

Calling All Student Scientists !

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

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.org or 802-439-6292.

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NORTHERN WOODLANDS MAGAZINE

802-439-6292

www.northernwoodlands.org

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 Autumn 2003 edition of *Northern Woodlands* magazine. What does the World Series have to do with the Northern Forest? Why does biodiversity matter? How can used French fry oil help reduce air pollution? You and your students can answer these questions and many more as you read this edition's articles.

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 6,800 students throughout the Northeast receive three issues of *Northern Woodlands* each school year. The sponsors are: the Alexander Host Foundation, Britton Lumber Company, Cersosimo Lumber Company, Inc., Columbia Forest Products, Fountain Forestry, Inc., Freeman Foundation, French Foundation, International Paper, Mill River Lumber, Northeast Lumber Manufacturers Assoc., Pompanoosuc Mills, and Wellborn Ecology Fund.

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 email Anne Margolis at (802) 439-6292 (email: anne@northernwoodlands.org). Visit our *Northern Woodlands Goes To School* website at www.northernwoodlands.org/goestoschool.html.

Noteworthy News:

Attention High School Science Teachers: Teaching Issues and Experiments in Ecology (TIEE) is a collection of peer-reviewed, classroom/field-tested teaching materials sponsored by the Ecological Society of America. Among these "scientifically sound and pedagogically innovative" teaching materials are a number of particularly well-designed ecology labs for field and classroom. As of July 2003, two of the seven labs on the website were complete and ready to download: Ecology of Habitat Contrasts and Environmental Correlates of Leaf Stomata Density. Both are designed for college-level courses. Five other labs covering a range of ecology topics will eventually be available, and users may also take advantage of an earlier set of labs from 1993. <http://www.ecoed.net/tiee/exps/experiments.shtml>.

PBS offers an online set of lesson plans and other learning resources to help students explore the world's oceans. The website provides ten interdisciplinary activities for grades K-12. The activities cover a broad range of fields, including history, poetry and literature, economics, and the sciences. The site also includes numerous links to related PBS and other websites, as well as a list of recommended books. The link to *The Voyage of the Odyssey: Real-Time Marine Science* leads to another PBS website offering many interactive educational activities created to "not only teach the facts of science, but also impart to teachers and student the adventure of science." http://www.pbs.org/teachresource/sci_tech.htm.

Eisenhower National Clearinghouse: ENC's mission is to identify effective curriculum resources, create high-quality professional development materials, and disseminate useful information and products to improve K-12 mathematics and science teaching and learning. www.enc.org.



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. Exploring Biodiversity: Biological Inventories (field study)

Rhode Island BioBlitz Leaves No Stone Unturned (page 14)

Lisa Gould, executive director of the Natural History Survey, sees conducting an intensive biodiversity inventory, or “BioBlitz,” as a way to highlight the “amazing biological diversity in our own backyards.”

- If there is a BioBlitz that occurs annually in your area, find out how your students can take part. Organize your own biological inventory of your school grounds. Invite local experts at identifying birds, plants, small mammals, reptiles, and amphibians (Audubon Society birders, state or federal agency biologists, college graduate students) to help your students begin to inventory the school grounds and explain the scope and limitations of such methods. Invite the local newspaper to cover the story or have students take photos and write a press release themselves.

 For links to information about BioBlitz activities going on in your state: <http://www.im.nbs.gov/blitz.html>.

Discover Life in America, Inc. (DLIA), (www.discoverlifeinamerica.org) is a nonprofit doing groundbreaking work to unite the efforts of scientists, volunteers, teachers, and students who wish to participate in biodiversity inventory of the estimated 100,000

species in Great Smoky Mountains National Park. DLIA is part of a team of organizations, collectively called Discover Life (www.discoverlife.org). On this site, you’ll find extensive files (photos and text descriptions) of many animal species, as well as an online key to identifying wildlife species.

Nature Mapping Program. Based out of Washington State, but seeking to create a national network. <http://www.fish.washington.edu/naturemapping/>.

Encouraging Biodiversity in the Schoolyard. National Wildlife Federation’s Schoolyard Habitats Program. www.nwf.org.



Bird Song Survey Who Fits Here?



#2 Cast of Thousands (Forest Ecology high school module)



Science and Technology B, J



Science 1a, 2a, 2b, 3a



3.9 Sustainability
4.6 Understanding Place
7.1 Scientific Method
7.2 Investigation

2. Exploring Biodiversity: Land Conservation Strategies

The Nature Conservancy Explores the Larger Landscape, by Rebecca Brown (page 30)

ducted high-profile land acquisitions throughout New York and New England. Have your students research one in your region (such as West Mountain in Vermont, St. John River Project in Maine, Round Lake in New York’s Adirondacks, Ashuelot River Watershed in New Hampshire). If possible, have a TNC representative visit your classroom, or, better yet, accompany your students on a field trip to one of their land holdings near you.

