



Autumn, 2004

Teachers were mistakenly sent a card asking if they wanted FIVE free copies of *Northern Woodlands* for the 2004-05 school year. At present, teachers can still order as many copies of the magazine as they need for their classroom. Please contact Anne Margolis at [anne@northernwoodlands.org](mailto:anne@northernwoodlands.org) or (802) 439-6292 if you need to update your numbers.

**Looking for an article?** A complete index of the past five years' worth of *Northern Woodlands* is available at [http://www.northernwoodlands.org/nw\\_index.html](http://www.northernwoodlands.org/nw_index.html); we would be happy to make a photocopy of an article you need and mail it to you.

#### Project Learning Tree Coordinators

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### NORTHERN WOODLANDS MAGAZINE

802-439-6292

[www.northernwoodlands.org](http://www.northernwoodlands.org)

#### Editorial Mission

To shape the future of the forests of the Northeast through information and education about their value, use, and conservation.

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

## Northern Woodlands Goes to School

Welcome to the Autumn 2004 edition of *Northern Woodlands* magazine. In this issue, you'll find articles to spur on a host of outdoor investigations—from mushroom hunting to animal tracking. You and your students can delve into the debates surrounding the Maine bear hunting referendum and wind-generated power. Or engage in a little comparative anatomy by reading Charles Fergus's essay on animal tails. There's plenty of food for contemplation, action, and exploration within these articles—we hope you enjoy them!

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 5000 students throughout the Northeast are able to participate in Northern Woodlands Goes to School this year. The sponsors are: the Alexander Host Foundation, Britton Lumber Company, Cersosimo Lumber Company, Inc., Columbia Forest Products, Fountain Forestry, Inc., Frank and Brinna Sands Foundation, Freeman Foundation, French Foundation, International Paper, Maine TREE Foundation, Mill River Lumber, New England Forestry Foundation, Northeast Lumber Manufacturers Assoc., Pompanoosuc Mills, Sugar River Savings Bank, Twinflower Farm, Wells River Savings Bank, and the Windham Foundation.

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](mailto:anne@northernwoodlands.org)). Visit our *Northern Woodlands Goes to School* website at [www.northernwoodlands.org/goestoschool.html](http://www.northernwoodlands.org/goestoschool.html).

### Noteworthy News:

**A Guide to Creating Community Treasure Hunts.** This book explains how individuals and organizations can create and organize quests to foster place-based education, stewardship, and fun. The book presents a rationale for place-based education and quest program goals and objectives that can easily be implemented in any community. For more information visit <http://www.vitalcommunities.org/ValleyQuest/ValleyQuest.htm>.

**Forest Landowner's Guide to Internet Resources: States of the Northeast.** <http://na.fs.fed.us/pubs/misc/flag/>. This web-based resource, compiled and annotated by the United States Forest Service, offers more than 1,100 links on a host of subjects including silviculture, riparian forest management, forest health, and mapping.

**International Paper's Life of the Forest educational materials.** <http://www.iplifeoftheforest.com/>. IP offers free full-color posters and teaching materials on 10 forest subjects including forest management, seeds, bark, leaf identification, endangered species, and regeneration.



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. Observing Birds (field study)

Book review of *The Geese of Beaver Bog*, by Bernd Heinrich (page 67)


*Woodpeckers' Work Includes Site Preparation*, by Virginia Barlow (page 65)

Both the articles above describe bird studies involving painstaking observation.

Learning to accurately observe events is an essential skill—whether students are creating art, performing scientific studies, or writing—and is the cornerstone of scientific methodology. Skillful observation requires patience, objectivity, and attentiveness to detail. Birds provide an excellent subject for developing such skills. Help students design and create a bird-feeding area at your school—preferably within view of your classroom—using a combination of bird-friendly plantings and feeding stations.


Have students observe the birds as they forage and record what they see. How does each species forage? (How do they open seeds? Which foods do they prefer?) Where do they forage? (On the ground? From the feeder?) How do the various species interact with one another? How do members of a given species interact among themselves? Encourage them to simply observe rather than interpreting what behavior they see.

