Philadelphia Green Schools

Green Schools, Thriving Neighborhoods

Making the Case

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Executive Summary

This paper makes case for *Green Schools, Thriving Neighborhoods*, a vision for Philadelphia public schools. The *Green Schools, Thriving Neighborhoods* program would include:

- **Improved schoolyards** that incorporate stormwater management and creative play spaces;
- **Place-based education** curriculum, which uses the school grounds, neighborhood and larger community for lessons across disciplines with an emphasis on real-world problem solving and service learning;
- Schools that are **accessible community hubs** and that actively engage and provide resources to community members of all ages.

This model Green Schools program for Philadelphia would capitalize on the Philadelphia Water Department's efforts to promote green infrastructure on school grounds as well as bring together the disparate streams of research and support for green schoolyards, place-based education, and community schools. A successful Green Schools program would help grow community capacity to create thriving neighborhoods, in which community members are empowered to define problems, envision alternatives, and leverage local resources and partnerships to enact change.

Green schoolyards, place-based education, and community schools have many benefits to students, teachers, schools, families and communities, and the environment. Some of these benefits are shared among all three program components. These include improved academic achievement, fewer discipline problems, increased student self-confidence, and the ability to rely on partner organizations that contribute to the success of the program. Another key benefit of a Green School is a school's ability to tailor the program components to fit its own needs, the interests of students, teachers, and community members, and available opportunities.

There are also some benefits that are unique to one or two of the program components. In addition, each program component has distinct professional organizations and potential partner organizations. Green schoolyards contribute to improved environmental quality, both in terms of physical improvements to the schoolyard and in cultivating lifelong values of environmental stewardship. Place-based education has a focus on student learning, including applying student learning to community problems outside of the classroom, and on teaching students critical thinking, leadership, and citizenship skills. Community schools allow the broader community to take advantage of school assets, which, in turn, strengthens the school as community members and organizations become more invested in the school and in student outcomes.

By combining the three elements, the *Green Schools, Thriving Neighborhoods* program is able to realize these unique benefits and draw on an aggregate of partners and opportunities not afforded by any single program component. As a result, this program turns schools into vehicles for improved environmental quality, student achievement and leadership, and thriving neighborhoods.

1. Introduction

Around the country, policymakers and education reformers are working on one of our nation's most intractable dilemmas: how to create schools that cultivate students who are engaged learners and citizens and who emerge well-prepared for college and careers. This paper makes the case for *Green Schools, Thriving Neighborhoods*, a vision for Philadelphia schools. The program proposed here combines green schoolyards, place-based education, and lessons from the community schools model to create schools that are not only green but also serve as hubs for positive neighborhood change.

This is a moment of opportunity to usher in just such a program. Growing bodies of evidence support the effectiveness of green schoolyards, place-based education, and community schools in fostering environmental awareness and stewardship; increasing student achievement; and cultivating leadership skills, among other benefits.

More specifically, a confluence of opportunities in Philadelphia makes this program feasible. These opportunities include:

- The Philadelphia Water Department's green infrastructure plan
- The completion of pilot green schoolyards in Philadelphia schools
- The School District of Philadelphia's commitment to sustainability
- Strong existing and potential partners
- Innovative funding opportunities
- Local expertise in university-assisted community schools
- A growing interest in the community schools model.

In 2011, the City of Philadelphia launched the landmark *Green City, Clean Waters* plan to tackle the stormwater management requirements, enforced by the US Environmental Protection Agency and the Pennsylvania Department of Environmental Protection, using green infrastructure instead of traditional grey infrastructure.[1] The City will improve reduce stormwater runoff and increase water quality by greening 34% of impervious surface over the next 25 years. Installing green infrastructure on publicly held land, including schoolyards, is a critical part of this goal.

The Philadelphia Water Department and the School District of Philadelphia are working together to transform bare cement schoolyards into productive and playful ones. To date, eight pilot schools have completed green schoolyards, with twelve schools in the design process, and five more in the planning stages. Twenty additional schools will have their schoolyards greened in the next five years, as part of the City's expanded Green2015 plan. The School District of Philadelphia will soon be releasing GreenFutures, a framework for education for sustainability. Through GreenFutures, students will benefit from curriculum that capitalizes on schoolyard investments and utilizes green schoolyards spaces for learning.

Philadelphia's pilot green schoolyards have been achieved through successful partnership models. The Philadelphia Water Department and School District have partnered with the Parks

[1] According to the Philadelphia Water Department, green stormwater infrastructure "includes a range of soil-water-plant systems that intercept stormwater, infiltrate a portion of it into the ground, evaporate a portion of it into the air, and in some cases release a portion of it slowly back into the sewer system." (http://www.phillywatersheds.org/what_were_doing/green_infrastructure)

and Recreation Department, the Trust for Public Land, the Community Design Collaborative, the Big SandBox, and the Philadelphia Eagles among others. Incorporating the community schools model, as proposed in this paper, will strengthen school-community partnerships and attract additional partners as schools prove the model and demonstrate success.

