



Winter 2002

Calling All Students !

We will publish students' scientific projects and other forest-related endeavors on the *Northern Woodlands* website, www.northernwoodlands.com.

Encourage your students to dig into a science project, write up their findings, and send them to us, along with a photo or two, if possible. For more information, contact Anne Margolis at anne@northernwoodlands.com or 802-439-6292.

Project Learning Tree Coordinators

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NORTHERN WOODLANDS MAGAZINE

802-439-6292

www.northernwoodlands.com

Editorial Mission

To inspire landowners' sense of stewardship by increasing their awareness of natural history and the principles of conservation and forestry that are directly related to their land.

To encourage loggers, foresters and purchasers of raw materials to continually improve the standards by which they utilize the forest's resources.

To increase the public's awareness and appreciation of the social, economic and environmental benefits of a working forest.

To raise the level of discussion about environmental and natural resource issues.

To educate a new generation of forest stewards.

Please allow your students to keep their copy of each edition of the magazine, and encourage them to share what they have learned with their families.

Teacher's Guide

A Note to Teachers

Welcome to the Winter 2002 edition of *Northern Woodlands* magazine. In this issue, you and your students can explore the interwoven human and natural history of our Northern Forest in articles ranging from the joy of winter tracking to the politics of forest liquidation, from soil mapping to endangered species recovery. This rich palette of articles offers a wealth of material that you can use to initiate field study, research, writing, dialogue, and debate.

This teacher's guide serves as a companion to *Northern Woodlands* magazine. In it are several in-class and outdoor activities that expand upon ideas presented in some of the magazine's articles. For each activity, we offer recommendations of related publications, contacts, and websites, as well as Project WILD and Project Learning Tree activities that build upon each activity theme. We also indicate the state curriculum standards each activity fulfills.

We'd like to extend special thanks to the sponsors of this project. As a result of their support, over 6,000 students throughout the Northeast receive four issues of *Northern Woodlands* each school year. The sponsors are: Judith Buechner, Freeman Foundation, Gorham Savings Bank, Warren & Barry King, Ledyard National Bank, Maine TREE Foundation, Mill River Lumber, Northeast Lumber Manufacturers Assoc., Ann and Pete Silberfarb, Wellborn Ecology Fund, and Wells River Savings Bank.

We would love to know your thoughts about our teacher's guide. If you have comments or suggestions, or if you need more (or fewer) copies of the magazine for your students or would like additional copies of this guide, just call or e-mail Tim Wolfe at (802) 439-6292 (email: tim@northernwoodlands.com). Visit our *Northern Woodlands Goes To School* website at www.northernwoodlands.com/goestoschool.html.

Noteworthy News:

Envirothon 2003: Encourage your high school students to participate in the 16th Annual Canon Envirothon competition. The mission of this national competition is to develop knowledgeable, skilled, and dedicated citizens willing to work towards achieving and maintaining a balance between the quality of life and the quality of the environment. Team members in grades 9-12 collaborate to develop an understanding of the ecology and management of soils, forests, wildlife, and aquatics. They also practice dealing with complex resource management decisions as they develop an oral presentation focused on a particular current environmental issue. This year's topic for oral presentations is "Agricultural Land Conservation and Preservation."

If your students get involved, they will compete, usually in late spring, with other teams from your state. The winner of each state competition goes on to compete in the national Envirothon competition, to be held July 26-31, 2003, in Maryland. Visit the national Envirothon website, www.envirothon.org, to find contact information for your state's Envirothon coordinator.

Young Naturalist Awards 2003. The Young Naturalist Awards program invites students in grades 7 through 12 to conduct original research in the areas of biology, earth science, or astronomy. Students work independently to make observations, record data, and illustrate significant findings, before documenting their research in a written essay or field journal. The twelve finalists (two per grade) receive scholarships ranging from \$500-\$2500, an expense-paid trip to New York City to meet Museum scientists, and a behind-the-scenes tour of the Museum. Entries are due by January 3, 2003. For more information, go to www.amnh.org/youngnaturalistawards.

