Implementing Sustainability Education
Lessons from Four Innovative Schools

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Abstract

This study was conducted to provide lessons and recommendations to Hathaway Brown School and other schools interested in implementing sustainability education (SE). This report describes the ways in which four innovative secondary schools are implementing SE, the impacts their efforts are having on students, challenges they have faced, and recommendations for other schools. During visits to each school, interviews were conducted, daily life at the school was observed and relevant documents were reviewed.

In addition to teaching about sustainability through the curricular and extracurricular programs, two other particularly successful teaching tools are community modeling of sustainability and school cultures that support sustainability. The impacts of these programs on students ranged from elevated awareness and engagement with sustainability issues to altered behaviors and worldviews reflecting a concern for sustainability. The main challenges faced are a lack of time, resistance to new teaching methods, student apathy, and high faculty-turnover rates.

SE efforts are strengthened by sending consistent messages to students about sustainability from many sectors of the school, including the curriculum, extra-curricular activities, facilities, governance, and culture. Five recommendations are offered to schools interested in implementing SE: foster students’ emotional connections to the issues, use authentic and place-based teaching methods, actively model sustainable practices, create opportunities for student ownership of the school and their learning, and embed sustainability in the school culture.
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Executive Summary

Study purpose and methods
With the goal of providing useful examples and recommendations to Hathaway Brown School and other schools interested in implementing sustainability education (SE), this report describes how four secondary schools, selected for their far-reaching approaches to SE, have implemented their visions for educating for and about sustainability. Two to four days were spent at each school, interviewing students, teachers, administrators, and staff. In addition, daily life at the schools was observed, and school documents related to SE were reviewed. The resulting analysis describes the ways in which these schools are implementing SE, the impacts their efforts appear to be having on students, the challenges they have faced, and offers recommendations that can guide the design of SE programs in other schools. While the report is designed to help school administrators or teachers envision how they can include SE in their schools, others with an interest in environmental education, global education, or civic education may find it useful as well.

Background
Sustainability education aims to provide students with opportunities to acquire knowledge, skills, values, and responsible citizenship behaviors related to living more sustainable lives. Among the primary content focuses of SE are social, environmental, and economic systems and how these systems interact. There is a strong emphasis on finding better ways of thinking and problem-solving, specifically using systems thinking with a long-term perspective. The ultimate goal is to educate citizens who will live responsibly, and who will work to build a more sustainable world.

How Schools are Implementing Sustainability Education
The study schools are using diverse means to implement their SE goals, including:

- *infusion* of sustainability into current courses
- *new courses* specifically focused on sustainability
- *activities and programs* within and outside of the curriculum
- *modeling of sustainable practices* through the school facilities, operations, governance, and faculty lifestyles.

*School culture* is another means that some schools use to support their SE efforts, while other schools are contending with elements in their school culture that seem to be at odds with their SE goals, leaving them with the challenge of cultural transformation. One common pedagogical approach seen in the SE efforts at the schools is *authentic learning*, often complemented by place-based education. Authentic, place-based learning experiences help contextualize the sustainability concepts being discussed.
and make them relevant, in turn motivating and empowering students to feel that their learning is meaningful and that they can help shape a more sustainable future.

Impacts on Students

Interviews with students suggest that the programs have wide ranging impacts including:

- **increased awareness** of environmental and social issues.
- **engagement** with the questions and issues of sustainability at an intellectual level.
- increased sense of **empowerment and ownership** over the direction of their education.
- **altered world-views**, life ambitions, lifestyles, and career plans, reflecting a concern for sustainability.

Program challenges

- **Limited time** creates challenges in many aspects of these programs - finding time for joint planning between disciplines, professional development, field-based work, and for students to spend time in nature and reflect on their experiences.
- **Re-orienting the classroom from traditional student-teacher roles, teaching methods, and curriculum** to those more supportive of SE has, in some cases, provoked resistance from students, teachers, and/or parents.
- Some schools are struggling with **student apathy**, a lack of interest in sustainability and/or a feeling of **disempowerment** within their student bodies.
- The intensity of these programs, which often ask faculty to blur the line between their professional and personal time (sometimes in combination with low salaries and/or geographic isolation) creates a situation of **high faculty turn-over**.

The Importance of Congruence

Schools that engage students with sustainability issues through as many different means possible appear to be more effective in their SE efforts than those that use only one or two means. By using the many spheres of influence on students, schools are more likely to be consistent in the message they are sending to students about what the school values, as well as to offer students multiple entry-points into the concepts and issues of sustainability.

Schools can use the **congruence matrix** presented here to examine their existing programs or to help them design a new SE program. The matrix can help schools break down the different means through which they might teach about and for sustainability, and the various outcomes of SE. Using this matrix, schools can explore where their programs excel and where they may need additional attention. In addition, the matrix can help a school tailor a SE program to suit its particular context and needs.
Customizing SE for Hathaway Brown

An effective SE program should be tailored to the specific context, needs, and resources of the school in which it will be implemented. Prior to designing a new program, or restructuring an existing program, a school should *identify the available resources and potential challenges* they have in the following areas: geographic location, within school resources, clientele, school mission and goals, and school culture. These areas have been assessed for Hathaway Brown.

Recommendations

While there are many routes to creating a successful SE program, there are five general recommendations that schools should keep in mind when designing their initiatives.

- Foster students’ *emotional connections* to the issues.
- Use *authentic and place-based* teaching methods.
- Actively *model* sustainable practices.
- Create opportunities for *student ownership* of the school and their learning.
- Embed sustainability in the *school culture*.

In addition, there are several broader issues to which schools should be attuned.

- Schools will need to decide whether to teach sustainability with an overt advocacy agenda or through a more objective perspective.
- A school must consider what *incentives* and/or *expectations* it will put in place to encourage participation in its SE program.
- Effective SE programs will need to go *beyond the easy-to-implement steps* if they want to do more than raise awareness in their school community.

Taken together, these recommendations suggest that schools interested in making a broad-based commitment to sustainability education will expand their curricular and extra-curricular offerings addressing sustainability, and make efforts to model sustainable practices in multiple ways. Some schools may also need to enter a multi-year transition that will alter the culture of the school. The sum of these efforts will help increase the degree of congruence with which the school promotes sustainability.
Chapter One: Introduction

Educating a citizenry that is able to understand and respond to complex, interdependent environmental and social issues is both urgent and daunting. A small but increasing number of schools have made this goal a priority by focusing on sustainability education (SE) (Sterling 2001; Munson 1997; Sitarez 1998). This report provides a view into four secondary schools that are making far-reaching efforts in SE. This study describes the ways these schools are implementing SE, some of the impacts of their efforts on students, and the challenges they have faced. These schools demonstrate just four of the many paths that can be taken in successfully educating for and about sustainability. Based on their experiences and explorations of the literature, we offer recommendations to guide the design of SE programs in other schools. It is our hope that this study informs efforts to initiate SE at Hathaway Brown and other innovative schools.

I. What is sustainability education?

Before turning to descriptions of the four study schools and how they implemented SE, it is important to establish how this report defines sustainability and sustainability education.¹ Sustainability is about maintaining a high quality of life for humans and other species, both now and in the long-term. It is “a vision of the future” – a future of economic security, environmental integrity, and social equity (Viederman 1996, p. 46; Ahlberg and Filho 1998). Sustainability requires that we consider how our actions will impact future generations, and demands that we recognize and work within the biophysical limits of the earth’s natural systems (Foster 2001; Orr 1992). In doing so, we must acknowledge both the complexity of natural and social systems, and our inability to fully understand and predict how they will respond to changes or external impacts (Tilbury 1995; Orr 1992). Sustainability education aims to help people learn to solve problems and make decisions with these approaches in mind.

Like sustainability itself, there are different understandings of SE (Tilbury 1995)². SE started as a way to integrate and advance the goals of environmental protection and economic development (Robinson 1992; McKeown and Hopkins 2003; Tilbury 1995). It still addresses these areas, but also extends beyond them, including the three E’s – social equity, environment, and economy – and their interrelations within its primary

¹ Sustainability Education goes by many names, including Education for Sustainable Development (ESD), Education for Sustainability (EfS), and Education for a Sustainable Future (ESF) (McKeown and Hopkins 2003).

² In this study, use of the term sustainability education is not meant to imply that other types of education are not sustainable or valuable in helping students create a better future. Here, SE is regarded as one particularly useful framework through which education can be approached. It is a framework that is likely to be successful in some contexts and not in others. For example, it may not be developmentally appropriate to expose elementary school students to potentially overwhelming social and environmental problems (Sobel 1995).
content (Viederman 1996; Hesselink et al. 2000; Sterling 2001; Tilbury 1995). The methods of SE tend to be interdisciplinary, learner-centered, experiential, and based on confronting real-life issues (Foster 2001; Hesselink et al. 2000). Both the methods and the content of SE make it a useful context or framework to reorient and improve education (Fien 1993; Tilbury 1995; Foster 2001; McKeown and Hopkins 2003). It is, perhaps, the combination of content, methods, and intended outcomes of SE that distinguish it from other kinds of education. Hopkins and McKeown explain that SE helps students develop “a knowledge base about the environment, the economy, and society,” in addition to helping them learn “skills, perspectives, and values that guide and motivate… [them] to seek sustainable livelihoods, participate in a democratic society, and live in a sustainable manner” (1999, p.3). In doing so, SE hopes to educate citizens who will ultimately contribute to systemic level reform to shape communities, nations, and a planet that can continue to thrive long into the future.

II. Goals of Sustainability Education
To understand the purpose of engaging in sustainability education, it is helpful to look at the commonly intended goals of SE. SE experts believe that achieving these goals will help shape active, motivated citizens engaged in shaping a more sustainable future. SE aims to provide students with opportunities to acquire knowledge, skills, values, and responsible citizenship behaviors related to six areas. These areas are: 1) long-term, futures approach, 2) systems thinking, 3) environment, 4) social equity, 5) economics, and 6) well-being. These goals are defined in the way that they appear to be understood in the context of sustainability education.

1) Long-term, futures approach: Since a primary aim of sustainability is to shape a healthy future, it makes sense that the ability to think in the long-term and envision the future is a common goal of SE (Hicks 1996; Viederman 1996; Cooper 1997; Tilbury 1995; Hesselink et al. 2000). Our image of the future tends to influence the ways in which we act (Ventura 1994). Therefore, if SE can help people envision a more socially, economically, and environmentally healthy future, they may be more likely to act in ways that help create that future (Hicks 1996). One way to connect our present actions with the future is through long-term thinking, which involves considering the impacts of current decisions on many generations into the future.

2) Systems thinking: Because issues of sustainability involve the interaction of social, environmental, economic, political, historical, and cultural forces,

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3 Though SE is similar to the field of Environmental Education (EE) in many respects, SE differs from EE in arguing for an integrated, holistic approach, with environment, economics, and social equity equally important (Paden 2000); EE considers the social and economic spheres as a “backdrop” to environmental considerations. EE has strongly shaped SE, and SE is also shaping EE; the disciplines are discrete yet complementary (McKeown and Hopkins 2003).

V. McMillan and A.L. Higgs
SE aims to teach students to examine the interactions between these systems (Viederman 1996; Ahlberg and Filho 1998; Haury 1998; Tilbury 1995). Systems thinking entails examining interrelationships as well as the behaviors and events that result from these interrelationships (Bellinger 2002). In the context of sustainability, systems thinking often involves examining the interactions between systems of different scales (local, regional, national, and global). A systems thinker integrates information rather than breaking it apart into discrete and independent bits, recognizing that the whole system is greater than the parts (Mebratu 1999). Systems thinking also tends to promote higher level and critical thinking skills (Tilbury 1995).

3) Equity: Social equity refers to fair access to resources, opportunities and power. Common aspects of social equity include just methods of conflict resolution, respect and fair treatment of others, participatory decision-making, tolerance and acceptance of diversity, and community involvement. Social equity is one of the three E’s of sustainability, based on the belief that a stable society is crucial to maintain a high quality of life over the long-term (World Commission on Environment and Development 1987).

4) Environment: Environment refers to the physical place, including both natural and built spaces, as well as the ways in which that place impacts humans. Environment is one of the three E’s of sustainability, recognizing that we and other species depend on healthy, resilient ecological and environmental systems to survive. Environmental or ecological integrity is maintained when communities do not deplete or destroy natural systems. Instead communities meet their own human needs in ways that maintain the health and integrity of the ecological system (Viederman 1996).

5) Economics: Economics refers to the ways in which people meet their material and service needs. It addresses people’s livelihoods, the exchange of goods and services, and the different systems through which such exchanges can take place. An economically sustainable system will carefully use and not deplete its financial capital, natural capital, or social capital. Sustainability requires that people have some degree of economic security – control over their economic lives and the ability to shield themselves from external economic shocks (Viederman 1996). Economic security is seen as a more sustainable goal than perpetual economic growth (Viederman 1996).

6) Well-being: In this study, well-being is understood to be healthy physical and psychological conditions in which to live. While well-being demands that basic material needs be met (including sufficient clean water, food, health, shelter, and sanitation) (Berthin 2000), a sustainability perspective does not assume that increasing material wealth beyond basic needs necessarily enhances well-being. Achieving well-being may include being healthy, satisfied with life, and having a sense of meaning or purpose in life (Ryff and Keyes 1995; McGregor and Little 1998). Although well-being has
not commonly been included in the goals of SE, some experts are beginning to include “understanding of appropriate and accurate indicators of well-being” (Cloud and Byrne 2003) within SE’s content.

These themes were derived from a review of the literature on sustainability and SE; they were not necessarily the goals articulated by the four schools in this study. Because of this, several of these themes do not emerge neatly from the data of this study. Understanding the theoretical framework of SE, however, can prove useful to schools interested in designing their own SE programs, offering a basis for breaking apart these concepts of sustainability and SE into more discrete components, and defining the school’s programmatic goals and outcomes.

III. Research Methods
This report is based on observations, interviews, and document reviews at four secondary schools, diverse in size, clientele, cost, location, and programmatic structure. These schools were selected for inclusion in the study because they are among the leaders in the country in the design and implementation of sustainability education efforts.

A. Selecting schools: Eighteen schools were originally identified for potential inclusion in the study. Before inviting schools to participate in the study, informational interviews were conducted with an administrator or admissions officer at each school, either by phone or email. These interviews allowed for better assessment of the scope of their sustainability education efforts beyond the information available through their web sites and published materials, which were also carefully reviewed. The four schools that showed the strongest evidence of a focus on environment, social equity, and economics, in their academics, facilities, governance, culture, and community service were then chosen for the study: Lakeside School, Common Ground, Arthur Morgan School, and The Island School.

B. Data collection: Between two and four days were spent at each school, interviewing faculty, administrators, students, and staff about the content, structure, challenges, and impacts of their SE efforts. Interviews usually lasted about one hour, totaling approximately 50 hours of interviews. The semi-structured interviews were tape-recorded and transcribed with the permission of the participants. Interviewees’ participation and commitment to the schools’ SE programs ranged from minimal to extensive. In addition to interviews, observations were made of classes, school meetings, faculty meetings, facilities, and the daily life and activities at the schools. Where relevant documents were available (including school newspapers, program planning documents, program reviews and statements of purpose, curriculum descriptions, project proposals, public speeches, and articles), they were collected for review.
The findings of this study and pursuant recommendations are drawn directly from the experiences of the study schools and the suggestions and advice that people at these schools shared. While all four schools gave written permission to identify their institutions by name, all interviewees were assured anonymity. Individuals, therefore, are identified by their general role in the school, such as “Island School student” or “Lakeside teacher.”

**C. Analysis:** This study did not aim to evaluate these schools, but rather to describe how they are teaching about and for sustainability and to extract the highlights of these programs, the challenges they have faced, and some of the impacts they are having on students. Common theories in the SE literature guided the research questions, shaped the collection of data, and helped create a framework for organizing and prioritizing the data. The analysis was an iterative process of examining the evidence, revisiting and revising theories, and again studying the evidence from the new viewpoint.

In reviewing the transcripts, recurring themes were identified and categorized. Unusual or particularly insightful comments and suggestions were also identified, even if these were not repeated in multiple interviews. The resulting concepts were then organized into the following themes: the highlights of how schools are implementing SE, the impacts they are having on students, the challenges they face, and recommendations for other programs.

The following chapter of this report provides a brief narrative introduction to the four schools visited, setting the stage for the presentation of the findings.
Chapter Two: The Four Schools

I. Arthur Morgan School
Simple living. Equity. Experiential learning. Responsibility. Non-violence. This is what Arthur Morgan School is about. The school, located in the scenic Black Mountains of North Carolina, several miles from the closest small town, was founded with an unusual mixture of educational and social philosophies that persist within its culture and institutions today (see school history). The young people who decide to attend Arthur Morgan School quickly realize that it is not a typical school. In fact, it feels and looks more like a little community than it does a school. Few 13-year olds are as involved in their community or given as much responsibility as Arthur Morgan School students. Since the school employs no janitors, cooks, or maintenance crew, the students and staff are responsible for the upkeep and daily functioning of the school community.

The twenty-five seventh through ninth graders and fourteen school staff learn by working, playing, living, and making decisions together. They supplement their kitchen with fresh produce from their organic, heirloom garden, preparing their vegetarian, family-style meals together. Many of them live together in big family houses with two house-parents and five to six other students. Two-thirds of the student body lives on campus with all the school’s staff. The campus reflects the school philosophy of voluntary simplicity, as the buildings are simple and rustic and there are no televisions or student computers to be found.

Every morning, the students and staff gather in their cozy commons room for “morning sing,” to focus the group and start everyone’s day on a good note. They spend the rest of the morning in class – math, language arts, a class called “Personal Growth,” and one called “Integrated Studies.” Even these core classes at Arthur Morgan School are atypical. While academics are an important element of the school, the primary focus of the school is not for students to attain the highest possible academic performance; it is to develop as a whole person, to “help each student grow into a confident and responsible young person. Instead of learning to compete, students learn to cooperate, care for themselves, their world and each other” (Arthur Morgan School 2001). The curriculum at
Arthur Morgan School focuses heavily on out-of-classroom, experiential learning that has the students exploring their world and working to solve real problems.

Immediately after lunch, students and staff do their chores. Then they move on either to electives, an internship, or work projects. The students themselves give significant input into which electives will be taught, (some by parents or community members); these have included classes such as globalization, glass-blowing, carpentry, auto maintenance, soccer, “art and activism,” forest ecology, and “what the Buddha taught.” Each student also does either an internship (in gardening, school administration, cooking, or school maintenance), or an “exploration,” which is a less formal elective that allows students to explore a topic of interest, such as psychology, native plants, wilderness medicine, or primitive skills. The work projects get students involved in taking care of their physical school, and are generally truly hard work. Activities might involve gardening, repairing a school building or canoe, chopping wood, or trail maintenance.

Arthur Morgan School works hard to make all community members feel accepted, loved, and supported. For the school prom, everyone draws someone else’s name out of a hat, and must then find a creative way to invite their date. Refusals are not acceptable. On prom night, everyone raids the theater costume room and emerges decked out in ridiculous garb ready to dance. At the school everyone participates in making community decisions. During the weekly “All School Meeting,” students and staff solve problems, make plans, and share thoughts. Each student participates in these meetings, and all important school decisions are made based on consensus (among students and staff in All School Meeting, staff in their staff meetings, and even on the Board of Trustees). There is no hierarchy among the staff, and no distinction between faculty, staff, and administration. All earn the same salary of $10,000 per year plus room, board and benefits. This helps keep the school accessible to a broad range of families, with a relatively low tuition of $15,300 per year for boarding students and $7,150 for day students. Sixty percent of students receive some sort of financial aid, on average covering one-third of the tuition. The school’s philosophy of voluntary simplicity allows it to run on a minimal budget (annual operating expenses are $300,000). The relative lack of financial resources does not seem to be missed by community members.

Arthur Morgan School does not describe itself as an “environmental school” or a school that teaches specifically about sustainability. Rather, the work it does in these areas emerges out of its founding philosophies. Yet, their program design and philosophy are very much in-line with that of a school explicitly focused on sustainability. Perhaps it is in examples like this that we see that SE is not just a content area, but rather incorporates an
educational philosophy that can also be considered good educational practice in general.

A Brief History of Arthur Morgan School

♦ Pre-1962 – Elizabeth Morgan, a product of home-schooling until 8th grade, teaches in a public school and describes the educational environment as “a giant babysitting operation, designed to keep kids out of a society which no longer needed them – a colossal waste of the children’s time, apparently designed to stamp out imagination and initiative” (in Morgan 1990).
♦ 1955 – Elizabeth Morgan begins work on the design plans for a new junior high school.
♦ 1957-1962 – Elizabeth and Ernest Morgan decide to fulfill their life-long dream of starting a school. The school is sited in the community of Celo, an intentional community originally settled by a group of peace and social activists, led by Arthur Morgan. They institute summer ‘work camps,’ giving campers from Camp Celo the chance to help build the school’s buildings. Campers work under the guidance of a young college graduate to build the school’s first big building, using local river stones and a borrowed cement mixer.
♦ 1962 – Elizabeth and Ernest Morgan found Arthur Morgan School, incorporating philosophies from his father and social engineer, Arthur Morgan (later the president of Antioch College), Maria Montessori, John Dewey, and Gandhi, as well as from her Quaker beliefs. They also draw on the ideas of Grundtvig and Pestalozzi.
♦ Present – Arthur Morgan School continues to function much as it did when it was first founded.

II. Common Ground
Walking around the campus of Common Ground School, one would never guess that the half-dozen mobile classrooms lined up in a parking lot house a progressive school for sustainability education. Upon first glance, even the students don’t seem the “type” to attend an environmentally focused school. Most of the 400 students are from the city, and they represent many skin colors, social groups, and family backgrounds. Upon entering a classroom in session or talking to these students, one quickly discovers what this place is all about. Most of the classroom walls are plastered with student projects and posters on issues like environmental justice, green economics, and urban sprawl. There is a half-assembled solar-heated water fountain next to the bookshelf, which is filled with titles on political advocacy, community organizing, spirituality, ecofeminism, and deep ecology.
Upon greeting each other, Common Ground folks generally hug one another – teachers and students alike. This is indicative of the trust and friendship that characterizes the interpersonal relationships at Common Ground. During class, students often sit in a circle or sprawl around the room in comfy chairs and sofas that appear to have been rescued from a final fate in a landfill. The teachers often sit with the students, leading heated discussions on controversial topics. The schedule is structured differently, too. Rather than each student having six or seven unrelated classes each semester, they have three classes in block periods, with teachers who coordinate their curricula to help connect students’ learning.