Creative financing approaches, at both the city and state levels, provide opportunities to fund *Green Schools, Thriving Neighborhoods*. Design grants from the Community Design Collaborative, stormwater management grants from the Water Department, Restoration Fund grants from the Schuylkill Action Center, and School Redesign Initiative funding from the School District are a few of many available opportunities. General obligation bonds, as used in Denver to convert schoolyards into "learning landscapes," and social impact bonds, provide two of many potential state funding opportunities.[2]

Finally, at the University of Pennsylvania, the Netter Center for Community Partnerships' university-assisted community schools model is a national leader in the community schools movement. Based on demonstrated results at local schools, there is a growing interest in place-based education and the community schools model among City and State officials.

In Philadelphia, local expertise, proven models, established partnerships, and funding opportunities, together, present a window of opportunity for a bold and innovative approach to transforming not only the settings in which students learn but also how, and what, they learn. The model program presented here, *Green Schools, Thriving Neighborhoods*, will match *Green City, Clean Waters* in establishing Philadelphia as a nationwide leader in executing innovative approaches to improving environmental quality, education, and community development.

This paper makes the case for *Green Schools, Thriving Neighborhoods*. Section 2 presents the program vision. Section 3 establishes the definition, benefits, and provides a successful case study for each program component: green schoolyards, place-based education, and community schools. Section 4 elaborates on the benefits of each individual program component and argues that *Green Schools, Thriving Neighborhoods* would be greater than the sum of its parts. Section 5 discusses the opportunity each green school has to designate a focus area informed by the needs and strengths of the neighborhood, and uses health and food as examples to demonstrate how a focus area could contribute additionally to the synergy among program components.

Finally, Section 6 concludes the paper by imagining what a school transformed by this program would look like and feel like to the teachers, students, families and communities who work and learn there. The attached Guide to Sources and Resources Appendices detail the bodies of literature that have contributed to this paper and list expert organizations and model programs for anyone who wants to delve deeper into the content presented here.

Many of the necessary pieces are already in place. Philadelphia is poised to transform its schools into places that make learning engaging, that foster citizens and leaders, and that serve as physical and social hubs for thriving communities. This is the *Green Schools, Thriving Neighborhoods* vision.

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[2] Lois A. Brink, "The Story of Denver's Learning Landscapes," *The Field: The Professional Landscape Architects" Network*, accessed December 15, 2015, http://thefield.asla.org/2014/09/30/the-story-of-denvers-learning-landscapes/.

2. The *Green Schools, Thriving Neighborhoods* Vision

A model Green Schools program for Philadelphia would capitalize on the Water Department's efforts to promote green infrastructure on school grounds as well as bring together the disparate streams of literature on green schoolyards, place-based education, and community schools.

The *Green Schools, Thriving Neighborhoods* program in Philadelphia would include:

- **Improved schoolyards** that incorporate stormwater management and creative play spaces;
- **Place-based education** curriculum**,** which uses the school grounds, neighborhood and larger community for lessons across disciplines with an emphasis on real-world problem solving and service learning;
- Schools that are **accessible community hubs** and that actively engage and provide resources to community members of all ages.

The particular program elements of a Green School would be guided by the vision of the neighborhood in which the school is located. Each school would engage a diverse set of partners from the broader Philadelphia community for both funding and programming at the school.

A successful Green Schools program would help grow the capacity within the community to create **thriving neighborhoods**, in which community members are empowered to define problems, envision alternatives, and leverage local resources and partnerships to enact change.

Improved outcomes in thriving neighborhoods would vary based on neighborhood needs and priorities, but may include physical neighborhood improvements, more or better employment opportunities, improved public health, or a more sustainable treatment of natural resources.

3. Program Components: Green Schoolyards, Place-based Education, and the Community Schools Model

The *Green Schools, Thriving Neighborhoods* program would combine elements from the concepts of green schoolyards, place-based education, and community schools. Each program component has its own definition, literature, professional organizations, and some unique benefits. This section discusses the benefits and a successful case study of each program component. Rather than citing specific studies, this section refers to the benefits that are mentioned repeatedly in the literature to give a general picture of the benefits of each component of a Green School. The attached Guide to Sources discusses the literature and professional organizations that were drawn upon for this analysis.

Green Schoolyards

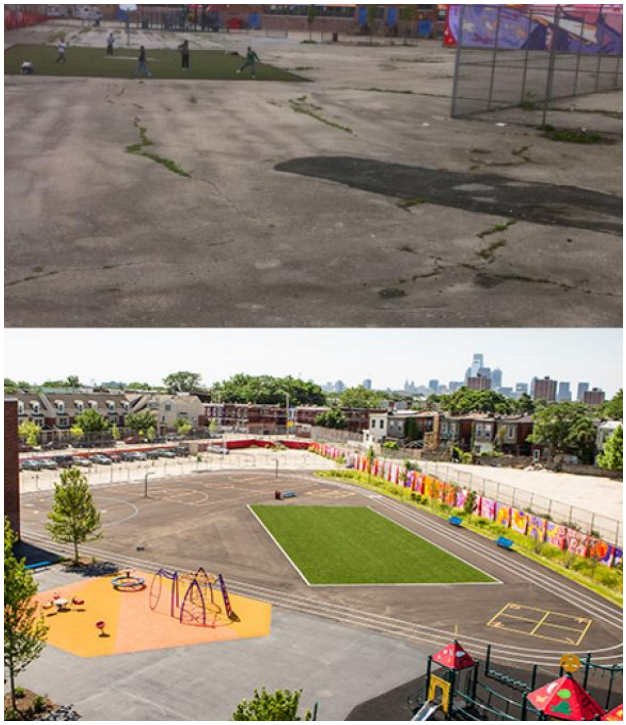
Definition

The first component of the Philadelphia Green Schools program is green schoolyards. Green schoolyards incorporate environmental elements such as stormwater management, gardens, natural play spaces, wooded areas, and more. Green schoolyards are often combined with outdoor classrooms and/or outdoor education, although this is not always a component of such a program.

