

project WEB

Fall
2011

Connecting Projects WILD, WET and Learning Tree in New Hampshire

Students Help Build Greener Communities

Many public agencies and organizations around the state provide opportunities for students and other community members to step up to the plate to make changes on both large and small scales that move them along the path toward a greener society. Whether it's children being taught to shut the water off while brushing their teeth, parents voting to support an energy-saving heat source for their community's school, students creating maps of local trails, or high school students involved in shoreland

restoration projects to ensure cleaner water, all are contributing in some way to the greening of our communities.

This issue of *Project WEB* is again dedicated to encouraging schools, communities and individuals to "go green." Included are examples of how teachers, students and others in the state are making a difference. We also offer a host of resources that may help you and your students take your first steps toward a more sustainable world.



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Come forth
into the light
of things.
Let nature be
your teacher.

- William
Wordsworth



Second Nature Academy, a private elementary school in Nashua, built the first LEED Platinum non-residential building in New Hampshire.

Second Nature Academy: a Leader in NH Green Design

By Debbie Gleeson

When we began our journey to create a new school campus several years ago, we knew several critical factors were requisite. Our pedagogy has always been to integrate core curriculum areas with science while using our natural environment for inquiry, observation, discovery, creativity and teaching humanity. We knew, therefore, that our new campus would have to have plenty of natural outdoor space,

forest, fields, ponds, wetlands and shelter for farm animals. It would also have to be free from chemicals, pesticides and other hazards. Moreover, the building must be warm and inviting, energy efficient and healthy. What we had not yet realized, however, was that the school buildings would be "green." Five years



ago, we knew little about green buildings. Today, looking back, we understand that there was no other reasonable alternative for a haven for children than a LEED school.

We originally learned about LEED (Leadership in Energy and Environmental Design), after we found an ideal piece of property right here in Nashua. We were intrigued and soon decided to pursue LEED for our project. LEED is a third party verification system that certifies green buildings in the categories of site sustainability, energy efficiency, water efficiency, improved indoor air quality and reduced dependence on fossil fuels. LEED also awards points for using local, renewable and recycled products. Additionally, LEED has programs for new construction and renovations, for homes, schools and businesses. Upon learning this, it became evident that our new school building must reflect our educational philosophy and could be used as a teaching tool for the children who attended. Still, we did not fully appreciate the amount of time, effort and money that would be involved. Despite many hurdles and financial challenges, we managed to become the first LEED Platinum non-residential building in



Second Nature Academy students watch the post-and-beam construction coming together.

NH and win *NH Business Magazine's* 2010 Green Building of the Year Award.

Naturally, cost is a major factor in any project, yet you cannot put a dollar value on a healthy environment. And, while the initial expense of green construction is higher than conventional construction, the benefits are innumerable. We have already realized the costs savings in our utility bills. Our impact on the environment is mini-

mal, our water consumption is remarkably low, and we are carbon neutral. But more importantly, we all benefit from the natural daylight, comfortable air temperature, clean air quality and pleasant ambiance. Moreover, our staff and student body have been significantly healthier since we have occupied the new school. That, to us, is reason enough.



Bicentennial Recycle Band

By Patricia Cauchon, Music Teacher, Bicentennial School

My school, Bicentennial Elementary, took part in a 3-year partnership with NH Project Learning Tree that created an outdoor classroom and curriculum and included teacher workshops on the science inquiry method. I was inspired to create a unit on acoustics for grade 5. My focus question was, "How can you use renewable and/or natural materials to create an instrument that would produce three pitched sounds?"

Students had three "sound awareness" lessons at the outdoor classroom. Their activity was to listen and draw nature "sound maps" during the fall, winter and spring. A second set of sound maps was created after listening to sounds in their homes. The students compared and shared, in both small and large groups, the kinds of sounds and the materials (natural or manmade) that produced environmental sounds.

Music class acoustic activities included witnessing sound waves moving through water and various objects. We pondered, why

do different materials resonate more than others? What effect does the resonance of sound have in our lives? Which string, wire, rubber, plastic or nylon materials produced the most "alive" sound?