Common Ground is actually a school within a school - part of the large Berkeley Public High School (3,200 students). Though some would hardly consider Common Ground small, it is one of three of Berkeley High’s “small schools;” small schools are a new educational approach that allow a group of teachers and students within a large school to create a more intimate learning community. The increased sense of community and purpose among students and teachers in small schools tends to make school a more enjoyable and productive place for teachers and students alike. Small schools like Common Ground have some autonomy from their larger schools in terms of teachers and budget, but they also depend on support from the larger school administration, the school board, the superintendent, and outside funders. Common Ground has received several grants from the Center for Ecoliteracy to fund projects such as the school gardens and curricular improvement.

Many Common Grounders feel that Berkeley High provides insufficient administrative, financial, and moral support and flexibility for their small school. Because of the limited administrative support, Common Ground students and their 14 teachers take on the role of running the school. Students have taken leadership roles in designing and starting the school, finding speakers, starting clubs, teaching classes, planting gardens, and more. One senior spent her summer free time working out the class schedules for all 400 students.

At Common Ground school leaders admit that they are advocating pro-sustainability values. While their curriculum doesn’t always present all sides of a story, they argue that students are getting enough of the “other side”
from mainstream culture, and the school therefore tries to balance that out with exposure to alternative ideas.

Common Ground is a young school, having officially launched itself in September of 2001. Previously, there were elements of the future school developing within Berkeley High for ten years; specifically, there was a set of interrelated classes on environmental issues and social justice. The leaders of Common Ground do not plan to remain a small school within Berkeley High. In the next few years, they hope to take many of their staff and students with them to create a charter school. While this will likely decrease student diversity, it will also allow them to have administrative staff, and to improve their 35 to 1 student-teacher ratio, among other advantages.

### A Brief History of Common Ground School

- **1992** – Common Ground’s founders, teaching at Berkeley High School, take a group of students to the UN PrepCom for the Rio Earth Summit. They are the only recognized student delegation. The trip “reaffirmed our hopefulness and sense of optimism that you could have an ecological and social focus in schools that joined forces. These little blips – one or two week events – could be life altering events for students.”
- **1993** – One of the founders organizes and teaches an Ecological Literacy class for high school students. Unsupported by the high school, the class meets for 3-4 hours on Saturdays at his home. Students receive credit for the course, but the teacher is not paid.
- **Mid-1990’s** – Common Ground’s founders organize and run a semester-long cultural exchange with the Urok tribe. Thirty Berkeley High School students participate with fifteen Urok students in this field-based program. The program is funded privately, but accredited through the high school.
- **Late 1990’s** – Common Ground’s founders start the Common Ground Environmental Studies Institute, offering approximately six elective courses on environmental and social issues to juniors and seniors at the high school.
- **2000-2001** – Plans for Small School Common Ground commence. Students and faculty participate in design retreats to plan the school’s curriculum, structure, and philosophy. Teachers and students are recruited from the big high school to participate. Eighteen teachers and about 400 students sign on. Funding for research and development is granted in part by Bill Gates and in part by the Center for Ecoliteracy.
- **2001-2002** – Common Ground successfully operates for its first full year as a small school within Berkeley High School.
- **In the plans** – Common Ground breaks away from Berkeley High School and establishes itself as a charter school.
III. The Island School

Every morning on the island of Eleuthera, Bahamas, 40 Island School students wake up to the alarm on one student’s watch, and head out for an hour of intense morning exercise with their teachers and administrators. This particular morning, they run five miles to various stations, where they move like marine species, do yoga, swim in the ocean, and simultaneously learn about ecological zonation from their teachers, who lead the exercises. Dirty, smelly students are then allowed a quick military shower, heated when necessary by some of the solar hot water heaters atop the school buildings.

The students, all but one from the United States (the one is a Bahamian student), dress in shorts and Island School tee-shirts (wearing school uniforms as all Bahamian students do), and head to the center of campus for their morning meeting. Forming a circle in the island sand, students sing the Bahamian national anthem, have a moment of silence, and the daily student leader and others share announcements and messages. The sense of a tight and accepting community is ubiquitous during this morning circle. After eating breakfast in the dining room, or outside on the tables just a few meters from the water, students do their chores, washing breakfast dishes, bringing the slop out to the pigs, sweeping, and checking the water level in the cisterns that collect rainwater.

The rest of a typical day is spent in non-traditional classes of marine science, English, math, environmental art, history, and an interdisciplinary sustainability class. These classes are coordinated with each other, and are all heavily based on exploring and understanding the unique local place; biophysically, culturally, economically, and politically. Classes are highly participatory, constructivist, and academically challenging. On most days, time is reserved for academically rigorous group research projects, during which students conduct original research on an important local sustainability challenge for which they design and implement potential solutions. Working with local experts and their teachers, the line between student and teacher sometimes blurs; it often feels more like a group of people working and learning together to solve problems for which no single person has the answer.

After classes, while one group of students (all of whom are SCUBA-certified) head underwater to explore the coral reefs, another group might...
work on the innovative green construction of a new school building made entirely of native materials and reclaimed junk. Students are regularly given time to spend in their special individual place outdoors, during which they write in their “place books” and reflect on their personal development. Some days, students head out to the school’s Deep Creek Community Resource Center to tutor a local sixth grader or help a Bahamian woman learn to use the computer. The school feels full of energy and motivation; it is both fun and serious, focused on team-work and competition.

During their semester at the Island School, these high school sophomores and juniors develop a tight connection with their natural surroundings. They spend their highly-structured days immersed in a community very different from any of their own. At the Island School, they are exposed to new ideas, they try out new behaviors, and they plan ways to apply what they have learned when they return to their respective hometowns. Faculty are young, enthusiastic, caring, committed to the school mission, and have high-expectations for their students; unfortunately most do not stay at the school for more than a few years.

Most students come from upper-middle class families in the US who are able to pay the $12,000 tuition. Approximately one third of students receive some financial aid, and several students have full scholarships. The Island School is a young school, founded in 1998 in association with the Lawrenceville School, and is funded in part by private foundations. In addition to the semester program, the school facilities are also used by research scientists, university field study programs, sustainability conferences, and summer adventure programs for youth.

### A Brief History of The Island School

- **Pre-1996** – The Island School’s current director establishes ties to Eleuthera through family visits to the island. He becomes interested in aquaculture as a way to maintain the traditional fishing culture and economic base while preserving wild fish stock.
- **1996** – The school’s director develops an aquaculture research program, including 1) a graduate student project focused on fish farming, 2) SCUBA lessons, and 3) a summer program for inner-city youth from New York City to camp, journal, and learn about aquaculture alongside Bahamian youth.
- **1998** – With the support, academic expertise, and financial backing of The Lawrenceville School, the school’s current director designs a semester program for 10th and 11th graders. Another staff member is hired to research solar and wind power, and alternative waste treatment
systems. Limited funding and a tight time schedule prevent inclusion of these systems in the school’s infrastructure from the start. Twenty-two Lawrenceville students sign up for the program, promoted as a semester studying marine science and aquaculture.

♦ 1998-2001 – With realization that their waste effluents are polluting their local waters, The Island School begins to reformulate their facilities and practices, hiring sustainability experts on their full-time staff to drive their efforts to become a model facility for sustainable design and operations. Sustainability becomes a focus of the school’s educational agenda, complementing the continuing focus on marine science. Additional funds become available through grants for the installation of solar and wind power systems.

♦ 2001 – Tensions arise among the faculty and staff as they debate the mission of the school; are they primarily an educational institution that incorporates sustainability in its curriculum, or are they primarily an institution focused on researching and demonstrating sustainable systems that also educates? This discussion continues.

♦ 2003 – The Island School will host a Sustainability Summit, launching a new, academic center for the study of sustainability issues.

IV. Lakeside School

It’s seven-thirty in the morning, and the campus is bustling with activity as students arrive for the day. They walk with purpose, eagerly chatting with one-another on the way to their classrooms. Groups of students making their way between the school’s buildings greet their teachers quickly in passing with friendly “hello’s.” It could be a New England prep school with its formal brick buildings and quaint chapel, but instead this is where East meets West, so to speak. Located in a residential area about ten minutes from downtown Seattle, Lakeside embodies the rigor and tradition of academic excellence and a college preparatory curriculum typical of a well-established independent school on the East coast (their self-professed model), while surrounded by the icons of the Pacific Northwest – salmon, old-growth, and Microsoft.

Entrance to Lakeside is competitive; only one of every ten students who applies is accepted to the freshman class, most coming because of the school’s well-earned reputation for a strong academic program and the resulting 99% college attendance rate among its graduates. The school’s
programs are well supported through state-of-the-art facilities, a $47 million endowment, and $18,000 annual tuition. The endowment allows Lakeside to diversify its student body; approximately 20% of Lakeside students receive financial aid. Expectations at Lakeside run high. Many students feel strong pressure to achieve, imposed by themselves, their parents, peers, and some teachers. It is not surprising, therefore, that with the wealth of opportunities offered to Lakeside students, including Advanced Placement and honors level classes, numerous sports, and a wide variety of extracurricular activities, most Lakeside students have a hard time limiting their involvement to what would appear a reasonable level to an outsider. The school feels busy. The Lakeside student body seems more sophisticated than the average high school, and many students take their education very seriously, treating it like a career.

Yet, this is still a school, full of energetic, at times boisterous teenagers. At the Upper School assembly, students pack themselves into an auditorium not designed to house all 450 of them. Announcements begin, and once students are cleared from the aisles, a couple of mountain bikers bounce down the stairs and onto the stage. Applause erupts, followed by laughter – a teacher appears on stage in full backpacking garb, and a car rolls on from stage left with a full carpool of students. The environmental club presents its plug for alternative transportation to school. The students go on to applaud their classmates as they are recognized for outstanding community service work. At these moments, Lakeside’s conservation-based efforts are prominent and people seem to be paying attention. However, the school struggles to keep its students engaged and interested in sustainability issues, despite impressive efforts to do so.

Many of the school’s faculty and staff are sincerely concerned with sustainability issues and are attempting to transfer this concern to the student body. Most Lakeside students, however, seem apathetic and uninterested in the issues, often rolling their eyes at words like “environment,” “community” and “diversity.” Despite both the signs that abound in the school cafeteria and heartfelt pleas and announcements, over 4,000 pieces of silverware, along with hundreds of ceramic plates and glasses reportedly disappeared last year, probably thrown out in the trash by students who felt they did not have time to return them properly. Students in the “Earth Corps,” the student environmental club, are disheartened and frustrated by the apathy they see in their peers, who seem unwilling to make even small behavior changes to benefit the environment.

Whether or not they call it sustainability education (and they don’t), Lakeside has been working consistently over the past ten years to develop and integrate sustainability into the school’s mission, curriculum, and facilities. Of the four study schools, Lakeside has gone through the most prolonged and sequential process in developing its commitment to being a “conservation-based school”
(see school history). The program’s efforts are impressive, revealing strategic initiatives including annual ecological audits of the school, the greening of school facilities, the integration of ecological content into all classes, and many more. Teachers involve students in exploring the links between economic, environmental, and social equity issues (particularly in classes like Environmental Science, Global Village, and Equity and Justice). Lakeside has also gained unusual and admirable financial and philosophical support for these efforts from their trustees and administration.

It is important to note that, like Arthur Morgan School, Lakeside does not use the word “sustainability” or “sustainability education” to describe what it is doing. In fact, some faculty actively steer away from use of the term, suggesting that it is ambiguous and meaningless to most people, and that the success of this initiative depends on using language and goals that are familiar to the school community. Lakeside’s commitment to being a conservation-based school is focused on the environmental side of sustainability, with much less attention to social and economic elements. However, the school also has separate initiatives focused on the social and economic sides of sustainability, including community service requirements for students, a campus coordinator of diversity issues, an intercultural program, and significant inclusion of social and economic issues in the curriculum. However, the school’s social and ecological initiatives are not expressly integrated within the larger framework of sustainability education, nor does the school suggest that this is one of their goals.

Whereas the other three schools involved in this study were founded and developed with sustainability principles in mind, Lakeside has tried to integrate this focus into a school with very different roots. Because of this, the lessons learned by Lakeside may be particularly relevant to other already-existing schools interested in adopting a new sustainability focus.

A Brief History of Lakeside as a Conservation-Based School

- 1919 – Lakeside is founded as a boy’s college preparatory boarding school.
- 1970’s – Lakeside goes co-ed, having eliminated its boarding program.
- 1990-1991 – Lakeside recognizes its graduating students lack a basic understanding of ecological systems and environmental issues. The school hires an Ecological Studies Coordinator to oversee curricular changes to improve teaching and learning about ecological studies and the greening of the school’s management, facilities and operations. The Coordinator begins the process by researching the status of the school’s existing curriculum and operations to establish a baseline from which to
measure progress in their goals. In addition, school-wide discussions are
initiated to define the school’s goals and commitments to conservation.

♦ 1992 – “Faculty, staff, students, and friends” at the school sign an
Environmental Statement which articulates the school’s understanding of
their role in teaching about ecological issues, stating: “In the very finite
world of Lakeside, our call must be to design a deliberate and coherent
approach to instructing ourselves and our students about appreciating the
land, water, and air as a complex web of exquisite but vulnerable
systems.” This is followed by a series of recommendations for the process
by which they should carry out their goals.

♦ 1992-2000 - The school continues its efforts, first providing support for
faculty interested in building an ecological component into their
coursework, and later requiring that all faculty include discussion of
ecological issues in their courses in some way. The school hires an
external consultant to help them evaluate the sustainability of their
facilities and management practices and recommend improvements. The
school implements extra-curricular projects and improvements in the
management of facilities and grounds, and begins to track resource use
from year to year to monitor progress.

♦ 2000 – Employees and students suggest to the school that it adopt a shared
statement of commitment to conservation in its operations.

♦ 2001 – A Guiding Commitment is endorsed by department heads as a
clarification of the school’s mission statement. The Guiding Commitment
states, “We accept responsibility for developing in all students the
characteristics necessary to live within the limits of what the ecosystems
on which we depend can sustainably provide” (in Gershon 2002).

♦ 2001 – The Board of Trustees, faculty, staff, students, and administrators
endorse a statement of Lakeside’s intention to be a “Conservation-Based
School,” saying: “Lakeside School aims to be a conservation-based
school, operating in ways that conserve and improve human well-being,
the school’s resources, and the health of the earth’s systems and
communities of life on which we depend.”

(The above description of the development and evolution of Lakeside’s conservation
based initiatives is drawn primarily from “The Ecological Journey of Lakeside
School” by Brian Gershon, 2002).
Chapter Three: Implementing Sustainability Education

The four schools studied have found a multitude of means by which to implement sustainability education (SE) and achieve their goals. These means have been divided into three general categories – curriculum, extra-curricular activities and programs, and modeling sustainability through the school community. The schools themselves do not necessarily categorize their efforts in this way. Before discussing each of these contexts, it is useful to consider an underlying pedagogical perspective that pertains to all of them. Thus, the first section discusses Authentic Student Work.

I. Authentic Student Work

Authentic learning emphasizes the real-world context, but means more than simply putting students in experiential or out-of-classroom settings. Authentic learning opportunities are an effort to make learning concrete, tangible, and relevant. According to the North Central Regional Educational Laboratory (2003), authentic student work happens when a school assignment has a real-world application. Such tasks bear strong resemblance to tasks performed in non-school settings (such as the home, an organization, or the workplace) and require students to apply a broad range of knowledge and skills. Often, they fill a genuine need for the students and result in a tangible end product.

Authentic learning is often cited as a primary success factor in SE efforts (Hesselink et al. 2000; Rausch 1998). A Common Ground student corroborated the importance of this approach, saying:

You can learn and retain so much more from actually doing something. [Like] anything that involves not sitting in a classroom and learning [about] agricultural run-off, but actually going out and seeing the effects on a riparian area and a watershed and then fixing it – I think that’s really, really important.

4 Unfortunately, the term “authentic” implies that other student work or learning is not real or meaningful; though we disagree with this, we have chosen to use the term because of its prevalence in the field of education and its use by two of these study schools.

5 The use of the term “real-world” is also problematic, implying that work done in school is not part of the real world, with which we disagree.
When explaining the authentic learning that happens at the four study schools, most interviewees were referring to learning that happens largely outside the school walls, usually confronting current issues in the community, and often organized through project-based work. At their best, these experiences are carefully crafted by teachers, including preparatory background work, guidance from teachers and other experts while ‘in the field,’ and opportunities for reflection upon completion of the project. Projects and out-of-school experiences are not the only format through which authentic learning can happen, however. Simulations, debates, and case study analysis can also provide forums for authentic learning, still including the “real world application… strong resemblance to tasks performed in a non-school setting,” and requiring “students to apply a broad range of knowledge and skills,” as described above. In some cases, these may actually be more productive learning experiences for students than field-based projects because the parameters can be more easily controlled, and students can more easily engage with multiple examples of similar problems or situations (Monroe and Kaplan 1988). These formats can also give students first-hand experiences with situations to which they might not otherwise have access. For example, having students participate in a simulation of a United Nations policy-setting meeting can bring them into this global arena, confronting the multitude of agendas and issues that arise in such a meeting, without actually having to gain access to such an event.

Because SE is such a young field, there has been little, if any, research done on the effectiveness of the best practices outlined by experts and practitioners in the field, leaving authentic educational practices unevaluated alongside the many other approaches advocated within SE. However, at a theoretical level authentic education seems to support SE goals. The study of sustainability includes the study of current problems and possible solutions involving economic, social, and environmental systems. These issues are the content of SE. Because of this, work that asks students to participate in solving tangible problems in these fields seems critical. Current thinking in the field of sustainability education supports this notion, arguing that SE at its best is issue-based and action-oriented – that it grounds student work in local issues, and gives them opportunities to work with current problems, helping make SE relevant to students (Hesselink et al. 2000; Tilbury 1995; Rauch 1998; Wheeler and Bijur 2000). This does not imply that effective SE requires all other teaching approaches to be abandoned, however. In fact, some of these other approaches are important in preparing students to engage in authentic learning.

Students at the study schools responded well to authentic learning opportunities, particularly those that allowed them to actively contribute to improving their world. Students at Common Ground explained that they were less motivated when they felt like they were working for the grade or for the teacher. When their education was based on solving real problems
through community service, they felt like their presence at school mattered. One Common Ground student explained that involvement in these authentic, experiential projects is one way to make students invested in their education:

> The best way [to build student commitment] is to get out and actually do things, because students can be invested in restoring a watershed or restoring an area... I think that that’s a really important feeling to feel that what you have actually done in high school matters and if you don’t show up to school that day someone is going to notice and something... that everyone wants to see won’t get done because you’re not there – because you’re important. I think that’s the feeling you have to foster, and you can do that... by having small groups of students doing important projects that won’t get done if they don’t do it – so they really feel responsibility for it.

Many students at Common Ground felt that their school work should be useful beyond the classroom, and that this was a strong motivator for their work. The student who spoke about building commitment through authentic projects added, “When you just write for a teacher, it doesn’t feel worth it,” going on to describe the added value she sees in writing grant proposals and for a school literary magazine. “Students should be encouraged to get published elsewhere – in local newspapers and things like that,” thereby making their work accessible and useful to the broader community.

Another Common Ground student echoed these sentiments when making recommendations for new SE programs: “[Students should spend time] working on projects like restoring houses, take on social equity projects, go help at a dairy farm and learn about the economic ins and outs associated with it, as well as helping-out there.”

Authenticity is essential to The Island School’s philosophy, in particular. An administrator there suggested that it “goes a long way toward allowing the students to really feel like they’re making a difference, and it raises the bar in their ability to learn and... function as a citizen.” The science research projects are a specific example of this. Referring to these, a visiting teacher said, “At the high school level students are consumers of knowledge,” but “at The Island School, students produce knowledge,” (The Island School 2001) actively contributing to the solution of local problems.

**Place-based education:** One of the most common frameworks for implementing authentic learning in the study schools was a focus on the local place. The literature on SE encourages this approach, arguing that effective SE will be locally appropriate and focus on the local place and community (MeKeown and Hopkins 2003; Viederman 1996; Hesselink et al. 2000;
Place-based learning is particularly central to the curriculum of The Island School and Arthur Morgan School. Teachers and students at these schools expressed that by linking the curriculum to the local place, issues become real and tangible, and opportunities are created for authentic student work. Reflecting on the things he liked about the Island School, one student said:

What I’m impressed with … the most is how the Island School tries to interact with the Bahamas as a whole – how we learn the national anthem, how we fly the Bahamian flag. How, when we do something agriculturally, we try to… do it in a way that might work for other Bahamians… I think it’s just how we do it while trying to stay in tune with the local community… It’s something that makes the whole experience a lot more tangible and a lot more real.

At The Island School, many curricular and extracurricular elements of their program are designed to connect students to the place. These include the science and humanities projects, the environmental art course (for which each student has his or her own special place outdoors), the English course that focuses on an epic poem about island life in the Caribbean, their morning outdoor exercise program, and their “place books,” in which each student journals his or her thoughts about place and personal growth. Not all of these means of connecting to place involve authentic learning. Beyond creating opportunities for authentic student work, the place-based focus provides a way to make learning relevant and tangible, ideally helping students to develop an emotional connection to place, as well. A Common Ground student recommended “having kids live in an environment and learn to care about it,” adding, “Fostering a love for what you’re trying to protect is one of the most important things.”

At Arthur Morgan School, the connection to place occurs in part because of the school’s experiential philosophy and in part because limited resources drive the school to draw upon the immediate community to strengthen the curriculum. This connection to place also makes it easier to build connections between environmental, economic, and social issues. As one Arthur Morgan School staff member explained,

“Your [educational] material has to be local for you to interact with it, so you study your region, and it’s much easier for there to be an environmental question in your study of region because you can see it right there. People will say things like ‘We don’t have

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6 Because SE efforts are tailored to the local context, one should not assume that what was successful at one school will necessarily work at another. The general strategies used by the schools are often still relevant to others.
enough rain, and that’s stressing out the economy’ – so this place based focus links into all three E’s.

While the Common Ground curriculum is more globally focused, it also draws on local examples to illustrate key concepts, often using an authentic learning approach in conjunction with these local examples. Lakeside has not built in a strong focus on local place at the high-school level, though interested faculty are exploring the notion of sense of place and how it might fit into individual courses.

The following descriptions of the curricular, extracurricular and modeling efforts of the four SE schools reveal multiple applications of a place-based and authentic learning approach, in addition to offering examples of other approaches to SE.