Case Study

Approximately 20 green schoolyard projects already exist or are planned in Philadelphia public schools. One example is the William Dick Elementary School, which opened a new green schoolyard in 2014. The schoolyard was transformed from an asphalt blacktop to a space with playground equipment, a turf field, and a large rain garden. This project was executed through collaboration between several partners, including the school, the Water Department, the Trust for Public Land, and the Philadelphia Eagles. The Trust for Public Land coordinated student involvement in the design of the new schoolyard.

Figure 1: William Dick schoolyard before and after greening project



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Source: Trust for Public Land. https://www.tpl.org/william-dick-elementary-schoolyard-design-and-construction-journal

Benefits

The literature on green schoolyards identifies numerous benefits, including improved academic achievement for students, new curriculum connections for teachers, the ability to instill lifelong environmental awareness and stewardship in students, and improved environmental quality in the schoolyard. Figure 2 summarizes the benefits of green schoolyards to the various stakeholder groups.

Figure 2: Benefits of Green Schoolyards

To Students:

- Improved academic achievement
- Increased enthusiasm for learning
- Reduced discipline problems
- Improved self-esteem and confidence
- Less fighting and aggressive behavior
- Improved physical and mental health
- More inclusive play spaces for children of all interests and abilities

To families and communities:

- Ability to involve experts, parents, and volunteers from the community

To schools:

- Reduced absenteeism and dropout rates
- Improved test scores
- Partners that contribute to the success of the program

To teachers:

- Ability to make connections across the curriculum
- Increased enthusiasm for teaching
- Reduced discipline and classroom management issues

To the environment:

- Students become better stewards of the environment
- Environmental stewardship and conservation behaviors are carried forward into adulthood
- Large amounts of impervious surfaces are available to manage stormwater

Place-Based Education

Definition

Place-based education takes the local community and local environment as a starting place for teaching, learning, and problem solving. Place-based educators use local contexts as a springboard to extend learning to larger contexts. David Sobel provides a good working definition of place-based education:

> Place-based education is the process of using the local community and environment as a starting point to teach concepts in language, arts, mathematics, social studies, science, and other subjects across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education increases academic achievement, helps students develop stronger ties to their community, enhances students' appreciation for the natural world, and create a heightened commitment to serving as active, contributing citizens. Community vitality and environmental quality are improved through the active

> engagement of local citizens, community organizations, and environmental resources in the life of the school.[3]

Because place-based education is rooted in the local, it is concerned with the local environment *and* with social, political, and economic processes. Place-based education teaches environmental literacy and it also strives to teach civic literacy, for example.

In Philadelphia Green Schools, the incorporation of place-based education means that:

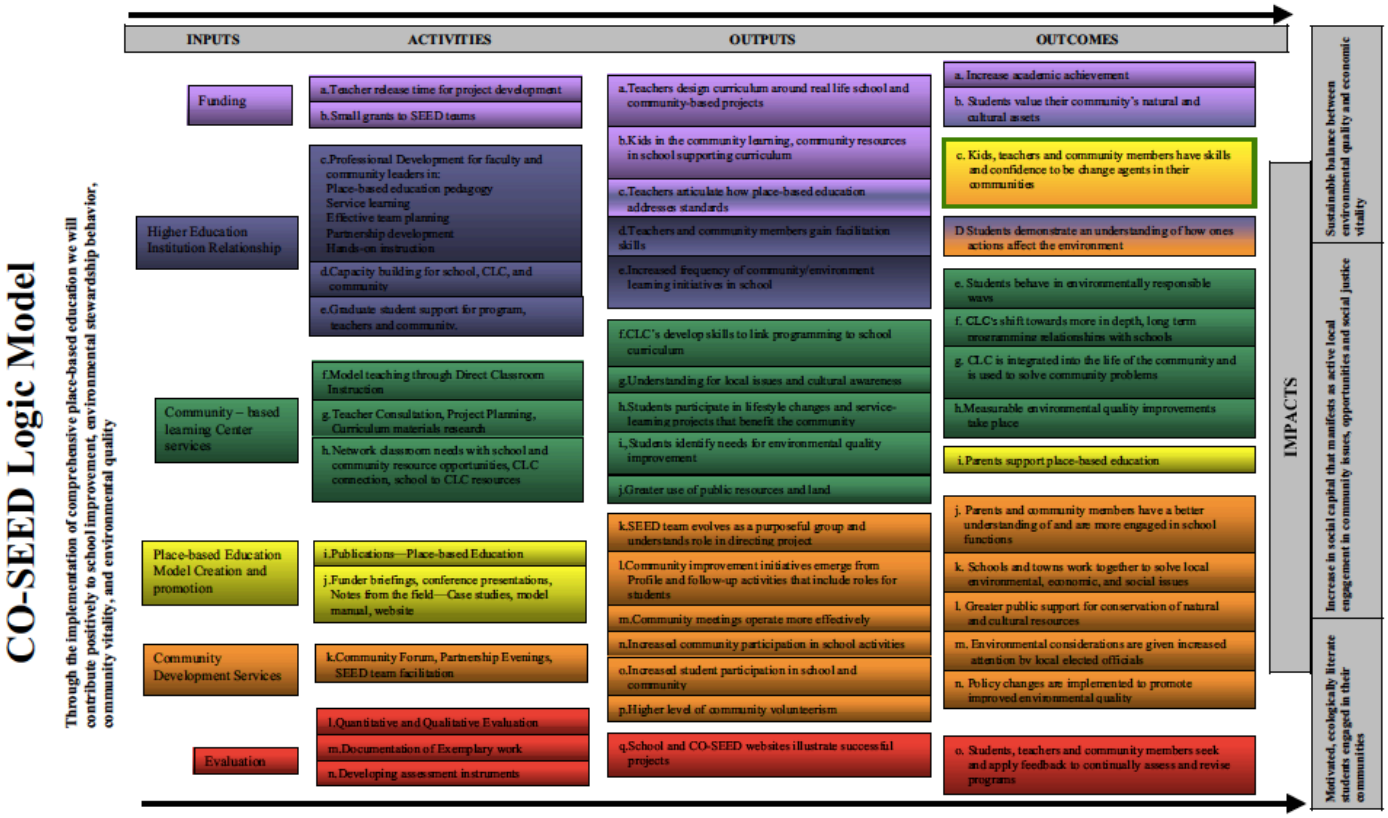
- Teachers utilize the school grounds, neighborhood, and larger community for lessons across disciplines;
- Curriculum engages community members and organizations, with an emphasis on real-world problem solving and service learning.

