

project WWEB

Winter
2011

Connecting Projects WILD, WET and Learning Tree in New Hampshire

Watersheds, Watersheds EVERYWHERE!

Who lives in a watershed? We all do! Wherever you are standing on Earth, you are in a watershed. Water that falls from the atmosphere to the land surface goes somewhere – either it passes through the soil into groundwater, flows over the land as runoff, seeps into surface waters, or evaporates back to the atmosphere. The land *sheds* the water.

Watersheds can be large, like the vast Mississippi watershed; or small, like a stream running through your schoolyard. In New Hampshire, we have five main watersheds, carrying water from the mountains to the ocean: the Connecticut River, Merrimack River, Piscataqua River, Saco River and the Androscoggin River. Four of these watersheds begin as mountain streams in a small area in the White Mountains, but these rivers all discharge into different parts of the Atlantic Ocean.

“Water, water everywhere” is an apt saying for

our state. Luckily for us, New Hampshire has an ample supply of water. But this isn't true everywhere. In many parts of the world, water is a scarce resource. And, because water is a finite resource – what's on Earth now is what always has been here and what will be here in the future – our growing global population is putting a bigger strain on the hydrosphere. Learning about human impacts on water will help to foster stewardship in your students.

Water is found throughout the science frameworks, and is even listed in social studies – it is an interdisciplinary topic. Many grade levels study water in some form – the properties of water, water as an essential requirement for life, the water cycle, aquatic organisms, water and weather; the list goes on. In this issue, you will read stories from four teachers around New Hampshire with different approaches to studying water and watersheds with their students.



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Gilmanton 7th Graders Learn Valuable Lesson

by Mary Fougere, 7th/8th Grade Science Teacher,
Gilmanton School

Getting 7th-grade students to understand the concept of a watershed as an ecosystem and his/her role within it is a monumental undertaking. Crafting this unit became a matter of sitting down with the frameworks and identifying the Essential Questions and Student Targets that would be addressed, such as: What role do external structures play in supporting our living species' populations and biodiversity today? In what ways has technology been used to protect the environment and change history? In what ways can we represent the flow of energy through an ecosystem and into the environment?

As a veteran educator, I soon realized that I couldn't do this alone. New Hampshire is rich in groups willing and able to extend a hand, no strings attached, into the classroom in order to better the



Gilmanton 7th grade students explore the Belknap Range.

MARY FOUGERE PHOTO



“Eventually,
all things merge into
one, and a river runs
through it.”

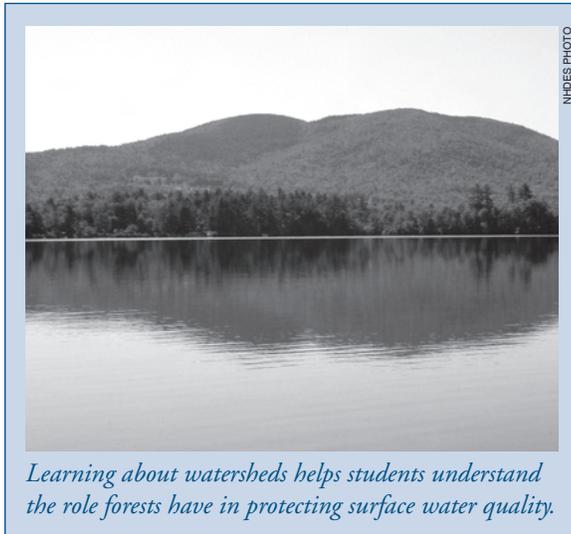
– Norman Maclean



lives of our children. The University of New Hampshire's Forest Watch program provided me with Landsat satellite images of both Gilmanton and the Suncook River watershed in true color and also in infrared, so students could better understand how the land within the watershed was being utilized. The Friends of the Suncook River Watershed provided a variety of base maps of the town and the watershed, including well water protection, dam locations, etc. The N.H. Fish and Game Department provided habitat maps highlighting areas of large unfragmented blocks of land, which is so important for our wildlife populations. Project Learning Tree, Project WET and others provided a myriad of activities with which to draw students into the experience.