Consider having students make these observations regularly throughout the school year. You could have a Bird Log in the classroom in which one student each day writes a 10-minute observation. Combine these observations with research about the birds they see and don't see. If hummingbirds disappear from nectar feeders in late September, where have they gone? What do chickadees feed on when they're not eating sunflower seeds? The possible research projects are endless and suitable for any age student.

 *The Sibley Guide to Bird Life and Behavior*, edited by Chris Elphick, John B. Dunning, Jr. and David Allen Sibley. Alfred A. Knopf, New York: 2001

*The Audubon Society Guide to Attracting Birds*, by Stephen W. Kress. Scribner: USA: Scribner, 1985.

*The Sibley Field Guide to Birds of Eastern North America*, by David Allen Sibley. New York: Alfred A. Knopf, 2003.

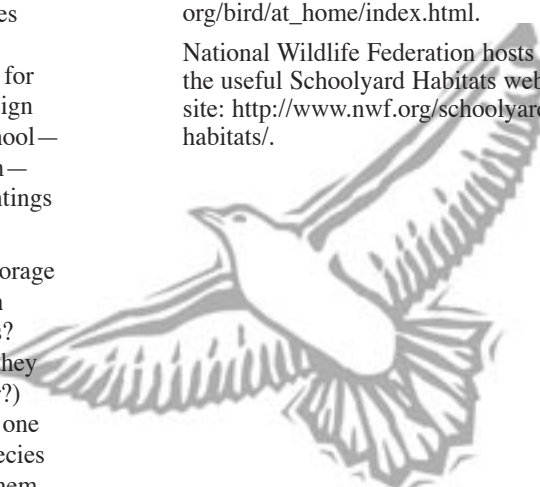
 For a succinct description of the scientific method, <http://sciencefairpro->

[ject.virtualave.net/scientific\\_method.htm](http://www.virtualave.net/scientific_method.htm).

Cornell Laboratory of Ornithology. All About Birds site, <http://www.birds.cornell.edu/programs/AllAboutBirds/>. Excellent information about attracting and observing birds as well as a top-notch, online bird guide with audio recordings and detailed information about hundreds of bird species.

Audubon Society website has a section devoted to attracting birds to your garden at [http://www.audubon.org/bird/at\\_home/index.html](http://www.audubon.org/bird/at_home/index.html).

National Wildlife Federation hosts the useful Schoolyard Habitats website: <http://www.nwf.org/schoolyard-habitats/>.



- ME** Science and Technology Jz  
English Language Arts A, D, H
- NH** Science 1a, 2a, 3a  
English Language Arts 1, 5
- VT** 1.19 Research  
7.1 Scientific Method  
7.2 Investigation  
7.13 Organisms, Evolution, and Interdependence

## 2. Bear Hunting Debate (current events)

*Whose Bears Are These?* by Robert Kimber (page 22)

Help students learn to develop informed opinions about public debates. The bear hunting referendum described in Kimber's article has generated heated discourse in Maine and beyond. Have students research bears in your region—ecology, population, encounters with humans, current research (see Susan Morse's article, page 21). Help them tease out myth from reality. Do most bears sleep in caves? (No!) Do bears hibernate? (No, again!)

Have students read and critique the information distributed by individuals and organizations on either side of the bear hunting debate. Are their arguments well founded? How do they use information to support their case? When do they mislead or misinform?

## CALENDAR


## CONNECTION


### Grubbing, by Susan Morse (page 21)

When students think of animal tracking, they're most likely to think of the prints made in mud or snow by an animal's feet. But as Susan Morse's article shows, there are many other signs that tell the story of an animal's presence. As tracker Paul Rezendes writes, "Sometimes there are no tracks at all, but there is never a square yard in the forest that does not tell us something about the wildlife within it." Animals are busily preparing for winter now. Take your students on a walk through nearby woods to witness signs of those preparations. Contact your local tracking club or Audubon Society chapter for suggestions of a tracker who might help guide your exploration.



Tracks!

 *Tracking and the Art of Seeing*, by Paul Rezendes. New York: HarperCollins, 1999.

 The Virtual Cub Scout Leader's Handbook-Tracking and Stalking North American Wildlife: A Cyber-guide for Scouts and Scouters, <http://www.geocities.com./Yosemite/9152/wildlife.html#tracks>.