Funding Available! The Center for Environmental Education offers grants to schools for community-based environmental projects and for programs that integrate environmental education into the k-12 curriculum. Go to www.SchoolsGoGreen.org or email cee@antiochne.edu.



The Framework identifies fields of knowledge considered necessary in the public school curricula of Maine, New Hampshire, and Vermont.



Project WILD is a national conservation education program designed to prepare students to make decisions affecting people, wildlife, and their shared home, Earth. Project WILD is administered by your state's fish and wildlife department.



Project Learning Tree (PLT) is a program of the American Forest Foundation and the Council for Environmental Education. PLT provides a series of educational activities focused around forests and forest issues. Contact your state forester's office for more information on PLT activities.



Websites are increasingly critical as a research tool. The Teacher's Guide includes web addresses that we hope will help to increase your students' learning opportunities.



Suggested books and readings are also included in the Teacher's Guide to help teachers and students get the most benefit from each edition of the magazine. These references focus on enhancing the concepts featured in the activities.



Where applicable, the Teacher's Guide offers helpful information or resources to supplement activities.

Suggested Activities


1. Understanding Endangered Species

"*Potentilla Prevails*" (page 14)

This article provides a stepping-stone for exploring endangered species designation. After your students read the article, have them identify questions the article raises for them. Such questions might include: What is the Endangered Species Act? Why was it created and what does it legislate? What are the criteria for federal listing (the defining characteristics of an endangered species) and delisting? What species are federally listed as endangered in this state? Who oversees the Endangered Species Act? Why does it matter if species go extinct?


- Have students consult the Endangered Species Act of 1973 to answer these questions (see weblink below).
- Have your students choose a listed species in your region to study. What is its current known population? What was its population believed to have been in the past? How do resource managers monitor its population? What means, if any, have resource managers adopted to stabilize and protect populations of this species? Have these efforts been successful to date? Using the information the students gathered about the Endangered Species Act and the particular species they chose to study, students can then create oral presentations for the class, supported by photos, maps, and any other appropriate media.


- Invite a biologist from The Nature Conservancy, US Fish and Wildlife Service, or US Forest Service to the class to talk about their work protecting federally endangered species in the field. Interesting stories include the reintroduction of Peregrine Falcons and current research on travel and nesting patterns of Indiana Bats.

 http://www.house.gov/resources/105cong/reports/105_c/esaidx.htm. This site offers a PDF format of the Endangered Species Act, in which students can read the Act's original language.

<http://www.endangeredspecies.com/>. Provides listings of endangered species in your state. <http://eelink.net/EndSpp.old/bak/E.S.lesson.html>. A great listing of teaching resources related to endangered species, primarily for middle school grades.

<http://endangered.fws.gov/kids/biodivrs.htm>. This U.S. Fish and Wildlife Service site offers a powerful metaphor for species extinction, as well as a student-friendly explanation of biodiversity.

 #88 Life on the Edge (gr. 5-8) Squirrels vs. Scopes (*Forest Ecology* High School Module)

 Here Today, Gone Tomorrow (gr. 5-8)
Back From the Brink (gr. 9-12)


- ME** English Language Arts
A, D, E, G, H
Science & Technology L, J
- NH** English Language Arts 1, 3, 5, 6
Science 1a, 2c
- VT** 1.15 Speaking
1.17 Notation & Representation
1.19 Research
1.20 Communication of Data
2.1 Types of Questions
6.2 Uses of Evidence & Data
6.3 Analyzing Knowledge

2. Think Globally, Eat Locally

Book Review: *Living Wild and Domestic: The Education of a Hunter-Gardener*, by Robert Kimber. Review by Chuck Wooster. (page 64)

"Is anything more symbolic of our messed-up relationship with nature than our messed-up relationship with food?" So asks Chuck Wooster in his review of Kimber's autobiographical account of his intimate, hunting/gardening relationship with the natural world.

