
Using ENVIRONMENT-BASED Education to Advance Learning Skills and Character Development

A Report, Annotated Bibliography,
and Research Guide

The North American Association
for Environmental Education

The National Environmental
Education & Training Foundation

OCTOBER 2001



INSIDE FRONT COVER

BLANK PAGE



Using ENVIRONMENT-BASED Education to Advance Learning Skills and Character Development

A Report, Annotated Bibliography, and Research Guide

The North American Association
for Environmental Education

The National Environmental
Education & Training Foundation

Washington, D.C.

OCTOBER 2001

LEFT HAND PAGE ii

BLANK PAGE



LEFT HAND PAGE iv

BLANK PAGE

This report describes the efficacy of envir



The Environment and Education

A quiet revolution is taking place in many American schools. Forced by underperformance, or even failure, a number of schools have adopted a new approach based on understanding what interests children and what can transform them into active learners.

ronmental science and related social issues to make sound and well-reasoned environmental decisions.

The term “environment-based education” (EBE) is used in this report to focus attention on the numerous benefits that arise from using the environment more broadly as a learning tool in schools and after-school programs. While environmental education focuses on building a base of environmental knowledge and skill to be applied to environmental stew

ful in bringing a student-centered approach to standards-based learning. In one recent examination of this question, Kearney (1999) finds that most teachers do not recognize all the educational improvement opportunities that environment-based studies routinely present. This could change as a growing body of evidence links environment-based education to improved test scores and grade level achievement. Klein (1995) and Volk and McBeth (1998) report that students who experience issues-based EE make significant cognitive and skill gains, with notable improvements in levels of measurable achievement. For example, students at Hawley Environmental Elementary School (Milwaukee, Wisconsin) exceeded the state average on both state tests and nationally-normed assessments, scoring higher than all other schools in Wisconsin with similar socio-economic status (U.S. Department of Education, 1999).

Environment-based education helps teachers meet standards across multiple disciplines within a single cur

study also found that student performance in each of the schools improved regardless of socio-economic factors.

Man

Examples of Environment-Based After-School Programs

EarthForce, Alexandria, Virginia A program that involves middle school students in community projects to encourage volunteerism, community service and service learning.

EnvironMentors, Washington, DC A program for inner city high school students that helps students work one-on-one with environmental professionals to improve skills used in environmental projects. The program focuses on populations where fewer than 25% of students graduate high school and go on to college. In last year's New Jersey EnvironMentors program, 12 of 14 graduating seniors planned to go to college.

Project Learning Tree, Project Wild, and Project WET, Washington DC, and Maryland These three programs supplement teacher training programs that reach some 100,000 teachers and millions of students per year. They can easily be adapted to after-school programming for all ages.

Bringing the Watershed, Washington, DC This public/private partnership gives high school students opportunities to study real-world science in the Washington, D.C. metropolitan area national parks. The Potomac and its watershed are the themes around which a multi-disciplinary high school science curriculum was created to enhance awareness and understanding in an after-school or out-of-classroom setting. The national parks are used as laboratories where students can apply science and math skills to real-world issues and cultivate a sense of stewardship for the nation's natural and cultural resources.

Bringing Education into the Afterschool Hours, Washington, DC This program of the U.S. Department of Education is aimed at helping local after-school providers understand how to integrate content such as science, reading, math, technology, and the arts into their programs to enhance children's learning and build on regular school programs.

can be as successful as the student who learns through lectures and books. In a 1994 article, "Learning Style Program Boosts Achievement and Test Scores," Klavas documents that teachers who changed instruction modes to match students' diverse learning styles often found that the students learned more and learned more easily.

