

- addresses a critical issue facing today's children
- offers a proven method for enhancing learning across the curriculum
- strengthens school, family and community relationships
- provides the tools for restoring the land and enhancing our relationship to it

The Challenge Facing Children Today

Today's children are immersed in technology. Television and the Internet have shown them the demise of rain forests and whales, the threat to endangered species, and the destruction wrought by hurricanes and earthquakes. They absorb this second-hand information, and the problems seem big and far away, engendering a feeling of hopelessness and helplessness.

Sadly, they have less and less first-hand exposure to the natural environment. Children today do not spend much, if any, time watching clouds move across the sky or examining the contents of a mud puddle. Between soccer games, piano lessons and swimming practice, what child has the time to listen to dried leaves and grasses rustle in the wind? How many know what it feels like to have a fuzzy caterpillar inch its way across their finger? Serendipitous encounters with nature are disappearing, a phenomenon that has been referred to as the "extinction of experience"¹ or more recently, "nature-deficit disorder."²

There is a disconnect between children and the natural environment. The connection between the food, energy and recreation the earth provides has been largely lost and, along with it, the perspective needed to understand the science and art of living on earth. How do we empower children and help them develop a sense of wonder and a sense of place in their local environment? How do we encourage in them a responsibility toward life-long stewardship of the natural world?

A crucial piece in the educational puzzle is missing. Who is teaching the next generation the skills needed to become active and scientifically literate citizens? Students need problems to solve that are real and manageable, not far away and hopeless. They need to know how to make a difference, and to understand their relationship to the environment.

There is hope and progress. There are schools where children have schoolyards rich in native species. They can be seen following butterflies from flower to flower, monitoring their activity. They know how to use a stopwatch to record data as part of a small experiment. They use the restored schoolyard as an inspiration for their art and writing. Flowers are in drifts among grasses of the restored prairies that groups of students, parents, and community members helped to create under the guidance of teachers. This is happening at schools across Wisconsin, from California to New York and Texas to Minnesota, thanks to Earth Partnership for Schools, a program aimed at healing the land and our relationship to it, while encouraging learning in all areas of the curriculum. Earth Partnership for Schools is an award-winning, nationally recognized program of the University of Wisconsin-Madison Arboretum.

The Earth Partnership for Schools Solution

Earth Partnership for Schools (EPS) connects with and inspires students as they learn while participating in activities in all subject areas that relate to their local environment, thus encouraging them to develop attitudes, knowledge, and skills necessary to become environmentally literate citizens. EPS activities foster a student's ability to learn about and relate to the natural environment in many ways — through creative arts, science, social studies, math, and language arts — while developing a sense of place in the world.

¹ Nabhan, Gary, and Stephan Trimble. *The Geography of Childhood: Why Children Need Wild Places*. Boston: Beacon, 1995.

² Louv, Richard. *Last Child in the Woods. Saving Our Children From Nature-Deficit Disorder*. Chapel Hill: Algonquin, 2005.

“... I choose a place on the prairie. In this place in the prairie I felt totally at ease with nature and insects. I felt like I could stay there forever. ... I felt content and happy, and even though I was far from everyone else I felt like I wasn't alone.”

5th Grade student
at an Earth Partnership
School

“Kids need to feel important, to feel that they make a difference in this world. If you feel that you are not going to have a future, you are not likely to go out and do something. This program provides different ways to give kids a sense of purpose and build competency...”

Milwaukee EPS teacher

EPS staff members demonstrate and share new experiential techniques for teaching science and other core subjects, grounding the lessons in the context of habitat restoration. EPS teachers encourage students to practice mental and physical skills that prepare them for the real world of work — critical thinking, communication, collaboration, persistence, and flexibility.

As conservationist Aldo Leopold wrote, “When we see land as a community to which we belong, we may begin to use it with love and respect.”³

EPS nurtures this respect in children at a time when they are forming their view of the world, and invites their parents and teachers to strengthen their own commitment to the land. This initiative forges beneficial links among students, their families, their schools, and their communities as they restore native plant and animal habitats on school grounds.

What better place to teach children to care for the earth than in their own schoolyard? These often barren settings are the perfect focal point for a process of education, restoration, and beautification through the creation of natural habitat areas, butterfly or rain gardens. The schoolyard offers abundant opportunities to encourage and reward a child's natural curiosity and to allow children a chance to enjoy being a part of nature.

The Arboretum has been a pioneer in restoration of native ecological communities for more than 70 years. Since 1991, EPS has helped teachers to envision, design, and plant natural gardens and restore native habitat with students at their schools. K-12 students plan, plant, tend, and study restorations of ecosystems on school grounds or nearby sites.