- Have your students explore their relationship with food by keeping a journal for two weeks of the foods they eat, what those foods are made of, and where they were grown and processed. What percentage of their food is grown locally? How much is processed, rather than eaten in its natural form? What foods, if any, did their family grow, hunt, or gather? Have them inventory the packaging from all the foods they consume in that two-week period, recording weight and materials used.
- What insight does this exercise, combined with Wooster's review and perhaps one or more of the readings suggested below, give your students? Have them write an essay about their eating choices and the impacts those food choices have on the rest of the world, using the specifics of their two-week inventory as examples. Have your students contemplate the food your school provides. Does any of the food come from local sources? Are there local alternatives available?
- Help your students start a garden at your school, growing vegetables that can be planted and harvested during the school year and require minimal care over the summer (carrots, onions, potatoes, pumpkins and other winter squash are good choices). If your school does not practice composting, develop a plan to create a composting system and present it to your school administration.


 Cornell University's *Composting in Schools* program offers helpful information and resource materials, including ideas for student research projects. <http://www.cfe.cornell.edu/compost/schools.html>.

CALENDAR

In Season: A Natural History of the New England Year, by Nona Estrin and Charles Johnson (page 75)

Northern Woodlands Winter Calendar (page 4)

Some species of frogs and toads produce a substance, glycerol, which keeps them from freezing during hibernation. Flying squirrels stay warm together in groups of 10 or more. Every animal and plant that over-winters in the Northeast has developed adaptations for surviving the deep cold. Have your students choose a local plant or animal and research its winter adaptations. Students can then work in groups to create a skit of surviving winter in the wilds.

 *Nature in Winter*, by Donald Stokes. Little, Brown, & Co., 1976.

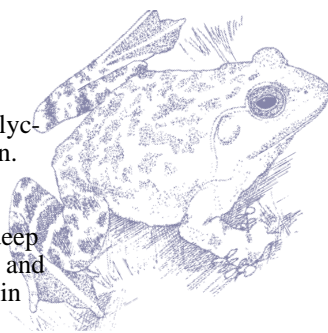
 I'm Thirsty (gr. 6-8)

ME Visual & Performing Arts A
Science & Technology B
English Language Arts A, D, H

NH Science 3a
English Language Arts 1, 5, 7

VT 1.16 Artistic Dimensions
1.19 Research
3.10 Teamwork
4.6 Understanding Place
5.8 Artistic Proficiency
7.13 Organisms, Evolution, & Interdependence

CONNECTION



Suggested Activities



For older students (grades 11-12), Wendell Berry's essay, *The Pleasures of Eating* (from *What are People For?* North Point Press, 1990), offers an excellent introduction to the politics of food. His book *The Unsettling of America: Culture and Agriculture* (Avon Books, 1978) is a classic on the subject of food, agriculture, and our health as individuals and as a culture.

The Food Revolution: How Your Diet can Help Save Your Life and Our World, by John Robbins. Conari Press, 2001, is another excellent, current resource.

Green Teacher magazine, Summer 2001, is devoted to teaching about food systems and offers many lesson plans on the subject for all grade levels. 416-960-1244 or email greentea@web.net.



