

Smart by Nature: Schooling for Sustainability

By Michael K. Stone and Zenobia Barlow

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What can educators do to foster real intelligence?...We can attempt to teach the things that one might imagine the Earth would teach us: silence, humility, holiness, connectedness, courtesy, beauty, celebration, giving, restoration, obligation, and wildness.

—David W. Orr¹

There is a bold new movement underway in school systems across North America and around the world. Educators, parents, and students are remaking K–12 education to prepare students for the environmental challenges of the coming decades. They are discovering that guidance for living abundantly on a finite planet lies, literally, under their feet and all around them—in living soil, food webs and water cycles, energy from the sun, and everywhere that nature reveals her ways. Smart by Nature schooling draws on 3.8 billion years of natural research and development to find solutions to problems of sustainable living, make teaching and learning more meaningful, and create a more hopeful future for people and communities.

School gardens bloom in wintry climates and on former asphalt lots. Students learn good nutrition while eating healthy lunches of farm-fresh food. At independent schools in New Jersey, public schools in California, and charter schools in Wisconsin, education comes alive as children discover the wonders of nature while restoring rural landscapes, protecting endangered species, and creating city habitats. Classroom buildings in schools on the South Side of Chicago, in central Arkansas, and in suburban Oregon become living laboratories for energy conservation and resource stewardship.

Schools from Washington to Florida have transformed into model communities. Utilities, governments, and educators have become partners in designing energy-efficient, safe, and healthy schools that promote the welfare of students and school staff while teaching wise resource use and care of the Earth. In small towns and large cities, students practice the arts of citizenship while improving the lives of their neighbors.

This movement responds to the realization that the young people in school today will inherit a host of pressing—and escalating—environmental challenges: threats of climate change; loss of biodiversity; the end of cheap energy; depletion of resources; environmental degradation; gross inequities in standards of living; obesity, diabetes, asthma, and other environmentally linked illness. This generation will require leaders and citizens who can think ecologically, understand the interconnectedness of human and natural systems, and have the will, ability, and courage to act.

The movement goes by many names: green schools, eco-schools, high-performance schools. We call it schooling for sustainability to underline its kinship with other global movements reshaping the relationships between human societies and the natural world. At the same time, we acknowledge that “sustainability” is problematic to some people.

“The word ‘sustainability’ has gotten such a workout lately that the whole concept is in danger of floating away on a sea of inoffensiveness,” wrote Michael Pollan in late 2007. “Everybody, it seems, is for it—whatever ‘it’ means.”² Paradoxically, many people remain unaware of the concept, while others have already concluded that it is on its way to joining “natural” and “ecological” as words that can simultaneously mean anything and nothing. “If a man characterized his relationship with his wife as sustainable,” wrote architect William McDonough and chemist Michael Braungart, “you might well pity them both.”³ After reviewing the alternatives, though, writer and consultant Alan AtKisson concluded, “As a name for the future of our dreams, sustainability may be ‘the worst word, except for all the others.’”⁴

To stay useful, however, sustainability must mean more than merely surviving or trying to keep a degraded world from getting worse. Otherwise, why bother? Invoking nature’s capacity for sustaining life, as physicist and system theorist Fritjof Capra suggests, is critical. A sustainable community worth imagining is alive, in the most exuberant sense of that word—fresh, vital, evolving, diverse, and dynamic. It cares about the quality as well as the continuation of life. It is flexible and adaptive. It draws energy from its environment, celebrates organic wholeness, and appreciates that life has more to reveal than human cleverness has yet discovered. It teaches its children to pay attention to the world around them, to respect what they cannot control, and to embrace the creativity with which life sustains itself.

Overcoming Obstacles

Few question the need to prepare students for the complex world into which they will graduate, but the schooling for sustainability movement nevertheless encounters obstacles: School systems are notoriously slow to change. Responsibilities for schools’ operations are often dispersed through multiple levels of authority, from the local principal to the federal government, with mandates that sometimes conflict. Virtually all schools and districts face financial challenges. Schooling for sustainability competes with other priorities, including standardized testing in public schools and pressure to focus on Advanced Placement in independent schools.

Schools across the country are creatively overcoming barriers to schooling for sustainability. Over the past two decades, the Center for Ecoliteracy, a public foundation in Berkeley, California, dedicated to education for sustainable living, has worked with hundreds of educators committed to this vision. In our 2009 book *Smart by Nature: Schooling for Sustainability* (Watershed Media/University of California Press), we set out to document the accomplishments of schools of all types and sizes from every geographic region, to share the lessons they have learned, and to further the discussion that has begun among the many parties to this movement.