Students began by identifying the boundaries and components of the watershed, looking at the history of the watershed, examining historic maps from 1919 (available online from UNH's historic documents website – see *WEB Resources*) of his/her neighborhood and making comparisons to current maps. We reviewed the water cycle using PLT's *Water Wonders* activity, and examined the wildlife habitat maps available from Fish and Game, discussing the importance of unfragmented blocks of land for wildlife populations.

Next, students look at the effect major weather events have had on the ecosystem and particular species within it, such as the endangered brook floater mussel. These



Learning about watersheds helps students understand the role forests have in protecting surface water quality.

events include the 2006 Mother's Day Flood (which resulted in the avulsion of the river), major downriver flooding in 2007, ice storms two years in a row – and the massive tornado that tore through many of the communities in the watershed, all within the past five years!

Including the Forest Watch program helps students understand the watershed as a system, while allowing them to participate in the longest-running student-scientist partnership program in the U.S. Through this program, students have been monitoring the health of trees near our school for the past eighteen years, and each year compare that data to trees throughout New England in order to get a better idea of the effect tropospheric ozone ("the bad stuff") has on the forested part of our watershed.

As a final activity, students hike to the most northern peaks of our watershed: Mt. Mack and Mt. Klem in the Belknap Range. Students use their new topography skills to estimate slope and distance. They also use new information about the geographic history and geology of the area to help identify rock samples and formations along the hike. During the hike, students even pull together socially to urge each other onward and upward in an attempt to make sure that every student experiences the views from the summits. Satellite images, 3-D computer-generated images, and topographic maps could not prepare the students for the view looking south

into our watershed. This hike brings all the components together: sky, forests, rivers and lakes, rocks, mountains and humans.

One of my most memorable hikes happened last year, when students finished climbing through a wooded part of the trail that opened to a spectacular view of the Winnepesaukee watershed, which borders our Suncook River watershed. This is when fifty 13 year olds broke into spontaneous song! The adult chaperones didn't know what to think of it. I like to think that at that moment, they were overjoyed to be part of this wonderful environment, and that they realized the importance of their role in caring for and protecting our watershed for themselves and their future. After all, isn't that the ultimate goal of understanding our watershed as an ecosystem? 

Activities Related to Articles in this Issue

Project WILD Aquatic suggests:

In *Watershed*, middle school students measure the area of a local watershed, calculate the amount of water it receives each year, and discuss the varied roles the watershed plays in human and wildlife habitat.

Students participating in *Dragonfly Pond* create a collage of human land use activities around an image of a pond, while considering the impacts not only to the pond and associated wetlands, but to the wetlands downstream from the pond.

In *Where Does Water Run?*, students calculate the weight and volume of water falling on a study site, determine annual

rainfall and runoff, and trace the course of water to aquatic habitats.

Project WET suggests:

In *Sum of the Parts*, students demonstrate how everyone contributes to the pollution of a river as it flows through a watershed.

Just Passing Through involves a whole body activity in which students investigate how vegetation affects the movement of water over land surfaces.

In *Branching Out!*, middle school students build a model landscape to investigate how water flows through and connects watersheds (K-2 Option).

Project Learning Tree Suggests:

In *Watch on Wetlands*, students conduct field investigations in a local wetland and learn how land use decisions and legislation affect wetland areas.

Through a game and an experiment, *Water Wonders* introduces students to the various steps of the water cycle and helps them understand connections between the water cycle and all living things.

In *Soil Stories Part B*, students carry out a percolation investigation in different soil types to assess water filtration.

Spotlight on...

Hubbard Brook Experimental Forest

Working to increase knowledge of the environment and create a better-informed citizenry

The Hubbard Brook Experimental Forest, located in the towns of Woodstock and Thornton in central New Hampshire, is a world-renowned hydrologic and watershed research facility. The 7,600-acre forest within the White Mountain National Forest was set aside by the U.S. Forest Service in 1955 and dedicated to the long-term study of forest and aquatic ecosystems. Hubbard Brook encompasses an entire forested bowl-shaped valley, which includes several clusters of similar-sized catchments where entire watersheds can be experimentally treated and studied.

