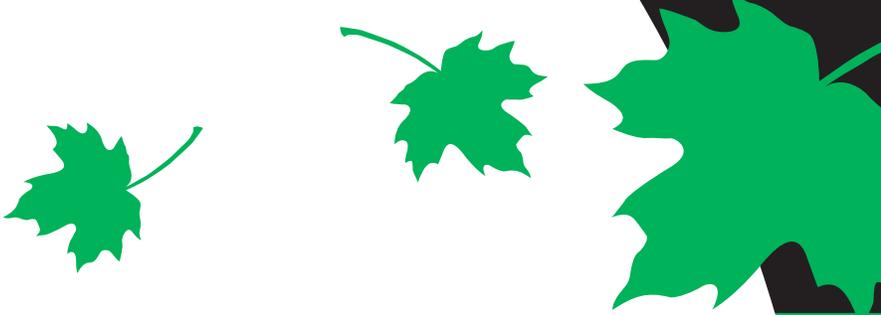




## APPENDIX

GLOSSARY.....	229
WISCONSIN STANDARDS .....	233
WISCONSIN STANDARDS (CHART).....	244
SUBJECT AREAS.....	246
MULTIPLE INTELLIGENCES .....	247
LESSON CONNECTIONS TO THE LEAF CONCEPTUAL GUIDE .....	248
LESSON FEEDBACK FORM (7-8 UNIT).....	249



## GLOSSARY

**AESTHETIC VALUE:** The worth of a forest in terms of its natural beauty.

**ALL-AGED MANAGEMENT:** A technique used to maintain a stand with trees of all ages from seedlings to mature.

**ALTERNATE BRANCHING:** A branching pattern where side branches and leaves do not grow directly across from each other.

**AXILLARY BUD:** A bud that grows just above the leaf petiole. It is capable of developing into a flower cluster or branch shoots.

**BELIEF:** Something that a person thinks to be true to the best of his/her knowledge.

**BEST MANAGEMENT PRACTICE (BMP):** A combination of practices aimed at protecting waterways.

**BIODIVERSITY:** The variety and complexity of all life on earth, including genetic, species, and ecosystem diversity.

**BIOME:** A regional ecosystem of the world characterized by distinct seasonal climatic differences, vegetation, and animals.

**BIOTECHNOLOGY:** The use of living organisms, or parts of living organisms, to provide new methods of production, alter disease resistance, make new products, and find new ways to improve our quality of life.

**BROADLEAF:** A tree that has broad leaves rather than needles.

**BUNDLE:** Group of conifer needles held together at the base by a small papery wrap called a fascicle.

**CLEARCUT:** An area where all the trees have been harvested at the same time.

**CLIMATIC ZONES:** Regions of different temperature and moisture conditions.

**COMMUNITY:** A group of plants and animals living and interacting with one another in a given area.

**COMPOUND LEAF:** A type of leaf that has many smaller leaflets that attach to its petiole, which is attached to a twig.

**CONIFER:** A tree that bears cones and has needles.

**CONIFEROUS FOREST:** Type of forest containing cone-bearing trees.

**CULTURAL VALUE:** The worth of a forest in terms of the way a person was raised to believe in it.

**DECIDUOUS FOREST:** Type of forest containing trees that shed their leaves annually.

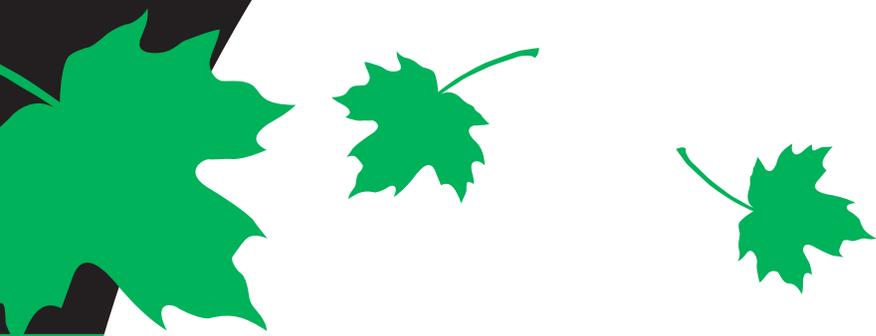
**DIAMETER AT BREAST HEIGHT (DBH):** The diameter of a tree 4.5 feet above ground level.

**DIAMETER TAPE:** A type of measuring tape specially graduated so that diameter can be read when the tape is wrapped around a tree (circumference) without extra calculations.

**DIRECTOR (COFRIN CENTER FOR BIODIVERSITY):** A person who studies plants and animals in order to gather information that will be used to help manage resources.

**DISEASE:** An abnormal condition in a plant that affects the health, longevity, or economic value.

**DUFF LAYER:** Layer of the forest containing partially decomposed organic material. Found beneath the litter layer on the forest floor.



**ECOLOGICAL VALUE:** The worth of a forest in terms of what it contributes to the ecosystem as a whole.

**ECONOMIC VALUE:** The worth of a forest in financial terms (dollars and cents).

**ECOSYSTEM:** An area that contains organisms (e.g., plants, animals, bacteria) interacting with one another and their non-living environment. Ecosystems can be of any size (e.g., forest, meadow, log).

**ECOSYSTEM DIVERSITY:** Variety of biologic communities or ecosystems in a given area over time.

**ECOTONE:** The transition zone between two adjacent ecological systems.

**EDUCATIONAL VALUE:** The worth of a forest in terms of its benefits for teaching and learning.

**ENDANGERED SPECIES:** A species that is in danger of becoming extinct.

**ENTIRE:** A type of leaf margin that is smooth and has no wavy or pointed edges.

**EVEN-AGED MANAGEMENT:** A technique used to maintain a stand with trees of uniform age and size.

**EVENNESS:** A comparison of the number of individuals of each species in a forest.

**EXOTIC SPECIES:** A species from a specific geographic region that has been introduced into an area outside of that region.

**FORB LAYER:** Layer of the understory containing non-woody plants.

**FOREST FUNCTIONS:** Processes in a forest ecosystem. These include nutrient cycling, photosynthesis, providing animal habitat, etc.

**FOREST MANAGEMENT:** The use of techniques (e.g., planting, harvesting) to promote, conserve, or alter forests to meet desired outcomes.

**FOREST SERVICES:** The benefits that a forest provides for humans. These may include recreation, products, aesthetics, etc.

