



Autumn, 2005

Northern Woodlands has just published its first-ever wall calendar. Order your 2006 calendar today and enjoy a full year of Virginia Barlow's natural history observations, as seen in each issue of *Northern Woodlands*, and take advantage of the opportunity to record your own. This calendar retails for \$12, but our price to teachers is just \$6 each. Buy one for your classroom wall or a whole bunch for your class's fundraising efforts. Call (802) 439-6292 today to reserve yours – the supply is limited!

Project Learning Tree Coordinators

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NORTHERN WOODLANDS MAGAZINE

802-439-6292
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 2005 edition of *Northern Woodlands* magazine. In it, you'll find articles galore to spark your students' curiosity about the natural world around them. Do woolly bear caterpillars really predict the coming winter's severity? What diminutive wildflower launches its pollen at 800 times the force astronauts feel on take off? How can you tell, by listening to its call, whether or not a chickadee feels threatened? You and your students will discover the answers to these questions and many more.

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: Columbia Forest Products, Fountain Forestry, Inc., Frank and Brinna Sands Foundation, Freeman Foundation, French Foundation, International Paper, Maine TREE Foundation, Margo and Joe Longacre, Merchants Bank, Mill River Lumber, New England Forestry Foundation, Northeastern Lumber Manufacturers Assoc., Sugar River Savings Bank, Tele Atlas North America, Inc., 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). Visit our *Northern Woodlands Goes to School* website at www.northernwoodlands.org/goestoschool.html.

Noteworthy News:

Community Works On-Line Resource Center. Check out this excellent resource, which provides curriculum tools, publications, and technical assistance to teachers. The organization's mission is to promote exemplary teaching strategies, practices, programs, and models that support students in becoming caring, responsible, and active members of their communities. Download their magazine free from www.vermontcommunityworks.org/.

Wildlife Action Grants. New Hampshire teachers can apply to the Homes for Wildlife Action Grant Program at New Hampshire Fish and Game for start-up funds. The program provides mini-grants of up to \$300 – or \$600 with matching funds – for projects that enhance habitat for people and wildlife. For a proposal packet, contact Marilyn Wyzga, Public Affairs Division, New Hampshire Fish and Game Department, at mwyzga@wildlife.state.nh.us or (603) 271-3211.

National Wildlife Federation's Schoolyard Habitats® program. Be sure to get in on the next funding round for this mini-grant program. NWF also offers many habitat curriculum materials, including a free online resource, Happenin' Habitats. www.nwf.org/schoolyardhabitats.



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. Deer Herd Mathematics

Ratio of Does to Bucks, by Kip Adams (page 16)

Kip Adams's article offers a perfect opportunity for real-life math applications. Download Vermont's *2004 White-Tailed Deer Harvest Report* (see website information below). According to the report, there were 120,000 deer in Vermont in 2004. 11,925 were killed during the fall hunting season. 63% were bucks, 27% were does, 10% were fawns. How many bucks, does, and fawns were killed? Using Adams's article as a guide, and assuming a doe:buck ratio of 2:1, 15% winter die-off, and two fawns born to each female, calculate the projected population for 2005 (total population, numbers of bucks and does) as well as the doe:buck ratio.

There are limitless extensions on this activity. Give students alternative scenarios, like a severe winter that causes major die-off, a buck-only hunting season, and so on. The human population in Vermont increased from 380,000 to 620,000 in the last 50 years. What effects might this have on the deer population? Obtain deer population statistics from your state wildlife agency and graph human and deer population trends and discuss possible reasons for the results.

 www.whitetailstewards.com. Visit this excellent site for articles about deer ecology and management.

Vermont's *2004 White-Tailed Deer Harvest Report* www.vtfishandwildlife.com/library/reports_and_documents/Hunting_and_trapping/Harvest_reports/_2004_White-tailed_Deer_Harvest_Summary_Report.pdf

For a free white-tailed deer poster: fwinformation@anr.state.vt.us

Every state offers information on deer hunting. Visit their websites: VT Department of Fish and Wildlife: www.vtfishandwildlife.com
NH Fish and Game Department:

www.wildlife.state.nh.us
Maine Department of Inland Fisheries and Wildlife: www.state.me.us/ifw
New York Department of Environmental Conservation: www.dec.state.ny.us



