 – Students will read about and present information on how Native Americans tribes in Wisconsin interacted with their natural environment.
B – History: Time, Continuity, and Change
B.4.1 – Students will learn what artifacts are and how they help us understand the past.
B.4.4 – Students will compare and contrast forest use today with early Native American forest use.
E – The Behavioral Sciences: Individuals, Institutions, and Society
E.4.11 – Students will read a Native American folktale and use it to help them determine how a particular Native American tribe in Wisconsin interacted with the natural environment.

Lesson 2
English Language Arts
C – Oral Language
C.4.3 – Students will participate in discussions about log transportation and company towns.
D – Language
D.4.1 – Students will learn vocabulary having to do with the subjects of Lesson 2.
F – Research and Inquiry
F.4.1 – Students will research wood characteristics.
Mathematics
E – Statistics and Probability
E.4.1 – Students will deduce why pine was cut first in Wisconsin's Northwoods based on their observations of wood characteristics.
Science
A – Science Connections
A.4.3 – Students will collect data about different types of wood.
C – Science Inquiry
C.4.2 – Students will observe what happens to different kinds of wood in water.

H – Science In Social and personal Perspectives
H.4.1 – Students will describe how railroads helped in wood transportation and aided in the development of the state of Wisconsin and the rest of the country.
Social Studies
A – Geography: People, Places, and Environments
A.4.4 – Students will learn about how lumberjacks interacted with the environment.
A.4.7 – Students will read about where Wisconsin's wood was used.
Environmental Education
A – Questioning and Analysis
A.4.1 - Students will research wood characteristics.
A.4.2 – Students will make predictions and then observe what different types of wood will do in water.
B – Knowledge of Environmental Processes and Systems
B.4.8 – Students will be able to identify wood as a natural resource.

Lesson 3
English Language Arts
A – Reading/Literature
A.4.1 – Students will read a story aloud that is from a tree's point of view to learn about the logging process.
C – Oral Language
C.4.3 - Students will participate in discussions about how the logging process was conducted in the late 1800's.
D – Vocabulary
D.4.1 - Students will learn vocabulary having to do with the subjects in Lesson 3.
Mathematics
A – Mathematical Processes
A.4.3 – Students will connect mathematics and forestry while completing the "Lumber and Numbers" worksheet.
B – Number Operations and Relationships
B.4.5 - Students will use addition, subtraction, multiplication, and division while completing the "Lumber and Numbers" worksheet.
Social Studies
A – Geography: People, Places, and Environments
A.4.4 – Students will identify how each kind of lumberjack job interacted with their natural environment.
B – History: Time, Continuity, and Change
B.4.4 – Students will compare and contrast logging practices today with those of the late 1800's.
Environmental Education
B – Knowledge of Environmental Processes and Systems
B.4.8 – Students will be able to identify wood as a natural resource.

Lesson 4
English Language Arts
C – Oral Language

C.4.3 – Students will participate in discussions about lumberjack life and culture.
D – Vocabulary
D.4.1 - Students will learn vocabulary having to do with the subjects in Lesson 4.
D.4.2 – Students will recognize, understand, and be able to use lumberjack lingo.
Social Studies
B – History: Time, Continuity, and Change
B.4.3 – Students will listen to and write lumberjack folktales.
E – The Behavioral Sciences: Individuals, Institutions, and Society
E.4.11 – Students will listen to and write tall tales that express the culture of the lumberjack.

Lesson 5
English Language Arts
A – Reading/Literature
A.4.1 – Students will read about some of Wisconsin's ghost towns.
B – Writing
B.4.1 – Students will create advertisements to sell cutover land and write letters from the point of view of somebody who lived on the cutover land.
C – Oral Language
C.4.3 – Students will participate in discussions about the cutover land, farming the cutover, and Wisconsin's ghost towns.
D – Vocabulary
D.4.1 - Students will learn vocabulary having to do with the subjects in Lesson 5.
Social Studies
A – Geography: People, Places, and Environments
A.4.4 – Students will describe through a letter-writing exercise how inhabitants of the cutover land interacted with their natural environment.
A.4.8 – Students will identify how humans created the cutover area.
B – History: Time, Continuity, and Change
B.4.4 – Students will compare and contrast living on the cutover land in the early 1900's with living in Wisconsin today.
Environmental Education
A – Questioning and Analysis
A.4.4 – Students will create advertisements to sell cutover land and write letters from the point of view of somebody who lived on the cutover land and share them with the class.
B – Knowledge of Environmental Processes and Systems
B.4.3 – Students will identify wood as a renewable resource.

Lesson 6
English Language Arts
A – Reading/Literature
A.4.1 – Students will read letters of a Peshtigo Fire survivor in order to help them understand the event.
B – Writing
B.4.1 – Students will write a newspaper account covering the Peshtigo Fire.

C – Oral Language
C.4.3 – Students will participate in discussions about the Peshtigo Fire.
D – Vocabulary
D.4.1 - Students will learn vocabulary having to do with the subjects in Lesson 6.
Social Studies
A – Geography: People, Places, and Environments
A.4.2 – Students will locate Peshtigo, WI on a map and figure out how to get there from where they live.
A.4.4 – Students will identify how human interactions with the natural environment led to the Peshtigo Fire.
A.4.8 – Students will identify how humans caused major changes in the community in and around Peshtigo, WI.
B – History: Time, Continuity, and Change
B.4.3 – Students will examine letters of a Peshtigo Fire survivor and relate them to historical events.
Environmental Education
A – Questioning and Analysis
A.4.4 – Students will communicate their understanding of the events surrounding the Peshtigo Fire through a newspaper article.

Lesson 7
English Language Arts
A – Reading/Literature
A.4.1 – Students will read aloud about political events in Wisconsin's forest history.
C – Oral Language
C.4.3 – Students will participate in discussions about forest management and some of its major leaders in the state.
D – Vocabulary
D.4.1 - Students will learn vocabulary having to do with the subjects in Lesson 7.
Social Studies
B – History: Time, Continuity, and Change
B.4.6 – Students will explain the significance of Arbor day.
B.4.7 – Students will identify Increase Lapham and E.M. Griffeth as leaders in Wisconsin forest conservation.
C – Political Science and Citizenship: Power, Authority, Governance, and Responsibility
C.4.4 – Students will explain how Wisconsin's state government had aided in forest conservation.
E – The Behavioral Sciences: Individuals, Institutions, and Society
E.4.8 – Students will describe the beliefs of those for and against state forests in the early 1900's.

Lesson 8
English Language Arts
C – Oral Language

C.4.1 – Students will create and present a "slide show" about the replanting of Wisconsin's forests.
C.4.2 – Students will listen and learn about replanting in Wisconsin from the presentations of their peers.
C.4.3 – Students will participate in discussions about the replanting of Wisconsin's forests.

D – Vocabulary

D.4.1 - Students will learn vocabulary having to do with the subjects in Lesson 8.

Social Studies

A – Geography: People, Places, and Environments

A.4.4 – Students will describe through a "slide show" presentation how Wisconsin's forests were replanted.
A.4.8 – Students will describe through a "slide show" how projects in Wisconsin's forests aided in forest conservation.

B – History: Time, Continuity, and Change

B.4.2 – Students will construct a timeline in the classroom illustrating the events surrounding the replanting of Wisconsin's forests.
B.4.4 – Students will compare and contrast life during the Depression with today's lifestyle.

Lesson 9

English Language Arts

C – Oral Language

C.4.1 – Students will communicate their scientific findings from Forest Products Laboratory experiments to the rest of the class.
C.4.2 – Students will learn about the experiments of their peers during class presentations.
C.4.3 – Students will participate in discussions about the Forest Products Laboratory in Madison, WI.

D – Vocabulary

D.4.1 - Students will learn vocabulary having to do with the subjects in Lesson 9.

F – Research and Inquiry

F.4.1 – students will conduct research and experiments on "railroad ties" to simulate actual research that took place at the Forest Products Laboratory.

Science

C – Science Inquiry

C.4.2 – Students will make prediction about what will happen and observe what does happen during experiments.

G – Science Applications

G.4.1 – Students will experience how Forest Products Laboratory scientists use science and technology in their work at the Forest Products Laboratory.

Social Studies

A – Geography: People, Places, and Environments

A.4.4 – Students describe how Forest Products Laboratory scientists research wood conservation and how this affects the environment.

A.4.9 – Students will give examples of how knowledge about wood has led to wood conservation.

B – History: Time, Continuity, and Change

B.4.8 – Students will compare and contrast past and present wood technologies.

Environmental Education

A – Questioning and Analysis

A.4.1 – Students will conduct their own investigations of "railroad ties."

B – Knowledge of Environmental Processes and Systems

B.4.10 – Students will identify the products made with trees that they use every day.

Lesson 10

English Language Arts

C – Oral Language

C.4.3 – Students will participate in discussions about sustainable management, multiple use, and urban forests.

D – Vocabulary

D.4.1 - Students will learn vocabulary having to do with the subjects in Lesson 10.

Social Studies

A – Geography: People, Places, and Environments

A.4.4 – Students will identify how various projects cause humans to interact with the environment and how they interact with the environment around them in their own area.

B – History: Time, Continuity, and Change

B.4.10 – Students will explain the history, culture, and tribal sovereignty of the Menominee peoples in Wisconsin.

Environmental Education

B – Knowledge of Environmental Processes and Systems

B.4.3 – Students will identify wood as a renewable resource.

B.4.8 – Students will give examples of natural resources that forests affect.

C – Environmental Issue Investigation Skills

C.4.2 – Students will apply what they have learned throughout the curriculum about the past and present of Wisconsin forests to make decisions about the future of a forested piece of land.

C.4.3 – Students will identify people and groups that might have interest in forested land.

C.4.4 – Students will identify what kinds of decisions, compromises, and actions would need to be carried out in order for several groups to be able to work with a piece of forested land.

D – Decision and Action Skills

D.4.1 – Students will demonstrate knowledge of the decision-making process by suggesting alternative uses for forested land that more than one group can agree with.

D.4.2 – Students will identify what actions on forested land are sustainable and which are not.

Master Materials List

Lesson 1
Paper
Crayons, markers, or other drawing materials
Overhead of Wisconsin vegetation map
Overhead projector
Copies of "Manabozho and the Maple Trees" (Insert 1) for the class
Copies of Native American Nature Cards

Lesson 2
Overhead projector
Wood pieces or household objects
Rope
Paper
Crayons, colored pencils

Lesson 3
Bucket
Candy (optional)

Lesson 4
A selected tall tale to read (check the 398.2 section of your library or use the tall tale provided in Insert 4.1)
A copy of the Paul Bunyan Breakfast menu for each student
A copy of A Day in the Life of a Lumberjack for each of the two readers
Six strands of different colored yarn
Broom
Long, stuffed sock
Blindfold
Tree cookies (optional)
Blanket (optional)
Tape player and lumberjack music (optional)
Logs and rope (optional)
Cast iron skillet (optional)
Bandanas (optional)

Lesson 5
Drawing paper
Drawing materials
Photo of advertisement (Insert 5.1)

Lesson 6
Copy of a "Trip-Tic" from AAA (optional)
Wisconsin maps with town names, including Peshtigo, Wisconsin for each student (be sure to add your
own town to the map before running off copies)
Colored pencils, fine-tip markers, other drawing materials
Lined and plain paper
Overhead projector
Copies of the four letters for each student

Lesson 7
Picture of forest (Insert 7.1)
Picture of Cutover (Insert 7.2)
Copies of Inserts 7.3 and 7.4 for your students

Lesson 8
Paper
Drawing materials

Lesson 9
Wrapped ream of paper
8.5x11 paper
Scissors
Tool box with: plastic bags, plastic wrap, duct tape, sponge, paper clips, scissors, glue, thumbtacks
Fake railroad ties
Glue
Wax paper
Lab coats
Water tubs

Lesson 10
M&M's or other small candies (be aware of chocolate allergies)
Bowl
Paper
Crayons, colored pencils
String and tape (if doing web activity)
Overhead of Menominee Reservation from space
Task cards A, B, and C for your students
Overhead of Map A

Vocabulary List

Lesson 1
Archaeology – the scientific study of materials from past human life and activities
Canopy – the highest layer of a forest
Cradleboard – a wooden object that babies can be placed in to be carried around or propped up
Culture – the beliefs, social customs, and material items of a racial, religious, or social group
Excavate – to dig out and remove
Glacier – a large body of ice slowly moving down a slope or spreading outward on a land surface
Manage – to purposely change something for one's own purpose
Primary succession – succession that occurs on completely bare land, such as after a volcano or glacier
Retreat – to move away
Secondary succession – succession that occurs after a disturbance such as a windstorm or fire
Segregation – forced separation of two or more groups
Static – showing little change
Succession – the change in an ecosystem from one group of plants and animals to another as each group changes their environment
Tension zone – an area where two different ecosystems overlap
Wigwam – a shelter typical of the Native Americans of the Great Lakes region made from rounded poles with bark over them

Lesson 2
Company town – a town in which all of the businesses and buildings are owned and run by a single company
Ethnic – relating to a race or large group of people that share common features or customs
Experiment – to perform tests under controlled conditions to discover something
Hardwood – wood from a non-coniferous tree that is usually more dense and so sinks lower in the water than other wood
Immigrant – a person who comes from another country to live
Mill – a building or collection of buildings with machinery in them to make something such as flour or lumber
Softwood – wood from a coniferous (cone-bearing) tree that usually floats higher in the water than other wood
Transportation – a way to travel from one place to another such as by car, ship, etc.

Lesson 3
Bucker – the person who cut the tree trunk up into logs
Crosscut saw – a saw designed to cut across the grain of wood; what lumberjacks used in the 1800's and early 1900's to saw trees down

Cruiser – the person who estimates the amount of wood in a forest before it is cut
Lumber – logs sawed up for use
Lumberjack – a logger
Notch – a v-shaped gap
River pig – the person who floats the logs down the river to the lumber mill
Road monkey – the person who spreads hay on icy slopes to make it safe for the sleighs to travel
Sawyer – the person who used a crosscut saw to saw a tree down
Scaler – the person who measures each log down at the river bank and estimates how much wood is there
Skidder – the person who drags the logs out of the forest and loads them onto sleighs
Stamper – the person who pounds the lumber company's stamp into the end of each log
Swamper – the person who cut the branches off of the tree after it had been cut down
Teamster – The person who brings the loaded sleighs down to the river
Top Loader – the person who stands on top of the logs on the sleigh and arranges them into a pile
Undercutter – the person who cuts a notch on one side of the tree in preparation for cutting it down

Lesson 4
Ancestor – family member who lived many generations before you
Boast – to brag
Brogue – a heavy shoe with nails in the sole
Bunkhouse – the building where all of the lumberjacks in a camp would sleep
Cant hook – a wooden stick with a metal hook on the end used to handle logs
Burden – something heavy that is carried
Character – a person in a story
Culture – the common features of a particular group of people including beliefs, products, and social customs
Derrick – a machine used for lifting heavy objects
Exaggerate – to enlarge a fact past what is actually true
Plot – the main story in a piece of writing
Feat – a large accomplishment
Jargon – the special vocabulary of a certain profession or other group of people
Gangplank – a moveable bridge used to board a ship
Gauge – to measure
Heed – to pay attention
Lingo – the special vocabulary of a certain profession or other group of people
Quandary – a state of puzzlement
Resolution – the part of a story where the main problem has been solved
Retort – to answer angrily
Setting – where something takes place
Tall tale – an incredible story with many exaggerations
Vessel – a boat or ship
Wharf – a structure built along the shore from which people or objects can get onto of off of a boat

Lesson 5
Company town – a town in which all of the businesses and buildings are owned and run by a single company
Cutover – what northern Wisconsin was referred to as after all of the trees had been cut
Desolate - empty
Ghost town – a town that used to be successful but has since been abandoned
Land speculator – someone who buys land and then sells it for a higher price
Natural resource – a source of money or needed material that comes from nature
Quarry – an open area in the ground from which a kind of rock or stone is gotten
Saloon – a bar
Sawmill – a mill that has sawing machines for lumber
Slash – leftover parts of trees that have been cut down
Timeline – a visual description of a sequence of events

Lesson 6
Color code – to indicate or instruct by using different colors
Mileage scale – a divided line on a map used to show what length on the map is used to show a certain number of miles
Navigate – to find one's way
Sawmill– a mill that has sawing machines for lumber
Travel agent – a person who arranges travel for others

Lesson 7
Con – a negative argument against something
Crop – a plant that is grown and harvested
Legal – allowable by law
Politics – the art or science of government
Preserve – an area set aside for the protection of a natural resource
Pro – a positive argument in favor of something
Slash - leftover parts of trees that have been cut down
Unconstitutional – something that goes against the constitution
Warden – an official in charge of enforcing certain laws

Lesson 8
Crops – plants that are grown and harvested for food
Cutover– what northern Wisconsin was referred to as after all of the trees had been cut
Great Depression – a time period in the United States, in the late 1920's and early 1930's, when many people lost their jobs and a lot of money
Tax delinquent – overdue in paying one's taxes

Lesson 9
Cellulose – a part of the cell walls of plants
Collapse – to fall down suddenly
Colleague – a fellow worker
Conserve – to keep safe and sound

Fiberboard – a wood product made up of strips of wood fiber all with their grains going in the same direction
Fungi – a group of lower plants such as mushrooms, mold, and some bacteria
Grain – the arrangement of fibers in wood
Laboratory – a place where experiments are done
Oriented strandboard – a wood product made up of layers of very small fibers; the grain or each layer is opposite that of the layers surrounding it
Particleboard – a wood product made up of very small pieces of wood; it can even be made from sawdust
Plywood – a wood product made up of several sheets of wood with the grain of each layer going in the opposite direction of the layers on either side of it
Preservative – something that keeps things from breaking down or decomposing
Railroad tie – a wooden support to which railroad rails are attached
Slash - leftover parts of trees that have been cut down

Lesson 10
Criteria – standards on which a decision is based
Insulation – a material that prevents the transfer of energy
Menominee – a Native American tribe native to Wisconsin
Multiple use – able to be used for many things
Pollutants – something that makes the air, water, etc. dirty
Renewable resource – a resource that can be replaced by a natural cycle
Runoff – the portion of rain, snow, etc. that reaches streams or other bodies of water
Sovereign – one that exercises authority in a certain area
Sustainable – able to be kept up at the same pace
Urban – in or close to a city
Urban forest – the trees within an urban area

Lesson 1 – Wisconsin's Early Forests and Its Inhabitants

In a Nutshell

Students will learn about Wisconsin's forests before European settlement. They will act out the concept of forest succession, learn about, illustrate, and present ways in which Native Americans of Wisconsin used forest resources, and discover the beginnings of forest management in Wisconsin.

Concepts

- Forests are a dynamic and ever-changing ecosystem.
- Native American tribes in Wisconsin had many uses of forest resources in their everyday lives.
- Native Americans in Wisconsin actively managed the forest with fire.

Objectives

After completing this lesson, students will be able to:

- Explain forest succession and the difference between primary and secondary succession.
- Describe at least four ways that Wisconsin's Native American tribes used the forest.
- Explain how fire was used by Native Americans to manage the forests of Wisconsin.

State Standards

ELA	SS
C.4.1	A.4.4
C.4.2	B.4.1
C.4.3	B.4.4
D.4.1	E.4.11

Total Estimated Time

1 hour 50 minutes

Materials

Paper
Crayons, markers, or other drawing materials
Overhead of Wisconsin vegetation map (Insert 1.1)
Overhead projector
Copies of "Manabozho and the Maple Trees" (Insert 1.3) for the class
Copies of Native American Nature Cards (Insert 1.4)

Teacher Preparation

Make copies of "Manabozho and the Maple Trees" for all of your students. Make an overhead of the map showing Wisconsin's early vegetation (Insert 1.1). Also, make copies of the Native American Nature Cards so that each group member has a copy of his/her group's card.

Background Information

Forests are a dynamic ecosystem. Even without human intervention, they are always changing. Succession is the natural process by which ecosystems change. It will happen on new, sterile ground as primary succession (such as after glaciers retreat or a volcano erupts). It also happens after natural disturbances such as windfalls and forest fires. This is known as secondary succession. Through the process of succession, one group of vegetation will establish itself, changing the landscape, and making the area suitable for another group of plants. Each group of plants also creates suitable living space for specific animals. Often as a forest goes through stages of

succession, different animals will be found at each stage.

Wisconsin's pre-European settlement vegetation is clearly divided into two regions (see Insert 1.1). The northeastern region of the state is characterized by cool air masses coming in from Canada. Winters are longer in this region. Boreal forests, conifer-hardwood forests, and pine savannas could be found here. This is where most of the logging in Wisconsin took place in the late-1800's and early 1900's.

The southwest portion of Wisconsin is controlled by warm, dry air from the Pacific and warm, moist air from the Gulf of Mexico. Summers are longer and warmer here. The vegetation types found in this area were prairies, oak savannas, and southern-hardwood forests. The area connecting these two climatic/vegetation regions is called the tension zone.

Glaciers are thought to have retreated from northern Wisconsin between 12,000 and 10,000 years ago. Their departure opened the area up for plants and animals to establish themselves. It is thought that Wisconsin's earliest human inhabitants arrived around 11,000 years ago. The people that lived in Wisconsin from this time until the arrival of Europeans kept no written history that we know of. What we know about them has all come from archaeological evidence.

When Europeans first arrived in Wisconsin, three Native American tribes were present. These were the Winnebago (or Ho Chunk), the Menominee, and the Santee Dakota.

These three tribes are known as the original tribes of Wisconsin. Tribes were moving around a lot in the 17th and 18th centuries as they were pushed out of areas that Europeans were settling in the east. The following tribes have also been recorded in Wisconsin historical records at one time or another: Potawatomi, Stockbridge-Munsee, Huron, Ioway, Chippewa (or Ojibwa), Petun, Kickapoo, Sauk, Miami, Fox, Illinois, Mascouten, Oneida, Ottawa, and Brothertown.

Each tribe had different customs and uses of the forest. Some forest uses depended on what part of the state the tribe was in. Hunting and gathering was more typical of those tribes in the northeastern regions of the state where it was cooler. Those in the southwestern part of Wisconsin often farmed in addition to hunting and gathering. Native Americans are known to have managed the forest with fire and to have removed trees for the purpose of planting crops. Their knowledge of forest plants was extensive. They depended on the forest for raw materials to make everything from canoes to homes to food.

Introduction

Although your students may not have learned about Wisconsin's forest history before, most of them probably have some ideas as to what the land was like before it was settled by Europeans. These ideas may be based on things they have heard from their parents, friends, books, or movies. Some of these ideas may be accurate, but others could be based on stereotypes.

Tell your students to close their eyes and imagine Wisconsin before Europeans settled there. Imagine Wisconsin before its great white pine forests were logged and before Native American tribes were forced off of the land. What do you see? What do you hear? What do you smell? Have your students share their ideas with the rest of the class. You might want to have them draw what they imagine they would have seen. Make sure your students know that there are no right or wrong ideas.

Activity 1.1 – The Secret of Succession (30 min)

We are beginning a journey into Wisconsin's forest history. Before we begin, I'd like to ask you a question. What if no trees in Wisconsin had ever been cut down? Would today's forests look the same as they did in the late 1700's before Europeans came? Give your students a chance to think about this. Let them share their ideas with the rest of the class.

The forest is not a static ecosystem. It is always changing, even without the help of people. Since we're learning about forest history, let's start at the very beginning. Assign your students the following roles: glacier, goose-grass, ferns, starflowers, blackberries, pine trees, maple trees, hemlock trees, lightning, meadow mice, sparrows, and deer. There should only be one glacier, but you should assign several students to every other role. As you read the following story, have them act out their part. You might want to come up with actions for each part before you begin reading. Read only Part 1 to the class at this time (see Insert 1.2).

READ PART 1.

Have your students sit down, and explain to them that the process you just read about is called succession. Succession is when one group of plants develops an environment that allows new plants to establish and eventually replace existing plants. After the glaciers retreated, the ground was bare. We call succession occurring after that event primary succession (primary means first). Groups of plants in each stage of succession usually have animals that accompany them because the animals live well under those specific conditions.

After the glaciers retreated, the forest grew and changed through succession. Was this the end of change for the forest? Absolutely not! As we said before, the forest is always changing. It is not static. Can you think of things that might cause more changes? Give your students some time to brainstorm. Have the students that were left standing after Part 1 of the story get back up in front of the class and then continue with Part 2.

READ PART 2.

Have your students sit down again. This time when the forest grew after the fire, was the ground totally barren, or empty, like it was after the glaciers left? No. There was still plant matter all over the ground and trees nearby. This kind of succession that happens after a disturbance such as fire is called secondary succession.

Activity 1.2 – Native American Forest Use (45 min)

1. Have your students take turns reading aloud from the Native American story entitled "Manabozho and the Maple Trees" found in Insert 1.3. When they have finished, have them think about how many ways in this story alone the Native Americans were using or interacting with nature. Brainstorm a list on the board. The following should be included: hunting game, fishing, harvesting maple syrup, making baskets from birch bark, gathering wood, collecting water, heating stones, and hoeing fields.

2. Explain to your students that Native Americans are thought to have entered Wisconsin about 11,000 years ago. It is hard for us to know very much about these early inhabitants. Why? Explain that there are no written records that these people left behind, or no written history. Europeans did not make contact with the Native Americans in Wisconsin until the late 1400's. This sounds like a long time ago, but it means that people had been living in Wisconsin for over 10,000 years before there were any written historical records! That's a long time! Most of what we know of Native Americans, and most of what you will be learning about, is from after the early 1600's when the French came to Wisconsin.

How can we learn about people who leave no written history? Ask your students if they have ever heard of the term "archaeology?" Can any of them tell you what it is? Archaeology is the study of the physical remains of the past. There are people called archaeologists who excavate, or dig up, ancient campsites of people to see how they lived. Take some time to make sure your students understand the basic concept of archaeology. Have them come up with what kinds of things might be found from an ancient culture.