II. Curriculum
Sustainability concepts and the three E’s – environment, social equity, and economics - are addressed in the curricula offered by all four schools, both through infusion of concepts into pre-existing courses and through the creation of new courses designed specifically to address sustainability-related concepts (see Table 1). The debate over whether infusion into current curricula or creation of separate courses better meets the goals of sustainability education persists. All four schools have decided to have some courses specifically dedicated to addressing these issues, though Lakeside and The Island School rely more on infusing sustainability into their existing course material.

A. Sustainability-focused classes
New courses tailored specifically to sustainability-related issues are usually designed as electives, and therefore do not have to meet standard curricular requirements. One of the drawbacks to creating elective courses is that upper level students are frequently given priority in enrolling in the courses, limiting first and second year students’ exposure to the issues. In addition, these courses are most likely to be appealing to those students who already have an interest in sustainability-related issues, narrowing the number and diversity of students who will be exposed to the material through these courses. At the same time, courses focused on sustainability themes are able to address specific issues in greater depth than might be possible when infusing the material into existing courses. In some cases, specialized courses have been deemed so critical to the school’s goals in teaching about

Table 1: Sample electives with sustainability-related content

<table>
<thead>
<tr>
<th>Global Village (Lakeside)</th>
<th>Alternative Energy (Arthur Morgan School)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tropical Marine Ecology (The Island School)</td>
<td>Environmental Journalism (Common Ground)</td>
</tr>
<tr>
<td>Equity and Justice (Lakeside)</td>
<td>Globalization (Arthur Morgan School)</td>
</tr>
<tr>
<td>Environmental Science (Common Ground)</td>
<td></td>
</tr>
</tbody>
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V. McMillan and A.L. Higgs
sustainability that they have become required for all students. All Island School students take an Interdisciplinary class focused on sustainability, for example, and Lakeside is developing an Environmental Science course that will be part of their core curriculum for all students.

B. Infusion of sustainability into existing courses

Both Lakeside and The Island School systematically infuse sustainability issues into nearly all their courses. One Lakeside teacher expressed the importance of an integrated curriculum:

One of the big problems here is that we are so compartmentalized. We only have one class that's sort-of interdisciplinary. Kids need to get the idea that it’s all connected. We have to connect academically if we want them to see the world as connected. It makes more sense to have the themes deeply integrated into everything than to have a few lone classes.

At the beginning of each year, all teachers at Lakeside are required to prepare a “Scope and Sequence” document for their courses, which includes a description of how and when they will include content on the environment, culture, and diversity. This document, shared with department heads, ensures that all courses are linking their material to these issues in some way. For example, the Scope and Sequence for a Spanish class includes a writing activity on environmental disasters in the news and a discussion on recycling at home. In order to get a more comprehensive picture of what is being taught from an ecological perspective in each department, Lakeside has also compiled summaries of what is already being done in each department and what the next steps are to better integrate ecological studies into the department’s curricula. For example, the Upper School History Department summarizes their efforts as follows:

1) Already Happening: Significant integration of people-nature interdependence themes in course revisions. US History has included a people-nature ethics unit for many years, and the place of people in nature is an important thread in the recently revised 10th grade course. Ongoing discovery and sharing of good resources for teaching ecology through history.

2) Next Steps: Continue to find, share, and put to use good resources. Start a central file of resources and develop a section on the ecological studies website highlighting history-related resources. At the opening meeting of the year, make time to highlight some of the most helpful resources.

At The Island School the infusion of sustainability concepts into the course material is deliberate and comprehensive, as well. Because The Island School does not offer a complete high school curriculum, or even
a standard curriculum for the 10th and 11th graders they serve, they have greater flexibility in shifting their course content to include sustainability-related themes. An administrator at The Island School shared his philosophy regarding infusion versus the development of new courses, explaining that teaching sustainability should be like "breathing the right way rather than creating a whole new discipline," and that all disciplines should incorporate sustainability concepts, which will help “break down the boundaries that exist between disciplines.”

While Arthur Morgan School and Common Ground do not have a formal mechanism to support such infusion, some sustainability-related themes emerge in most classes.

With the challenges of exposing the majority of students to sustainability-related concepts, meeting current curricular requirements, and offering students both breadth and depth of knowledge in these areas, it becomes clear that both infusion and new, specialized courses are important for SE schools. Because all of the study schools use both integration and specialized courses, the data cannot distinguish the outcomes of only integrating the curriculum or only offering specialized courses. However, the choice by all four schools to use both suggests that they feel neither approach, alone, is sufficient to meet their SE goals.

C. Linking the 3 E’s through curriculum
All of the schools visited help students learn the beginnings of systems thinking by linking the three E’s, both through infusing the concepts into existing courses, and in the classes that focus on sustainability. A Common Ground teacher explained that in Common Ground courses, students gain an “organic” understanding of the linkages between the three E’s, but that real world application is necessary for the students to internalize these relationships.

Teachers help students make these links through discussions, debates, and assessment tools. For example, in Lakeside’s world history class students engaged in a debate about European colonialism, drawing on the environmental, social, and economic impacts on colonized and colonizing countries in their arguments. At The Island School, all students take an oral assessment at the end of the semester, in which they are asked to articulate these connections. Lakeside is also in the process of developing a final assessment for its graduating seniors that would ask them to build links between the three E’s. For teachers to help students make the links, it is crucial that they, themselves, understand these complex relationships.

At The Island School, the curricular philosophy of “less is more” also appears to foster systems thinking. An Island School teacher explained that teaching factual information is not the goal; instead The Island School strives for
conceptual understanding and problem solving skills. This teacher suggested that in cutting back on the content requirements in the curriculum and approaching a few key concepts from many angles, it is easier for students to see the links between things.

Research projects: Research projects also help students integrate their knowledge and build links between the three E’s. In many cases, coursework is tied into project work, often including field trips or community service. Several faculty members at Common Ground identified project work as the most effective means of helping students make links between the three E’s. When asked how Common Ground helps students build these links, one teacher said, “Projects always do that. Projects are where these things come together. It gives them skills and debriefs to help it all come together.” Some students made it clear that they have built these connections when describing school projects.

I did a project in Environmental Science about soil erosion in Central California Valley. I talked about economic issues and social justice issues with farm workers in addition to evaluating the environmental impacts… You can’t really look at one of those issues without looking at the others. (Common Ground student)

Corroborating this, several Island School students expressed that their humanities and science projects helped them internalize the links between the three E’s. The humanities project at The Island School engages students in sociological research through interviews, observations, and readings on local economic and social issues such as tourism, Bahamian politics, and family dynamics. The school’s ongoing field-based scientific research topics include mangrove restoration, artificial coral reef construction, and conch population studies associated with a no-take reserve. Within these projects, students explore the economic and social implications of their scientific findings, which are often presented to Bahamian government officials, local non-governmental organizations, and research scientists. The projects in which students at The Island School and Common Ground are involved are excellent examples of one kind of authentic learning opportunity.

III. Activities and Programs
Activities and programs are school-sponsored experiences that are usually extracurricular, organized for students (and often by students) outside of classes. These are typically more experiential, informal learning experiences. Occasionally, students receive credit for these activities and events, or they may be a requirement for graduation, such as community service. This research looked at the school activities and programs that support student learning about sustainability, such as environmental or social action clubs, gardening and farming programs, wilderness expeditions, and trips within
and beyond the United States. These are not always considered extracurricular, since some schools hesitate to draw the line between their formal course curriculum and activities that occur outside of the formal curriculum.\textsuperscript{7}

These activities and programs appear to be important for schools focused on sustainability education for several reasons. They often motivate students to engage with the issues of sustainability, as mentioned in various interviews. They also give students a low-stakes environment to test out new sustainability-related behaviors and explore new ideas and values. This could happen working in a school garden or participating in a workshop on non-violent conflict resolution. Finally, they allow teachers and students to engage in sustainability-related activities that may be either unacceptable or unfeasible as part of the formal curriculum. For example, student attendance at a protest or political event – whether or not they are actually participating in it - may be perceived as advocacy, not education, and therefore be inappropriate as a course-related field trip. However, some schools choose to sponsor extra-curricular trips to such events for those students who are interested in attending. Additionally, extended trips abroad or in the wilderness can simply be difficult or impossible to fit into the regular school schedule, and are more easily organized as extra-curricular trips on weekends or during school vacations.

A. Clubs
Both Lakeside and Common Ground have clubs or club-like programs related to sustainability. Because of the integrated, highly experiential nature of the curriculum and schedules at both The Island School and Arthur Morgan School, neither school has clubs. Lakeside’s student club, the Earth Corps, is the student voice for environmental protection on campus. Though a fairly small club (about thirty students in a student body of 430), Earth Corps has an active and visible presence on campus. Their activities range from running the composting and recycling programs to organizing school-wide alternative transportation and electricity-use reduction campaigns. Though student members of the Earth Corps were in general disheartened and frustrated with the student body, which they described as uninterested and apathetic, they seemed determined to change things nonetheless.

Common Ground students participate in a club-like program called “Farms and Slews,” in which students work with local farmers to help restore farmland and wetlands, and make the shift to more sustainable systems of food production. Organized by the local Sierra Club and other environmental

\textsuperscript{7} For example, at Arthur Morgan School, the entire school takes an eighteen-day field trip every year with a theme such as civil rights. This trip is required of all students and has academic components, yet it is not associated with any particular course. Such a trip is not neatly categorized as either curricular or extracurricular.
groups in cooperation with area farmers, students from multiple schools participate in the program. Though participants miss school to attend program work days (about 10 throughout the year), teachers and students repeatedly cited this as a model learning opportunity that helps students build the links between the three E’s.

**B. School gardens**
All four schools give students the opportunity to participate in some sort of gardening on the school grounds. These gardens were cited as serving multiple purposes; they help students connect with sources of their food, make the campus more aesthetically pleasing, create natural spaces for gatherings, retreat, and reflection, and provide research and academic opportunities.

Arthur Morgan School staff and students have an heirloom vegetable garden near the center of campus. Although the garden only supplies between five and ten percent of the food eaten in the school cafeteria, the head of the gardening program explained that being able to grow some of their own food is an important part of the school’s simple living focus. Students can sign up for a garden internship as part of their Internships and Explorations elective. These interns work actively in the garden and conduct research on agriculture and related sustainability issues. As part of the garden internship, the interns presented their research, teaching other students about maintenance of agricultural biodiversity, heirloom species, natural pest control, and rotating crops. Their discussion of the social, economic, and ecological concerns demonstrated an understanding of links between the three E’s.

Gardening at The Island School is challenging given the desert-like ecosystem. Garden beds are located in the center of campus, surrounding the dormitories and the central gathering area. Through regular seaweed mulching and on-going experimental research that is part of the science research program, students are trying to turn the sand into soil and to eventually expand their permaculture garden to grow crops. Interviews revealed that the permaculture research not only encourages students to think about the sources of their food but also helps link students to local economic and environmental issues. One student described the permaculture program, saying,

> It goes beyond just looking after yourself – it kind of looks after the community… A lot of it is oriented toward developing a successful method of agriculture, which other farmers [on Eleuthera] can use because the agriculture industry is not really doing that well.

The Island School also collects food scraps, which go either to their pigs or to compost for the gardens. This is one of the school’s many physical
demonstrations of closing resource loops, a dominant theme in the sustainable systems set up by the school.

Common Ground School has both a vegetable garden and a native plants garden. The vegetable garden supplies a limited amount of food to Berkeley High School’s “Good Food Café.” The native plants garden, entirely managed by students, provides habitat for butterflies, birds, and insects. There is no formal gardening program at Common Ground, so the gardens are a labor of love on the part of interested students and faculty. In this urban setting, these gardens offer patches of green, which beautify the campus, provide peaceful spots for eating lunch or studying, and give students a chance to get their hands in the dirt and connect with the growing process. One student at Common Ground who has been very involved with the gardens said, “BHS [Berkeley High School] is concrete. But we’re fixing that.” A teacher there who manages the vegetable garden explained that the gardens provide psychological restoration, native habitat, educational opportunities, and healthy nourishment. Another teacher noted that “working in the garden is a priority in some classes... Kids need time to play outside. It’s important.” The willingness to dedicate class time to garden work is exemplified by the geometry teacher who willingly gave two seniors the opportunity to design and teach a garden-based geometry curriculum to younger high school students. While both the teacher and the student teachers admitted that the lessons did not always include heavy geometry content, all involved felt that the benefits of time spent in the garden balanced the cost of some lost instructional time.

Lakeside has a small vegetable garden, fruit trees, a greenhouse, and compost bins next to the Middle School, but no garden program for high school students.

C. Wilderness trips
Giving students positive experiences in the wilderness creates another venue for exposing them to natural systems and developing an empathetic bond with nature.\(^8\) When combined with academic work, it also creates a way to explore the links between the three E’s. All four schools have wilderness programs, which give students significant, and repeated experience in natural settings. Wilderness trips at the schools include backpacking, kayaking, ropes courses, climbing, backcountry skiing, and theme trips. At Common Ground and Lakeside, these trips are organized primarily through their wilderness trips clubs. Students have a large role in organizing the trips, but are supported strongly by very active faculty who serve as part-time, paid wilderness trip program directors.

\(^8\) Hungerford and Volk (1990) include “an empathetic perspective toward the environment” (p. 11), which they call “environmental sensitivity,” as one of the factors leading to environmentally responsible behavior.

V. McMillan and A.L. Higgs
In addition to their wilderness trips clubs, certain classes at both Lakeside and Common Ground take wilderness trips as part of their coursework, combining the wilderness experience with academic study. For example, the Quest class at Lakeside is an elective for seniors that combines study of literature with personal explorations and reflection. The highlight of the course is a three-week backpacking trip in Utah, during which students do extensive journaling and take part in a three-day solo experience. At The Island School and Arthur Morgan School, wilderness trips are part of the formal curricula, and all students and faculty are expected to participate in organized trips during the school year, ranging in length from three to eight days.

Coming from diverse social and economic backgrounds, many students would never have this intimate an experience with nature without the wilderness programs. At Common Ground, the cost of trips is assessed on a sliding scale to make the trips economically available to all students. The difference in cost is made up through student-led fundraising. The program coordinator at Common Ground explained that the wilderness exposure was incremental, starting with day trips, then car camping, and finally extended backcountry trips. This gave urban students unfamiliar with wilderness settings the chance to become more comfortable in these environments before spending extended time in the wilderness.

As an element of a SE program, wilderness trips offer multiple benefits. Wilderness trips have been shown to play a significant role in helping students gain commitment to sustainability, perhaps because they can help students understand the fragility of the natural world and see firsthand the impacts of their behavior on the environment (Cooper, 1997). Time spent in wild and semi-wild places, particularly with adult role models or mentors who respect and love nature, has been linked to developing “a predisposition to taking an interest in learning about the environment, feeling concern for it, and acting to conserve it” (Chawla 1998, p.19). Building upon this, these experiences may also help students build an emotional connection and a sense of empathy toward the natural world that can potentially make them more interested in and committed to its preservation (Hungerford and Volk 1990). “What’s important is that children have an opportunity to bond with the natural world, to learn to love it and feel comfortable in it, before being asked to heal its wounds” (Sobel 1995).

Ideally, this love of nature will have formed in early childhood, as students in high school are developmentally ready to tackle environmental problem solving (Sobel 1995). However, many people are not given the opportunities to develop these emotional ties as children; the emotional connection remains important into adulthood. Thus, creating opportunities to develop or strengthen these ties, even in high school, can be important to motivating students to take action for the environment. Reflecting on her experiences on wilderness trips with students, a teacher at Arthur Morgan School explained
that these trips challenge students in ways that most of them are not accustomed to, pushing them to develop a deeper understanding of themselves, the natural world, and the ways in which they interact with one another.

In addition to their potential to develop positive emotional connections with nature, wilderness trips have been shown to achieve many of the factors that support psychological restoration and reflection (Kaplan 1995). One Lakeside teacher saw this happening during a trip he led: “One student talked about her sense of time slowing down, relaxing, and re-prioritizing life – revaluing how she spends time. They become very conscious of the fact that they have choices and control.” As long as a student feels at ease in a wilderness setting, an extended wilderness trip can offer an ideal setting for reflection and restoration. Such restoration can contribute both to individual well-being and provide ideal settings for personal reflection and thought on big questions, such as one’s life and priorities (Kaplan and Kaplan 1989), perhaps including examination of one’s role in society and responsibilities to the global community. The solo wilderness experiences in which students at The Island School and some at Lakeside participate, which require them to stay alone in the same place for several days with minimal food and shelter, may be one way of creating space and time for deep reflection on wilderness trips (Cooper 1997). Solos have also been shown to help develop self-esteem, self-efficacy, problem-solving skills, and self-reliance, all of which are important for sustainability education (Cooper 1997).

**D. Other trips**

All four schools regularly organize trips to less developed countries, and to other communities in the US. Some of these trips are multi-day events, while others are single-day field trips to local communities and sites (see Table 2). In addition to bringing students to communities suffering from poverty, social unrest and environmental destruction, the schools organize trips to model communities and programs, and to political demonstrations and conferences. For example, Common Ground brings students on a tour of a self-sufficient house and to conferences on environmental justice, and Arthur Morgan School students attend peace marches and other political demonstrations.

These trips are often powerful experiences for students, raising their awareness to the conditions under which much of the world outside (and within) the United States lives. An Arthur Morgan School faculty member described the eighteen-day van-trip the students take each year:

> We do service projects on field trips, especially with the poor. We studied globalization in Mexico with the maquiladoras. We went on a toxic tour and we do something like that just about every year. We visited slums and saw the impacts of multinational corporations. We also see the migrant workers here
and are working in our own community to… improve conditions for them.

One of the students from Arthur Morgan School commented on the impacts this trip had on her:

It really made me think. Here we are in this poor village where babies are dying, and we arrive in our nice clothes in our new van. It made me realize how the way we live really affects everybody, and I think about that now when I buy things.

In addition to raising awareness about global issues and inequities, these trips help students build the links between the three E’s. Visiting developing countries and struggling communities in the United States afflicted with environmental justice problems can make the links between the three E’s more tangible. One student at Common Ground specifically cited such trips as helping her develop her understanding of the links between the three E’s:

The wisdom of my teachers here was what made me first start to understand and make the links between the three E’s. But what really solidified [that understanding] for me was the field trip to the superfund site, a project I did on environmental justice, and our trip to [the student Sierra Club conference in] DC. On that trip, we were one of the only groups there that wasn’t all white kids, and we hung out with the Navajo and Hopi student groups. We talked about how the Sierra Club can’t save the Red Rock Wilderness without starting to find solutions for the Navajo and Hopi… how our wilderness is their home. It was just so obvious to us – and not to the other groups there – that everything is connected.

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<thead>
<tr>
<th>Table 2: Examples of trips students have taken at the study schools</th>
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<tr>
<td><strong>Southern United States and Mexico (Arthur Morgan School):</strong> 18-day civil rights tour of the South, crossing into Mexico to visit maquiladoras</td>
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<tr>
<td><strong>The Bahamas (The Island School):</strong> A three-day, off-campus trip to other communities on the island (and the semester of island life itself is similar to an international trip)</td>
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<td><strong>Washington, DC (Common Ground):</strong> Attended environmental and social activism and lobbying workshops; World Bank conference</td>
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<tr>
<td><strong>Costa Rica (Common Ground):</strong> Visited banana plantations, participated in reforestation project, helped endangered sea turtles with nesting</td>
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<tr>
<td><strong>Alaska (Lakeside):</strong> Visited Inuit communities and studied issues surrounding oil drilling in the Arctic</td>
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E. Community partnerships
The interdisciplinary nature of sustainability education, the benefits of offering experiential and authentic educational opportunities, and the fact that many teachers do not have sufficient sustainability expertise makes drawing on outside community resources a necessity for many SE programs. SE experts recommend building educational partnerships with community, government, business, and non-governmental organizations as a way to improve programs (Rausch 1998). Three of the four schools have developed relationships with outside organizations or individuals in the community to support their SE efforts, which include, but are not limited to the following (see Table 3):

<table>
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<th>Table 3: Partnerships at the study schools</th>
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<td>Common Ground:</td>
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<tr>
<td>• <em>The Ecology Center:</em> financial support, curricular consulting</td>
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<tr>
<td>• <em>Berkeley Youth Energy Services:</em> student training in home energy retrofits and internships to retrofit elderly and low-income homes</td>
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<tr>
<td>• <em>Eco-House:</em> the “Solar Man” visits the school weekly to work with students on building demonstration solar energy systems for the school and community</td>
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<tr>
<td>Arthur Morgan School:</td>
</tr>
<tr>
<td>• <em>Individual local community members:</em> teach classes, volunteer with students on work projects such as the garden</td>
</tr>
<tr>
<td>Island School:</td>
</tr>
<tr>
<td>• <em>Research scientists:</em> student science research projects are guided by local scientists; research scientists visit the campus to conduct research, and students share their results with scientists.</td>
</tr>
</tbody>
</table>

IV. Modeling Sustainability through the School Community
All of the study schools use the community and school facilities to help students learn about the three E’s and other aspects of sustainability. At some schools, school governance and administration are used to model social equity. Similarly, facilities can be used to model environmentally conscious operational procedures and to help students learn about environmental responsibility. Efforts toward economic sustainability are being modeled both through operational decisions and student work programs.

Modeling of sustainable practices varies both in the behaviors or practices modeled (as described above) and in the degree of personal involvement required of students. There appear to be three levels at which students can
interact with modeling of more sustainable practices within their schools, and varying contexts in which each level of interaction happens. The first level of interaction sets an example of sustainability but does not necessarily require that students actively engage with it, as may be the case with school facilities and administration. The next level of modeling helps students become involved with sustainability-related school decisions and processes; this can happen through work programs and student participation in school decision-making. The third level helps students internalize sustainability and take a more introspective look at their own lifestyles. Close personal relationships with sustainability-minded teachers appear to help fill this need.⁹

In order for these sustainable practices to be considered models for students, students need to actually see or experience them. While a school may structure its governance system or facilities to be more sustainable, if these efforts are not made obvious to students – if they are not transparent – then students will be less able to learn from them.

A. Governance
Governance structures within the school administration and the student body can be an effective means of modeling social equity. Specifically, students appear to be learning about sustainability through: 1) the levels of autonomy and decision-making power given to the faculty and students, 2) the demonstration and role modeling of participatory processes and social equity, and 3) the degree of transparency in decision making.