#15 A Few of my Favorite Things (gr. 5-8)
#16 Pass the Plants, Please (gr. 5-8)
#92 A Look at Lifestyles (gr. 5-8) Composting (*Municipal Solid Waste* High School Module)
Take Action: Success Stories and Personal Choices (*Municipal Solid Waste* High School Module)



What Did Your Lunch Cost Wildlife (gr. 5-8)
Enviro-Ethics (gr. 5-8)
Can Do! (gr. 9-12)



Science & Technology J
English Language Arts E
Economics A



Science 3a
English Language Arts 2, 7
Social Studies 5, 9



1.12 Personal Essay
2.2 Problem Solving
2.13 Product/Service
3.9 Sustainability
3.10 Teamwork
6.15 Knowledge of Economic Systems
7.2 Investigation

3. Growing Clean Water

Managing Woods for Water at Quabbin Reservoir, by Robert Kimber (page 22)

Where does your school's water come from and how is its quality protected and improved? Who makes sure your drinking water is healthy? Have your students conduct a water quality test of your school's

drinking water. If your water comes from a local reservoir, invite a water quality specialist from your state's natural resource agency to accompany you on a field trip to that source to test its quality and examine the health of the forest and water sources surrounding it. He or she can also help your students develop a project to improve water quality by improving streamside vegetative buffers in your area.

Kimber's article provides an excellent overview of how healthy forests enhance water quality. Your students can explore the specifics of why good forest management creates high-quality water by conducting in-class and outdoor studies. Project Learning Tree's activity #44, Water Wonders, suggests a great exercise for hands-on learning about the capacity of plant roots to hold soil and prevent erosion. The activity can be done either in the classroom or in the schoolyard. Students run water down two sloped stretches of soil—one vegetated and one bare soil—to see the differences in water absorption and soil erosion.



To contact your state's water quality department for water test kits, information about stream bank restoration, and staff support:

Maine Bureau of Land and Water Quality 1-800-452-1942

New Hampshire Department of Environmental Services 602-271-3503

New York Department of Environmental Conservation, Division of Water 518-402-8233

Vermont Department of Environmental Conservation 802-241-3778



Orion magazine, Spring 2002 issue, has an excellent article, *The New Economy of Nature*, in which older students can learn about current trends in water management that operate on the premise that healthy watersheds produce healthy water. Students can learn how New York City, when faced with declining water quality, chose the revolutionary option of investing \$1.5 billion to improve protection of their watershed instead of installing a \$6-8 billion filtration system. www.oriononline.org.

The Streamside Sentinel, a 12-page introduction to riparian buffers, is produced by the Vermont Agency of Natural Resources. 802-241-3770.



#44 Water Wonders
#96 Improve Your Place (gr. 5-8) What's a Forest to You? (*Focus on Forests* High School Module)
Take Action! (*Focus on Forests* High School Module)



Science & Technology B, J



Science 1a, 2a, 3a, 4c
Social Studies 12



4.6 Understanding Place
7.1 Scientific Method
7.2 Investigation
7.13 Organisms, Evolution, & Interdependence
7.16 Natural Resources

CAREER

Sonatas in Spruce, Minuets in Maple, by Catherine Tudish (page 38)

Talk about locally adding value to local wood! Douglas Cox takes a few pieces of spruce and red maple—some that he has pulled from firewood piles—and transforms them into a \$15,000 violin. Your students may find great inspiration in Cox's story, in which his passion for music and his superb craftsmanship combine to become his life's work. Ask your students to choose an inspirational person in their community—teacher, craftsman, musician, forester—and interview them to learn the story of how they came to do the work they do. Have them take pictures, if possible. Students can then write up the interview in the form of a feature news article and submit it to your local paper.



Appendix: Guidelines for Interviewing People



English Language Arts G
Career Preparation A, E

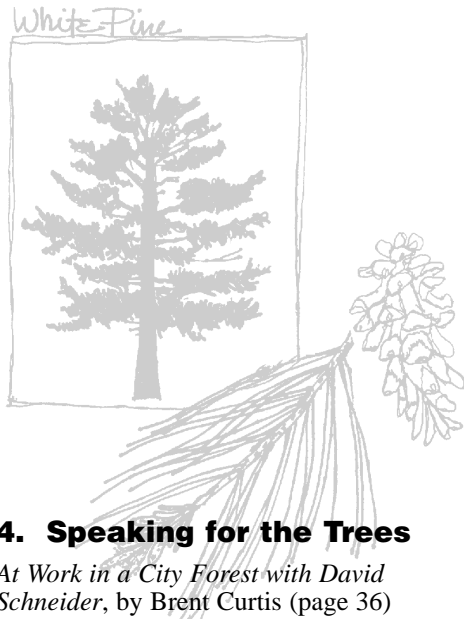


English Language Arts 2, 3



1.8 Reports

Suggested Activities




4. Speaking for the Trees


At Work in a City Forest with David Schneider, by Brent Curtis (page 36)