We discovered that schooling for sustainability is a winning proposition with many direct and indirect benefits. What is good for the future of the environment and for communities is also good for schools and students now. Students who learn nature's principles in gardens and serve their communities through civic participation become more engaged in their studies and score better in diverse subjects, including science, reading and writing, and independent thinking.

Designing buildings to conserve energy and water can save enough money to convince finance-minded school boards. Going green helps competitive independent schools to attract students and local communities to attract residents and business. Students and staff members who eat better meals and spend their days in buildings with better air quality are absent less often, report higher satisfaction, and perform better. Schools become better appreciated as assets to their communities.

What Is Education For?

We have sought to identify schools that, in their own ways, are rising to the challenges posed by David W. Orr in "What Is Education For?"—To teach students how they are part of the natural world; to emphasize self-understanding and personal mastery; to recognize the responsibility to use knowledge well in the world; to understand the effects on people and communities of the application of knowledge; to provide role models of integrity, care, and thoughtfulness in institutions whose actions embody their ideals; and to recognize that the process of education is as important as its contents.⁵

There is no single schooling-for-sustainability blueprint that is appropriate for all schools. Increasingly, though, we find ourselves drawn to affirmations that we have distilled into principles we describe in detail in *Smart by Nature*:

- Nature Is Our Teacher
- Sustainability Is a Community Practice
- The Real World Is the Optimal Learning Environment
- Sustainable Living Is Rooted in a Deep Knowledge of Place

The goal of education conducted according to these principles is cultivation in students of competencies of the head, heart, hands, and spirit.

To nurture communities that are in concert with nature, we must understand nature's principles and processes, the deep facts of life: for instance, that matter cycles continually through the web of life, while living systems need a continual flow of energy; that diversity assures resilience; that one species' waste is another species' food; that human needs and achievements are both supported by and limited by the natural world.

Teaching this ecological knowledge, which is also ancient wisdom, requires seeing the world from the perspective of relationships, connectedness, and context. This way of thinking is emerging at the forefront of science through the evolving theory of living systems, which

recognizes the world as a network of patterns of relationships and the planet as a living, self-regulating system.

Ecological study is inherently multidisciplinary, because ecosystems connect the living and nonliving worlds. Therefore, it is grounded not only in biology, but also in geology, chemistry, thermodynamics, and other branches of science. Human ecology, meanwhile, entails a range of other fields, including agriculture, economics, industrial design, and politics.

Knowledge and intellectual understanding are crucial, but they are never enough. Students also need to be able to adapt their knowledge to new circumstances and to use it to solve problems. To do so requires critical and creative thinking, as well as the ability to recognize the unquestioned assumptions and habits of thinking that can lead well-intentioned people to make ecologically catastrophic decisions.

It also requires competencies of the hands, for instance, the capacity to apply ecological knowledge to ecological design; practical skills to create and use tools and procedures for design and building; the ability to measure, assess, predict, and alter energy and resource consumption.

More, still, will be needed. Creating and maintaining sustainable communities will entail hard work over long periods, in the face of conflicting interests and passionate advocates. The strength to persist and the ability to succeed will call for competencies of the heart: deeply felt, not just understood, concerns for the well-being of the Earth and of living things; empathy and the ability to see from and appreciate multiple perspectives; commitments to equity, justice, inclusivity, and respect for all people; skills in building, governing, and sustaining communities.

Finally, we have identified a number of competencies of the spirit which we believe will characterize people who will be effective agents for sustainable living: a sense of wonder; the capacity for reverence; a felt appreciation of place; a sense of kinship with the natural world; and the ability to invoke that feeling in others.

Curriculum Is Anywhere That Learning Occurs

Nurturing these competencies depends on a definition of “curriculum” that is broader and more holistic than “a set of courses.” A team of educators from Yap, a South Pacific atoll, once visited the Center. As a parting gift, they left a poster proclaiming “Curriculum Is Anywhere Learning Occurs.” We concur wholeheartedly. The campus, the life of the school community, and that community’s relationships with the larger communities in which it is embedded are not just the context for curriculum. They *are* curriculum.

Schooling is everything the school does that leads to students’ learning—whether that learning is intended or not (the unintended learning is often the most powerful, especially when it contradicts the designed curriculum). Students learn from what the school serves for lunch, how it uses resources and manages waste, who is included in its decisions, how it relates to the surrounding community.