Long-term ecological research, collectively referred to as the Hubbard Brook Ecosystem Study, has produced some of the most extensive and longest continuous databases in the world on the hydrology, biology, geology and chemistry of a forest and its associated aquatic ecosystems. This continuing ecological record has proven to be invaluable for identifying and helping to solve environmental problems around the world.

Over the years, hundreds of scientists, representing more than 40 universities, governmental agencies and other institutions, including Cornell University, Dartmouth College, Syracuse University, Yale University, the Institute of Ecosystem Studies and the U.S. Geological Survey, have conducted research at Hubbard Brook. Since 1963, more than 1,750 publications have been produced based on research done there, providing a wealth of information on the structure, function and development of forest, stream and lake ecosystems of the site.

To provide support for the scientists at Hubbard Brook and to help foster the public's understanding of ecosystem science, the Hubbard Brook Research Foundation (HBRF), a nonprofit organization, was established in 1993. Support is provided directly to the scientists by providing lab facilities and residences during the field season.

The HBRF is also involved in two aspects of education. One is to make information available to public decision-makers, so they are better informed about such topics as nitrogen and mercury pollution and

acid rain. The Science Links Program helps bridge the gap between science and public policy by working with Hubbard Brook scientists to help communicate the results of their research to public interest groups and the general public.

Additionally, as part of its education component, the HBRF has created an acid rain teaching guide, available on its website at www.hubbardbrookfoundation.org/education_outreach, that targets teachers and other educators of students grades 7-12. A series of interdisciplinary lessons incorporating data sets created from Hubbard Brook research is currently being developed and expected to be available this spring. Migratory bird science and mathematics lessons also will be available on the website.

The research and educational outreach



PHOTO COURTESY OF HUBBARD BROOK ECOSYSTEM STUDY

One of the research sites at Hubbard Brook Experimental Forest.

taking place at the Hubbard Brook Experimental Forest is helping to enhance ecological literacy, foster better-informed environmental decision-makers and encourage a new generation of ecosystem scientists.



One Teacher's Experience at Hubbard Brook

by Sarah Thorne, Prospect Mountain High School

Have you ever noticed a two-month old sugar maple seedling, too young to have grown its distinctive lobes? Have you ever contemplated the fungi, soils and neighbors that affect seedling survival? Have you ever tickled the roots of an American beech, all in the interest of determining their respiration rate? Last summer, I had the chance to do all these things and more with the scientists who work at the Hubbard Brook Experimental Forest in the White Mountains of New Hampshire.

I am a teacher at Prospect Mountain High School (serving Barnstead and Alton). I got this amazing opportunity as a result of my participation in the Project Learning



PHOTO COURTESY SARAH THORNE

Sarah Thorne at work at Hubbard Brook Experimental Forest.

Tree-led *A Forest for Every Classroom* program during 2009-2010, after which I was invited to apply for the summer position by the Hubbard Brook Research Foundation (HBRF). HBRF secured funding from the National Science Foundation's Research

HUBBARD BROOK continued on page 6

Watershed Excitement in Lebanon Schools

by **Stephanie Davis, 4th Grade Teacher, Lebanon, NH**

Fourth graders in the Lebanon School District have found an exciting way to celebrate their watershed. Teachers, students and community members take part in this year-long project, learning firsthand about the life cycle of the brook trout and the Mascoma River watershed.

The project starts off with a bang as the students travel to the New Hampton Fish Hatchery in the fall to learn how trout are raised. This is a great jumping-off point, as we discuss the life cycle of the brook trout and prepare to raise our own trout from egg to fry in the classroom. Students have a chance to learn all about what goes on at a hatchery. One of the many highlights of the trip is when students get the opportunity to strip the female trout of their eggs and the male trout of their milt.

