



Teacher's Guide Winter 2010

Northern Woodlands Goes to School Winter 2010

Welcome to the Winter 2010 edition of *Northern Woodlands* magazine. The articles in this issue will prompt plenty of discussion and explorations, both in the classroom and in the field. Tom Wessels' article will teach you and your students how to estimate a tree's age without special tools. Other articles will immerse you in early 1900s life in the Northern Forest, describe amazing adaptations for winter survival, delve into the ecological and cultural considerations in white-tailed deer management, and much more.

This teacher's guide serves as a companion to *Northern Woodlands* magazine. In it are several indoor and outdoor activities that expand upon ideas presented in some of the magazine's articles. For each activity, we recommend 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've just launched an online survey that will help us evaluate the Northern Woodlands Goes to School program. The survey is designed to give us information that we can use to modify the program to most effectively meet the needs of today's educators. If you haven't received an invitation to participate and would like to, please email Emily Rowe emily@northernwoodlands.org in order to get the survey link and introductory information.

Noteworthy News

Be sure to have your students check out the *Outdoor Palette* column in *Northern Woodlands*. This column features a different artist and work of art in each issue, so your students can see how different northeastern artists express their experience of the natural world. This issue's *Outdoor Palette* column features a woodblock print, *Below Mt. Pemigewassett*, by Matt Brown of Lyme, New Hampshire. Such artwork can inspire wonderful classroom art projects. Imagine, for example, your students creating a series of linoleum block prints of northeastern trees in winter, inspired by Matt Brown's prints (Students can see many of his works on his website, www.ooloopress.com).

If your students would like to take part in the **2011 Envirothon**, it's time to start preparing for this national competition. The Envirothon's mission is to develop knowledgeable, dedicated citizens willing to work towards achieving and maintaining balance between quality of life and quality of the environment. Team members in grades 9-12 collaborate to learn about 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 (the 2011 issue relates to freshwater and saltwater estuaries). If your students get involved, they will compete, usually in May, with other teams from your state. The winner of each state's Envirothon competes in the national Envirothon. Visit www.envirothon.org for

information about the 2011 competition. On that site, you'll find a list of local programs, which lists contact information for each state's Envirothon coordinator.

1. Bringing History to Life

Slolly, Sprinklers, and Mackinawed Men, by Dr. Edward H. Risley (pg. 23)

Dr. Risley's journal offers a vivid, first-person account of life in rural Maine in the early 1900s. Use this article as a springboard for launching an oral history project with your students. Your local community is likely filled with elders who can help bring your community's history to life. Help students identify community elders to interview, through your community's historical society, elder-care program, churches, and so on. Have each student select an elder to interview. They may choose to focus on a particular skill or expertise of their elder, a particularly memorable outdoor experience in that person's early life, or perhaps inquire about recollections of daily life back in the day. Or you may, as a class, decide to create a particular, central question or series of questions that each student poses to their interviewee. Whatever approach they choose, students should try to draw vivid, detailed descriptions from the elder they interview.

Have students then create a presentation of their elder's history. Let students choose a form of presentation that fits the information they've uncovered through the interview process—it could be anything from an oral history performance in which they play the part of their elder to a display that draws upon photos, drawings, memorabilia, and quotes.

Website: The Grandparent/Elder Project. This Library of Congress website offers lesson plans and resource suggestions for learning history by interviewing community elders. Designed for 9th graders and adaptable for 7-12, this website can help your students formulate their approach to conducting the interview and generate interview questions. <http://memory.loc.gov/learn/lessons/98/grand/teacher.html>

WILD	Appendix: Interviewing People
PLT	In the Good Old Days A Look at Lifestyles Did You Notice?
ME	English Language Arts B, E, G, H History B
NH	English Language Arts 2, 3, 6 Social Studies 17
NY	ELA 1 Listening & Reading ELA 2 Speaking & Writing MST 7 SS 1 SS 3
VT	1.8 Reports 1.13 Clarification and Restatement 1.15 Speaking 4.6 Understanding Place 6.3 Uses of Evidence and Data 6.4 Historical Connections 6.8 Movements and Settlements

2. The Wonders of Winter Survival

Bum breathers, by Bill Amos (pg. 16)

Bum-breathing turtles? Talk about amazing adaptations for winter survival! It's easy for students to take for granted the mystery and miracle of winter survival in all its forms in the Northern Forest ecosystem, since it occurs with such little fanfare each winter. As a class, explore the various ways animals survive winter in the Northern Forest, including torpor, deep sleep, and true hibernation. Then list as a class the animals that utilize each of these winter survival methods—from insects to large mammals. Have each student select one animal to study in-depth. Students should create an eye-catching interpretive display of their animal, using photos, illustrations, text, and any other engaging display materials to tell their animal's winter survival story.