Case Study

CO-SEED, Community-Based Environmental Education, is a project of the Center for Place-Based Education at Antioch University of New England Institute. Started in 1997, CO-SEED establishes three-year collaborations to help communities and schools work together to develop place-based curriculum. CO-SEED works with partner schools in Massachusetts, Vermont, New Hampshire, and Maine. The model has 8 integrated components, which include: community Vision to Action forums, a site steering committee, professional development, and evaluation among other components. CO-SEED classrooms work on projects including books, community guidebooks, maps, field guides, and lesson plans. Finally, CO-SEED has established a comprehensive logic model for the implementation of place-based education programs, illustrated in Figure 3 on the next page.

[3] David Sobel, *Place-Based Education: Connecting Classrooms & Communities*, 2nd ed, Nature Literacy Series, no. 4 (Great Barrington, MA: Orion Society, 2005).

Figure 3: CO-SEED Logic Model

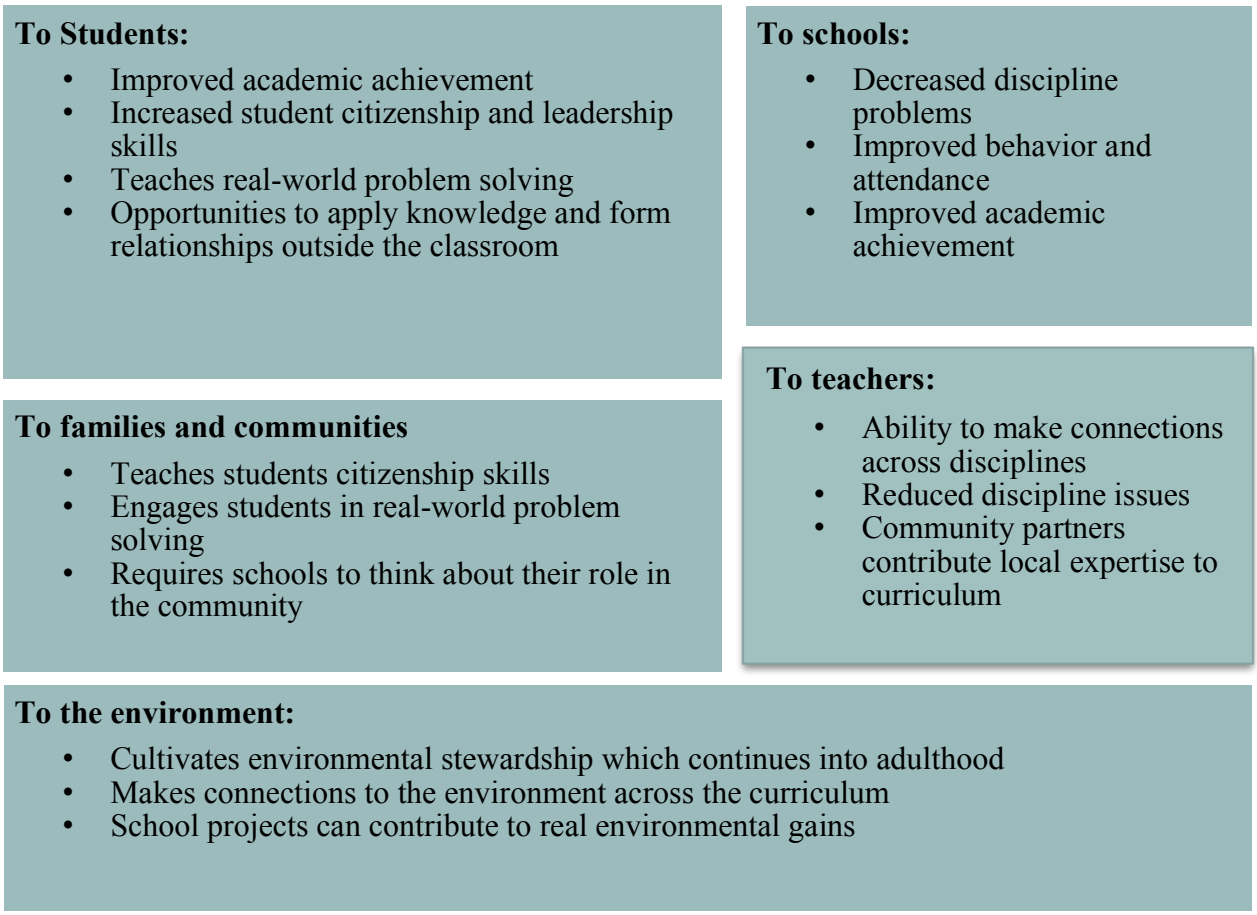


Source: Center for Place-Based Education, Antioch University of New England, http://www.antiochne.edu/wp-content/uploads/2012/08/58_logic_model_final.pdf

Benefits

Place-based education has been identified with numerous benefits. These include opportunities for students to solve real-world problems in their communities and reduced discipline problems in schools, among many others. Figure 4 summarizes the benefits of place-based education to the various stakeholder groups.

Figure 4: Benefits of Place-Based Education



Community Schools

Definition

Community schools redefine the purpose and boundaries of a school so that each school becomes a community hub. Community schools provide space and services to the greater community, and sometimes also incorporate community partnerships in curriculum and extracurricular learning. According to the Coalition for Community Schools:

> A community school is both a place and a set of partnerships between the school and other community resources. Its integrated focus on academics, health and social services, youth and community development and community engagement leads to improved student learning, stronger families and healthier communities. Community schools offer a personalized curriculum that emphasizes real-world learning and community problem-

> solving. Schools become centers of the community and are open to everyone – all day, every day, evenings and weekends.[4]

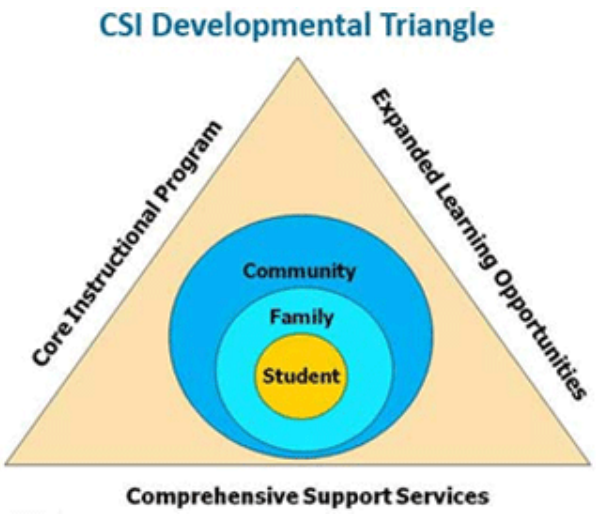
The Coalition writes that, while there are numerous local and national community school models, most share the following principles: "fostering strong partnerships, sharing accountability for results, setting high expectations, building on the community's strengths, and embracing diversity and innovative solutions."[5]

In the Philadelphia Green Schools vision, schools become accessible hubs that actively engage and provide resources to community members of all ages. Schools engage community partners in this effort.

Case Study