3. What do I mean when I say the word culture? Culture means the common beliefs, social life, and material goods of a certain race or religious group. I've been using the term Native Americans a lot. Do all Native Americans share the same culture? Let your students think about this. No, all Native Americans do not share the same culture. There are many different Native American tribes that were in Wisconsin when Europeans arrived. They lived in different places, had different lifestyles, and often spoke different languages.

Have your students take a look at the map of Wisconsin's early vegetation (Insert 1.1). What do they notice about it? Give them some time to brainstorm. There are different kinds of plants growing in the north and south. Why do you think this might be the case? Do you think this might affect the kinds of animals that could live there? Do you think it could effect how people could use the land? Definitely!

The culture of the different Native American tribes was somewhat determined by where they lived. The northern portion of Wisconsin is in what is called the Canadian Zone. Most of the trees in this area are conifers, like pine trees, and the temperature is colder. The southern area is called the Carolinian province. It has more deciduous trees (trees that lose their leaves in the winter) and is warmer. The Canadian and Carolinian regions have different types of animals common there. In between

these two areas is what is called the Tension Zone. This is where the Canadian and Carolinian areas overlap. Native American tribes that lived in northern Wisconsin were more likely to depend on hunting and fishing, while those in southern Wisconsin lived in a climate warm enough to do some farming.

Native Americans living in Wisconsin at the time of European contact used natural resources such as trees for almost everything they did. Today, we don't interact with nature as much as people used to. We get our food from the grocery store, and our water comes out of the faucet. Even if our food comes from nature, we're usually not the ones going out into nature to get it. Native American tribes, however, got almost everything they needed from the forests of Wisconsin.

Divide your students into six groups. Explain that each group is going to get a Native American Nature Card (Insert 1.4) that is going to explain one way that a tribe used the forest to live. Each group will read the information provided on the card, and then present the information to the rest of the class by making a poster about what they learned.

Once all of the groups have presented, ask the students if they are surprised by how much the Native Americans used the forest. Based on what they have already learned, can they think of other things that the forest would be used for?

Activity 1.3 – Fire As A Management Tool (15 min)

Not only did Native Americans in Wisconsin use products from the forest, but they also managed the forest for those products. What do I mean when I use the word manage? Let your students brainstorm some ideas. To manage something means to work on it to try and change it for a certain purpose. That is exactly what Native Americans did with the forest. Native Americans in Wisconsin managed the forest with fire! To do this, they would purposely set fire to parts of the forest.

One reason that fires were set was to drive game out of the forest. This helped Native Americans in their hunting efforts. Another reason to set fires was to bring animals into the forest. When old plants on the forest floor are burned away, fresh green plants are encouraged to grow. This provided lush food for animals. Fire was also used to clear the land for those who farmed, and sometimes to control pests.

To manage an area with fire, a Native American could take a coal from a fire and put it into a big clam shell. The clam shell was put inside a deerskin pouch and carried to the forest. A torch would be made out of birchbark, and once out in the forest it would be touched to the hot coal. This birchbark torch would then be used to set piles of leaves and twigs on fire. Men would keep the ground fire under control. In just a few days new plants would begin to grow in the burned area of the forest.

Conclusion

Remember when you closed your eyes and imagined the forest before Europeans arrived in Wisconsin? Would you imagine it the same way if I asked you to do that again? Who was surprised by all of the Native American's uses of the forest? Who was

surprised that Native Americans managed the forest with fire? There are many parts of Wisconsin's forest history that will surprise you. This was only the beginning!

Extension Activities

- Read The Land of Gray Wolf by Thomas Locker with your class. It is an excellent book relating how Native Americans used fire. You can also use Exploring the Environment Through Children's Literature: An Integrated Approach by Carol M. and John W. Butzow which has a chapter dedicated to the above-mentioned book.
- Have your students develop their own myth about how something came to be in their own life. Illustrate them and share them with the class. You could even put together a myth book for your classroom.
- Watch Earl's Canoe: A Traditional Ojibway Craft with your class. This video was produced for the Smithsonian Center for Folklife Programs and Cultural Studies
- Get a copy of the Ojibway Coloring Book from the Minnesota Historical Society. Copies can easily be made for your students to use.

Evaluation

- Evaluate students on their presentation of the Nature Card information.
- Have your students write definitions to the following words: primary succession, secondary succession, archaeology, culture, management, and wigwam.
- Conduct a class discussion about how Native Americans used the forest as a resource and evaluate students on their participation.
- Have your students create and illustrate lists of how Wisconsin's early Native Americans used the forest.

Resources

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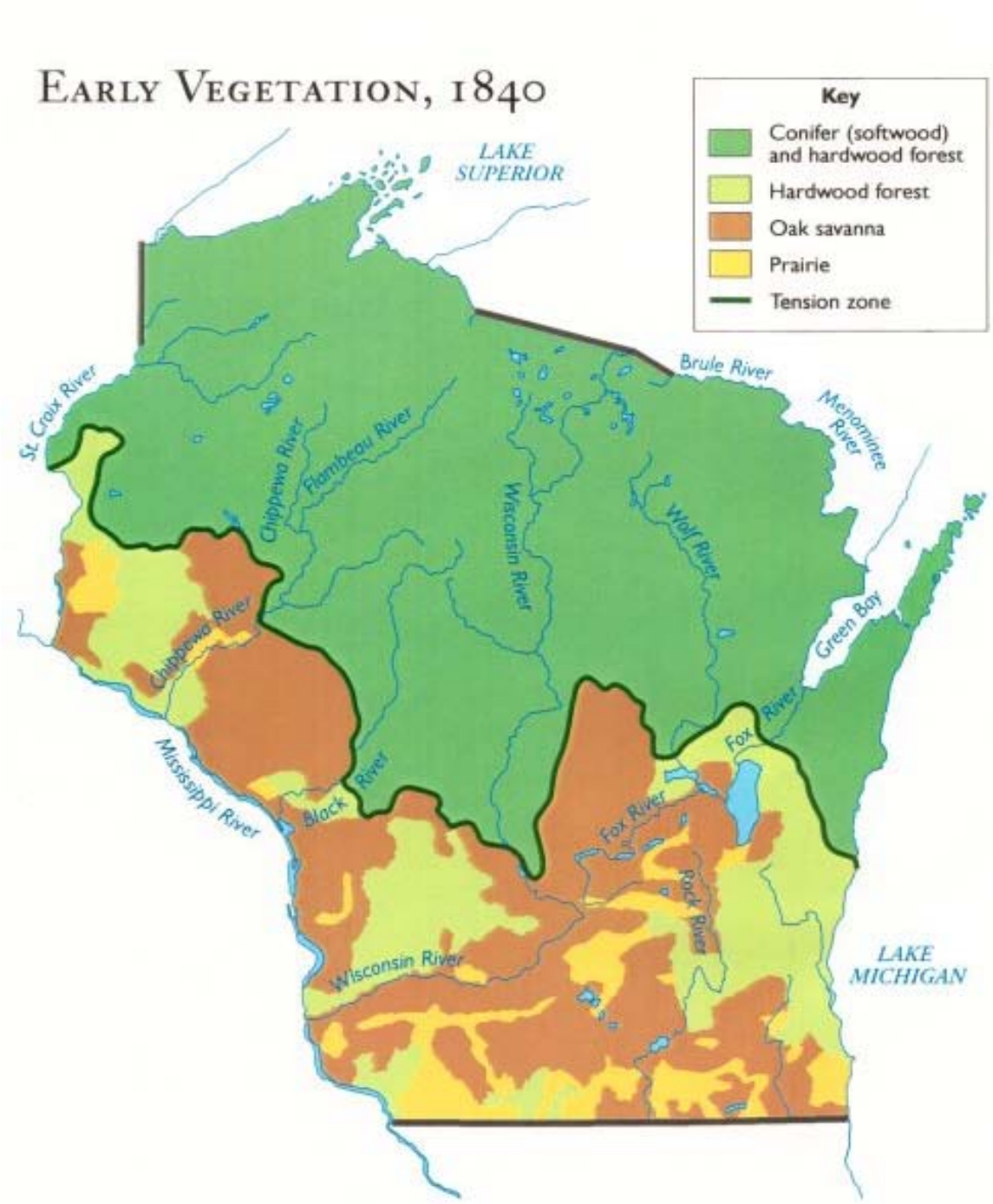
Insert 1.1



Wisconsin Cartographer's Guild and Malone, Bobbi. Mapping Wisconsin History – Teachers Guide and Student Materials. Madison, Wisconsin: State Historical Society of Wisconsin; 2000.

Insert 1.2

Part 1
Many thousands of years ago, most of Wisconsin was covered in a big sheet of ice called a glacier. Only the southwestern portion of the state was not under ice, but it was still much colder than it is today. Scientists think it was about 12,000 years ago that the glaciers over Wisconsin finally started to melt. As they melted, they retreated to the north.

Eventually, plants such as goose-grass and starflower began moving in from the south. These plants grow well in open sunlight, and they were soon covering the ground. Ask your students what kinds of animals might like to live in an area covered with grasses and flowers. Animals such as meadow mice, snakes, woodchucks, and other animals that lived in open fields moved into the area. Pretty soon larger plants were growing up as well. Blackberry shrubs and ferns grew up over the field plants.

After many years, a single tree seedling sprouted out of the grasses. Its seed must have blown in the wind from a southern forest. It was a white pine tree, and white pine trees grow very well in the bright sunlight. Pretty soon there were white pine trees everywhere. Brush-dwelling birds such as warblers began moving into the area. What was once a meadow was slowly changing into a pine forest. As the pines got taller, they blocked the weeds, grasses, and wildflowers from the sun, and these plants died. The field-loving animals such as the meadow mice and snakes could no longer live in the area. The forest was so thick with pine trees that even pine seedlings could not grow. There was no enough sun for them.

With all of the shade from the pine trees, shade-loving tree seedlings like hemlock and maple began to grow. When a pine would fall down from wind, a space would be created that let the sun shine through to the shorter hemlock and maple. This sunshine allowed the trees to grow taller. Deer moved into the area. They now had places to hide and food to eat. Chipmunks and squirrels moved in, too.

Part 2
The pine trees towered over the rest of the forest. They shaded out many other trees from sunlight. One day, there was a great storm in the forest. A bolt of lightning struck one of the very tall pine trees and it caught on fire. It had been a very dry summer, and a section of the forest quickly burned. Many burned trees lay on the ground, and many more burned tree trunks were left standing.

Just three years later, the forest floor was already covered with new grasses and wildflowers. The goose-grass and starflowers were again able to grow there because there were no longer big trees shading the ground from the sun. What do you think happened next? Succession! Ferns and blackberry bushes came in and then pine trees and pretty soon hemlock and maple.

Disturbance like fire, wind, insects, disease, and death from old age provide growing conditions for different plants. The death of one tree opens the canopy and allows sun-loving trees an opportunity to grow. All of these changes are natural and they result in succession. A natural forest is always changing!

Insert 1.3

Manabozho and the Maple Trees

(Anishinabe – Great Lakes Region)

Taken from Keepers of the Earth: Native American Stories and Environmental Activities for Children by Michael J. Caduto and Joseph Bruchac

A long time ago, when the world was new, Gitchee Manitou made things so that life was very easy for the people. There was plenty of game and the weather was always good and the maples were filled with thick sweet syrup. Whenever anyone wanted to get maple syrup from the trees, all they had to do was break off a twig and collect it as it dripped out.

One day, Manabozho went walking around. "I think I'll go see how my friends the Anishinabe are doing," he said. So he went to a village of Indian people. But there was no one around. So Manabozho looked for the people. They were not fishing in the streams or the lakes. They were not working in the fields hoeing their crops. They were not gathering berries. Finally he found them. They were in the grove of maple trees near the village. They were all just lying on their backs with their mouths open, letting the maple syrup drip into their mouths.

"This will not do," Manabozho said. "My people are all going to be fat and lazy if they keep on living this way."

So Manabozho went down to the river. He took with him a big basket he had made of birch bark. With this basket he brought back many buckets of water. He went to the top of the maple trees and poured the water in so that it thinned out the syrup. Now thick maple syrup no longer dripped out of the broken twigs. Now what came out was thin and watery and just barely sweet to the taste.

"This is how it will be from now on," Manabozho said. "No longer will syrup drip from the maple trees. Now there will only be this watery sap. When people want to make maple syrup they will have to gather many buckets full of the sap in a birch bark basket like mine. They will have to gather wood and make fires so they can heat stones to drop into the baskets. They will have to boil the water with the heated stones for a long time to make even a little maple syrup. Then my people will no longer grow fat and lazy. Then they will appreciate this maple syrup Gitchee Manitou made available to them. Not only that, this sap will drip only from the trees at a certain time of the year. Then it will not keep people from hunting and fishing and gathering and hoeing in the fields. This is how it is going to be," Manabozho said.

And that is how it is to this day.

Insert 1.4

Native American Nature Card #1

Birchbark Canoes

Water was the chief means of travel for most Native Americans living in Wisconsin, so the birchbark canoe was a very important item. The Ojibway, or Chippewa, are known for their canoes. Men and women worked together to build these canoes. Men did most of the woodworking and women did the sewing and "pitching" (gluing). The first step was to choose the right birch tree from which to get the bark. The tree had to be big and the bark had to be in good shape. Just finding the right tree could sometimes take hours. While the men found the right tree, the women collected roots for sewing the bark together and gum from trees for pitch (used like glue).

Once the proper tree was found, the bark could be removed all in one piece in the springtime when the sap was flowing and the temperature was just right. A level bed of sand was then prepared on which to build the canoe. The bark was laid out and a canoe form (like a mold) or an old canoe was put on top of it. The bark would then be wrapped around the mold and staked down. Gunwales (the top edge of the boat) were made out of cedar.

Next came the cedar ribs of the boat, which gave the boat its rounded shape. These pieces of cedar were very hard to bend. Boiling water had to be poured over them to make them bendable. Many of them would be broken during the making of a canoe. The bent ribs would be left in the canoe to dry, and then removed so that cedar planks could be put in the bottom of the boat. The ribs were then put back in to hold down the planking.

The canoe was then turned over so that the women could do the pitching. Pitch was made from spruce tree gum and deer tallow (part of deer fat), and was used like glue to hold together the places where the bark may have ripped or where sewing had to be done. This made the canoe watertight, meaning it would not leak.

These birchbark canoes were very light, but they were able to carry a lot. Some of them were estimated to be able to carry 2000 pounds. That's like putting about 13 adults in a canoe! There are Ojibwe tribe members who still make traditional birchbark canoes today.

Image courtesy of Joseph E. Velazquez, original artist

Native American Nature Card #2

Wigwam

Many Native Americans in Wisconsin lived in wigwams during the late fall and winter months. The frame of a wigwam was made with saplings, or young trees. The ends of the saplings were sharpened and then stuck into the ground in the shape of a circle. The other end of the saplings were bent to form a dome shape and tied together in the middle with strips of basswood bark. The dome was usually 12 or 15 feet across.

The frame was then covered with cattail leaf mats or sewn rolls of birchbark or elm bark. These mats were also tied on with strips of basswood bark. One woman could put together a wigwam by herself fairly quickly.

Inside of the wigwam there would be a fireplace in the center with a hole at the top of the wigwam to let smoke out. Still, the inside of the wigwam would be very smoky. Given the choice of fresh air or warm air, warmth won out. Inside the wigwam, people would sit on beds of evergreens that were then covered with animal skins or mats.

Wigwams were easy to build, which was good since tribes had to move around a lot, while hunting. The saplings for the frame could be found almost everywhere. The mats and the bark coverings could be rolled up and carried along!

From the pamphlet Kenosha Past To Present produced by Bernadette S. Tacki, Alvina M. Lijegren, and Patti Landa for the Kenosha Unified School District

Native American Nature Card #3

Cradleboards

Native American women often kept their babies on cradleboards. These cradleboards were made out of wood with a footrest at one end and a hoop at the other. The hoop could support a covering for the baby and provide protection if the baby was to fall forward, Often times, small dangling objects were hung from the wood to amuse the baby.

Babies could be laced onto cradleboards, and in the winter warm wraps made of deer skin could be put around them. The cradleboard was very handy for mothers. They could strap the cradleboard on their back and go about their daily chores. In crowded homes, the baby could be out of the way and still see what was going on. Cradleboards were even hung in trees, to keep the child away from boiling water or knives that the women were working with.

Kansas State Historical Society

Native American Nature Card #4

Birchbark Containers and Baskets

Birchbark containers were very important in Native American life in Wisconsin. Women used the baskets for picking berries, sorting things, storing things, and cooking. The bark had to first be heated so that it was bendable and then it was cut out in whatever shape the woman wanted to make. The bark could be folded and then stitched together. Some had lids and others were even watertight, meaning they would not leak.

These birchbark containers were often decorated. Bark would be peeled off in flower shapes. They were also sometimes decorated with the dyed quills of a porcupine. Different colors were obtained from natural plant dyes. Baskets made in Wisconsin were often sewn together with sweetgrass so that the baskets smelled good.

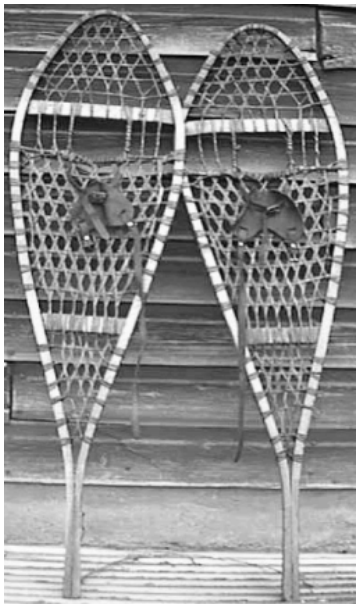
Ontario Native Women's Association.
Thunder Bay, Ontario

Native American Nature Card #5

Snowshoes

You have probably used snowshoes, or at least seen them. Native Americans in Wisconsin made their own snowshoes to make winter travel easier. They were made from wood strips that had to be heated and bent into the shape of a snowshoe. Wooden crossbars were added to help support the frame of the snowshoe, and sinew (animal tendons) was woven to fill in the spaces.

There were all sizes and shapes of snowshoes, depending on where they were being used and what for. More than just a person's weight had to be supported by the snowshoes. In winter, Native Americans might be traveling with meat from a hunt. They might also be carrying items to trade. In the winter, entire camps were often moved, and so people would be carrying all of their possessions. This was no easy task, but snowshoes made it possible.



Courtesy of antiqueskis.com

Native American Nature Card #6

Bows

Bows were common weapons and hunting tools for Wisconsin's Native Americans. Most of them were made out of a single piece of wood that was rubbed and polished to be made smooth. Bows could be over four feet long! Each one, however, was custom made for who would be using it and what would be hunted.

Bows were effective weapons of war. They were also helpful in providing meat for food. It is important to remember, though, that besides wood, forest animals were often used to make needed materials. Bows provided tribes with animals, and therefore provided them with skins and fur for clothes, bones and antlers for tools, and sinews to use as thread.

Pranik Saiyasith – Iowa Archaeology Month, 2000 Poster Contest

Lesson 2 – Forestry Needs More Than Trees

In a Nutshell

Much more than just trees were needed for the early logging that took place in Wisconsin. The focus of this lesson will be on the need for transportation of logs, the people involved in the logging process, and company towns that sprung up in Wisconsin. Students will conduct experiments to help them understand the importance of wood characteristics, design a company town, and discover how difficult the language barrier could be for new immigrants.

Concepts

- Many resources are needed in order to harvest trees.
- Technological advances made transportation of logs easier.
- During the late 1800's and early 1900's, immigrants from Northern Europe provided the labor for the lumber industry in Wisconsin.
- Lumber company-owned company towns were very common around saw milling areas.

Objectives

After completing this lesson students will be able to:

- List ways in which railroad transportation made logging easier.
- Explain why Wisconsin's larger early towns in the north were all located along rivers.
- Design a company town with everything in it that its population would need.

State Standards

ELA	M	S	SS	EE
C.4.3	E.4.1	A.4.3	A.4.4	A.4.1
D.4.1		C.4.2	A.4.7	A.4.2
F.4.1		H.4.1		B.4.8

Total Estimated Time

1 hour and 45 minutes

Vocabulary

Company town – a town in which all of the businesses and buildings are owned and run by a single company
Ethnic – relating to a race or large group of people that share common features or customs
Experiment – to perform tests under controlled conditions to discover something
Hardwood – wood from a non-coniferous tree that is usually more dense and so sinks lower in the water than other wood
Immigrant – a person who comes from another country to live
Mill – a building or collection of buildings with machinery in them to make something such as flour or lumber
Softwood – wood from a coniferous (cone-bearing) tree that usually floats higher in the water than other wood
Transportation – a way to travel from one place to another such as by car, ship, etc.

Materials

Overhead projector
Wood pieces or household objects
Rope
Paper
Crayons, colored pencils

Sink or Swim Data Sheet (Insert 2.3)
Wisconsin Wood Products Map Overhead (Insert 2.1)
Wisconsin Railroads Overhead (Insert 2.2)

Teacher Preparation

Get samples of different kinds of wood. Check out what is available at your local lumberyard or from the shop class at your local high school. Be sure to get several kinds of hardwoods (oak, maple, aspen, etc.) and several softwoods (pine, balsa, etc.). If it is not possible to obtain different wood samples, use common household items such as straws, screws, sponges, etc. Make overheads of the maps of Wisconsin's wood products (Insert 2.1) and railroads (Insert 2.2). Make copies of the Sink or Swim data sheet for your students.

Background Information

Before the 1870's, lumbering in Wisconsin depended heavily on waterways. Once trees were cut, they were actually floated down the rivers. This placed limits on where both logging could take place and where lumber mills were located. For this reason, many towns grew up along the waterways. Stevens Point, Mosinee, Wisconsin Rapids, Plover, Nekoosa, Chippewa Falls, Eau Claire, Oshkosh, Fond du Lac, Neenah, and Menasha are all examples of cities that grew up around lumber mills in the 1800's.

With the introduction of railroads, there was less reliance on Mother Nature. By the 1870's, lumber mills that were still relying on water were having trouble competing with those who shipped by rail. As early as 1890, all of the major clusters of lumber mills were located along a railroad.

Company towns were owned entirely by lumber milling companies. They provided housing, stores, a church, a school, and pretty much anything else that was needed by their workers. Sometimes, traveling salesmen came to these towns to sell things as well. Once the cutting of the forests was completed in northern Wisconsin, many of the company towns became ghost towns. This will be discussed in Lesson 5.

The population of Wisconsin's lumber milling towns generally mirrored that of the rest of the state. Milling towns, however, did not often have the ethnic segregation that was common in other manufacturing towns. Towns did have a very high population of young, single males. While lumber company owners looked for married men, they still often had many single males staying in a large boardinghouse.

Introduction

Tell your students that you will be discussing how Wisconsin's forests were cut down in the 1800's. Right now we want to think about what would have been needed to do this. There were lots and lots of trees all over the state. Is this all that was needed to produce lumber? No. Of course not.

Let's brainstorm what would have been needed in the 1800's to cut wood from the forest. Make a list on the board of everything that the students come up with. Ideas may include: people, tools, money, transportation, places for people to live, people to buy the lumber, etc.

Discuss why you would need all of these things. Some of them may be harder to come up with than others. Direct your students' answers with questions. For example, if they have already come up with people, ask them about what these people would have needed. Could you cut forests if the people doing the cutting didn't have a place to live?

Activity 2.1 – Of Rivers and Railroads (45 min)

Today we are going to focus on three of these needs for logging – transportation (or how the logs were moved after they were cut), people, and company towns (where many of the lumbermen lived).

First, let's think about what needed to be done with the wood once it was cut. Why were people cutting the trees in the first place? Have your students think about this and give ideas. People needed wood to build things like homes and furniture. How do you think this wood got from the forest to the people who needed to use it? Some of these people lived far away from the forests. Have your students brainstorm how the wood could have been transported.

If your students come up with water, mention the white pine and that it was so popular because it could be floated down the river. If your students don't come up with water transportation, use the white pine as a clue. There is something very special about the white pine trees that were found all over northern Wisconsin. They were big and straight and a lot of wood could be obtained from one tree. There is something else very special about white pine…it floats! How would this help a lumberman? Again, give your students time to think about it and let them know that the men who cut the trees down floated them down the rivers in Wisconsin to get them to the lumber mills.

Take a look at this map of Wisconsin (see Insert 2.1). It shows where wood product industries were located in Wisconsin from the 1860's to the 1910's. It also shows major rivers in the state. What do you notice about where the mills are located? Give your students some time to think about this. They are mostly next to rivers. Why? The logs had to float down rivers to the mills so most mills were very close to water.

Ask your students if all wood is the same. No, it's not. Can you name some different kinds of wood? Give them a moment to brainstorm some different kinds of wood. Explain that every kind of wood is either a softwood or a hardwood. Softwoods are less dense, or lighter than hardwoods. They will usually float higher in the water than hardwoods.

Have your students conduct an experiment with the different pieces of wood or the different household items you have obtained. Have them record their observations as to how well they stay above water on the "Sink or Swim" data sheet (Insert 2.3). Once your students have completed their experiment, ask them which kinds of wood would have been able to be floated down a river to the mill.

Do you think people only wanted softwoods to make things from? No. You probably have things in your home made of oak, etc. There was an invention in the 1800's that made it possible to move the huge hardwood logs. Can anybody think of what it

could have been? Railroads! By the 1870's there were many railroads in Wisconsin. How do you think this changed the cutting of trees?

Using the overhead projector, overlap the map of Wisconsin's wood products and rivers and Wisconsin's early railroads (Insert 2.2). What do you notice? Give your students time to make observations. The railroads go to a lot of places that the rivers could not. Most of the rivers run north/south while most of the railroads run east/west. Explain that railroads made moving logs to the mills much easier. They could build the railroads into the forests instead of having to move the logs to the rivers!