During art and music classes, small groups of students experimented during class time using junk and recyclable materials to create an instrument that could produce a pitch that could be sung or matched to a piano, recorder or other tunable instrument. Why did certain materials and designs resonate louder than others? What happens when we change or add different objects to this design? How are the orchestra and band instruments similar or different in design to these creations?

At home, each student created an instrument that could produce at least three different-pitched sounds. They demonstrated and described their instrument to their class.

Small groups of four to six students composed a modern piece of music using



PHOTO BY ERIN HOLLINGSWORTH

Bicentennial Recycle Band displays their "recycled" instruments.

original notation. They performed for their class.

The activities were such a success that students formed a Bicentennial Recycle Band to perform for other people. Original compositions were written and conducted by three volunteer fifth graders for various guests. The display of the three-dimensional instruments in the music room sparked lots of questions from the younger grades. It will be interesting to hear and see this year's instrumental creations.



Spotlight on...

NH LAKES Lake Conservation Corps

Teens Working to Protect New Hampshire's Lakes

By Robie Parsons

The New Hampshire Lakes Association's (NH LAKES) Lake Conservation Corps (LCC) is a natural resource stewardship learning program designed to actively involve high school students and their teachers in hands-on shoreland and watershed restoration projects during the summer. Projects are designed using best management practices to divert stormwater runoff to areas where the water can be absorbed into the ground where it is used by plants or cleansed by natural processes in the soil. Reducing runoff washing into a lake reduces the amount of phosphorus and sediment that enters the lake, resulting in a healthier water body. In excess, phosphorus fuels unwanted plant and algal growth, which smothers habitat for aquatic organisms and makes lake bottoms feel mucky.

NH LAKES, along with municipal leaders, property owners, lake associations and other conservation groups, identifies project locations and designs projects to divert and absorb runoff away from shorelines. NH LAKES helps secure project funding and recruits students and teachers who are hired for part-time summer work, receive school credit or fulfill school-required community service project hours to construct the projects.

Participating students and teachers have the opportunity to learn about lake ecology, build their resumes and get their hands dirty as they help restore water quality in their communities. Open houses showcasing the finished projects encourage other property owners to make similar stormwater improvements. Since the program began in 2007, NH LAKES LCC crews have constructed lake-friendly landscaping on 23 sites, reducing the amount of pollution flowing off the landscape and into 12 lakes and rivers throughout the state. Summer 2011 projects included the following.

Lake, Opechee, Laconia: The Laconia Middle School has a new building along the shore of Lake Opechee. Unfortunately, behind the new building, water flows off the roof and landscape directly into Lake Opechee. To help alleviate this problem, six students and their teacher constructed an

infiltration trench two feet deep and nearly 50 feet long. In addition, a vegetated buffer was planted and an earthen water bar was created on the downhill side of the trench.

Lake Waukewan, Meredith: With a grant from the N.H. Department of Environmental Services' Local Source Water Protection Program, six students from Inter-Lakes High School and their teacher completed six large runoff improvement projects around Lake Waukewan. The lake serves as the drinking water supply for approximately 45 percent of the residents in Meredith. The projects included installing rubber razors and water bars to divert runoff away from the lake, and infiltration trenches and steps, rain gardens and vegetated buffers to absorb runoff. Together, the projects are expected to prevent approximately 15 tons of sediment, 30 pounds of nitrogen (which can contribute to excessive plant and algal growth), and 15 pounds of phosphorus from polluting the lake each year. "We couldn't be happier with the results and how it looks," lauded Robert Normandy, a property owner at Hidden Cove.

Clarksville Pond, Clarksville: Way up



Students from the Colebrook Academy talked about the Clarksville Pond LCC project at the Colebrook Moose Festival.

north, just a few miles south of Pittsburg, Clarksville Pond is home to Rudy's Cabins and Campground, LLC, a seventy-year-old family business. The owners of the property were excited to work with six students and a teacher from Colebrook Academy to enhance the ability of a vegetated buffer along the pond to absorb runoff water by removing rotting lumber from the buffer area and planting native plants.