In *Smart by Nature* we explore four domains—food, the campus, community, and teaching & learning—that offer multiple avenues for the transformative work of schooling for sustainability. Each chapter includes profiles of schools or districts that have creatively addressed these topics and the strategies they have employed to overcome obstacles, create change within institutions, and incorporate schooling for sustainability into curricula.

PROFILE:

The Sustainable Schools Project: Burlington, Vermont

Barnes Elementary School had a horrendous reputation. According to former principal Paula Bowen, “It’s in the inner city, with high poverty. It’s where refugees are first resettled. Anybody who had the wherewithal to get their kids into some other school typically did.” Now, though, “Barnes is the groovy school, the cool school. Test scores are up. Parents are asking for variances to get *into* Barnes.”

The spark behind the turnaround was the Sustainable Schools Project (SSP), a collaboration with nearby Shelburne Farms, a 1,400-acre working farm, National Historic Landmark, and national leader in schooling for sustainability. The project demonstrates the power of combining place-based learning, school-wide curriculum collaboration, partnerships with community organizations, and hands-on civic engagement.

In 2000 Vermont became the first state to incorporate sustainability and understanding place into its standards. In response to requests for assistance in teaching the new standards, Shelburne Farms designed professional development workshops and contributed the bulk of the writing of the “Vermont Guide to Education for Sustainability.”⁶

The state standards had intentionally left the definition of “sustainability” broad, out of a belief that communities should create homegrown definitions. Shelburne Farms’ formulation, “Improving the quality of life for all—socially, economically, and environmentally—now and for future generations,” reflects the work of the Burlington Legacy Project, a citywide effort to envision a sustainable Burlington.

For Shelburne Farms, the link between sustainability and schooling is civic engagement. Former Sustainable Schools Project coordinator Erica Zimmerman identifies three elements essential to successfully grounding education in civic engagement:⁷

- *Understanding connections.* Learning gains meaning and depth and students begin to comprehend how human and natural systems work when they see the networks of interconnection within their community.
- *Connecting to place.* Students need to know their own place before they can make the leap to thinking globally. With such knowledge, they have more reason to care for this world and become stewards of it.
- *Making a difference.* In order to become motivated and engaged citizens, students need to know that they can make a difference. Schooling for sustainability depends on projects that are meaningful, developmentally appropriate, have

academic integrity, and can be completed with the time and resources available to students.

Big Ideas and Essential Questions

Colleen Cowell, a dynamic fourth- and fifth-grade teacher at Champlain Elementary School on Burlington’s suburban fringe, attended one of Shelburne’s workshops. The content resonated with her, but she wanted to go beyond individual teachers’ putting the ideas of sustainability into practice. What if a whole school worked together? With her enthusiasm and strong support from principal Nancy Zahniser, Champlain and Shelburne Farms launched the Sustainable Schools Project. Three years later, it migrated to Lawrence Barnes.

Working with Shelburne Farms consultants, teachers identified nine “big ideas of sustainability” as a framework for curriculum integration: diversity, interdependence, cycles, limits, fairness and equity, connecting to place, ability to make a difference, long-term effects, and community. They created curriculum maps tracing these ideas from grade to grade and from the classroom to the schoolyard, the neighborhood, and the wider community. They identified “essential questions” that connect sustainability concepts across subject-matter boundaries. For instance:

- What do all living things need in order to live a safe, healthy, and productive life?
- What does it mean to be a citizen in our community?
- What connections and cycles shape our Lake Champlain ecosystem?
- How do we take care of the world, and how does the world take care of us?

The big ideas and essential questions helped recapture portions of the curriculum that testing mandates such as No Child Left Behind had squeezed out, connecting science to social studies and literacy. “We hoped to demonstrate how using the big ideas of sustainability to enhance existing curriculum was engaging and something they were already doing—with a slight twist,” says Shelburne Farms SSP staff member Tiffany Tillman.⁸ “Instead of a unit on living organisms,” explains Barnes third-grade teacher Anne Tewksbury-Frye, “you’re looking at it as a unit on systems and how those systems interact and how you can address other systems in a more global fashion.”

