

# Planning School Grounds for Outdoor Learning

## *National Clearinghouse for Educational Facilities*

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Almost every K–12 school has at least some outdoor space that faculty could use (or already do) to breathe life into concepts learned in the classroom. Even within tight urban settings, many schools have had success using rooftops to install safe and secure play and garden areas. Research shows that students better absorb and retain math, science, language arts, and other skills that incorporate their immediate environment and use all five senses (Lieberman and Hoody 1998). A more recent study has linked outdoor play to stronger social skills and increased creative development (Miller, Tichota, and White 2009). These positive educational impacts are especially strong when outdoor activities are an integral part of the structured curriculum (Learning through Landscapes 2008). Once we accept that education naturally occurs both indoors and out, the term "outdoor learning" will begin to seem as strange as the never-used "indoor learning."

Thoughtful and imaginative teamwork by designers, teachers, students, facilities personnel, and parents can develop a new or existing school site's full potential in ways that create:

- A more flexible learning environment with greater educational options overall
- A safer school less prone to student vandalism and accidents
- A closer cultural connection to the surrounding community
- Environmental and energy savings from wisely adapting the building to the site
- Cost savings during facility construction and in ongoing maintenance.

This publication covers the planning and design of school grounds for outdoor learning in new and existing K-12 facilities. Curriculum development as well as athletic field planning and maintenance are not covered although some references on these topics are provided.

## **Background**

Educators have used the outdoors for teaching, gardening, and physical education for more than 100 years. Today, as suburban and urban living becomes ever more the norm and computers dominate as the focus of social interaction, children are becoming distanced from nature. Along with the looming threat of worldwide degradation of our natural resources, there is a heightened international awareness of the importance of environmental stewardship. Part of that is heightened attention to outdoor learning.

The National Environmental Education Act of 1990 called attention to how the natural environment could be included in curricula at every educational level. Over two decades, the U.S. Environmental Protection Agency (EPA) and various other public and private organizations have produced numerous resources for incorporating environmental education into the K-12 school curriculum, including an environmental education grant program. (The EPA Environmental Education program awarded \$3.4 million in grants each year in 2008 and 2009.)

In the United Kingdom, environmental education became more directly linked to the use of school grounds when Learning through Landscapes (LtL) was founded in 1990. LtL works closely with the British government's Department for Education and Employment (DfEE) to enable schools to use their grounds for outdoor learning of all kinds. Both LtL and DfEE publish high-quality grounds maintenance and curriculum guides, and compile research and best practices gathered from British schools nationwide.

The National Environmental Education Advisory Council's 2005 report to Congress highlighted the advances in K–12 environmental education, stating: "The Council finds abundant evidence that every state in the nation has responded to this call for action. Since the National Environmental Education Act was passed in 1990, the overall quality of environmental education has improved measurably across the nation. Professional development programs are flourishing, and high-quality

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instructional materials (increasingly aligned to state academic standards) are being used in both formal and nonformal settings." (National Environmental Education Advisory Council 2005:7). That the concept is growing exponentially can also be seen in the wealth of books now available on the topic, notably Richard Louv's *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*, first published in 2005 and recipient of the 2008 Audubon Medal.

## Types of Outdoor Learning Environments

When considering outdoor learning environments for new or existing facilities, it helps to articulate the school's educational program before examining the specific instructional objectives of individual departments and faculty members. Although environmental education is most frequently associated with outdoor learning in the United States, there are many types of educational, recreational, and social skills that may be successfully taught outdoors. A DfEE publication on outdoor classrooms provides useful examples of how school grounds may be used effectively to teach language, mathematics, science, geography, drama, art, music, and more (DfEE 1999:1–14).

Outdoor learning spaces include pathways, play structure areas, gardens, sandy spaces, aquatic areas, seating areas of various sizes, ball fields, dramatic play areas, wooded areas, and covered pavilions or porches. Special outdoor spaces—such as the musical play area recently built in Sweden through collaboration between students, teachers, an artist, and landscape architect—may be created also. The space now contains large-scale percussive instruments built on wooden frames—a pine marimba, a set of chimes, aluminum xylobars, and a set of gongs (Dacapo Hantverksskola 1999).

Depending on the age groups served by a school, it can also be useful to consider the types of play children engage in and then design areas to accommodate them. In his book, *Creating Environments for Young Children*, architect Henry Sanoff lists various types of play typical of preschoolers. He emphasizes that this age group needs outdoor spaces of suitable scale designed to enhance their rapid behavioral development (Sanoff 1995:87–89).