David Schneider believes that the key to the health and longevity of Rutland's trees is to plant and nurture a wide diversity of tree species. He cites the demise of the American elm as a prime example of what can happen when a community plants a tree monoculture.

Why does Schneider avoid planting monocultures? Do tree monocultures occur in natural systems? Have your students research Dutch elm disease and the rapid transformation it brought to communities across the Northeast. The streets of Burlington, Vermont, for example, were once lined with roughly 10,000 elms, of which only a handful is left. Your local historical society or library may be a good source of photographs.


Who "speaks for the trees" in your community? Most communities have a tree warden. Invite your tree warden to speak with your students and brainstorm tree planting opportunities in your community.

 For information and photographs about Dutch Elm Disease, www.forestry.auburn.edu/enbak/526lect/dutch/dutch.html.

 #31 Plant a Tree (gr. 5-8)
Take Action! (*Focus on Forests* High School Module)

 Civics and Government A
Science & Technology B, M


 Science 3a
Social Studies 4


 4.6 Understanding Place
6.9 Meaning of Citizenship
7.13 Organisms, Evolution, and Interdependence


5. Digging for Answers


Soil Mapping: Getting Down to Earth with a Soil Scientist, by Marijke Hecht (page 54)

What did the land on which your school is situated look like before it was cleared to build your school? What kinds of plants lived there? What factors determine which plant species will grow on a given piece of land? Students can unearth the answers to these questions through soil mapping. Invite a representative from your NRCS office to join your class to test and map the soils around your school. Ask them to familiarize your students with the tools of their trade—soil auger, soil maps, aerial maps, perhaps even a portable stereoscope.


 Consult the *Soil Mapping* article for contact information for your local NRCS office.

 *Wetland, Woodland, Wildland*, by Elizabeth Thompson and Eric Sorenson. University Press of New England, 2000.

 #70 Soil Stories

 Geography A
Science & Technology J

 Social Studies 10, 15
Science 1a, 2a

 4.6 Understanding Place
6.7 Geographical Knowledge
7.1 Scientific Method
7.2 Investigation


6. Vanishing Forests


Buy, Cut, Sell: Liquidation Harvesting Chops up Maine's Forests, by Drew Barton (page 46)


• In the "Searching for Solutions" section of this article, Barton wonders which


approach to the problem of liquidation harvesting will prove more effective—incentives like forest certification or strong legislation. Have your students research the extent of the problem of liquidation harvesting in your state, as well as the approaches in place (regulations and incentives) to counter it. Invite a representative from your state forestry department to your classroom to discuss the issue.


- What are the ecological effects of liquidation? Why does it matter if the basal area of a forested tract is reduced to 30 sq. ft. per acre? This number will likely mean little to your students. Invite a forester to show your students how to use a prism to determine the stocking or "crowdedness" of trees in a forest. Michael Snyder's article, *Why Does a 10-Factor Prism Work?* (page 21) will be a good reference for this work.


 For contact information for your state's forestry department, www.stateforesters.org.