Our previous experience shows that students at all levels and with diverse learning styles have grasped scientific concepts through this hands-on, context-rich, experience.

How Earth Partnership for Schools Works

We offer schools a comprehensive, interdisciplinary program linked to state education standards that has been implemented by more than 200 schools throughout Wisconsin and in nine additional states.

A group of teachers and community members from each participating school is trained during professional development institutes at the Arboretum. During the institutes, participants experience the multidisciplinary curriculum, which has more than 100 activities that span the restoration process, from learning the history of the site, studying the existing conditions of soil and vegetation, to ways to design, implement, and manage a habitat restoration. Participants are encouraged to explore at each step of the way — learning how questions lead to experiments as they build their own knowledge and gain confidence.

³ Leopold, Aldo. *A Sand County Almanac*. London: Oxford University Press, 1949.



“This was not just a 3 credit class. This was a life changing experience for me.”

2005 Earth Partnership participant (Milwaukee)

“This institute has been a once in a life-time experience for me as a teacher. I have never taken any course that has left me so energized to improve my teaching and student learning.”

2003 Earth Partnership participant (Madison)

“This has been the best educational workshop that I’ve ever attended. Most important is what I’ve learned about teaching.”

2005 Earth Partnership participant (Milwaukee)

Evaluations of the program illustrate that it has positive impacts on school culture and fosters a school community’s ability to create a sustainable learning laboratory on school grounds. EPS is highly successful in: 1) generating enthusiasm and acceptance of the initiative in the school and community; 2) developing school-wide coalitions for ecosystem restoration; 3) getting students meaningfully involved in restoration and scientific processes; and 4) addressing needs and abilities of students with different learning styles. ¹

Some argue that depriving young people of intimate interactions with the natural world can have detrimental intellectual, biological, emotional, and developmental impacts. A 2004 study published in the *American Journal of Public Health* found that children as young as five years old had significant reductions in Attention Deficit Hyperactivity Disorder (ADHD) symptoms when they became engaged in nature.²

Given this perspective, programs like EPS that provide relevant and meaningful outdoor experiences — while also meeting educational mandates placed upon schools, teachers and students — are essential.

For these programs to take hold, educators must learn new pedagogical techniques and subject matter that may seem unfamiliar or even challenging and to include them in an already demanding curricular schedule. Therefore, the opportunities available through EPS for teachers to gain new skills, knowledge, and understanding of the issues involved are critically important. The program is remarkably cost-effective as EPS-trained teachers take information to their school districts and, in turn, train their colleagues.

Earth Partnership for Schools Expands Learning Opportunities Nationwide

Through the RESTORE (Restoration-based Education, Science Training and Outreach for Regional Educators) program, professional development teams are being trained to bring Earth Partnership for Schools to California, Indiana, Illinois, Kansas, Kentucky, Minnesota, Missouri and Oregon and additional regions of Wisconsin.

Since 1991, EPS has received grants totaling more than two million dollars from the Institute of Museum and Library Services, EPA, National Science Foundation, Howard Hughes Medical Institute, Wisconsin Environmental Education Board, Center for Biology Education, the Baldwin Wisconsin Idea Endowment and the Wisconsin ESEA Professional Development Program. We are now seeking funding to sustain and improve existing efforts in Wisconsin and to expand this effective, award-winning program across the country.

¹ Clifford, M. (2003) *Summary of Survey Responses*. Madison, WI: Springboard Training and Evaluation.

² Frances E. Kuo, PhD and Andrea Faber Taylor, PhD *A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence From a National Study* September 2004, Vol 94, No. 9 | *American Journal of Public Health* 1580-1586



Curriculum Guide Introduction

“Even though I am a language arts teacher, inquiry-based teaching/learning could have a great impact... to guide my students through new materials and help them have a deeper understanding.”

EPS Summer Institute
Middle School Teacher

“Awesome ideas to get students involved/creating ownership.”

EPS Summer Institute
High School Teacher

The Restoration-Education Process

The Earth Partnership for Schools is a nationally recognized model for restoration-based educational programming initiated at the University of Wisconsin-Madison Arboretum. The University of Wisconsin-Madison Arboretum has a threefold mission to conserve and restore Arboretum lands, advance the science of restoration ecology, and foster the land ethic. The land ethic, the idea that we consider soil, plants and animals as part of the community to which we belong and act in a way that allows for their continued existence, was proposed in *A Sand County Almanac* by Aldo Leopold (1949/1966), co-founder and first researcher for the Arboretum. For many years, classes from nearby schools would tour the Arboretum to learn about prairies, forests and ecological restoration. However, Arboretum staff realized they wanted young people to connect with the natural world in ways that were more personally meaningful than a once-a-year field trip could offer. This desire evolved into the creation of Earth Partnership for Schools to teach teachers how to actively engage their students in restoring ecosystems at their schools.