The schools visited present a wide spectrum of governance structures and distribution of decision-making power. At Lakeside and The Island School, the faculty and administration work through more traditional governance structures. Faculty meetings are closed to students, and the faculty and administration retain decision-making power, feeling that there are certain areas where it is inappropriate for students to have input or influence decisions. These two schools do not appear to be actively using their governance structures to model sustainability to students. In contrast, Arthur Morgan School and Common Ground have made intentional decisions to use their governance structures as educational tools.

Arthur Morgan School operates using consensus-based decision-making within its Board of Trustees, within the faculty, and in all-school meetings with students. The governance at Arthur Morgan School is non-hierarchical.

⁹ As observed, the level of engagement that students have with the sustainable practices being modeled at the schools do not fit neatly into the categories outlined above. For example, some students may be more engaged with the actual design and functioning of school facilities, bringing these ideas into their own homes, than they are with school decision-making processes. These levels of engagement and the types of modeling that promote each provide a useful framework, nonetheless, for examining modeling as a means to teach about sustainability.
They do not have a head of school; everyone is considered faculty, and all hold equal status and decision-making power, and all employees earn the same salary. Running the school by consensus is a compelling demonstration to students of equitable distribution of power. One faculty member described the staff-run, consensus-based system as, “the core and foundation of the social equity base of the school.” Numerous faculty members there noted the impact this has on students, both empowering them and giving them equal access to school decision-making processes. A teacher explained:

The staff-run system takes time and responsibility, but it pays off in unity and it models incredible equality to students. It’s non-hierarchical, values everyone’s opinions…and is very inclusive. [We use] the same process for all-school meetings. Students have a good sense of empowerment here – [it teaches] them how to handle daily problems…how to find information, resolve conflict, and take action.

While faculty still retain the ultimate decision making power, students are given a voice in nearly all school decisions – student admissions, faculty hiring, courses offered, and trips taken. Notably, their input is valued and seriously considered when these decisions are made. Students also recognize and value the power they have to influence the direction of the school, as articulated in several student interviews. In addition, while finding the consensus process difficult at times, students are aware of the value of consensus in ensuring that all voices are heard, learning to compromise and tolerate differences, and learning different ways to approach problems:

The school tries to operate on consensus… and we always try to come up with compromises to meet everyone’s needs. It’s tough to decide if you don’t agree with something, whether you should risk getting people mad at you by blocking consensus, or if you should just go along with everyone else. (Arthur Morgan School student)

Despite the inefficiencies and difficulties of the consensus-based system, discussions with students made it clear that the governance system at Arthur Morgan School is an essential part of the education offered there, and a key element to their developing understanding of social equity and conflict resolution.

Common Ground does not have a formal school administration in place beyond that of the overarching bureaucracy of Berkeley High School and the school district. Common Ground’s founders remain in the leadership roles for the school, in addition to carrying heavy teaching loads. Students were heavily involved with designing the small school, and continue to play a strong role in executing and even helping administer the school. Initially,
students participated in faculty meetings, and made up more than 50% of the program design group. One student describes the administration of Common Ground as “democratic, but that means that if people don’t agree on it, it doesn’t happen.” One of the founders expanded on his leadership philosophy with this recommendation to other school leaders:

The leader should be comfortable with a leadership role, but choose staff well enough so that you are comfortable giving up leadership and power to a collective group. It’s best to give up as much power as you can…Hierarchy breeds antagonism, lack of ownership, lack of commitment, and resentment. Nobody can carry it all. Try to get rid of hierarchy as soon as possible, but not just randomly. It has to be replaced systematically with an egalitarian group of people… Empower kids, but don’t be afraid to lead.

The goal of empowering students is visibly met at Common Ground. Students have been given the support needed to bring in top-name guest speakers, organize and fundraise for the Wilderness Club, build gardens, teach classes, and advocate for themselves in the Berkeley High School and school district administrations.

The contrast between the bureaucratic, non-transparent governance of Berkeley High School and the school district, versus the loosely organized, democratic, largely transparent decision-making processes within Common Ground has been educational for those Common Ground students who are more involved with school leadership. These students, deeply committed to Common Ground’s success and philosophy, see the need for democratic, transparent decision-making processes even more clearly given the contrast with the higher-level bureaucracy. The frustration with the lack of true opportunities for participation in district-level decision-making processes was apparent in discussions with several students and faculty members. One student gave the following account:

Lots of students went to City Hall to ask not to have double periods taken away. We were basically laughed at by the School Board Head that teenagers would have something to say. She looked down on us and didn’t hear anything we said. (Common Ground student)

Research has shown that involving students in the decision-making process is a primary determinant of the success of SE initiatives (Sterling 2001). While Common Ground and Arthur Morgan School have modeled highly decentralized, egalitarian systems of governance, we speculate that schools should be able to model social equity through a more traditional, hierarchical governance system as well, as long as there is some degree of transparency.
and democracy. Governance systems like that of Arthur Morgan and Common Ground are likely to be more problematic and less realistic in a large school, where the scale may necessitate some level of hierarchy for productivity and efficiency. Research suggests that people mainly want opportunities for their voices to be heard, and do not necessarily want to be in control (Kaplan and Kaplan 1982). It seems, therefore, that radical transformation of school governance may not be necessary for SE if effective systems are created to make student and faculty voices heard.

B. Administrative support
Support from the upper-level administration and trustees or school boards was repeatedly cited as not only crucial to making these programs function and allowing them to grow and develop, but also important in demonstrating a higher-level commitment to sustainability. This is consistent with the claims of SE experts (Ahlberg 1998; Rauch 1998). Arthur Morgan School was founded on the philosophy of social, ecological, and economic sustainability, and thus the Board of Trustees is highly supportive. The staff-run school eliminates the need to gain administrative support, since administration and teachers are one and the same. The Island School is largely autonomous as well. It remains under the founder’s leadership, and like Arthur Morgan School, was founded under the principles of sustainability. Because of this, The Island School has also enjoyed upper-level support for its programs.

Common Ground and Lakeside have both struggled to build support from the administration and the governing boards of the schools (School Board and Board of Trustees, respectively), with radically different success levels. Common Ground interviewees reported receiving no support from the administration for their programs. Faculty and students describe the relationship with the Berkeley High School administration as a constant struggle to get basic resources, such as books and other things absolutely needed to teach. Berkeley High has made minimal, if any, accommodations to facilitate field trips or projects, cornerstone elements of Common Ground’s teaching philosophy. Despite the lack of administrative support, Common Ground has succeeded in creating an alternative educational environment at Berkeley High because it has managed to establish some autonomy. There appears to be little modeling of or support for Common Ground’s sustainability efforts from the upper-level administration, however.

In contrast to Common Ground’s struggle with the administration, Lakeside’s Board of Trustees and administration have made public commitments to sustainability education at Lakeside. A Lakeside administrator highlighted this:

I think the thing that has been most impressive about all of these issues is that we got the school to make the commitment at the
highest levels to being a ‘conservation based school,’ which seems like a simple thing, but it’s not.

Similarly, a Lakeside faculty member identified this school commitment as one of the three most important things the school is doing to address sustainability issues, saying the “Head of School has given us permission to teach towards the mission statement.” In some cases administrative support for sustainability education translates into financial support at Lakeside. For example, they have a half-time position for the Ecological Studies Coordinator. In addition, they offer a financial reward to faculty who ride their bikes to school a certain number of days per year. Despite the apparent support from the administration for sustainability efforts, several faculty members expressed frustration that this support sometimes seems illusory, declared on paper, but not actively manifested in the daily decisions made in running the school. These faculty members felt that more active support, rather than merely a lack of resistance, would help move the program forward and better encourage reluctant teachers to engage more with sustainability issues in their courses. Students and teachers did express, however, that the administrative commitment to conservation in itself sets a good example for the community. This could serve as a model for other group commitments and even personal commitments to sustainability.

C. Facilities and operations
Leaders of the schools visited articulated three major reasons for working to make their facilities and operations more sustainable. The first is to teach students about sustainability through modeling. The second is to save money, and the third is to avoid hypocrisy or incongruence between the school’s teachings and actions. Failure to “practice what they preach” can generate skepticism and negative reactions to the school’s SE efforts.

These four schools demonstrate how campus facilities, infrastructure and operations can serve as powerful tools to teach students about environmental responsibility. When a school strives to make its facilities both sustainable and transparent (with the environmental considerations evident to students), an educator’s burden is partially lifted. Even without the participation of teachers, facilities help students learn through what several faculty referred to as “osmosis.” They serve as implicit teaching tools that once created, can constantly educate those who use them. An Island School administrator explained that their facilities play a crucial role in sustainability education, because they get the same messages across to students that teachers do, but without the risk of seeming preachy.

Green facilities also act as catalysts for student discussions about sustainability, giving students a tangible point of entry from which to formulate their own questions (e.g. “Why does the school use wood heat?”)
“How much food do we compost everyday?”) Transparency in the school’s efforts and operations is essential to making the facilities effective teaching tools. The Island School focuses heavily on transparency to ensure that the ecological, social, and economic benefits and impacts of the facilities and operations are clear to students and others. For example, one wall in their library displays monitoring panels that track the school’s power generation and consumption throughout the day. Similarly, students measure stored water levels and announce daily water use and how many days worth of water is available at current usage rates. Students at The Island School repeatedly cited the facilities and sustainable systems as important to their increased awareness and knowledge of sustainability issues.

A few of Lakeside’s ecological advocates see their efforts to green their facilities as teaching tools. Others, however, describe these efforts mainly as a way to make their words and actions more consistent, and thus seem to be less concerned with making operational greening transparent to students. The fact that Lakeside’s facilities greening efforts are not very visible or transparent became evident in our discussions with students and staff. For example, the people in charge of facilities and food services at Lakeside explained dozens of greening efforts they had implemented at the school. However, when students were asked about these efforts, even members of the Earth Corps club were only able to mention a few. The differing motives for green operations may help explain why these efforts appear to be less transparent to Lakeside students.

The presence of more sustainable facilities and operations on school campuses relates directly to the notion of living a sustainable lifestyle that many students find so powerful. While this arose most often in interviews with Island School and Arthur Morgan School community members (which are importantly both boarding programs), it is possible that the same idea would have been articulated at Lakeside if their facilities and operations were more transparent, and at Common Ground if they had more control over their facilities and operations.

Table 4 highlights some of the key efforts that these schools have made to lessen the environmental impact of their facilities and operations.
### Table 4: Greening efforts of school facilities and operations

#### Building Construction and Grounds
- Cordwood building (Island School): experimental green building made of native and reclaimed materials; primary construction material is casuarina wood, an invasive species on the island (cutting it has restored native habitat); local, traditional building processes used in combination with creative new methods; built by students and faculty
- Classroom buildings and living spaces (Arthur Morgan School): made partly of reclaimed materials; are visually unobtrusive in the landscape
- Landscaping (Lakeside): some use of native plants; no chemical fertilizers or pesticides; grass clippings are left on lawns; school compost used for mulching

#### Energy
- Solar and wind power (Island School): 150 photovoltaic panels; 6 solar hot-water heaters; wind-generator; interface with electrical grid to feed excess electricity back into grid; prominent display with on-going, real-time monitoring of energy production and consumption
- Energy efficiency and conservation (Island School): passive cooling systems (indoor plants, underground water piped through walls); natural lighting; area lighting and cooling; energy efficient appliances; personally altering comfort zones and re-evaluating personal needs
- Local and solar energy sources (Arthur Morgan School): passive solar and locally harvested wood heat; photovoltaic panels; active solar hot water heating in plans
- Biodiesel tractor (Arthur Morgan School): purchase of biodiesel tractor in plans
- Flexible gas heat (Lakeside): converted from oil to gas heat; area specific control of thermostats
- Lighting (Lakeside): motion sensors turn lighting on and off; all light bulbs replaced with high efficiency florescent ballasts

#### Water
- Rainwater collection and monitoring (Island School): rainwater collected from roofs into cisterns; cistern levels and water consumption reported daily by students
- Water conservation (Island School): toilets flushed only when absolutely necessary; low-flow showerheads; “navy-showers” with no more than 30 seconds of running water are the community norm and expectation; limited showering when water levels are low
- Water conservation (Lakeside): rain sensors on sprinkler system; plans to use divided trays in cafeteria instead of plates and bowls to reduce water use for dishwashing

#### Food
- Menu (Arthur Morgan School): vegetarian meals; organic, whole foods
- Food sources: (Arthur Morgan School, Common Ground, Island School): locally grown produce, some from school gardens; Island School is developing on-campus
production through permaculture gardens, and pigs.
- Canning (Arthur Morgan School): school’s garden produce is preserved for consumption after growing season

### Office and Cleaning/Maintenance Products
- Cleaning products (Arthur Morgan School and Island School): environmentally friendly cleaning products
- Paints (Island School and Lakeside): low or no VOCs (volatile organic compounds)
- Paper (Lakeside): emphasize use of electronic communications to reduce paper consumption; recycled paper napkins in cafeteria
- Product purchasing (Arthur Morgan School): maintenance and office supplies are purchased from local businesses

### Waste Management
- Composting (Island School, Arthur Morgan School, Lakeside): food and yard wastes are composted; traditional and vermiculture systems used; plans to purchase industrial scale composter at Lakeside
- Waste-water treatment (Island School): wetland garden processes waste water; solids settle out and are composted separately; photos of wetland hung in bathrooms to remind users of the resource loops
- Recycling (Common Ground, Arthur Morgan School, Lakeside): recycling programs for paper, bottles, cans, and cardboard

### Transportation
- Alternative transportation (Lakeside): active student campaign to encourage use of alternatives to single-occupancy vehicle transportation; financial incentives to faculty who bike to school; bike-to-school days twice a year

### D. Work programs and chores
In addition to using their schools to model sustainable practices, The Island School and Arthur Morgan School have consciously involved students with the work of running and maintaining the school facilities as part of their educational programs. Although both are boarding schools, it would certainly be possible to incorporate similar programs in a day school setting. At Arthur Morgan School, students receive academic credit for the work they do during the chore period. Their six hours per week of “Practical Life Skills” chores, in combination with student work projects, meet the state requirement for a home economics class. At both The Island School and Arthur Morgan School, students are responsible for about 30 minutes of chores per day, which rotate between students. It is remarkable to see how much work can be accomplished in this short time, demonstrating to students the power of collective effort. Neither school employs a custodial staff. Thus, the students and faculty become the caretakers of the schools. In doing so, they assume
responsibility for jobs such as cleaning the bathrooms, sweeping common areas, washing the dishes, collecting trash, recycling, composting, and caring for school animals. In addition, students at both schools take part in longer work projects in the afternoons that involve on-going maintenance, building construction, office administration, cooking, gardening, and community work.

Student involvement in caretaking appears to serve three main purposes related to SE: 1) it increases transparency, 2) it gives students ownership and responsibility, and 3) it elevates the value of physical work. By increasing the transparency of the school’s operations, the waste, consumption, inequities, and actual economics of running the school are made more visible and tangible to students. As an Island School administrator pointed out,

So much is hidden on a traditional campus… We want to try to be seamless, and let students see how we use resources and where our waste goes… They don’t just - you know - watch someone else take the trash out of the classroom or out of the kitchen. You know, they actually take the trash out and then they see where it builds up and they work with faculty to think of ways of how we can reuse waste.

A teacher at Arthur Morgan School echoed these thoughts, saying,

Work projects make them more involved with their environment – where their resources come from and where their waste goes… Everyone works to maintain the school. There is a natural tendency to become aware of how your life impacts the place that you live and the land that you’re on since we are the ones who mow the lawn and clean the septic system. We talk about our watershed all the time – where our water comes from and where wastewater goes.

The second purpose for involving students in school caretaking is that it gives them the ownership and responsibility for stewardship of their place. It asks them to consider how they treat the place they live and demands that they hold both themselves and one another accountable for their impacts on their place and community. When The Island School was first started, a custodian was hired. Finding students disrespectful of their place when they had someone else cleaning up after them, the school decided to terminate the custodial position. An Island School administrator described to us:

[Now] students are doing things. They’re taking care of the place. I mean, if someone else is coming in to clean the bathroom, the level of responsibility that the student, you know, shows that space is not as great as if they and their peers have to do it. So,
you know, it’s like a kid going to another kid, ‘Hey, you made a mess of the shower,’ or ‘you never pick up your wet clothes,’ … rather than… someone just coming in and showing that it’s their job to pick up after the kids. And, especially where a lot of these kids are coming from, that’s not happening.

Several interviewees explained that the personal investment students make by being the caretakers of their school buildings and campus often tends to translate into a deeper commitment to their physical place. Largely as a result of taking such responsibility for their place, work programs tend to help students develop a sense of ownership. At The Island School,

students take responsibility, ownership for their immediate environment because they are responsible for cleaning the bathrooms, measuring how much water is in the cistern, you know, helping prepare food, helping grow food…The students are involved in making this place function and grow. So, as they leave at the end of the semester, there are buildings that have been built – you know, the new cordwood building – and there are systems that are in place that they have played a role in bringing on-board. And that ownership and responsibility goes a long way, again, toward raising the bar, or making the student feel like they are really doing something…The school would not function… without student input. (Island School administrator)

Finally, students’ realization that their own work keeps the school running elevates the value of physical work, helping them respect all kinds of work. Although this was not specifically mentioned at the schools, observations of students suggest it is the case. Students work readily and willingly alongside their faculty work leaders. Doing physical work is not seen as a punishment at Arthur Morgan School and The Island School, as it so often is in other schools. Involving students in this physical work develops in them a respect for the work people do with their hands as well as the work people do with their heads. In doing so, students learn to respect different social classes and occupations – a potentially important ingredient to internalizing a commitment to social equity.

E. Living in community
The Island School and Arthur Morgan School have the advantage of being residential programs, providing the students with a more consistent environment to support learning about sustainability than they would otherwise have. Both of these schools are physically isolated from the surrounding communities, so they focus internally to build community. This gives the schools more control over the external influences on students. Students and faculty at both schools mentioned the difficulty of teaching sustainability concepts and behaviors when there is a lot of interaction with mainstream society. When asked if it would make a difference whether a school teaching about sustainability was a boarding or day school, an Island
School student responded, “It would be hard to do in a day setting. I think being removed would be really important. Given the nature of what you are trying to teach and the nature of society, I think it would be difficult.”

The boarding setting allows the students to receive a more consistent message regarding lifestyle choices related to sustainability. On a daily basis, students have the chance to live a different kind of lifestyle than they might at home. By living on campus, students are immersed in the cultural, social, and physical realities of the school. They are asked to adopt certain behaviors while at these schools, such as composting, water conservation measures, and cleaning responsibilities. In addition, students agree to participate in community meetings and conflict resolution and decision-making processes. This immersion appears to support students in trying new behaviors that are often related to sustainability. One student at The Island School explained why living there makes learning about sustainability easier for her:

The boarding setting makes [learning about sustainability] a lot easier. It’s harder to convert an entire family with these ideas. When you are just learning about it and you’re not really sure what it is about, it’s hard to have it sink in. Here, you can immerse yourself in it, so you can pick up on everything. In a regular school when you go home, you just carry on with your normal lives, but here you have to be attentive to it. You can’t get away from it.

The boarding setting also appears to make community building easier, which is an important goal of each of the schools we visited. Another Island School student described the community experience there:

Community is stressed here beyond everything else. It comes first… It’s as tight a community as I’ve ever been in. At [my home] school, it’s a community to a certain extent, but you don’t really know everyone’s name or care about them. Here it’s a necessity to know everyone’s name and care about them… You are constantly involved in each other’s lives.

An Arthur Morgan School student commented on the importance of community to SE, assigning, “equal or almost equal importance of natural environment and human community components. The natural component is pretty essential but the community component is very essential.”

Living on campus seems to facilitate the community building process because students and faculty are interacting in formal and non-formal settings. The schools have traditions and ceremonies that help build the sense of community. For example, The Island School students and faculty all exercise together every morning before breakfast, and later, they stand
outside in a circle, sing the Bahamian national anthem, and share reflections. Similarly, the Arthur Morgan School community gathers every morning for thirty minutes of singing before daily announcements. At both schools, regular school meetings are included in the daily or weekly schedule. The process of living and learning together, having to resolve differences and find ways to support and have fun with one another pushes students to confront issues of equity, respect, and tolerance. As several interviewees explained, students and faculty cannot simply retreat to their homes away from school to avoid social issues that arise, and so they learn how to confront and resolve these issues.

The small size of The Island School and Arthur Morgan School also appears to facilitate the community building process. Lakeside and Common Ground certainly uphold the ideal of community, as well. However, the larger scale of the schools and the fact that they are day programs makes building a cohesive, tight community more challenging.

F. Personal relationships
Close student-teacher relationship were the norm at Arthur Morgan School, Common Ground, and The Island School, as evidenced in our observations of the interactions between students and teachers and in interviews and informal conversations with students and faculty members. At these schools many students expressed that their teachers are their friends, mentors, and sometimes even equated them with parents. Students call teachers by their first names and spend informal time outside of class talking, playing, and relaxing with them.

Several teachers and students at Arthur Morgan School and Common Ground talked about the importance of close student-faculty relationships to their SE efforts, though few clearly conveyed why or how these relationships support SE. In trying to articulate why these relationships are important to SE, one Common Ground teacher explained, “the whole school pivots around the tight relationship between the elders and the youngers…. [These relationships] open up the realm of talking about more ethical questions.” By exploring their own values and attitudes and those of sustainability-minded teachers whom they know well and respect, students may be more likely to challenge some mainstream attitudes in favor of those more in line with sustainability. A Common Ground Student also noted, “The fact that we are so close with our teachers does facilitate that type of conversation… about sustainability, the future, and how we should live our lives.” Such personal discussions of both values and lifestyle choices suggest that students are internalizing the concepts of sustainability – thinking about applying what they have learned to their own lives.

These discussions are likely to be sparked by faculty who role-model sustainable behaviors. For some teachers, awareness of being a role model can actually drive them to become better role models of sustainable lifestyles. An Arthur Morgan School teacher described this happening to her:
There’s no way I can teach all the time actively, but I can model all the time. It’s like working with 25 mirrors – they [the students] show you yourself so clearly – you can’t get away from it. You can’t be dishonest to yourself. It brings out the most honest kind of living that I’ve ever done…You have to practice what you preach.

It is important to note, however, that not all teachers necessarily model behaviors or attitudes supportive of sustainability, yet these teachers may form equally close relationships with students. Thus, while close student-faculty relationships have the potential to be effective teaching tools for SE, whether or not the relationships support SE depends upon whether the teachers are modeling sustainability.