Books: *Life in the Cold*, by Peter J. Marchand. University Press of New England: Hanover. 1991. Best for older students. Excellent discussion of the adaptations of plants animals, and indigenous human populations to life in the cold.

A Guide to Nature in Winter, by Donald W. Stokes. Little, Brown & Co.: USA. 1976.

WILD	I'm Thirsty Quick-Frozen Critters
ME	Visual and Performing Arts A Science and Technology B English Language Arts A, D, E, H
NH	Science 3a English Language Arts 1, 2, 5, 6
NY	ART 1 Visual Arts MST 1, Scientific Inquiry, MST 4 The Living Environment, MST 7 Strategies CDOS 3 Managing Information
VT	1.5 Writing Dimensions 1.8 Reports

3. Reading the Winter Woods

How Old is That Tree? by Tom Wessels (pg. 20)

This excerpt from Tom Wessels' new book, *Forest Forensics: A Field Guide to Reading the Forested Landscape*, offers instruction on how to estimate the age of various forest trees without the aid of tools. Take your students on a walk in the winter woods. Invite your county forester (or a local consulting forester) along to help, and ask him or her to bring an increment borer and diameter-measuring tools (Biltmore sticks or diameter tape). Use Wessels' instructions to estimate the age of several of the trees in your woods, then use the increment borer to check your estimates.

Students should create data sheets on which they record tree species name, diameter, bark characteristics (Wessels describes how bark characteristics can help you determine the tree's age.), estimated age, and actual age as determined by the increment borer. You'll need a good field guide to help you determine the species of each tree you sample. If a tree's age differs significantly from your estimations, have students contemplate the possible reasons why. If a tree is surprisingly old for its diameter, has it been suppressed by surrounding trees? Is it one of multiple trunks? Use Wessels' article to help you identify the factors that might be contributing to the tree's diameter.

Books: *Reading the Forested Landscape*, by Tom Wessels. The Countryman Press, 1997. This earlier book by Wessels is a beautiful, intriguing explanation of how to "read" the clues present in a forested landscape that offer evidence as to its land use history.

Tree Identification Book, by George W. Symonds and Stephen V. Chelminski, 1972.

PLT	How Big is Your Tree? Tree Cookies
ME	Physical Education A Science and Technology B, J, M
NH	Physical Education 1 Science 1a, 2a, 2b, 3b, 6a
NY	HPHE 1 Physical Education MST 1 Scientific Inquiry MST 4 The Living Environment 3.5 Physically Active Lifestyle Choices
VT	7.1 Scientific Method 7.2 Investigation 7.13 Organisms, Evolution, and Interdependence

4. Ailing Trees

New Disease Threatens Black Walnut, by Dave Boyt (pg. 17)

Saving Herbie, by Scott Gibson (pg. 38)

American chestnut, *Castanea dentata*, by Virginia Barlow (pg. 45)

Dave Boyt's article describes how black walnut trees are at risk to the deadly, one-two punch of a beetle and a fungus. Sound familiar? To those of us who grew up with stately elm trees prominently gracing the northeastern landscape, the similarities between thousand cankers black walnut disease and Dutch elm disease are alarmingly strong. This issue of *Northern Woodlands* actually includes three articles related to tree pathogens, offering a great opportunity to study them.

How has insect infestation and disease changed our forested landscape over the past century or so? In addition to Dutch elm disease, chestnut blight, and thousand cankers black walnut disease—which are discussed in the articles listed above, many other diseases and infestations (from hemlock woolly adelgid to mountain pine beetles) are affecting the composition and structure of forests across the country. Have students pick a pathogen to research. They should explore the pathogen's life cycle, affect on their host tree, ecological impacts, economic impacts, current treatments, and anticipated effect on the host tree species in the future. Have students create an engaging visual display for their report.