If you would like to learn more about the LCC Program, contact Robie Parsons, NH LAKES Programs Coordinator, at rparsons@nhlakes.org or (603)226-0299. 

Prevent Stormwater Runoff

Use the following features to reduce runoff flowing into nearby water bodies:

Dripline Trench: A trench dug in the ground to absorb roof runoff, typically sloped away from a foundation, lined with non-woven geotextile fabric, and filled with crushed stone.

Infiltration Steps: Steps built with timbers and filled with crushed stone to slow down and absorb runoff on moderate slopes.

Infiltration Trench: A trench dug in the ground and filled with crushed stone to absorb runoff from paved driveways, rooftops, and other areas.

Rain Barrel: A system that collects and stores rainwater from rooftops, often composed of a 55-gallon drum, a vinyl hose, PVC couplings, and a screen grate to keep debris and insects out. A rain barrel can be attached to gutter downspouts or placed under a roof line to catch free-falling water to be used to water gardens

and wash cars and windows.

Rain Garden: Attractive and functional landscaped areas that collect runoff water from roofs, driveways, and other hard surfaces and allow it to soak into the ground.

Rubber Razor: Used to divert water off paths, gravel driveways, and camp roads into stable, vegetated areas. Constructed out of new or used conveyor belts sandwiched between rot-resistant timbers and backfilled with gravel.

Vegetated Buffer: An area of natural or established vegetation along a shoreline where runoff water can soak into the soil, filter sediment and contribute to ground water recharge.

Water Bar: Fallen or rot-resistant timbers placed in a trench, backfilled with soil and/or stone, secured, and angled to intercept water traveling down footpaths, trails, and other areas, diverting it into stable vegetated areas. 

What's New in Green Education?

Schools that are excelling at “going green” are being recognized and encouraged at the state, national and even global level.

Financial Incentives for Green Schools

New Hampshire is one of five New England states that have joined together to develop the Northeast Collaborative for High Performance Schools (NE-CHPS) to encourage construction of schools that provide high quality educational and energy-efficient environments. NE-CHPS outlines a set of criteria for meeting state mandates and performance-based incentive programs for new school construction and renovation.

By offering financial incentives, school planners are encouraged to meet or exceed the high standards promoted by NE-CHPS to provide a healthy environment and energy efficiency, while using materials and construction practices that have minimal impact on the environment. The guidelines incorporate all the features and benefits of high performance school design, including a healthy indoor environment; efficient use of energy; thermal, visual and acoustical comfort; and cost effectiveness.

Several schools have already received N.H. Department of Education incentive funding for their construction projects:

- **Mason Elementary School** in Mason, N.H., installed a wood pellet boiler heating system, which resulted in a 49%

reduction in total energy use beyond that which is considered acceptable by N.H. school building code standards.

- At **Laconia Middle School**, 99% of the materials from the old building that was demolished was recycled. The new school is expected to save more than \$112,000 per year in energy costs, compared to a standard building.
- At **Profile School** in Bethlehem, N.H., rainwater from roof runoff is used to irrigate fields, and more than 75% of construction waste was recycled.
- The **Keene High School North Campus** gets 7% of its electricity from solar power, and the school uses 32% less water than a standard building.

To learn more, contact Ed Murdough at the N.H. Department of Education at Edward.murdough@doe.nh.gov or 603-271-2037.

Eco-Schools USA

Around the world, schools are making efforts to “go green.” School buildings generally have large environmental footprints, so even small changes to benefit the environment can lead to resource savings that add up quickly. The greening process is also an engaging, authentic lesson for students.

The international Eco-Schools program works in 51 countries, involving 38,000 schools and 10.5 million students. In the

United States, Eco-Schools USA is hosted by the National Wildlife Federation and presently serves K-12 schools in 41 states.

There is no cost to register, and progress through its levels saves schools money. The program’s framework focuses on action in three main areas: the school building, the school grounds, and the curriculum. The program strives to make environmental awareness and action an intrinsic part of the culture of a school.