V. School Culture

Culture, often described as the shared, underlying values, beliefs, norms of behavior, and assumptions about the way things work within a community (Schein 1985; Project Lead 1988), can support sustainability initiatives and education, or can work against them. Schools have a culture unto themselves, which is embedded in the culture of the broader community. Faculty and administrators at the study schools identified both school culture and the broader culture of society as important to the messages that students are receiving about sustainability. For example, one Arthur Morgan School administrator said:

The school has a tradition behind it of … creating a culture that can live with the environment more sustainably… it is this unconscious asset that we have… It can be hard to maintain what we think of as a sustainable culture – especially hard if you have too much contact with the mainstream culture. For us, our isolation from mainstream society supports sustainability. (Arthur Morgan School administrator)

If one of the goals of SE is individual behavior change, the cultural setting may be a critical element in achieving this goal. The traditional behavior change model from the field of environmental education, stating that knowledge leads to behavior change, has been demonstrated to be inadequate in describing the process leading to behavior change (Hungerford and Volk 1990). Other behavior models have included “situational factors” (Hines et al. 1986-87) and “subjective norms” (Azjen and Fishbein 1980; Azjen 1991) as important factors influencing individual level behavior. Situational factors are defined more broadly than culture, including things such as “economic constraints, social pressures and opportunities to choose different actions” (Hines et al. 1986-87), but certainly include elements of culture as well. Likewise, subjective norms, defined as the “perception of social pressures to
perform or not perform the behavior.” (Azjen and Fishbein 1980) also have elements of culture. This suggests that the cultural environment is an important influence on students, especially on encouraging them to adopt alternative behaviors that are more environmentally and socially responsible.

A. The opportunity of school culture
The influence that culture has on people’s actions, thoughts, and feelings makes it an important and powerful teaching tool (Peterson 1996). Culture’s norms are so familiar that few of us consciously realize they are there (Finnan and Levin 1998; Erikson 1987). Additionally, culture is pervasive, providing a constant source of influence on the school community. In contrast, the curriculum, activities, and programs are only experienced in discrete chunks of time, and can be set aside at other times. While schools may be unable to change the culture in which students are immersed outside of school, they can work to make the school culture supportive of their SE goals.

School culture is manifested in diverse ways, through rituals, traditions, and customs, through buildings, programs, instructional methods, and extracurricular activities (Stine 2000) and also in the school’s “institutional norms, social structures, cause-belief statements, values, and goals” (Banks 1993). For example, Common Ground’s sustainability culture (one of several sub-cultures in the school) asks those who are part of it to question mainstream culture’s norms and practices, particularly with respect to materialism, power structures, educational paradigms, and social and environmental justice. This culture is imbued with a drive towards justice and equity in society. These cultural norms are manifested in part in the mission and goals of the school, which was founded to teach about environmental and social justice. At Common Ground, the expectation that community members will question why and how existing systems do or do not work creates an environment supportive of SE. Similarly, Arthur Morgan School’s culture of simple living is manifested in their humble buildings and lack of concern (in some cases, contempt) for material wealth. Again, such a culture supports SE. Importantly, a school’s culture can be manifested or defined as much by what the school does not talk about or include in its curriculum, the “null curriculum” (Eisner 1985), as what it does. Thus, the lack of emphasis on material wealth at Arthur Morgan School is as important as their deliberate use and discussion of non-violent, alternative conflict resolution in defining the school’s culture.

As a subtle, less overt means of educating, culture may succeed where other methods are less effective, particularly in eliciting environmentally and socially responsible behaviors and thought patterns. If students feel that sustainable behaviors are acceptable (rather than being directly told to engage in them), we speculate that they are more likely to adopt such behaviors. While nobody likes to be told what to do, people want to feel accepted by their peers. The desire of adolescents to find acceptance within their peer group is particularly high (Newman and Newman 2001). Thus, creating
cultural norms consistent with sustainability may help schools further their SE goals. Furthermore, culture may be effective at helping students transfer the concepts and ideas of sustainability from abstract applications to ‘others,’ to a more personal application to themselves. In other words, culture may be one way to make sustainability come alive within the students’ own lives.

B. The challenge of school culture
Because culture is pervasive and can have a strong influence on thoughts and actions, a school culture that is not supportive of a school’s SE efforts may present a genuine challenge to a program’s success. Lakeside, more than any of the other schools, identified their school culture as a barrier to their conservation-based initiatives. While a few administrators feel that conservation pervades most school thinking and decision making, more interviewees thought that the school’s culture was out-of-sync with its conservation goals. Lakeside faces the additional challenge of building a culture supportive of SE from within a pre-existing school. This process of cultural transformation is, perhaps, more difficult than the creation of a new culture because of culture’s “long range stability” (Schein 1985, p. 245), making it difficult to change once formed. Yet, several Lakeside teachers and administrators recognized a need for school culture transformation in order to take their conservation-based initiatives to the next level.

I think we’ve built support within the culture, to a degree. I think we’ve done some educational awareness…we’ve done that pretty well. But I think for it to live as a real element of the school and to have the outcomes - to have students leaving here with a different mindset than when they came, that’s the next and bigger step… internalizing it and making it part of the fabric of the school. (Lakeside administrator)

Two particular elements of the school culture emerged out of these conversations at Lakeside. First, several people suggested that the definition of success at the school does not support their SE initiatives. A Lakeside teacher explained, “It’s hard to promote sustainability within a school that has a very traditional definition of success, teaching methods, schedule, and grading system.” Similarly, an administrator described the definition of success at the school as a key resource that they were not able to use at this point.

The definition of success is a huge resource here. And right now that resource is being used on college preparatory education, SAT scores, AP scores… that’s the coin of the realm… If we were able to co-opt that resource and make the coin of the realm awareness, critical thought, social ethical development, or ethically compatible behavior… those are the resources that we need next… That’s a huge cultural shift, and it’s not an easy one. I mean, it’s one that is anti-societal in some ways. (Lakeside administrator)
Neither interviewee offered further explanation of the conflict between the definition of success embedded in the school’s culture and their conservation-based goals. These comments seem to imply, however, that if students are to leave the school “with an altered mindset” towards sustainability, the school culture needs to value that way of thinking and identify it with success. The current definition of success seems to have little to do with this. This is not meant to imply that academic achievement and a drive to excel are at odds with SE. The Island School, where serious academic achievement and sustainability go hand-in-hand, demonstrates that this is not the case. Rather, the cultural focus at Lakeside on grades, standardized test scores, and college acceptances\(^\text{10}\) may not be pushing students to engage as personally with SE as they might if the school culture placed greater value on social and ethical development and behavior.

Perhaps partly related to their definition of success, Lakeside also seems to have developed a “culture of oversubscription.” Almost everyone there seems to be incredibly busy, and feels an expectation to be so. Schedules are packed with demanding classes, sports, and extracurricular activities. Students and faculty tend to eat meals in a hurry, many students packing their schedules so full that they do not even have a lunch period. According to a Lakeside administrator, a group of outside evaluators from the Pacific Northwest Association of Independent Schools commented on this in their report to Lakeside, saying the schools is “too busy to understand itself.” A Lakeside teacher reflected on the impact of this cultural phenomenon on students.

I think the school culture to really oversubscribe yourself in terms of activities inhibits it [SE efforts]. And the activities are academics and athletics and the arts. And all those have a lot of value, but I think there’s not an obvious other track where a kid can go to explore something else. And there’s pressure from their parents, pressure from their peers, pressure from themselves, all … directed towards [getting] into a really good college.

(Lakeside teacher)

This teacher seems to be saying that the pressure on student to participate in these more traditional activities limits their opportunities to explore

\(^{10}\) The emphasis on grades, scores, and college acceptances as measures of success may have emerged partly out of the assessment systems used at schools. Because grades, scores, and college acceptances are frequently the only sources of feedback that students, families, and the school itself get regarding the strength of their academics, it makes sense that these become the defining factors for success. Instituting alternative methods of assessment and feedback, or using grades in a different way, with greater emphasis on demonstration of ethical and social development, etc. may be one way to begin to shift cultural definitions of success at the institutional level. One Lakeside student envisioned this, saying, “Imagine what the difference would be if our GPA’s were affected by how much we recycle.”
alternative interests. It may also be the case that the hectic pace of life at the school limits the amount of time students have to reflect on sustainability-related issues, and consider alternative options to the status quo. As a Lakeside administrator explained, “The kids need to walk away owning this stuff, and I think you do that through reflection.” When asked if reflection could be built into the program, he continued:

   Yes… but I think that is still structural. It’s a step – and it’s a step that has to happen, I think, organically. The student culture has to develop to the point where not only is it just sort of required, but ‘that’s what we do here’… it’s the students who are teaching each other that – and that’s a cultural shift.

All of the study schools recognize the importance of reflection in processing and internalizing the lessons related to sustainability. The other three schools have chosen to build time for reflection into their programs, approaching this from a structural perspective. At the same time, the fact that personal connections to sustainability comes up in both classroom and informal conversations at Arthur Morgan School, The Island School, and Common Ground suggests that they have succeeded in moving this kind of thinking into the culture of their schools, perhaps in part because they have structured their programs to encourage it.

Another cultural element that all the schools contend with in some way is the culture of consumption and materialism that is so dominant in the United States. A Lakeside faculty member described this:

   We serve a very privileged group of kids. Their consumer mentality is unbelievable. They drive here in their SUV’s, live in 4000 square foot homes, and then recycle a can. In general, the kids don’t see any care for the earth modeled for them. It is hard to make them see a different way of thinking when the pressure from home and peers is to do the opposite.

While a school may not actively promote a culture of consumption within its own walls, not actively discouraging it may, in this case, be a case of the null curriculum working against sustainability goals. Some of the study schools have chosen to counter this cultural pressure by building school cultures that deliberately step away from consumption. They have worked to build this into their culture through deliberate decisions such as building simple buildings, limiting access to television, and recasting old traditions in a new light – as Arthur Morgan School does with the school prom (see school description).

The challenges that both school culture and societal culture present are likely to be felt in some way by most schools seeking to implement major SE initiatives. However, these challenges should not deter schools from
incorporating SE into their programs. An administrator at Lakeside suggested that the way to shift the culture of the school was to put in place as many structural pieces, such as courses, extra-curricular activities, speakers, and changes in school operations that would convey their conservation message as possible. Eventually, he surmised, the school would hit a “tipping point” and the culture would follow the structure. Whether or not this theory is correct, the exposure students get to SE through all the structural pieces is as important an element to SE as a supportive culture, and something that any school can incorporate in their program in some way. Schools should, however, be aware of the role that the school’s culture can play in supporting or inhibiting their SE efforts.

C. Building school culture

Much of the literature on school culture suggests that traditions, rituals, and ceremonies are effective and important ways to establish culture (Stine 2000, Peterson 1996) and embed it in an institution. This was evident at several of the study schools. For example, by reporting cistern water levels every morning to the community, the Island School helps create a culture that is attuned to resource use. It becomes embedded in their way of thinking and functioning throughout the day. At Arthur Morgan School, school-wide participation in daily chores contributes to cultural norms of respect and care for their physical place. Lakeside is currently working to shift its culture by establishing new traditions and ceremonies. For example, several times a year at Lakeside’s Upper School, students have the opportunity in all-school assembly to acknowledge their gratitude to someone else at the school for something they have done. According to one of the administrators there, this public display of appreciation is part of Lakeside’s effort to cultivate an “attitude of gratitude” in its student body and to make this way of thinking part of the school’s culture.

Because culture develops from shared beliefs, norms, and values, self-selecting group members can also be an effective means of establishing a particular culture. This was readily acknowledged among the study schools, where school leaders suggested that their ability or lack thereof to select students and faculty with inclinations towards sustainability influenced the culture of their program and overall success at SE. A few key individuals early in the process of cultural transformation or culture formation can be instrumental. However, there is a danger in relying too heavily on key individuals to carry a program, and a true cultural shift is rarely the result of the presence of a single person. Ultimately, the shift must happen at a deeper level so that the culture lasts following the departure of these individuals. An Arthur Morgan School administrator touched on this while sharing his thoughts on developing school culture:

Having a few hand-picked kids [or faculty] the first few years would really help create this little seed culture. It’s like yeast – whatever you bring in will build and build and build… ideals
can’t be plopped out of nowhere. You can’t make them ideals just by saying they are. They have to emerge from the school history.

As this administrator pointed out, a school cannot just decide that a particular value or way of thinking is part of their culture. A shifting culture must be built on existing values and ideals, or emerge out of newly found but shared values or ways of thinking. Thus, in transforming a school culture, there should be a balance between new traditions and new blood, and building from the strengths of the school’s existing values and ideals.
Chapter 4: Impacts And Challenges

I. Impacts on Students
The sustainability education methods used by schools become meaningful in examining how they impact their students. Impacts on students are hard to examine, however, largely because the most important effects of sustainability education should become evident predominantly in the long-term future through students’ career and lifestyle choices and decision-making processes and priorities. Furthermore, without gathering longitudinal data or conducting a formal or quantitative evaluation of program outcomes, we are limited in the claims we can make about the impacts or the effectiveness of any given program or method. In addition, we are not able to establish causal links based on the study’s data. Specifically, it was often difficult to distinguish whether an impact on a particular student was primarily due to the school’s SE efforts, or to experiences outside of school. There is likely to be a strong selection bias affecting the results of our study as well.\(^{11}\) Despite the many limitations of the research, there is still much that can be said about the schools’ impacts on students.

The following section explains the impacts that the schools are having on students, which appear to result largely from the schools’ SE emphasis. Many students at these schools have an increased awareness of and interest in sustainability-related issues. In some cases, this awareness translated into a feeling of personal responsibility for the issues and a sense of empowerment, with students expressing that they felt able to make a difference as individuals. Just as students at the study schools are gaining new perspectives on the issues surrounding sustainability, some are also seeing their educations in a new light. Students are developing a sense of responsibility and ownership for their school experience and learning, a reflection of the general educational strength of these programs. These programs are also leading some students to take action to help solve sustainability-related problems. For most, these are relatively small behavior changes, but in some cases, students have had transformative experiences, leading them to alter their career paths and even their worldviews.

A. Engaging with the issues – awareness and responsibility
At a minimum, the schools have succeeded in raising awareness of sustainability issues among most of their students and engaging students with

\(^{11}\) While most students probably do not choose these schools because of the sustainability focus, we found that many of the students (and their families) at Common Ground, The Island School, and Arthur Morgan, come from liberal backgrounds. Furthermore, many of them were searching for an alternative educational experience, a factor likely to predispose these students to being more responsive to sustainability education. Lakeside students and parents, however, generally choose the school because of its excellent academic reputation, and while school leaders describe most of the parents as “relatively liberal,” it appears that few have chosen Lakeside because of factors related to sustainability education.
the issues. The following statements from students at each of the four schools convey this heightened awareness and engagement:

I was definitely not interested in social and environmental things before I came here. I started paying much more attention to it since I’ve been here. I notice garbage on the side of the road now and think it’s a bummer when I didn’t used to think much of it. (Arthur Morgan School student)

Common Ground definitely had an impact on me. I was more interested in social justice issues before, but not the environment. Common Ground has brought in the environmental side for me. (Common Ground student)

At home, you don’t really think about it. Every day I take a shower, and eat commercially grown food. Here you pay attention to sustainability with everyday rituals and community. Everyone is more aware now. That interest developed here. (Island School student)

We have a bunch of courses that focus on these things and make us aware of it. I’ve only taken a few of these courses, but they have definitely made me more aware. (Lakeside student)

For some students, this awareness has translated into a deeper feeling of personal responsibility for sustainability issues. As one student at AMS said, “I think about the consequences of my daily decisions more since I’ve been here… partly because the school places a lot of responsibility on us, and we get used to that.” An Island School student echoed this feeling of responsibility:

We’re responsible for the energy or water that we use. If we use it up, it’s our fault and we feel the impact of it, so we make decisions like everyone not taking a shower for a few days. We realize it’s our own responsibility – that we each individually have an impact, instead of saying that it is someone else’s fault or responsibility.

In the minds of many students, these programs are a starting point, not an endpoint, for their interest and exploration of sustainability and what it means to them personally. This was particularly true at The Island School, perhaps because this semester experience was the first exposure most of these students have had to the ideas of sustainability. Knowing that their time there would end shortly, Island School students saw exposure to sustainability as a base from which to further explore the issues once they returned home.
Before I came here, I couldn’t have cared less [about sustainability]. Now I’d say I care a lot more. I still have lots of questions and lots to learn before I could say I am really into sustainable living and that when I go back to the US, I’m still going to navy shower… This isn’t supposed to change your mind so much as it is planting a seed. Right now I’m sixteen, and yeah, I can do some stuff, but the important thing is that I now have a core knowledge and I will grow with that. I am empowered and will also grow with that. A large-scale effect can be had if I continue to grow with this and implement it. (Island School Student)

I’m growing more into [sustainability] as I learn more about it. I used to think vegetarians were crazy, but I’m realizing things now – how 90% of grain is fed to cattle – and I think the education I’ve received on these things has totally changed my mind on issues. This is serious stuff. I am passionate about it, and I’d like to continue learning about this stuff. (Island School Student)

While the vast majority of students at all four schools appear to have a heightened awareness of the issues, it was difficult to gauge how pervasive the feelings of ownership and responsibility for the issues were at the different schools. At each school, a handful of students articulated or clearly demonstrated a sense of personal responsibility for sustainability. Informal discussions with students and observations of the schools suggested that there are more students than just the obvious handful that are engaging with the issues, but certainly not all students are. One teacher at Common Ground estimated that only one-third to one-half of all students there were “actually actively participating in everything that is going on” - a sound reminder that all students are not becoming fully engaged. Yet, to engage even one-third of 400 students in thinking about sustainability is a notable outcome. A greater proportion of Arthur Morgan School and Island School students appear to be highly engaged.

B. Students owning their education
Student ownership of their education is frequently cited as an important outcome of SE in the literature (Tilbury 1995; Cooper 1997). Both through the level of responsibility given to students, and through experiential, student-centered teaching methods, the study schools have generally succeeded in getting students to take ownership for their educations, and in giving students with strengths in different areas the opportunity to use and develop these. This is manifested through a renewed excitement for school and learning, a sense of empowerment, and more positive school experiences for students who have struggled in traditional educational environments. These effects were seen most dramatically at Arthur Morgan School, The Island School, and Common Ground.
Part of this ownership seems to stem from the input that the schools give students into the content of their education. One student said, “It’s so cool how at Common Ground, we get to decide what we want to learn.” An Arthur Morgan student had similar sentiments:

Before the new class term begins, the teachers ask us what we want to learn, what classes and electives we want offered, and then they actually take our advice. [This year], they offered a baking elective, spring sojourns and play electives because of student demand.

Student ownership and responsibility for learning extends beyond the classroom as well. At Common Ground and Arthur Morgan School, the level of influence that students have on school decisions gives them the freedom to take on projects such as organizing guest speakers or multi-day school trips. Many students seize these opportunities and seek them out. For example, when students at Arthur Morgan School wanted to take a five-day field trip and the faculty said they did not have the time to organize it, the students took on the job. An administrator explained the process:

The students asked if they could organize it themselves... They did it all on their own with minimal if any staff involvement, led by three 9th graders. When they made an announcement, everyone helped out to take a job. It was so well organized. Staff sat back and let it happen. They made a tent sleeping chart, a supervision list... They foresaw all possible problems. (Arthur Morgan School administrator)

Several Common Ground students demonstrated a feeling of ownership for their education when they went before the School Board to protest the proposed elimination of the block scheduling system in Common Ground, arguing that elimination of the block schedule would compromise the school’s educational quality. One Common Ground student expressed:

A lot of responsibility is given to students who show they can take it. Even the development of our school was as much student-run as it was teacher run, if not more… Teachers will listen to us – our voices are respected.

Students at both the Island School and Common Ground reported that these schools have changed the way that they view their education, largely because of the focus on authentic learning. They explained that the authentic purpose and application of their education makes it more relevant to their lives and helps them feel like they are contributing. One Island School student explained that she now feels that learning just for the sake of learning is almost selfish, explaining that there are so many ways to help the community
and learn at the same time: “it just makes so much more sense to learn like that.” Similarly, one Common Ground senior said:

[New SE programs should include] community projects – learning by doing things that help the community. It’s so useless to learn [math] formulas, but great to learn it if it’s to wire electricity for a solar-powered community center.

These comments suggest that the schools make some students feel like more than high-school students – they realize they are useful citizens who can make a difference. Even those students who have struggled in traditional school setting in the past are finding that the SE programs allow them to participate in their educations in new ways. One teacher at Common Ground described the following:

In the classroom… all this classism develops. Get out of the classroom and put a shovel in someone’s hand and all of that changes. The kids who are the biggest pain… in the classroom are no problem when you get them out of the classroom and change the setting and structure.

One Common Ground student explained that many students like himself would not be succeeding without small schools: “If I have problems, I can talk to my teachers, but in the big school, I didn’t feel comfortable talking to the teachers. The teachers here are so much more open. In the big school, I’d wander off in the crowd.” The ability of these schools to help struggling students appears to have more to do with the smaller scale, and the alternative, constructivist\(^\text{12}\) approach to education, than the content of sustainability.

SE experts generally advocate a constructivist approach to SE\(^\text{13}\). Furthermore, constructivism may even be an inherent characteristic of SE, or of successful SE, though assessing this is beyond the scope of this study. It is likely that student ownership of their education in general is as much a product of the constructivist methods employed as it is a result of a focus on sustainability. It is probable, for example, that a school using highly constructivist methods but instead focusing primarily on the arts, might shape students who take equally impressive ownership of their education.

\(^{12}\) Common characteristics of teaching methods associated with the constructivist learning philosophy include the following: high levels of student participation and cooperation; allowing students to drive lessons and shift content; student autonomy and initiative; encouraging student inquiry; and working on authentic, current problems (Hoy and Miskel 2001).