Activity 2.2 – Who Were These People? (30 min)

Besides trees to cut and rivers or railroads to transport the logs, it was also necessary to have people to cut the trees. Who were these people? They actually came from all over the world. The first people to cut the forests of Wisconsin had come from the Eastern United States. The forests in these areas had already been logged, and so the lumbermen moved west to find more forests and more work. Later, immigrants came from Northern Europe. Many were German, Irish, or Scandinavian. Often times people who had immigrated to the United States five to ten years earlier did not associate with newer immigrants. In logging towns, however, there was not much segregation. All of the different nationalities lived and worked together.

Since loggers were coming from all over the world, they often spoke different languages. This often presented difficulties when these people were trying to work together. Have your students take part in one of the team activities below in which they are unable to talk to each other.

Option 1
Divide the class into two groups. Meet with one of the groups and tell them that you have different names for the letters in the alphabet than the other group. What the other group calls a "W", you call a "kazaam." Bring the class together again, and have everyone stand in a circle holding onto a rope. Explain to the group you did not meet with that you and the other half of the class speak a different language. You have different names for the letters of the alphabet than they do. The challenge for the whole class is to make the letter that you call out WITHOUT TALKING! Explain that half of them won't know what the letter is, so they will need to take direction from the other half of the class, but remember, no talking. Yell out "kazaam!" You may want to do this activity twice, the second time meeting with the other half of the class and choosing a different letter.

Option 2
Have your students pair up with each other. Tell them that each pair needs to come up with and write the name of a tree on the board. The challenge is, they cannot speak to each other because they do not speak the same language. Also, they must take turns writing one letter at a time of the name of their tree.

When you have completed the challenge, ask your students how that felt. Was it hard not being able to understand each other? Was it frustrating? What if you

were doing something dangerous like cutting down a huge tree?

In some lumbering towns there were very large populations of a single ethnic group. Oshkosh, Wisconsin is a good example. In 1899, a community of Germans from the Volga Region began forming on Oshkosh's West Side. Four of these Volga Germans were hired by the Paine Lumber Company and the company gave them housing. The Paine Lumber Company encouraged these Germans to invite more people from their home country region to come to Oshkosh to work. Hundreds of them came! In fact, in 1910, 81% of the Volga Germans in the area were working for the Paine Lumber Company!

Activity 2.3 – Company Towns (30 min)

All right, so we have the trees to cut and we have a way to move them to the lumber mills and we have people to cut the trees and work in the lumber mills, but what about the items these people needed to live? Many of the lumber mills were not near other towns. The men working at the mills needed a place to call home.

Sometimes the lumber companies had to build an entire town for their workers. These were known as "company towns." In company towns, a single lumber company owned everything in the town.

Every company town had a company store. It usually also served as a gathering place for people who lived in the town. Some company towns had boot and shoe shops, meat markets, drugstores, barbershops, and banks. A few even had opera houses, movie halls, and hospitals. Almost every company town had a church and a school. These towns usually had rows of identical houses for all of the married men. Single men lived in a hotel, boardinghouse, or in cabins.

Have your students make up a lumber company and design their company town. Make sure they have everything in the town that people who lived there would need. Have them promote why their town is the best. Have them create an advertisement for families to move there.

Extensions

- Set up a company town in your classroom. Have different groups of students take on different roles within the town. Have them create their buildings, houses, etc on big pieces of paper.
- Some company towns had their own money issued by the lumber company itself. Have the students design their own company town currency. Your class can vote on which one to use, and then you can copy it and hand it out. Think of creative ways to use it in the classroom!
- Pretend that you are a lumberjack in Wisconsin in the early 1900's. Write a letter to the rest of your family in whatever country your ancestors are from. Research lumber milling company towns as well as the history of the country where your ancestors are from. Use your new knowledge to try and convince them to come work for your lumber company. Why is Wisconsin a better place to live?

Evaluation

- The following questions can be used to guide an evaluative discussion with your students:

- What were some important resources for logging in Wisconsin?
- Why were rivers so important?
- How did railroads change things?
- Why was white pine so useful?
- What is a "company town?"
- What could be found in company towns?
- Describe the people who were working for the lumber companies.
- Evaluate the data taken from the wood/object floating experiments.
- Evaluate company town designs.

Resources

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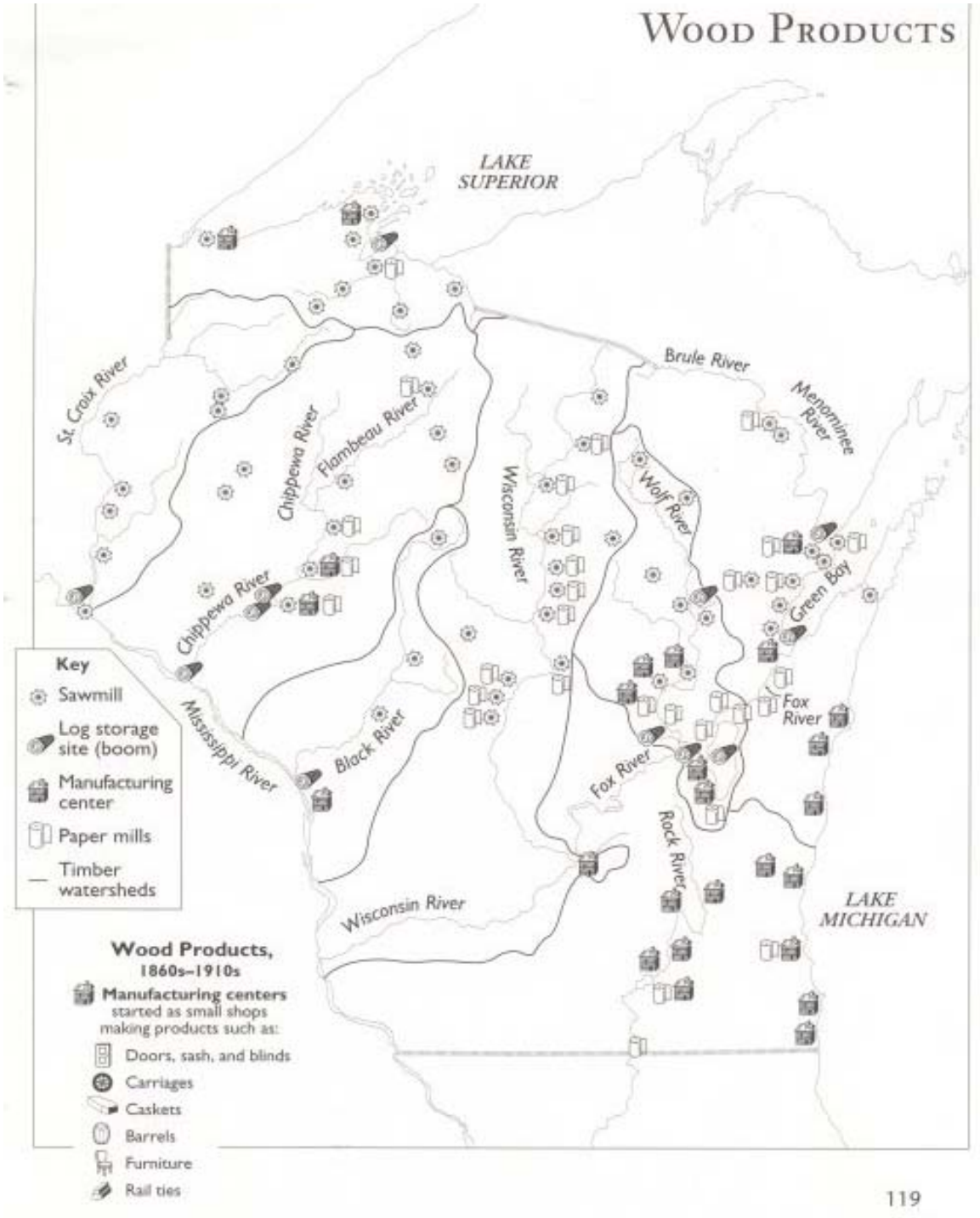
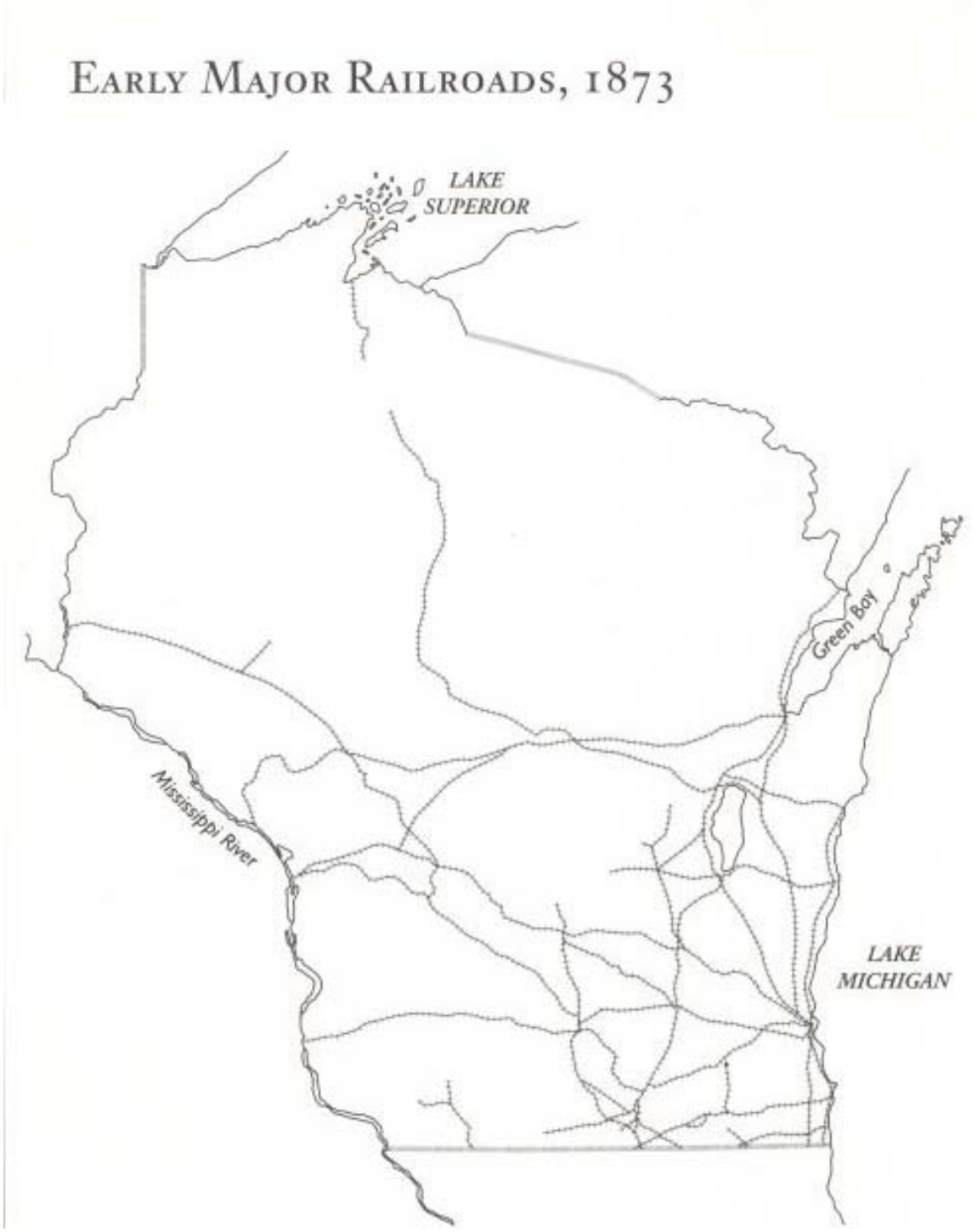
Insert 2.1



Wisconsin Cartographer's Guild and Malone, Bobbi. Mapping Wisconsin History – Teachers Guide and Student Materials. Madison, Wisconsin: State Historical Society of Wisconsin; 2000.

Insert 2.2



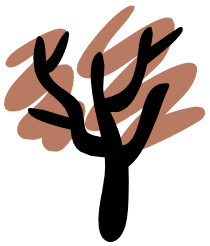
Wisconsin Cartographer's Guild and Malone, Bobbi. Mapping Wisconsin History – Teachers Guide and Student Materials. Madison, Wisconsin: State Historical Society of Wisconsin; 2000.

Insert 2.3

Sink or Swim Data Collection Sheet

You will be conducting an experiment to see how well different kinds of wood or different objects float in water. Be sure to record anything you observe during this experiment. Time your object for two minutes when determining how long it will float. Have fun!

Object	Does it float?	For how long?	Hardwood (H) or softwood (S)	Would you want to float this wood on rivers before the 1870's?	Scientist's notes



Lesson 3 – The Logging Process

Nutshell

The lumbering era of early Wisconsin was a colorful and exciting time. This lesson will show the sequence of turning a raw material (trees) into a finished product (lumber). Students will hear the adventures of a northern Wisconsin tree, do an activity that will demonstrate why log stamps were so important, and put in order all of the people that were involved in turning a tree into lumber.

Concepts

- Many steps were involved in the process of cutting a tree down and turning it into usable lumber.
- Early logging in Wisconsin was done in the winter so that logs could be more easily moved and floated down river during the spring thaw.
- Wisconsin's forests helped provide necessary building materials for other parts of the country.

Objectives

After completing this lesson, students will be able to:

- Discuss two reasons why logging in the late 1800's in Wisconsin was done during the winter
- Organize the twelve jobs mentioned in the lesson related to turning trees into lumber in their proper order
- Locate two communities outside Wisconsin where Wisconsin wood was used and discuss why.

State Standards

ELA	M	SS	EE
A.4.1	A.4.3	A.4.4	B.4.8
C.4.3		B.4.4	
D.4.1			

Total Estimated Time

1 hour and 10 minutes

Vocabulary

Bucker – the person who cut the tree trunk up into logs
Crosscut saw – a saw designed to cut across the grain of wood; what lumberjacks used in the 1800's and early 1900's to saw trees down
Cruiser – the person who estimates the amount of wood in a forest before it is cut
Lumber – logs sawed up for use
Lumberjack – a logger
Notch – a v-shaped gap
River pig – the person who floats the logs down the river to the lumber mill
Road monkey – the person who spreads hay on icy slopes to make it safe for the sleighs to travel
Sawyer – the person who used a crosscut saw to saw a tree down
Scaler – the person who measures each log down at the river bank and estimates how much wood is there
Skidder – the person who drags the logs out of the forest and loads them onto sleighs
Stamper – the person who pounds the lumber company's stamp into the end of each log
Swamper – the person who cut the branches off of the tree after it had been cut down
Teamster – The person who brings the loaded sleighs down to the river
Top Loader – the person who stands on top of the logs on the sleigh and arranges them into a pile

Undercutter – the person who cuts a notch on one side of the tree in preparation for cutting it down

Materials
Bucket
Candy (optional)
The logging story (Insert 3.1)
Job descriptions (Insert 3.2)

Teacher Preparation
Make copies of Insert 3.1 for all of your students. Also, make a copy of the job names and descriptions (Insert 3.2) and cut them apart.

Background Information
As this country was settled, the demands for lumber increased. By the early 1800's, Wisconsin's forests were helping meet the demands of westward migration and settlement. The demand for lumber within Wisconsin increased as the population rose from 3,000 in 1830 to 30,000 in 1840 and to 300,000 in 1850.

When the Civil War ended, the need for Wisconsin lumber increased dramatically. By 1869, the annual harvest of the state reached one billion board feet. This increased to a peak of 3.4 billion board feet in 1899. That year Wisconsin took over as the nation's chief lumber producer. (A board foot is a volume of lumber equal to 12"x12"x1", or 144 cubic inches.) Wisconsin lumber was used around the nation for homes, barns, sidewalks, furniture, boats, paper, gunstocks, barrels, etc.

The process of getting usable lumber out of Wisconsin's forests in the late 1800's was not an easy task. White pine was the tree of choice. It was tall and straight, and since it was a softwood, it floated easily on water. Before the railroad was used, lumber companies depended on the state's waterways to transport their logs to the lumber mills. Lumber mills often depended on the waterways to also send their lumber to the lumber yards to be sold.

Wisconsin wood was used in many places besides Wisconsin. As settlement in the United States expanded, material was needed to build houses, farm buildings, and towns. Many of the places being settled were not as fortunate as Wisconsin in their wood resources. Many areas in the country lacking forests got their wood from Wisconsin.

Introduction
Ask your students what things need to be done to a tree to turn it into boards in a lumberyard. Some ideas might be cutting the limbs off, peeling the bark off, etc. If your students are having trouble coming up with ideas, ask them leading questions such as, "Does lumber in a lumberyard still have bark on it?" or "How does the tree get from the forest to the lumberyard?"

Activity 3.1 – A Tree's Story (20 min)
Tell the students that today you are going to be learning about how trees in the late 1800's went from standing in Wisconsin's forests to being wood in a lumberyard. Have your students take turns reading the story in Insert 3.1 to the class

READ STORY.

Discuss the story with your students after it has been read. Was there anything that surprised them about the story? Why did the lumberjacks cut the

trees down in winter? Which jobs were dangerous and why?

Activity 3.2 – It's a Tough Job, But Someone's Got to Do It (15 min)

Pass out the names of the different lumbering jobs as well as the descriptions found in Insert 3.2. Have your students pair up with the description that matches their job title or vice versa. Depending on how many students you have, some cards may be given to a pair of students. Once your students have paired up with who they think should be their partner, go around the room and check to see if any groups need to be shuffled around.

Next, have the students put the jobs in order of when they were done. Go over the answers with your students.

Activity 3.3 – A Mark of Ownership (15 min)

Have your students put all of their pencils and pens (or some other item that they might have more than one of) into a bucket. You could also have them choose a few pieces of their favorite candy from a mixed bag and then put them in the bucket. Mix the items in the bucket around, and then go around the room asking each student how many pencils, pens, or pieces of candy they put into the bucket. Randomly hand them the number of items that they tell you. The items will probably not be their own.

You will probably hear complaints that the pencil or candy they got back was not their pencil or candy. Ask them if it matters since they got back the same number they put in. Why does it matter? Give your students a chance to answer. What could they do to make sure they got their own items back? Put their name on it! Allow your students to get their possessions back, and then explain that this is similar to what happened when logging companies floated their logs down the river. Loggers wanted to make sure they got the same logs that they cut, and they wanted to make sure they got all of them. That is why each company had its own stamp so people would know the log belonged to them!

Conclusion

Discuss with your students what they think it would have been like to be a lumberjack in the late 1800's. Be sure to include the role of women. What would women have done? They weren't usually lumberjacks, but some women had the job of being the cook at the lumberjack camp. Many, however, were on their own while their husbands worked in the woods. Since many lumberjacks were farmers, the wives stayed home and kept the farms going while the husbands were logging in the northwoods. The life of a lumberjack was very hard work, but in the next lesson you'll learn that they were still able to have fun despite all of the work and danger.

Extensions

- Have your students create their own logging company stamp. Hang these up in your room.
- Do the math activity found in Insert 3.3.
- Logging charades – have the students role play the logging jobs they learned

about and have the rest of the students guess what job they held.
- Write classified ads for the lumberjack jobs.

Evaluation

- Conduct an evaluative discussion with your class using the following questions:
  Why was lumbering done in winter?
  What were some of the jobs of the lumberjacks?
  Can you think of places where Wisconsin wood went?
  What were some of the hardships of the lumberjacks?

Resources

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Insert 3.1

You wouldn't believe my story if I told you. It really is quite incredible how I ended up in Iowa. I used to live in Wisconsin, just like you. Now I am part of a house in Des Moines. I'll tell you how it happened, and I promise that all of what I say is true.

I grew up in northern Wisconsin in a beautiful forest surrounded by my fellow pine trees. Yes, I used to be a majestic white pine tree. Birds and squirrels used me for shelter. I was gorgeous, especially when I was covered in a blanket of snow. I was proud to be part of that forest. That was a long time ago, though.

I enjoyed my life in the woods of Wisconsin, and I thought those days would last forever. In the late 1880's, however, things began to change. A man came through my patch of woods looking us white pine trees over very carefully. He was a CRUISER, and his job was to figure out how much wood and money could be gotten out of the forest. Some of the other trees had heard of this happening, and they said that it wouldn't be long until more men came and cut us down.

At first I was a little nervous, but the idea of being cut down and going somewhere was also exciting. I had been stuck in the same place my whole life. I wondered where I might be going.

Just as the other trees had said, it was not long before more men came into the forest with axes and saws and lots of other equipment I had never even heard of. I was a big, strong tree, so it wasn't long before they decided to cut me down. The first man I met was called an UNDERCUTTER. He used an ax to cut a notch on one side of me. He swung the ax over and over again until I had a big wedge missing from my left side.

I thought he was going to cut me down, but he stopped after he had chopped the wedge. Next, I met two men who worked together using a crosscut saw. That's a big, long saw with lots of big teeth and a handle at both ends. The men were called SAWYERS. They cut from my right side, opposite of where the big wedge had been chopped out. They stood on either end of the saw, and one of them would pull the saw towards himself and then his partner would pull the saw towards himself. As their saw reached the missing wedge, they yelled, "Timber!" at the top of their lungs. I was so startled I nearly fell over, and then I realized that I was about to fall over anyway! The sawyers ran from me as my trunk cracked, swayed, and came crashing to the ground.

I was now lying on the forest floor. I had never seen it up close like that. I barely had time to look at much before the SWAMPER came and trimmed off all of my limbs. Then a pair of BUCKERS came and cut my trunk into several logs. I was now ready to be moved. How exciting!

I tried to wait patiently for the SKIDDERS. I saw that these men moved logs onto a big sleigh. At first I wondered why these bundled up lumberjacks hadn't waited until it was

warmer to cut us down, but now I understood. It was much easier to move us logs around on the ice and snow.

There was a man on top of the pile of logs on the sleigh called a TOP LOADER. He had quite a dangerous job. He helped me to the top of the log pile on the sleigh. I almost rolled on top of him! He must be a brave man to do that job. He finally got me balanced and then stood on top of me to help put more logs on the sleigh.

Before I went anywhere on the sleigh, I noticed that the roads through the forest had water from the river sprayed on them so that there was a sheet of ice over all of them. This made it easier for us logs to be moved. There was also a man called a ROAD MONKEY who spread hay on the ice so that the sleigh would not go too fast down the slope to the river bank.

It was the TEAMSTER'S job to drive the sleigh down to the river bank. The sleigh was pulled by strong horses. Once I got down to the river bank, a SCALER measured me to see how much wood I could provide.

Next I was stamped by the STAMPER with a mark that looked like this: ☆. All of the other logs were also stamped with the same symbol. This was so that when we got to where we were going, people could tell which logging company we belonged to.

I couldn't wait to get to where I was going, so I impatiently sat at the frozen river's edge and waited…and waited…and waited some more. I had to wait there until the spring thaw! When the ice on the river melted and it began to flow, the craziest thing happened. I was pushed into the river with all of the other logs I had been waiting with. It was so cold!

Men called RIVER PIGS traveled with us on the river. Sometimes they would travel along the river bank, but sometimes they would walk on us logs while we were floating on the water! Some of the drivers drowned along the way when they slipped and fell between logs. I couldn't believe these people!

At one point, all us logs got stuck in a log jam. I couldn't move! The river pigs had to use explosives to get us unstuck, but not before we backed up on the river for two miles. Finally, after a long time floating down the river, we arrived at a lumber mill. I saw logs with all kinds of stamps like ✧, ᔕ, and ⊖. All of the logs with a ☆ like me were grouped together.

At the lumber mill I was cut into boards like you might see in a lumberyard or hardware store. Then I was put on a huge river raft carrying lots of other boards. That's how I ended up in Iowa. You see, there weren't a lot of trees in Iowa in the late 1800's like there were in Wisconsin, so the people who lived there had to get wood from other places. Some of my friends went to Illinois, Missouri, or even Wyoming.

So, I was used to help build a farm house in Iowa. I've been here for a long time, and I have been a home for many people. I am proud to be part of this house.

Insert 3.2

Job Title	Job Description
Cruiser	**Your job is to go through the forest before any trees are cut. You estimate how much money your boss will get from cutting the trees. You better be right, or he will lose money and you could get fired!**
Undercutter	**Your job is to cut a notch on one side of the tree using an axe. You are the first person to cut the trees. It is a very important job!**
Sawyers	**You two work with the big cross cut saw. You cut on the side opposite of where a big notch has been cut. When the tree is about to fall, you yell, "Timber!" and get out of the way!**
Swamper	**Your job is to cut all the branches off the tree trunk. These branches and limbs are not needed for making lumber.**
Bucker	**Your job is to cut the tree into logs. Some of those white pine trunks were really long, so there could be a lot of logs from a single tree!**
	Your job is to drag the logs out

Skidder	**of the forest and help put them on sleighs. You will work with the top loader to pile a lot of logs onto each sleigh that will be taken to the river.**
Top Loader	**You have a very dangerous job. You must stand on top of the logs on a sleigh and arrange them so that a lot can fit on a single sleigh. You'll be lucky if you make it through the logging season without getting hurt.**
Road Monkey	**The logging roads are very icy which makes moving the logs easier, but it can also be dangerous when the sleighs are going down slopes. Your job is to spread hay on the icy slopes for safety.**
Teamster	**Your job is to bring sleighs full of logs down to the river. You used to use oxen for the job, but now you use horses. You and your horses work as a team!**
Scaler	**Your job is to measure each log once it has made it down to the riverbank. You want to let your boss know how much wood is in each log. The amount of wood is measured in board feet.**

Stamper	**Your job is to put the lumber company's stamp on the end of each log before it goes down the river. This way, your boss will be sure to get money for all of his logs.**
River Pig	**You have a dangerous job. You follow the logs down the river to the mill. Sometimes you walk along the banks of the river, but other times you stand on the floating logs. Don't slip!**

Insert 3.3

Lumber and Numbers

1. If a crew harvests 30 trees a day for a week (remember, they don't work on Sunday), how many trees would they harvest? _____

2. How many trees would they harvest in a 135-day season (Sundays have already been subtracted)? _____

3. If the lumber mill will pay $15 per tree, how much money would the crew make in one week? _____ For the whole season? _____

4. If there are five companies sending logs to one mill and each company sends the same amount, how many came from each company if the mill receives 1205 logs? _____

5. If each lumberjack wears two pair of socks to keep warm and there are 50 lumberjacks in camp, how many sweaty socks are hanging from the rafters in the evening to dry? _____ Yuck!