Environmental educators often observe that students who fail in traditional school settings can succeed when the natural outdoor environment becomes the students' learning laboratory. Environmental educators believe that studying the environment furthers school reform objectives by making academic success an achievable goal for all students. In the 1999 inaugural issue of *Environmental Educators*, TD [(leNAAe)2to (i)21 (e)T 2 j 565e f o r

How the Environment Prepares Students for Work

- Investigation and issue orientation
- Real world and complex problems
- Community projects and service learning
- Teamwork skills

School-to-Work and Community Service Skills

With the support of community leaders who seek to address society's need for school graduates ready to work and learn on the job, school-to-work programs have become much more popular in the past several years. The overall concept of school-to-work preparation has expanded beyond the notion of traditional vocational education.

Two aspects of environment-based education make it an appropriate and useful component of school-to-work programs. First, it is project-oriented and gives students the opportunity to see projects through from planning to implementation.

Second, environment-based learning can be highly oriented to community service.

EE and Education for Leadership	
<i>EE Instructional Strategy</i>	<i>How it Contribut</i>
Cooperative learning (working in teams or with partners)	
Critical thinking and discussion	
Hands-on activities	
Emphasis on action strategies	
Involvement in (real world) issue-based projects	

(Massialas, 1989). Issue-oriented approaches give students a better idea of the possibilities and constraints on citizen action, and about the roles and responsibilities of citizenship.

Leadership ability is built on many of the skills that environment-based education fosters: cooperation and the ability to act in appropriate, socially acceptable ways; letting all who want to be part of the action participate, either individually or as part of a team or group; showing concern for others; demonstrating active leadership and participation in the democratic process; and connecting to the community. In issues-oriented instruction, students are invited to actively solve problems, often connecting with the community in environmental service learning projects. Because it is inquiry-based (that is, learning and knowledge evolve from student questions and curiosity within a framework of agreed-upon academic standards), environment-based education is an excellent vehicle for helping students develop and practice the critical thinking and decision-making skills needed in the democratic process.

Examples of environment-based education programs that develop leadership skills include the following:

- *Watershed Conservation Leadership Institute* This school program uses the subject of watershed conservation to develop a range of education skills. It includes a leadership skills training institute that emphasizes investigation and problem solving.
- *Conservation Leadership Institute* Students come to Penn State University to study how resolving conservation issues produces leadership skills.

■ *Handwriting practice, cursive, letters, numbers*

Fourth to 12th graders

Develops Confidence and Higher Self Esteem

Youth who receive instruction in both environmental issues and action strategies assume personal responsibility for realizing their values. Such a sense of responsibility increases confidence and self-esteem. It also helps them feel part of “something larger than them” (Iozzi, Laveault, and Marcinkowski, 1990; Lieberman and Hoody, 1998).

Students in some schools have been able to assist their communities with projects that would otherwise be too costly (National Association of Conservation Districts, 1998). For example, students enrolled at the School for Environmental Studies at the Minnesota Zoo in Apple Valley, Minnesota, completed a water quality study of the City of Eagan’s 20 ponds. Community agencies used the students’ data to improve city water quality.

Contrary to skeptical opinions that EE infuses students with a “gloom and doom” outlook, students who have increased knowledge about the causes of environmental problems are generally more positive about being able to correct and prevent future problems. They are also more confident about their own effectiveness in problem solving (Hoody, 1995; Champeau, 1997). Teens in the late 1990s exhibited rising optimism about their generation’s ability to mobilize and lead society to overcome large-scale challenges affecting the future, including environmental issues. They believe that individual actions can make a difference (Carrier, 2000).

Self-empowerment can also lead to improved career outlooks. In a 1999 report, *Self-Efficacy Beliefs and Career Development*, Brown found such a correlation between student self-esteem and self-empowerment, and future career success.

Few students realize that the choices they will make in their adult lives depend very heavily on basic precepts of science. My classes address real-life issues that they soon may face.

Ñ Jenelle Hopkins, Teacher,
Centennial High School,
Las Vegas, Nevada

Professionally-executed environmental education (EE) is a comprehensive process for helping people understand the environment, their place in it, and related issues. Environment-based education (EBE) uses the environment more broadly as a learning tool in schools and after-school programs. EBE employs a popular subject matter to improve student learning skills and to create a wider learning context for students, teachers, and the community. EBE emphasizes interdisciplinary integration of subject matter, problem- and issue-based learning experiences, team teaching, learner-centered instruction, constructivist approaches, and self-directed learning.

