



Teacher's Guide

Fall 2007

Northern Woodlands Goes To School

Welcome to the Fall 2007 edition of *Northern Woodlands* magazine. As you and your students settle back into the school year, you'll find articles that will spark explorations of the natural world outside your classroom door. Do beech nuts have enough caloric value to fatten bears for winter? Do coyotes and domestic dogs interbreed? How many acorns can a single blue jay plant in a year? Your students will find the answers to these questions and countless more in this *Northern Woodlands* issue.

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 5,000 students throughout the Northeast are able to participate in Northern Woodlands Goes to School this year. The sponsors are: Fountain Forestry, Inc., Frank and Brinna Sands Foundation, French Foundation, International Paper, Maine TREE Foundation, Merchants Bank, New England Forestry Foundation, Northeastern Lumber Manufacturers Assoc., Twinflower Farm, 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, 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/goes_to_school.php, where you can also download each quarter's teacher's guide.

Noteworthy News

A Forest for Every Classroom is a year-long professional development series for educators, aimed at providing the inspiration, knowledge and skills required to transform classroom teaching into effective and exciting place-based education. For more information about how you can participate in this innovative program, visit <http://www.nhplt.org/FFEC.htm>.

1. Autumn Birding

Identifying Hawks, by Alan Pistorius (pg. 32)

Autumn is the perfect time for hawk and falcon watching. While many bird species migrate at night, hawks and falcons migrate by day, making it possible to watch them on their journey. Entering the world of birding can feel daunting to students (and teachers!), particularly because beginners tend to rely solely on plumage to identify species. As Pistorius notes, other important features—including behavior, location, and body shape—help make identification easier.

As a class, list all the hawk and falcon species that live in your region. Have each student choose one species to study. Have each create a one-page birding guide for his or her bird, including where the bird is most likely to be seen, where it nests, what it looks like overhead (since that how it'll most often be seen), key body and plumage identification features, and where members of that species go for the winter. Be sure to have students include a photo of the bird, both perched and flying overhead. Laminate the pages and place them in a 3-ring binder to bring into the field with you.

Have each student create a large flashcard with 3 identification prompts plus a photo of the bird flying overhead on one side of cardstock, and the species name on the other side. For example, "I have long, pointed wings. I bob my tail while perching and hover before diving on prey. I have a red back and tail. Who am I?" Use the flashcards as a study tool to prepare for a birding outing.

Consult with members of your local Audubon Society chapter to determine the best time and place for a hawk-watching fieldtrip. Ask one or two members to accompany you. Bring the students' laminated identification sheets and a pair of binoculars for each student. If your school doesn't have these, your local Audubon Society chapter members may be able to help. Record numbers and species of birds you see. Have students enter their findings on the interactive eBird website.

Books: In *The Sibley Guide to Bird Life and Behavior*, produced by the National Audubon Society (Alfred A. Knopf: 2001), you'll find an informative section on "hawks and allies."

Websites: Co-sponsored by the Cornell Laboratory of Ornithology and the Audubon Society, eBird provides an online checklist program in which you can enter and analyze birding data, www.ebird.org.

Wild:	Birds of Prey (grades 9-12)
ME	Science and Technology B, J English Language Arts A, D, H, J
NH	Science 1a, 2a, 2b, 3a, 6d English Language Arts 1, 5
NY	MST 1 Scientific Inquiry MST 2 Information Systems MST 4 The Living Environment MST 6 Patterns of Change
VT	1.8 Information Technology 1.9 Research 4.6 Understanding Place 7.1 Scientific Method 7.2 Investigation 7.13 Organisms, Evolution, and Interdependence

2. Connecting with Wildlife

As Still as a Stump: How to Have a Close Encounter of the Wild Kind, by David C. Brown (pg. 42)

In this article, David Brown describes his up-close experiences with wildlife. He notes that one of the best ways to see wildlife is to sit and wait. Some of your students may be hunters and so have experience with this, but for others, sitting quietly outdoors and watching wildlife may be a new experience. Give students "do-nothing" homework—have them find a comfortable spot in the woods to sit quietly and motionless for a half-hour at a time, preferably at dawn or dusk, and record any wildlife they see or hear. If the school has a bird feeding station, you can place a chair nearby and have students sit quietly there.