The Chicago Community Schools Initiative is an example of a district-wide program, operating in 120 public schools in Chicago. Each school in the program works with a partner organization that provides many of the non-academic services and an in-school resource coordinator who interfaces between teachers, parents, students, and partner organizations, and ensures that the programs are running smoothly. The built-in reliance on partner organizations decreases the burden of providing services that would otherwise fall on teachers. Schools in the program can pick their own focus for programming. Programs are generally focused on academic support, health and wellness, social and emotional health services, social and cultural enrichment, and adult education. Figure 5, the Chicago Community Schools Developmental Triangle, illustrates the components and methods of the program.

Figure 5: Chicago Community Schools Initiative Developmental Triangle



Source: Chicago Public Schools Community Schools Initiative, http://cps.edu/Programs/DistrictInitiatives/Pages/CommunitySchoolsInitiative.aspx#sub1

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4 "What Is a Community School?," *Coalition for Community Schools*, accessed December 14, 2015, http://www.communityschools.org/aboutschools/what_is_a_community_school.aspx.

5 "About Us," *Coalition for Community Schools*, accessed December 10, 2015, http://www.communityschools.org/about/default.aspx.

Benefits

Community schools have been identified with numerous benefits, including higher graduation rates, improved teacher satisfaction, more efficient use of the school building, and increased social capital through parent and community involvement. Figure 6 summarizes the benefits of community schools.

Figure 6: Benefits of Community Schools

To Students:

- Improved academic achievement
- Reduced discipline problems
- Improved self-esteem and confidence
- Improved physical health
- Improved communication skills
- Higher graduation rates and increased college acceptance rates for high school students
- Lower achievement gap between African American and white students

To schools:

- Improved test scores
- Higher graduation rate
- Positive return on investment
- More efficient use of school building
- Partners contribute to the success of the program

To teachers:

- Improved teacher satisfaction
- Reduced discipline and classroom management issues

To families and communities:

- Students and schools contribute to real-world problem solving,
- Encourages schools to consider their role and responsibility to the larger community
- Students learn citizenship and leadership skills
- Increased social capital through greater parent and community engagement
- Increased neighborhood stability
- School assets that sometimes don't exist anywhere else in the community can serve the community

4. Benefits of a Comprehensive Program

Green schoolyards, place-based education, and community schools share some benefits, but they each also have unique ones. By combining all three program components, *Green Schools, Thriving Communities*, can be greater than the sum of its parts.