EBE helps teachers meet standards across multiple disciplines. Its emphasis on higher-order thinking increases academic achievement in language arts, math, science, social studies, and the arts. Its focus on the immediate environment and the local community makes learning relevant, interesting, and compelling. Students involved in EBE develop advanced lifelong learning skills, stronger workplace and community service and leadership skills, and develop confidence and higher self-esteem. Environment-based education enables teachers to produce environmentally literate young adults who are prepared to take their place in the complex and challenging society of the 21st century, and who can compete in a global economy with the skills, knowledge, and inclinations to make well-informed choices and exercise the rights and responsibilities of members of a community.

Broader adoption of environment-based education can help produce high-performance lifelong learners, effective future worker

REFERENCES

- Hungerford, H. R., R. B. Peyton, and R. J. Wilke. (1980). Goals for Curriculum Development in Environmental Education. *Journal of Environmental Education*, 11(3), 42-47.
- Hungerford, H. R. and T. L. Volk. (1990). Changing Learner Behavior through Environmental Education. *Journal of Environmental Education*, 21(3), 8-21.
- Iozzi, L., D. Laveault, and T. Marcinkowski. (1990, March). Assessment of Learning Outcomes in Environmental Education. In: Simmons, D (Ed.). 1995. *The NAAEE Standards Project: Papers on the Development of Environmental Education Standards*, (p. 15-16). Troy, OH: North American Association for Environmental Education.
- Kearny, A. R. (1999, November). *Teacher Perspectives on Environmental Education and School Improvement (Final Report)*. Seattle, WA: Research on People on Their Environments. <http://www.evergreen.edu/user/K-12/eeFinRep.pdf>.
- Kennedy, C. (1999). In the Cascade Reservoir Restoration Project Students Tackle Real-World Problems. *ENC Focus* 6(2), 18-25.
- Klavas, A. (1994). Learning Style Program Boosts Achievement and Test Scores. *Clearing House*, 67(3), 149-51. <http://ericae.net/ericdb/EJ479200.htm>.
- Klein, P. (1995). Using Inquiry to Enhance the Learning and Appreciation of Geography. *Journal of Geography*, 94(2), 358-67.
- Krynock, K. and L. Robb. (1999, November). Problem Solved: How to Coach Cognition. *Educational Leadership*, 57(3), 29-32.
- Leinhardt, G., C. Stainton, and J. M. Bausmith. (1998). Constructing Maps Collaboratively. *Journal of Geography*, 97(1), 19-30.
- Lieberman, G.A. and L. L. Hoody. (1998). *Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning*. San Diego, CA: State Education and Environmental Roundtable.
- Massialas. (1983). In Vontz, T. S. and W. A. Nixon. (1999). *Issue-Centered Civic Education in Middle Schools*. Bloomington, IN: ERIC Clearinghouse for Social Studies/Social Science Education. http://www.ed.gov/databases/ERIC_Digests/ed429929.html.
- Mastrofski, S. and S. Keeter. (1999). *Fight Crime Invest In Kids, Poll of Police Chiefs*. Washington, DC: George Mason University. <http://www.fightcrime.org>.
- Murphy, J.W. (1999). Educating for Business: Keeping Pace with the Changing Marketplace. In: *The 21st Century: Meeting the Challenges to Business Education: 1999 Yearbook*, (pp. 162-172). Reston, VA: National Business Education Association.
- NAAEE. (1999). *Excellence in EE: Guidelines for Learning (K-12)*. Rock Spring, GA: North American Association for Environmental Education.
- NAAEE. (1999). *EEducator: Advancing Education Reform*. Troy, OH: North American Association for Environmental Education. <http://www.neetf.org/Education/reports.shtm>.
- NAAEE. (1996). *Environmental Education Materials: Guidelines for Excellence*. <http://www.naaee.org/npeee/materials.html>.
- NAAEE and ELC. (2001). *Environmental Studies in the K-12 Classroom: A Teacher's View*. <http://www.environmentliteracy.org/survey2001.pdf>.