An additional study focused on what the researchers termed “authentic play,” by which they mean child-initiated play. Being outdoors where adults supervise

with minimal intervention allows a full range of creative endeavors the authors describe nostalgically: “Using sticks, branches, logs, sand, dirt, water and other natural materials they built forts, castles, houses, ships, rockets.” Research observations centered on a Nebraska “Nature Explore Classroom” designed to inspire creative play—a variety of paths connecting areas covered with sand, mulch, and plants all festooned with sticks, chunks of wood, and other nature-made materials. The study showed how the 3–5-year-olds developed concepts of leadership, cooperation, and rule setting and devised myriad scenarios from day to day using a finite palette and infinite imagination. (Miller et al. 2009)

## Flexible Spaces

The concept of spaces designed for flexibility of use extends from kindergarten on. In contrast to specific-use spaces like tennis courts, vegetable gardens, or wetlands, school grounds can include outdoor spaces adaptable to many types of activities. They may be open-air porches adjacent to classrooms, art and science rooms, or cafeterias, and they may include various seating areas, such as amphitheaters, pavilions, steps, planters, benches, or individual student-sized chairs. Research conducted by LtL has found that “because seating enhances children’s varied opportunities to socialize, with a friend, in small groups or as a part of the larger school community, it is a critical element on school grounds” (Stine ASLA 1997:97).

Some urban schools facing harsh environments and tight budgets have used interior courtyards to accommodate many types of play and group activities. Plants and trees are not necessarily the primary elements in these spaces. In the 500-student Moylan Elementary School in Hartford, Conn., landscape architect Mik Young Kim introduced a child-height serpentine wall with numerous openings and passageways as the space’s organizing feature. In addition to children using the wall as a prop for self-invented games, the wall creatively defines areas for physical play on customized climbing equipment and for small-group and classroom-sized gatherings (Bennett 1999:86–93).

Large inner city schools, where space is at a premium, may also develop compact space plans in which courtyards and play areas are stacked above parking lots or lunchrooms. The International Elementary School

in Long Beach, Calif., contains various flexible outdoor student spaces, all above street level.

Flexible outdoor spaces are just as valuable in small schools. The 35-student Chilmark School on Martha's Vineyard, Mass., serves grades K–5, with shared classrooms between grades. The school's grounds contain a three-tiered amphitheater nestled close to the building and scaled for young children. Its stones come from the foundation of a 19th-century schoolhouse previously located on the site.

## Environmental Education Resources

Although flexible spaces can serve an environmental education curriculum, environmental education also requires specially designed spaces that offer children the chance to observe and effect change in the natural world. Once made easily accessible to students and teachers, the outdoors occupies a more significant role in the educational program and the curriculum can evolve along with the outdoor learning environment.

Some teachers may be interested in outdoor environmental education using school grounds, but may lack instructional tools. Fortunately, resources in this area are plentiful, with much available online. One of the best web sites is [EE-Link](#), which gathers together many types of information: lists of organizations, grants, classroom resources, and a calendar of events. EE-Link is funded by the [North American Association for Environmental Education](#) (NAAEE).

The EPA has an [Office of Environmental Education](#) that also hosts a web site. This site has areas for educator training, student opportunities, and advisory groups, and provides tips for developing successful applications to the Environmental Education grants program referenced in the "Background" section of this report, above.

The National Wildlife Federation (NWF), a national, not-for-profit organization, has expanded its 30-year-old "Backyard Wildlife Habitat" program into a distinct effort called Schoolyard Habitats, in which more than 900 schools nationwide now participate. This program is the most useful for educators looking for specific applications of environmental education in the schoolyard. The [Schoolyard Habitats](#) web site features curriculum ideas, information on becoming an Eco-School, and case studies.

These online resources are the most prominent American examples and will lead you to other regional and local resources, but there are also excellent resources through the [Learning through Landscapes web site](#), including print publications such as *Without Walls*, *Playout*, and *Tree Ties*.

## Environmental Education on School Grounds

School grounds may contain useful instructional habitats such as wetlands, woodlands, and meadows. They may also have gardens from which herbs, flowers, and vegetables are harvested. Pathways or trails with more intimately scaled areas enable students to experience their environment on a personal level, although all options must be checked against the faculty's instructional objectives and teaching styles. While wetlands and other natural areas may be environmentally beneficial in general, on school grounds their true value emerges only through their integration into the school's overall educational program.