**FORESTER:** A person who plans and makes decisions about forests to meet goals and support healthy ecosystems.

**FORESTRY:** The practice of creating, managing, using, and conserving forests for human benefit.

**FRAGMENTATION:** The process of dividing forest into smaller patches of forest and non-forest land.

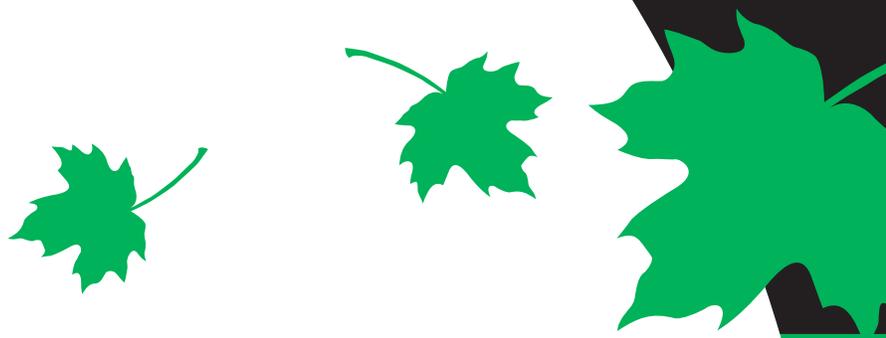
**FUNCTIONAL DIVERSITY:** The variety of functions in a forest. Functions include nutrient cycling, photosynthesis, providing animal habitat, etc.

**GENETIC DIVERSITY:** Genetic variation within a population or species.

**GIS SPECIALIST/FORESTER:** A person who uses maps and computers to manage forests.

**GLACIATION:** To be covered by large masses of slow-moving ice formed by accumulated snow.

**HORIZONTAL STRUCTURE:** The distribution of forest layers across the landscape.



**INVASIVE SPECIES:** A species that enters an area and causes harm by out-competing species that are already there.

**KNOWLEDGE:** The information or facts someone has about something.

**LEAF BASE:** The lower edge of a leaf.

**LEAFLETS:** A small leaf that is part of a compound leaf.

**LEAF MARGIN:** The outer edge of a leaf.

**LEAF SCAR:** The mark left behind on a twig when a leaf falls from a tree.

**LIMITING FACTOR:** A factor that limits the growth, abundance, or distribution of a population of organisms in an ecosystem.

**LITTER LAYER:** Surface layer of the forest floor composed of leaves, twigs, needles, etc. with minimal decomposition.

**LOBE:** A projection that extends outward from the center of the leaf.

**MICROHABITAT:** A specific combination of habitat elements in an area that are needed by a particular organism.

**MULTIPLE USE:** A type of forest management that promotes at least two types of forest use (e.g., for recreation and wildlife habitat).

**OPPOSITE BRANCHING:** A branching pattern where side branches and leaves grow directly across the stem from each other.

**OVERSTORY:** The uppermost trees in a forest.

**PARKS OPERATIONS MANAGER:** A person who directs daily activities of park employees to maintain parks.

**PETIOLE:** The stalk that supports a leaf and attaches the leaf to the twig. They can be round, flat, or square.

**PLANT PATHOLOGIST:** A person who researches plant diseases.

**PLOT:** A measured parcel of land. Plots vary in size and shape.

**PRECIPITATION:** All forms of moisture that fall from the sky, including rain, snow, hail, etc.

**PRESCRIBED FIRE:** A fire planned and executed to achieve management goals.

**PRODUCT DEVELOPER:** A person who works with customers to create new wood products.

**PROJECT DIRECTOR (NATURE CONSERVANCY):** A person who works for the Nature Conservancy to oversee and plan the protection of natural communities.

**PUBLIC AFFAIRS SPECIALIST:** A person who shares material on key issues with others for the USDA Forest Service.

**RECREATIONAL VALUE:** The worth of a forest in terms of its use for leisure.

**RICHNESS:** A measure of the number of different species in a forest.

**SCALY:** Conifer needles that are flat and overlapping, like fish scales.

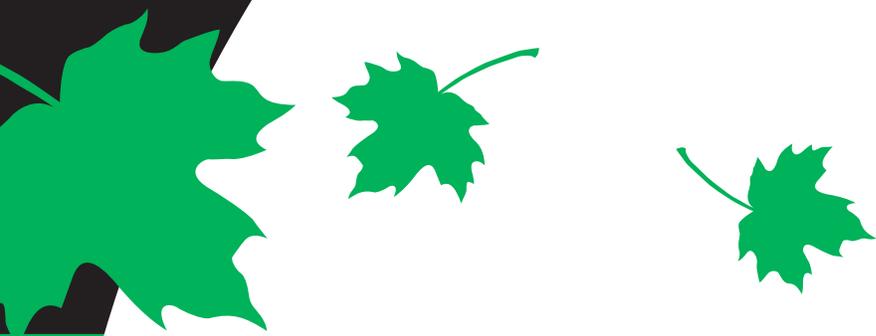
**SCAT:** A scientific term for animal feces.

**SHRUB LAYER:** Layer of the understory containing woody plants with multiple stems.

**SIMPLE LEAF:** A type of leaf that has one blade attached to a twig by a petiole.

**SINUS:** The space in between lobes on a leaf.

**SPECIES DIVERSITY:** The variety of species present in a given area.



**STAND:** A group of trees in a given area.

**STEWARD:** A person who takes responsibility to make decisions and take actions today that will allow resources to be maintained in a healthy manner.

**STRUCTURAL DIVERSITY:** The variety in the physical organization of a forest. It has both vertical and horizontal components.

**STRUCTURE:** The horizontal and vertical distribution of layers in a forest, including height, diameter, and species present.

**SUSTAIN:** To nourish, keep up, or maintain.

**SUSTAINABILITY:** The ability of natural resources to provide ecological, economic, and social benefits for present and future generations.

**SUSTAINABLE:** The ability for something to be maintained for use today and in the future.

**SUSTAINABLE MANAGEMENT:** Maintenance of forests to meet current and future ecological, economic, and social needs.

**TAIGA/BOREAL FOREST:** Type of forest found in the circumpolar regions of the northern hemisphere.

**TEMPERATE FOREST:** Type of forest found in regions with an average temperature of  $\pm 50^{\circ}\text{F}$  for two to four months of the year.

**THREATENED SPECIES:** A species that is likely to become endangered.

**TIMBER STAND IMPROVEMENT (TSI):**

A forestry practice used to improve the composition, structure, condition, health, and growth of a forest stand.

**TOOTHED:** A type of leaf edge that has small points along it (teeth).

**TOPOGRAPHY:** The relative elevations and configuration of features in a landscape.

**TROPICAL FOREST:** A forest that grows in “winterless” tropical climates with high temperatures and generally high annual rainfall.

**TROPICAL RAINFOREST:** Type of forest found in regions with high temperature, humidity, and rainfall with an average temperature of  $65^{\circ}\text{F}$  for the coolest month.