Teachers discovered the teaching potential of their own place. “Something I never did before SSP was to look at what resources we have on the school property,” one first-grade teacher told a researcher. “Now that I have some knowledge about vernal pools, I know I can make use of them. Before it was just a big wet spot in the playground, and now I know it is teeming with life.”⁹ Teachers discovered that children can learn more about nature from the squirrels they observe every day than from exotic animals they see only in books. The project connected teachers with local farmers, experts on the indigenous Abenaki people, artists, business people, and myriad other community members who have spoken to classes, lent resources, and contributed to student projects.

Healthy Neighborhoods/Healthy Kids

Place-based education, community connections, and civic engagement converge in Healthy Neighborhoods/Healthy Kids, a fourth- and fifth-grade project within SSP. Students brainstorm quality-of-life indicators in a neighborhood. Their lists have included green places with plants and flowers, habitat for animals, more trees for better air, healthy food, speed bumps to calm traffic, murals instead of graffiti, safe places to play, and spots for neighbors to meet.

Then they conduct neighborhood walks and create report cards, which they use to grade their communities. The walks can be eye-openers. Children from higher-income parts of the city discover that some classmates live without parks, tennis courts, stop signs, or other amenities they take for granted. But they also find features that are absent in their own neighborhoods, like community centers where kids can hang out.

The report cards become the starting point for civic engagement, leading to student-generated projects such as creating habitat for local birds, cleaning up streams, or organizing block parties to bring neighbors together. Students present their report cards to local government bodies. State Senator Tim Ashe, a former Burlington city council member, observed, “I think we grown-ups tend to take many things for granted, both good and bad, because we’ve learned to live with them. Kids are able to see for the first time a broken sidewalk, graffiti on a building wall, or a faltering street light and ask, with legitimate confusion, ‘Does it have to be this way?’”¹⁰

The Case of the Missing Park

The students sometimes discover that they know more about the city than the authorities responsible for it. Barnes students found a park that the city had forgotten. They contacted the Parks and Recreation Department about this park, where they didn’t feel safe at night, to suggest installing lights. “We don’t have a park on South Champlain Street,” they were told. “Yes, you do. There’s a sign there that says ‘Parks & Rec Department.’ We want to tell you about it.”

Another time, children from Barnes reported that the street in front of the school had no School Zone sign, making for dangerous traffic. The city council drafted a resolution to put in a sign. The director of the public works department, a city council member, and the mayor came to unveil the sign and praise the students’ initiative. A small matter, perhaps, but the response and the media coverage were important to a neighborhood used to finding itself in news stories about crime and drugs.

After Barnes joined the Sustainable Schools Project, reading scores rose 22 percent and math scores 18 percent, parents became more involved, residents began to take pride in the neighborhood and to see the school as a resource within it, *and* Barnes became the “cool school.” In 2008 the school that parents once shunned was chosen by the district to become the nation’s first K–5 magnet school with a sustainability theme.

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- ¹ David. W. Orr, “Some Thoughts on Intelligence.” In *Earth in Mind* (Washington, Covelo, and London: Island Press, 2004), pp. 48–53.
- ² Michael Pollan, “Our Decrepit Food Factories,” *New York Times Magazine* (December 16, 2007), <http://www.nytimes.com/2007/12/16/magazine/16wwln-lede-t.html?pagewanted=1>.
- ³ William McDonough and Michael Braungart, *Cradle to Cradle: Remaking the Way We Make Things* (New York: North Point Press, 2002), p. 155.
- ⁴ Alan AtKisson, *Believing Cassandra: An Optimist Looks at a Pessimist’s World* (White River Junction, VT: Chelsea Green, 1999), p. 148.
- ⁵ David. W. Orr, “What Is Education For?” In *Earth in Mind* (Washington, Covelo, and London: Island Press, 2004), pp. 7–15.
- ⁶ The Vermont Guide to Education for Sustainability.
<http://www.vtefs.org/resources/EFS%20GuideComplete-web.pdf>.
- ⁷ Erica Zimmerman, “Education for Sustainability,” *Community Works Journal* (Summer 2004): 4.
- ⁸ *Sustainable Schools Project Newsletter* (Spring/Summer 2006): 8.
- ⁹ Place-based Education Evaluation Collaborative, “Examining the Staying Power of the Sustainable Schools Project: A Program Evaluation focused on Champlain Elementary School,” http://www.peecworks.org/PEEC/PEEC_Reports/S00686CFB-0069AC2C.
- ¹⁰ Quoted in Tiffany Tillman, “Healthy Neighborhoods/Healthy Kids Project Guide” (a publication of Shelburne Farms’ Sustainable Schools Project, in partnership with Smart Growth Vermont), 2007, p. 57.

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