\(^{13}\) While the term constructivism rarely appears in the SE literature, many SE experts describe SE using the above characteristics of constructivism, with words like “learner-centered,” “experiential,” “participatory,” “inquiry-based,” and “authentic” (Hesselink et al. 2000; Rausch 1998; Sterling 2001).
C. Taking action for a more sustainable world

The empowerment, awareness, knowledge, skills, and attitudes that students develop at these schools often prompts them to take action to help make their schools, lives, and their communities more sustainable. All of the schools provide opportunities for students to work to solve sustainability issues, at times requiring some level of participation. The approach to action taken by the four schools prepares students for different kinds of participation in the sustainability movement. Common Ground and Arthur Morgan School appear to have more of an activist approach, preparing students to engage in the political process and in social action and organizing, but not requiring students to participate in activism. Students at these schools have opportunities to attend lobbying workshops in Washington, DC, peace rallies and protests, and to work in their local communities on environmental and social justice issues. In contrast, The Island School and Lakeside take a more scientific and academic approach to the issues. Students at The Island School participate in resolving sustainability issues through the technologies and lifestyle at the school, and through the science and humanities research projects (which also involve implementation). At Lakeside, students engage with the issues primarily through their academic classes, as well as through required community service opportunities, some of which focus on sustainability.

Some students at each school are particularly engaged in taking action, and have internalized these behaviors and translated them to other areas of their lives, as well. When asked whether their SE experience at school influences either their small daily choices or will influence larger, future decisions regarding careers and lifestyles, most students interviewed (17 out of 24) said that it does or will, and described actions they are taking or intend to take:

Yes, certainly [it influences my choices]. Like the things I eat now. After Environmental Science, I will never eat fast food again. And recycling. (Common Ground student)

Down here it [SE] undoubtedly affects my choices. At home we’ll see if it does. If I were to go into business, I would definitely keep it in mind. If I were building a building, I would keep Amory Lovins’ ideas in mind…I think that it will affect little decisions too, like what I buy – cleaning products, health care products. (Island School student)

I’m going to start composting at home, and recycling…I’m more cautious about buying aerosol cans. I thought they could be recycled but they can’t here. (Arthur Morgan School Student)
I often go home and do the stuff I do at Lakeside, like recycling and picking out efficient light bulbs, and for social issues it brings more of an awareness. When I’m talking with friends not from Lakeside, I draw on debates from Lakeside. (Lakeside student)

These students are translating the responsibility they feel for these issues into action, and demonstrating empowerment with regards to sustainability-related issues. While our inability to conduct a longitudinal study or interview alumni means that we do not have data on the long-term impacts of on students, there is some evidence that student engagement with the issues lasts, at least in some cases. One Island School faculty member who recruits for the school noticed this from his visits with former students:

I’ve seen the kids a year after the semester still paying attention to these things and trying to implement what they have learned here back at their own schools. They are going beyond things like starting a recycling club to doing things like trying to affect their school’s curriculum, which is really hard for a 16 year old kid. This is really what we want to have happen.

From recycling to the more difficult work of changing school curriculum or integrating sustainability into business ventures, the actions of these students speak to the potential these programs have to motivate students and make them feel like their actions can make a difference. A handful of students mentioned that their school has made them interested in pursuing a new career path. For example, one Common Ground student who had been struggling in Berkeley High explained, “once you start learning about it [sustainability], it becomes a part of you… I want to work as an arborist, working with trees, so I’m studying about that now.” Some students expressed that these programs have sparked their imaginations, profoundly shifting their worldviews, life ambitions, and self-perceptions to include and address sustainability issues.

A Common Ground senior said the following about her experience:

Common Ground has changed the way I look at the world…it’s changed the way I want to live for the rest of my life. [I’ve had a] complete change of focus, from wanting to be a rich lawyer to wanting to live a full life, and helping the world. (Common Ground student)

The following quotations from students at Common Ground, the Island School, and Arthur Morgan school communicate similar experiences:

Being here has made me so passionate about social equity and teaching people about sustainability…The whole experience has
helped me decide what I want to do with my life, and what kind of life I want to lead… I feel like there’s so much I need to do… to make the world more sustainable and more equitable. (Common Ground student)

[The Island School] has made me totally excited about sustainability, and it has changed the way I see the world… I am amazed at how far a little education can go. Just imagine if every high schooler learned about these ideas of sustainability what a different world it would be – real change would happen. (Island School student)

Coming down here opened my eyes to all the possible things I can do to make a difference. [It] has broadened my scope of what I could do and made me more confident in what I know I can do… The Island School has really made me realize that I love marine science and conservation. It’s scary to think this might be what I’ll end up doing, but I’ve become more confident in that. (Island School student)

My dream has always been to have a really big fancy house with maids, but now I want a little cottage in the woods and to ride my bike places… Now I’d like to be a teacher, and I’d like to come here and work for AMS… I [used to want to] be an interior decorator. (Arthur Morgan School student)

Clearly, these programs have had life-altering impacts on some students. However, these experiences were the exception, rather than the norm, and some of the above students might have started down a similar path had their school not exposed them to sustainability education. While we are unable to confidently differentiate between student impacts that resulted directly from their schools’ SE focus and other influences and experiences students may have had, these programs certainly appear to have a powerful influence on some students.

Our interviews and observations revealed that most students have not revolutionized their worldview, altered their career path, or significantly changed their lifestyle as a result of their schools’ focus on sustainability. A few even reported decreased interest in or awareness of these issues since entering their school.

Some of the students will probably not realize how the school has affected them until later in life. As one Island School student explained, “There are 38 great people here with core knowledge and passion growing in them who are destined to do great things. The spillover effect thirty years from now will be massive.”
Many of the impacts on students described above were visible at Arthur Morgan School, The Island School, and Common Ground, but were somewhat less evident at Lakeside. Lakeside students did demonstrate a drive for academic excellence and were engaged in sustainability-related efforts through their courses. Yet, despite the numerous initiatives and program elements that they have put in place, Lakeside is not generally seeing the impacts on students to the degree that they were apparent at the other three schools. Possible reasons for these differences in student impacts are discussed in the sections on School Culture (above – Chapter 3) and Program Challenges (below).

II. Program Challenges
The implementation of SE programs in schools entails inevitable challenges. In addition to the challenges that school culture and mainstream culture can create (discussed previously in Chapter 3), administrators and teachers at the four schools described the following major challenges to their SE efforts: lack of time, diverging from traditional pedagogy and curriculum, faculty lifestyles and turnover, and student apathy.

A. Lack of time – a logistical challenge
Time as a limited resource is a challenge that all schools face on a regular basis. In the course of a school day or school year, it is nearly impossible to meet the multiple demands and agendas expected of schools. The time requirements of sustainability education are many, some immediate, and some long-term. Limited time makes it difficult to include the breadth and depth of curricular content to which many aspire. In addition, time constraints limit opportunities for field study, professional development and planning, and unstructured “downtime” for students.

*Time within the curriculum:* The challenge of how to fit SE into an already packed curriculum has been addressed in different ways by the study schools. The Island School minimizes curricular demands by enrolling students for just one semester, making a conscious choice to pursue depth in a limited and focused curriculum, rather than breadth of coverage in many areas. The school is able to keep their curriculum focused both because they do not need to prepare students to take state standardized tests, and because they have a self-selected student body interested in their curriculum.

In addition, the Island School has adopted a minimalist approach to their curriculum. One teacher there explained this:

> We really try to teach through not bogging students and teachers down with content requirements, but keeping it simple. And then the real learning, the real understanding comes through fitting the pieces together… So we always try to ask ourselves is this information going to be useful in… ten years? This gets rid of a
lot of the extra fluff and stuff that goes into a lot of curriculum, so that it simplifies things and gives you more time for doing field work, for doing exploration, or discussions…Less is more.

Arthur Morgan School builds SE into its curriculum by teaching non-traditional courses. Because the whole school philosophy is built upon principles that are in line with sustainability, most courses explore sustainability-related issues regardless of the discipline. In addition, one Arthur Morgan administrator explained that academics are not the main focus of the school, as the curriculum is alternative and highly experiential. The school’s overt prioritization of personal development and interpersonal relationships over academics helps faculty choose what to teach and what not to teach, relieving some of the pressure to cover heavy content loads.

Working within more traditional educational frameworks, Common Ground and Lakeside struggle more to dedicate curricular time to SE. Common Ground meets this challenge in part by offering credit for SE activities that students pursue outside of school, and by supporting students who need to miss classes for such activities. In addition, both Lakeside and Common Ground teachers work to find links to sustainability in the course material they are required to cover. For example, at Common Ground, the economics class discusses the triple bottom line and alternative accounting methods. Even these forays into SE take time away from something else in the end, however. Ultimately, allocation of curricular time to SE becomes a matter of what the school most values and decides to prioritize.

**Blocks of time for field trips/field study:** As an integral part of SE, the study schools have had to find ways to make time for extended field-based opportunities. Their solutions to this challenge include block scheduling, flexible daily schedules, concentrated course-work in the mornings with flexible afternoon blocks of time, and use of vacation time and weekends to minimize missed school days for extended trips.

**Time for teacher planning and professional development:** When asked what challenges they faced in teaching SE, numerous teachers commented on their lack of time to plan jointly with colleagues in order to make their programs truly interdisciplinary. Teachers also commented on the difficulty of developing curriculum and integrating a new overarching vision once the program is underway, emphasizing the need to give teachers compensated time to learn new material and to plan and design curriculum before a new program gets started. Though this issue does not appear to have been successfully resolved at any of the schools, the Island School has come closest to a resolution by collectively evaluating and revising their entire curriculum at the end of each semester. They also build professional development into their hiring process, often hiring young teachers as interns.
who are given time to learn more about teaching methods and content before taking on a full teaching load.

B. Diverging from traditional pedagogy and curriculum
Teachers and administrators at both the Island School and Common Ground reported that redefining traditional student-teacher roles presented a challenge to their SE efforts. Often, students and teachers must unlearn old expectations and educational styles in order to create the student-led, self-directed classroom that is characteristic of SE. As one Common Ground teacher said:

The challenge is getting students to be self-responsible and want to learn the stuff first. The unlearning has been a challenge… Convincing them that they should do their homework – not just their physical homework, but that they should check things out.

Shedding traditional conceptions and ways of doing things is never easy, and may be made more difficult because of continual pressure from outside sources (e.g. parents, donors, colleges) to perpetuate the norms. Common Ground teachers have been criticized by some outside the school for straying from state and national standards. Similarly, the Island School feels pressure from its sending schools to conform to a more traditional educational model. An administrator there commented on this, saying:

We’re stretching further and further away from what is palatable for the sending schools. You know, I think we are stretching toward a curriculum that really is blended together, and only artificially broken out for other people to digest. But from our standpoint, we see history and art and English and science and math all coming together.

These schools appear to be walking a fine line. On one hand, they must take care not to alienate students, families, and supporters by shifting cultural norms, traditions, and teaching methods. On the other hand, they need to be wary of falling short of their SE goals because their existing norms, traditions, and methods fail to support their SE programs.

C. Student apathy
Student apathy and general disinterest with sustainability issues is a challenge in some schools. At Lakeside, the few students who are highly interested in sustainability are frustrated with their peers, describing the general attitude of the student body towards sustainability issues as “a sea of apathy.”

14 An analysis of “green schools” in Europe also found the difficulty of overcoming constraints of traditional pedagogy and student-teacher roles to be one of the greatest challenges to the schools (Rausch 1998).
The thing I don’t like is the laziness factor. The faculty and administration are so behind it, but there is this laziness on the part of students. We all say we have two sports to play, five classes, and we have to get into Harvard. People can’t take the time to take the caps off bottles or recycle paper. (Lakeside student)

Numerous Lakeside faculty also mentioned the lack of interest and buy-in among students. The disinterest and eye-rolling that accompanies sustainability-related discussions makes it difficult for the school to push its conservation-based agenda forward. Common Ground faculty face a similar challenge in much of their student body. One faculty member there estimated that approximately one-half to one-third of students at Common Ground are actively engaged with sustainability issues, and two-thirds remain less interested.

Schools have worked to counter student apathy through multiple means: offering incentives for participation in sustainability-related events (e.g. pancake breakfast for those who bike to school on specific days), making certain courses or events required, enlisting the help of popular students to promote sustainability-related events, giving students more control over decision-making, and being selective in the students they accept into their programs.

D. Faculty retention and personally unsustainable lifestyles
Because SE at its best asks teachers to be role models and mentors in and out of the classroom, it creates a highly intense work environment. This posed a challenge to faculty and staff at Common Ground, The Island School, and Arthur Morgan School. For faculty members in boarding settings like The Island School and Arthur Morgan School, the work day does not end during the school year, since they work, play, eat, and live with the students. The small size of these communities makes the work environment more intense because there is rarely anyone else to carry the load if a faculty member needs time off. The intense work with little personal time creates a high rate of faculty burn-out. Ironically, part of what makes the programs so successful for the students is also what makes the jobs personally unsustainable for the faculty.

Several faculty members commented on the damaging effects of the intense lifestyle on some faculty marriages and relationships. Most teachers at these schools are single, and many articulated the importance of making these schools places where married people with families can work. Low salaries and intense work explained why several Arthur Morgan School faculty members felt that committing themselves to the school for the long-term was not a viable option. While the Island School is able to offer somewhat more competitive salaries to experienced teachers, the geographically and
culturally isolated environment makes it a difficult place to raise a family. Lakeside does not seem to face the same challenges with faculty retention, perhaps in part because it is not a boarding school.

Interviewees explained that good leadership, sufficient down time, and administrative and support staff help to lessen this challenge. At schools that don’t have the financial resources to hire administrative and support staff, parents are called on to help fill this role.
Chapter Five: Steps toward Sustainability Education

I. Striving for Congruence

It is difficult to say which of the different means that schools have available to them for sustainability education (SE) has the greatest impact. In fact, one approach may be more effective than another for different elements of sustainability education. While we cannot identify essential components of SE without which it would fail, this research does suggest that the schools that are consistent in their message about sustainability through all the different spheres of influence on students have more effective SE programs. In comparing the study schools, one possible explanation for their differences in effectiveness is the degree of congruence in the sustainability messages that students are receiving through the curriculum, activities and programs, governance structures, facilities and operations, and school culture.

Although the four schools had many similar elements in their programs, not all schools had all the elements. Where The Island School and Arthur Morgan School have approached SE from nearly all angles possible, Lakeside and Common Ground have used fewer different approaches to teaching about and for sustainability. When schools do not incorporate sustainability issues into the many different spheres of influence that they have on students, they are often left sending incongruent messages about what they value to their school communities. For example, at Lakeside, the messages students receive through the school’s culture about sustainability seem to be incongruent with the messages they receive from their courses or extracurricular activities. While the former are telling them to pursue traditional notions of success, including material wealth and a ‘high power,’ consumptive lifestyle, the latter are encouraging them to consider diversity, equity, and the environment in their decision-making. In contrast, at Arthur Morgan School, students are receiving the same message about simple lifestyles, and respect of others, the environment, and themselves from nearly all aspects of their school.

The notion that congruence among the many elements of a school will strengthen its effectiveness is not new, and is certainly not unique to sustainability education. Emerging out of the educational reform movement, researchers and educators are calling for greater consistency in the messages students receive through schools’ content, structure, and resources to increase school effectiveness (Smith and O’Day 1991). “The better schools are more tightly linked - structurally, symbolically, and culturally – than the less effective ones” (Murphy and Datnow 2002, p. 10). They operate as an “organic whole,” consistent within and across major components of the organization. As Hoy and Miskel explain, behavior in schools is not just a
function of its elements and the external forces on the school – it is a function of the interaction of these elements.

We posit a congruence hypothesis: other things being equal, the greater the degree of congruence among the elements of the system, the more effective the system. For example, the more consistent the informal norms and the formal expectations, the more likely the organization will be to achieve its formal goals. Likewise, the better the fit between individual motivation and bureaucratic expectations, the more effective the performance. (Hoy and Miskel 2001, p. 29)

Within the field of SE itself, taking a “whole school approach” to implementing SE has been identified as both one of the key success factors and one of the biggest challenges (Sterling 2001, Ahlberg and Filho 1998, Rauch 1998). The importance of congruence among the different points of influence on students in a school setting is important not just for the consistency of the message that students receive, but also because this approach exposes students to similar ideas through multiple approaches.

It’s great for everything that you do… to try to have a lot of different related ways of approaching it… try to support your factual teaching with hands on experience and trips, and experiences in work place or service organizations. (Common Ground teacher)

Every student learns in a slightly different way. Exposure to the same ideas using different means not only reinforces the ideas, but also gives students with different frames of reference and learning styles, multiple entrance points from which to build their own conceptual frameworks of sustainability. In this way, building congruence into a school’s program also helps support a constructivist approach to education.

A. A self-assessment tool: the congruence matrix
Schools aiming to educate about and for sustainability can use the congruence matrix presented in Figure 1 as a self-assessment tool to better understand where they may be sending conflicting messages, or sending no message at all to their students regarding sustainability. This matrix was developed as part of this study as a way to examine these holistic programs in terms of more manageable components, and to explore how the different means schools are using intersect with the goals of SE.
Using the congruence matrix: The top row of the matrix represents the primary means by which schools may be sending messages regarding sustainability to their students. The left column represents the goals of sustainability education as defined in Chapter One. To assess the congruence of a school’s SE program, the school can ask itself which of the means it is using to achieve each of the six goals. The questions listed in Table 5 serve as a guide for how to think about each of the six goals. Rather than asking whether or not the school as a whole does these things, however, replace ‘school’ in each question with whichever means from the matrix is being evaluated for congruence. For example, if curriculum is being evaluated for long-term perspective, one would ask, “Does the curriculum help students consider the impacts of decisions in the far future as well as in the short term?” If it does, the cell in the matrix at the intersection of curriculum and long-term should be marked with a ‘+.’ If this is an area in which the curriculum is lacking, the cell should be left blank. While it is possible to imagine what most of the intersections of the means and goals might look like in practice, there are some intersections that do not readily make sense. In these cases, cells are shaded in dark gray.\(^{15}\) For a blank matrix worksheet that can be used to evaluate congruence within your own school, see Appendix V.

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**Table 5: Questions to guide completion of congruence matrix**

**Long-term perspective:** Does the school help students consider the impacts of decisions in the far future as well as in the short-term?

**Systems thinking:** Does the school help students build links between the three E’s? Does the school help students see interrelationships between issues and explore these interactions to explain particular events or behaviors? Does the school encourage non-linear thinking?

**Equity:** Does the school help students understand what social equity is, and the ramifications of inequitable systems? Does the school help students learn how to create more equitable social systems?

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\(^{15}\) A gray cell does not mean that the given goal is impossible to achieve with the mean listed – a creative school might be able to build a program to do this. A gray cell does mean that we were unable to imagine a meaningful way for the particular means and goal to intersect.
Economy: Does the school help students think about how people meet their material needs? Does it help students understand the exchange of goods and services both at a local scale and at a global scale? Does it account for different kinds of capital such as social and natural capital?

Environment: Does the school help students understand what the environment is and issues related to the environment? Does the school help students grasp the scientific fundamentals needed to understand environmental issues – ecology, geology, biology, chemistry, physics? Does the school help students understand human interactions with the environment?

Well-being: Does the school help students develop a meaningful way of understanding and assessing quality of life that goes beyond common measures such as material wealth and social status? Does the school help students consider the quality of life that they and others have? Does the school help students make deliberate decisions about the factors influencing their well-being?

A school which has +’s distributed throughout the vertical columns of the matrix would be considered to have built an SE program in which the different elements are working together to achieve their SE goals. In contrast, a school that has many +’s in one column, but is lacking any in another column may not be sending congruent messages to its students regarding sustainability, and may want to consider implementing new elements in its program that will help make the lacking column more consistent with the SE goals. Similarly, a program may have multiple means by which it achieves a particular goal, manifested by a horizontal row with many +’s, but may find that another row is devoid of +’s, indicating that the school is doing very little to address that SE goal. Thus, the matrix can be used both to assess the congruence of the messages sent via the different means, as well as the extent to which the school is working towards each of the goals of SE.

Sample use of the congruence matrix: In Figure 2, two schools have been evaluated using the congruence matrix. Looking at the matrix for School A, it becomes clear that while the school is doing a reasonably good job of integrating SE into its curriculum and extra-curricular activities, it is not using the full palate of means available to convey its SE message to its students. In fact, it is largely missing all the elements of role modeling that were discussed earlier as an important element of SE, which could be incorporated through facilities, management, and governance. This school may want to consider greater integration of these areas into its SE program. In addition, it should examine its culture and explore ways to shift it so that it is more supportive of SE goals.

Also apparent from School A’s matrix, when looking across the rows, is its lack of emphasis on economy and well-being. Thus, the school can see that these are goals that are not being addressed in any meaningful way in the school’s SE program. New SE efforts should focus on incorporating
elements of economy and well-being into the program before strengthening programming to achieve the other goals.

School B has also focused its SE efforts on curricular and extra-curricular activities. In contrast to School A, however, School B shows a culture that is either in transition, or that is split between two or more sub-groups in the school. Again, the facilities and management are not being used to further the school’s SE goals.

School B however, has included more of the goals of SE in its program, appearing particularly strong in the well-being, environment, and equity goals.

**Figure 2: Sample use of the congruence matrix**

<table>
<thead>
<tr>
<th>SCHOOL A</th>
<th>Curriculum</th>
<th>Extra-curricular</th>
<th>Facilities</th>
<th>Management</th>
<th>Governance</th>
<th>Culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term</td>
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<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systems</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economy</td>
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<tr>
<td>Environment</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>split</td>
</tr>
<tr>
<td>Well-being</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>SCHOOL B</th>
<th>Curriculum</th>
<th>Extra-curricular</th>
<th>Facilities</th>
<th>Management</th>
<th>Governance</th>
<th>Culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td>split</td>
</tr>
<tr>
<td>Systems</td>
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<td>Equity</td>
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<tr>
<td>Economy</td>
<td>+</td>
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<tr>
<td>Environment</td>
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<td>split</td>
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<tr>
<td>Well-being</td>
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<td></td>
<td>split</td>
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</tbody>
</table>

Numerous questions about the structure of SE programs emerge from the congruence matrix. Is there an ideal distribution of +’s within the matrix? Are there intersection points that are necessary to achieving certain goals? Are there intersection points that are sufficient for achieving certain goals, making additional efforts unnecessary? Are there intersection points that are necessary but not sufficient to achieving certain goals? While this study is unable to answer these questions, it does suggest that not all means are equally effective in achieving all the different goals. Thus, a completely filled-in matrix is neither necessary for an effective SE program, nor does it guarantee one. For example, equity may be more effectively modeled through the school’s governance than through the facilities or management. Governance, in fact, appears to be a means that will address a very narrow range of SE objectives, based upon the number of cells shaded gray in this column. And yet, as Arthur Morgan School demonstrated, governance
structures can be a powerful tool for teaching students about equity and power distribution. Thus, the distribution of +’s in the matrix may be as important as their presence or absence. Assessing whether particular means are necessary and/or sufficient to achieving particular goals is an area that merits further research.