The charts below summarize the benefits shared by all three program components, two of the three components, and those unique to a single component. Adding up these benefits illustrates the advantages of a comprehensive program that combines all three components.

Figure 7: Benefits of all three components

Improved academic achievement Fewer discipline problems Student self-confidence Partners contribute to the success of the program

Figure 8: Benefits shared by two components

Green Schoolyards	Place-Based Education	Community Schools

Improved academic achievement Fewer discipline problems Student self-confidence Partners contribute to the success of the program	
Students become stewards of the environment Environmental stewardship continues into adulthood Connections across the curriculum	Contribute to real-world problem solving Students gain citizenship and leadership skills Form positive relationships with adults outside of school

Figure 9: Unique benefits achieved by combining the three components

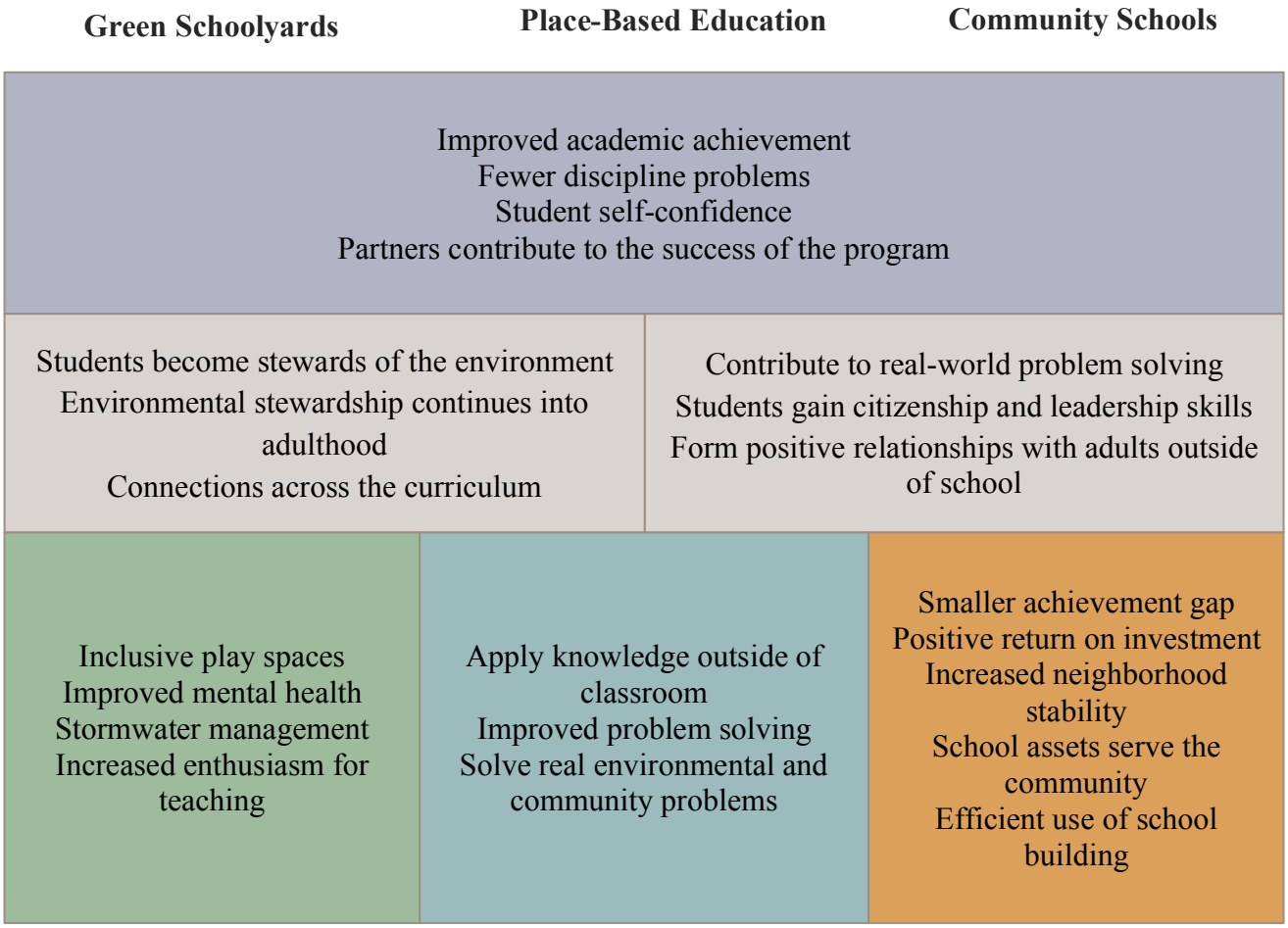

Figure 9 shows the unique contributions of each program component. Green schoolyards contribute to improved environmental quality, both in terms of physical improvements to the schoolyard and their ability to instill in students lifelong values of environmental stewardship. Place-based education has a focus on student learning, including applying student learning to community problems outside of the classroom and teaching students critical thinking, leadership, and citizenship skills. Community schools allow the broader community to take advantage of school assets, which in turn strengthens the school as community members and organizations becomes more invested in the school and student outcomes. By combining the three elements, the proposed program is able to realize these unique benefits that would not be present if one of the program components was left out.