Carrying Capacity, Checks and Balances, Deer Dilemma



Science and Technology B
Mathematics C, G, J



Science 3a
Mathematics 1a, 1b, 2b, 5a



7.6 Arithmetic, Number, and Operation Concepts
7.10 Mathematical Applications
7.13 Organisms, Evolution, and Interdependence

2. Northern Forest Management Issues

Ten Years Later; Common Ground is Easier to Find, by Glenn Rosenholm (page 50)

Plum Creek's Big Plan, by Carrie Chandler (page 17)

"Confrontation and polarity do not work. Finding solutions does work." So says Charles Niebling of the Society for the Protection of New Hampshire Forests, one of the participants in the planning process that resulted in *Finding Common Ground*, the 1994 report that offered recommendations for management of the 26-million-acre Northern Forest. Chandler's article offers an example of the far-reaching land use issues facing Northern Forest communities. As the Forest's major landowners—namely timber companies—sell their holdings, many communities face development of working forests into subdivisions for vacation homes. Others are seeing large tracts of private land sold to timber investment management organizations (TIMOs). Both could significantly change the region's human and natural communities.

Discussion Questions: Have students examine the "Land Ownership Changes" table in Rosenholm's article. What are the implications of the tremendous changes in land ownership that have occurred over the last 10 years? During the past decade, public and private organizations have protected hundreds of thousands of acres of land from development through conservation easements. Initiatives

WILDLIFE

Chickadees Sound a Complex Alarm

by Anne Margolis (page 49)

Tuning in to the natural world is a process of noticing sensory details. Learning bird songs helps students become aware of the tremendous diversity of wildlife around them. Hang a birdfeeder outside a classroom window, and learn the songs of the birds that frequent it. Focus on just one new song each week, and students will have a basic repertoire by the time the spring birding season begins. Play the song at the beginning of class as students are settling in. At the end of each week, challenge the students to identify all the songs learned to date.



www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/. Cornell University's Laboratory of Ornithology maintains this excellent website, on which you'll find vocalizations for each bird species, as well as extensive information.

www.birds.cornell.edu/schooyard/. Bird-related teaching activities from Cornell University.

Birding by Ear CD or cassette, by Robert W. Lawson and Richard K. Walton. Part of the Peterson

CONNECTION

Field Guide Series, this recording groups birds by acoustic similarity and offers many mnemonic devices for recognizing songs.

Bird Song Survey



Science and Technology A



Science 3a



1.14 Listening Critique
7.13 Organisms, Evolution, and Intedependence

Suggested Activities

like the Downeast Lakes Forestry Partnership (website below) exemplify collaborative conservation to preserve human and natural communities in the Northern Forest. What are the impacts of such conservation initiatives?



www.nefainfo.org/publications/nflc10thforumfinal.pdf. The final report of the Northern Forest Lands Council 10th Anniversary Forum.

<http://research.yale.edu/gisf/assets/pdf/yff/05.03.pdf>. This excellent summary from the Yale Forestry Forum on institutional timberland investment will introduce students to TIMOs.

www.downeastlakes.org/dlfp.htm. The Downeast Lakes Forestry Partnership.

<http://nature.org/wherewework/northamerica/states/idaho/science/art8987.html>. Brief, but helpful, description of how conservation easements work.



Old-Growth Forests (High school module: *Focus on Forests*)

Tough Choices (High school module: *Focus on Forests*)

400 Acre Wood

Planning the Ideal Community



Cabin Conflict, To Zone or Not to Zone, Planning for People and Wildlife



Science and Technology J
Economics A
Geography B



English Language Arts 7,
Social Studies 5, 9, 13, 14



2.2 Problem Solving
3.9 Sustainability
6.15 Knowledge of Economic Systems

3. Forest Health and Off-Road Vehicles

Another View, by Karen Bennett (page 9)

In her article, Bennett cites unmanaged outdoor recreation as one of the four major threats facing private and public forests today. How do your students recreate in the forest, and what are the impacts of these activities? Of the many forms of outdoor recreation (from cross-country skiing, hiking, and hunting to snowmobiling, 4-wheeling, and dirt biking), how would students rank them in terms of environmental impact? Have them research and list the ecological and social impacts of each activity.