II. Customizing SE for Hathaway Brown

The success of any new school program depends on its being crafted to custom fit the school in which it will be implemented. Every school has a different geographic location, resource base, clientele, mission and goals, and culture. Understanding these elements of Hathaway Brown (HB) will help the school design a more effective sustainability education program. The descriptions below are drawn from observations and conversations with students, faculty, and administrators at HB. In describing what we saw and heard at the school, we hope to highlight the particular strengths HB has to build upon in designing this new program, as well as characteristics of the school that may make such a program more challenging to implement or that may help focus or guide the content and direction the program takes.

A. Geographic location

HB’s location in Shaker Heights creates both limitations and exciting options. The space available to expand the school’s programs is physically limited by the size of the campus and the lack of immediately surrounding areas available to the school. In addition, the building and zoning codes in Shaker Heights are fairly strict, again potentially limiting new projects on campus, such as greenhouse construction, for example.

While HB does not have immediate access to large greenspaces without transporting students, there are parks and other natural areas nearby that are accessible within a reasonable distance. Doan Brook runs right through the campus, offering a site for ecological study and restoration projects. The Shaker Lakes are the most obvious off-site greenspace, but not the only point of easy access to natural areas. University School’s Upper School campus, the Chagrin Reservations, Lakeside Cemetery, and Lake Erie all offer fairly easy access to natural space.

HB’s proximity to downtown Cleveland and the Rapid Transit route just a few blocks from campus position the school well to integrate urban issues into a sustainability education program. The downtown area offers opportunities for students to access the Cleveland Environmental Center in Ohio City, the Cuyahoga River in its most industrial and urban zone, and brownfield and environmental justice sites. The Rapid Transit route also makes it easier for students from urban areas to get to Hathaway Brown, or vice versa, should the program design incorporate collaboration with other schools.
B. School resources
Hathaway Brown has substantial resources in a variety of realms that can strengthen a sustainability education program. First, the school is well supported financially. It has the means to implement new programs should they be top priorities of the school. Alumnae support of the institution is strong; the school brings in substantial tuition dollars; and the Cleveland community is known for its philanthropy. Sustainability is a hot topic, recognized as important and urgent, and thus should be easily fundable given the resources available to the school.

In addition to its financial resources, HB’s ties to the Cleveland community will be an important resource in developing a sustainability education program. The school already has extended itself into the community through HB Aspire, the Science Research and Internships program, and community service projects. The connections developed through these initiatives will undoubtedly prove useful in integrating off-campus components in a new SE program.

HB’s faculty is another important resource at the school. Already, many faculty members are incorporating bits and pieces of SE in their courses. In addition, there is excitement and energy among the faculty to broaden the scope of SE at the school. Our sense is that all the faculty members with whom we have spoken are supportive of the idea of a SE initiative at the school. However, many feel they do not have the time or the background to address these issues on their own with students, suggesting the need for professional development. In addition, they are looking for guidance and affirmation from school leadership that this is a direction that will be supported by the school.

One identifiable weakness in HB’s resources for implementing SE is the apparent lack of concern for environmental and social issues in the way the school runs. Nearly every student and teacher with whom we talked mentioned the fact that the school did not even recycle, an activity that epitomizes the most basic level of environmental consciousness to many people. It is exciting to see that the recycling program has been reinitiated this year, after these discussions. In some ways, the school is facing a dilemma, in that students and faculty are waiting to see the school make a commitment to sustainability before they dive into it, while the school is waiting to see the energy and commitment in the students and faculty before investing in it. Overcoming this duality may require small by increasing commitments on the part of students and faculty, and on the part of the school administration.
C. HB’s Clientele
Hathaway Brown works with an academically gifted group of girls and young women. Parents sending their children to HB expect a high level of academic rigor and individual attention. These expectations can certainly be met within the context of a SE initiative. At the same time, however, HB should be aware that sustainability education is often perceived as presenting a politically and socially liberal perspective on issues; HB will need to be sensitive to potential conflicts with views held by students, parents, alumni, and donors.

While HB is working to diversify its student body, and has been quite successful in its efforts, it still serves primarily Caucasian, upper to upper-middle class families. This can influence the kinds of issues and topics that seem most relevant and immediate to HB’s students. For example, urban sprawl or alternative transportation may be more relevant to most HB students than environmental justice issues. Consumption patterns in the US may be more interesting and translatable to their lives than ozone depletion. This does not mean that the school should avoid addressing such issues, and should focus only on those that are immediately relevant to students, but understanding what is important to the students and their families will help to focus and strengthen a new SE program at HB.

D. HB’s mission and goals
Hathaway Brown strives to prepare girls and young women to meet “the challenges of the times” (Hathaway Brown School, 2003) through a rigorous academic program and enriching extra-curricular opportunities. In addition, the school strives for learning that will extend beyond the school walls, meeting the motto of learning “not for school, but for life.” Sustainable development and creating sustainable lifestyles and systems for ourselves now and in the future is one of the great challenges facing the world today. Whether they choose to or not, students at HB will be forced to engage with questions of sustainability – environment, social equity, and economics – in significant ways as they move beyond the school’s walls. Many people at the school rightfully feel that it is the school’s responsibility to be addressing these issues in some way with the students. To neglect this is leaving them unprepared to address these challenges, immediately and in the future.

The school recognizes that academic learning is essential but not sufficient in preparing students to be leaders capable of meeting future challenges. As a result, HB encourages students to participate in more experiential learning opportunities, such as Strnad Fellowships and the Science Research and Internships, to complement their academic work. Hathaway Brown seeks to expand these experiential opportunities, and possibly to make participation in some program of this sort a requirement for graduation. This recognition of the educational and personal growth value of more experiential, non-curricular projects and opportunities matches well with the goals and methods of a SE program.
In the development of a SE program, HB seeks to expose all students to the concepts and issues associated with sustainability at a basic level. In addition, the school wants to provide opportunities for more in-depth work on these issues for those students who are interested. In other words, the program should be designed to offer both breadth and depth, and should be designed for multiple levels of engagement.

Hathaway Brown also has the goals of further developing its connections with the city of Cleveland and distinguishing itself from other schools in the area, and as a national leader in girls’ education. These two goals are compatible, and in fact, may work synergistically in the context of SE. HB has a unique resource in its proximity to Cleveland, which can be built upon in designing a SE program. Developing an urban focus to such a program would help HB distinguish itself from schools in the area, while simultaneously fostering a stronger relationship with the city. HB is well situated to do so, both geographically and in the goals the school has for itself beyond SE.

E. HB’s culture
The following portrait of the culture at Hathaway Brown is far from complete. It is based largely on observations and conversations with Upper School faculty, staff, and students. Having spent little time in the Middle and Primary Schools, it would be inappropriate for us to characterize the culture in these segments of the school. Additionally, there are surely elements of the Upper School culture that we have missed. What is described here are those elements of the culture that came across most strongly in our observations and conversations at HB and that may be relevant to new SE efforts.

Hathaway Brown’s Upper School has a warm community, welcoming and friendly. The students and faculty are engaged, lively, and intellectually curious. At the same time, the students and teachers feel significant pressure to perform and to achieve excellence in everything they do. Success is measured through academic achievement, awards received, and college admissions. The college admissions process is a key factor in the culture in the Upper School. Students identify getting into a good college as the purpose of their high school education. This pressure is reinforced both from within the school and from home for HB students. As we discussed in the section “The challenge of culture,” academic excellence and a drive to excel can be highly beneficial to SE. However, definitions of success rooted in grades and college admissions, and an overly hectic schedule for students may work against an SE initiative. Faculty members at HB have observed that HB students are very good at exploring complex issues from an abstract perspective, but are less willing or able to translate their thinking about these issues back to themselves and their own lives. Some of this may have to do with the motivations behind student learning.
HB students’ reluctance or difficulty in translating abstract lessons to their own lives may also be related to the limited time they have for reflection on and internalization of the material they are studying. The drive to achieve and the fact that students value themselves through their achievements creates a culture of busyness and productivity. Students feel that they must always be doing something to advance themselves. There is little room for down-time or play. While most students enjoy the work they do and push themselves out of sheer curiosity and excitement about learning, many also are exhausted by the pace of life at the school and by the implicit and explicit demands placed on them by the curriculum and the culture.

The Upper School faculty and students interact within a fairly traditional framework of teacher-student roles. There is relatively little informal interaction between faculty and students. However, students seem to like and appreciate their teachers; the faculty feels similarly about the students. If not for the very busy schedules at the school, there is a good chance that students and faculty would interact informally more often. With teachers interested in or committed to sustainability, such interactions might open the door to more personal discussions of how to translate the ideals of sustainability into one’s daily life (see Personal Relationships section in Chapter 3).

The students also bring with them to school a culture of affluence and material consumption. As is true at almost any school, appearances are important to the students. HB students are brand conscious, and many of them have substantial buying power already. The culture of consumption is difficult to combat because it is so ubiquitous in mainstream American culture, representing a widespread cultural issue. However, HB seems to do little to actively counter this culture. As appears to be happening at Lakeside, the ‘null curriculum’ at the school may, in fact, reinforce this culture in some ways through the ways the school operates and simply through the appearance of the buildings and grounds. Concepts of simplicity and non-consumption arise sporadically in some courses, but a culture of consumption dominates.

Going hand-in-hand with the material culture at HB is a lack of awareness about environmental and sustainability-related issues. Students seem unconcerned with environmental issues, perhaps because they hear about them only sporadically at school; the school lacks a unified, pervasive message in this respect. The minimal discussion about these issues within courses, and the apparent lack of attention to the environmental and social impacts in the way the school runs probably contributes to a school culture that does not highly value or concern itself with environmental issues. To clarify, this is not to say that HB’s culture encourages irresponsible

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16 The null curriculum is what a school does not talk about or include in its curriculum (Eisner, 1985).
environmental behaviors. Rather, the environment seems to be a non-issue at HB. It is not present in the minds of most faculty and students during the school day. This may be less true of social issues. The school culture does seem to support active community service. The Urban Issues course is a class of which many spoke very highly, particularly citing the opportunities to do service work in class. In addition, students spoke highly of the opportunities to tutor younger students on a regular basis.

Certainly, Hathaway Brown’s existing strengths and values will provide the foundation of a good SE program at HB, and HB’s culture already has several important values related to sustainability that can support this new initiative. Specifically, the school has a strong emphasis on community, diversity, academic excellence, preparing students for future challenges, and experiential learning. In addition, HB has built a warm, trusting community, open to multiple perspectives and opinions. All of these will provide a rich foundation on which to build a SE program. HB should take advantage of these values while putting a new sustainability twist on them. While it is important that the school culture minimizes or sheds social norms that work against the goals of sustainability, much of the cultural work will consist not of building new culture, but of building the links between the existing values and those of sustainability. Still, if HB chooses to invest fully in the goals of sustainability education, the school will probably be faced with the challenge of at least some cultural transformation.

III. Building your Program
Developing an effective sustainability education program involves efforts in multiple areas of school functioning. As your school begins this process, there are five key recommendations that should be kept in mind (see Table 6), as well as some broader issues in program development that your school will want to consider. Both the recommendations and broader issues are described below. Schools are encouraged to think creatively about how to best operationalize these recommendations within their own context. However, should your school want specific ideas to get started, Appendix I includes ideas for putting each of the suggestions below into practice.

Throughout the following recommendations (and suggestions for operationalization in Appendix I), keep in mind that designing and implementing an SE program is best done slowly and incrementally. No
school could do all of these things quickly. In fact, a common piece of advice from the study schools to those designing a new program was to start slowly and build the program gradually. Upon reviewing the history of each of the study schools, it is clear that they all took years to develop their programs, often changing the program structure significantly as the programs grew and matured. The Island School, Common Ground, and Lakeside would also say that their programs continue to change. Arthur Morgan School is the only one of the four study schools that might describe its program as fairly stable and consistent from year to year, and they have had forty years to bring it to this point. Thus, these recommendations should be used as guidelines to direct your school’s program development, while allowing the time and flexibility to design a program that suits HB’s context and needs. There are many routes to a successful SE program.

A. Recommendations for schools

*Foster students’ emotional connections to the issues:* Emotion is a powerful motivator. Students have little incentive to explore environmental issues and take action if they neither have a positive emotional connection to the natural world, nor have felt the impacts of environmental degradation. Likewise, students are more likely to respond to social injustice if they can imagine such an injustice impacting someone they have met or care about. Students often develop these emotional connections through intimate personal experience with natural places or social groups. Students need repeated and extended time in these settings, some of which should be non-academic and unstructured.

*Make student work authentic and place-based:* Authentic learning opportunities that are place-based support SE by framing big ideas in a more manageable, concrete context, making issues relevant to students, and addressing issues from an interdisciplinary perspective that helps students understand the three E’s and systems dynamics. While learning that is either place-based or authentic can provide a sound context for SE, a learning experience that is both place-based and authentic is often richer, more productive, and more relevant – both to sustainability and to their lives.

*Actively model sustainable practices:* Role modeling offers a powerful means by which to convey ideas, values, and behaviors. In fact, it may be an effective way to help build or shift school culture. In our society, it is rare to consider the three E’s, long-term impacts, and systemic interactions when making important decisions. Students have few role models, individual or institutional, from which to learn to incorporate these concepts into their lives. Creating opportunities for students to interact in meaningful ways with such role models is an important component to effective SE. Active role modeling should be done by the faculty. In addition, the school as an institution should take this role, modeling sustainability through its facilities, operations, administration, and governance. Opportunities to visit other people and places that model sustainable lifestyles can also be inspiring.
helping to counter the pessimism and feelings of helplessness that can accompany studies of social, environmental, and economic problems.

**Create opportunities for student ownership of the school and their learning:** Giving students access to decision-making power, leadership positions, and the resources needed to carry out innovative projects often empowers students and makes them more engaged in their own education. Similarly, if students have the opportunity to help create and direct their learning experiences, they may become more invested in the experience and find ways to create something that is relevant to them. Giving students greater responsibility for elements of school functioning can also increase student ownership of the school. For example, if a student is the only one responsible for collecting the recycling on a given day, or for introducing the guest speaker, then she will recognize that this job may not get done unless she does it. Through ownership, empowerment, and responsibility, students are more likely to engage with and internalize what they are learning about sustainability.

**Embed sustainability in the school’s culture:** Culture is a powerful influence on student learning. Because it constantly surrounds students, it can be a less overt means through which to teach. In some cases, schools may find that there are elements of their culture that do not support their SE initiatives, or may feel that a slightly different culture could more actively contribute to the school’s SE efforts. The challenge of shifting a culture should not be underestimated. However, if a school’s culture does not include elements supportive of sustainability and minimize or eliminate those that work against sustainability, the resulting outcomes of SE efforts may be superficial in nature or may even be met with resistance within the school community.

**B. Broader issues in program development**
Implementing the above recommendations will take time and significant effort. As a school interested in implementing SE begins this endeavor, it will need to initiate a school-wide dialogue about the goals of the program and where the school community stands on the continuum between objective education and overt advocacy about these issues. In addition, schools must realize that success may depend partly on the incentives that students and teachers are given to participate, and that an effective program requires more than just implementation of the ‘low hanging fruit.’ Finally, schools need to strive for congruence in the messages it sends to the school community through its curriculum, activities and programs, facilities, operations, governance, and culture.

**Advocacy versus objective education:** The concept of sustainability itself is values-laden. Therefore, even at its most objective, sustainability education attaches greater importance to some ideas and perspectives than others. However, schools can choose to present issues with more or less emphasis on a particular perspective or set of values. Advocating, preaching, or
convincing students to adopt certain behaviors can make them feel uncomfortable and lead to parental or community discontent. A balanced presentation of the issues is generally preferable, particularly in the classroom. However, as one teacher at Common Ground said when explaining the school’s values-laden program, “If the world is not balanced to begin with, then what is really balanced?” adding that students’ daily exposure to mainstream culture may actually be the counter-balance to what might otherwise seem like a biased presentation of material at their school. If the school decides to teach with a values-laden agenda, it should make this clear to prospective students, parents, and faculty, so that they know what to expect. When developing a new sustainability education program, schools will need to initiate a school-wide discussion of where to fall on the continuum between objective education and overt advocacy.

**Offering incentives and creating expectations to participate:** Students, faculty, administrators, and staff at most schools are very busy. Schedules are often packed, leaving little time to add in anything new. Many people are unlikely to spend their time pursuing activities that demand a heavy time commitment, are neither in line with their personal interests nor required by the school, or for which they lack the necessary resources or skills. By creating incentives or expectations, and offering professional development opportunities, schools can increase the level of participation in their new initiative while simultaneously demonstrating that the school values SE and is committed to making it part of every student’s education. Appendix III provides a list of suggested incentives to increase participation in sustainability-related initiatives.

**Not just the ‘low hanging fruit’:** Some of the suggestions above and in the appendices are fairly easy to implement, while others will require substantial investments of time, energy, or money, or significant changes to the school’s structure and culture. While it may be tempting to implement just the ‘low hanging fruit,’ this will ultimately leave a school with a mediocre SE program, unlikely to produce the more profound impacts on students that were observed at the study schools. Awareness raising, the outcome of many of the easier-to-implement suggestions, is just a starting point. For a truly effective and outstanding SE program, these efforts need to be accompanied by some of the more difficult initiatives such as developing new courses, making significant changes to the school’s operations and facilities, and working to shift the school culture in subtle but important ways.

**Congruence:** In developing a new SE program, schools should work to send consistent messages about sustainability through the many points of influence on the school community – curriculum, activities and programs, facilities, operations, governance, and culture. Students, faculty, and others are likely to be sensitive to inconsistencies in the words and actions of the school, or between different sectors of the school. If the school sends mixed messages,
students and faculty may be less likely to take the school’s efforts seriously, instead perceiving hypocrisy and perhaps even reacting negatively to what would otherwise be positive steps towards building an SE program. In addition, learning happens best when students get repeated exposure to new material from multiple sources. Aligning many aspects of the school with its sustainability message will not all happen at once. Rather, over time and as the program develops, a school should work to diversify and coordinate its efforts among the many sectors through which the sustainability message can be communicated.

Taken together, these recommendations suggest that Hathaway Brown and other schools interested in implementing SE programs enter a multi-year transition that will examine and potentially alter the culture of the school, expand the curricular and extra-curricular offerings addressing sustainability, and make efforts to model sustainable practices through multiple sources. The sum of these efforts will help increase the degree of congruence with which the school promotes sustainability.

While the challenges of sustainability education are great, the potential benefits to both the school community and others, are even greater. Not only can SE be an excellent framework for schools educationally, it is also one of the most important steps to shaping a future that is healthy, just and sustainable. We hope that other schools will step up to the challenge of sustainability education, building upon the lessons learned by the four pioneering schools in this study.
Appendix I: Ideas for Implementing the Recommendations

Before reading the ideas below, schools are highly encouraged to creatively brainstorm their own ways to best operationalize these general recommendations:

A) foster students’ emotional connections to the issues
B) make student work authentic and place-based,
C) actively role model sustainable practices,
D) create opportunities for student ownership of the school and their learning, and
E) embed sustainability in the school’s culture.

Brainstorming can both increase ownership of resulting projects, and increase the probability that initiatives will be tailored to the context of your school. The ideas below are provided to help get a school started. Keep in mind that many of these ideas for putting the suggestions into practice will have multiple positive effects. They are listed, however, under the general recommendation to which they seem most closely tied.

The ideas below are rated according to the level of effort they might require to implement. As noted in the recommendations, it is important to move beyond the ‘easy to implement’ suggestions to build an effective SE program. These may be good places to start, but should not constitute the school’s only efforts. A school wishing to be a national leader in this field would need to implement ideas from all three levels.