Currently there is only one New Hampshire school that is registered – Hampstead Academy in Hampstead – so consider joining the effort! Learn more and register at www.ecoschoolsusa.org or contact Elizabeth Soper at soper@nwf.org. 

Energy Smart Schools Program

The New Hampshire Energy Smart Schools Program, sponsored by the N.H. Public Utility Commission and the N.H. Department of Education, is helping schools save an average of 20% of their annual total energy costs!

Here’s how it works: Benchmarks are established using information and data submitted by participating schools, including electricity and heating fuel use, size of the school, number of students, types of heating and cooling systems, and the number of computers. After this data is provided, schools get a customized report analyzing building energy use and assessing utility data to determine the basic nature of the school’s energy consumption and utility costs. You’ll see a comparison of the school’s performance compared to similar schools in the state and across the country. And, best of all, you’ll get recommendations for making money-saving improvements and finding resources to help implement them, including technical assistance, financial incentives and rebates.

To date, 96 schools in the state have been benchmarked through the Energy Smart Schools Program, which represents 25 school districts and \$9,154,360 of total annual utility costs.

To find out more about the program and begin the benchmarking process, visit www.nhschoolbenchmarking.com or call 603-766-1913. 

Activities Related to Articles in this Issue

Project WILD suggests:

In *Sustainability: Then, Now, Later*, high school students analyze two articles on sustainability in which they investigate community life in the present and 100 years ago, then predict community life 100 years in the future.

Middle school students use a simulated field trip, lecture-discussion and student-gathered data to explore water use and its effects on wildlife habitat in Project WILD Aquatic’s *Alice in Waterland*.

As part of the Project WILD Aquatic activity *Water’s Going On?*, middle school students estimate and calculate water consumption, then design and try ways to conserve water.

Project WET suggests:

Students identify and implement water conservation habits in *Every Drop Counts*.

In *Rainy Day Hike*, students are introduced to the concept of watersheds by collecting data about water flowing over school grounds.

Through investigating, analyzing and participating in projects that address water resource issues in *Water Actions*, students gain a sense of accomplishment and are motivated to help manage and protect water.

Project Learning Tree suggests:

Students often do not know which resources are renewable and which are nonrenewable, or which are recyclable or reusable. In *Renewable or Not*, students learn what these terms mean and discover why sustainable use of natural resources is so important.

Resource-Go-Round gives students the opportunity to explore a variety of natural resources and products that people depend on every day. They learn about product life cycles, then research a specific product to find out the sources of its various components.

In *Waste Watchers*, students look at how they use energy in their own homes and how they can reduce the amount of energy they waste.

Merrimack Valley Heats with Biomass

Merrimack Valley School District's 5,000,000 BTU biomass heating system in Penacook provides heat for four buildings by burning wood chips at an annual fuel cost savings of up to \$68,000 compared to the cost of burning fuel oil.

The Merrimack Valley Middle School, High School, superintendent's office building and the bus garage are all heated by the biomass boiler, which first started operating November 1, 2006. The boiler is located in a separate building on school grounds, which also has the capacity to store more than two trailer truckloads, or seventy tons, of wood chips. During the coldest part of winter, the boiler burns approximately two truckloads every week. The cost of one truckload last winter was \$50, but fluctuates from year to year, depending on the cost of oil. According to the school district's facilities director, Fred Reagan, one truckload of wood chips has approximately the same heating potential as 60.78 gallons of fuel oil, which the school is purchasing for \$2.35 per gallon. Although the cost to build the biomass heating plant, including the space for wood chip storage, was greater than a comparable oil burning plant, the cost savings in the fuel is expected to make up the difference within ten years.

Wood chips, once considered essentially a waste product of the logging industry in the state, are now in demand to fuel biomass heating systems at several New Hampshire schools. Merrimack Valley, Hanover High School and Richmond Middle School, also in Hanover, were the first three schools in the state to have biomass furnaces. Several others, including Phillips Exeter Academy, Winnisquam, John Stark and Proctor Academy, now have them. Unlike oil, wood chips are a renewable energy source.