Wild:	Too Close for Comfort Ethi-Thinking
ME	Science and Technology B, J English Language Arts A, D, E, H
NH	Science 1a, 2a, 3a English Language Arts 1, 2, 5
NY	MST 1 Scientific Inquiry MST 4 The Living Environment ELA 2 Speaking and Writing
VT	1.19 Research 1.23 Poetry 7.2 Investigation 7.13 Organisms, Evolution, and Interdependence

Have students write a poem or essay about their experiences involving encounters with wildlife.

Stalking wild animals to see them up close can disturb wildlife and endanger the viewer. Discuss wildlife viewing ethics. What are appropriate and inappropriate ways to interact with wildlife and why? Why is it OK to feed some animals (songbirds at the birdfeeder), but not others? Discuss helpful tools for seeing animals up close without getting too close (binoculars, spotting scope, camera with telephoto lens). Younger students can choose an ethic to illustrate in a poster. Older students can research and report on a particular ethic or on wildlife viewing ethics as a whole, drawing from scientific studies on wildlife behavior and from the many news stories about people who have paid the price for viewing wildlife from too close a distance. You'll find links to useful viewing ethics websites below.

Websites: A few of the many useful sites that discuss wildlife viewing ethics:
http://www.wildlife.state.nh.us/Outdoor_Recreation/wildlife_watching.htm (New Hampshire Fish and Game Department); <http://wdfw.wa.gov/viewing/ethics.htm> (Washington Department of Fish and Wildlife).

3. Creating Early Successional Habitat

Fields Among the Forests: Keeping Open Land Open, by Chuck Wooster (pg. 38)

Discuss historical land coverage patterns in northeastern states. Is early successional forest “natural” in this region? What events would have historically created early successional habitat? What events create early successional habitat today? Not all fields are of equal value to wildlife—the field’s plant diversity and management determine its wildlife value. Have students conduct a biological inventory in a nearby unmowed field. Each student can survey a one-yard square, carefully inventorying the various plants and animals they discover there. Then have them each assess the biodiversity of a one-yard square in a mowed section of the school grounds. What do they hypothesize the difference will be? What do their studies reveal? Discuss the idea of how habitat structure (the vertical arrangement of plants within a meadow or forest) affects species diversity and how the management choices landowners make impact that diversity.

PLT	Nothing Succeeds Like Succession
ME	English Language Arts B History B Science and Technology B, J
NH	Science 1a, 2a, 3a Social Studies 12, 17
NY	MST 1 Scientific Inquiry MST 4 The Living Environment SS 1, 3
VT	4.6 Understanding Place 6.4 Historical Connections 7.1 Scientific Method 7.2 Investigation 7.13 Organisms, Evolution, and Interdependence 7.16 Natural Resources and Agriculture

Books: *Wetland, Woodland, Wildland*, by Elizabeth H. Thompson and Eric R. Sorenson. Excellent discussion of succession in Vermont's forests and the history of human disturbance in these forests.

Websites: Harvard University's Fisher Museum at Harvard Forest offers a visual timeline of changes to the New England landscape from pre-settlement times to the present.
<http://harvardforest.fas.harvard.edu/museum/landscape.html>.

For an introduction to the ecology of forest structure, visit
www.museum.state.il.us/muslink/forest/htmls/intro_struct.html.

On Vermont Audubon's website, you'll find information on bird-friendly forest management, including retention of early successional habitat.
www.audubon.org/chapter/vt/vt/sciCon_ForestBirdFactSheets.html.

4. Water-Inspired Art

Woodland—New Haven River #1 painting by Janet Fredericks (pg. 79)

Janet Fredericks's artwork illuminates a whole new way for students to observe and interact with the natural world. Have students visit her website to see images of her paintings and illustrations and her

process of creating art. Be sure to have students explore the website fully—they'll discover videos that include footage of Fredericks creating her water-inspired art.

Though Fredericks works with paper underwater, your students can work with a more durable medium—canvas. Have students submerge a long piece of canvas in water and observe the play of light and water over the canvas' surface. Fredricks uses oil-based lithograph crayons, but regular crayons will also work to capture the movements and shapes the students see. On dry land, students can add color to the canvas with watercolor paints. Encourage students to write a poem connected with the artwork they produce.

ME	Visual and Performing Arts A
NH	Visual Arts 1, 6
NY	ART 1 Visual Arts
VT	5.28 Artistic Proficiency 5.29 Visual Arts

Websites: Janet Fredricks's site, www.janetfredericks.com.