Websites: *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.

PLT	Home Sweet Home (<i>Forest Ecology</i> high school module) Saga of the Gypsy Moth (<i>Forest Ecology</i> high school module)
ME	English Language Arts A, B, D, E, H Science and Technology B
NH	English Language Arts 1, 2, 5, 6 Science 3a
NY	CDOS 3 Managing Information MST 4 The Living Environment MST 7 Strategies
VT	1.8 Reports 1.19 Research 6.2 Uses of Evidence and Data 7.13 Organisms, Evolution, and Interdependence

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://invasivespecies.gov/>.

Three American Tragedies: Chestnut Blight, Butternut Canker, and Dutch Elm Disease, by Scott E. Schlarbaum et al. www.invasive.org/symposium/schlarba.html. This scientific paper describes the changes wrought by these diseases and on-going efforts to develop disease-resistant trees of each species.

The U.S. Forest Service maintains a Forest Health Protection website that provides information about many tree diseases and pests, www.na.fs.fed.us/fhp/.

5. Good News!

A Step in the Right Direction, by Todd McLeish (pg. 54)

In these days of dire environmental news, it's important for students to hear positive news about the environment as well as the steady litany of disasters. *A Step in the Right Direction* is one such piece of good news, describing measurably lower pollution levels in northeastern lakes.

Create a schedule for the semester in which each student presents a hopeful news story about the environment. For example, Fridays could be your "good news" day, and each student has a particular Friday during the semester on which they discuss a current positive news story they found. Encourage them to delve into the article's implications—to do extra research beyond summarizing the article itself. *A Step in the Right Direction*, for example, doesn't discuss the reasons for the decline in lake pollutants. Do scientists believe it's due to less coal burning? Better scrubbers? A change in jet stream currents? Have students bring in their article and post it in a designated "Good News" area of your classroom wall.

Website: The *Good News Gazette* is, as its name suggests, dedicated to positive news stories. It pulls articles from reputable sources (AP, BBC News, CNN, etc) and organizes them by subject area. www.goodnewsgazette.net/Environment/Environment.html

ME	English language Arts A, D Civics and Government A Science and Technology B
NH	English Language Arts 1, 5 Social Studies 4 Science 3b, 4c, 6a
NY	MST 2 Information Systems MST 4 The Living Environment SS 3, 5
VT	1.19 Research 3.13 Roles and Responsibilities 7.13 Organisms, Evolutions, and Interdependence 7.16 Natural Resources and Agriculture

6. Carrying Capacity

Too Many White Tails? by Madeline Bodin (pg. 30)

Madeline Bodin's article is packed with great information and insights to fuel classroom discussions and investigations. One idea that stands out is the notion of cultural carrying capacity versus ecological carrying capacity. While your students may be familiar with ecological carrying capacity, it's likely that the idea of cultural carrying capacity is new to them. (If they're not aware of ecological carrying capacity, this article provides a perfect opportunity to introduce this idea, and Project WILD offers several activities related to ecological carrying capacity, listed below.)

Bodin describes the cultural carrying capacity for deer as "the number of deer that people are happy having around." Thus, it's not an ecological question but an emotional one, though one that is informed by such ecological events as the heavy browsing of wildflowers and native tree saplings or cases of Lyme disease (carried by deer ticks).

WILD	Carrying Capacity (9-12) Deer Dilemma (9-12) Checks and Balances
ME	English Language Arts A, D, H Science and Technology J
NH	English Language Arts 1, 3, 5 Science 3a, 6b Social Studies 11
NY	CDOS 3 Managing Information ELA 3 Listening & Speaking MST 4 The Living Environment MST 7 Strategies SS 3
VT	1.19 Research 4.6 Understanding Place 6.3 Analyzing Knowledge 6.14 Forces of Unity and Disunity 6.19 Identity and Interdependence 7.13 Organisms, Evolution, and Interdependence 7.14 Natural Resources and Agriculture

Have students create a community survey in which they develop questions that strive to assess your community’s cultural carrying capacity for deer. Each student should deliver the survey to a specified number of community members (You’ll need to decide how rigorous and statistically significant you want this survey to be, which will help determine the number of respondents you need). Tally the results and have students write a report on their findings.