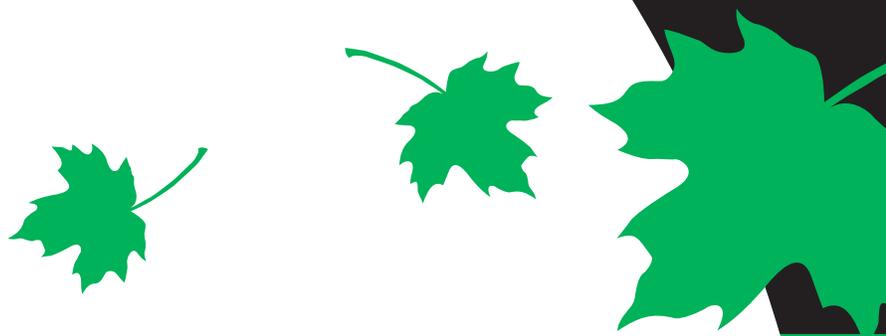
**UNDERSTORY:** Forest vegetation present under the overstory which can include trees, shrubs, and forbs.

**VALUE:** The worth someone places on something.

**VEINS:** Distinct lines of tissue that form the framework of a leaf. Used for food and water transport.

**VENEER:** A thin layer of wood created when logs are shaved from the outside into the center.

**VERTICAL STRUCTURE:** The distribution of forest layers from top to bottom.



## WISCONSIN STANDARDS

LEAF lessons address Wisconsin Model Academic Standards in Agriculture Education, Environmental Education, Science, Social Studies, and Visual Arts. They also address Common Core Standards for Mathematics and English Language Arts. On the following pages, you will find the standards listed by lesson along with an explanation of how they are addressed by each lesson. The most current correlation to the most current standards can be found on the LEAF website.

### LESSON 1: DISCOVERING WISCONSIN'S FORESTS

#### ENGLISH LANGUAGE ARTS W.7.2A-F & W.8.2A-F Writing

**Standard is:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

Students develop a travel brochure about the forests they learned about.

#### ENGLISH LANGUAGE ARTS W.7.4 & W.8.4 Writing

**Standard is:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Students develop a travel brochure about the forests they learned about.

#### ENGLISH LANGUAGE ARTS W.7.6 Writing

**Standard is:** Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.

Students develop a travel brochure about the forests they learned about.

#### ENGLISH LANGUAGE ARTS W.8.6 Writing

**Standard is:** Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others.

Students develop a travel brochure about the forests they learned about.

#### ENVIRONMENTAL EDUCATION A.8.4 Questioning and Analysis

**Standard is:** Use critical thinking strategies to interpret and analyze gathered information.

Students draw conclusions about the location of different types of forests and climatic, soil, and topographic factors using notes taken while watching a video and by doing a mapping exercise.

#### ENVIRONMENTAL EDUCATION A.8.6 Questioning and Analysis

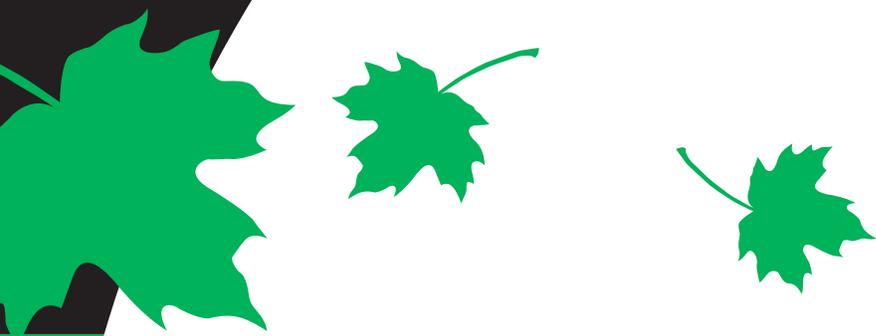
**Standard is:** Communicate the results of investigations by using a variety of media and logically defend their answers.

Students create a travel brochure on a type of forest found in Wisconsin based on gathered information, a mapping exercise, and discussion.

#### ENVIRONMENTAL EDUCATION B.8.6 Energy and Ecosystems

**Standard is:** Describe major ecosystems of Wisconsin.

Students gather data on types of forests in Wisconsin and create a travel brochure on one type, including factors contributing to location and plants and animals present.



## MATHEMATICS 7.RP.2

### Ratios and Proportional Relationships

**Standard is:** Analyse proportional relationships and use them to solve real-world and mathematical problems.

Students graph precipitation and temperature data for different biomes.

## SOCIAL STUDIES A.8.1

### Geography: People, Places, and Environments

**Standard is:** Use a variety of geographic representations, such as political, physical, and topographic maps, a globe, aerial photographs, and satellite images, to gather and compare information about a place.

Students superimpose data from maps showing Wisconsin glaciation and climatic zones on a map of Wisconsin landforms as a way of determining the factors that affect where different types of forest are located.

## VISUAL ARTS E.8.3

### Visual Communication and Expression

**Standard is:** Communicate complex ideas by producing popular images and objects, such as folk art, traditional arts and crafts, popular arts, mass media, and consumer products.

Students create a travel brochure with images or graphics describing one of the types of forests in Wisconsin, including factors contributing to its location and plants and animals present.

## VISUAL ARTS H.8.5

### Visual Communication and Expression

**Standard is:** Be able to read complex maps, charts, plans.

Students superimpose data from maps showing Wisconsin glaciation and climatic zones on a map of Wisconsin landforms as a way of determining the factors that affect where different types of forests are located.

## LESSON 2: BIODIVERSITY AND THE FOREST CONNECTION

## ENVIRONMENTAL EDUCATION A.8.5

### Questioning and Analysis

**Standard is:** Use the results of their investigations to develop answers, draw conclusions, and revise their personal understanding.

Students gain a deeper understanding of biodiversity, the role of forests and biodiversity, and how Wisconsin's forests contribute to world biodiversity by studying pictures, identifying species, and participating in discussion.

## ENVIRONMENTAL EDUCATION B.8.3

### Energy and Ecosystems

**Standard is:** Explain the importance of biodiversity.

Students discover that diversity contributes to the stability of systems on a large scale through a simulation using jigsaw puzzle pieces. They also determine that lack of biodiversity makes a species more susceptible to natural and human caused disturbances.

## ENVIRONMENTAL EDUCATION B.8.8

### Energy and Ecosystems

**Standard is:** Explain interactions among organisms or populations of organisms.

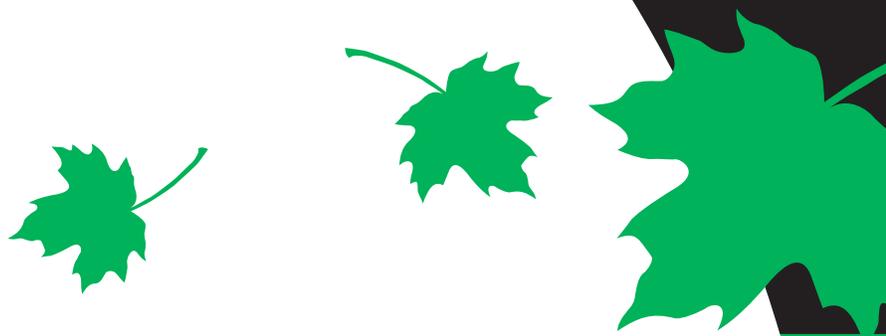
Students investigate how different ecosystems are interconnected by making a Venn diagram.