During a recent tour of the heating plant, Reagan explained that, as required by state regulations, Merrimack Valley circulates 100% fresh air through its schools. For additional energy conservation and cost savings, an energy recovery unit takes heat from the exhausted air leaving the building to pre-heat the outside air being taken in. By the time the fresh air reaches the coils of hot water heated to 185 degrees from the boiler, it is already pre-heated, minimizing the energy needed to heat the buildings.

Maintenance of the boiler is minimal, taking no more than a few minutes each



The biomass heating plant at Merrimack Valley Middle School.

cyclone filtration system, which minimizes the amount of particles released to the outside. The heating system is computerized. To enhance energy conservation, it is programmed to operate at lower heat output when the school is not occupied, such as during vacations and weekends.

Reagan welcomes visitors to the Merrimack Valley biomass plant for a tour. He noted that there are grants available for feasibility studies to determine if a biomass system is right for your school. For more information about the Merrimack Valley facility or to schedule a tour, contact Fred Reagan or district plant manager Neil Barry at 603 753-6422 or freagan@mv.k12.nh.us.

For information about researching the feasibility of a biomass heating system for your school – and the availability of grants to get started – contact Sarah Smith, UNH Cooperative Extension in Durham at 603-862-2647 or sarah.smith@unh.edu. **WEB**

day. The coals need to be raked once per day and the ash cleaned out every three or four days. The ash is spread on the schools' lawns and is not nearly enough to fertilize even one of the athletic fields. Waste air from the boiler circulates through a multi-

Energy Answers for You

"If you have energy questions, we have energy answers!" is the motto of the UNH Cooperative Extension's Energy Answers Program, which provides tips on how to save money and reduce home energy bills.

Did you know that each degree the thermostat is turned down can save 3% on space heating costs? An Energy Answers tip suggests turning the thermostat down at night when you're sleeping. It is a myth that it will take more energy and dollars to reheat the space. Another tip suggests turning the thermostat of hot water heaters down to 120 degrees. They are the second biggest energy user in the home, just after space heating. Residential hot water heaters consume about 21% of the average home's energy use. If you'd like to find out how much energy various household items consume, Energy Answers will even let you

know where to borrow a watt meter for you to measure your own household energy use.

The Energy Answers Program sponsors a toll-free information line that is answered by volunteers in Manchester trained to answer energy-related questions or to refer callers to energy experts who can. The program enables informed decision-making by connecting callers with the best New Hampshire-specific energy information from experienced professionals throughout the state.

The Energy Answers Info Line can be reached by calling 1-877-EXT-GROW (1-877-398-4769), Monday through Friday, 9:00 a.m. to 2:00 p.m. For more information about the program or more energy saving tips, visit the Energy Answers' website at <http://extension.unh.edu/Energy/Energy.html>. **WEB**

Fall 2011 WEB Resources

- U.S. Dept. of Education EnergySmart Schools. www1.eere.energy.gov/building/energysmartschools/about.html
- EPA Tools to Reduce Waste in Schools www.epa.gov/osw/education/toolkit.htm
- Green Energy Challenge www.greenenergyfoundation.org
- USGBC Center for Green School Resources www.centerforgreenschools.org/guides.aspx
- EPA Climate Change: What you can do at school. www.epa.gov/climatechange/wycd/school.html

Outside Connections Club: Nashua Teens Hit the Trail for Service Learning

By Marianne O'Connor

Winters in New Hampshire can be pretty rough. It's cold, dark, stormy and icy. Last winter was no exception. But some Nashua teenagers found a way to stay tough against the elements of Mother Nature. Twenty-six students from Pennichuck Middle School participated in the Outside Connections Club, a program developed by school staff to address students' needs and connect them with the world outside. These middle school students all face academic challenges, but together they learned how to operate GPS navigation devices, take waypoint data and save it to a file on the computer. They learned these applications while practicing on snowshoes. And they all stayed after school to do it!

By January, the students were ready to take their skills to the field. They were given the opportunity to help the City of Nashua create a trail map in a city park. Roby Park, located on the city's southern section, is used by many. Behind the ballfields lie acres of woods and an unmarked trail that connects the park to a neighborhood development.