5. Revitalizing Aquatic Habitat

Rebuilding a Trout Stream, by Stephen Long (pg. 16)

What are the measures of river system health? Stephen Long lists several qualities—water temperature, levels of pollutants, streambank vegetation, downed woody debris in the river channel. Work with students to measure the health of a river near you. Invite an aquatic biologist from your state's fish and wildlife department to help conduct a scientific study. If possible, measure the river in two sections—one in a more remote section where down woody debris and canopy cover are present, and one section that passes homes, where more clearing has occurred.

Discuss with students the unintended consequences of management choices. Neatness can be deadly to natural communities. A stream cleared of debris and streambank vegetation sustains less life than a "messy" one. A mowed lawn supports far less biodiversity than an unmowed meadow, overgrown with milkweed and goldenrod. Far more wildlife will live in a forest with large downed material, standing dead trees, and a shrubby understory than in an even-aged plantation.

Websites: The United States Forest Service offers an on-line version of the excellent reference book, *Riparian Forest Buffers*, by David J. Welsch, www.na.fs.fed.us/spfo/pubs/n_resource/buffer/cover.htm.

Wild	Blue-Ribbon Niche (Aquatic Guide)
PLT	Field, Forest, and Stream
ME	Science and Technology B, J
NH	Science 1a, 2a, 2b, 3a, 6d
NY	MST 1 Scientific Inquiry MST 4 The Living Environment MST 6 Patterns of Change
VT	7.1 Scientific Method 7.2 Investigation 7.13 Organisms, Evolution, and Interdependence

6. Forests for the Future

At Work Managing Forests with Mike Greason, by Douglas R. Allen (pg. 52)

Forester Mike Greason's mission is simple, "To motivate forest owners to manage their woods, and to give them guidance to become good forest stewards." In Allen's article, Greason gives the disheartening statistic that 80 percent of all timber harvests in New York state are not carried out in a way that maintains the forest's health. Invite a forester to lead you on a field trip to a recently harvested local forest that he or she feels has been harvested in an exemplary way (with access roads that prevent soil erosion, little residual site damage, buffers around streams and vernal pools, etc). Using Vermont Family Forests' Forest Management Checklist and Woodlot Monitoring Checklist as guides,

PLT:	400-Acre Wood Green Space (High School Module: <i>Places We Live</i>) Forest Consequences
ME	English Language Arts A Science and Technology B, J
NH	English Language Arts 1 Science 1a, 2a, 3a, 4c
NY	SS 3, 5 MST 1 Scientific Inquiry MST 4 The Living Environment MST 6 Patterns of Change
VT	7.2 Investigation 7.13 Organisms, Evolution, and Interdependence 7.17 Natural Resources and Agriculture

students can assess the health of this forest and become acquainted with the art of sustainable forest management.

Website: Vermont Family Forests, a forest education organization that oversees Forest Stewardship Council certification of many private forest parcels, offers a website chock-full of sustainable forestry information. You'll find their Forest Management Checklist and Woodlot Monitoring Checklist on their publications page, www.familyforests.org/public-education/publications.shtml.

Penn State University provides extensive forestry curriculum materials, <http://sftrc.cas.psu.edu/LessonPlans/Forestry/SustainableForestry.html>.

Career Connection

Family Business: Father, Son, Mother, Daughter Log Together, by Tovar Cerulli (pg. 24)

As Tovar Cerulli's article reveals, diversification is often a key to survival for wood products businesses. Have students choose and research a local forest-related business, interview its owners and/or managers, visit its operations if possible, and learn the economics and family dynamics of the business. Try to cover a spectrum of businesses, from loggers and foresters to value adders (furniture, flooring, plywood, paper, etc.) and non-timber forest products providers (maple syrup, ginseng, mushrooms, etc.). Have each student prepare a display of their findings, including both written report and appropriate visuals. Arrange to display their work at your local library or other public meeting place.

Wildlife Connection

The Oak and the Jay, by Richard Norman (pg. 19)

Northern Woodlands' Stewardship Stories series encourages readers to write and send in their own stewardship success stories. Have students develop a stewardship project to complete during the year, then write an article about the project at year's end. The project doesn't need to be huge and complex—much of the beauty of Richard Norman's project lies in its simplicity. How can you improve the stewardship of your school grounds? Is there wildlife habitat work to be done? What about river habitat rehabilitation? Have students map the school grounds and develop a stewardship plan for the property, or work on a nearby community-owned property.