## SCIENCE F.8.8

### Populations and Ecosystems

**Standard is:** Show through investigations how organisms both depend on and contribute to the balance or imbalance of populations and/or ecosystems, which in turn contribute to the total system of life on the planet.

Students investigate the connections between organisms and ecosystems, seeing how these contribute to the “big picture” of life on Earth through a simulation using jigsaw puzzle pieces.



### VISUAL ARTS E.8.4

#### Visual Communication and Expression

**Standard is:** Communicate complex ideas by producing visual communication forms useful in everyday life, such as sketches, diagrams, graphs, plans, and models.

Students compare ecosystems by making a Venn diagram.

## LESSON 3: HOW FORESTS ARE MANAGED

### ENGLISH LANGUAGE ARTS SL.7.1A-D & SL.8.1A-D

#### Comprehension and Collaboration

**Standard is:** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 (8) topics, texts, and issues, building on others' ideas and expressing their own clearly.

Throughout this lesson, discussion is used to make comparisons and draw conclusions, especially during the newspaper simulation and from the video discussion.

### ENVIRONMENTAL EDUCATION A.8.5

#### Questioning and Analysis

**Standard is:** Use the results of their investigations to develop answers, draw conclusions, and revise their personal understanding.

Through discussion based on experimentation with common objects, students draw conclusions about multiple use and sustainability.

### SCIENCE C.8.3

#### Environmental Issue Investigation Skills

**Standard is:** Design and safely conduct investigations that provide reliable quantitative or qualitative data, as appropriate, to answer their questions.

Students experiment with newspaper to find out how many compatible uses they can devise and whether their methods are sustainable or not.

### SCIENCE F.8.10

#### Diversity and Adaptations of Organisms

**Standard is:** Project how current trends in human resource use and population growth will influence the natural environment, and show how current policies affect those trends.

Students brainstorm and simulate many uses for one resource and the demands those uses place on the resource. Through discussion they then relate this to forest resources and the how human uses and population growth can affect the environment.

## LESSON 4: FOREST MANAGEMENT ISSUES

### AGRICULTURE EDUCATION B.8.3

#### Technology/Information

**Standard is:** Access and apply information in the evaluation of natural resource use.

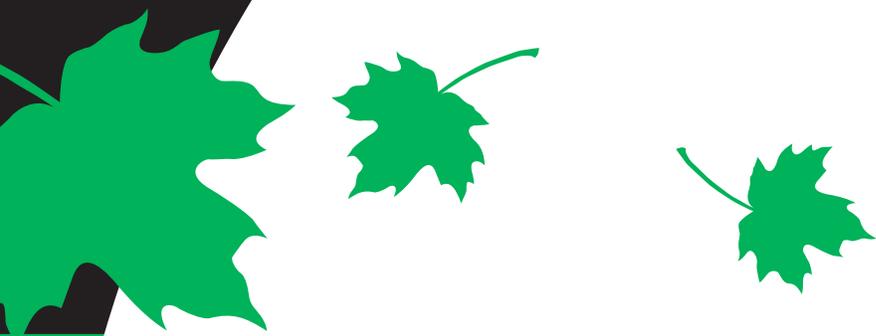
Students evaluate the effects (economic, environmental, social) of several forest management techniques and use scenarios.

### ENGLISH LANGUAGE ARTS SL.7.1A-D & SL.8.1A-D

#### Comprehension and Collaboration

**Standard is:** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 (8) topics, texts, and issues, building on others' ideas and expressing their own clearly.

Students participate in discussion to evaluate the role of knowledge, beliefs, and values in people's perceptions of forest management techniques and decisions.



## ENGLISH LANGUAGE ARTS RI.7.3 & RI.8.3

### Reading and Literature

**Standard is:** Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).

**Standard is:** Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).

Students identify the controversial statements in an article about a forest related issue and analyze the values and knowledge held by the people or groups making those statements.

## ENVIRONMENTAL EDUCATION A.8.5

### Questioning and Analysis

**Standard is:** Use the results of investigations to develop answers, draw conclusions, and revise their personal understanding.

Students read an article about a controversial forestry issue, identify the positions of the players involved, and explore their associated beliefs and values. Through discussion, students draw conclusions about which player is more correct and are then asked to explore their own position on a forest management situation.

## ENVIRONMENTAL EDUCATION C.8.1

### Environmental Issue Investigation Skills

**Standard is:** Define and provide examples of environmental issues, explaining the role of beliefs, attitudes, and values.

Students read an article about a controversial issue related to forestry, identify the positions of the players involved, and evaluate the ways that those issues arise from differing beliefs, values, and knowledge. Students gain an understanding of how perceptions are influenced by many factors.

## ENVIRONMENTAL EDUCATION C.8.3

### Environmental Issue Investigation Skills

**Standard is:** Use questioning and analysis skills to determine beliefs, attitudes, and values held by people in an environmental issue.

Students read an article about a controversial issue related to forestry, identify the positions of the players involved, and determine the players' associated beliefs and values.

## ENVIRONMENTAL EDUCATION D.8.7

### Decision and Action Skills

**Standard is:** Identify examples of how personal beliefs can influence environmental decisions.

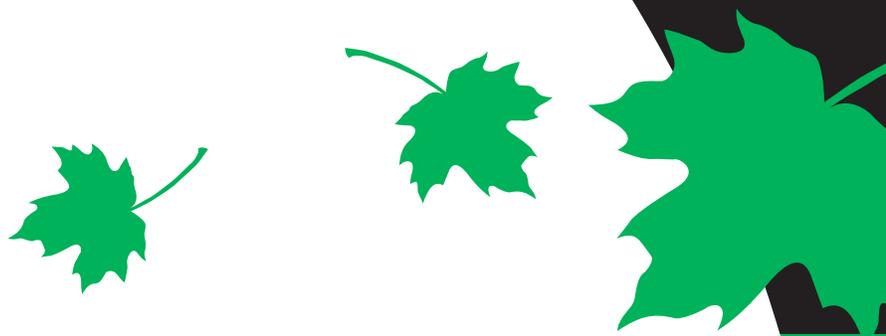
In a simulation, students make forest management decisions about a piece of property based on various landowner profiles. The discussion following centers on how beliefs and values influence the types of decisions that were made.

## SCIENCE G.8.3

### Science Applications

**Standard is:** Illustrate the impact that science and technology have had, both good and bad, on careers, systems, society, environment, and quality of life.

Students investigate the social, economic, and ecological effects of management and they investigate controversies related to techniques and decisions.



## **SOCIAL STUDIES B.8.4 & B.8.10**

### **History: Time, Continuity, and Change**

**Standard is:** Explain how and why events may be interpreted differently depending upon the perspective of participants, witnesses, reporters, and historians.