NEETF. (2000). *Environment-based Education: Creating High Performance Schools and Students*. Washington, DC: The National Environmental Education and Training Foundation.

NEETF and Roper Starch Worldwide. (2001). *Lessons from the Environment: The Ninth Annual National Report Card on Environmental Attitudes, Knowledge and Behavior*. Washington, DC: NEETF

PCAST Biodiversity and Ecosystems Panel (President's Committee of Advisors on Science and Technology). (1998, March). *Teaming with Life: Investing in Science to Understand and Use America's Living Capital*. Washington, DC: The White House.

Rainer, J. D. and E. M. Guyton. (1999). Democratic Practices in Teacher Education and the Elementary Classroom. *Teaching and Teacher Education*, 15(1), 121-32.

Senge, P. M. (1990). *The Fifth Discipline: The Art & Practice of The Learning Organization*. New York: Currency Doubleday.

Simmons, D. (ed.). (1995). *The NAAEE Standards Project: Papers on the Development of Environmental Education Standards*. Troy, OH: North American Association for Environmental Education.

Stapp, W. B. and D. A. Cox. (1974). Environmental Education Model. in *Environmental Education Activities Manual*. Ann Arbor, MI:

Stapp, W. B., A. E. J. Wals, and S. Stankorb (eds). (1996). *Environmental Education for Empowerment*. Dubuque, IA: Kendall/Hunt.

UNESCO/UNEP. 1978. The Tbilisi Declaration. *Connect* 3(1), 1-8.

U. S. Department of Education. (1999). Hawley Environmental Elementary School, Milwaukee Public Schools, Milwaukee, WI. In: *Hope for Urban Education: A Study of Nine High-Performing, High-Poverty, Urban Elementary Schools*. Washington, DC: U.S. Dept. of Education. <http://www.ed.gov/pubs/urbanhope>.

U.S. Department of Education. (1998). *Safe and Smart: Making the After-School Hours Work for Kids*. Washington, DC: U.S. Department of Education.

ANNOTATED BIBLIOGRAPHY *A list of supplemental sources.*

Wright, T. A., & Griggs, M. (2009). *Improving student achievement: A review of the research*. Washington, DC: U.S. Department of Education, Office of Education Policy and Practice. http://www2.ed.gov/pubs/200909/200909_01_000.pdf

In spite of progress in the elementary schools, students in high schools still lag behind the benchmarks set by Goals 2000. Student achievement remains flat and college remediation rates have risen to unprecedented levels.

Wright, T. A., & Griggs, M. (2009). *Improving student achievement: A review of the research*. Washington, DC: U.S. Department of Education, Office of Education Policy and Practice. http://www2.ed.gov/pubs/200909/200909_01_000.pdf

A study of whether EE can enhance near and far transfer in learning. Implications for further study are discussed.

Wright, T. A., & Griggs, M. (2009). *Improving student achievement: A review of the research*. Washington, DC: U.S. Department of Education, Office of Education Policy and Practice. http://www2.ed.gov/pubs/200909/200909_01_000.pdf

Schools should become caring communities wherein children and adults model the kind of respect and responsibility that are the cornerstones of good character.

Wright, T. A., & Griggs, M. (2009). *Improving student achievement: A review of the research*. Washington, DC: U.S. Department of Education, Office of Education Policy and Practice. http://www2.ed.gov/pubs/200909/200909_01_000.pdf

A review of the relationship between students' self-esteem and self-empowerment beliefs and how those attitudes influence future career success.

Wright, T. A., & Griggs, M. (2009). *Improving student achievement: A review of the research*. Washington, DC: U.S. Department of Education, Office of Education Policy and Practice. http://www2.ed.gov/pubs/200909/200909_01_000.pdf

A compendium of practices that enhance learning and achievement.