At the end of this year of study and raising our brook trout, students take part in an annual culminating event that draws on experts from all over the Upper Valley and New Hampshire. The Lebanon Student Watershed Congress is a day filled with environmental place-based student learning centered on our watershed and the life forms that live in it.

The Lebanon 4th grade team has been fine-tuning this learning experience for their students for the past five years. Each year, more and more enthusiastic volunteers become part of our Watershed Congress. Participants come from both the state and local levels. This event draws in experts from the N.H. Fish and Game Department, N.H. Department of Transportation Bureau of Environment, N.H. Department of Environmental Service, N.H. Lakes Association, Trout Unlimited, Vermont Institute of Natural Science, Lebanon Conservation



Students participate in the Project WET activity “Incredible Journey”

Commission and many local teacher and parent volunteers.

At the conference, students take part exploratory learning as they move from station to station. Throughout the day,

The Lebanon Student Watershed Congress is a day filled with environmental place-based student learning centered on our watershed and the life forms that live in it.

students take part in many activities, both in and out of the water, such as:

- Determining the health of the watershed by collecting benthic macroinvertebrates from Great Brook guided by N.H. Fish and Game and Trout Unlimited.
- Collecting data through electro-shocking and fish identification.

- Learning how to fly fish and tie a fly.
- Experimenting with an interactive model of the Whaleback Watershed.
- Making a topographical relief map.
- Looking at the history of the watershed and glacial history of the area.
- Playing many games that relate to the water cycle, human impact on our environment, and the life cycle of the animals in our watershed.
- Taking a closer look at species that use wetland habitats.
- Participating in Project WET’s *Macroinvertebrate Mayhem* activity.

This project is an example of place-based education that meets a variety of science and social studies frameworks under a reinforcing culminating activity that involves the entire community. It could not be done without the support of many generous donations of time and funds. 

Winter 2011 WEB Resources

- U.S. Environmental Protection Agency’s *Surf Your Watershed* <http://cfpub.epa.gov/surf/locate/index.cfm>
- U.S. Geological Survey’s *Water Science for Schools* <http://ga.water.usgs.gov/edu>
- UNH Forest Watch Program www.forestwatch.sr.unh.edu
- N.H. Department of Environmental Service www.des.nh.gov
- Enviroscapes watershed models www.enviroscapes.com or call Alicia Carlson, NHDES, 603-271-4071
- UNH Digital Collections (including historic maps) www.library.unh.edu/diglib

The latest issue of *Wild Times for Kids* is all about watersheds. Get copies for your classroom by calling Fish and Game at 271-3211 or you can download it at www.wildnh.com.



Water and Watersheds in a Nashua 5th Grade Classroom

by Lisa Saunders, Grade 5,
Bicentennial School, Nashua

Water and children – a natural combination! Unfortunately, many of our students have become increasingly disconnected from the natural world around them. In my 5th grade science unit on Water and Watersheds, I am attempting to restore the sense of wonder that comes from playing with water and to connect students with the Nashua and Merrimack River watershed areas.

I have used my Project WET training to plan lessons in which students explore the marvelous properties of water. Their concept of the water cycle is expanded as they learn how plants, animals and even they are part of the water cycle. Playing the *Incredible Journey* water cycle game, they learn that the water cycle is a circle in concept only, and that a water drop can spend a lot of time in the middle of a glacier, at the bottom of the ocean or in groundwater.

Students at this age can be exposed to the concept of water as a precious natural resource. Even though we live in a part of the country where clean water is readily available, they can begin to understand that many people in the world do not have easy access to clean drinking water. My students look for “Water in the News” articles to add to a bulletin board. The subjects range from the city’s attempt to take over control of the local provider of drinking water to the search for evidence of water on the moon.

Where does our water come from, and where does it go when it goes down the drain? I suspect that most people do not spend time pondering these questions. We do! Students learn that they are actually drinking purified pond water and that the water treated by our wastewater treatment facility is actually cleaner than the Merrimack River. To celebrate Clean Water Week in June, we visit our wastewater treatment facility. They see firsthand how this efficiently performed process contributes to the health of not only the people in the community, but also the health of the river system.