Park and Recreation officials knew that the trail was widely used and wanted waypoint data to create a map for the public.

The trail mapping mission involved city officials, including the Nashua GIS Department and Park and Recreation staff. Mike Kolski, Educator from UNH Cooperative Extension, Erin Hollingsworth from N.H. Project Learning Tree and volunteers from Eastern Mountain Sports rounded out the crew. Principal Paul Asbell gave the students permission to travel by bus to spend the day in the snowy woods and perform the mission.

The students took careful measures to obtain waypoint data for the city to use. While out in the snow, they also looked for animal tracks and reported unusual land features they discovered. At the end of the day, they performed an inquiry on what makes the fastest sled. It was an exhausting but fulfilling day. Once the files were handed off to the GIS Department, we all waited anxiously to see the final results. Finally, the map was revealed, and the students were in awe seeing their work carried out on a real map for all to use.



PHOTO BY MARIANNE O'CONNOR

Students take GPS coordinates on a trail in Nashua's Roby Park.

As the school year began in September, students began asking if there will be more opportunities to do mapping. I couldn't possibly disappoint them. "Yes," I tell them, "We have a chance to map 50 acres of Nashua Conservation land!"

"Can we do it now?" They wondered.

"Don't we want to wait for the snow?" I ask.

"Yes, Mrs. O'Connor, definitely.

Mapping is way more fun on snowshoes!"

See a trail map and video of the project at: www.gonashua.com (search "Outside Connections").



ANNOUNCEMENTS

Wildlife Action Grants Available

Interested in involving youth to make a difference for wildlife? Mini-grants of up to \$300 (\$600 with matching funds) are available for projects on schoolyards, public areas or community lands to enhance habitat for wildlife and outdoor learning. Contact Marilyn Wyzga, N.H. Fish and Game Dept., 11 Hazen Drive, Concord, NH 03301; email marilyn.wyzga@wildlife.nh.gov; or call 603-271-3211. Deadline: February 1.

NH Environmental Educators Annual Conference

SAVE THE DATE! The New Hampshire Environmental Educators will hold their annual conference on Wednesday, March 14, 2012, (snow date: March 15) at the Seacoast Science Center in Rye, 8:30 a.m.–4:30 p.m. Register through the NHEE website at www.nhee.org.

Wonders of Wildlife Classroom Programs

Free interactive programs focusing on wildlife and the environment are available for classrooms (grades 3-6). Deadline to submit requests for spring programs is February 24. For information and a program request form, visit www.wildnh.com/Education/school_progs.html.

Junior Duck Stamp Contest

Encourage your students to submit original artwork depicting North American waterfowl to the N.H. Junior Duck Stamp Art Contest. Cash prizes. Deadline is March 15, 2012. Contact Ellen MacNeil, N.H. Fish and Game Dept., at 603-271-2461 or wildlife@wildlife.nh.gov. Visit www.wildnh.com/Education/Junior_Duck_Contest.htm.

High School Teachers: Join N.H. Envirothon

The N.H. Envirothon, a competition for high school students, is looking for participants. Teams of five students compete in environmental subject areas. The 2012 theme is Non-Point Source Pollution and Low Impact Development. Contact Sue Kessler, NH Envirothon Coordinator, at envirothon@nhacd.org.

Project WET Has Revised Its Guide!

The national Project WET office has revised its curriculum and activity guide and has released the new version: "WET 2.0"! The new guide is significantly different from the previous version.

Educators who have been trained in Project WET within the past 5 years are eligible to be "re-trained" at an abbreviated workshop. Other

educators are welcome to request or attend a full-length workshop. Contact Alicia Carlson at alicia.carlson@des.nh.gov or (603) 271-4071.

Engaging "Tweens" in Water Games

Along with the new guide, Project WET recently unveiled www.discoverwater.org—a website for "tweens" (students aged 7 to 12). The interactive website is organized around 8 water "chapters," which are focused on different water themes. Students can explore the chapters on their own at home, or educators can oversee the activities.