Eagle Bluff Environmental Learning Center: Animal Signs, <http://www.eagle-bluff.org/pages/animalsigns.html>.

- ME** Physical Education A  
Science and Technology B, J
- NH** Science 1a, 2a, 3a
- VT** 3.5 Physically Active Lifestyle Choices  
7.2 Investigation  
7.13 Organisms, Evolution, and Interdependence

# Suggested Activities



As in the Observing Birds activity, encourage students to observe the debate, rather than judging, so that they can discover the strengths and flaws of both sides of the debate and the techniques employed in such debates to sway public opinion. Consider polling students as to how they would vote on the hunting referendum—first, prior to reading Kimber’s article and conducting follow-up analysis, and again after they complete their research.



Pro and Con: Consumptive and Nonconsumptive Uses of Wildlife Philosophical Differences



For numerous links about bears: <http://www.wildlifesearch.com/bear.htm>.

Vermont Department of Fish and Wildlife offers a downloadable 4-page fact sheet about black bears. [http://www.vtfishandwildlife.com/library/factsheets/Hunting\\_and\\_trapping/big\\_game/black\\_bear\\_fact\\_sheet.pdf](http://www.vtfishandwildlife.com/library/factsheets/Hunting_and_trapping/big_game/black_bear_fact_sheet.pdf).

Sportman’s Alliance of Maine: [http://www.samcef.org/bear\\_referendum\\_information.htm](http://www.samcef.org/bear_referendum_information.htm).



Maine Citizens for Fair Bear Hunting: <http://www.fairbearhunting.org/pages/1/index.htm>.



English Language Arts A, D



English Language Arts 1, 3, 5

- 1.19 Research
- 6.14 Forces of Unity and Disunity
- 6.18 Nature of Conflict

### 3. Taking on Invasive Exotics (field study/public service)

*Controlling Invasive Species in Your Woodlot*, by Joseph Smith (page 51)

Because invasive exotic species are ones that

proliferate rapidly, controlling them can be a daunting, seemingly futile, task. But you and your students can serve as a catalyst for action in your community by initiating a small control project that serves as an educational model. With the help of a local forester or botanist, identify an invasive species that poses a significant ecological threat in your community. Have students research the plant’s origins and ecological effects on native vegetation and investigate methods for controlling it. Identify a control plot in a highly visible place (if not on the school grounds, then in an accessible, well-traveled place) and develop a plan for controlling or, if possible, eradicating the invasive exotic in that plot.

Then have students develop a public education campaign to spread the news about invasive exotics—their impacts and how to control them, focusing on the species you selected. Have students identify the media they think will be most effective. This may include radio spots, newspaper articles, bumper stickers, pamphlets, and interpretive signs at the control plot.



Home Sweet Home (in *Forest Ecology*, High School Module)

Saga of the Gypsy Moth (in *Forest Ecology*, High School Module)



World Travelers (gr. 5-8)  
Turkey Trouble (gr. 9-12)

*For 9-12 graders:* In this PBS-American lesson plan, students are challenged to consider the ramifications of introducing a non-native plant species into an area and how this affects the overall health of that area’s ecosystem. [http://www.pbs.org/americanfieldguide/teachers/non\\_native/non\\_native\\_sum.html](http://www.pbs.org/americanfieldguide/teachers/non_native/non_native_sum.html).

The National Park Service hosts a website with extensive curriculum materials on invasive exotics. The materials are currently geared to middle school students but are being expanded to include high school materials.

<http://www.nps.gov/invspcurr/aliencurriculum.htm>.

The National Invasive Species Council, a federal agency, maintains a website with extensive information on invasive exotics, <http://invasive.species.gov/>.

The Nature Conservancy hosts a website loaded with links to invasive exotics information, <http://tncweeds.ucdavis.edu/links.html>.