Off-road vehicles (ORVs) can cause soil compaction and erosion, disrupt nesting sites, and create noise disturbances to humans and wildlife, and their usage is on the rise. ORV use on public lands is a hotly debated issue nationwide. Have students research the arguments on either side and formulate persuasive essays for both sides. Then conduct a classroom debate, having students defend the position they agree with least.



www.naturaltrails.org/issues/fieldguide2vehicles.html. Background on impacts of various ORVs.

www.ens-newswire.com/ens/sep2004/2004-09-07-10.asp. This article on the Environmental News Service sheds light on the national ORV debate. Searching the internet for "Off Road Vehicle Debate" will yield many such sources.

Loving it Too Much



Playing Lightly on the Earth, *Enviro-Ethics, Wildlife Issues: Community Attitude Survey*



English Language Arts A, D, E, G, H
Social Studies B



English Language Arts 1, 2, 3, 5
Social Studies 13, 14



1.11 Persuasive Writing
1.19 Research



6.2 Uses of Evidence and Data
6.14 Forces of Unity and Disunity
6.19 Nature of Conflict

4. Forest Succession

Woods Whys, By Michael Snyder (page 19) and *Fieldwork*, by Catherin Tudish (page 34)

All Northeast landscapes have a succession story to tell. Most forests have been cut over at least once, if not several times, over the past two centuries, and many were completely cleared during the heyday of farming and livestock grazing in the 1800s. Explore forest succession with your students by visiting a nearby forestland. Bring a forester or field naturalist with you if you can, and use the clues the forest offers to unravel the mysteries of past land use that shaped the forest's current composition. Are some parts of the forest younger

CALENDAR

A Discovery a Day, *Autumn Calendar* (page 4)

Help your students become aware of incremental seasonal changes by creating a means for them to record daily discoveries in the natural world. Students could keep their own daily journals, or the class could maintain one together in the form of a large calendar on which students can write, draw, or affix found objects. If, for instance, one student notes on a particular day that milkweed pods are bursting along the roadside, she could glue a pod or fluffy seed to the calendar square, or draw the pod and describe where she found it. Each day's discovery should be unique. Encourage the students to make their calendar as beautiful and diverse as possible. The *Northern Woodlands Autumn Calendar* can give your students an idea of the kinds of observations that are possible.



www.outdoors.org/publications/outdoors/2003/2003-learningtosee-main.cfm. A great introduction to field journaling.

www.lessonsforhope.org/pdf/Guide_To_Tree_Sketching_PDF.pdf. Download this wonderful guide, by artist Claire Walker Leslie, to sketching trees in a field journal.



Wild Words



Science and Technology B



Science 1a, 2a



4.6 Understanding Place
7.13 Organisms, Evolution, and Interdependence



Suggested Activities

than others? How can you tell? What species do you find in the younger woodlands? Select a site in the forest and have students draw or describe in words what they imagine the site looked like 10,000 years ago, 400 years ago, and 100 years ago.

Students should note the cultural artifacts in the forest that give clues to historical land use. Cellar holes, stone walls, and domesticated plantings like lilacs and apple trees can tell volumes about past residents.

As follow-up, have students ponder what might it look like 100 years from now. What about 400 years from now? They can postulate changes in land ownership and how those might affect the forest. How might global warming influence forest succession?



characteristics and vice versa. What kinds of soils define the natural communities around your school grounds? Choose a forested study site and obtain soil maps of the site from your local Natural Resources Conservation Service (NRCS) office. Invite an NRCS soils scientist to help you in your explorations. What does the soil map suggest about the soils on your

site? Conduct soil studies – pH, texture, drainage. Is there a thick humus layer? Are there seeds present? Fungi? Invertebrates? Have students identify the major plant species present using tree and wildflower guides. If your soil maps indicate a different soil type nearby, visit that site and compare your findings.



www.nrcs.usda.gov/feature/education/. NRCS offers K-12 soil information and curricula on this excellent website.

http://school.discovery.com/schooladventures/soil/teacher_tips.html. Soil curricula for grades 5-8.

www.fieldmuseum.org/ua/nettopt.htm. Good listing of soil study resources.

Soil Stories



ME

Science and Technology J
Geography A

NH

Science 1a, 2a, 2b
Social Studies 10, 15

VT

4.6 Understanding Place
6.7 Geographical Knowledge
7.2 Investigation
7.13 Organisms, Evolution, and Interdependence



Reading the Forested Landscape, by Tom Wessels. Countryman Press: Vermont, 1997.