Lumber and Numbers Answer Key

1. If a crew harvests 30 trees a day for a week (remember, they don't work on Sunday), how many trees would they harvest? **180**

2. How many trees would they harvest in a 135-day season (Sundays have already been subtracted)? **4050**

3. If the lumber mill will pay $15 per tree, how much money would the crew make in one week? **$2700** For the whole season? **$60,750**

4. If there are five companies sending logs to one mill and each company sends the same amount, how many came from each company if the mill receives 1205 logs? **241**

5. If each lumberjack wears two pair of socks to keep warm and there are 50 lumberjacks in camp, how many sweaty socks are hanging from the rafters in the evening to dry? **100** Yuck!

Lesson 4 – Lumberjack Life

Nutshell

The logging days were a colorful time in history for those who lived in the lumber camps. The men worked long hours during the winter months. Secluded in the camps, far from town, a unique language and creative entertainment were born. Students will learn about life in a lumber camp by hearing tall tales told by lumberjacks, playing lumberjack games, and using lumberjack lingo.

Concepts

- The life of a lumberjack was one of long days and hard work.
- Lumberjacks created their own forms of entertainment.
- The lumberjack had a language all his own.

Objectives

Upon completion of this lesson, students will be able to:

- Describe a day in the life of a lumberjack.
- Explain the characteristics of a tall tale.
- Describe ways in which lumberjacks entertained themselves.
- Apply language unique to lumber camps.

State Standards

ELA	SS
D.4.1	B.4.3
D.4.2	E.4.11

Total Estimated Time

1 hour and 55 minutes

Vocabulary

Ancestor – family member who lived many generations before you
Boast – to brag
Brogue – a heavy shoe with nails in the sole
Bunkhouse – the building where all of the lumberjacks in a camp would sleep
Cant hook – a wooden stick with a metal hook on the end used to handle logs
Burden – something heavy that is carried
Character – a person in a story
Culture – the common features of a particular group of people including beliefs, products, and social customs
Derrick – a machine used for lifting heavy objects
Exaggerate – to enlarge a fact past what is actually true
Plot – the main story in a piece of writing
Feat – a large accomplishment
Jargon – the special vocabulary of a certain profession or other group of people
Gangplank – a moveable bridge used to board a ship
Gauge – to measure
Heed – to pay attention
Lingo – jargon
Quandary – a state of puzzlement
Resolution – the part of a story where the main problem has been solved
Retort – to answer angrily
Setting – where something takes place
Tall tale – an incredible story with many exaggerations
Vessel – a boat or ship

Wharf – a structure built along the shore from which people or objects can get onto of off of a boat

Materials

A selected tall tale to read (check the 398.2 section of your library or use the tall tale
provided in Insert 4.1)
A copy of the Paul Bunyan Breakfast menu for each student (Insert 4.3)
A copy of A Day in the Life of a Lumberjack for each of the two readers (Insert 4.2)
Six strands of different colored yarn
Broom
Long, stuffed sock
Blindfold
Tree cookies (optional)
Blanket (optional)
Tape player and lumberjack music (optional)
Logs and rope (optional)
Cast iron skillet (optional)
Bandanas (optional)

Teacher Preparation

Select a tall tale to read if you are not using the one provided. Gather the materials for the lumberjack pastimes.

Background Information

The term "lumberjack" came into use in the 1860's. It is difficult to imagine what life in a lumber camp was really like. By the late 1800's, most lumber camps had a shed for baled hay, a granary, blacksmith shop, root cellar, saw filer's shack, living quarters, eating quarters, and a cook shack. The living quarters were often a room full of bunk beds. Many of these beds had to be entered from the end and so were referred to as "muzzle loaders."

Lumberjacks were awoken from their bunks at three or four in the morning by a horn or the call "Roll out!" or "Daylight in the swamp!" From here they went to breakfast in the eating quarters. At breakfast there was no talking except for an occasional food request like "Shoot the beans!" Right after breakfast the lumberjacks got ready to go out into the woods.

Since lumberjacks were up so early to eat and get out to the forest at first light, you can imagine how early the cook had to get up. Often times it was as early as two in the morning. After breakfast was cleaned up, he or she had to start preparing lunch. It was a tough job to cook for fifty or sixty hungry lumberjacks.

The bundled up lumberjacks worked in the forest all morning. Lunch was brought to them by the cookee, or cook's helper. After lunch, the lumberjacks continued cutting down trees until it got dark. At this point they came back for dinner. After dinner, pipes were smoked, music and games played, and tall tales told! Lights were out by nine since the next morning would be an early one.

Lumberjacks worked six days a week. Sunday was the only day they got off, so, as you can imagine, Saturday nights could get quite wild. Dances were often held, but since there were no women to dance with, the lumberjacks would dance with each other. One of them would tie a handkerchief around his arm to designate himself as the lady.

Lumberjacks led a dangerous life. Death was a common occurrence. In fact, sometimes sawyers would yell, "Widow-maker!" instead of "Timber!" They

were a unique mix of nationalities with their own lingo and social rules. Their life is often glamorized, but there was no glamour to it at all. Body lice were a constant nuisance, and try to imagine what the bunkhouse smelled like. Fifty men who work hard all day, don't shower, and hang their sweaty socks up to dry. No wonder there were no women to dance with them!

Introduction

In one hand, hold up five strands of yarn, each a different color. With students, talk about the elements of a story: characters, plot, setting, problem, and resolution. Add a sixth color, something vibrant, and explain that this color represents exaggeration. One of the things lumberjacks did to entertain themselves was make up tall tales, trying to out-do each other as the stories evolved. I'm going to read you a tall tale (see Insert 4.1). As I read, listen for each of the story elements. When I get to an exaggeration, cross your left leg over your right. When you hear another exaggeration, switch legs. Continue switching with each exaggeration.

Activity 4.1 – Tall Tales (20 min)

Read aloud the tall tale you have selected.

As you ask students to recall the plot of the story, hold up one yarn. Continue with the other elements of the story: setting, characters, problem, and resolution. As the students recall these elements, weave the yarns together, noting how these elements are intertwined to create the story. Point out that the "exaggeration" yarn is still separated from the story: exaggeration is the critical element in a tall tale. Ask your students to recall examples of exaggeration, reweaving the yarns during the discussion.

Activity 4.2 – Lumberjack Olympics (30 min)

Life was hard six days a week, but on Sundays lumbermen had the day off. They used this day to do their laundry and other necessary chores. When these chores were done, it was time to have fun! Lumberjacks challenged each other's skills and also created competitions which were downright silly! Dress up as your favorite lumberjack and choose from the following list activities for your own lumberjack Olympics.

*** Riding the Mule**

Two men would hold a cant hook stalk between them. A lumberjack stood on it to see how long he could balance himself before falling off. *Possible classroom adaptation: Use a broom handle placed on the ground. Student lumberjack stands toe-to-heel on the broom handle.*

*** Rooster Fight**

A broom handle was placed under the knees of a squatting man with his hands tied to it on either side. Two men tied in this fashion butted each other to see who would tip over first. *Possible classroom adaptation: Have each student lumberjack squat, holding hands behind his/her knees. Students try to unbalance each other.*

***Jack in the Dark Where are You?**

A robust, roughhouse game played in the bunkhouse. Two jacks are blindfolded;

one is "jack in the dark," and the other jack is searching for him. On the command "Jack in the Dark, where are you?" both jacks attempt to swat each other with long stockings stuffed with water-soaked socks. Real swatting resulted! *Possible classroom adaptation: use a clean empty sock in place of the long stockings stuffed with water-soaked socks.*

***Hot Back**
A roughhouse game played by lumberjacks in the bunkhouse. Jacks formed a circle; one blindfolded man was in the center of the circle. Any jack could swat him on the back. The blind folded man had to guess who swatted him. If he guesses correctly, the swatter became the blindfolded jack in the middle of the circle. *Possible classroom adaptation: students can tap the blindfolded jack on the shoulder rather than swatting on the back.*

***Shovel the Brogue**
Everybody sat in a ring with one person in the middle. Everyone in the ring passed an old shoe underneath their knees. The one in the middle had to guess who had the "brogue" (shoe). When people in the ring sat close together and held knees tight against each other, it was difficult to know just who had the brogue.

***denotes actual descriptions of lumberjack games**

Other possible games…..

Cookie Toss
Each student should have a tree cookie (an inch-thick crosscut piece of a log). Students underhand toss their cookie, trying to get their cookie to roll the farthest.

Skillet Toss
Using a cast-iron skillet, students take turns throwing the skillet Frisbee style, trying to see who can throw it the farthest.

Blanket Throw
Students spread out around the perimeter of a blanket, holding onto the edge. Place a ball in the center of the blanket. Hanging onto the blanket, students try to flip the ball into the air and catch it in the blanket. Students can see how high they can toss the ball, how fast they can repeat the tosses, etc. Additional balls can be added as students' proficiency improves. *(Lumberjacks actually tossed each other in the blanket!)*

Log Pull Obstacle Course
Set up a simple obstacle course using cones. Put a rope around a log. Students pull the log through the obstacle course. Individuals could be timed, two teams could race against each other, or create your own twist!

Stag Dance
Sundays were also a day of singing and dancing. The men would get out their "scratch-my-backs" (saw fiddle) and "squeeze boxes" (accordions) and "mouth organs" (harmonica) and play square dance tunes while the men danced. There were no women in the camps, however, so half the men wore a handkerchief on their arm or tied a sack around themselves and they'd be the girls. *Have the students listen to square dance music.*

Activity 3 – Lumberjack Lingo (30 min)

Within cultures there exist sub-cultures complete with their own vocabulary. Point out to kids examples such as truckers jargon ("a big 10-4 buddy" or "put the hammer down") or the skateboarding lingo popular today or the slang a small group of friends will create to talk with each other. With this in mind, this activity is designed to submerge kids in the lingo used by lumberjacks. The lumberjacks had a language all their own. It was a rough language, and much of it has been lost.

To give the students a feel for the lumberjack lingo read aloud the following paragraph:
A lumberjack was brought into the hospital in the early logging days. A nurse, full of sympathy, asked him what happened. He replied, "Well, sister, I tell you how the whole thing happened. You see, I was up in the woods a-loading. One cold morning when I was sending up a big, burly schoolmarm on fourth tier, I see she was going to cannon, so I glams into it to cut her back when she broke and she comes and caves in a couple of my slats." (taken from Lumberjack Lore)

Discuss: Have the students brainstorm the meaning of the passage. For your benefit, what follows is the explanation of what actually happened.
The worker was loading a big forked log onto a sleigh full of logs. When he saw that it was going to upend, he tried to hold it back, then the chain broke. The log fell on him and broke a couple of his ribs. (taken from Lumberjack Lore)

Lumberjacks had their own lingo at meal time, too. A typical breakfast would consist of "murphies" (potatoes), "sow belly" (salt pork/bacon), "stove lids or sweat pads" (pancakes), "black lead" or "dish water" (coffee), "swamp water" (tea), "logging berries" (prunes), "door knobs" (biscuits), "cackleberries" (eggs), and "sinkers" (donuts). Condiments included "red lead" (ketchup), "Mexican powder" (pepper), "long sweetenin'" (sugar), and "salve" (butter), "gravel" (salt).

Supply each student with a copy of the breakfast menu that follows. Ask students to write in the blank what they believe each of the items is either before or after discussion of the above list.

Activity 4.4 – A Day in the Life of a Lumberjack (15 min)

A lumberjack's day was long and hard. They ate breakfast before first light and worked from sunrise to sunset. The day ended when it was too dark to see an axe handle at arm's length. After rehearsal, two students should read the script in Insert 4.2.

Conclusion

Ask your students if they have a better understanding of what you mean by "lumberjack culture." Lumberjacks had their own stories, language, and games. Why do you think they might have done this? Let your students brainstorm some ideas.

Extension Activities:

- Prepare a lumberjack breakfast for the students. Remind students that breakfast was consumed quickly without conversation. *"In the old logging camp shanty, there was some rules that everybody lived by even if they had never been passed by the state legislature or even by the lumberjacks themselves. When you was eating, no talking was allowed except to say "Pass the meat" or "Shoot the beans" when them things didn't come around fast enough. I guess the rule was to keep the food moving fast enough so everybody got all he could eat without yelling for it."* (taken from The Lumberjack Frontier, Walker D. Wyman, 1969)
- Novel study: Journey Back to the Lumberjack Camp by Janie Lynn Panagopoulos (River Road Publications, Inc. 830 Savidge St., Spring Lake, MI 49456
- Novel study: Cookcamp by Gary Paulsen
- Guest: "Timber Lady" Mary Blahnik 44414 South Union Road, Manitowoc, WI 54220, 920-758-2379
- Have kids read more tall tales in groups (see source list in appendix). Students should compare and contrast or story map the tales, focusing on the element of exaggeration.
- Have students write their own tall tales.

Evaluation

- Students can work in pairs: one is a logger and one is an interviewer. Together they can write a scripted interview teaching about life in the lumbercamps.

Resources

- Panagopoulos, Janie Lynn. Journey Back To Lumberjack Camp. River Road Publications; 1993.

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Insert 4.1

"His Ancestor" from The Hodag and other Tales of the Logging Camps by Lake Shore Kearney

"Excuse my interruption," McFay said, "and far be it from me to boast or brag. As you know, I am no boaster, but since you were speaking of men who could lift, I have a right to brag, for I came from a tribe of powerful men, I might say without any exaggeration, giants."

"On my father's side, my ancestors were from the heather clad mountains of Scotland, and on my mother's side, from the high mountains of Wicklow, Ireland. To relate the numerous feats accomplished by them, both on land and sea, would make the world's library of adventure tales."

"Your looks are not encouraging, as you are anxious to see someone in the 'deacon's chair', who can really talk. However, I will not keep you much longer. I will just relate one small affair in the life of my Uncle Duncan, who was a man as large as two of me. He had a hand as large as four of mine and a body in proportion."

"My uncle's first day in the city of New York, with all its wonders, kept him traveling from one sight to another, and he finally wandered down to one of the great wharves on the river front. Looking around, he spied a group of men standing around an anchor, weighing from four to five tons. Judging from their actions, they were in a quandary as to what to do to solve their problem of moving the anchor."

"Walking up to the group, Uncle Duncan said, 'boys, what seems to be the trouble?'"

"An interference of this kind with this type of men would, under ordinary circumstances, bring a sharp retort, but my uncle's size and appearance prompted an honest answer."

"'We have an anchor here that weighs four tons or more, and we want to put it aboard that vessel. As the boat is due to sail in three hours and we have no derrick to load the anchor, we do not know how to manage the job.' Sneeringly, the man added, 'I suppose, Big Boy, that you think you can load it alone.'"

"Paying not the least heed to them and looking through his eyelashes which were at least an inch in length, Uncle Duncan strode through the group. He pushed the men out of his way as if they were so many children, and walked up to the anchor. He stooped over and raised one of the points as if gauging the weight of the anchor. Then, he straightened up to his full height, and gazed around as if alone. He removed his great frieze coat and his coarse, hand crocheted ox hair shirt, made from the hair of the longhaired cattle of the mountains of Scotland. The sight that met the eyes of those men, was one hard to believe."

“Boys, my uncle had a form of herculean size, with a creeping of muscle over his powerful back and arms, showing through a thick tangle of hair. The upper part of his body was bare to the waist, and a belt, four inches wide, made of boar’s hide, circled his body at the waist, supporting a pair of corduroy trousers. A pair of brogans, heavily studded with Swedish nails, encased his feet.”

“He settled to his task, first getting down on his knees, then inch by inch, he began moving the huge burden up towards his shoulders. The muscles on his back and shoulders stood out like whipcords and his neck showed the tremendous strain, as he lifted the anchor to his back. As he straightened to his full height, the anchor cut deep into his shoulders and back. Then he began to move slowly, watching each place he set foot. In spite of his care, there was a crunching of planks, as his great left foot sank through the heavy plank flooring of the wharf.”

“He extricated his foot and went on, step by step towards the gangplank of the ship. The bystanders gasped and shuddered as Uncle Duncan, by superhuman strength, reached the gangplank.”

“Boys, most of you know what a gangplank is. This one was used for the loading of heavy machinery and had powerful truss rods running lengthwise underneath, making it safe for loading weighty articles. Well, he had moved within a few feet of the center of the gangplank, when there was an awful crashing of wood and steel, then a mighty splash into the water. The fire alarm sounded and there were yells from the crowds, while a burly blue coat vainly endeavored to push them back.”

“A diver was hurriedly trying to adjust the headpiece on his diving suit, preparatory to diving for my uncle. Twenty minutes had elapsed since Uncle Duncan had plunged with the anchor into the water. Then shouts rose from a hundred throats as the men saw the anchor appear above the water. Soon the head and shoulders of my uncle were to be seen. Waist high, he arose above the water, shaking the water from his massive head. Boys, you would have died laughing to see that old son of a gun treading water with that four ton anchor on his back.”

“He scrambled to the side of the vessel and climbed laboriously up to the deck. As he dropped the anchor to the deck, it crashed partly through and was just stopped from going clear down in the hold, by a great ship’s timber.”

“Having finished his task of loading the anchor, Uncle Duncan slid off the boat, treaded water across to the dock, and climbed out of the water. Reaching the spot where he had dropped his clothes, he picked them up and tucked them under one arm, as, with a majestic stride, he hove off into the great city in search of more adventure.”

When McFay finished his story, the other members of the crew told no more tales of feats of heavy lifting. McFay rolled into his bunk, having nothing more to add to the evening’s entertainment.

Insert 4.2

A Poem For Two Voices

Being a young man	Being a young man
Is hard work!	
	Is a blast!
I'm seventeen	I'm seventeen
I'm a lumberjack!	
	I'm a high school senior!
I'll gladly explain	I'll gladly explain
I hear the call "Daylight in the Swamp!" It must be 4:30. Time to get up.	
	(snore…)
It's cold outside; better wear the woolies! Breakfast is ready. Time to go eat.	
	(snore…)
Tables are full. No one's saying a word. Have to eat quickly. There are trees to be cut!	
	(snore…)
"Timberrrr!" First tree is down! Then another and another… Great start to the day!	
	(grumbling) There's my alarm. Must be 7. I can't believe I have to get up so early!
Timberrrr!	
	Ah, a clean t-shirt to go with my jeans and Nikes. Where's my Dew? Gotta get to school.
It's 9:00	It's 9:00
I'm exhausted and starving! Time for a break. Sinkers sure taste good.	
	It's snowing. I suppose I'll have to shovel tonight. Two more classes 'til lunch. Sure am hungry.
Timberrr! The first cord is cut!	
	There's the bell!! My favorite time of day. Lunch with my buddies. Can't wait to hear what they all did last night!
Hey jacks! Let's get one more tree down before the dinner wagon arrives.	
	Aww… the bell already? We have to go back to class.

Perfect timing! Tree is down, and the dinner wagon's here. The stew, bread, and pie sure will taste good! Better eat quick.	
	3:00! Another day done! Gotta get ready for the basketball game tonight.
Not much daylight left. Gotta keep moving. Big Push expects another cord cut!	
5:30 . Time for supper	5:30 Time for supper
	Gotta eat quick. Game starts in an hour.
Finally, a chance to relax. Where's my fiddle? I feel like playing a tune.	
	Yea! We won! To McDonald's for a burger.
It's 9:00	It's 9:00
Douse the glim! Lights out! Morning comes quickly in the lumbercamp.	
	Biology test tomorrow. Better start studying.
(snore…)	
	It's midnight. Time to catch some zzz's. Mornings come quickly for a high school student!
(snore…)	(snore…)

Insert 4.3

Paul Bunyan Breakfast Specials

Main Entrees

Sow belly ..... _____
Cackleberries ..... _____
Stove Lids ..... _____

Side Orders

Murphies..... _____
Door Knobs..... _____
Sinkers..... _____
Logging Berries..... _____

Beverages

Swamp water ..... _____
Dish water .... _____

Condiments

Mexican Powder..... _____
Gravel ..... _____
Long Sweetenin' ..... _____
Red Lead ..... _____
Salve ..... _____

Answer Key

Paul Bunyan Breakfast Specials

Main Entrees

Sow belly ..... pork
Cackleberries ..... eggs
Stove Lids ..... pancakes

Side Orders

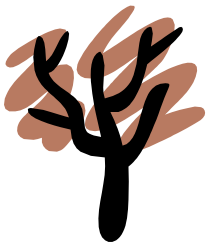
Murphies..... potatoes
Door Knobs..... biscuits
Sinkers..... doughnuts
Logging Berries..... prunes or beans

Beverages

Swamp water ..... tea
Dish water .... coffee

Condiments

Mexican Powder..... pepper
Gravel ..... salt
Long Sweetenin' ..... sugar
Red Lead ..... ketchup
Salve ..... butter



Lesson 5 – Farming the Cutover and Wisconsin Ghost Towns

In a Nutshell

Following the sound of the axe and the saw was the aftermath of the forests' removal. The great forests of the northwoods had been reduced to slash and bare soil. In this lesson students will learn about attempts made to farm the cutover land and the ghost towns that resulted from loss of resources. They will learn about the trials of farming through a "reader's theater" piece, write letters from the perspective of an inhabitant of the cutover land, and read about three of Wisconsin's ghost towns.

Concepts

- Farming the cutover land was often not successful.
- Many people lost money in their attempt to own land in Wisconsin after logging.
- Ghost towns resulted in Wisconsin from boom-and-bust company milling towns.

Objectives

After completing this lesson, students will be able to:

- Define "cutover area."
- Describe why farming on the cutover area was difficult.
- Give examples of how land was advertised.
- Define ghost town and explain how they arose in Wisconsin.

State Standards

ELA	SS	EE
A.4.1	A.4.4	A.4.4
B.4.1	A.4.8	B.4.3
C.4.3	B.4.4	
D.4.1		

Total Estimated Time

2 hours and 15 minutes

Vocabulary

Company town – a town in which all of the businesses and buildings are owned and run by a single company
Cutover – what northern Wisconsin was referred to as after all of the trees had been cut
Desolate - empty
Ghost town – a town that used to be successful but has since been abandoned
Land speculator – someone who buys land and then sells it for a higher price
Natural resource – a source of money or needed material that comes from nature
Quarry – an open area in the ground from which a kind of rock or stone is gotten
Saloon – a bar
Sawmill – a mill that has sawing machines for lumber or rock
Slash – leftover parts of trees that have been cut down
Timeline – a visual description of a sequence of events

Materials

Drawing paper
Drawing materials
Photo of advertisement (Insert 5.1)
Butcher paper
Reader's theater piece (Insert 5.2)
Living On the Cutover (Insert 5.3)
Ghost town information (Insert 5.4)

Teacher Preparation

Copy the readers' theater piece (Insert 5.2) for those who will be reading it. Also, make copies of "Living On the Cutover" (Insert 5.3) and the ghost town information (Insert 5.4) for your students.

Background Information

By the early 1900's, logging was slowing down in Wisconsin and moving west and south. The owners of the logged over land, the cutover, were eager to sell it. Much of this land was owned by railroad companies, land dealers, and lumber companies. These groups were not invested in the land itself, and so were not in the frame of mind to work cooperatively. They were in it to make money. Railroad companies were especially eager to have the land settled. Not only would they make money on the land, but they would also prosper by having new farm goods to transport.

Immigrants were eager to come to the United States. In fact, many areas in northern Wisconsin had clusters of certain nationalities. The greatest influx of settlers in northern Wisconsin came between 1890 and 1910. There were many reasons why the area seemed appealing. Many had the dream of owning their own land.

Many railroad companies advertised to prospective immigrants. Brochures and pamphlets were prepared by companies and the state government advertising the great quality of northern Wisconsin land. Pictures of farmers with huge crops were staged and used in these advertisements. One of the most convincing of these was Northern Wisconsin: a Handbook for the Homeseeker, created by the University of Wisconsin College of Agriculture for the State of Wisconsin in 1895 (See picture provided in Insert 5.1).

The advertisements were indeed convincing and the settlers did come, but what they arrived to find was not what had been promised. The land needed a lot of work before crops could even be planted. The soils in northern Wisconsin did not lend themselves to agriculture as those of southern Wisconsin had, and the growing season was short. The land was rocky and covered with brush, limbs, treetops, and unwanted logs left over from lumbering. Worst of all were the stumps left behind. People used mechanical stump pullers and bought dynamite to remove the stumps. In the end it took a decade to put into farms the amount of land deforested in one year.

Due to post WWI factors, the Depression, and the physical limitations of the land, by the late 1920's northern Wisconsin was in poor shape. In fact, in 1929, the state immigration agency stated that its main function was to prevent settlers from entering the northern lands unsuited for farming. Much of the land was abandoned by those who could not pay their taxes.

Another major consequence of logging in northern Wisconsin is the presence of ghost towns. Most of us think of the west when we hear the term ghost town, but Wisconsin actually has quite a few. Most of these ghost towns were company towns, meaning that the entire town and everything in it was owned by a milling company (refer to Lesson 2). The life of these towns followed a boom-and-bust cycle. Some of them seem to have been created overnight, but

when the lumber was gone in the area upstream from the mill, they were abandoned.