I have found that while many children have frequent experiences with ocean water, they do not have the same knowledge about rivers and watersheds (they frequently draw



TARA SIMARD PHOTO

Bicentennial Elementary School students learn from Doug Smithwood (U.S. Fish & Wildlife Service) about salmon (and their scales) at the Nashua Fish Hatchery.

rivers as having sandy banks looking more like a beach), even though we live in a city with two river systems.

One way that we reconnect children and rivers is through the Adopt-A-Salmon program sponsored by the U.S. Fish & Wildlife Service. In the autumn, we visit the Nashua Fish Hatchery, where students learn about the life cycle of the Atlantic salmon. They play a game to simulate real-life hazards of the salmon (predators and dams, for example), and they watch a spawning demonstration. We receive the fertilized eggs

There is no better way to promote environmental stewardship than to have a child release a little fish into the river that he or she raised from an egg!

in January after they have been incubated, and raise the salmon into fry. To me, there is no better way to promote environmental stewardship than to have a child release a little fish into the river that he or she raised from an egg!

I am excited about a new partnership this year with the Nashua River Watershed Association called the River Classroom.

Through a grant that we received, a naturalist will visit our classrooms several times this year to help lead environmental lessons. For the first classroom visit, the naturalist will co-facilitate a lesson on point-source pollution and non-point source pollution with the Enviroscape watershed model purchased with funds from our CS2P partnership (Connecting Schools to People and Place) with N.H. Project Learning Tree. Using this model, students will begin to understand the connection between the abiotic (nonliving) and biotic (living) components of a watershed, as well as the impact of humans on watersheds.

In May, students will spend a day at the Nashua River. They will spend half the day paddling in canoes observing plants and wildlife, and the other half collecting aquatic insects and performing water quality tests. Children spending a day on the river – it doesn’t get anymore hands-on than that!

Water, water, everywhere. In our science unit on Water and Watersheds, students can reconnect with this amazing molecule and see what their own impact is on our local watersheds; in the process they are encouraged to be stewards of this precious resource.



Experience for Teachers program.

I was like a kid in a candy shop, soaking in the knowledge of scientists from all over the country who converge on the 7,600-acre watershed each summer. Hubbard Brook is famed for pioneering the use of small watersheds in ecosystem science and has the longest-running data set in the nation. Scientists who have studied atmospheric deposition, hydrology, nutrient cycling, biomass production and wildlife populations over the past five decades are helping us understand the ecosystem impacts of acid rain, climate change and other human and natural perturbations. It was a great honor to work alongside the professors, graduate students and undergradu-

ates there, all of whom are passionate and creative in their work.

After peppering the scientists with questions and helping them gather data last

It was a great honor to work alongside the professors, graduate students and undergraduates there, all of whom are passionate and creative in their work.

summer, my principal project was to gather data for Dr. Natalie Cleavitt and her forest community ecology team. We measured sugar maple seedling regeneration and condition in plots in various watersheds. The

project is still underway, and Dr. Cleavitt will analyze the relationships between site characteristics, soils, proximity to neighbors, disease and seedling survival.

I am developing lessons based on the findings of Hubbard Brook scientists – from bird abundance to seedling survival. This winter, I will be piloting the lessons, and others developed by the Foundation, in my high school field ecology classes. If all goes well, the lessons will appear on the Hubbard Brook Research Foundation website (www.hubbardbrookfoundation.org) for broader use within the next year.

Thank you, PLT for opening this opportunity for me and my students!



ANNOUNCEMENTS

NH Environmental Educators Annual Conference – March 9, 2011

The New Hampshire Environmental Educators will hold their annual conference on Wednesday, March 9, 2011, from 9:30 a.m. to 5:30 p.m. at the Harris Center for Conservation Education in Hancock. Registration will be available through the NHEE website at www.nhee.org.