Landowner's Guide to Wildlife Habitat: Forest Management for the New England Region, by Richard M. DeGraaf, Mariko Yamasaki, William B. Leak, and Anna M. Lester. University of Vermont Press and University Press of New England, 2005. See book review (page 63).



Story of Succession (High School Module, *Forest Ecology*)
Nothing Succeeds Like Succession



Time Lapse, Forest in a Jar

ME

Science and Technology J
Geography B

NH

History B

VT

Science 1a, 2a
Social Studies 11, 17

4.6 Understanding Place
6.4 Historical Connections
7.2 Investigation
7.13 Organisms, Evolution, and Interdependence

5. Soil Legacies

Woods Whys, by Michael Snyder (page 19)

The Mystery of Pease's Mountain, by Bob Popp (page 22)

Snyder's article offers a wonderful glimpse of the complex world beneath our feet, and Popp's article illustrates how soil characteristics determine natural community composition. By knowing the plants present in a given forest site, one can predict soil

CAREER

Hunters for the Hungry,

by Katie Johnston (page 54)

Part of being an active, involved citizen is noticing problems and devising creative solutions. The Hunters for the Hungry program is one such solution – a locally based way to meet the needs of community members. Your students have an opportunity and the ability to bring about positive changes in their community. Is there a Hunters for the Hungry program in your area? Have students plan to either launch the program in your community or expand the existing program to involve more hunters. What is the best means to spread the word? What obstacles does the program face, and how might students overcome them? Have students develop informational materials (handout, brochure, newspaper articles) to inform hunters of the opportunity to participate and to inform the community about the program.



www.conservativeposts.us/hunting/huntersagainsthunger.php. This site offers state-by-state contact information for venison donation programs.



Improve Your Place



Planning for People and Wildlife, Can Do!, Sustainability: Then, Now, Later

CONNECTION



ME

Civics and Government A
English Language Arts E

NH

English Language Arts 7
Social Studies 4
Science 4c

VT

2.4 Improving Effectiveness
2.14 Planning/Organization
3.9 Sustainability
3.13 Roles and Responsibilities
6.9 Meaning of Citizenship
7.16 Natural Resources

Scavenger Hunt

Within the pages of the Autumn 2005 edition of *Northern Woodlands*, you'll find the answers to the following questions.

1. Name the three rare plant species identified by botanist Arthur Stanley Pease in 1912 on a remote ledge in Vermont's Northeast Kingdom.
2. Because of its ability to withstand spring frosts, hobblebush leafs out earlier than most other deciduous shrubs and trees. This adaptation increases the plant's annual photosynthesis by how much?
3. Two factors indicate a healthy, well-managed deer herd. One is a low sex ratio. What is the other?
4. Scientists recently detected this non-native insect in the United States. It threatens our native pine trees.
5. Chronic wasting disease affects members of the family Cervidae. Which animal species are in this family?
6. Woolly bear caterpillars are the larval state of this insect.
7. Term used to describe the fall mating season for moose.
8. As a chickadee senses increased danger, how does its call change?
9. Term given to a tree in which a mother bear will leave her young cubs while she feeds.
10. Name of the wildflower that disperses its pollen by launching it forcefully.

Scavenger Hunt

Within the pages of the Autumn 2005 edition of *Northern Woodlands*, you'll find the answers to the following questions.

1. Name the three rare plant species identified by botanist Arthur Stanley Pease in 1912 on a remote ledge in Vermont's Northeast Kingdom. BENTGRASS, SCIRPUS-LIKE SEDGE, AND BLAKE'S MILK-VETCH
2. Because of its ability to withstand spring frosts, hobblebush leafs out earlier than most other deciduous shrubs and trees. This adaptation increases the plant's annual photosynthesis by how much? 40 PERCENT
3. Two factors indicate a healthy, well-managed deer herd. One is a low sex ratio. What is the other? AGE STRUCTURE OF THE BUCK POPULATION
4. Scientists recently detected this non-native insect in the United States. It threatens our native pine trees. WOODWASP (*SIREX NOCTILIO*)
5. Chronic wasting disease affects members of the family Cervidae. Which animal species are in this family? MULE DEER, WHITE-TAILED DEER, ELK, AND MOOSE
6. Woolly bear caterpillars are the larval state of this insect. ISABELLA MOTH
7. Term used to describe the fall mating season for moose. THE RUT
8. As a chickadee senses increased danger, how does its call change? THE NUMBER OF "DEES" IN THE "CHICK-A-DEE" CALL INCREASES
9. Term given to a tree in which a mother bear will leave her young cubs while she feeds. REFUGE TREE
10. Name of the wildflower that disperses its pollen by launching it forcefully. BUNCHBERRY