Introduction

Give students paper, drawing materials, and these very simple instructions: "The logging company has come and gone. All lumberjacks have moved on. What buildings existed have been removed. The trees have been cut. And there you stand… What do you see? Take a minute to visualize this view in all directions. When you're ready, begin drawing what you see."

Activity 5.1 – Farming the Cutover (20 min)

The text in Insert 5.2 is written to be used in "readers' theater" style in which a group of four students read the information to the class. It is critical that these four students have time to rehearse together. For maximum benefit, your guidance and coaching will be necessary during some rehearsal time to enhance the meaning of the script with gestures, expression, etc. You could, instead, divide your class into groups of four in which each person in a group can take the role of each of the students listed in the script.

Activity 5.2 – Just Speculating (20 min)

Tell your students "You are all land speculators! You each have purchased 30,000 acres of cutover land with the intention of selling it and making a generous profit for yourself. You paid $1.25 per acre for this land, and you hope to sell it for $5.00 per acre. (These are realistic prices for Wisconsin in the early 1900s.) Use your persuasive creativity to develop an advertising poem or jingle which will entice prospective buyers to move north and farm the cutover!"

Allow the students to create advertising "jingles" much like those mentioned in the student text material. Students may wish to include pictures like the photographs shown in Insert 5.1. Encourage students to use strong, persuasive, positive language. Unlike today's abbreviated language used in advertising, you may wish to encourage students to use the style authentic to the time period that tended to use more complete thoughts and sentences.

Activity 5.3 – What To Do? (30 min)

Read the following information to your students:

Many advertisements, like the ones you just created, were successful in drawing people to the northern Wisconsin cutover region. Unfortunately, once the farmer was on his land, the trouble really began. Before he could produce anything, he had to clear land. Land clearing was expensive and very difficult. Horses strained as they tugged on various stump-pulling devises. The University of Wisconsin spent many hours and much money creating new methods for removing stumps. Special trains traveled through the north teaching farmers how to remove stumps. After World War I, explosives became a popular (but dangerous) method for removing stumps. Again, the University of Wisconsin sent trains and trucks north with explosives and lessons. They were determined to turn cutover land into productive farmland.

Many land companies offered plans to ensure the success of the farmers. The Wisconsin Colonization Company, organized in 1917, bought 50,000 acres of cutover land in southern Sawyer County. They built a model town called Ojibwa. It provided houses, barns, and telephone lines. They also began community clubs and sponsored crop contests and stump pulling festivals. The company officials kept a close watch, visiting farms, writing letters, and giving advice. One letter said, "Keep up the good work; we're with you." Another encouraged the farmer by stating, "You have only 30 days left to blow stumps and break land. Your success depends upon the plowed acre and every new farmer should use every hour of the day to stump and plow!" Most new farmers were putting in very long hours. The company would write to its farmers, "Brush, stump, and plow, and LIVE OFF THE LAND. Nothing can stop you from succeeding." Some companies promised too much, like a big house built by the company and land which was ready to be plowed.

In the end, however, it was very difficult. Many settlers failed in their attempt to make a living from cutover lands. Some became bitter with land companies breaking their promises for assistance, homes, roads, and schools. Some began questioning the accuracy of the photos that had appeared in the advertisements and books they had seen.

Using your new knowledge of the dilemma (what to do with the cutover land), you are now going to choose one of the options listed on the "Living On the Cutover" table (Insert 5.3). ROLE explains the viewpoint that you should take. AUDIENCE explains to whom you are addressing your thoughts. FORMAT indicates the style of writing. TASK is rather self-explanatory!

Activity 5.4 – Ghost Towns (45 min)

Ask your students what image pops into their head when they hear the word ghost town. You can do this in your regular classroom setup, or with your students sitting in a circle. Go around and get everyone's ideas.

Explain that a ghost town is a town that was once busy and successful, but has since been deserted by everyone who lived there. This usually happens when a natural resource that was important to the town runs out. Make sure your students understand the concept of a ghost town. You want to be sure they know it does not really have to do with ghosts. You might want to discuss why the term "ghost" is used.

Did you know that we have ghost towns in Wisconsin? What do you think the natural resource was that many of them depended on? Wood! Let's take a look at three Wisconsin ghost town histories to discover how these towns went from being so successful to quickly fading away (Insert 5.4).

You may choose to divide the class up into three groups so each group can concentrate on its own ghost town. Or you may choose to study one or all of them together as a class. Students should read through the condensed history for a general overview. It is suggested that students read the history a second time, searching for key

developments and the approximate dates of each one. When students have comprehended the information, they can organize these key developments on a timeline. You might suggest to your students that they highlight dates as they read that should be included on the timeline. By comparing the timelines, students will be able to compare and contrast the similarities and differences between these communities. Timelines can be constructed on on a large piece of butcher paper.

Conclusion

Marketing was alive and strong in the early periods of our statehood! Unbelievable amounts of time, money, and effort were devoted to turning the cutover land into successful farmland. In the end, however, the lessons from the land prevail. Soil types, growing seasons, and climate lend themselves to specific crops. In many of the cutover areas, especially in the northern portion of Wisconsin, these factors are best suited for growing trees. Also, many towns quickly grew up around the lumber industry, but many of them disappeared when the trees disappeared, leaving deserted areas scattered around the state.

Extensions

- If it's possible, students could experience the difficulty in pulling stumps! One possible comparison would be to pull dandelions, with the goal of removing the entire taproot from the ground. Once students realize the difficulty in that task, they could compare it to stump removal.
- Students could collect photos of stump pulling devises used at the turn of the century or now. Or students could create their own stump-pulling inventions or models of those used.
- Students could grow carrots to examine taproots which are similar to the taproot of trees.
- Students could research a nearby ghost town. Contact the Area Research Center or a UW near you for assistance.

Evaluation

- The following questions can be used to guide an evaluative discussion with your students:
    - This dedicated attempt to turn cutover land into productive agricultural land
    - occurred during what time period?
    - What was left behind after clear-cutting?
    - Do you think the advertising used to promote agricultural use of cutover land
    - was honest?
    - Most purchases were made without seeing the land, but purchasers did
    - understand the land was cutover. With this in mind, how do you think you
    - would have felt seeing your land for the first time? How do you think you
    - would have felt after a month of attempting to clear stumps?
    - Today in the northern highlands you will find little farming. Why?
    - What happens when we over harvest?
    - Can clear-cut land always be developed into farmland?
    - What advice would you give to a logging company before they begin cutting to

- avoid over-harvesting the timber stand?
- What patterns or similarities exist in the development of the three ghost towns
- you read about?
- What caused the towns to prosper?
- What caused the towns to fail?
- How would you feel as the nine or ten-year-old child of a lumber mill worker
- moving into one of these new towns?
- How would you feel as you watched your town decline?

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Insert 5.1

Wisconsin State Historical Society Whi(H44)94

Insert 5.2

Farming the Cutover

A Reader's Theater Script for Four Readers

Student 1: Look at our Wisconsin map and think about this: at the time Wisconsin became a state in 1848, about ¾ of the state was covered with forests. Seventy years later (around 1920) just about all the forests in the state had been cut!

Student 2: Wow! That's a lot of trees!! Remember when we drew our pictures of what we thought the land would look like after logging? Here's a photo of one site which had been logged. After a tree was cut down, its branches and bark were removed, and this slash, or tree leftovers, was left lying on the ground. But you also have to remember that sawyers cut at chest-height. Stumps were left in the ground because they're extremely difficult to remove.

Student 3: It's a pretty sad, desolate sight, isn't it. At this same time, as the 1800s came to an end, many people were moving into Wisconsin. People dreamed of owning their own land! And they had heard about Wisconsin's rich land. However, much of the good farmland in the southern part of the state had already been taken.

Student 4: But in the northern part of the state were 10 million acres of cutover land!!

Student 2: People who owned this cutover land had a few choices to make. They could allow the land to set idle, which means not doing anything with it. Since they owned the land, they would still have to pay the taxes on it, though, so that option wasn't very pleasing.

Student 3: Or, they could let the county take the land. Then they wouldn't have to pay the taxes. Unfortunately, it's like simply giving the land away and getting nothing for it. That did happen in many places, but there was another option.

Student 1: Yeah. Owners of cutover land were willing to sell their land pretty cheaply, so land speculators bought it!!

Student 4: What are land speculators?

Student 1: Good question! A land speculator is someone who purchased the land, hoping to sell it at a higher price so he could make lots of money!

Student 2: One speculator was Mr. Caleb Cushing. In 1869, he bought about 43,000 acres of land in Polk County and created the Great European-American Emigration Land Company! He had an office in New York where he enticed people to buy an 80-acre Wisconsin farm for $1000. That was a good price back then.

Student 3: He had problems keeping his promises, however, so his speculating didn't go too well! Lots of people were disappointed with their land.

Student 1: I heard about another interesting experiment. In 1870 John Welch bought 80 acres of timber. He cut, logged, and burned it off. Then he planted potatoes. He wanted to prove that cutover land would be good farmland. He grew 756 bushels of potatoes in 2 ½ acres and made a profit of $270. That was a pretty good profit in the late 1800s!!

Student 4: What about the railroads that had been built for the logging companies?

Student 3: Good point! The railroad companies didn't really want to leave the land sitting idle, either. If no one was trying to get to northern Wisconsin, they'd have to go out of business. So the railroads were pretty involved in helping to sell the cutover lands in northern Wisconsin, too.

Student 1: Remember Mr. Welch's potato experiment? Photos of his crop were posted in railroad stations! Railroad companies like the Soo Line and the Wisconsin Central Rail Road employed people to go to Europe and talk people into settling in Wisconsin.

Student 2: The railroad companies even bought cutover land to sell. In fact, in 1890, the Wisconsin Central Railroad had 838,628 acres of land they were trying to sell! That's like 838,000 football fields of cutover land!

Student 4: How else did they advertise this land?

Student 3: You have to remember that the idea of owning your own land, not renting it from someone else, was something very desirable. So advertising really tried to get people excited about owning land.

Student 2: One pamphlet printed by the Soo Line Railroad said:
"He who owns a home of his own, If only a cottage with vines overgrown, Of all the pleasures of life, gets a greater percentage, than his haughtiest neighbor who has to pay rent." *(Take the Easy Way to the Soo Line Farm Home in Wisconsin* in the American Immigration Company Papers.*)*

Student 4: Wow… makes you feel like you're nothing if you *rent* your land!

Student 2: Here's another ad that appeared in a railroad station:"Come to Sunny Southern Sawyer! There's a future here for you. Mother Nature's always smiling. And the skies are always blue. Where the crops are always "bumper" And the taxes always paid. Where you've got a dollar waiting, When you've got a dollar made." (Two stanzas of a poem entitled "An Invitation," printed on the back of an undated mimeographed form letter in the Wisconsin Colonization Company Papers)

Student 4: Hmmm… the advertisement is like a poem… and it sure makes farming in Sawyer County seem pretty easy!

Student 3: Yup.

Student 1: Experiments like John Welch's…

Student 2: …and the advertisements that were written…

Student 3: … and the books that were printed…

Student 4: …and the photographs which were posted…

All students: ….all made farming the cutover look very pleasant!

Insert 5.3

Living On the Cutover

ROLE	Land owner	Farmer	Farmer	Kid	Tree
AUDIENCE	Prospective buyer	Land company	Family/self	Friend/self	People
FORMAT	Advertisement	Letter	Letter/diary	Letter/diary	Editorial piece in print or other media (radio/TV?)
TASK	Sell land!	Share frustrations about stump removal or poor crops	Share experiences with other family members or reflect in diary	Share experiences with friend or reflect in diary	Teach people about quality land management

Insert 5.4

The Story of Dunnville

Dunnville was located southeast of Menominee along the waters of the Red Cedar River. While there was some logging done in this area as early as the 1820's, it was almost forty years later that any heavy tree cutting went on there.

In the spring of 1846, a man named Mr. Wilson from Iowa was coming up the Mississippi River by steamboat. He was told of a great stand of white pine along the Chippewa River. He decided to see if this was true. He walked to the Red Cedar River and found a small sawmill. Mr. Wilson, with a Native American as his guide, used a canoe to paddle fifty miles upriver to examine the timber. He was amazed by how much he saw. He then returned to Iowa, raised money, and purchased the sawmill with a man named Mr. Knapp.

Dunville became a "company town," which means that most businesses there were operated by the lumber company. It included a creamery, a quarry for cutting stone, and a sawmill. It was 1840 and the settlement had still not been named. A few years later, a man by the name of Amos Colburn put up the first hotel called the "Colburn House." He built homes and other buildings for those who were coming to the village to live. In his honor, the settlement was named Colburn. When the postal service was established a few years later, however, the village was officially named Dunville in honor of Charles Dunn who was the first Chief Justice of the Wisconsin Territory.

In 1852, a man named Mr. Stout from Dubuque bought into the company. The company became known as Knapp, Stout, and Company. It dominated this region of the Wisconsin pineries for almost fifty years, controlling 480,000 acres of land and employing as many as 2,500 people.

In 1854, on the east bank of the river, the lumber company built a large store. The second story was a dance hall. Four years later, in 1858, the company built a huge wooden hotel next to the store. At the same time a warehouse was built at the boat landing and Dunville became a bustling river port. The village had grown as far up the Red Cedar River as the paddle-wheeled steamboats from the Mississippi River and Chippewa River could travel.

Knapp, Stout, and Company operated steamboats which carried passengers, supplies, and farm produce. Goods were unloaded at Dunnville and carried by horse-drawn wagons to various company stores in the pineries. The company also kept a four-horse stage coach which ran daily between Menominee and Dunnville. Dunnville reached its peak in the 1850's. At this time it was a bustling village with a population of several hundred.

In 1858, the courthouse burned to the ground. From that time on, Dunville began to fade. In 1888, railroads began pushing northward, and Dunnville lost its importance as a river

port. By this time, the last of the great white pines were being cut from the northern reaches of the Red Cedar River valley. The lumber rafts that floated past Dunnville for markets south became fewer and fewer.

On a sunny Sunday, August 11, 1901, a raft tied up at the port. Two of the raftmen's families lived in the village. They told the locals on shore that they were looking a what would be the last lumber raft to float the Red Cedar River, and added that anyone who wished to ride down the river was welcome to come aboard. About a dozen people, mostly kids, took the raftsmen at their word and rode the raft south. A few hours later they were returned to Dunville on a hay wagon.

Despite the raftsmen's prediction, the village continued to function for several decades, but with each year one or more buildings burned or was vacated. The Dunnville School closed. Eventually, trees and tall grass covered what once had been a bustling community.

Today there is still much to see and imagine at this site on the Red Cedar River. It is here that Caddie Woodlawn lived from 1857-1867. You can read her tales in the book Caddie Woodlawn written by her grand-daughter, Carol Ryrie Brink. Several other buildings from the Dunville days are still standing. One is the old Colburn House. Standing on the wooden bridge over the dark, moving waters of the Red Cedar River, it is difficult to imagine that one-hundred years ago this was a thriving town!

The Story of Heineman

The history of Heinemen begins with a story in the May 29, 1900 Merrill newspaper. The story reported that a man named Mr. Thomas (who was a Merrill logging contractor and timber owner) proposed to build a saw mill, store, blacksmith shop, houses, and other structures needed for the residents of a village at a place where his logging camps were recently built. Mr. Thomas also promised to put in telephone lines and build good roads!

His plan began with the construction of the sawmill in the middle of a timber stand which he believed would support his business for more than twenty years. The settlement began to grow with already 100 men working. In July of 1900, it acquired the name Trout City because Mr. Thomas caught more trout there than anyone else. The mill was constructed and running by October 1 of that year.

By January 1901, there were twenty-two houses, a boarding house, a rooming house, a blacksmith shop, and other structures. Horse teams would haul lumber to nearby Merrill, and they would haul hay, grain, and other supplies back to Trout City. Fifty to seventy-five farmers visited Trout City daily to sell their produce. By February, a two-story building with a basement was built. In it there was a store, apartments, and a storehouse where people could get anything to eat, drink, or wear. Keep in mind that just ten months ago this had been a thickly forested area.

Mr. Thomas continually tried to improve life in the village. There was talk of building a railroad into town. Plans for a schoolhouse were organized for the fifty children who lived in town, too. A drug store opened in mid-March of 1901 and plans were created for a new hotel.

The growing population at Trout City soon expected regular mail service. A petition with two hundred signatures was sent to Washington, D.C. requesting a post office. In the spring, the government did establish a post office at Trout City in the general store. It was about this time that the name of the town changed to Earling to avoid confusion with other towns also called Trout City. The name honored the superintendent of the Saint Paul Railroad Company.

By fall, the railroad company had begun building a line into Earling. The town was described as the "busiest burg in the country" and there were still new houses being built! In December of 1901, it was announced that Mr. Heineman had purchased the lumber mill and all the buildings at Earling. In 1902, a petition was sent to Washington requesting that the post office name be changed from Earling to Heineman and that daily mail service to the town be established. These requests were granted in June.

1902 was a very successful year for the lumber company that produced lath (narrow strips of wood), shingles, cedar poles, and railroad ties. By 1903, Heineman had a railroad depot and daily passenger train service. A large, modern store, a new dance hall,

two hotels, and a large barn to replace the horse stables were soon built. By 1905, the population of Heineman reached 300 and growth continued. An amusement hall, an opera house, and a meat market were added by 1910.

Just when operations at Heineman seemed to be reaching a peak, disaster struck. As the Merrill newspaper wrote, "Last Monday, during the noon hour, fire was discovered in the Heineman sawmill at Heineman, and although the local fire department and all the residents turned out promptly, the building was burned to the ground." The company swiftly rebuilt, but disaster soon struck again. The Merrill newspaper wrote, "The village of Heineman was totally destroyed by forest fires Wednesday evening. There were about twenty-five families living there, and all men, women, and children were driven from their homes by the flames, leaving behind everything they possessed to be devoured by the fire-head."

Since the company still had timber which had not been destroyed by the fire, it moved its operations to Merrill and continued in the lumber business for approximately twenty years. Today, little remains at Heineman. One of the company houses still stands, and the road that passes through the site is known as Heineman Road. It is hard to imagine, though, that just 100 years ago it was a busy mill town with 400 people living there.

The Story of Star Lake

In late 1893, two lumbermen named Mr. Williams and Mr. Salisch were looking for additional timber land to purchase northeast of Minocqua. They bought this land from the Starr brothers, Bob and Harry, and began to construct a mill.

By August of 1894, a railroad began extending northward to Star Lake. Trains did not begin running regularly until the spring, but as soon as the steel was laid, supplies were hauled to the logging camp which consisted of a bunkhouse, cook shanty, office, and barn.

In early 1895, Star Lake began to look like a town. Several families had already moved there. A store and a saloon were opened. Thirty-five houses were finished and sixty-five more were to be built as quickly as possible. By summer, weekly train service began, telegraph communications began, and attempts were made to establish a post office. A full line of groceries, dry goods, and hardware could be found in the store. The town now contained a boarding house, barber shop, doctor's office, and hotel. The hotel served residents of Star Lake as well as many tourists who came to hunt or fish in the area. Construction of a school for the fifty students soon began. On August 28, 1895, a special train arrived carrying the majority of the mill employees, their families, and household goods.

By November of 1895, there were seventy homes, some of which were supplied with electricity. A post office had been established in the general store. Star Lake was a bustling mill town. Regular church services were held. There was no church, so services were held in whatever building was available. There were ice cream socials, fairs, auctions, and dances. Star Lake continued to boom into the new century. By 1904, 700 men were employed in the mill which operated twenty-four hours a day!

Shortly after this time, however, the town began to decline quickly as the pine forests were cut over. The last log was cut in 1906. By 1908, the population of Star Lake was down to 250. The company tore down houses and shipped them to Columbus, Ohio, where they were reassembled and sold. The school was torn down by 1920, and the railroad line was abandoned by 1940. Now, an open field is almost all that can be seen where the town of Star Lake was once thriving.

Lesson 6 – The Peshtigo Fire

Nutshell

The Peshtigo fire took more lives than any other fire in American history. Part of its cause was irresponsible use of the forests surrounding Peshtigo, Wisconsin. Students will color code a navigation route, create a mileage "key," and figure out the shortest route to Peshtigo, WI from their school. They will then act as travel agents and generate a "trip tic" to Peshtigo. Finally, they will read letters from a nine-year-old survivor of the fire.

Concepts

- Peshtigo is located just north of Green Bay in eastern Wisconsin.
- Maps can be used to locate places of interest and navigate a route from one place to another.
- Leftover slash from logging, irresponsible use of fire, and a very dry summer were all causes of the Peshtigo fire.
- While the Peshtigo fire was extremely violent, fires during that time period were quite prevalent.

Objectives

- After completing this lesson, students will be able to:
- Locate Peshtigo, WI on a Wisconsin map.
- Identify, describe, and record three navigation routes from the student's school to Peshtigo, Wisconsin.
- Explain the causes of the Peshtigo fire.

State Standards

ELA	SS	EE
A.4.1	A.4.2	A.4.4
B.4.1	A.4.4	
C.4.3	A.4.8	
D.4.1	B.4.3	

Total Estimated Time

2 hours and 20 minutes

Vocabulary

Color code – to indicate or instruct by using different colors
Mileage scale – a divided line on a map used to show what length on the map is used to show a certain number of miles
Navigate – to find one's way
Sawmill– a mill that has sawing machines for lumber
Travel agent – a person who arranges travel for others

Materials

Copy of a "Trip-Tic" from AAA (optional)
Wisconsin maps with town names, including Peshtigo, Wisconsin for each student (be sure to add your own town to the map before running off copies)
Colored pencils, fine-tip markers, other drawing materials
Lined and plain paper
Overhead projector
Copies of the four letters for each student (Insert 6.2)
Copies of three Wisconsin maps for each group (Insert 6.1)

Teacher Preparation

Read through all of the provided materials, photocopy Wisconsin maps, make a Wisconsin map transparency to use on the overhead projector, and copy the four letters for each student.

Background Information

October 8, 1871 was a disastrous day for two places in the Midwest. Two of the most damaging fires in American history happened on that day. One was the famous Chicago fire, and the other took place in the Wisconsin woods, in a town called Peshtigo. Both were caused by the same conditions: drought, a changing wind, and human carelessness.

Peshtigo, Wisconsin was a typical lumber town of the late 1800's. Located along the Peshtigo River, seven miles upstream from the waters of Green Bay, it was built around a sawmill and surrounded by dense forest. The town's largest employer was the Peshtigo Company, which operated several enterprises including a sawmill with 97 saws, a gristmill, machine shop, and a wooden factory that produced shingles, tubs, pails, and broom handles.

For some time leading up to the Peshtigo fire, burning forests had become almost the norm. The summer and fall of 1871 were the driest on record in eastern Wisconsin. In Peshtigo it had only rained once all summer. In addition, there was plenty of slash (leftover wood from logging) left in the forests that were easily ignitable. Fires were being started to clear land for both railroads and farming. Many of these fires were not monitored, but rather were left to burn. In fact, Peshtigo's residents had found it difficult to breathe due to all the smoke in the air for some time before the famous fire.

The fire that eventually consumed Peshtigo was anything but typical. For one thing, it was not just a ground fire. The trees were so dry that the fire spread easily to the crowns and could travel above land. In addition, the land itself was on fire. Fire was actually spreading underground from place to place. Finally, it was not just a fire that befell Peshtigo, but a firestorm. Survivors said it sounded like thunder or freight cars coming towards them. The winds were so strong that people were blown down while trying to escape. The term "tornadic fire" has been used to describe the tornado-like fire twisters that demolished things before even burning them.

It is estimated that there were about 2000 people living in Peshtigo and its neighboring Sugar Bush logging settlements at the time of the fire. Estimates of the number killed range from 700 to 1500. We do know that it is the greatest loss of life in a fire in the United States. Those that survived had to jump into the river. Many stayed there for up to five hours waiting for the flames to stop. Even in the water, many had trouble breathing or were injured or drowned by objects and livestock entering the river. Many survivors of the actual fire died soon after from smoke inhalation.

Surprisingly, even after the Peshtigo fire, behavior was not changed to lower risks. Similar disasters occurred up through 1908. In fact, the Peshtigo fire was at first blamed on bogs. There was a consensus of opinion that gasses being released by peat bogs had caused the intensity of the fire, not human carelessness. Eventually, the lessons of fire were learned, but not until far too many lives had been lost.

Introduction

Have your students close their eyes and read them the following excerpt from Reverend Peter Pernin's first-hand account of the Peshtigo fire.

"The air was no longer fit to breathe, full as it was of sand, dust, ashes, cinders, sparks, smoke, and fire. It was almost impossible to keep one's eyes unclosed, to distinguish the road, or to recognize people, though the way was crowded with pedestrians, as well as vehicles crossing and crashing against each other in the general flight. Some were hastening towards the river, others from it, whilst all were struggling alike in the grasp of the hurricane. A thousand discordant deafening noises rose on the air together. The neighing of horses, falling of chimneys, crashing of uprooted trees, roaring and whistling of the wind, crackling of fire as it ran with lightning-like rapidity from house to house – all sounds were there save that of the human voice. People seemed stricken dumb by terror."

How did that passage make you feel? Discuss this with your students. Explain that the passage was written by a survivor of the Peshtigo fire. Who has heard of the Peshtigo fire?

Activity 6.1 – Who Wants To Be a Travel Agent? (1 hour)

Tell your students that before they learn more about the Peshtigo fire, they should first find out where the town is located. Break your students up into groups of about four. Give each group a map of Wisconsin. Have them locate Peshtigo with their group members, reminding them that it is located near Green Bay, a large city in eastern Wisconsin. Have each group raise their hands when they have located Peshtigo. Go around to all of the groups to check their work and provide help to any who are having trouble.

Now that you know where Peshtigo is, make sure everyone knows where they are located. Have each group locate your town on the Wisconsin map (you may have had to add this to the map yourself). Again, help any groups having difficulties. Today you are all going to be travel agents. What is a travel agent? Give your students some time to come up with ideas. A travel agent helps people make plans for a trip. Today it will be your job to provide your client with several travel options from here to Peshtigo. As a group, you need to identify three possible routes from here to Peshtigo on the map. You will then color code each of these routes on the map.