Since 1991, teams of teachers from hundreds of schools have learned to incorporate ecological restoration into the curriculum through the Earth Partnership for Schools Program. This multi-disciplinary teacher professional development program emphasizes inquiry-based learning and multiple intelligences in a hands-on, collaborative setting. Recreating or restoring an ecological community on school grounds provides opportunities for students to study local history, map current site conditions, learn about species tolerances, conduct research, manage their restorations, and celebrate a new personal relationship with the land.

The theme of ecological restoration and the real-life task of restoring an ecosystem on the school grounds provide a framework that can unite lessons and activities across different subject areas and motivates students to learn about the world around them.

This K–12 Curriculum Guide weaves environmental knowledge and skills into core curriculum and assessment. EPS is grounded in research and practice, which shows that using school grounds in learning is simply good, effective teaching. EPS has created more than 100 lessons, complete with education standards and student assessment ideas. More than a series of engaging activities, EPS' focus on restoring a living environment for student study connects young people with the natural world while simultaneously enhancing their learning. Each activity in this guide includes objectives, a background section, directions, assessment ideas, relevant field sheets, as well as options for extensions and additional resources.

10 Restoration Education Steps

This guide is structured to follow a 10-step process of restoring an ecosystem, with each step containing a variety of lessons:

1 Study

Study the Model – study and visit examples of the ecological communities intended for restoration. What is an ecosystem and how do ecosystems interact? Visiting high quality restorations or remnants, students identify species, record their observations in journals and imagine and plan what their restored schoolyard site can become over time. This helps to create a mental model of the ecosystem or habitat to be restored. Reading and on-line research can expand horizons of what is possible.

2 Investigate

Investigate Site History – review land office surveyors’ notes, historical maps, written and oral histories and other original sources to determine the ecological community prior to European settlement and integrate ecological restoration into social studies. Math classes can convert the surveyors’ chains and links to miles and feet or metric units. Local literature and student journals can provide additional windows for language arts.

3 Analyze

Perform Site Analysis – study the current site conditions to determine the suitability for different species and restoration strategies. This step can include analyzing soil, measuring water infiltration rates, calculating slope of the land, and mapping existing features such as paths, sun/shade and existing vegetation, sketching and visually assessing physical and aesthetic qualities.

4 Connect

Make Community Connections – reach out to the both the school and local communities for support. Students can write articles in school and local newspapers, describing the project and needs. Many people in the community welcome the opportunity to share their expertise and resources and get more connected with the school.

5 Plan

Plan the Restoration – choose an area for the project based on the site analysis, create a design, lay out the design, develop a budget and select appropriate species. Native plant nursery catalogs and web-based regional native plant lists provide good starting points. Design considerations include proximity to the school building for easy access by classes, considering existing land use, and aesthetics, such as the use of curved instead of straight boundaries. Starting with a butterfly or rain garden or 1000 square feet can prove that smaller can be a beautiful and prudent beginning.

- 6**
Prepare

Prepare the Site – remove existing vegetation using a variety of approaches including cultivation, mulching, and sod removal. Involve students in researching alternative methods, deciding on a plan and actually preparing the site. Parents and community volunteers can also be helpful. A well-prepared site will result in a better restoration and less frustration.
- 7**
Plant

Plant the Site – sow seeds and/or transplant seedlings. Engage as many students as possible (the entire student population) in planning and implementing a celebration for the “birth” of their site by performing skits, singing songs, or other presentations related to local natural and cultural history. Involving additional students each year to add a small area to the site or create a new one increases the number of stakeholders for maintaining the restoration.
- 8**
Manage

Manage the Site – control invasive species through pulling weeds, prescribed burning, and mowing. Students learn to identify and how to control invasive plants. Master gardeners and other community volunteers are an important asset to help students maintain restorations during vacations and assist with long-term maintenance.
- 9**
Research

Conduct Research – ask questions and gather data throughout the restoration process. Compare the effects of different seed mixes in terms of competition with weeds, site preparation and management techniques. Students can collect and analyze data about insect and animal population dynamics. Most importantly they can learn to observe and ask their own questions and use their own creativity to find the answers.
- 10**
Learn

Learning Grounds –there are endless learning opportunities available once students, teachers, and community members have restored a native habitat on their school grounds. Students experience EPS activities that incorporate language arts, science, math, social studies and service learning opportunities. They participate in creating a living legacy at their schools and can learn how to be citizen stewards of their own communities.

“The activities were amazing. ...I can easily see how we can seamlessly fit this curriculum into our various disciplines. I can’t wait to get these activities into my team mates hands and begin the planning process for creating our own native prairie...”