Attention High School Teachers: Join NH Envirothon in 2011

The New Hampshire Envirothon, a competition for high school students, is looking for participants. Teams of five students compete in environmental subject areas. The 2011 theme is Estuaries. Training will occur on April 9, 2011, at Seabrook Station. The competition takes place on May 17, 2011, at the Great Bay Discovery Center in Greenland. For more information, contact Sue Kessler, NH Envirothon Coordinator, at envirothon@nhacd.org or go to www.nhacd.org/envirothon.htm.

PLT's GreenSchools! Program ... Schools Wanted

PLT's GreenSchools! program provides environmental investigation audits for educators, students, parents and interested community members to teach, learn and engage together in creating a more green and healthy learning environment at their school. This FREE program com-

bines environmental education, service learning and leadership opportunities for students to help turn their school into a model GreenSchool!. Register to get started at www.pltgreenschools.org.

Discover Wild New Hampshire Day

April 30, 2011 • 10 am – 3 pm
N.H. Fish and Game Dept.
11 Hazen Drive, Concord

Introducing PLT's New Online Community!

You can join PLT's New Online Community for Educators at www.connect.plt.org. Through this online community, you can access the PLT Biotechnology and Biodiversity Lesson Plans, discuss issues, share ideas and success stories, send updates to colleagues, join and form groups related to professional development topics, and chat with educators from around the world.

N.H. Natural Leaders Program: June 26-July 1, 2011

Education and leadership development program for N.H. youth age 14-17 who are interested in natural resources and the environment. Exceptional opportunity to inspire emerging environmental and community leaders through active engagement in fun outdoor recreational and educational experiences. One-week summer session (June 26-

July 1, 2011) includes hiking and staying overnight at an AMC hut, plus leadership skills training, group challenge activities, chance to explore N.H. ecosystems, air quality research, aquatic systems, wildlife management and forestry operations. Opportunity to do a day of service in the fall. Sign up at <http://extension.unh.edu/4H/4HCamps.htm>.

Attend the First Global Water Education Conference September 13-16, 2011

The Project WET Foundation is organizing "Sustaining the Blue Planet," a global water education conference in September 2011. Located in scenic Bozeman, Montana, the goal of the conference is to increase the knowledge and capacity of conference participants to effectively reach children and youth through education that leads to action in schools, communities and corporations. "Sustaining the Blue Planet" will offer five conference strands, a full array of speakers, the much-anticipated launch of Project WET's *Curriculum & Activity Guide 2.0*, pre- and post-conference workshops, pre-conference field trips and dedicated networking opportunities...all within easy reach of some of the best outdoor recreation anywhere. For more information, visit www.projectwet.org.

ON THE H.O.M.E. FRONT

Landscaping for Wildlife in the Schoolyard

by Marilyn Wyzga

Just add water, and invite a world of diversity into your schoolyard. Water is the essential habitat ingredient most often missing from our developed landscapes. If your site is graced with one of the state's many waterbodies or courses – a pond, stream, lake, vernal pool, bog, river or marsh – you may not need to enhance your site for water. If, instead, your site has no wet areas, a water source such as a small fabricated pond or birdbath set on the ground will benefit a variety of wildlife, from birds to butterflies to frogs. A pond can shelter small fish, aquatic insects and other amphibians like toads and salamanders, and provide them a place to breed. Water sources for wildlife should be clean and accessible to other habitat components such as food and cover or shelter.

Creating a Wildlife Oasis

At the N.H. Fish and Game Department headquarters in Concord, we built a small, rubber-lined pond that attracts water striders, diving beetles and over five species of frogs, plus dragonflies that perch on pickerelweed. Fox, deer and turkey stop by to drink, and songbirds bathe in the shallows. Garter snakes enjoy the food resources provided by pond-dwelling tadpoles and frogs. In its tenth season, the pond has proven to be a surprisingly low-maintenance habitat feature with great aesthetic, educational and wildlife values.