Next, you will need to figure out the length (in miles) of each leg of the trip. This can be done using the mileage scale at the bottom of the map. Show your students how to measure distance on a scale of miles. Show them how they can line up a blank piece of paper along their navigation route, mark the length of one leg of the route, and line it up with the mileage scale.

Once your students understand how to do this, have them find the shortest of the three routes to Peshtigo and write out the directions for that route. You might want to show your students a AAA Trip-tic as an example. It might even be helpful to have one available for each

group to look at while they are designating their own routes.

Once your students have completed the task, have each group come up and present their chosen route. After each group has presented, discuss the project with the class as a whole. Did you feel that making the color-coded map and writing out directions was helpful? Did you learn anything? Do you think navigation and map-reading skills are important? Why or why not?

Activity 6.2 – Fire at Peshtigo (1 hour)

Now that you know where Peshtigo is located, you are ready to learn more about what happened there in October of 1871. Have your students read aloud the series of letters in Insert 6.1. There are discussion questions for each letter.

Discussion Questions For Letter 1

1. What do you know so far about the town of Peshtigo?
2. How old is Claudia?
3. Why did Claudia's family move to Peshtigo?
4. What products were made by the Peshtigo company?

Discussion Questions For Letter 2

1. What else have you learned about the town of Peshtigo?
2. Are there any clues that something bad might happen?
3. What are the causes of the fires?
4. Are you surprised by Claudia's reaction to what has been going on in Peshtigo?

Discussion Questions For Letter 3

1. How is the town reacting to what is going on?
2. What are some things that affect the fires?

Discussion Questions For Letter 4

1. How did this letter make you feel?
2. Besides the fire itself, what were some other things the people had to face?

Conclusion

Have your students write their own newspaper account of what happened in Peshtigo. Each article should chronicle the event and give some quotes from people whether they be survivors, family of those living in Peshtigo, government officials, etc.

Even after the disaster in Peshtigo, fires were common. Explain to your students that while the number of people who died in the Peshtigo fire made it memorable, fires were very common in the Wisconsin cutover lands. Did Claudia seem concerned in her first few letters about the fires? Not really. Fires were considered a normal occurrence.

Extensions

- Have your students listen to the song *Peshtigo* song by Ken Lonnquist (http://www.kenland.com)
- Have your students do further research on the Peshtigo fire and the events surrounding it. Then have them develop a timeline of the events.

Evaluation

- Grade the map routes and presentations of the groups.
- Grade the newspaper article.
- Discussion participation.

Resources

- Lonnquist, Ken. *Peshtigo* on Weave. http://www.kenland.com.

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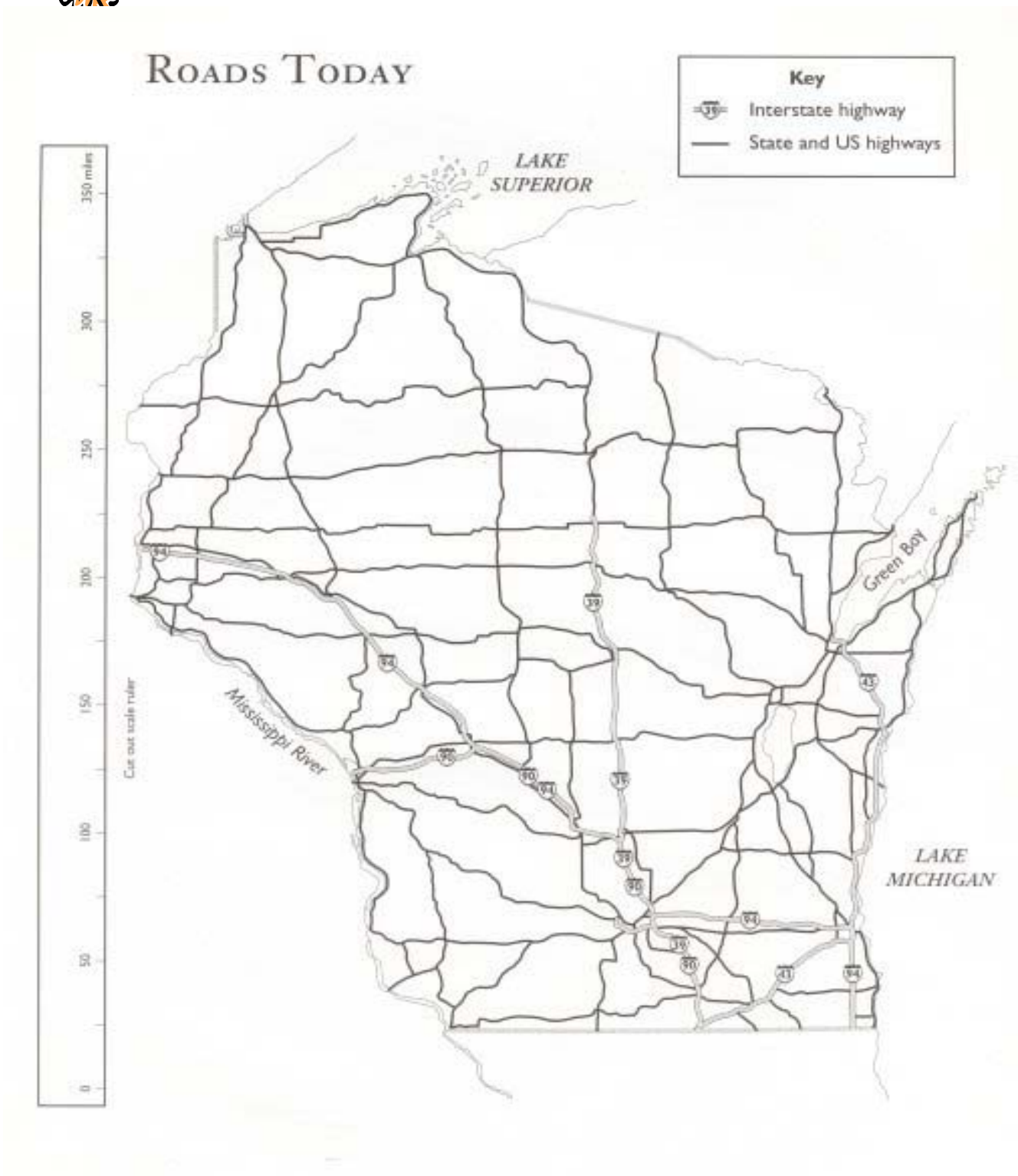

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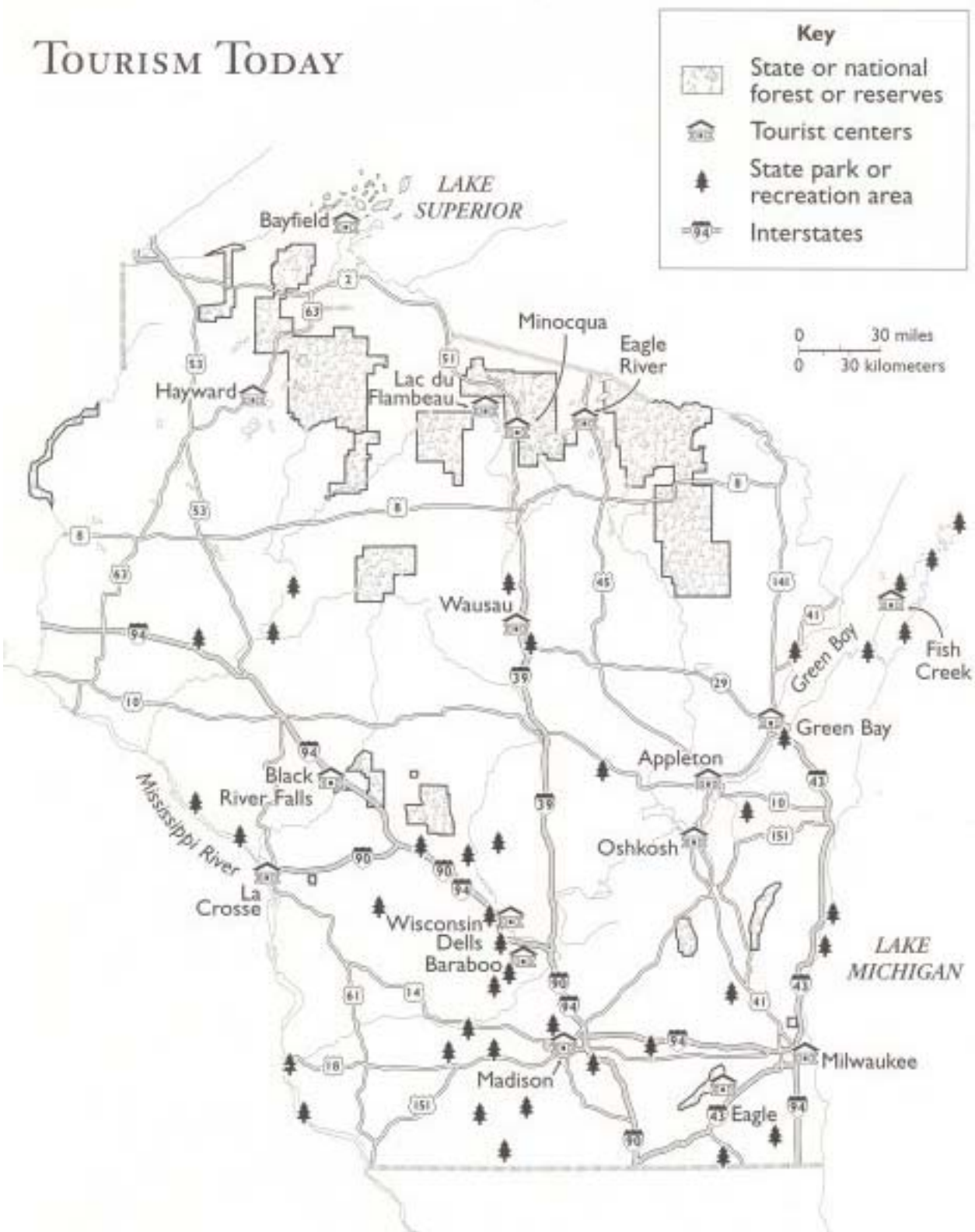

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Insert 6.2

August 6, 1871

Dear Alexis,
I miss you so much. I do not like it here in Peshtigo, but father said we needed to move here so that he could get a good job. He is working for the Peshtigo Company. They do all sorts or woodwork there. It is the largest manufacturer of woodenware in the whole country! Father works in the sawmill, but the Peshtigo Company also makes wooden tubs and pails and broom handles and things like that. In fact, it seems like this whole town is made of wood! I mean it. Every single building is built from wood, and even the streets are covered in sawdust to make it less dusty.

I have not met very many other girls my age, but I hope to. Elizabeth is doing fine, but since she is only 10 months old she's not much of a companion. I do get to help mother with the house chores and help her take care of Elizabeth. She says that next year, when I'm 10, she is going to start teaching me how to cook with her. I want to learn now, but she says I have to wait.

The weather here has been dreadfully hot this summer. People keep saying that they cannot remember the last time it has been so hot and dry. It has only rained once the whole summer! That

makes me happy, because that means I can go out and play every day. What has the weather been like in Appleton? No matter what it has been like, I wish I were still living there. That way we could play all summer long. I really do miss you. Tell Aunt Melinda and Uncle Thomas I say hello. Please write soon!

Love,
Claudia

September 3, 1871

Dear Alexis,

Things here are getting better. I have met some friends in school. Katherine is my best friend here. Her father works in the sawmill, too, and she has a little sister, just like me. I have told her all about you.

I like the town better now. There is a big river running through it, and it is surrounded by forest. Sometimes Mother will take Elizabeth and me down to the river and I will bring Katherine. We like to play there. Mother usually gets cross with us for getting dirty, but it is so much fun!

I want to go play in the forest, but Mother forbids it. There have been some small fires in the forest and so she is worried. The townspeople are always able to put them out. Sometimes Father has had to leave work to help put out a fire in the forest. He says that they start because people are burning the trees down to clear land for farming and the railroad companies are getting rid of trees to make room for train tracks. It has been so dry that the fires spread easily, but I am not worried. Father and the other men in town know how to put them out.

Thank you for your last letter. I was so excited when Mother said I had received mail. I hope to hear from you again soon. Send my love to everyone.

Love,
Claudia

September 27, 1871

Dear Alexis,

Never before have I had such an alarming and exciting Sunday as last Sunday! I told you before that there have been frequent fires in the forest around us. Well, Saturday evening Father was called upon to protect the town from fire. There was a fire so big and so high in the trees of the forest that sparks were blowing across the Peshtigo River and into town. The sparks would catch the sawdust streets on fire, and Father and the other men of the town would have to put it out.

Father did not come home until very early on Sunday morning. Mother and Father thought I was asleep, but I was not, and I could hear Father telling Mother all about it. He said that he could see the tops of all of the trees on fire across the river. A lot of the old pine trees were falling over and the air would be filled with sparks and cinders. To make things worse, he said that the birds of the forest were flying around in a frenzy and making an awful noise.

We went to church on Sunday as usual. The fires had died down. Father was quite tired, but he came with us anyway. In the middle of the church service, the steam whistle from Father's factory blew. Mother grabbed my hand and we all ran

out of the building to see what was going on. Everyone had come out of their churches to see what was happening. The sawdust had caught fire again near the factory, but by the time we got there it had already been put out.

The air was filled with smoke. Poor little Elizabeth was coughing the whole time. All of the men were fighting the fire and moving things from buildings that they thought might burn. Father told us to go back home. He whispered something to Mother and then ran off to help the other men. The whole night was smoky. Mother prayed and kept looking out the windows.

On Monday the wind changed direction and finally blew the smoke away. Father came home and went right to bed. He slept until supper! He said that we were very lucky that things had not been worse. Today all the men are back at work and things are going on as usual. I hope that never happens again! Do not worry about us. Everything has calmed down. I miss you.

Love,
Claudia

November 2, 1871

Dear Alexis,

I know it has been some time since I have written. I apologize, but given all that has happened I am sure you understand. I know you must be so worried about us. I am happy to report that Father, Mother, Elizabeth and I are all alive and well. It must have been some sort of miracle that we all survived.

I am sure you have seen in the newspapers in Appleton that on the evening of October 8, Peshtigo burned to the ground. It was so awful, Alexis, I will try and explain it to you but I know I will not do it justice.

Sunday, October 8, was a cold and smoky day in Peshtigo, quite similar to most days this fall. In the evening it started to get warmer. This was odd, but we were all happy to not have to have so many layers on. Father came running into the house and said that we all had to leave immediately. Mother and I did not understand, but his voice was so full of fear that we just did as he said. Mother took Elizabeth in her arms and took my hand and we left the house.

As soon as we were outside, we knew why Father was so scared. The sky had turned orange, and

there was fire everywhere. Father said we had to get to the river. The fire was approaching with a loud roar. It sounded like a freight train. The winds were so strong that I could hardly run. It was like a tornado of fire. The wind knocked me down, and Father had to pick me up and carry me to the river.

The smoke was so thick I could hardly breathe. People everywhere were running and screaming. Horses were running loose and trampling people. I could tell Father wanted to help people, but there was no time. We made it to the river and went in until I could hardly stand. The air was so hot and there were so many sparks flying that we had to keep dunking our heads under water to keep from catching fire ourselves. Mother would hold Elizabeth's nose and dunk her under water.

We were in the water for five hours, but it seemed like even longer. It was so cold and smoky. We could hear people crying and screaming over the roar of the firestorm.

Finally we were able to get out of the water. The ground was still hot and there were some flames left burning. We stood next to them to warm up. There were burned bodies everywhere. I took Elizabeth from Mother and tried to comfort her so that I would not have to look at them. The next

few days I can hardly remember. I was in such a daze and in so much pain from breathing all of that smoke.

We are now in Green Bay, staying with a family that offered to take in survivors of the fire. We are so lucky to have made it out of Peshtigo alive. There are hundreds that did not, including my friend Katherine. I remember seeing her father after we got out of the water. Katherine and her mother and little sister had all died in the flames. I miss her, and so many other people. I do not know why bad things like this have to happen. I am so thankful, though, that my family is okay.

Father says we might be coming to stay with you soon. I will tell you more then. It upsets me to even write about it, but I wanted you to know that we are okay.

Love,
Claudia

Lesson 7 – Politics and Forestry Beginnings In Wisconsin

Nutshell

There were forward thinkers in Wisconsin who recognized the need to protect forests in the mid-1800's and early 1900's. It wasn't until the early 1920's however, that forestry became firmly established in the state. Students will learn about two of Wisconsin's early forest protection advocates, debate the pros and cons of forestry in the 1920's, and learn about both sides of the fire suppression debate by reading about these topics aloud in class and playing a forest history "Jeopardy!" game.

Concepts

- When a natural resource is not properly managed, negative effects can be felt by society and individuals
- A few conservation-minded individuals in Wisconsin realized the potential problems of over-harvesting forests long before the general public.
- Conflicts arise when at least two parties have differing opinions associated with an issue.
- Wisconsin has been active in conserving and maintaining its forest resources by enacting laws, establishing state agencies, and creating state forests.

Objectives

After completing this lesson, student will be able to:

- Name two major pioneers in Wisconsin's forestry history.
- Identify the pros and cons of managing a natural resource such as forests.
- Explain why fire was such a big problem in Wisconsin in the early 1900's.
- Identify the pros and cons of natural fires.

State Standards

ELA	SS
A.4.1	B.4.6
C.4.3	B.4.7
D.4.1	C.4.4
	E.4.8

Total Estimated Time

1 hour and 5 minutes

Vocabulary

Con – a negative argument against something
Crop – a plant that is grown and harvested
Legal – allowable by law
Politics – the art or science of government
Preserve – an area set aside for the protection of a natural resource
Pro – a positive argument in favor of something
Slash - leftover parts of trees that have been cut down
Unconstitutional – something that goes against the constitution
Warden – an official in charge of enforcing certain laws

Materials

Picture of forest (Insert 7.1)
Picture of Cutover (Insert 7.2)
Copies of Insert 7.3 for all students
Copies of Insert 7.4 for all students

Teacher Preparation

Make copies of Inserts 7.3 and 7.4 for your students.

Background Information

Conservation was not a popular idea on Wisconsin's northern frontier. Early settlers recognized the monetary values of our forest for jobs, lumber, agricultural land, and as part of the tax base. Forestry was an idea that they thought threatened all of these things.

There were some forward-thinking people who did try to make changes. They are often described as being ahead of their time. One of these people was Increase Lapham (pronounced La-fum). He wrote a report back in 1867 entitled The Disastrous Effects of the Destruction of Forest Trees now Going on So Rapidly in the State of Wisconsin as part of the Special Commission on Forestry. The commission reported that warmer summers, cooler winters, flooding, soil erosion, and lower water levels would be the result of the rapid deforestation of the times. Despite these warnings, the destruction of Wisconsin's forests continued.

In 1903, the State Forestry Commission was established. It was replaced by the State Board of Forestry in 1905. A man by the name of Edward M. Griffeth became Wisconsin's first state forester. He established several forest reserves in the state and started the ball rolling for Wisconsin forestry.

There was much opposition to what Griffeth was doing. So much, in fact, that in 1913 a Special Legislative Committee on Forestry was appointed. In 1915 the committee ruled that forestry fell under "internal improvements" and was hence unconstitutional. It claimed that forestry was a national, and not a state, responsibility. Furthermore, forestry reserves that had already been established had to be returned to the State Commissioners of Public Lands.

In 1925, forestry was re-established in the state of Wisconsin. Griffeth's ideas would be accepted twenty to fifty years after he first proposed them. 1930 marked the year when fire protection got effectively underway in Wisconsin, sixty years after the horrible Peshtigo fire. It took a long time, but effective forestry practices were finally underway in Wisconsin.

Introduction

Share the two picture in Insert 7.1 and 7.2 with your students. (The picture in Insert 7.1 is of Wisconsin's forests before lumbering, and the picture in Insert 7.2 is of Wisconsin lands after clear cutting had occurred.)

Have your students look at the first picture and ask for their feedback. What do you think of when you see this picture? What are some words you would use to describe the picture? Now show your students the second picture. What do you think of when you see this picture? What are some words you might use to describe it? What do you think could be done to fix or repair this land? Who should be responsible for fixing or repairing it?

Explain that the first picture you showed was of Wisconsin before the lumbering era. Wisconsin had huge forests. The forests were so big that people thought they could cut down all of the trees they wanted and never run out. The second

picture you saw was of Wisconsin after the trees had all been cut down. It turns out that Wisconsin did run out of trees faster than most had thought possible. Would you be worried if your surroundings looked like the second picture?

Activity 7.1 – Forestry's Political Beginnings (25 min)

Have your students take turns reading each paragraph in Insert 7.3. Make sure you stop them along the way when questions should be discussed and ideas written up on the board.

Activity 7.2 – Pros and Cons of Fire (20 min)

Now have your students take turns reading each paragraph in Insert 7.4. Again, be sure and facilitate discussion where necessary.

Activity Conclusion

Review the pros and cons of fire with your students and make a list on the board. Evaluation suggestion #1 (found in Insert 7.5) can be used to wrap up this lesson.

Evaluation

- Play Forest History Jeopardy with your class (Insert 7.5).
- Use the discussion from Inserts 7.3 and 7.4 to evaluate your students' understanding.

Extension

- Have your students create posters that give the pros and cons of fire. They can focus on one of each, or list them all, but each poster should have at least one pro and one con.
- Invite a forester or local fire warden to come speak to your class.
- Learn more about Smoky Bear. Share some of his posters. Learn more about the history of this national symbol.
- Have a debate! Divide students into two teams. One team should agree with Increase Lapham's views, and the other should disagree. The same could be done with Edward Griffith's views.

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Insert 7.1

Provided courtesy of the Chippewa Valley Museum, Eau Claire, Wisconsin.

Insert 7.2

The State Historical Society of Wisconsin #WHi(W63)2976 (Image has been cropped)

Insert 7.3

In the mid-1800's, there were some people who were concerned about what was happening to Wisconsin's forests. One of these people was Increase Lapham.

Increase Lapham wrote a report titled "The Disastrous Effects of the Destruction of Forest Trees Now Going on So Rapidly in the State of Wisconsin" in 1867. Increase told the people of Wisconsin about the importance of their forests. He believed that if people destroyed the forests they would lose all of their comforts like houses, furniture, heat, and food.

He came up with several ideas for saving the forests. What do you think some of his ideas could have or should have been? What would you have done back then to save the forests? Let's come up with a list on the board.

Lapham's ideas were:

1. The government should help people replant trees by giving people trees. He even listed what kinds of trees should be planted, when, and where.
2. The government should take over some land and create state forests.
3. Laws should be passed that would control the cutting of timber.

Have you ever come up with a really good idea and nobody listened to you? That's what happened to Increase! Even after Increase shared his ideas about the trouble that would come and what should be done, the trees were still cut very quickly. Wildfires and unusable land became a huge problem.

In 1892, Wisconsin joined Nebraska in celebrating Arbor Day. Who knows what Arbor Day is? It is a holiday that celebrates trees and takes place the last Friday in April. Celebrating Arbor Day still did not help promote Lapham's ideas.

In 1903, the state of Wisconsin created the Forestry Commission. A man named Edward Griffeth became Wisconsin's first State Forester. He had learned about forests by studying what had happened to the forests in Germany many years before. He was worried that Wisconsin would destroy all of its forests.

Edward Griffeth hired fire wardens. The job of a fire warden is to prevent forest fires and enforce fire safety laws. He also created maps of Wisconsin's forested land. Finally, he set aside land is Wisconsin as state forest preserves. A forest preserve is an area of forest that is set aside to be protected.

Many people agreed with Griffith and the state government that Wisconsin's forests should be replanted and taken care of. They thought it was okay to set aside forest preserves and limit logging in some areas.

Other people disagreed with Griffith and the state government. They thought that trees take too long to grow and that planting other crops that grow quicker would be better for everyone. They thought that the public should be able to use the forest and land however they wanted, and were worried that the government would take away fishing and hunting on state forest land.

What do you think? Should the government buy land and make it into a state forest? Is it okay for the government to pass laws that limit logging and how forests are used? What if these things help protect the forest for other people? Let's talk about this and make a list of the pros and cons of establishing state forests.

Enough people were against what the government was doing that in 1915 forestry was actually outlawed in Wisconsin! The state Supreme Court said that it was unconstitutional!

Luckily, by 1924, it was realized that if forests were to be protected for future use, forestry needed to be made legal again. Wisconsin's state forestry program was re-established in 1924.

Insert 7.4

Who has heard the phrase, “Only YOU can prevent forest wildfires!”? Who uses that motto? Smokey Bear! What do you know about Smokey Bear?

What have we learned so far about forest fires in Wisconsin? Let’s make a list on the board of what we have learned.

Most of us probably remember the horrible effects of fire such as those of the Peshtigo Fire. We need to remember how Native Americans used fire to promote plant growth and flush game from the forests. Can fire ever be a good thing?

Forest fires were a huge problem in Wisconsin. After the loggers had cut down all of the trees in areas, left behind was what was known as slash. Slash is tree scraps and leftovers.

During dry, warm years this slash caught fire very easily. Some of these fires were started by lightning, but many of them began when fires started by people for clearing land for farms or railroads went out of control.

Even after the horrible Peshtigo Fire, not much was done by the people of Wisconsin to make sure it wouldn’t happen again. Fires were common throughout the early 1900’s. It wasn’t until the 1930’s that Wisconsin’s state government made a big effort to control forest fires.

Before 1930, people estimate that 500,000 acres of forest burned every year in Wisconsin. After 1930, this number went down to 10,000 acres per year! This was done by hiring more fire wardens, making more fire safety laws, building fire lookout towers, and using airplanes to help look for forest fires.