A Forest for Every Classroom 2012

Forest for Every Classroom (FFEC) is a year-long professional development series for middle and high school educators, aimed at providing the inspiration, knowledge and skills required to transform classroom teaching into effective and exciting place-based education. Graduate credits are available from PSU. FFEC 2012 begins May 11-12, at the Hubbard Brook Experimental Forest, Woodstock, NH. Other dates include August 2-3 and 8-10, and dates for October and February 2013 sessions will be decided by the group in August. To register, visit www.nhplt.org.

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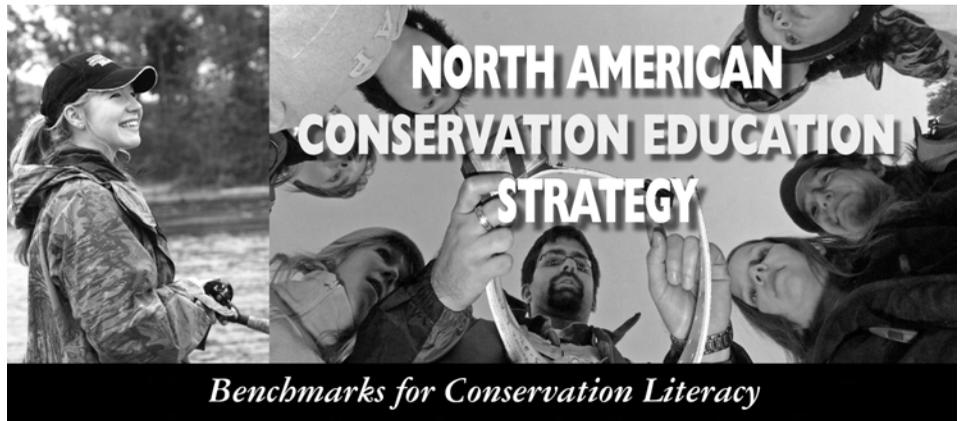
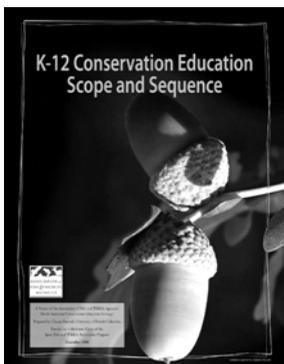
Investigating Schoolyard Biodiversity with One of the New Tools for Conservation Education

by Marilyn Wyzga

Enhancing your schoolyard habitat is one way a school can “go green.” To begin, you want to know what is living on, in and around your school grounds. The brand new *Schoolyard Biodiversity Investigation Educator Guide* can help get you there by guiding students in collecting data to learn about the biodiversity of their own schoolyard. It is one of seven new conservation education tools available for free from the Association of Fish and Wildlife Agencies (AFWA). You can download all of these guides and tools to use in your classroom or education program.

The North American Conservation Education Strategy

Conservation education enhances public understanding and appreciation of fish and wildlife, their habitats and management, while shaping long-term conservation and enjoyment of natural resources. The North American Conservation Education Strategy (CE Strategy) delivers unified, research-based core concepts and information about fish and wildlife conservation, translated into K-12 academic standards to support



the development of students’ environmental literacy, stewardship and outdoor skills. All were developed and designed with input from resource specialists from around the country, carefully peer reviewed and completed with expert assistance from educators and classroom teachers.

AFWA hopes to achieve an informed and involved citizenry that understands the value of fish and wildlife resources as a public trust; appreciates that conservation and management of terrestrial and water resources are essential to sustaining fish and wildlife, the outdoor landscape and the quality of our lives; and actively participates in the stewardship and support of our natural resources.

A Tool Kit for Achieving Excellence

In today’s educational system, it’s critical that any subject content address state education frameworks. The resources in this CE Strategy Tool Kit help make those connections between conservation education programs and science and social studies standards. The tool kit is not a conservation education curriculum. Instead, these resources are designed to work with your existing curriculum, and to provide for communication with your state fish and wildlife agency and department of education.