- How do we best protect biodiversity? TNC offers just one approach to dealing with increasing human pressure on natural populations. There are many different strategies for conserving public and private lands and the plants and animals that live there, and as many different agencies and non-profit organizations facilitating those strategies. What conservation efforts are occurring or have occurred in your region? Have students work in teams to research and report on one of these organizations and their conservation strategy. Are they effective (both in acquisition and in maintaining biodiversity)? How do they get the job done? Which constituencies do they work effectively with and which do they tend to alienate?



Three-part series about The Nature Conservancy in The Washington Post, May 4-6, 2003: www.washingtonpost.com/wp-dyn/nation/specials/natureconservancy. TNC’s rebuttal to the Post’s criticisms: www.nature.org.

Find out about TNC’s land conservation work near you at: www.nature.org/wherewework.

The Northern Forest Alliance maintains a list of conservation organizations at work in the Northeast. www.northernforestalliance.org/links.



Improving Wildlife Habitat in Your Community



#56 We Can Work it Out
#57 Democracy in Action
#4 Who Owns America’s Forests? (Focus on Forests module, gr.9-12)



English Language Arts A, D, E, H



English Language Arts 1, 2, 5, 6



1.5 Writing Dimensions
1.8 Reports
1.9 Research
4.6 Understanding Place
6.3 Analyzing Knowledge



Suggested Activities

3. Exploring Biodiversity: An Endangered Act (Current Events)


Playing Games with Critical Habitat, by Patrick Parenteau (page 9)


Why does biodiversity matter? Why does extinction matter? What is the federal government's role and responsibility in protecting biodiversity? Is it fulfilling that role? Have students read Parenteau's commentary on the Bush Administration's reduction of funding for endangered species' habitat protection and write a response to it with these questions in mind.


 The World Wildlife Fund site offers endangered species information: <http://www.wwfus.org/species/species.cfm>

Conservation International hosts an award-winning website on Endangered Species, called Biodiversity Hotspots: www.biodiversityhotspots.org/xp/Hotspots.


The Endangered Species Coalition hosts a site that focuses on current Endangered Species legislation: <http://www.stopextinction.org/>.

 Here Today, Gone Tomorrow Know Your Legislation

 #88 Life on the Edge

 English Language Arts A, E, G

 English Language Arts 1, 2

 1.1 Persuasive Writing



Student can create informational brochures about diesel emissions and alternatives and distribute them to local farm machinery dealers, truck shops, etc.

<http://www.epa.gov/cleanschoolbus/>. This EPA site contains extensive information on reducing school bus emissions, including case studies of school districts that have implemented these changes. Visit the rest of the EPA transportation site for information about current programs involving diesel fuel and emissions reductions. Their Voluntary Diesel Retrofit Program page offers a retrofit calculator that allows you to calculate the tons of emission reductions a retrofit of the bus fleet would create.

The article mentions World Energy as the only New England based producer of on-road certified biodiesel. www.worldenergy.net.

John Hurley's Dog River Alternative Fuels website, www.veggiefuels.com, offers good information about biodiesel and several useful links to more information.



Taking Action Can Do!



#85 Air to Drive

#96 Improve Your Place

#8 Take Action! (Focus on Forests high school module)



English Language Arts

A, D, E, G, H

Science and Technology J

Mathematics C



English Language Arts 1, 2, 3, 5, 6



1.15 Speaking

1.19 Research

1.8 Reports

2.13 Product/Service

2.14 Planning/Organization

6.3 Analyzing Knowledge

5. Owl Pellets (Hands-on study)

Guess Who Came to Dinner? Owl Pellets Reveal the Raptors' Prey, by Leighton Wass (page 37)

Dissecting owl pellets can be a great way to study owls—their anatomy (adaptations for finding prey in the dark; ability to swallow prey whole; how and why they produce owl pellets) and ecology (food preferences, nocturnal behavior, niche, habitat). Pellets also make a good lead-in to studying rodent anatomy and population ecology. There are many internet sources from which to purchase owl pellets (simply search “purchase owl pellets”), some of which offer free bone identification posters. One, www.teachersource.com, sells pellets that contain bones from a variety of prey species, for roughly \$2.25 each.