 Who Owns America's Forests? (*Focus on Forests* High School Module)

 Changing the Land (gr. 6-8)
Riparian Zone (gr. 5-8)
Cabin Conflict (gr. 9-12)

 English Language Arts A
Science & Technology B, J, M
Economics A

 English Language Arts 1
Science 1a, 2a, 3b, 6a
Social Studies 5, 9, 13, 14


 1.19 Research
3.9 Sustainability
4.6 Understanding Place
6.3 Analyzing Knowledge
6.15 Knowledge of Economic Systems
7.1 Scientific Method
7.13 Organisms, Evolution, & Interdependence

WILDLIFE


CONNECTION

Slippery Business, by Susan Morse (page 19)

Take your students winter tracking! There's no better time to track than in winter after a light snow has fallen. The snow will record each animal's day- or nighttime travels. Explore your schoolyard and beyond. Bring a ruler and a good tracking guide (see below). Have students make note of where they see tracks (clearing, forest, edge between the two, wetland) and what the animals might be doing.

 *Mammal Tracks*, by Lynn Levine and Martha Mitchell. Heartwood Press, 2001.

 Tracks! (gr. 5-8)

 Science & Technology J

 Science 1a, 2a, 3a

 7.1 Scientific Method
7.2 Investigation

Word Search

Winter Calendar (page 4)

Well-fed Plant Cuts Back on Meat (page 44)

1. Brightest star in the winter sky.
2. These birds display in the air to attract mates.
3. Substance produced by American toads that keeps their bodies from freezing during winter hibernation.
4. Bird-eating raptor (two words).
5. Carnivorous plant of Northeastern bogs (two words).
6. Bird that hops up tree trunks searching for grubs (two words).
7. The root of this biennial plant is edible.
8. These are born in the last week of January.
9. Favored food of bald eagles.
10. In one scientific study, increased levels of this nutrient changed the way pitcher plants grow.
11. Name given to an organism scientists monitor to determine an ecosystem's health (two words).

B R E P E E R C N W O R B P W B P D B T
 U E F U S T B D Y A P R P E E W M B I P
 L V O M G U S W I L T S U T L A R U Y S
 C D C H R H I N D I G K T V N O M V T I
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 Y A O B P D U F I A I R G H S I F N A H
 X C P W G E M I H S H O U J W N L S L G
 K B O D H E U S G B R O R B U I N B P T
 J T V G L Y R F D T E W N R K M A U R I
 S I M D R E H S I F G N I K D E T C E B
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 S C V O D I E D W O R B W L O I P B I R
 A S E I C E P S R O T A C I D N I V P C

Word Search

Winter Calendar (page 4)

Well-fed Plant Cuts Back on Meat (page 44)

1. Brightest star in the winter sky. SIRIUS
2. These birds display in the air to attract mates. RAVENS
3. Substance produced by American toads that keeps their bodies from freezing during winter hibernation. GLYCEROL
4. Bird-eating raptor (two words). COOPER'S HAWK
5. Carnivorous plant of Northeastern bogs (two words). PITCHER PLANT
6. Bird that hops up tree trunks searching for grubs (two words). BROWN CREEPER
7. The root of this biennial plant is edible. BURDOCK
8. These are born in the last week of January. BEAR CUBS
9. Favored food of bald eagles. FISH
10. In one scientific study, increased levels of this nutrient changed the way pitcher plants grow. NITROGEN
11. Name given to an organism scientists monitor to determine an ecosystem's health (two words). INDICATOR SPECIES





Zimmer's poem is about an old woodpecker, or is it? What else might he be describing? Perhaps he's describing, using the metaphor of the woodpecker, someone he knows—his grandfather or elderly neighbor or even a man he noticed in a restaurant one day. Think of a person you know or have noticed, and think of a plant or animal that seems to you to illustrate some aspect of their personality. Write a poem that reveals those characteristics by describing the plant or animal's traits and actions, never mentioning the person.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

In Sue Kashanski's essay, a particular tree draws the writer and reader into a larger memory. Read her essay, and then choose a tree that you associate with a memorable event or period in your life. Write below about the tree and the events you associate with that tree, using sounds, sights, smells, textures, and tastes to bring your recollections to life.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.