If fires can cause damage and harm, how can they be a good thing? Think back to how the early Native Americans in Wisconsin used fire. It helped new and healthy plants grow, right?

In fact, some plants need fire to grow. Trees like the jack pine found in Wisconsin have seeds inside cones that cannot be released until heated to very high temperatures. Also, fire can help protect forests from disease.

Insert 7.5

Draw a Jeopardy board up on the chalkboard. Each category will have questions worth 100, 200, 300, and 400 points. The categories should be as follows: A Forward Thinker; Wisconsin's First State Forester; Fire; and Other Things We Learned. Break your students up into three equal groups.

A Forward Thinker
100 – What was a major problem for forests in the late 1800's?
200 – What was the man's name who wrote, "The Disastrous Effects of the Destruction of Forest Trees Now Going On So Rapidly In the State of Wisconsin?"
300 – What was one of Lapham's ideas?
400 – What year did Lapham write his paper?

Wisconsin's First State Forester
100 – Who was Wisconsin's first state forester?
200 – What is a forest preserve?
300 – What does a fire warden do?
400 – Where did Wisconsin's first state forester first study forestry?

Fire
100 – Who is the national forest fire safety mascot?
200 – Give an example of a natural fire.
300 – Give an example of an unnatural fire.
400 – Give a reason that fire can be good.

Other Things We Learned
100 – What is the holiday that celebrates trees?
200 – Why did some people think that Wisconsin's forests should not be replanted?
300 – What are trees scraps and leftovers called?
400 – Why wasn't forestry practiced in Wisconsin from 1915-1924?

Lesson 8 – Rebuilding Our Forests

In a Nutshell

Planting new trees after the forests of Wisconsin had all been cut down was not an easy task. It took a lot of work and a lot of thought. In this lesson, students will create their own "slide show" to help them understand who was involved in the replanting of Wisconsin's forests.

Concepts

- Counties acquired much of the tax delinquent lands and began establishing county forests.
- The Civilian Conservation Corps provided a major work force for replanting trees in Wisconsin.
- Trees For Tomorrow helped educate landowners in forest management.

Objectives

After completing this lesson, students will be able to:

- Explain how county forests helped the reforestation effort.
- Identify three major projects of the Civilian Conservation Corps in Wisconsin.
- Explain why wood products were especially important when Trees For Tomorrow was established and what Trees For Tomorrow did to improve forests.

State Standards

ELA	SS
C.4.1	A.4.4
C.4.2	A.4.8
C.4.3	B.4.2
D.4.1	B.4.4

Total Estimated Time

1 hour

Vocabulary

Crops – plants that are grown and harvested for food
Cutover– what northern Wisconsin was referred to as after all of the trees had been cut
Great Depression – a time period in the United States, in the late 1920's and early 1930's, when many people lost a lot of money
Tax delinquent – overdue in paying one's taxes

Materials

Paper
Drawing materials

Teacher Preparation

Read through the lesson and slide show narrative (Insert 8.1)

Background Information

The late 1920's was a time of financial depression throughout the country, especially in the cutover regions of northern Wisconsin. It was evident that crops were not going to grow as well as they did in the southern part of the state. People started realizing that northern Wisconsin was more fit for trees than for food crops.

In 1927 the Forest Crop Law was established. Under this new law, the land would be taxed annually, but timber would only be taxed when it was cut and the income realized. Before this law, timber growing on land was taxed for its

full worth every year. It is clearly not profitable to raise timber when the growth of previous seasons is taxed year after year. The law was meant to encourage people to practice private forestry.

The next step to promote forests came in 1928 and was led by the county of Marinette. At this time, 400,000 of Marinette's 905,000 acres were tax delinquent. People couldn't pay the taxes on their land and just abandoned it. Charles Drewry, an extension agent and crop expert, suggested that pine should be replanted in the area. Tax delinquent land became county forests under public ownership. Land on streams and lakes was set aside for recreation. The Civilian Conservation Corps helped in the endeavor, and other counties soon followed.

The Civilian Conservation Corps was established in 1933 by president Franklin Roosevelt. It was in response to both conservation needs and unemployment due to the Great Depression. People from cities were sent to work in forests all over the country. In Wisconsin, 483 bridges were built, 4,040 miles of telephone wire were laid, 4,390 miles of truck trails and minor roads were built, 265,631,000 trees were planted, 269,447 man-days were spent fighting forest fires, and 517,792,648 fish were stocked! The CCC was a major success and lasted until 1942.

Workers also built campgrounds and lookout towers, surveyed and developed forest cover maps, worked on timber stand improvement and soil erosion control projects, and were called upon in crisis situations such as floods, storms, and disease and insect infestations.

One of the most remarkable forestry programs in Wisconsin is still active today. It is Trees For Tomorrow, and was established in 1944. It was headed up by Melvin N. (Mully) Taylor and nine paper mills in the Wisconsin River Valley. The idea behind Trees For Tomorrow was that if shown how, small woodland owners could be convinced of economic stability through improved forest management.

The original objectives of the program were to provide "1) a local, self-sustaining wood supply for industry by encouraging small forest landowners to plant trees and practice management techniques; 2) year-round employment from the woods to the mills; 3) stabilization of the tax base; 4) better watershed protection, and; 5) enhancement of the resource for an expanding but sometimes precarious tourist business."

During WWII, Trees For Tomorrow offered two free tree seedlings for every tree cut for the war effort. By the 1970's, the replanting of Wisconsin's trees was nearly complete, and Trees For Tomorrow began to focus on natural resources education. This is still their focus today.

Introduction

You have been learning a lot of information about the cutover lands of northern Wisconsin. Well, eventually something had to be done to improve its condition, right?! Something was definitely done. Each of you, with a partner, are going to get a piece of paper that describes a little bit of what was

done. It will be your job to draw a picture that shows your part. In the end, we will read each part in order and show the picture that goes with it. We'll have our own special slide show of the replanting of Wisconsin's forests.

Activity 8.1 – How Wisconsin's Forests Were Rebuilt (40 min)

Insert 8.1 contains the bits of information that you should hand out to each pair of students. Remind them that each one might not make perfect sense since they don't yet know where it fits into the story. You might also need to help them think of things that they could draw for their "slide."

Conclusion

When they have finished, each group should come up with their picture and read the information for their slide. The slides and the information that goes with them can be hung up in the classroom.

Evaluation

- Evaluate students on their slide show presentation.

Extension

- Have students research what the Civilian Conservation Corps did in your area.
- Have students pretend you were working for the CCC. Write a letter home and tell about what you have been doing.
- Have students find out where Trees For Tomorrow is. How could they get there from where they live? Use the maps found in Lesson 6.
- Have a county forester talk to your class about forest management.

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Insert 1

1. At the turn of the century, 1900, most of Wisconsin's forestland was cutover. The logging companies had cut down the best trees, leaving piles of slash, or tree leftovers, behind.

2. Much of the land was destroyed by fires. Farmers tried to change the land from forests to farms, but not all of Wisconsin was good farm land. Poor soils, short growing seasons, and rocky ground make the northern area a difficult place to farm.

3. After the farms failed, families moved away to try their luck in better areas or just gave up. Nobody wanted the land, and so nobody was paying taxes on it. The land was said to be "tax delinquent." This tax delinquent land that was not fit for farming became the property of the counties.

4. Let's look at Marinette County as an example of what could be done to make the land healthy again. Their idea was to plant new forests! Many people did not agree with this, but the county board stuck by their decision.

5. By replanting pine trees in Marinette County, land that was not fit for growing food could once again grow a crop…trees! In 1933, the first county forest was set up. Many other counties soon decided to do the same thing.

6. These new county forests began bringing in money. Marinette County was able to build a courthouse, a hospital, and many public parks with that money. It once again had beautiful forests. In fact, 75% of the county is now covered in forests. These forests bring in thousands of visitors every year. But who planted all of these trees?

7. 1929 was the beginning of the Great Depression in the United States. Many people lost all of their savings and it was very hard to find a job. During the Great Depression, a man named Franklin Roosevelt became president of the United States. He had an idea of how to help people without jobs, and at the same time help the environment.

8. In 1933, President Roosevelt began the Civilian Conservation Corps, or the CCC. It was made up of a group of men who had lost their jobs. Their new job in the CCC was to help take care of natural resources, like forests, in the United States.

9. The CCC was active from 1933 to 1942. During this time, 75 camps were started in Wisconsin and over 75,000 men worked there. Their main jobs were:
    - Protecting the forests from fire, disease, and insects.
    - Improving the forest by planting trees, taking care of them, and making maps of the forest.
    - Building campgrounds and parks for people to use.
    - Improving where animals live by planting, doing forest research, and improving streams.

10. In the early 1940's, WWII was going on, and wood and paper were needed, but most of the foresters were now soldiers in the army. So, farmers, old men, and even kids were urged to go out and cut trees.

11. In 1944, nine paper mills led by a man named Mully Taylor got together and organized Trees For Tomorrow. Their goal was to work with people who owned land and show them how they could make money by planting and taking care of forests on their land. Trees For Tomorrow was another group that played a very important role in replanting Wisconsin's forests.

12. In the early years, Trees For Tomorrow held workshops for landowners. They started the "2 for 1" plan. Under this plan, two seedlings were given to people for every one tree they cut down. Trees For Tomorrow taught people how to plant trees, had summer camps for teachers, and summer camps for high school students. Even after the war was over, Trees For Tomorrow helped plant trees in Wisconsin.

13. By the 1970's, reforestation had been a success. Wisconsin was again covered with forests! Trees For Tomorrow began to focus on teaching kids. Today they are still teaching students like us all over the state!

Lesson 9 – Forest Products and Technology

In a Nutshell

Wood and other forest products continue to be heavily used in our everyday lives. The Forest Products Laboratory (part of the US Forest Service), located in Madison, Wisconsin, researches these products in order to discover how we can best use them. Students will learn about the work done at the Forest Products Laboratory by acting as wood scientists.

Concepts

- Technology has aided in wise use of forest resources.
- Research into forest products and their use is ongoing.
- Much wood research takes place here in Wisconsin at the Forest Products Laboratory.

Objectives

At the end of this lesson, students will be able to:

- Conduct their own experiments.
- Explain what is done at the Forest Products Laboratory.
- Describe one scientific advance the Forest Products Laboratory is responsible for in wood use.

State Standards

ELA	S	SS	EE
C.4.1	C.4.2	A.4.4	A.4.1
C.4.2	G.4.1	A.4.9	B.4.10
C.4.3		B.4.8	
D.4.1			
F.4.1			

Total Estimated Time

1 hour and 40 minutes

Vocabulary

Cellulose – a part of the cell walls of plants
Collapse – to fall down suddenly
Colleague – a fellow worker
Conserve – to keep safe and sound
Fiberboard – a wood product made up of strips of wood fiber all with their grains going in the same direction
Fungi – a group of lower plants such as mushrooms, mold, and some bacteria
Grain – the arrangement of fibers in wood
Laboratory – a place where experiments are done
Oriented strandboard – a wood product made up of layers of very small fibers; the grain or each layer is opposite that of the layers surrounding it
Particleboard – a wood product made up of very small pieces of wood; it can even be made from sawdust
Plywood – a wood product made up of several sheets of wood with the grain of each layer going in the opposite direction of the layers on either side of it
Preservative – something that keeps things from breaking down or decomposing
Railroad tie – a wooden support to which railroad rails are attached
Slash - leftover parts of trees that have been cut down

Materials

Wrapped ream of paper
8.5x11 paper
Scissors
Tool box with: plastic bags, plastic wrap, duct tape, sponge, paper clips, scissors, glue, thumbtacks

Fake railroad ties
Glue
Wax paper
Lab coats
Water tubs

Teacher Preparation

Put tool boxes together and fill tubs with water for each group. Prepare paper examples (explained in lesson)of plywood, fiberboard, particleboard, and oriented strandboard.

Background Information

Wisconsin's forests and the products that come from them have been important as long as people have been living in the state. After most of the Northwoods had been cutover, people began taking steps to conserve and protect what forests were left and replant new forests. In addition to these efforts, in 1910 the Forest Products Laboratory was established in Madison, Wisconsin by the United States Forest Service. The Forest Products Lab conducts scientific research on wood, wood products, and how to attain better use of both.

Much of the early research that took place at the Forest Products Lab had to do with wood drying and the physical properties of wood. As time went on, much work was done to conserve our wood resources. A great example of this kind of work accomplished by the Forest Products Lab has to do with railroad ties.

Before 1880, it is estimated that 410 ties per mile of track had to be replaced every year. This meant that each tie lasted an average of 7 years. By 1910, the year the Forest Products Lab was opened, 239 ties were replaced per mile of track every year. This meant that the average life of a tie had gone up to 11 years. By 1990, only 61 ties per mile per year were replaced. The lifespan of a tie was 20 to 40 years. Less wood was needed as time went on due to the development of wood preservative treatments, such as creosote. These have been improved through research throughout the 20th century. In fact, now we are facing quite an opposite problem with railroad ties. When they finally do need to be discarded, they won't break down due to their preservative coating. In the year 2000, scientists at the Forest Products Lab were studying preservative-tolerant wood decay fungi that would biodegrade treated wood waste.

The list of other such conservation-minded products and research at the Forest Products Lab is lengthy. Production of plywood, fiberboard, and particleboard have made it possible to use less wood, lower quality wood, and wood scraps. Through a process called oriented strandboard (OSB) manufacturing, smaller diameter trees can now be harvested for wood than was previously possible. This allows the surplus from forests that need thinning to be used. Thanks to research, wood that used to go to waste is now usable.

Research has also been conducted by Forest Product Lab researchers on paper recycling, use of alternative tree species, better wood strength assessment resulting in less wood necessary for building, fuel production, better and safer wood glues, and saw improvements that have resulted in less wood waste. The list goes on and on.

The Forest Products Laboratory has six different areas of emphasis. These are: conservation of resources;

environmental research; sustaining ecosystems; social and economic vitality; foundation research; and public service. Researchers at the Forest Products Lab continue to learn more and more about our precious resource.

Introduction

Ask your students to ponder the following problem. Let's say that they are responsible for building a wooden bridge that people will use to cross 50 feet above a river below. They are not sure how much wood is needed to support the bridge and the people using it. Would they chance it and use less wood than they think is necessary, or use enough wood so that even eighteen-wheelers could cross the bridge? Have your students discuss this with a partner. Then have pairs of students express their opinions to the class.

Activity 9.1 – Changing Ties (45 min)

Of course you would use more wood than you thought necessary to make sure the bridge wouldn't collapse. It makes more sense to waste some wood than to endanger people's lives. Wouldn't it be nice, though, to know exactly how much of a load different kinds of wood can handle? This way, no wood would be wasted, and no lives would be in danger. That kind of wood research is exactly what is done at the Forest Products Laboratory in Madison, Wisconsin.

The Forest Products Laboratory was established in 1910 by the United States Forest Service. The national government thought that research of forest products would help forestry by conserving wood. Ask your students to brainstorm ways that studying wood and wood products could aid in conservation. If they are having trouble, remind them of the bridge-building example. How would knowing the strength of wood aid in conservation? You might also want to ask other leading questions. Was wood ever wasted in the forestry practices of the early 1900's? Do you think research could have helped in that area? How?

Let your students know that they are going to learn about the research done at the Forest Products Lab by becoming wood researchers! Divide your students into groups of about 4. If you have science lab coats that they can wear for their experiments, that would be great. Each group should have their own lab station with a "toolbox" and a tub of water.

Ask your class if anybody knows what a railroad tie is. Railroad ties are the individual pieces of wood laid down next to each other on which the railroad tracks are built. You are all scientists at the Forest Products Lab in the year 1911. Were railroads important in getting around in 1911? You bet! You and your colleagues have discovered that these wooden railroad ties don't last too long. After only about 7 years they need to be replaced. This means that every year, about 410 ties per one mile of track need to be replaced. The main problem seems to be water. After these ties are exposed to rain and snow, they begin to break down.

You and the other scientists in your group need to figure out a way to prevent your railroad tie (hand out "railroad ties") from getting wet. You must use the resources in your scientist's

toolbox to accomplish this task. The railroad tie must be able to be submerged in the tub of water without getting wet. Give your students about 15 minutes to create their solution and allow five minutes for all of the groups to share their findings.

After all of the groups have presented their results, tell the class that they were very successful. In fact, thanks to their work and other scientists like them, by 1990 each railroad tie would last from 20 to 40 years instead of just 7. This meant that only 61 ties had to be replaced per mile of track per year. Great job!

Uh oh, but by the year 2000 some problems were found with your great discoveries. You see, even though the railroad ties last for a long time, they don't last forever. When they finally do get replaced, what do you think happens to the old railroad ties? They get thrown away. What do we want to happen to wood when it is thrown away? We want it to break down. Well, it seems that whatever keeps the water away from your railroad tie keeps it from breaking down. Now your challenge is to find a way water can get in contact with your altered railroad ties. Again, give the groups time to come up with a solution and then have them present them to the class.

The example that we just worked with actually happened to Forest Product Lab scientists. Before 1880, ties would only last for about 7 years. Research done at the Forest Products Lab as well as other research facilities led to the use of preservatives on wood that keep water from soaking into it. Do any of you have a wooden deck or porch? These items are often treated with preservatives so that water will not damage them. This research has been so useful that by 1990, railroad ties were lasting 20 to 40 years. This, as you can imagine, saved a lot of wood since a real railroad tie is about twice your height.

Unfortunately, recent findings have shown that the treated wood will not break down once thrown away. Researchers at the Forest Products Laboratory have been working on finding fungi that are not harmed by the treated wood and can help break it down.

Activity 9.2 – That's Made From Trees?! (15 min)

Tell your students that you are going to name some products. Have them raise their hands if they think that the product comes from trees. You could also have all of the products on hand and have your students group them.

<u>Products</u>

Pencils	Make-up
Mouthwash	Toilet paper
Car tires	Pencil erasers
Candy wrappers	Buttons
Life jacket stuffing	Matches
Ice cream	Ping-pong balls
Baseballs	Toothbrushes
Soap	Medicines
Maple syrup	Salad dressing
Chewing gum	Camera film
Lemons	Rayon shirt

Explain to your students that all of the items you just named (or showed them) come from trees! Are they surprised? Usually when we think of forest products, we think of things that we can tell are made of wood, like pencils or furniture. There are a lot of parts of

trees that can be used to make things we might not have associated with the forest.

Most paper products, including toilet paper and candy wrappers, are made from trees. Bark is used in baseballs and some medicines. Cellulose, which is a part of plant cells, is used to make plastic-like products such as buttons, ping-pong balls, and cloth. Cellulose also helps make liquids thicker, which is why it is used in ice cream. Sap from trees is used in products like chewing gum and make-up. Many fruits and spices come from trees. Finally, combinations of various tree parts can be used to make products like stuffing for life jackets. The more research that is done, the more uses for trees are discovered. Where would we be without trees?

Have your students take an inventory of the items in their desk. How many of them came from trees? Does that surprise them?

Activity 9.3 – This Piece of Wood Is Not Like the Other (20 min)

Think back to how the lumberjacks of the early 1900's cut down trees. Have your students tell you about what they learned back in lesson 3. Ask questions to jog their memory. Were all kinds of trees cut down? All sizes? Was the whole tree used? Who cut off the tree limbs?

Now ask your students if they can see where trees or parts of trees were wasted in this process. Again, it may help if you ask some leading questions. What about the stumps left behind? What about the limbs that were cut off? What about small trees and different tree species? Who remembers what slash is? Make a list on the board of their ideas.

Another thing that the Forest Product Lab in Madison Wisconsin has done is researched how wood that used to be wasted can be used. It used to be that only large chunks of wood could be used. Explain to your students that you are going to use a wrapped ream of paper to represent a large chunk of wood.

In the more than ninety years that the Forest Products Lab has been around, several alternatives to using large, solid pieces of wood have been found. The first of these is plywood. Plywood is made up of several thin sheets of wood. Each layer of wood has its grain going the opposite way of the one before it. Show your students what this means by using several 8.5x11 sheets of paper on which you have drawn line lengthwise. Stack the pieces of paper on top of each other so that the lines on one piece of paper are perpendicular to the ones on the next piece. Put glue between the pieces and explain to your students that glue and pressure are used to put the separate pieces of wood together. Show your students a stack of five pieces of paper that you put together in advance to represent plywood.

Another kind of wood product is called fiberboard. Fiberboard is made of strips of wood fiber. To show your students what fiberboard is like, cut up pieces of paper into lengthwise strips. Then glue these strips together so that they are parallel but overlapping.

Particleboard is made up of even smaller pieces of wood. In fact, it can be made from sawdust! To demonstrate how fiberboard is made, rip a few pieces of paper into very small pieces. Next, mix these pieces with glue and flatten them out to form a flat sheet.

The most recently developed technique is the production of oriented strandboard, or OSB. OSB is made up of wood fibers, too, but like plywood, layers of fibers are placed with their grain in opposite directions. To show your students what you mean, lay out strips of paper next to each other so that their edges are parallel. Then, glue a layer of strips on top of those so that the strips in the second layer are perpendicular to those of the first.

Ask your students if they can think of why plywood, fiberboard, particleboard, or OSB would be better than a large chunk of wood the same size. Which do they think is stronger? Would it be good to be able to use up smaller pieces of wood? Why?

Conclusion

As you can see, the Forest Products Laboratory has been doing and continues to do research on how to use wood products more wisely. Thanks to the researchers at the Forest Products Lab, many tree products can be recycled, many wood products last longer, and kinds and sizes of trees that were not used in the past can now be utilized.

Evaluation

- Evaluate your students on their ability to work in groups and think creatively during the experiments as well as in discussion.

Extension

- Bring in examples of the different kinds of board and have your students choose which is which.
- Have your students come up with new wood conservation ideas.
- Have your students research how fungi helps break things down.
- Visit a sawmill.

Resources

Forest Products Laboratory Website
http://www.fpl.fs.fed.us

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Lesson 10 – Managing For the Future

In a Nutshell

Ideas we have today about managing our forests for the future are very different than those of the past. Students will take part in a sustainability model, do a multiple-use management role-play, and learn about how they can make a difference in their own backyard.

Concepts

- Managing for sustainability can apply to forestry.
- Many forests today are managed for multiple use.
- Most Wisconsin citizens live in "urban forests."

Objectives

After completing this lesson, students will be able to:

- Define sustainable forestry and give a working example.
- Define what it means to manage for multiple use and list at least three uses.
- Explain what an "urban forest" is and why they are important.

State Standards

ELA	SS	EE
C.4.3	A.4.4	B.4.3
D.4.1	B.4.10	B.4.8
		C.4.2
		C.4.3
		C.4.4
		D.4.1
		D.4.2

Total Estimated Time

2 hours and 35 minutes

Vocabulary

Criteria – standards on which a decision is based
Insulation – a material that prevents the transfer of energy
Menominee – a Native American tribe native to Wisconsin
Multiple use – able to be used for many things
Pollutants – something that makes the air, water, etc. dirty
Renewable resource – a resource that can be replaced by a natural cycle
Runoff – the portion of rain, snow, etc. that reaches streams or other bodies of water
Sovereign – one that exercises authority in a certain area
Sustainable – able to be kept up at the same pace
Urban – in or close to a city
Urban forest – the trees within an urban area

Materials

M&M's or other small candies (be aware of chocolate allergies)
Bowl
Paper
Crayons, colored pencils
String and tape (if doing web activity)
Overhead of Menominee Reservation from space (Insert 10.1)
Task cards A, B, and C for your students (insert 10.3)
Overhead of Map A (Insert 10.4)

Teacher Preparation

Read over the background information and the activities. Prepare the bowl of candy for the sustainability simulation.

Make overheads of Map A, the Menominee Reservation from space, and the Menominee Tribal Enterprises logo. Make copies of Task Cards A and B for the whole class and at least five copies of Task Card C.

Background Information

Today, 16 million of Wisconsin's 35 million acres are forested. That's 46% of the state! It is important that these forests be well-managed if all land and life in the state is to benefit. Of this forested land, 57% of it is privately owned. (5% is state-owned, 10% is federal, 15% is owned by counties and municipalities, and the rest is tribal and industry-owned.) What does this mean? It means that it is not up to the government or county foresters to see that most of our forested land is taken care of. It is up to the individual citizens of Wisconsin who own it. What an individual does with his or her own land can have major effects on many other people.

When many people think of managing lands today, they think of sustainability. Sustainability means "meeting the needs of the present without compromising the ability of future generations to meet their own needs." This idea can apply to forestry as well as many other habitats and activities. Sustainable forestry is defined as "the practice of managing dynamic forest ecosystems to provide ecological, economic, social, and cultural benefits for present and future generations." There are several lumber producers that are seeking sustainable management certification. Organizations such as the Forest Stewardship Council, Sustainable Forestry Initiative, American Tree Farm, and International Standards Organization 1400 are some that have certification systems with which they assess companies.

The first official sustainable commercial operation in the country was the Menominee Reservation Forest in northeast Wisconsin. The reservation itself was established in 1854, at which time there were 1.3 billion board feet of lumber on the reservation. Today there are 1.7 billion board feet of even better quality lumber. It is part of the Menominee culture and tradition to be in balance with the natural world. This is the idea upon which Menominee Tribal Enterprises manages the forest. It is indeed a unique place. The reservation is actually visible on satellite images as a dark square surrounded by lighter areas which are farm fields of surrounding counties.

Multiple use is another buzzword in forestry today. What does it mean to manage for multiple use? Multiple use management means that a forest is not managed for one thing only, such as wood production, but for many different values and uses. These may include lumber, wildlife habitat, aesthetics, water quality, hunting, camping, etc. Sometimes one use may conflict with another, while others tend to go hand in hand.