Environmental education can physically impact school grounds. For example:

- An enormous asphalt lot at the 800-student King Middle School in Berkeley, Calif., was transformed into the Edible Schoolyard Project with help from local restaurant owner Alice Waters. The site now contains a half-acre organic garden designed and cared for by 6th and 7th graders. The school's science curriculum for these two grades focuses entirely on the garden and student kitchen, in which students learn about cooking, nutrition, and foods from diverse cultures.
- Chicago's John Hay Community Academy, converted an asphalt-covered schoolyard into a garden that became part of the school's K–5 curriculum. The academy, which serves a predominantly African-American neighborhood, won an award from the Illinois State Council on Business/Education partnerships. In one activity, at the 800-student school, students interviewed relatives about favorite family foods and related these to their school science research and to their newly transformed school garden.

- Brunswick High School in Maine serves 1,200 students on a 50-acre site in a coastal watershed protected by strict environmental codes. Required to create wetlands to mitigate increased surface runoff, the architecture and engineering firm Harriman Associates designed the wetlands to serve as an environmental lab, where students monitor the absorption of nitrates and the effect of fertilizers and pesticides on ground water. The town also monitors the wetlands, which to date have functioned as intended (Sutton 1996 and Harriman).
- Meadows are an alternative to some of the expansive lawn areas on many rural and suburban school grounds. Hollywood Elementary School in St. Mary's County, Md., involved students in converting one-third of the school's lawn into a wildflower meadow. Students performed some of the physical work, calculated the environmental advantages meadows offer through reduced mowing schedules and use of pesticides on the grounds, and monitored the newly installed meadow for plant and wildlife colonization (Maryland State Department of Education 1999:33-40).
- One doesn't necessarily even need school grounds, in the traditional sense. The Gary Comer Youth Center, also in Chicago has little access to safe outdoor space. Instead, the center turned 8,000 square feet of otherwise unused roof area into a year-round after-school learning center staffed by a full-time gardener who guides the educational curriculum.

### Considering Outdoor Education during School Site Selection

Creating outdoor learning environments on existing school sites, although certainly commendable, invariably involve constraints and ultimate trade-offs. Creatively elegant solutions are most readily achieved when considering outdoor education at the earliest stages of facility planning. Further, state and local jurisdictions often publish site selection standards, lists of criteria, and evaluation tools, yet they typically take into account outdoor learning considerations beyond traditional play equipment and athletic fields. For the full spectrum of outdoor learning possibilities, a school site selection committee may need to turn to other sources for ideas

on conserving and enhancing the natural environment in a way that benefits the school's overall curriculum. How future expansion may be accommodated is also a consideration. Some of those sources of insightful suggestion are internal—teachers, students, the community, and facility managers, for instance—and some are external.

California has been one pioneer in developing guidelines for ensuring the environmental quality of outdoor spaces for schools, including requirements for analyzing landfill areas and a site's proximity to dumps, chemical plants, refineries, fuel storage facilities, nuclear generating plants, abandoned farms, and agricultural areas in which pesticides and fertilizers have been heavily used (California Department of Education 1989:5).

Retaining the professional services at the initial planning phase can help a school district avoid costly mistakes. Once a site is selected, the landscape architect will provide valuable guidance regarding site development and integrating environmental concerns with education opportunities, budgeting, and regulatory requirements. Landscape architects, architects, and engineers have expertise in these areas, as often do local colleges offering degrees in these disciplines and local government agencies, such as the cooperative extension, soil conservation service, or forestry board.

For examples of excellence in outdoor learning environments, one may also turn to awards programs such as the [American Society of Landscape Architects Annual Awards](#) or the [American Institute of Architects Committee on the Environment Top 10](#). Almost without exception there are exemplary school grounds designs mixed among each year's award recipients.

### Considering Outdoor Education during School Site Development

Once a site is acquired, design development usually proceeds rapidly. Amenities conducive to outdoor learning must be incorporated at this stage, so it is important that the design team includes those whose role is to design, realize, and maintain the outdoor spaces. Preferably, a detailed site survey should be completed prior to the development of a schematic design.