In addition, have students discuss as a class the implications of one of the statements within the article, “Wildlife is owned by everybody, so everybody needs to make the decision.” Who “owns” wildlife? What are the ethical considerations involved in managing deer or any other wildlife species?

Website: Caring for Deer and Forests. www.deerandforests.org. This excellent website was developed by a team of scientists and extension educators with input from a broad-based advisory team, and funding from the USDA Forest Service Electronic Commons project and Northern Initiatives. You’ll find loads of information on the whole subject of deer, forests, and carrying capacity.

Career Connection

A School of Hard Knocks, by Patric Hendrick (pg. 46)

While most secondary school education programs focus on helping students develop academic skills, the summer program described in this article helps students develop such practical skills as swinging an ax, lighting a fire without matches, and so on. For today’s students, who may spend little time outdoors, such life skills—how to hunt, fish, grow food, cook a meal, sew clothing, and so on—may be in short supply. Help your students assess the presence of such life skills in their own lives. Have students brainstorm a list life skills as a class, then list the life skills they possess, and the ones they’d like to learn. Have them write an essay on the “Five life skills no student should leave home without.”

ME	Career Preparation A English Language Arts E
NH	Career Learning 7 English Language Arts 2
NY	CDOS 1 ELA 2 Speaking & Writing
VT	1.12 Personal Essays 3.15 Career Choices

Calendar Connection

Nature as Stimulant, by Todd McLeish (pg. 54)

This article describes recent scientific research that finds that people who spend time outdoors generally feel better than those who don’t. Have your students assess how much time they spend outdoors each week by keeping a journal for a two-week period of how they spend each day. Each day, they should note how much time they spent in various settings (at school, watching TV, sitting in front of the computer, playing sports, etc). They should particularly note how much time they spend outdoors and what the nature of that outdoor experience was (on a manicured sports field, biking on city streets, walking in a wild setting, gardening, etc).

Have students compile their findings, creating a graph of their average daily routine, and write a brief essay discussing that routine and what changes might make them feel healthier and happier.

ME	English Language Arts E Physical Education A Science and Technology J
NH	English Language Arts 2 Physical Education 1 Science 3a
NY	ELA 2 Speaking & Writing HPHE 1 Physical Education MST 1 Scientific Inquiry
VT	1.12 Personal Essays 3.5 Physically Active Lifestyle Choices 7.2 Investigation

Wildlife Connection

Halloween ladybeetle, *Harmonia axyridis*, by Virginia Barlow (pg. 37)

Stewardship Story, by Jon Harris (pg. 18)

The two articles above describe two invasive exotic species impacting the Northeast—Halloween ladybeetle and oriental bittersweet. Both were purposefully introduced to this country, and both have thrived, bringing unintended ecological consequences. Tinkering with nature without knowing the

consequences—in this case importing plants and animals for our own uses, but repeated in countless ways by humans across the planet—has done much to disrupt ecosystems in our region and around the world. Harris’ article describes the author’s persistent efforts to undo some of those unintended consequences on one small piece of land.

Help students learn about the invasive exotic species present in your community. Create a list of the top invasive species, drawing upon your local extension agency and country forester to help you flesh out the list. Have students work in groups of three or four, choose one of the species, and create a presentation to the class, covering its origins, introduction to this region, ecological impacts, and control methods. Ask students to assess the efficacy and ethics of these control measures (If, for example, control necessitates a pesticide that could have other unintended consequences, is it the right thing to do?).

Websites: See listing of websites related to invasive exotics for activity #4, *Ailing Trees*, above.

WILD	World Travelers Turkey Trouble
ME	English Language Arts A, B, D, E, H Science and Technology B
NH	English Language Arts 1, 2, 5, 6 Science 3a
NY	CDOS 3 Managing Information MST 4 The Living Environment MST 7 Strategies
VT	1.8 Reports 1.19 Research 6.2 Uses of Evidence and Data 7.13 Organisms, Evolution, and Interdependence

HANDOUTS

Writing from the Land

Footwear, by Robert Kimber (pg. 63)

Read the essay *Footwear*, in which the author describes the footwear in his mudroom and contemplates what it says about the life he leads. Using vivid imagery, describe your footwear and what it reveals about your lifestyle and your relationship to the outdoors. To what interesting outdoor places and events has that footwear taken you?