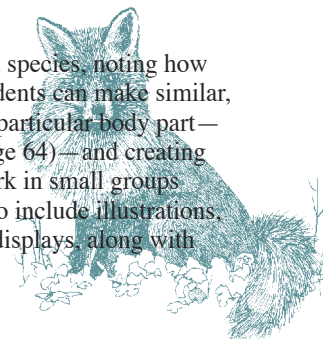
## WILDLIFE

## CONNECTION

*Brushes, Stubs, and Cudgels: A Tale of the Tail*, by Charles Fergus (page 38)

*A Nose for Diving*, by Anne Margolis (page 64)

Charles Fergus compares tail anatomy among several animal species, noting how the varied tail structures serve each animal species. Your students can make similar, fascinating studies, exploring the comparative anatomy of a particular body part—eyes, ears, teeth, feet, skin, noses (see *A Nose for Diving*, page 64)—and creating an interpretive display of their findings. Encourage them work in small groups and to compare at least 10 animal species. Encourage them to include illustrations, photographs, and hands-on, interactive components in their displays, along with captivating text.



Adaptation Artistry



The Teacher Resource Center of Georgia Department of Education hosts a website that offers links to numerous resources on animals at: <http://www.glc.k12.ga.us/trc/cluster.asp?mode=browse&intPat hID=5739>.



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



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



1.5 Writing Dimensions  
1.8 Reports  
1.19 Research  
1.21 Selection  
5.29 Visual Arts  
6.2 Uses of Evidence and Data  
7.13 Organisms, Evolution, and Interdependence

# Suggested Activities

**ME** Civics and Government A  
Science and Technology B, J, M  
English Language Arts A, D, H

**NH** English Language Arts 1, 5, 7  
Social Studies 4, 13, 14  
Science 3b, 6a

**VT** 1.19 Research  
2.4 Improving Effectiveness  
2.13 Product/Service  
2.14 Planning/Organization  
3.10 Teamwork  
3.13 Roles and Responsibilities  
4.6 Understanding Place  
6.3 Analyzing Knowledge  
7.13 Organisms, Evolution, and Interdependence



## 4. Marvelous Mushrooms (field study)

*At Work Identifying Mushrooms with Sam Ristich*, by Susan Chisholm (page 60)

Autumn is the perfect time to investigate the wonders of mushrooms and other fungi. Mushrooms are just the tip of the fungal iceberg, the fruiting bodies of fungi that live beneath the soil surface. Many tree species depend on fungi to improve their nutrient and water absorption capacity. Take your class into the woods and record the fungal species you find. Contact your local mycological society for suggestions of a volunteer to guide you on your exploration.

Continue your fungus study in the classroom by growing edible mushrooms. You'll find many mushroom-growing kits available on the internet, many of which come with teaching materials. When you're done with your study, sauté up a mushroom feast using the recipe in Susan Chisholm's article. (Be sure to strongly caution students against consuming wild mushrooms!)



The Fallen Log

## Nature's Recyclers



For a listing, by state, of North American mycological societies, <http://www.mykoweb.com/index.html>.

Links to mycology teaching resources, <http://biodiversity.uno.edu/~fungi/fteach.html>.

For younger students, learning tools to introduce mushroom ecology, <http://www.americanmushroom.org/workbook.pdf>.

**ME**

Science and Technology J

**NH**

Science 1a, 2a

**VT**

7.2 Investigation  
7.13 Organisms, Evolution, and Interdependence

## 5. Exploring Tree Physiology (field study)

*Tree Height Constrained by Plumbing*, by Anne Margolis (page 64)

As this article notes, many factors limit tree growth. Foresters use a measurement known as site index to indicate the quality of a given site for growing trees. Site index is the average height a tree stand will attain in 50 years. Invite your county forester or a local consulting forester to your school grounds or

a nearby forest to practice measuring tree height and age and determining site index. What are the constraints to tree height in your forest? What about at the top of a nearby mountain, or in a local wetland?



How Big is Your Tree?



*Working With Your Woodland*, by Mollie Beattie, Charles Thompson, and Lynn Levine.

Hanover: University of New England Press, 1983.



This 4-H Forestry site offers easy-to-understand instructions in tree measurement, <http://forestryjudging.nres.uiuc.edu/>.