**Key**

Each recommendation below is rated with one to three stars, which signify the following:

- ☆ Easy to implement – you could do this tomorrow
- ☆☆ Moderate effort to implement – may need to convince some people and/or need a small infusion of time, money, or expertise
- ☆☆☆ Substantial effort to implement – will require significant commitment, effort, and resources

A. Foster students’ emotional connection to the issues

  a) Start a wilderness trips club or program. To encourage participation, this could be run like a sport, with regular meetings after school and funding for periodic travel to parks and waterways. ☆☆

  b) Have students design, plant, and maintain vegetable or native plant gardens at the school. (Added benefits of this could include fresh, local vegetables for the school cafeteria, increased understanding of agricultural ecosystems, and a context for studying food systems, sustainable agriculture, and alternative economics.) ☆☆
c) Offer trips to developing countries or regional or local areas that are facing economic, social, or environmental challenges. These visits will have a stronger emotional impact on students if they include opportunities for students to interact with local residents and live in the community. Service-based trips are an excellent context for these experiences. (This is one way to make student learning authentic and place-based – see below.) ☆☆☆
d) Include a field-study component in science and humanities courses. Science courses should spend significant time outside, studying natural systems. Likewise, humanities courses should spend substantial time in the local community, working to understand community issues and the experience of the people who live there.
☆☆☆☆

B. Make student learning authentic and place-based
a) Hold a capacity building workshop or offer other professional development opportunities so that teachers can learn to integrate authentic learning and place-based methods into their classes (see Chapter 3 – Implementing SE for descriptions of these approaches).
☆☆
b) Allocate sufficient time for use of authentic, place-based learning. Faculty need time for joint planning and coordination in order to make learning authentic, interdisciplinary, and place-based, in addition to needing time for related projects or trips with students. Consider altering the schedule to include a half-day or full day each week dedicated to sustainability-related field trips, projects, and interdisciplinary work. ☆☆☆
c) Build partnerships with local non-profits, businesses, and institutions that have an interest in sustainability issues. These partnerships can lead to opportunities for student internships, service projects, formal research, or class projects. See Appendix IV: Local Sustainability Contacts for potential groups with whom to partner. ☆☆☆

C. Actively model sustainable practices

1. Work to minimize the school’s negative social and environmental impacts in the following areas: building construction, energy and water use, food consumption, office and maintenance products, waste production, and transportation.
   a) Replace light bulbs with energy efficient ballasts. ☆
   b) Encourage double-sided photocopying and printing and use of scrap paper for copies and printouts. Allow and encourage students to hand in papers and homework on paper that is used on one side. ☆
   c) Initiate a campaign to reduce the number of community members who commute to school in single-occupancy vehicles. ☆
d) Initiate or expand the school’s recycling program and compost kitchen food wastes. ☆☆
e) Insist on ‘green’ cleaning products for the school. ☆☆
f) Expand the community’s thermal ‘comfort zone’ to use less heating and air conditioning. ☆☆
g) Work with kitchen staff to purchase as much organic, non-genetically modified, locally-produced food as possible. Discontinue food items with plastic disposable packaging. ☆☆

a) Fuel school buses with biodiesel, or biodiesel blend. (In the Cleveland area, this is produced locally by Biodiesel Cleveland). ☆☆
b) Adjust purchasing procedures to support the local economy. ☆☆
c) Install low-flow or composting toilets. ☆☆☆
d) Use native plants for landscaping and ‘low mow’ grass. Reduce or eliminate use of chemical fertilizers and pesticides on grounds. ☆☆☆

2. Make sure that the school’s environmental and social impacts, along with any efforts to minimize these impacts, are transparent to students and to the school community. Community members can then monitor progress and see the impacts of sustainability efforts.
a) Create permanent displays explaining the school’s sustainability efforts. ☆
b) Report projects in the school newspaper and on the school website. ☆
c) Involve students with research and recommendations for changes to the school’s facilities and operations. ☆
d) Monitor energy, water, and materials consumption and waste production in a central and conspicuous location. ☆☆
e) Conduct annual, student-led sustainability audits of school progress made toward sustainability goals. ☆☆

3. Foster close, friendly, and informal relationships between faculty, staff, and students.
a) Allow students to call teachers by their first names. ☆
b) Encourage students and teachers to eat lunch together. ☆
c) Encourage teachers to ‘hang out’ with students outside of class. ☆☆
d) Create opportunities for students and faculty to take multi-day trips together (e.g. wilderness trips, international travel, field study trips). ☆☆

4. Take field trips to other sites and bring in speakers that are sustainability role models. For Hathaway Brown School, local possibilities include:
a) A visit to the Adam Joseph Lewis Center for Environmental Studies at Oberlin College, and a meeting with Dr. David Orr. ☆
b) A field trip to the Cleveland Environmental Center and Cleveland EcoVillage in Ohio City, and a meeting with Sadhu Johnston, Director of the Green Building Coalition. ☆
c) A visit to the Crown Point Ecology Center in Bath, and a discussion with staff there on connecting spirituality, human values, and environmental stewardship. ☆

d) A workshop with Ray Holan, founder of Biodiesel Cleveland, on biodiesel production and the development of his new business in Cleveland. ☆

e) For additional ideas, consult Appendix IV: Local Sustainability Contacts. ☆

5. **Make school decision-making processes transparent to the school community and as participatory as is reasonable.**

   a) In smaller group settings (e.g. class meetings, clubs, committees), consider using a consensus-based process. ☆☆

   b) Post minutes from meetings on the school website or on a bulletin board. ☆

   c) Open meetings to community members whenever possible. ☆

   d) Make opportunities for feedback to school decision-makers plentiful, obvious, and easy to use. ☆☆

6. **Ensure that all students have equal access to school programs.**

   a) Create sliding scales or scholarships to cover program costs for which students or families are responsible. The difference in cost can be made up through student fundraising activities. ☆

   b) Build endowment to minimize external costs to students, and to increase available financial aid. ☆☆☆

   c) Establish mutually beneficial partnerships with other organizations that will give students educational opportunities while incurring minimal costs to your school. ☆☆☆

D. **Create opportunities for student ownership of the school and their learning**

   a) Include student representatives on school committees, the Board of Trustees, the PTA, and in planning and design processes. ☆

   b) Allow students to vote on which elective classes should be offered at the school. ☆

   c) Encourage students to propose and help design new programs, projects, trips, or courses, and create an avenue for review of proposals, decisions on funding, time allowances, etc. ☆☆

   d) Create opportunities for students to take on a teaching role. This can be done through older students working with groups of younger students, one-on-one tutoring or mentoring, student-led seminars, or presentations to parents, teachers, community members, or students from other schools. ☆☆☆

   e) Phase out custodial staff and increase student responsibilities for taking care of the school. Allocate 20 minutes per day to chores, or
longer periods weekly or monthly for students to participate in school work projects such as facilities or grounds maintenance. ☆☆☆

E. Embed sustainability in the school’s culture

1. Initiate a school-wide discussion of sustainability and the school’s responsibilities to address these issues. ☆
2. Make the school’s commitment to sustainability clear to new and prospective students and families. ☆
3. Get popular students and teachers to make announcements or lead activities relating to SE. ☆
4. When hiring new faculty, make the school’s commitment to SE and sustainability clear. Consider weighting their familiarity with and commitment to sustainability in hiring decisions. ☆☆
5. Build the school sense of community and culture with regular traditions and ceremonies that relate in some way to social or environmental themes. ☆☆
6. Include parents in SE by offering a series of evening seminars, an educational meeting followed by suggested readings, or discussion of sustainability topics in parents’ newsletters, school publications, and on the school website. ☆☆
7. Make a public statement of commitment, signed by the Board of Trustees, administration, faculty, staff and students to SE and environmental and social responsibility in school facilities, operations, and management, and follow through on it. ☆☆☆
8. Sign a school version of the Kyoto Protocol or make other specific public commitments to better manage social and environmental resources, and follow through with them. ☆☆☆
Appendix II: Sequence of Implementation

As Hathaway Brown School considers the many different recommendations and ways to operationalize them, it may be overwhelming to decide where to begin. This appendix offers some thoughts on where to begin and how to proceed. Other schools interested in implementing a sustainability education program may find this useful as well.

Getting Started
A. Raise awareness.
B. Build emotional connections.
C. Initiate a school-wide discussion.

A. Raise awareness
Consciousness of sustainability-related issues among HB students seems to be quite low. Many HB faculty have expressed that awareness raising should be one of the first steps in the school’s SE initiative, and we agree. There are numerous methods that can be used to raise awareness. Many of the ‘low-hanging fruits’ suggested in Appendix I could be used to raise awareness in the school community. While students at the study schools cited outside speakers as inspirational and important to their SE programs, HB students cautioned us against bringing in too many speakers, saying that speakers are often boring and students do not enjoy them. Speakers may be an appropriate means of engaging students with these ideas once the students have some interest in this area, but may not be the best place to start. Consider more interactive means to initially engage students, such as gardening, building solar panels, or smaller round-table discussions.

B. Build emotional connections
Awareness, alone, will not necessarily elicit interest in these issues. As discussed earlier, students need to develop an emotional connection to natural places and a personal concern for their stewardship and the well-being of others. Aligned with HB’s existing interest in establishing a wilderness or outdoor education program, we recommend working with students to create a wilderness trips program, giving students opportunities to play in nature. Such a program could also support academic experiences in the wilderness, but its primary focus, initially, should be to give students the chance to fall in love with the natural world.

D. Initiate a school-wide discussion
As HB begins raising awareness and building connections to sustainability issues, it will be helpful to initiate a school-wide discussion that involves faculty, administrators, staff, students, and parents in defining the mission and goals of the SE initiative. In doing so, the school can work to build
school-wide support for the initiative and to secure a commitment from all stakeholders to address these issues.

**Building the Program**
A. Establish baselines and self-assessment systems.
B. Begin to make curricular, cultural, and operational changes.
C. Establish links with community organizations.

**A. Establish baselines and self-assessment systems**
As HB embarks on this journey towards sustainability, tracking its progress towards its goals will be important to assess the effectiveness of the school’s efforts. To do this, it will first need to know where it started. The school should undertake a self-assessment to establish its current levels of awareness, knowledge, integration of sustainability concepts in the curriculum and operations, and resource use. Building from the mission and goals of the SE initiative, articulate specific, measurable, and realistic objectives. In addition, HB should create a framework for program evaluation.

**B. Begin to make curricular, cultural, and operational change**
Once the program mission and goals are established, HB should begin to find ways to move towards these goals through curricular, extra-curricular, cultural, and operational changes.

**C. Establish links with community organizations**
Building links with community organizations will help create opportunities for authentic, place-based learning, as well as publicizing HB’s efforts. Establishing relationships with these organizations early on in the development of the school’s SE initiative, but after clear program goals have been established, will give HB and these organizations the time needed to explore opportunities for mutually beneficial partnerships as the SE program grows and evolves.

**Program Maturation**
A. Shift the culture if necessary.
B. Re-design and renovate facilities.
C. Self-evaluate and revise programs.

**A. Shift the culture if necessary**
Shifting or changing a culture is a slow and difficult process, but may be necessary if the school decides that its current school culture inhibits achievement of its SE goals. While some of this should be worked into the earlier phases of program implementation, it may become marginally easier to do once the school has some more tangible pieces of the SE program in place, such as the wilderness trips program and revised curriculum.
B. Re-design and renovate facilities
While small changes can be made to facilities and operations almost immediately, larger changes will likely occur as facilities undergo renovation because of necessary repairs, or redesign. In either case, major changes to the facilities will be the product of a serious commitment to sustainable design and operations, and thus are more likely to be accepted by decision-making stakeholders later in the program’s implementation, when smaller pieces are in place and momentum from many fronts is carrying the initiative forward.

C. Evaluate and revise programs
Ideally, all major SE initiatives should be evaluated as objectively as possible for effectiveness and efficiency of resource use in meeting the program goals, both internally and potentially by an external evaluator. The results of these evaluations should be used to improve SE initiatives.

Keep in mind that the above sequence is merely a suggestion of the order in which things be done. This sequence should act as a guide from which HB can readily depart, depending on the circumstances and what the particular situation at the school allows or demands.
Appendix III: Suggested Incentives to Increase Participation in SE Initiatives

For students
1. Make proficiency in sustainability a requirement for graduation, including a pre-graduation assessment.

2. Offer academic credit for sustainability-related experiential learning opportunities or independent studies.

3. Offer scholarships for students to participate in off-campus sustainability related programs.

4. Allow alternative assignments or coursework to replace work missed because of participation in important sustainability-related events.

5. Confer honors or awards to those students who make significant contributions to the school’s sustainability goals.

For faculty, administrators, and staff
1. Hire a school sustainability expert who can coordinate activities and provide resources, information, ideas, and contacts.

2. Search out and encourage professional development opportunities to help faculty, staff, and administrators learn more about sustainability and how it relates to their own field.

3. Give faculty time to plan together and coordinate so that they can build interdisciplinary units and draw on the expertise collectively held among them all.

4. Require faculty to include sustainability content in their courses in some way.

5. Require staff and administrators to take sustainability principles into account in their school decision-making.

6. Offer rewards (financial or otherwise) to faculty, staff, or administrators who model environmentally and socially responsible personal behaviors (such as biking to school).
Appendix IV: Local Sustainability Contacts for Hathaway Brown

Adam Joseph Lewis Center for Environmental Studies at Oberlin College
contact: www.oberlin.edu/envs/ajlc/. 22 Elm Street, Oberlin, OH 44074.

“The Center was developed as a ‘building that teaches,’ that is, a facility in which the lessons embodied in technology and design choices serve to reinforce lessons taught in the classrooms. Indeed, the Center provides a fertile space that has attracted the focus of specific courses, lecture series, student research, winter term projects, community groups, regional schools, and universities and professionals from the international community” (www.oberlin.edu/envs/ajlc/). The Center offers a demonstration of ecological building design, including a “living machine” for waste water treatment, solar energy production, and native landscaping.

BioDiesel Cleveland
contact: Ray Holan, Owner. rayholan@mindspring.com. 1003 Woodland Drive, Mayfield Village, OH 44143.

BioDiesel Cleveland is a start-up business producing biodegradable diesel fuel from used restaurant cooking oil. The production process is fairly simple, and the resulting fuel, which can be used in any traditional diesel vehicle, is cleaner burning and produces many fewer carcinogens in its exhaust than regular diesel fuel.

Cleveland Council on World Affairs

The Cleveland Council on World Affairs seeks “to enhance public dialogue on and understanding of important international economic, political and social issues through informed discussions, personal contacts and other educational activities with business, community and educational leaders in Northeast Ohio” (www.ccwa.org). It does this through bringing internationally renowned speakers to Cleveland, running a model UN for Cleveland area schools, offering professional development opportunities and resources to educators, and sponsoring events that focus attention on Northeast Ohio’s connection to the
global economy, the digital divide, global environmental issues, and the increasing gap between rich and poor peoples of the world.

**The Cleveland Museum of Natural History**  
contact: Bob Segedi, Director of Young Scientists Program.  
www.cmnh.org. 800-317-9155. 216-231-4600, ext. 251. 1 Wade Oval Drive, University Circle, Cleveland, OH 44106-1767.

The Natural History Museum runs the Young Scientists Program for selected high school students interested in natural history studies. In addition, they have week-day programming for school groups, and numerous specialists on their staff working in fields ranging from anthropology, to ornithology, to live animal rehabilitation.

**Cuyahoga Valley Environmental Education Center**  
contact: www.cveec.org. 800-642-3297. 330-657-2058. 3675 Oak Hill Road, Peninsula, OH 44264.

CVEEC runs environmental education programs for youth and adults in the Cuyahoga Valley National Park. They offer both residential and day programs, which explore the park’s ecosystems and incorporate arts and outdoor skills.

**Crown Point Ecology Center**  
contact: farm@crownpt.org. www.crownpt.org. 330-668-8992. 3220 Ira Road, Bath, OH.

“The mission at Crown Point is to connect spirituality with the practical application of ecology. We strive to do this through the integration of sustainability, justice, spirituality, and community. Crown Point is situated on a 130-acre farmstead in Bath, Ohio. The center includes a certified organic farm that supports a 60 family Community Supported Agriculture (CSA) project and the Akron/Canton Regional FoodBank. At least 50% of the harvest is donated to the FoodBank and is shared with hungry families throughout an eight county area. The farm serves as a learning center for area school children and summer day campers. Programs are also offered for adults and families that include concerts, seasonal celebrations, and workshops that focus on eco-spirituality, earth literacy, and voluntary simplicity” (www.crownpt.org).
Earthday Coalition
contact: Dawn Wrench, Director of Student Environmental Congress. dwrench@earthdaycoalition.org.
www.earthdaycoalition.org. 216-281-6468. 3606 Bridge Avenue, Cleveland, OH 44113.

“Earth Day Coalition protects and restores Ohio's environment, quality of life and public health through community pollution prevention, student leadership conferences, cleaner transportation, sustainable economic development, and EarthFest, Ohio's largest environmental education event” (www.earthdaycoalition.org). Among many other projects and initiatives, Earth Day Coalition runs the Student Environmental Congress, a year-long multi-school project that brings together high school students to teach and learn from each other about environmental issues in the Cleveland area.

EcoCity Cleveland
contact: David Beech, Director. Manda Gillespie, Project Manager. david@ecocitycleveland.org. manda@ecocitycleveland.org. 216-932-3007. www.ecocitycleveland.org. 2841 Scarborough Road, Cleveland Heights, OH 44118.

“EcoCity Cleveland is a nonprofit environmental planning organization that promotes the design of cities in balance with nature in Northeast Ohio” (www.ecocitycleveland.org). The group works on urban re-development in the city of Cleveland, open-space preservation, and urban sprawl and smart growth. They are one of the partners in the development of Cleveland’s Eco-Village in Ohio City, they participate in many task forces and planning committees, have sponsored numerous seminars and forums for discussion of future growth and planning for the Cleveland area, and produce several publications.

Entrepreneurs for Sustainability
contact: Holly Harlen, Director. 216-371-1177. Info@e4sustainability.org. www.e4sustainability.org. P.O. Box 181127, Cleveland, OH 44118.

Entrepreneurs for Sustainability seeks “to create and support a community of entrepreneurs who will implement Sustainability principles in their new or existing businesses and encourage new ventures which capitalize on emerging opportunities in a sustainable economy” (www.e4sustainability.org). The organization acts as a networking and resource center and organizes seminars and educational opportunities for business leaders and those interested in sustainable enterprise.
Global Issues Resource Center
216-987-2224. East 1, Cuyahoga Community College, 4250 Richmond Road, Cleveland, OH 44122.

“The Global Issues Resource Center fosters citizen responsibility through cultivation of a global perspective on critical issues affecting our planet and its people. The Center's special focus is on sources and management of conflict; issues of diversity and multicultural understanding, the ongoing threats to global security; and environmental dilemmas” (www.global-issues.org). The Center holds educational resources on subjects ranging from arms control, global security, and environmental issues, to diversity and multicultural issues. These materials are available for educators to borrow – videos, books, magazines, games and simulations, etc. In addition, the Center sponsors skills training workshops, public lectures and seminars, and facilitates simulations and active learning events.

Green Building Coalition

“The purpose of the Cleveland Green Building Coalition (GBC) is to generate broad support for various individual efforts, build momentum, and advance the green building agenda in Cleveland and Northeast Ohio through education, consultation, and cooperation” (www.clevelandgbc.org). The Green Building Coalition sponsors workshops and speakers on green building techniques, is one of the partners in the EcoVillage project, and has spearheaded the renovation of the Cleveland Environmental Center in Ohio City as a demonstration of a green renovation that still maintains the historic character of the building. The Environmental Center will serve as office space for many of the environmental non-profits in the city.

Green Energy Ohio

Green Energy Ohio is “dedicated to promoting environmentally and economically sustainable energy policies and practices in Ohio… Current projects include conducting wind monitoring and investigating sites for wind development, working with municipal utilities on green power programs, providing training opportunities for those interested in a career in renewable energy, and promoting residential renewable energy systems for Ohioans”
They also offer seminars and training sessions on green energy systems, and information on how to purchase green electricity.

**The Holden Arboretum**

*contact: educ@holdenarb.org.  www.holdenarb.org.  440-946-4400.  9500 Sperry Road, Kirtland, OH  44094-5172.*

The Holden Arboretum is the largest arboretum in the United States. It has hiking trails that extend through varied ecosystems, as well as specimen tree areas and a visitor’s center. The Arboretum runs education programs for all ages and they also offer internships for college students and volunteer positions. In addition, the Arboretum sponsors T.E.E.N., a club for high school students interested in environmental conservation and outdoor activities. “T.E.E.N. stands for **Teen Energy for the Environment and Nature**. This club, unique in the area, will provide high school students (grades 9 - 12) with opportunities to explore, enjoy and gain service hours outdoors, meet teens from other schools and towns, and gain leadership skills” (www.holdenarb.org).

**Innovative Farmers of Ohio**

*contact: Jeff Dickinson, Director.  740-368-8552.  www.ifoh.org.  3083 Liberty Road, Delaware, OH  43015*

“Innovative Farmers of Ohio is dedicated to promoting, through research, education, and community-building activities, an agriculture that preserves and strengthens the economic, social, and environmental well-being of Ohio’s farms, farm families, and rural communities and protects and improves the health and productivity of Ohio’s land’s and waterways” (www.ifoh.org). The organization works with farmers to help them improve their practices and connect them directly to local markets. They also conduct research on farming methods with collaborating farmers, and work at the local, regional, and national levels to promote sustainable agriculture.

**Northeast Ohio Regional Alliance**

*contact: www.noraonline.org.  216-371-5114.  216-382-3456.  3860 Claridge Oval, Cleveland, OH  44118.  4672 Liberty Road, Cleveland, OH  44121.*

“The Northeast Ohio Regional Alliance is an organization of citizen, government and business leaders who believe regional collaboration is essential to preserving and creating healthy communities of all sizes. NORA’s mission is to engage the citizens of the Northeast Ohio Region in shaping and realizing a shared vision for a region which is economically, environmentally and socially sustainable”
(www.noraonline.org). NORA helps sponsor and organize seminars and speakers on topics ranging from low-income housing to urban sprawl and farmland preservation. They also support an online listing of articles and websites related to planning and sustainability.

**Ohio Environmental Council**
*contact: 614-487-7510. 1207 Grandview Avenue, Suite 201, Columbus, OH 43212*

The Ohio Environmental Council is a statewide conservation network, environmental policy leader, and government watchdog that focuses efforts on protecting Ohio’s air and water quality, scenic rivers, parks, forests and farmlands. “The mission of the OEC is to inform, unite, and empower Ohio citizens to protect the environment and conserve natural resources” (www.theoec.org).

**Ohio State University Extension – Community Gardens**
*contact: Lynn Gregor, Community and Urban Gardening. 216-397-6000. OSU Extension, Cuyahoga County, 2490 Lee Boulevard, Suite 108, Cleveland Heights, OH 44118-1255.*

The Community Gardens Extension offers groups support in starting and maintaining community and urban gardens through site-visits, organizational support, reference materials, newsletters, and workshops.

**Regional Alliance for Informal Science Education**
*contact: Info@raiseohio.org. www.raiseohio.org.*

RAISE is a coalition of organizations involved in science education in Northeast Ohio, including science museums, nature centers, parks, and environmental organizations. Among their goals are strengthening professional development opportunities for teachers, involving more students in science through interacting with schools, and strengthening ties between the informal and formal education communities. They compile listings of educational programs taught by their members.

**Shaker Lakes Nature Center**

"The Nature Center at Shaker Lakes exists for the preservation and enjoyment of a natural area surrounded by city and suburb, and for the education of all in the region so they may become stewards of the environment" (www.shakerlakes.org). The Center offers on-site
natural history and ecology lessons for toddlers through sixth graders. In addition, they have traveling programs that can come directly to the school. They are actively involved with plans for the restoration of Doan Brook.

**University School**

*contact:* Marilyn Doer, Ecology Teacher. Terry Harmen, Director of Outdoor Programs. www.us.edu. 216-831-2200. 2785 SOM Center Road, Hunting Valley, OH 44022.

University School has tremendous resources available on its Upper School campus for SE. These include woodlands and a lake for ecological studies, an active trout hatchery, a maple sugaring operation, and vegetative septic treatment systems. The school was very encouraging about the possibility of HB students working in collaboration with US students on projects there, or conducting their own studies on the property.

**Weatherhead School of Management, Case Western Reserve University**

*contact:* Hilary Bradbury, Assistant Professor. 216-368-0070. hilary.bradbury@weatherhead.cwru.edu. Organizational Behavior Department, Sears 568, 10900 Euclid Avenue, Cleveland, OH 44106-7235.

Hilary Bradbury conducts research on sustainable enterprise with specific focus on organizational change, sustainable development, and organizations in the natural environment. She teaches about organizational behavior using a whole systems approach, as well as teaching about the “triple bottom line” (economic, environmental, and social capital). She was one of the founders of the Weatherhead Institute for Sustainable Enterprise, which has since merged into a broader organization at the University.
### Appendix V: Congruence Matrix Worksheet

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An explanation of how to fill out this worksheet can be found on page 66.
Works Cited


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