4. Biodiesel (Current Events)

Vermont Logger Brews a Different Kind of Diesel, by Kate McKenney (page 54)

U.S. school buses drive more than 4 billion miles each year. Have students research your school district's diesel usage and conduct a cost/benefit analysis of changes that would lessen pollution emissions, including eliminating unnecessary bus idling, upgrading buses with better emission-control technologies, and fueling them with cleaner fuels like biodiesel. Have students make a presentation to the school board and create an information display for community venues (library, town hall). Encourage them to promote their findings and ideas through articles in both school and local papers.

CALENDAR

Autumn Calendar (page 4)

Now is a good time to establish your class's nature journal for the year. It could take the form of a giant calendar, with students taking turns making natural history observations and entries each day (weather data, new sightings for the season), or a 3-ring binder into which students can insert artwork and photos as well as written notations. Consider giving your journal a theme for the year. With the theme of biodiversity (see Rhode Island BioBlitz Leaves No Stone Unturned, page), students can observe and key out a new plant or animal species each day.

CONNECTION




Suggested Activities

With either project, students will, in the process, learn much about bird ecology, habitat requirements, habits, and predators.


 Vermont Institute of Natural Science Raptor Rendezvous education program will bring live raptors to your classroom or school. Check with your state wildlife department to see if such a program is available in your area. www.vinsweb.org
 Vermont Department of Fish and Wildlife: www.anr.state.vt.us/fw/fwhome
 Maine Department of Inland Fisheries and Wildlife: www.state.me.us/ifw
 New Hampshire Fish and Game Department: www.wildlife.state.nh.us
 New York Department of Environmental Conservation: www.dec.state.ny.us

www.owling.com. This extensive site offers natural history descriptions, photos, and recordings of owl calls.

 Owl Pellets

 Science and Technology B, J

 Science 3a

 7.2 Investigation
 7.13 Organisms, Evolution, and Interdependence


6. Timber Theft (Current Events)


New York Increases Penalty for Timber Theft (page 17)


This article highlights new legislation designed to protect public property—in this case, trees in the Adirondack Preserve. It's yet another example of an attempt to ensure that our public resources (air, water, forests, oceans, and so on) or Commons, as they have come to be known, are well cared for and are equally available to all citizens.


As population increases, pressure on the Commons increases. How do we protect resources that belong to us all? Will legislation best protect the Commons? What other means have people employed in the past? Have they worked? What new means might we try in the future? Students can discuss these questions as a group and write an essay on their own as follow-up.



 Further reading for older students: "In Law We Trust," by Mark Dowie. *Orion* magazine. July/August 2003. pp 18-25.


 *Putting the "Pop" in Population: Population and Environment in the Great Northern Forest*. Teaching curriculum created by the Fairbanks Museum & Planetarium. This and 35 other curriculum packets available for free downloading, www.fairbanksmuseum.org.

 Know Your Legislation

 #58 There Ought to be a Law

 English Language Arts A, E

 English Language Arts 1, 2


 7 Responses to Literature
 1.12 Personal Essays


WILDLIFE


CONNECTION

Non-Native Earthworms Are No Friend of Forest Trees (page 44)


People often make judgments of animal species that are based on incomplete or mistaken information, fear, and the winds of public opinion. Earthworms have long been considered "good," high up on the list of "man's best friends" with dolphins and ladybugs. Similarly, many animals are on the "bad" list, like coyotes, porcupines, and potato beetles. Many animals have shifted lists over time, as public opinion has shifted. These simplistic judgments of wildlife cannot encompass the complexity of any organism. Have class brainstorm two lists, labeled Good and Bad, and quickly categorize all the animals they can think of. Then have them select one of those animals, research it fully, and create a presentation for the class (including artwork, photographs, diagrams, maps, and any other support media) that moves beyond judgmental labels and reflects the complexity of that animal's role in its natural community.


 *Owls Aren't Wise and Bats Aren't Blind: A Naturalist Debunks Our Favorite Fallacies About Wildlife*, by Warner Shedd. Random House: 2000.