Each of the guides can build on the others. For instance, prior to undertaking the biodiversity investigation, you might lead students through Outdoor Observation Skills activities. Conducting the biodiversity survey then paves the way for Field Investigations as the students have gathered background information on the schoolyard. They can then go into more depth of study with Landscape Investigations, which consider the area beyond the schoolyard site. Several of the guides reference activities

from Projects WET, WILD and Learning Tree that reinforce the focus topics, concepts and skills. You will also see there are additional tools for fish and wildlife staff to use in professional development with teachers, including the Outdoor Skills Education Handbook and Benchmarks for Conservation Literacy. The benchmarks identify what students should know and be able to do at the 5th, 8th and 12th grade levels to guide them on their way to becoming involved, responsible, conservation-minded citizens.

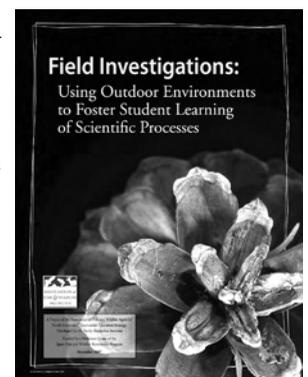
An Integrated Set of Classroom Tools

Fostering Outdoor Observation Skills

The first step in conducting field investigations is learning to observe. Fostering Outdoor Observation Skills helps teachers take their students beyond the classroom to help students connect with the natural world and help them learn to read the “book of nature.”

Field Investigations: Using Outdoor Environments to Foster Student Learning of Scientific Processes

This guide helps K-12 teachers introduce their students to the methods used for scientific field research, and guides them through the process of conducting field studies, using descriptive and comparative methodologies. Students become systems thinkers, learning the skills of scientific in-



HOME continued on page 8

quiry and understanding that science doesn't only happen in a laboratory or classroom. Outdoor experiences in natural settings increase students' problem solving abilities and motivation to learn in social studies, science, language arts and math.

Schoolyard Biodiversity Investigation Educator Guide

Students often learn about the biodiversity of far-off places. Schoolyard Biodiversity Investigations provides them the opportunity to learn about the biodiversity in their own schoolyards. This guide, most appropriate for middle school students, includes 4 sections which describe biodiversity, provide directions for mapping the school grounds, and explain how to conduct a biodiversity investigation and how to calculate the bio-

diversity index. All student data sheets and instructions are included in the appendices.

Landscape Investigations Guidelines

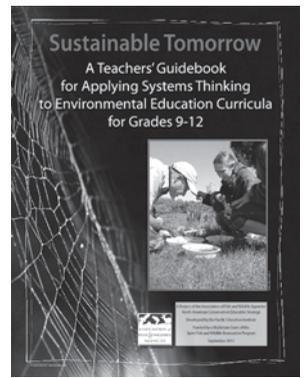
Fish, wildlife and other natural resources are integral parts of our landscapes. The Landscape Investigation Guidelines provide a model for student investigations of their landscapes in ways that meet K-12 social science and geographic academic standards.

Sustainable Tomorrow – Applying Systems Thinking

The natural world is a complex system and effective conservation requires critical systems thinking skills. This publication shows how to use concepts and tools to apply systems thinking to environmental education curricula. Designed for teachers

of grades 9-12, it uses lessons from Project WILD, Project WET and Project Learning Tree to demonstrate how to apply a systems approach.

When children have the opportunity to experience direct, active contact with natural habitats on a regular basis in their formative years, they are far more likely to grow into adults who will value those environments, make informed decisions to help sustain them, and understand and enjoy wildlife-related recreation such as fishing, hunting, and wildlife watching. You can see for yourself. Go to www.fishwildlife.org and click on "Focus Areas: Conservation Education," to download all of the new guides for free.



Some of this text was adapted from the Association of Fish and Wildlife Agencies materials and website.

GBDC Goes Green

The N.H. Fish and Game Department is doing its part to go green at its Great Bay Discovery Center in Greenland, N.H., which features a solar roof (right), rain garden, the porous asphalt and concrete driveway demonstration areas, geothermal heat and composting toilets. The center is open to the public and school groups. Visit www.greatbay.org.



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