[illegible]

Note to Teachers:

You and your students can use the questions generated in this activity in several ways. Students can:

1. Choose one of the questions and journal (free write) on it, pondering why the question intrigues them and what they think the answer might be.
2. Write a poem, using the question as a prompt. Mary Oliver's poetry offers many wonderful examples.
3. Research the answer to the question, and write an essay.
4. Create a Natural Mysteries board in the classroom. Have each student write their favorite question on a paper and affix it to the board. Challenge students to work together to answer all the questions, jotting their findings beneath each question.

Crossword Puzzle

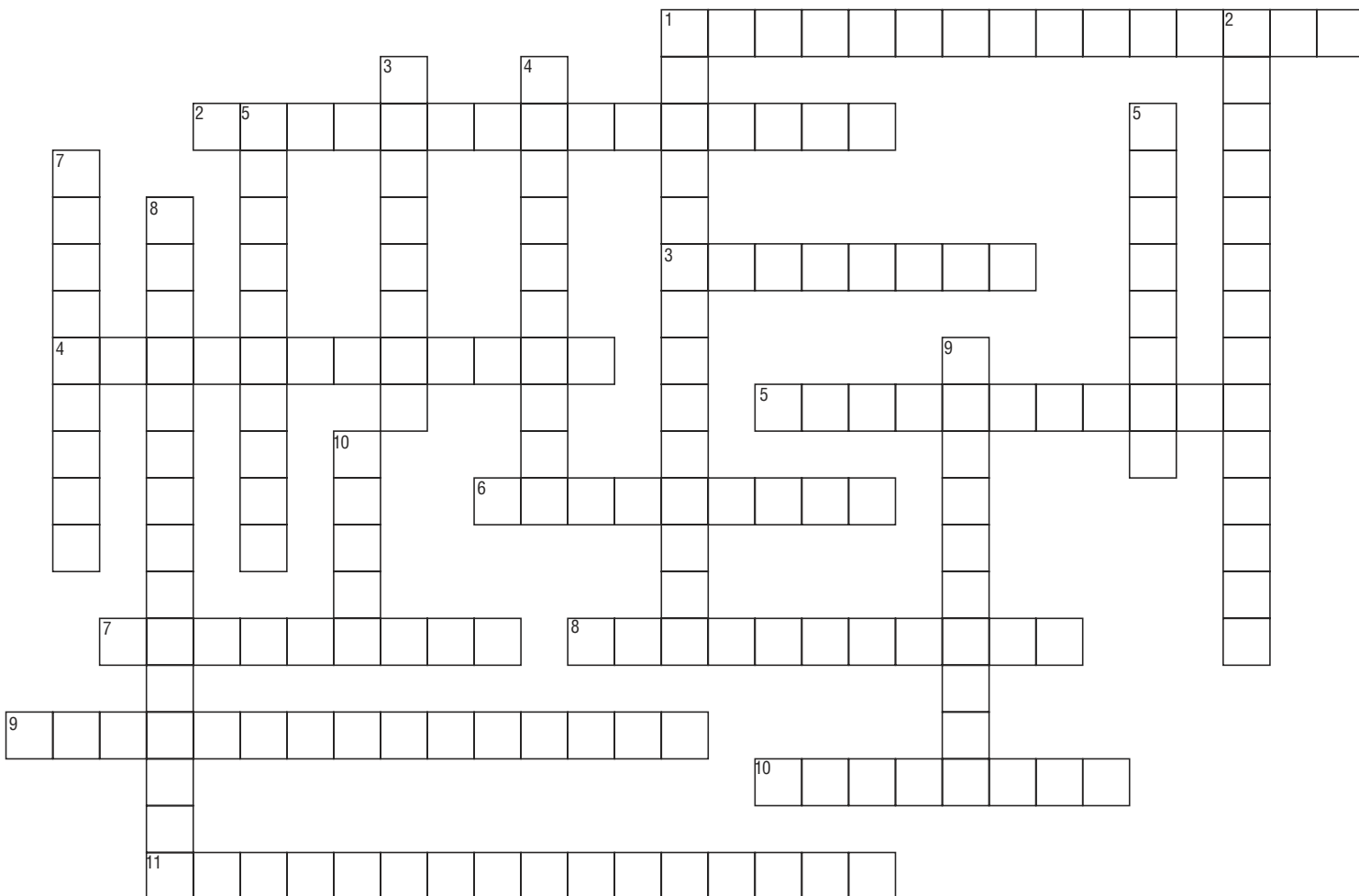
Autumn Calendar (page 4)