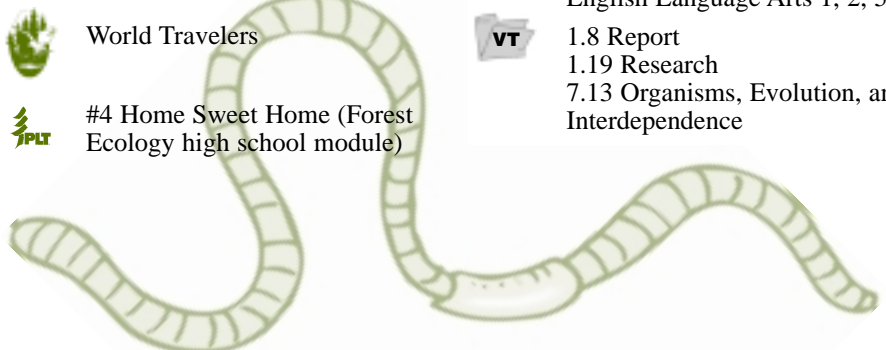
 Science and Technology B
 English Language Arts A, D, E, H

 Science 3a
 English Language Arts 1, 2, 5, 6

 World Travelers

 1.8 Report
 1.19 Research
 7.13 Organisms, Evolution, and Interdependence

 #4 Home Sweet Home (Forest Ecology high school module)



Word Search

November meteor shower.

Squirrels, turkeys, deer, bear, and jays all eat these nuts.

In November, you can find the leaf-wrapped cocoons of this insect on the ground (2 words).

This reptile's eggs hatch in early September (2 words).

These insects come inside for the winter, and might drive you nuts with their music.

Though many ferns die back and turn brown in the fall, the fronds of this fern stay green throughout the winter (2 words).

Birds love the berries of this plant, better know for its shiny, compound leaves that bear 3 leaflets (2 words).

These butterflies migrate south in the fall.

Both cluster flies and the earthworms they parasitize are natives of this continent.

This raptor is one of the last birds to migrate south in the fall (3 words).

Genus of composite wildflower that blooms in autumn.

This shrub is the last woody plant to flower in the Northeast (2 words).

This butterfly overwinters as an adult and is one of the first butterflies you'll see in early spring (2 words).

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

Word Search

November meteor shower. LEONID

Squirrels, turkeys, deer, bear, and jays all eat these nuts. ACORNS

In November, you can find the leaf-wrapped cocoons of this insect on the ground (2 words). LUNA MOTH

This reptile's eggs hatch in early September (2 words). WOOD TURTLE

These insects come inside for the winter, and might drive you nuts with their music: CRICKETS

Though many ferns die back and turn brown in the fall, the fronds of this fern stay green throughout the winter (2 words). SPINULOSE WOODFERN

Birds love the berries of this plant, better know for its shiny, compound leaves that bear 3 leaflets (2 words). POISON IVY

These butterflies migrate south in the fall. MONARCH

Both cluster flies and the earthworms they parasitize are natives of this continent. EUROPE

This raptor is one of the last birds to migrate south in the fall (3 words). RED-TAILED HAWK

Genus of composite wildflower that blooms in autumn. ASTER

This shrub is the last woody plant to flower in the Northeast (2 words). WITCH HAZEL

This butterfly overwinters as an adult and is one of the first butterflies you'll see in early spring (2 words). MOURNING CLOAK

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

Crossword Puzzle

Play Ball!

Adirondack Baseball Bats Make the Big Leagues, by Stephen Long (page 22)

Across

1. This player battled with Sammy Sosa in the 1998 Home Run Derby, breaking Roger Maris's record by hitting 70 with his Adirondack Bat.
2. A baseball player uses about 120 of these during a typical season (2 words).
3. Billet ends are coated with this substance to keep them from drying out too quickly in the kiln.
4. Most bats are made from this tree species (2 words).
5. Machine in which the billets are stored for 30 days to reduce their moisture content to 10-12 percent (2 words).
6. A three-inch cylinder of wood, 40 inches long, that will be carved into a bat.
7. Machine that carves a flitch into a non-professional bat.

8. Barry Bonds hit his home run record using bats made from this wood.

9. This mark, about 18 inches up on the bat handle, tells you it's an Adirondack bat.

10. The most popular bat model at present, the 456, is used by this Red Sox catcher. JASON VARITEK

Down

1. To avoid breaking a bat, here's where you've got to hit it (3 words).

2. The first growth of wood each year.

3. Largest bat manufacturer in the country.

4. Machine that carves a billet into a professional model bat (2 words).

5. Most important wood characteristic in making a high-quality bat (2 words).

6. The faster the growth of the ash tree, the _____ the wood.

7. This player for the Anaheim Angels uses Adirondack bats and was named Most Valuable Player in the 2002 World Series (2 words).

8. This catcher for the San Francisco Giants used Adirondack bats in the 2002 World Series (2 words).

9. The Rawlings/Adirondack Company, now the second largest bat producer in the country, has made wooden bats in this town since 1946.