Wild	Appendix: Interviewing People
PLT	Who Works in this Forest?
ME	Economics A English Language Arts A, D, E, G, H
NH	Social Studies 5, 9, 11 English Language Arts 1, 2, 3, 5, 6
NY	SS 3, 4 ELA 1 Listening and Reading MST 1 Scientific Inquiry MST 7 Strategies
VT	1.8 Reports 1.13 Clarification and restatement 1.19 Research 3.9 Sustainability 4.6 Understanding Place 6.15 Knowledge of Economic Systems 6.19 Identity and Interdependence 7.16 Natural resources and Agriculture

Wild:	Planning for People and Wildlife Improving Wildlife Habitat in the Community
ME	Science and Technology B, J Civics and Government A Geography A English Language Arts E
NH	English Language Arts 2, 7 Social Studies 4, 10, 15 Science 3a
NY	CDOS 3 Thinking Skills CDOS 4 Human and Public Services SS 5 MST 4 the Living Environment ELA 2 Speaking and Writing
VT	1.12 Personal Essays 2.2 Problem Solving 3.13 Roles and Responsibilities 6.7 Geographical Knowledge 7.13 Organisms, Evolution, and Interdependence

Calendar Connection

Calendar (pg. 4), *Woodland—New Haven River #1* painting by Janet Fredericks (pg. 79)

Have your students begin the school year by practicing their observation and artistic skills. Have each student keep a field journal in which they note one seasonal change each week in words and images. The *Northern Woodlands* calendar can give students ideas of what to look for. Janet Fredericks's artwork offers inspiration for the possibilities for field art. Have students visit her website and look at examples from her field journals.

ME	Science and Technology J Visual and Performing Arts A
NH	Visual Arts 1, 6 Science 1a, 2a
NY	MST 1 Scientific Inquiry ART 1 Visual Arts
VT	5.29 Visual Arts 7.2 Scientific Investigation

Books: *Nature Journaling: Learning to Observe and Connect with the World Around You*, by Claire Walker Leslie. Storey Publishing: 1998.

Websites: You'll find samples from Janet Fredericks's field journals at www.janetfredericks.com/fieldnotes.html.

Although the curriculum activity at this PBS Kids website is designed for younger students, the information it provides works for any age. www.pbskids.org/backyardjungle/info/nature_journaling.php.

Handouts:

Writing from the Land

Woodland—New Haven River #1 painting by Janet Fredericks (pg. 79)

Take a long look at the painting by Janet Fredericks, entitled *Woodland—New Haven River #1*. Consider water in all its forms—from ocean waves to trickling forest streams. What is your favorite water place? Take time to picture it fully in your mind. How does it sound, smell, feel, look? In essay or poem, bring that place to life with words.