Routine site development tasks should be performed more thoroughly when a school's priorities include maximizing the use of its grounds. Site development

includes preparing an existing vegetation survey and tree protection plan, testing soil, and evaluating the microclimate, including conducting studies of sun and shade patterns at the site. Orientation of the building to the site, provisions for outside access, and a study of pedestrian and vehicular circulation around the school campus are also important for the outdoor educational program's success.

Several alternative arrangements should be developed.

Elements that are most easily and economically incorporated during design development include placement of outdoor storage areas, access to running water, lighting, overhead shelter, seating, signage, and trash receptacles. Design development addresses all site components as well, including integration of driveways, service roads, parking, and athletic fields with the rest of the outdoor spaces and determining adjacency requirements to provide for safety, air quality, and noise control.

Urban schools with outdoor spaces located on rooftops or terraces must be designed in close collaboration with the project's structural engineer. Trees, grass, gardens, irrigation, furniture, and play equipment may all be installed on roof decks, as long as the deck structure has been designed for these loads and have taken into account all regulatory provisions. Fire and safety codes for roof gardens, for instance, provide criteria for access, setbacks, enclosure, and the percentage of wooden structures allowed.

Unlike a school facility that is basically completed when students start using it, school grounds take years to develop and grow. Their changing nature is part of what holds students' interest and attention. So even while advanced planning is critical, the ultimate success of a growing landscape depends on how it fares over time. A period of five years is not unusual. With the school's commitment, long-term grounds plans can readily be achieved while adapting to the inevitability of change over time.

### **Redesigning Existing School Sites**

The design concerns and processes for working on existing school grounds are similar to those for new schools. However, when attempting to redesign a school site, funding is usually more difficult to obtain. Consequently, the school site assessment should include taking inventory of available community and human resources because volunteer labor and donated

materials can play an important role in the project's success.

Studies of how students use existing school grounds may be performed and then compared to how they are intended to be used in the future. Involving students in assessments of existing school grounds is an excellent way to solicit feedback. While mostly intended for existing indoor spaces, the checklists provided in Henry Sanoff's *Creating Environments for Young Children* can easily be adapted to the outdoor environment. *Natural Learning* by Robin Moore and Herb Wong describes a California schoolyard that was completely transformed over a period of 10 years from an asphalt lot into a diverse educational environment. Moore's and Wong's book provides useful examples of how student, teacher, and community feedback and assistance were elicited over the years.

The National Wildlife Federation's resources are primarily directed to educators working on existing school grounds. The Schoolyard Habitats network of nearly a thousand schools is another excellent resource.

## Additional Information

**American Society of Landscape Architects**—  
<http://www.asla.org>.

**EE-Link**— <http://eelink.net/> Environmental education on the Internet.

**Green School Network**—  
<http://greenschoolyardnetwork.org>

**Learning Through Landscapes Trust (LtL)**—  
<http://www.ltl.org.uk/> 3<sup>rd</sup> floor Southside Offices, the Law Courts, Winchester, Hampshire SO23 9DL, UK. LtL is an independent British organization concerned solely with school ground design, their educational use and maintenance. LtL publishes books, videos, and CDs.

**National Clearinghouse for Educational Facilities**— <http://www.ncef.org>  
See resource lists:

*Landscape Planning for School Grounds*

<http://www.ncef.org/rl/landscape.cfm>,

*Outdoor Learning Environments*

<http://www.ncef.org/rl/outdoor.cfm> ,

*Site Selection for Schools*

[http://www.ncef.org/rl/site\\_selection.cfm](http://www.ncef.org/rl/site_selection.cfm),

*School Athletic Fields*

[http://www.ncef.org/rl/athletic\\_fields.cfm](http://www.ncef.org/rl/athletic_fields.cfm) , and

*School Playgrounds*

<http://www.ncef.org/rl/playgrounds.cfm>.

**National Wildlife Federation, Schoolyard Habitats Program**—  
<http://www.nwf.org/Get-Outside/Outdoor-Activities/Garden-for-Wildlife/Schoolyard-Habitats.aspx>

**The Natural Learning Initiative**—A research and extension program of the School of Design, North Carolina State University. <http://naturalearning.org/>.

**North American Association for Environmental Education (NAAEE)**— <http://naaee.org>.

**U.S. Environmental Protection Agency (EPA), Office of Environmental Education (EE)**—  
<http://www.epa.gov/enviroed/index.html>.

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