In addition, each program component has its own unique professional organizations and potential partner organizations. A green schoolyards program could draw in the Water Department, stakeholders concerned about air quality as well as gardening and local food proponents. Place-based education programs could partner with organizations interested in environmental education and other forms of creative curriculum strategies. Community schools could partner with community organizers and health and social service organizations. Combining the components gives each Green School access to a greater pool of community partners from which to draw.

5. Illustrating a Green School: School Specific Focus

One key benefit of a Green School is a school's ability to tailor the program components to its own needs, to the interests and strengths of students, teachers, and community members, and to meet available opportunities. To illustrate what this school-specific focus could look like in practice, examples of how a Green School could focus on health or food are described below.

Health

Health is an exciting opportunity to foster greater synergies among the three model components and the additional programmatic elements that a health focus could bring. A school that elects this focus could incorporate health in the following ways:

- **Green Schoolyards:** Students study the health impacts of pollution and track and measure improvements to air and water quality. Alternatively, students grow food in raised beds and use vegetables in nutrition lessons.
- **Place-Based Education:** Health and nutrition are incorporated in curriculum. Mentorship and internship opportunities contribute to career readiness in health fields.
- **Community Schools:** A community health center located at school provides primary and preventative care for neighborhood residents. Local professionals provide internships and mentorship opportunities.

Case

The Sayre High School in Philadelphia provides an excellent example of a health-focused community school. Sayre is part of the Netter Center for Community Partnerships at the University of Pennsylvania's university-assisted community schools program. Sayre's programming includes: inquiry-based lessons in STEM disciplines; internship opportunities in peer nutrition and urban agriculture; and the Pipeline Program, a partnership with the University of Pennsylvania's Medical and Nursing Schools that provides curriculum integration and mentorship opportunities in neuroscience, cardiology, and infectious disease.

Finally, the Dr. Bernett L. Johnson Jr. Sayre Health Center provides health services to both insured and uninsured patients, and professional education for high school, undergraduate, and graduate students.[6] Sayre demonstrates the potential impact of a health-focused community school, and these benefits could be greatly extended by integrating a framework that recognizes environmental determinants of health and makes connections to green schoolyards and local environments.

Figure 10: The Pipeline Educational Program at the Perelman School of Medicine, University of Pennsylvania

Source: The Perelman School of Medicine, University of Pennsylvania, http://www.med.upenn.edu/pipeline/

[6] "Sayre High School | The Netter Center," *Netter Center for Community Partnerships: University of Pennsylvania*, accessed December 13, 2015, https://www.nettercenter.upenn.edu/programs/university-assisted-community-schools/sayre.

Benefits of a health focus

Focusing on health provides an opportunity to tap into another movement with its own strong advocacy and research. The health-promoting schools movement employs a 'setting'-based approach to health in, which shares many of the same aims as the program proposed in this paper, including: to "engage parents and the broader community," to "foster empowerment and the ability to take action, cope and generate change," and to "ensure that the curriculum is relevant to the needs of students, the school and the community."[7] Thus, the goals of the health-promoting schools movement dovetail nicely with the *Green Schools, Thriving Neighborhoods* vision and would gain additional supporters for the program.

There are many health benefits associated with green schoolyards. Evidence suggesting reduced exposure to pesticides and other chemicals, decreased exposure to ultraviolet radiation in schoolyards with more foliage and shade, and increased physical activity and fitness is well documented.[8] Additionally, green schoolyards have also been shown to contribute motor development; improve nutrition through food gardening; and improve social health through increased cooperation and inclusion. Green and natural settings have been shown to improve attentional functioning and to reduce the negative impact of stressful events.[9] Finally, a growing body of research links good nutrition to improved student achievement.[10]

Finally, the proposed *Green Schools, Thriving Neighborhoods* program has significant potential to contribute to psychosocial health and resilience. Well-documented research in psychology demonstrates that children with an understanding of family history and narrative demonstrate a greater ability to monitor the effects of stress.[11] This is largely attributed to a perception of being part of a collective larger than themselves. Green schoolyards, place-based education and the community schools model all may contribute to a student's perception of belonging. Place-based education focuses on local issues, and the increased connections to community that occur in the community schools model, can both contribute to a student's understanding of "neighborhood narrative." Students who understand community history and neighborhood narrative are better positioned to weather challenges resiliently and to be creative agents of change.

Food

Food is another potential focus area for a Green School. A Green School that chooses to focus on food could incorporate food into the curriculum in the following ways:

- **Green Schoolyards:** Students learn about gardening and food production in a school vegetable garden.

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[7] Anne C. Bell and Janet E. Dyment, "Grounds for Health: The Intersection of Green School Grounds and Health-promoting Schools," *Environmental Education Research* 14, no. 1 (February 2008): 77–90, doi:10.1080/13504620701843426.
[8] Ibid.
[9] Ibid.
[10] James Vaznis, "Fresh-Made Meals a Learning Experience at Schools," *Boston Globe*, December 5, 2015, http://www.bostonglobe.com/metro/2015/12/05/test-kitchen/3seH35zL96MMFWenYE5KBK/story.html.
[11] Feiler Bruce, "The Stories That Bind Us - This Life," *The New York Times*, March 15, 2013, sec. FASHION & STYLE, http://nyti.ms/17TFZmv.