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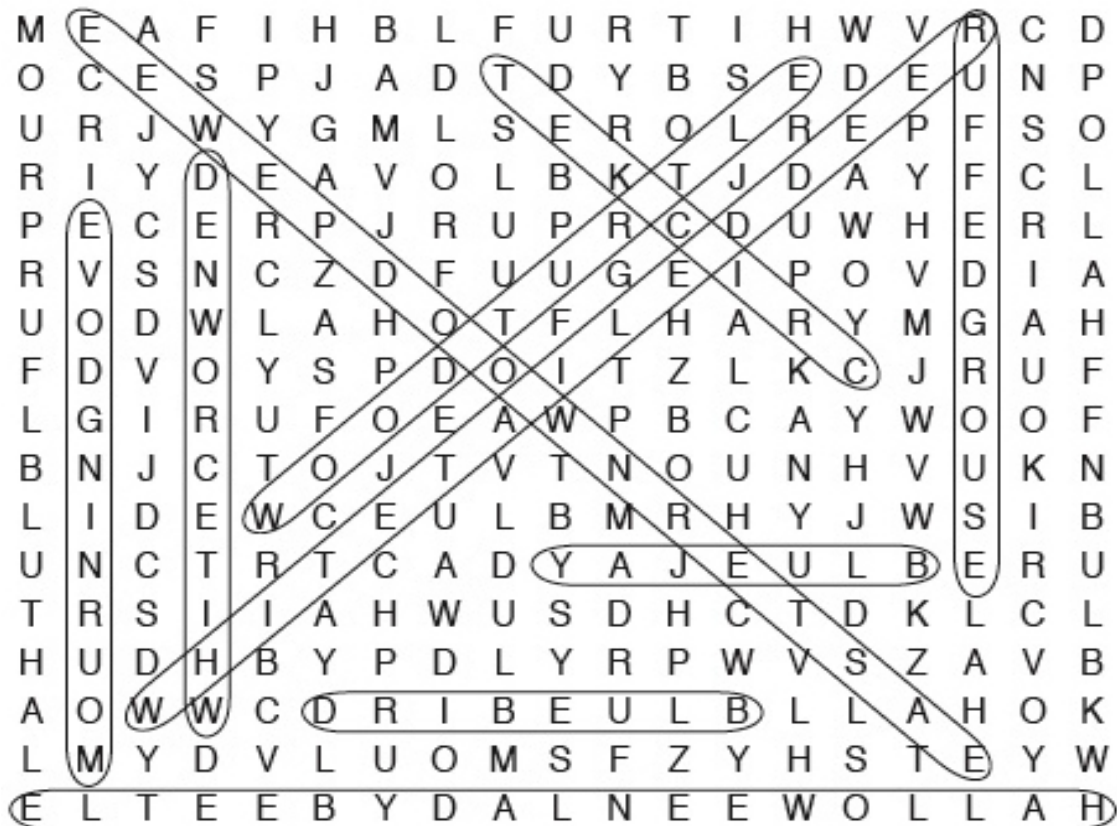
Word Search

Animals of the Northern Forest

Autumn Calendar, (pg. 4)

Using the Northern Woodlands Autumn Calendar to help you solve the clues, find ten animals of the Northern Forest in the word search below.

1. Many species of sparrow migrate south for the winter, including this one (2 words) WHITE CROWNED
2. This bird species grows “snowshoes” on its toes in winter (2 words). RUFFED GROUSE
3. The outer hairs of this mammal’s fur are hollow (3 words). WHITE-TAILED DEER
4. This bird species buries acorns for the winter (2 words). BLUE JAY
5. This chirping insect hibernates for the winter. CRICKET
6. Though most flycatchers have already headed south by September, you can still hear some members of this species singing a three-note song (3 words) EASTERN WOOD PEWEE
7. This non-native insect eats about 300 aphids during its larval stage of growth (3 words) HALLOWEEN LADY BEETLE
8. Cold, slow-moving grasshoppers make easy autumn food for this bird species. BLUEBIRD
9. This butterfly overwinters as an adult, and so is one of the first butterflies to be seen in early spring (2 words). MOURNING CLOAK
10. This reptile hibernates in stream banks and root masses (2 words) WOOD TURTLE



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

Crossword

Autumn Calendar (pg. 4)

Across

1. This tree species loses half its needles each autumn (2 words). WHITE PINE
2. The pods of this wild plant dry out in autumn and float on the wind, dropping seeds along the way (2 words). WILD CUCUMBER
3. The flowers of this woodland shrub bloom in late October (2 words). WITCH HAZEL
4. October meteor shower, noted for its slow-moving meteors. DRACONID
5. Long after other deciduous trees have dropped their leaves, this tree species holds onto its browned leaves. BEECH
6. This butterfly species flies south in late September. MONARCH
7. Best part of the day during which to see migrating hawks. MIDDLE
8. Mice use the fluff from this flower head for winter insulation. CATTAIL
9. Woodpeckers eat this seeds of this woodland vine (2 words). POISON IVY
10. Late October meteor shower. ORIONID
11. The dried fruit of this plant feeds wildlife in winter (2 words). WILD GRAPE

Down

1. As mating season approaches, male white-tailed deer rub this substance off their antlers. VELVET
2. Deer have scent glands in this part of their bodies. FEET
3. The fruits of this forest tree ripen in mid-September (2 words). BLACK CHERRY
4. This tree turns reddish orange in autumn due to acidic sap (2 words) SUGAR MAPLE
5. Many waterfowl species will stay in the north until lakes and rivers freeze, including this species. MALLARD
6. The eggs of this reptile hatch in early September (2 words). WOOD TURTLE
7. Some catbirds spend the winter in this Central American country (2 words). COSTA RICA
8. November meteor shower. LEONID
9. Ruffed grouse eat the buds of this tree. ASPEN



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