**Standard is:** Analyze examples of conflict, cooperation, and interdependence among groups, societies, or nations.

Students read an article about a controversial issue related to forestry to identify and evaluate the ways that those issues arise from differing beliefs, values, and knowledge.

## **SOCIAL STUDIES C.8.7**

### **Political Science and Citizenship: Power, Authority, Governance, and Responsibility**

**Standard is:** Locate, organize, and use relevant information to understand an issue of public concern, take a position, and advocate the position in a debate.

Students read an article about a controversial issue related to forestry to identify and evaluate the ways that those issues arise from differing beliefs, values, and knowledge.

## **LESSON 5: MANY FORESTS, MANY VALUES, MANY REASONS**

## **AGRICULTURE EDUCATION F.8.2**

### **Business Management and Marketing**

**Standard is:** Recognize that agricultural businesses produce, process, transport, and sell food, fiber, and natural resources to make a profit.

Students analyze factors, including economic, that affect why forests are valued. They make a list of jobs associated with harvesting, transporting, processing and selling forest products.

## **ENGLISH LANGUAGE ARTS RI.7.1 & RI.8.1**

### **Key Ideas and Details**

**Standard is:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

The *Legacy of a Maple* activity involves reading to understand how people's values and experiences influence their points of view. Students also need to read the various passages and infer what values were expressed and the factors affecting those values.

## **ENVIRONMENTAL EDUCATION B.8.10**

### **Energy and Ecosystems**

**Standard is:** Explain and cite examples of how humans shape the environment.

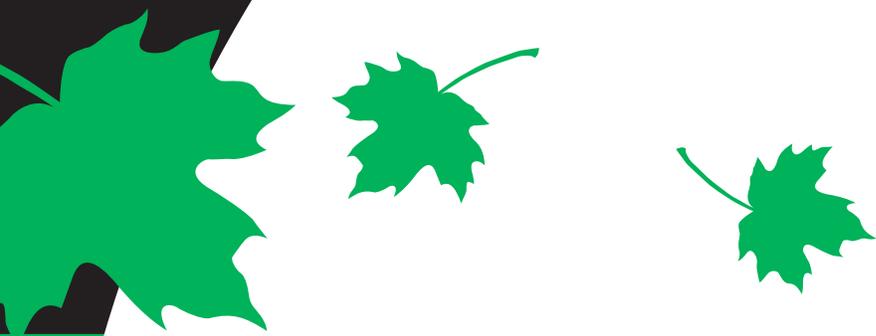
As students complete the *Wisconsin Forests and Communities Then & Now* Student Page, they look at how forests have impacted and continue to impact society and conversely how human activities have impacted and continue to impact forests.

## **ENVIRONMENTAL EDUCATION B.8.15**

### **Natural Resources and Environmental Quality**

**Standard is:** Analyze how people impact their environment through resource use.

As students complete the *Wisconsin Forests and Communities Then & Now* Student Page, they look at how forests have impacted and continue to impact society and conversely how human activities have impacted and continue to impact forests.



## ENVIRONMENTAL EDUCATION D.8.3 & D.8.7

### Decision and Action Skills

**Standard is:** List reasons why an individual or group chooses to participate or not participate in an environmental activity in the home, school, or community.

**Standard is:** Identify examples of how personal beliefs can influence environmental decisions.

Through reading, categorizing, and discussing, students learn about factors that affect the way people value and use forests.

## SCIENCE B.8.4

### Nature of Science

**Standard is:** Describe types of reasoning and evidence used outside of science to draw conclusions about the natural world.

Students read *Legacy of a Maple* and match statements made about an old tree with the speakers who made them. They analyze people's values to draw their conclusions about the death of a tree.

## SCIENCE E.8.6

### Earth's History

**Standard is:** Describe through investigations the use of the earth's resources by humans in both past and current cultures, particularly how changes in the resources used for the past 100 years are the basis for efforts to conserve and recycle renewable and nonrenewable resources.

Students answer questions about the use of Wisconsin forests since early logging days. They also discuss how various factors, including those involving society and culture, influence how we value, use, and care for forest resources.

## SOCIAL STUDIES A.8.4

### Geography: People, Places, and Environments

**Standard is:** Conduct a historical study to analyze the use of the local environment in a Wisconsin community and to explain the effect of this use on the environment.

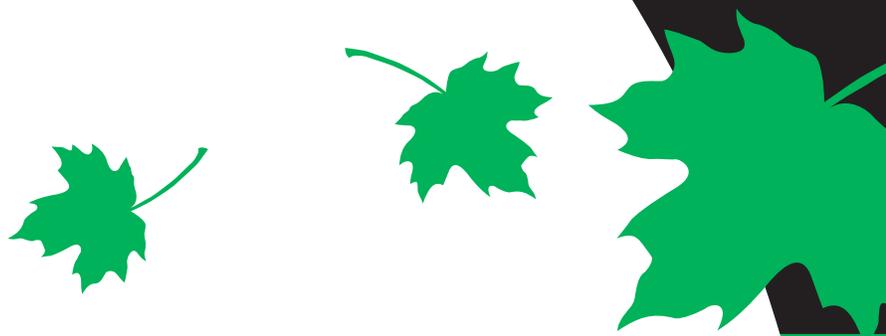
Students take a historical look at how forests impact society and how human activities impact forests by completing the *Wisconsin Forests and Communities Then & Now* Student Page.

## VISUAL ARTS C.8.9

### Visual Design and Production

**Standard is:** Come up with ideas and carry them through to completion of an original work of art.

Students creatively express what they've learned. Among the options are making a collage, making a mobile, writing a poem or reflective prose that includes an illustration, creating a slide show presentation, or performing a rap, song, play, puppet show, mock TV talk show interview, etc.



## VISUAL ARTS E.8.1, E.8.2, & E.8.3

### Visual Communication and Expression

**Standard is:** Communicate complex ideas by producing studio art forms, such as drawings, paintings, prints, sculpture, jewelry, fibers, and ceramics.

**Standard is:** Communicate complex ideas by producing design art forms, such as graphic design, product design, architecture, landscape, and media arts, such as film, photography, and multimedia.

**Standard is:** Communicate complex ideas by producing popular images and objects, such as folk art, traditional arts and crafts, popular arts, mass media, and consumer products.

Students creatively express what they've learned. Among the options are making a collage, making a mobile, writing a poem or reflective prose that includes an illustration, creating a slide show presentation, or performing a rap, song, play, puppet show, mock TV talk show interview, etc.

## LESSON 6: MAKING BROADER CONNECTIONS

### AGRICULTURE EDUCATION F.8.1

#### Business Management and Marketing

**Standard is:** Explain how food, fiber, and natural resources are part of a global economy.

Students draw conclusions about how the use of Wisconsin forests affect forests worldwide through a simulation activity and discussion.