**ME**

Science and Technology B, J

**NH**

Science 1a, 2a, 2b, 3a, 6d

**VT**

7.2 Investigation  
7.13 Organisms, Evolution, and Interdependence



## CAREER

## CONNECTION

### Rough and Ready, by Stephen Long (page 44)

In this age of box stores and global economics, your students may be largely unaware of impacts their consumer choices have on the economic, social, and environmental health of their community. Why does it matter where your lumber comes from? Who benefits when wood is processed and purchased locally? Visit a local sawmill. Where did the wood come from? What wood products do they sell and who buys those products? See if the sawmill will donate wood for constructing bluebird or bat boxes. Construct the boxes with your students and hang them in appropriate habitat around the school grounds. Create interpretive signs to teach other students of the local origins of the wood, benefiting the local economy and local wildlife.



A Few of My Favorite Things



*Stokes Birdhouse Book: The Complete Guide to Attracting Nesting Birds*, by Donald and Lillian Stokes. Little Brown & Co., 1990.



For instructions on building bat houses, <http://www.conservation.state.mo.us/nathis/woodwork/ww15/>.

**ME**

Economics A

**NH**

Social Studies 5, 9, 11  
Science 4c

**VT**

3.9 Sustainability  
4.6 Understanding Place  
6.15 Knowledge of Economic Systems  
6.19 Identity and Interdependence  
7.16 Natural Resources

## Word Search

*Brushes, Stubs, and Cudgels: A Tale of the Tail*, by Charles Fergus (page 38)

This mammal's tail is prehensile, meaning that it can wrap around and hold on to objects.

Though this mammal lacks a tail when it is born, it sports a noticeable tail during its early fetal development.

This animal uses its tail for balance as it leaps from branch to branch (2 words).

This animal uses its tail as both rudder and oar while swimming.

When frightened, this animal raises its tail, exposing a white underside that signals danger to other members of its kind.

The bushy plume of this animal's tail is known as a "brush" (2 words).

This subterranean mammal stores fat in its tail (3 words).

This animal's tail makes a warning noise when shaken.

This bird uses its sharp-feathered tail as a stabilizing prop when clinging to a tree trunk.

Predators steer clear of this animal's dangerous tail.

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

## Word Search

*Brushes, Stubs, and Cudgels: A Tale of the Tail*, by Charles Fergus (page 38)

This mammal's tail is prehensile, meaning that it can wrap around and hold on to objects. OPOSSUM

Though this mammal lacks a tail when it is born, it sports a noticeable tail during its early fetal development. HUMAN

This animal uses its tail for balance as it leaps from branch to branch (2 words). GRAY SQUIRREL

This animal uses its tail as both rudder and oar while swimming. BEAVER

When frightened, this animal raises its tail, exposing a white underside that signals danger to other members of its kind. DEER

The bushy plume of this animal's tail is known as a "brush" (2 words). RED FOX

This subterranean mammal stores fat in its tail (3 words). STAR-NOSED MOLE

This animal's tail makes a warning noise when shaken. RATTLESNAKE

This bird uses its sharp-feathered tail as a stabilizing prop when clinging to a tree trunk. WOODPECKER

Predators steer clear of this animal's dangerous tail. PORCUPINE

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



# Crossword Puzzle

*Autumn Calendar* (page 4)

## Across

1. This reptile's eggs hatch in late summer (2 words).
2. This duck species eats the berries of red-osier dogwood when they ripen in October.
3. This fish lays its eggs in November (2 words).
4. Butterfly species that migrates to Mexico for the winter.
5. Group of ruffed grouse.
6. Most members of this species turn white in winter (3 words).
7. November meteor shower.
8. Winter food for porcupines.
9. Immature male turkey.
10. This animal species will stash an edible mushroom in the crotch of a tree branch for winter food (2 words).

## Down

1. A favorite food of pileated woodpeckers (2 words).
2. September winds disperse the seeds of this deciduous tree (2 words).
3. This diminutive bird lives year-round in the Northern Forest (3 words).
4. This amphibian mates in October but lays its eggs in June or July (2 words).
5. This bird species buries acorns to eat in winter (2 words).
6. This large migratory bird is well on the way to its South American wintering grounds by mid-November (3 words).
7. Moose mate during this month.
8. Milkweed fluff makes warm bedding for this small mammal (2 words).
9. Woodpeckers eat this plant's white berries in autumn (2 words).