Word Search

Using the *Winter Calendar* (pg. 4) to help you answer the following clues, find ten animals of the Northern Forest in the word search puzzle below.

1. This songbird picks up salt from winter roadways (two words). PINE GROSBEAK
2. This mammal tunnels through the ground below frostline, hunting worms and slugs (three words). STAR-NOSED MOLE
3. This mammal eats birch polypore fungal conks (two words). RED SQUIRREL
4. This bird species eats acorns shell-and-all (two words). WILD TURKEY
5. Mammal whose fur changes from brown to white in the winter (two words). SNOWSHOE HARE
6. This bird species eats Virginia creeper berries (two words). PILEATED WOODPECKER
7. This amphibian hibernates deep underground during winter (two words). REDBACKED SALAMANDER
8. This mammal survives the winter by eating the bark of stored twigs and branches. BEAVER
9. This mammal eats the rootstalks of cattails and the leaves of aquatic plants in winter. MUSKRAT
10. This feline feeds on dead deer in winter. BOBCAT



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

Crossword Puzzle

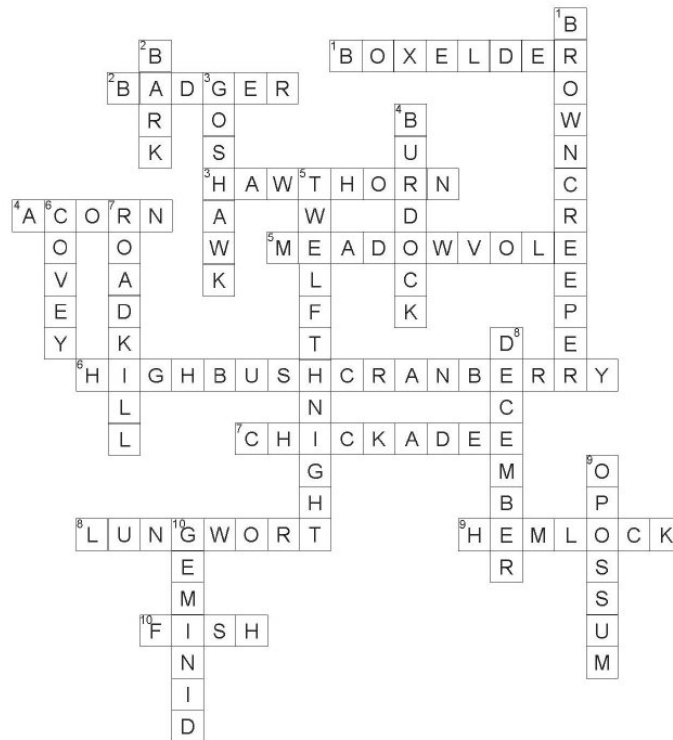
Use the *Winter Calendar* (pg. 4) to help you answer the following clues:

ACROSS

- This maple holds its seeds throughout the winter (two words). BOX ELDER
- While groundhogs are seen as a predictor of weather in the United States, this mammal is seen as the weather predictor in Europe. BADGER
- The fruits of this tree provide a last-resort food source for animals in late winter. HAWTHORN
- Blue jays cache large numbers of this kind of nut as winter food. ACORN
- This rodent breeds throughout much of the year, creating an important food source for hawks and owls (two words). MEADOW VOLE
- Berry eaten by cedar waxwings (two words). Highbush CRANBERRY
- One of the songbird species eaten by northern shrikes in winter. CHICKADEE
- Favorite moose food in winter. LUNGWORT
- Chickadees, siskens, and crossbills eat the seeds from this tree. HEMLOCK
- Important part of a river otter's winter diet. FISH

DOWN

- This bird climbs up tree trunks in a spiral path (two words). BROWN CREEPER
- Porcupine's primary winter food. BARK
- Bird of prey known to attack grosbeaks and mourning doves at birdfeeders. GOSHAWK
- This biennial plant has an edible taproot. BURDOCK
- Day when, according to European folklore, animals can speak (two words). TWELFTH NIGHT
- Name given to a group of grouse. COVEY
- Food source for crows. ROADKILL
- Month this winter in which a total lunar eclipse will be visible across North America. DECEMBER
- This mammal is prone to getting frostbite on its ears and tail. OPOSSUM
- December meteor shower. GEMINID



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