### ENGLISH LANGUAGE ARTS SL.7.1A-D & SL.8.1A-D

#### Comprehension and Collaboration

**Standard is:** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 (8) topics, texts, and issues, building on others' ideas and expressing their own clearly.

The introduction and parts of all activities rely heavily on discussion and student participation.

### ENVIRONMENTAL EDUCATION A.8.4

#### Questioning and Analysis

**Standard is:** Use critical-thinking strategies to interpret and analyze gathered information.

By interpreting information presented in collages, students gain insight that they apply in *Forestry Jeopardy* about the connection between forestry and Wisconsin's economy, society, and environment.

### ENVIRONMENTAL EDUCATION B.8.16

#### Natural Resources and Environmental Quality

**Standard is:** Recognize the economic, environmental, and other factors that impact resource availability and explain why certain resources are becoming depleted.

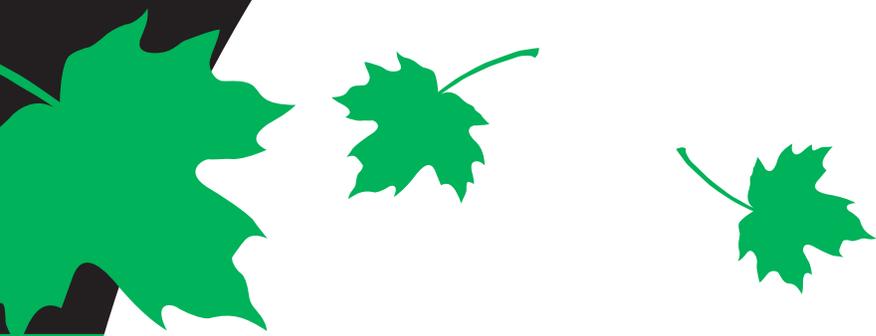
Students evaluate the steps involved in making a wood product and the resources, jobs, costs and social, economic, and environmental impacts associated with those steps.

### MATHEMATICS 7.EE.4

#### Expressions and Equations

**Standard is:** Use variable to represent quantities in a real-world or mathematical problem, and construct a simple equations and inequalities to solve problems by reasoning about the quantities.

Students calculate an ideal number of game pieces to maintain a supply into the future.



### **SOCIAL STUDIES D.8.3** **Economics: Production, Distribution, Exchange, and Consumption**

**Standard is:** Describe Wisconsin's role in national and global economies and give examples of local economic activity in national and global markets.

Students evaluate future demand for forest resources and suggest ways that these changes will affect forests and the economy of Wisconsin and the world through a simulation activity.

## **LESSON 7: KEY STRATEGIES FOR OUR FUTURE**

### **AGRICULTURE EDUCATION B.8.3** **Technology/Information**

**Standard is:** Access and apply information in the evaluation of natural resource use.

- Technology applications in wildlife/natural resource management

Students read stories and extrapolate information about science and technology use in forestry. They then make predictions about the future of Wisconsin's forests in the absence of science and technology.

### **ENVIRONMENTAL EDUCATION A.8.4** **Questioning and Analysis**

**Standard is:** Use critical-thinking strategies to interpret and analyze gathered information.

Students answer questions and make predictions based on readings and a list of trends.

### **ENVIRONMENTAL EDUCATION B.8.23** **Natural Resources and Environmental Quality**

**Standard is:** Identify governmental and private agencies responsible for environmental protection and natural resource management.

Students identify the collaborative partners that make the science and technology possible after reading two stories highlighting science and technology used in forestry.

### **SCIENCE G.8.3** **Science Applications**

**Standard is:** Illustrate the impact that science and technology have had, both good and bad, on careers, systems, society, environment, and quality of life.

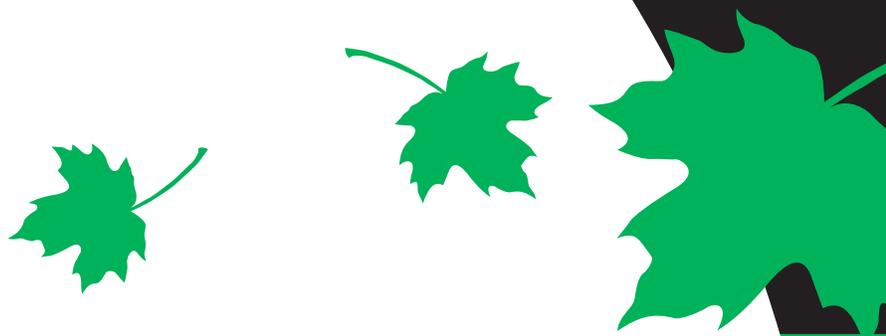
Students investigate some of the science and technology used in forestry and predict alternative outcomes had the science and technology not been available.

## **LESSON 8: SUSTAINING OUR FORESTS – CITIZENS' ROLES**

### **ENVIRONMENTAL EDUCATION A.8.4** **Questioning and Analysis**

**Standard is:** Use critical thinking strategies to interpret and analyze gathered information.

Students analyze the situations presented in the dilemma cards in order to make choices and defend them.



### ENVIRONMENTAL EDUCATION B.8.15 Natural Resources and Environmental Quality

**Standard is:** Analyze how people impact their environment through resource use.

Students learn what it means to be a steward (a positive way humans can impact the environment while still using its resources).

### SCIENCE B.8.6 Nature of Science

**Standard is:** Explain the ways in which scientific knowledge is useful and also limited when applied to social issues.

Students make decisions about lifestyle choices that affect forests using *Dilemma Cards*. In doing so they draw on their scientific knowledge, but also social realities.

### SOCIAL STUDIES E.8.4 The Behavioral Sciences: Individuals, Institutions, and Society

**Standard is:** Describe and explain the means by which individuals, groups, and institutions may contribute to social continuity and change within a community.

Students read about and discuss what individuals and groups do to be forest stewards on their land and promote sustainable use of Wisconsin's forests. Students also examine lifestyle choices that impact the forests and community around them.

## CAREERS EXPLORATION

### ENVIRONMENTAL EDUCATION B.8.22 Natural Resources and Environmental Quality

**Standard is:** Identify careers related to natural resources and environmental concerns.

Students read career profiles and play a game involving professionals in forestry-related careers.

### SCIENCE G.8.1 Science Applications

**Standard is:** Identify and investigate the skills people need for a career in science or technology and identify the academic courses that a person pursuing such a career would need.

Students read career profiles about professionals in forestry-related careers and determine the skills, education, and experience needed for each career.