Finally, it is important for people to realize that forests don't just refer to larges tracts or undisturbed land covered with trees. Eighty percent of Wisconsin residents live in what is known as the urban forest. An urban forest is the trees and other plants within and surrounding

towns, villages, or cities. Trees are very important in cities. They provide shade, trap carbon dioxide and other pollutants, reduce flooding, pollution, and sedimentation in lakes and rivers, cool cities on hot days through evaporation, and provide insulation during the winter. Research has even shown that the presence of trees reduces the level of violent behavior in residents of the urban forest. Even if you don't live in a big forest or even near a large forested area, you and your students are probably part of an urban forest ecosystem!

Introduction

Use the following simulation to explain the concept of sustainability to your students. It will definitely get their attention! Put twenty M&M's in a bowl and put it on a table in the front of the classroom. Call four students up to the front. Tell them that when you say go, they may take as many M&M's as they want, but they must pick up one at a time and put it in their hand that's not doing the grabbing before they get another one. Say go and time them for five seconds. At the end of five seconds say stop and count the number of M&M's left. For every two M&M's left, add one to the bowl. Repeat this with a new group. Each group only gets one five-second chance. Be sure to keep track on a piece of paper how many M&M's there are at the beginning of each round. Keep track on a piece of paper. When at least four groups have come up, put the numbers on the board.

Activity 10.1 – Managing For Sustainability (45 min)

Ask your students what they notice about the numbers of M&M's at the beginning of each round. There will most likely be fewer and fewer at the beginning of each round. Explain to your students that you counted the M&M's at the end of each five-second round. You put in one M&M for every two left, so if there were ten left you put in five. If there were eight left you put in how many? Four. So, if people kept taking at the rate that they were, how many M&M's do you think you would have at the end of ten rounds? Zero. Now, what if during the fist round when you started with twenty M&M's you didn't take any out of the bowl. How many M&M's would you have at the beginning of the next round? Thirty!

This activity shows what happened to the forests of Wisconsin. People came to Wisconsin and thought they could cut as many of the trees down as they wanted. They didn't think they would ever run out. What happened? They ran out. What could you have done up here when you were taking M&M's to keep from running out? Let your students brainstorm. They should figure out that if they just take some, the bowl of M&M's would continue to grow and will last for the class a lot longer. This is what it means to be sustainable. Ask if any of them have heard the word sustainable or sustainability before. Do any of them know what it means? Sustainable means "meeting the needs of the present without compromising the ability of future generations to meet their own needs." In other words, if we go back to our M&M example, the first group should not take so many M&M's that the next group can't get as many.

So, if the first group never took any M&M's, could you get unlimited candy? Again, let your students think about it. No, eventually we wouldn't have any more space left in the candy bowl. Plus,

is that any fun to get no M&M's? Of course not.

Now, let's think about how this could be compared to forests. Taking all of the M&M's all at once was like cutting all of the trees in Wisconsin at once in the late 1800's and early 1900's. What would have happened if no trees were cut down? Would we keep getting more and more? Give your students time to think about this. No. Why not? Well, first of all, at a certain point there would be no more space for trees. Second, don't people need wood? Definitely! We use wood to make a lot of the things we need. So, what would be the solution? Let your students brainstorm until they come up with the idea of taking only some of the trees at any one time.

If only some of the trees are taken, will more trees eventually grow back? Yes. A resource we use that can replenish itself is called a renewable resource. Trees are a renewable resource. This means that if they are harvested wisely, more will continue to grow.

Who remembers what the word sustainable means? Be sure your students understand what it means for something to be sustainable. What do you think sustainable development means with forests? Give your students time to brainstorm what this could mean. Sustainable forestry means taking care of a forested area so that it meets people's needs today but will still be able to meet them in the future. Have your students start thinking about some things that they use forests for. Write them down on the board. Choose one to focus on. For example, you could focus on wood products. Ask your students what it means for wood production to be sustainable. It means that people can use wood from the forests today, but not so much or so quickly that there will not be time for new trees to grow for future generations. What would sustainable forestry mean for camping and recreation? It would mean that people could enjoy camping in the forests today, but that they could not leave such an impact that future generations would not be able to camp there. If they littered and hiked off the trail and damaged plants, that forest would be ruined for future generations who wanted to camp there.

Let's go back to our M&M model. What kind of difference would there have been if, instead of four of you up here picking out M&M's, there were 100 of you? What would have happened? Would there have been enough for all of you to have eaten your fill? No, you'd need a bigger bowl. Let's apply that to the forest. Back in 1900, there were about 2 million people living in Wisconsin. By 1998 there were over 5 million! That's a big difference! We need wood for that many more people. Can we have bigger forests? How would we create bigger forests? Where would we get the extra land? Do you think there will be as much land available with so many more people needing places to live? How will our population size affect our forests?

Have your students look at an overhead of the Menominee Reservation from space (Insert 10.1). Ask them what they think that big dark patch is. Have them come up with some ideas and share them with the class. Explain to them that this patch is the forest on the Menominee

Reservation in Wisconsin. It is so different from all other forests that you can see it from outer space! In fact, satellites use the forest edges to focus their cameras since the edges are so distinct!

The Menominee Indian Tribe of Wisconsin is a federally recognized sovereign nation. This means that they make their own laws. The reservation where many Menominee live was established in 1854. A sawmill was established that very same year. What is so amazing about this forest is that over the first 140 years since the reservation was established, more that 2½ billion board feet of lumber have been harvested. That means that the standing timber has been cut twice over. Today, however, the amount of standing timber is greater than in 1854. How did that happen?

The Menominee provide an excellent example of sustainable forestry practices. Trees to be cut are carefully selected so that wood can be obtained but so that the rest of the forest will not be hurt. The logging practices are taken care of by Menominee Tribal Enterprises. It is a business branch of the Menominee tribe. Show your students the Menominee Tribal Enterprises logo (Insert 10.2). It represents a balance between the three things that you see. What do you see in these three pictures? The environment, the community, and the economy.

Have your students create a logo for a logging company of their own. Have them explain why they designed their specific logo. What does it stand for?

Menominee Tribal Enterprises has received certifications from various groups which declare them to have sustainable forest practices. It's like having a stamp of approval that their products came from a sustainably managed forest.

Activity 10.2 – Managing For Multiple Use (1 hour)

Take a look at all of the uses of the forest that you brainstormed in Activity 1. Are you missing any? Give your students some suggestions and add them to the list if necessary. Have your students pick one thing that they value the forest for (wood products, recreation, hiking, camping, photography, wildlife observation, etc.). Have them illustrate it on a piece of paper. The following discussion may be done in a number of ways. Students can pair up with each other, students can come up in front of the class, or you could make a web on the board with string connecting the pictures. The point is to have students determine which uses of the forest are compatible with one another and which are not. (If you use the web on the board idea, you might want to use green string between those that are compatible and red between those that are not.) Discuss why certain uses are not compatible with one another.

Forests serve many different functions, too. Some of them we don't even think about. Did you know that forests help keep our water clean? Plants and trees help hold soil in place. When many trees are cut at once, a lot of the soil can be washed into rivers and streams causing them to become polluted. Nutrients in the soil that get into the water systems can cause there to be less dissolved oxygen, something that is needed by fish. Finally, when forests are

cleared from river and stream banks, there is less shade and so water temperatures rise. This can be harmful to some kinds of fish.

No matter where you live in Wisconsin, there are forests somewhere near you. Tell your students that they are going to take part in a simulation game concerning land use. What is a simulation? A simulation is when you pretend to be in a certain situation. We will be acting out, or role-playing, that we are in charge of an area of forest near us.

Hand out Task Card A (Insert 10.3) and the map of the area (Insert 10.4) and have your students take turns reading it out loud. When they have finished, develop a list on the board of ways they could use the land. You may want to give them some ideas. Tell them to use their imagination. They can come up with anything. Don't stop until you have about 15 to 20 different choices on the board. Next, have the students classify the ideas on the board. Which of these uses are similar? Are some more closely related than others? How? Group similar uses and then have the students label all of the categories. Some possibilities include recreation, housing, commercial, industrial, etc.

Now, have groups of students draw out of a hat to see what category they will represent. Explain to your students that they will be role-playing. This means that they will be acting like another person that may have ideas and preferences different than their own. Just because you say during this exercise that you want to build a skyscraper on this land does not mean you really would want to do that in real life. You're just acting! Try to be convincing in your role.

Pass out Task Card B and give your students about 10 minutes to fill it out. Explain that Task Card B asks for ideas of what their group would do with the land. They should list these and then give the possible consequences associated with them. You may want to go through an example from each category together.

After about 10 minutes, pass out Task Card C. Tell the groups that they have 20 minutes to decide what their group wants to do with the land and develop a short presentation that they will give to the Board of County Supervisors. A visual display of what they want to do will be necessary.

When 10 minutes of planning time have passed, have each group select one of their members to be a County Board Supervisor. Take these selected students to their own corner of the room and talk to them about what their new role will be. They are responsible for listening to the presentations and deciding which one is best. Make sure they know that they are no longer supporting the group that they came from. They must decide which is the best decision based on what the teams present. Right now they must develop the criteria, or what they will look for, to evaluate the proposals. What are the kinds of things they should take into account. Discuss this with them for a moment to get them on the right track.

Remind the groups how much time they have left to prepare their visual displays

and presentations. At the agreed-upon time, have the County Board members sit at the front of the room. Remind everyone that his or her group will only have 3 minutes. Appoint a timekeeper. Have him/her give the presenters a one-minute-left warning. After the presentations, the board may ask questions to any of the groups. This should take about 5-10 minutes at most. When the board has enough information, they can go into a hall or a corner of the room and make their decision. While the board is meeting, develop a list of criteria the rest of the students think should be used to judge the proposals. Again, what are the kinds of things they should take into account. Discuss this with them for a moment to get them on the right track. When the board returns, have them list the criteria they used in making their decision, and then have them announce their decision.

Conduct a wrap-up discussion with your students. Why is land-use important? Why can it sometimes be an emotional topic? Why is land use such a complex issue? What did you find yourself considering during the presentations? Did any of your considerations conflict or did yours conflict with somebody else's? What did you think about the criteria used? What would you have used that was different? What else would you have wanted to know about the land before you made any of these decisions (water quality, wildlife present, etc.)? How could you become involved in land-use decisions?

Activity 10.3 – Managing Your Own Backyard (30 min)

When you hear the word "forest," what do you think of? Close your eyes and imagine a forest. Make a list of your students' ideas on the board.

Do you live in a forest? You might be surprised at the answer to that question. Eighty percent of Wisconsin's population lives in what is called the "urban forest." The word urban means in or close to a city.

When we think of forests, we usually think of many trees crowded together, wild animals, and not very many people. Explain that the trees around your school and around your home are part of the urban forest. This means that your school, your house, your pet, your teacher, your friends, and most importantly, YOU, are part of the urban forest ecosystem!

You just learned the many good things that forests do…prevent soil erosion, help keep fish healthy, provide shade, etc. Do you think trees could be helpful to people in a city? What about people in a neighborhood such as your own? Give your students a chance to brainstorm what good trees could do for their own community. You might want to have your students illustrate one thing they think of and then present them to the class. You could also come up with a class list of things your students would miss with no trees. Share the following list of tree benefits with your class. Perhaps you could divide them into groups and have each group illustrate one of these benefits:

1. Shade – Trees provide shade on hot summer days. They might provide a comfortable place for you to sit. They can also save you and your family money. Trees that shade houses can save you money in air conditioning bills.

2. Insulation – Just as trees can keep your house cooler in the summer, they can also keep it warmer in the winter. Trees provide insulation. They can save your family money in heating bills because they help to trap heat around your home.
3. Beauty – Many people simply like the looks of trees. They can add a lot of color to neighborhoods, especially in the fall.
4. Recreation – Do you use trees when you play? Lots of people like to spend time in nearby parks hiking among the trees, tree climbing, picnicking, camping, etc. Trees provide people a place to meet and do things, provide a sense of community, and muffle noise pollution.
5. Absorb Pollutants – Trees absorb carbon dioxide and other pollutants found in the air. One tree can absorb 26 pounds of carbon dioxide in a year!
6. Windbreaks – Trees create a windbreak during storms. They help shelter your house and can keep strong winds from causing damage.
7. Less Runoff – Trees can soften the blow from a downpour. They allow rain to soak gradually into the ground, and they help anchor the soil so that it doesn't get washed away. There are many benefits to this – reducing flooding, sedimentation in rivers and lakes (when the soil runs off into the water, polluting it), and the need to build bigger sewer systems. More soil moisture helps to recharge local aquifers, giving us more of the water we need.
8. Energy Efficient – Trees store sunlight in the form of energy rather than heat.
9. Cools Neighborhood – Trees bring up water through a process called transpiration and then the water evaporates from the leaves, cooling the area.
10. Behavior – Studies have shown that trees make people healthier. People living near trees are less likely to be violent. Also, patients who can see trees from their hospital room have been shown to recover faster than those with no trees visible.

Did you know that trees served so many purposes? They are pretty good to have around. So, what can you do? Well, for starters, you could plant a tree! Give all of your students the tree-planting guide from the Wisconsin DNR (Insert 10.5). Check out your local nursery to find out what grows well in your area, or contact your local DNR Forester.

Conclusion

Sustainable management, managing for multiple use, and managing urban forests are just a few of the trends and issues concerning today's forests. How are the problems and issues we deal with today different than forestry problems of the past? Are there things we're dealing with today that people didn't have to think about in the 1800's? It will soon be up to you to determine the future of Wisconsin's forests!

Extensions

- Have your students research current issues in forestry and share them with the class.
- Ask your students to look for another example of sustainable development or multiple use management.

- Conduct an urban forestry project right on your school grounds. Identify the trees that are there and learn about them. Maybe you could get permission to hang up informative signs about them. Educate others about how to take care of the urban forest.
- Do some journaling activities with your own urban forest. If you are lucky enough to have a school forest or forested land around your school, that would be a great place to do this. Nature journals are something your students can create and hang onto for a long time. You can make them out of recycled materials like paper with writing on only one side, paper grocery bags, etc.
- Map trees on their home block or on the block that their school is on.
- Learn how to identify the trees in a forest near you. Learn at least three interesting facts about each of the trees you identify.
- Learn the correct way to plant and care for a tree (Insert 10.5).

Evaluation

- The following questions can be used to guide an evaluative discussion with your students:
  What does sustainability mean?
  What is sustainable forestry?
  Name different uses and values of the forest. Which are compatible? Which are not? Why?
  How do the Menominee practice sustainable forestry?
  How do forests help us?
  What is an urban forest?
- Assess the students' logging company logos and the accompanying explanation.

Resources

- Forest Trees of Wisconsin: How to Know Them. Madison, Wisconsin: Department of Natural Resources, 1989. (Free from WI DNR)
- Growing Greener Cities: Environmental Education Guide. Washington DC: American Forests; 1992.
- Logging In: A Closer Look at Our School Grounds – Reproducible Student Activities. St. Paul: Minnesota Arbor Month Partnership; 1997.
- Sustainable Forestry: Commitment Future – A Teacher's Activity and Resource Guide for Grades 6-12. Madison, Wisconsin: Wisconsin Department of Natural Resources, 1996.
- Urban Forestry: Laboratory Exercises for Elementary, Middle, and High School Students
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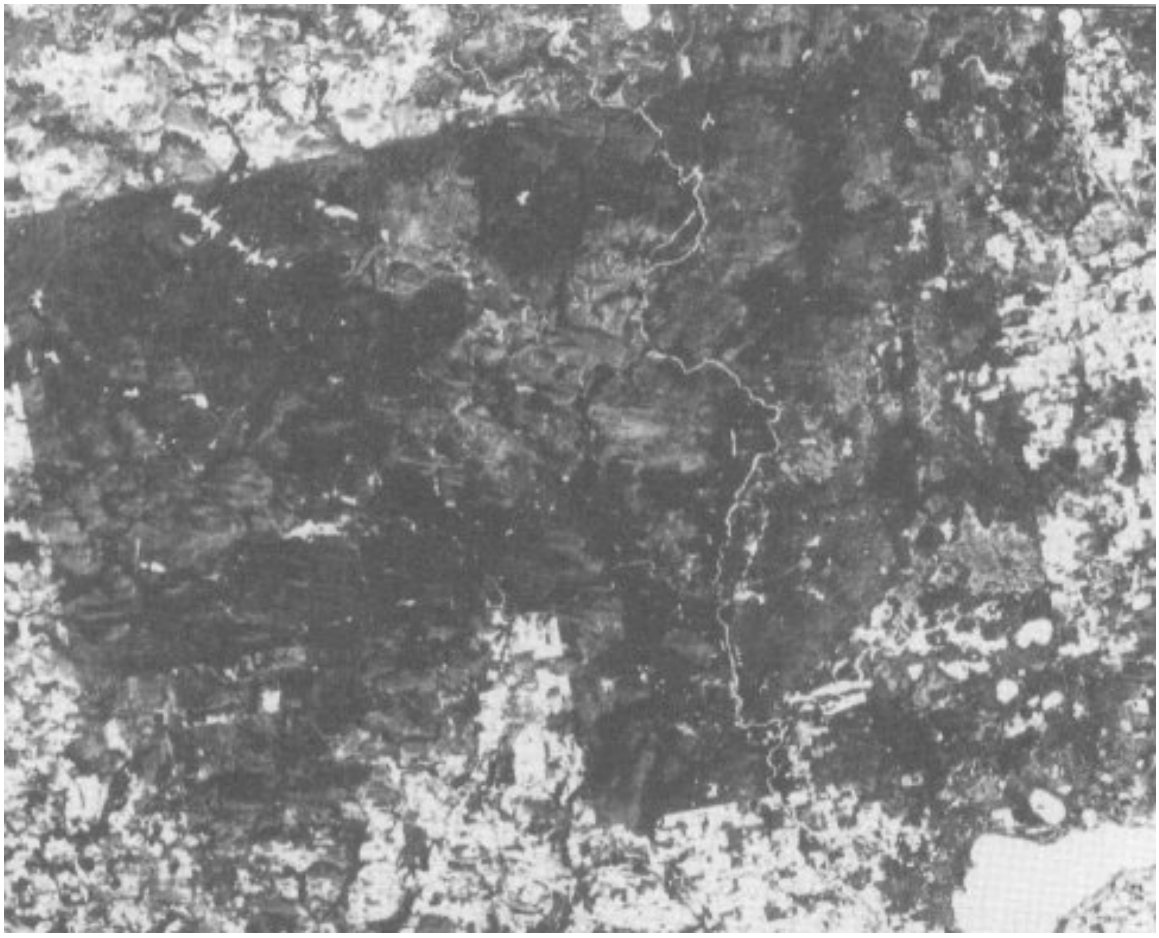
Insert 10.1



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Insert 10.2

Menominee Tribal Enterprises – The Menominee Forest Management Tradition: History, Principles and Practices; 1997

Insert 10.3

Task Card A

Congratulations! You are now the proud owners of a 800-acre piece of land just outside of your town! One acre is the size of 1.2 football fields; so try to imagine 960 football fields all bunched together. That's how much land you now own. That's a lot of land. Your land isn't grass or turf like a football field, though. It's a forest!

Take a look at the map that your teacher gave you. This is the land that you now own. As you can see, there is a river running through it. This river is about 12 feet deep at the deepest point. It's a fantastic habitat for fish and other aquatic critters. The river is surrounded by forested land. The forest is very diverse. That means that it has a lot of different kinds of trees and plants living there.

There is one road from your town that leads to your new area of land. It is a two-lane road with a speed limit of 40 miles per hour. Surrounding your land are a few houses. The land used to belong to the owners of one of the houses. They used it mainly for camping and hunting. They have not used it in awhile and there is not much evidence of their use.

Your town's Land Use Board is responsible for land zoning in your county. This means that, however you decide to use this land, it will have to be approved by the Land Use Board. Start thinking about what you could do with this 100-acres of land. Think of all the possibilities! Make a list with the rest of your class of all the things that could be done.

Task Card B

Your task is to examine each of the possible land uses in your category. On the chart below, it asks your group to list different ideas of what you could do with the land within your category. It then asks you to think about good things and bad things that might come out of that choice.

Category of Land Use: _____

Land Use	Good consequences	Bad Consequences

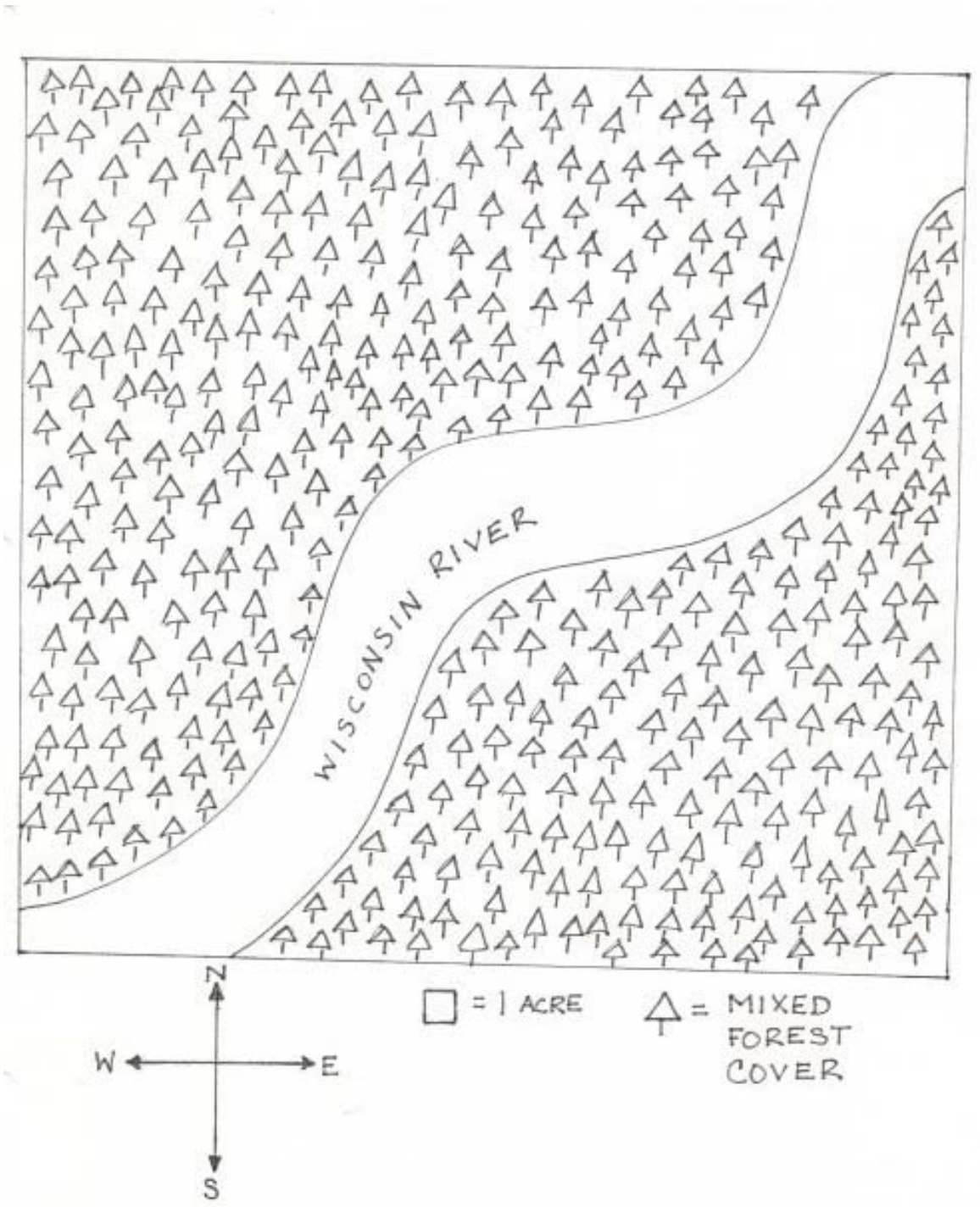
Task Card C

Your group must now select the best land use for the area in your category. You have 20 minutes to choose and create a presentation for the Land Use Board to convince them it's the right idea. You must have visuals to support your idea and work together as a team.

Things To Include In Your Presentation:

1. What land use category you are representing?
2. What you plan to do with the land?
3. Why do you think this is the best idea?
4. How will this choice be good for the area? (Think of people, jobs, the environment, money, etc.)
5. Does this choice have any negative effects and how will you deal with them?

Insert 10.4



Insert 10.5

How To Plant A Tree

Taken from the Wisconsin DNR Website http://www.dnr.state.wi.us

Procedures

- Dig a wide hole. The diameter of the hole should be two to three times the diameter of the root ball. The hole should be shaped like a shallow bowl, not a vertical column. Roots grow primarily near the surface. Loosening the soil as far as possible away from the trunk will make it easier for the roots to grow and establish.
- Don't plant too deep. The root collar (where the trunk and roots meet) should be even with the final grade.
- Leave the soil beneath the root ball undisturbed. The hole should be dug only as deep as the root system otherwise the ball will settle and the root collar will be too deep.
- Use existing soil to backfill. The soil removed from the hole should be loosened and broken up and then back filled around the root ball. Don't add other material to this fill.
- If your tree is balled and burlaped (B&B), cut the burlap and twine. They should be cut off or rolled down exposing the top half of the soil ball after the tree has been set in the hole.
- B&B trees normally don't need to be staked. In an active school yard staking may be needed. But, remember, remove the stakes after one year. Also, if you stake, don't keep the staking wire too tight.
- Mulch your tree. A wood chip mulch is essential to keep the soil moist and cool, reduce weed competition and protect the trunk from weed whip and lawn mower injury.
- Don't forget to water your tree. Deep water regularly throughout the first growing season. Allow water to run slowly, soaking the soil, once or twice a week. Don't overwater.
- Have fun!

Resources

Lesson 1

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General Resources

Wisconsin Department of Natural Resources http://www.dnr.state.wi.us
Wisconsin Forest Resources Education Alliance http://www.wfrea.org Be sure to check out their CD entitled Wisconsin Forests Forever.

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