Wright, T. A., & Griggs, M. (2009). *Improving student achievement: A review of the research*. Washington, DC: U.S. Department of Education, Office of Education Policy and Practice. http://www2.ed.gov/pubs/200909/200909_01_000.pdf

A critique of what passes for EE in some schools; a cry for standardization, scope, and sequence; and praise for Project Globe.

Explores Dewey's philosophy about the relationship between citizenship, schooling, and a respect for nature, and his belief that rampant individualism is what leads to reckless waste of resources.

Study assesses the effectiveness of a pedagogy that uses farming and gardening as interdisciplinary contexts for learning. Pedagogy motivated students, encouraged healthy lifestyles, and improved verbal communication and relationships.

Problem-based learning promotes understanding and knowledge retention, in contrast to lecture, which tends to offer wide content coverage.

A look at the relationship between the skills required for lifelong learning and the process of EE.

Innovation is composed of four elements: an ill-structured problem, substantive content, student apprenticeship, and self-directed learning. Research supports the idea that problem-based learning is better for long-term retention than traditional classroom instruction.

Describes a real-world EE project and argues that the approach gives students responsibility for their own learning.

Engineering students were found to lack a connectedness of knowing, particularly of relationships between technology, society, and the environment, and this writer recommends more interdisciplinary education and problem-solving activities to increase the engineers' effectiveness.

A qualitative study based on a survey designed to find out how teachers conceptualized the environment and whether they perceive a link between EE and school improvement. Teachers appear to have a relatively broad understanding of the environment and of EE, but many do

not perceive the relationship between EE and school improvement, nor of how EE and curriculum integration are related.

A teacher in Idaho describes a highly sophisticated project, having to do with water testing and reservoir restoration, undertaken by his high school juniors and seniors.

Teachers who changed instruction to meet students' diverse learning styles found that students learned more and learned more easily.

Reported that students who experienced issues-based EE made significant cognitive and skill gains.

Maintains that students who see their work as relevant and engaging are more motivated to learn.

Students who worked collaboratively in constructing maps demonstrated better understanding and competence than those who worked alone.

Learning happens through connecting ideas, subjects, and experiences. If they expect students to learn, teachers must create learning situations that foster connections.

When the environment is used as an integrating context for learning, student achievement improves. This qualitative study of 40 schools provides the results of surveys, interviews, observations, and in some cases, achievement tests, that demonstrate how, why, and to what degree.

Many processes (beyond the technical skills that are problem-specific) are involved in problem-solving. The author discusses the roles that thinking, thinking about thinking, and motivation play in the process.

A qualitative study of what teachers trained in EE think about teaching EE. The results show a number of perceived benefits to students. Those who cited potential barriers found ways to

circumvent them. Social norms and expectations from other faculty were found to influence whether teachers teach EE.

... () (1).

Vignettes of

... (2000, ...). Interviews with leaders in the EE field. Positions EE as a means of promoting citizenship and of meeting students' academic needs.

... (1 ...). Underlying constructivism is the recognition of the value of the learner as thinker. The ability to think, the authors say, is related to the ability to generate and consider important questions.

... (1 ...). Wild lands must be preserved for recreational use, the author says, and in order to ensure that the supply of wild lands continues to meet increasing demand, the education of professional outdoor leaders must include environmental activist skills, critical thinking skills, and environmental ethics.

... (1 #). ... (1), ...
Contends that everyday classroom life is saturated with moral meaning that shapes students' character and moral development. Uses observational records to demonstrate how routine aspects of teaching convey moral messages that influence the formal curriculum.

... (1 ...). Both EE and informal, outdoor education programs seem to produce the same results. The author maintains that infusing recreation into EE programs can provide the additional benefit of ... (profes)T0 Tw 19 (http

... (1 ...).
... 201...
Contends that students need an economics-specific course to fully comprehend how the
econom

THE NORTH AMERICAN ASSOCIATION FOR ENVIRONMENTAL EDUCATION

The North American Association for Environmental Education (NAAEE) is a network of profes

INSIDE BACK COVER

BLANK PAGE