## FIELD ENHANCEMENT 1: TREE IDENTIFICATION

### ENVIRONMENTAL EDUCATION A.8.4 Questioning and Analysis

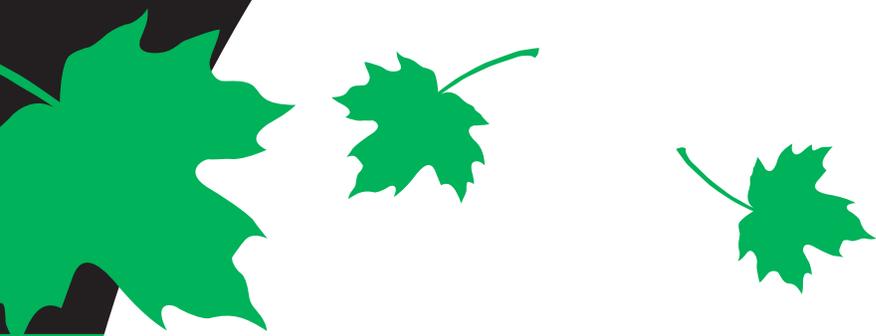
**Standard is:** Use critical-thinking strategies to interpret and analyze gathered information.

Students collect information about tree species and apply this to a dichotomous key to determine what kind of tree they are examining.

### SCIENCE C.8.2 Science Inquiry

**Standard is:** Identify data and locate sources of information including their own records to answer the questions being investigated.

Students collect data and identify trees based on observation and previous knowledge.



## FIELD ENHANCEMENT 2: FOREST MAPPING

### ENVIRONMENTAL EDUCATION A.8.4

#### Questioning and Analysis

**Standard is:** Use critical-thinking strategies to interpret and analyze gathered information.

Students collect data on tree size, species, and age to create a map of a forest plot. From the class maps, students examine tree abundance, age, and presence of wildlife.

### ENVIRONMENTAL EDUCATION A.8.6

#### Questioning and Analysis

**Standard is:** Communicate the results of investigations by using a variety of media and logically defend their answers.

Students gather data from a forest plot to create a map of the area and share their results with other groups.

### MATHEMATICS 7.G.4

#### Geometry

**Standard is:** Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

Students measure a tree to determine its diameter.

### SCIENCE C.8.10

#### Science Inquiry

**Standard is:** Discuss the importance of their results and implications of their work with peers, teachers, and other adults.

After creating a map of their forest plot from gathered data, students discuss how and why similar information is used by foresters.

### SOCIAL STUDIES A.8.1

#### Geography: People, Places, and Environments

**Standard is:** Use a variety of geographic representations, such as political, physical, and topographic maps, a globe, aerial photographs, and satellite images, to gather and compare information about a place.

Students study various kinds of maps to determine the types of information they are conveying and then gather data to create their own maps. From maps they have created, the class answers questions about the forest area they are in.

## FIELD ENHANCEMENT 3: FOREST DIVERSITY

### ENVIRONMENTAL EDUCATION A.8.4

#### Questioning and Analysis

**Standard is:** Use critical-thinking strategies to interpret and analyze gathered information.

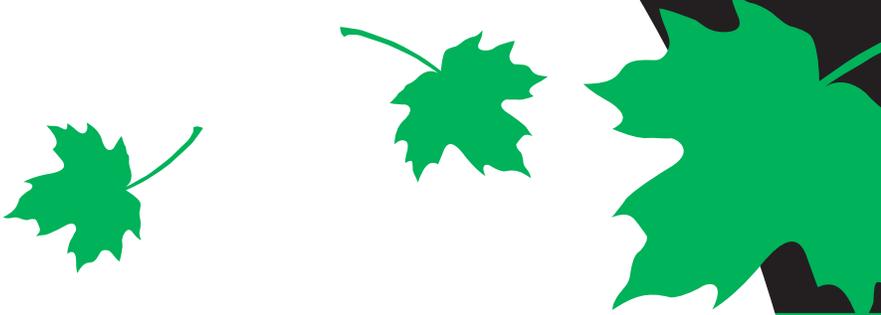
Students draw conclusions about levels of forest diversity based on gathered data and discussion.

### ENVIRONMENTAL EDUCATION A.8.5

#### Questioning and Analysis

**Standard is:** Use the results of their investigations to develop answers, draw conclusions, and revise their personal understanding.

Students discuss the implications of different levels of forest diversity based on gathered data and discussion.



## MATHEMATICS 7.SP.1

### Statistics and Probability

**Standard is:** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

Students evaluate levels of diversity in forest plots and draw conclusions about the implications of different levels of diversity after gathering and comparing data.

## SCIENCE C.8.6

### Science Inquiry

**Standard is:** State what they have learned from investigations, relating their inferences to scientific knowledge and data they have collected.

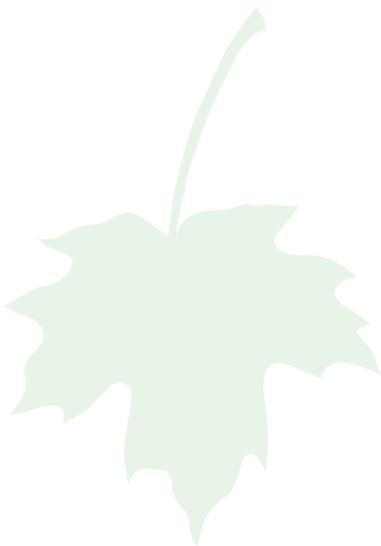
Students evaluate levels of diversity in forest plots and draw conclusions about the implications of different levels of diversity after gathering and comparing data.

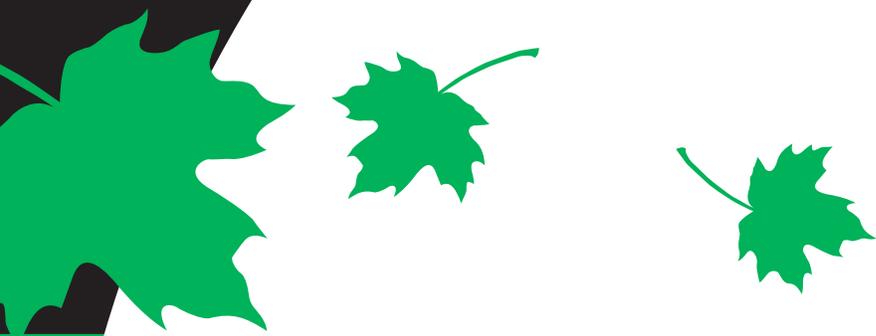
## SCIENCE F.8.9

### Diversity and Adaptations of Organisms

**Standard is:** Show through investigations how organisms both depend on and contribute to the balance or imbalance of populations and/or ecosystems, which in turn contribute to the total system of life on the planet.

Students explore the connection between diversity and ecosystems across the landscape after collecting data and discussing the nutrient cycle.