Our pond was built by Jeff Crary of Center Barnstead's Crary Waterfalls and Aquatic Nursery. The Crarys have created

Plants and falling water help keep the pond clear and prevent mosquitoes from breeding. (right)

A small investment can yield big wildlife returns with a plastic pond kit like this one at Lyme School. (below)



MARILYN WYZGA PHOTOS

an instructional video, "Falling Water: A Guide to Building Your Own Pond," available for purchase at www.crarywaterfalls.com. A hole was excavated and leveled, then lined with a 3 mil. rubber sheet. Because our office building is on former pine barrens – a sandy glacial deposit – the soil is uniform, easy to dig and free of rocks. A filter network system of slotted 4-inch PVC pipe was laid on the liner, then topped with 6 inches of rounded pea stone. Large rocks form a perimeter; where they emerge from the water, they provide landing pads for insects and birds, and places for frogs to sun and rest. An electric pump circulates the pond's 1,000 gallons, which drop over two waterfalls into the deepest pool. You could



Besides their wonderful colors and forms, wildflowers around a pond provide insects and birds with nectar and seeds, plus safety from predators.

also use a pre-formed plastic shell from a home building supply store; for under \$100, you can have a pond with a pump.

No pond should be an island. Including plants for cover and food in the surrounding area is essential to building good wildlife habitat. The aquatic plants we selected for our pond are mostly native to the Northeast, and include pickerelweed, water lily, iris, monkey flower and arrowhead. A rotting log shelters small mammals and amphibians. Various trees, shrubs, ground covers and perennials connect the pond to the surrounding woodland.

A small water feature on the ground benefits wildlife that can't fly in. A salamander would be vulnerable shimmying up a birdbath pedestal, and a tree frog might not have enough cover once it's in the basin. While a chipmunk could hop down from a nearby stone wall, a toad would be hard pressed to jump two feet off the ground. You can purchase a bird basin without a pedestal and place it in a shallow depression on the ground, use a trash can lid or have students form one from clay or concrete. Surround the edges with small rocks to simulate a tiny pool, and plant it with ferns and groundcovers to provide creatures safety from predators. Protect birds from cats by

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providing high cover that the birds can escape to, and avoiding intermediate cover that a cat can hide in.

Keep It Clean

Over-nutrition can be a difficult issue for ponds. Hosting larger wildlife like fish adds their larger waste loads to the system, encouraging algae growth, so we opt to skip fish. Be sure to keep your pond regularly cleaned, to discourage algae from growing (which can be harmful to the birds) and mosquitoes from laying eggs. A circulating pump in a pond, no matter the size, will serve the same purpose. Adding barley straw or salts and balancing the pH help

keep algae at bay. Clean or empty birdbaths, or other sources of standing water, at least weekly to eliminate the likelihood of mosquito larvae development during the breeding season. Weekly cleanout is not necessary if water is being pumped and circulated through a water feature.

Over time, you will gradually notice organic matter, such as leaves and small plant parts, accumulating on the bottom of the pond. This creates a microhabitat that is occupied by aquatic insects or other organisms. If you leave it there, it will simulate conditions of a natural pond. Overall, the goal is to allow the water garden to become a balanced, self-contained system. We leave the bottom layer and scoop the excess.

Learn, Study, Investigate

For curriculum connections, students can practice math skills by measuring pond perimeters or calculating volumes. Social studies skills could be exercised in mapping an area to build a new pond, or mapping the area of an existing pond, using a grid. Students could apply scientific process skills in observing wildlife activity around the pond, involve language arts in writing about what they observe or art to illustrate their observations, or build on their observations by devising a field investigation.

Directions for building a pond can be found in many wildlife landscaping books, including:

Water Gardens, Expert Advice and Practical Instructions and Ideas for the Most Beautiful Streams, Pools and Water Gardens; Peter Stadelmann, 1992 by Barron's Educational Series, Inc. Hauppauge, NY

Waterscaping: Plans and Ideas for Natural and Created Water Gardens, Judy Glattstein, Storey Books, Pownal VT 1994



MARILYN WYZGA PHOTO

Position a bird bath near food and shelter plants, and clean it regularly.

Even if it's as simple as a cache pot with a single water-loving plant in it, the fastest, easiest way to introduce an entirely new world of diversity into your schoolyard site is to add water.



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