ACROSS

1. Latin name for a fungus found predominantly on hemlock trees (two words).
2. This vine's leaves turn bright red in autumn (two words).
3. Before assuming its adult form, this amphibian spends two winters as a tadpole.
4. This amphibian digs deep into the soil for the winter (two words).
5. Red leaf pigment made from decomposed chlorophyll.
6. New England asters bloom during this month.
7. Hairy woodpeckers eat the ripe fruits from this vine in autumn (two words).
8. This native holly species bears bright red fruits.
9. This raptor migrates to southern Mexico and to Central and South America for the winter (three words).
10. The leaves of this tree lack the showy autumn color of other hardwoods, turning from green to brown (two words).
11. Raptor that eats songbirds (three words).

DOWN

1. This shorebird needs open water for foraging and migrates south in winter (three words).
2. One owl species that inhabits the Northern Forest year-round (three words).
3. When the pods of this plant burst open in autumn, they release hundreds of fluff-topped seeds distributed by the wind.
4. This insect often overwinters in buildings (two words).
5. A saprophytic forest plant (two words).
6. Small mammal that eats sugar maple seeds.
7. Name for the horny scales on a grouse's toes.
8. The Latin name for the shaggy mane mushroom, in the group called "inky cap" mushrooms, because they turn to black goo as they age (two words).
9. Reptile that often hibernates on the bottom of slow-moving streams (two words).
10. The only member of a bumblebee colony to survive the winter.



Crossword Puzzle

Autumn Calendar (page 4)

ACROSS

1. Latin name for a fungus found predominantly on hemlock trees (two words). GANODERMA TSUGAE
2. This vine's leaves turn bright red in autumn (two words). VIRGINIA CREEPER
3. Before assuming its adult form, this amphibian spends two winters as a tadpole. BULLFROG
4. This amphibian digs deep into the soil for the winter (two words). SPRING PEEPER
5. Red leaf pigment made from decomposed chlorophyll. ANTHOCYANIN
6. New England asters bloom during this month. SEPTEMBER
7. Hairy woodpeckers eat the ripe fruits from this vine in autumn (two words). POISON IVY
8. This native holly species bears bright red fruits. WINTERBERRY
9. This raptor migrates to southern Mexico and to Central and South America for the winter (three words). BROAD-WINGED HAWK
10. The leaves of this tree lack the showy autumn color of other hardwoods, turning from green to brown (two words). WHITE OAK
11. Raptor that eats songbirds (three words). SHARP-SHINNED HAWK

DOWN

1. This shorebird needs open water for foraging and migrates south in winter (three words). GREAT BLUE HERON
2. One owl species that inhabits the Northern Forest year-round (three words). GREAT HORNED OWL
3. When the pods of this plant burst open in autumn, they release hundreds of fluff-topped seeds distributed by the wind. MILKWEED
4. This insect often overwinters in buildings (two words). LADY BEETLE
5. A saprophytic forest plant (two words). INDIAN PIPE
6. Small mammal that eats sugar maple seeds. CHIPMUNK
7. Name for the horny scales on a grouse's toes. SNOWSHOES
8. The Latin name for the shaggy mane mushroom, in the group called "inky cap" mushrooms, because they turn to black goo as they age (two words). COPRINUS COMATUS
9. Reptile that often hibernates on the bottom of slow-moving streams (two words). WOOD TURTLE
10. The only member of a bumblebee colony to survive the winter. QUEEN