# WISCONSIN STANDARDS

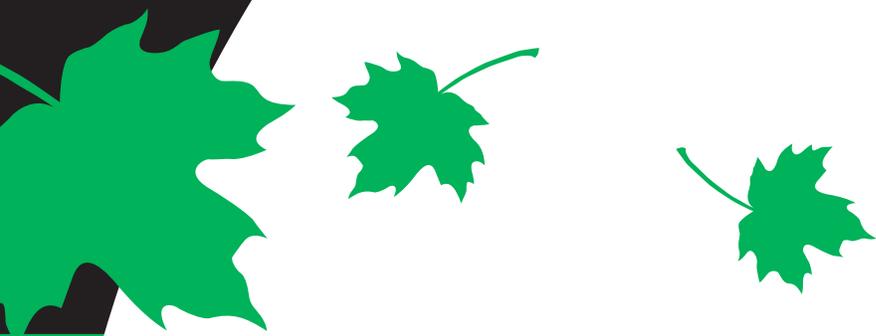
Standard	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8	Careers	FE 1	FE 2	FE 3
<b>AGRICULTURE EDUCATION</b>												
B.8.3				🍁			🍁					
F.8.1						🍁						
F.8.2					🍁							
<b>ENVIRONMENTAL EDUCATION</b>												
A.8.4	🍁					🍁	🍁	🍁		🍁	🍁	🍁
A.8.5		🍁	🍁	🍁								🍁
A.8.6	🍁										🍁	
B.8.3		🍁										
B.8.6	🍁											
B.8.8		🍁										
B.8.10					🍁							
B.8.15					🍁			🍁				
B.8.16						🍁						
B.8.22									🍁			
B.8.23							🍁					
C.8.1				🍁								
C.8.3				🍁								
D.8.3					🍁							
D.8.7				🍁	🍁		🍁					
<b>ENGLISH LANGUAGE ARTS</b>												
RI.7.1, 8.1			🍁		🍁							
RI.7.3, 8.3				🍁								
W.7.2, 8.2	🍁											
W.7.4, 8.4	🍁											
W.7.6, 8.6	🍁											
SL.7.1, 8.1				🍁		🍁						

(Continued on page 245.)

# WISCONSIN STANDARDS

Standard	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8	Careers	FE 1	FE 2	FE 3
<b>MATHEMATICS</b>												
7.RP.2												
7.EE.4												
7.G.4												
7.SP.1												
<b>SCIENCE</b>												
B.8.4												
B.8.6												
C.8.2												
C.8.3												
C.8.6												
C.8.10												
E.8.6												
F.8.8												
F.8.9												
F.8.10												
G.8.1												
G.8.3												
<b>SOCIAL STUDIES</b>												
A.8.1												
A.8.4												
B.8.4												
B.8.10												
C.8.7												
D.8.3												
E.8.4												

(Continued on page 246.)



## WISCONSIN STANDARDS

Standard	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8	Careers	FE 1	FE 2	FE 3
<b>VISUAL ARTS</b>												
C.8.9												
E.8.1												
E.8.2												
E.8.3												
E.8.4												
H.8.5												

<b>SUBJECT AREAS</b>	<b>ARTS</b> (Art, Dance, Drama, Music)	<b>LANGUAGE ARTS</b>	<b>MATHEMATICS</b>	<b>SCIENCE</b>	<b>SOCIAL STUDIES</b>
<b>LESSON 1</b> Discovering Wisconsin's Forests					
<b>LESSON 2</b> Biodiversity and the Forest Connection					
<b>LESSON 3</b> How Forests Are Managed					
<b>LESSON 4</b> Forest Management Issues					
<b>LESSON 5</b> Many Forests, Many Values, Many Reasons					
<b>LESSON 6</b> Making Global Connections					
<b>LESSON 7</b> Key Strategies for Our Future					
<b>LESSON 8</b> Sustaining Our Forests – Citizens' Roles					
<b>CAREERS EXPLORATION</b>					
<b>FIELD ENHANCEMENT 1</b> Tree Identification					
<b>FIELD ENHANCEMENT 2</b> Forest Mapping					
<b>FIELD ENHANCEMENT 3</b> Forest Diversity					

# MULTIPLE INTELLIGENCES

Multiple Intelligences can be thought of as different modes of learning and retaining information. Generally everyone has all the multiple intelligences, but in varying strengths. Students excel when they have an opportunity to express themselves in their preferred intelligences, but also need to have opportunities to strengthen other areas. The table below lists each of the LEAF lessons and the multiple intelligences that are addressed.

## V-L: VERBAL-LINGUISTIC

Using language to express ideas and concepts, thinking symbolically and reasoning abstractly, and the ability to create conceptual verbal patterns.

## L-M: LOGICAL-MATHEMATICAL

Skillfully able to think logically, inductively, categorically; recognize patterns; and work with abstract concepts.

## V-S: VISUAL-SPATIAL

Perceiving images and spatial elements and representing those expressions effectively.

## B-K: BODILY-KINESTHETIC

Creatively using the whole body to illustrate ideas and concepts.

## M-R: MUSICAL-RHYTHMIC

Discriminating among musical components and using instruments or the voice to express understanding.

## INTER: INTERPERSONAL

Demonstrating empathy toward or appreciating the thoughts and feelings of others.

## INTRA: INTRAPERSONAL

Analyzing one's own thoughts and motivations and expressing understanding of those thoughts and feelings through behavior.

## NAT: NATURALISTIC

Sensing patterns in and making connections with nature and the environment.

	 V-L	 L-M	 V-S	 B-K	 M-R	 Inter	 Intra	 Nat
<b>Lesson 1:</b> Discovering Wisconsin's Forests								
<b>Lesson 2:</b> Biodiversity and the Forest Connection								
<b>Lesson 3:</b> How Forests Are Managed								
<b>Lesson 4:</b> Forest Management Issues								
<b>Lesson 5:</b> Many Forests, Many Values, Many Reasons			 *		 *			
<b>Lesson 6:</b> Making Global Connections								
<b>Lesson 7:</b> Key Strategies for Our Future								
<b>Lesson 8:</b> Sustaining Our Forests – Citizens' Roles								
<b>Careers Exploration</b>								
<b>Field Enhancement 1:</b> Tree Identification								
<b>Field Enhancement 2:</b> Forest Mapping								
<b>Field Enhancement 3:</b> Forest Diversity								

\* = Expression of this intelligence will depend on individual student project choice.

# LESSON CONNECTIONS TO THE LEAF CONCEPTUAL GUIDE

The objectives of each lesson in the *LEAF Wisconsin K-12 Forestry Education Guide* are based on subconcepts outlined in the *LEAF Conceptual Guide to K-12 Forestry Education in Wisconsin*.

This chart identifies the subconcepts covered by each lesson in the 7-8 Unit.

Subconcept:	Theme 1: What is a Forest?															Theme 2: Why Are They important?																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
Lesson 1																																
Lesson 2																																
Lesson 3																																
Lesson 4																																
Lesson 5																																
Lesson 6																																
Lesson 7																																
Lesson 8																																
Careers																																

Subconcept:	Theme 3: How Do We Sustain?															Theme 4: What is the Future?																	
	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60			
Lesson 1																																	
Lesson 2																																	
Lesson 3																																	
Lesson 4																																	
Lesson 5																																	
Lesson 6																																	
Lesson 7																																	
Lesson 8																																	
Careers																																	