- **Place-based education:** The vegetable garden is used as part of the curriculum in a variety of subject areas. In addition, a restaurant run by students teaches business and problem-solving skills and provides opportunities for hands-on job training.
- **Community Schools:** Community members work in a garden after school and in the summer. The school may partner with nearby community gardens and urban farms to provide additional food for the restaurant. The restaurant, which uses produce from the garden, is open to community members as well as used for school lunches.

Figure 11: School vegetable garden

Source: http://www.geograph.org.uk/photo/3043271

Benefits

An additional group of organizations and literature focuses on growing food at schools. For example, the Edible Schoolyards Project has a mission of building and sharing an "edible education" program, and provides many curricular, cooking, and gardening resources to interested schools. The National Farm to School Network is an advocacy organization working to bring local food and agriculture into schools. In addition to working with these national organizations, a Green School focused on food could bring in an additional group of local partner organizations, including urban farms, local chefs, and restaurants.

Edible schoolyards and farm-to-school programs have many of the same benefits discussed in relation to the Green School program components such as improved academic achievement, student behavior, and physical health. In addition, these types of programs improve student health by providing nutritional food, lower environmental impacts associated with food

production and transport by growing food locally, and provide job training for students interested in careers in the restaurant industry or agriculture.[12]

6. Revisiting the Vision

To review, a successful Green Schools program in Philadelphia would include:

- **Improved schoolyards** that incorporate stormwater management and creative play spaces;
- **Place-based education** curriculum**,** which uses the school grounds, neighborhood and larger community for lessons across disciplines, with an emphasis on real-world problem solving and service learning;
- Schools that are **accessible community hubs** and that actively engage and provide resources to community members of all ages.

What does such a school look like? What does it feel like for the students who learn there and the teachers who teach there? How has the school changed for the parents who pick their kids up from school and utilize the services that are now convenient and accessible, such as evening adult education classes or a community health clinic? How has the transformation of the school changed the neighborhood and the broader Philadelphia community?

The transformation of a school into a Green School is most physically evident in the transformation of its schoolyard. The expanse of pavement, with little visual interest and little to inspire play or inquiry, becomes an outdoor classroom and a living laboratory. The simple landscape provides a generative space for classroom lessons *and* for imagination – transformed through play into a magical forest or a merchant's district. Green infrastructure provides ecosystem services such as stormwater management and pollution filtering, and also provides an opportunity for students of all ages to design and implement science experiments and to monitor real environmental quality improvements.

Through the incorporation of place-based curriculum, the local neighborhood, community, and ecology becomes the focal point for learning across disciplines. Students learn to 'read' neighborhood landscapes and gain an understanding of the social, political, environmental, and economic forces that have shaped their neighborhoods over time. Through this 'landscape literacy' they are empowered to imagine how their neighborhoods could be different and to design ways to enact change.[13] Students practice applied critical thinking, and service learning provides opportunities to direct learning toward addressing real community problems. Already natural leaders, students further develop leadership capacity as they take on responsibility for identifying problems and executing solutions from beginning to end. Through the focus on local issues, schools begin to engage community organizations as partners in place-based curriculum and service learning projects.

Finally, schools become hubs that offer resources to community members of all ages. A school may begin to offer adult education in the evening, house a social service office, build an edible

[12] "The Benefits of Edible Education - Literature Summaries," 2012, http://edibleschoolyard.org.
[13] Anne Whiston Spirn, "The Nature of Mill Creek: Landscape Literacy and Design for Ecological Democracy," July 10, 2014.

garden with plots for the community, or even create a community health center. As community members are drawn in by these services and resources, they come to see the school as the center of the community. Local organizations and people – a neighborhood's 'experts' - are engaged in contributing to curriculum. The school fulfills its potential as a neighborhood asset and provides physical and social space for a dynamic, multigenerational community of people learning and enacting positive neighborhood change together.

The School District of Philadelphia, meanwhile, sees rising test scores and increasing numbers of students graduate prepared for college and careers. The City is able to bring in nationally and internationally renowned partners such as the Philadelphia Water Department, the Pennsylvania Horticultural Society, and the Netter Center for Community Partnerships, which contribute to the success of the program through expertise, funding, and innovation. Philadelphia is recognized as a leader for addressing educational, environmental, social, and economic problems with one comprehensive program, all the while building the capacity of people in the community.

This vision may seem distant, but Philadelphia already has many of the components in place. The City's use of schools for stormwater management, the presence of university-assisted community schools, and the current focus on education reform make it well positioned to implement *Green Schools, Thriving Communities*. By combining elements of green schoolyards, place-based education, and community schools, Philadelphia can create a program that turns schools into vehicles for thriving neighborhoods.

Appendix A: Guide to Sources

This paper drew from literature about green schoolyards, place-based education, and community schools. All three types of programs have their own bodies of literature and national research and advocacy organizations. This Guide to Sources provides a summary of the most useful resources for each program component for those who are interested in further reading. A full bibliography of the sources consulted for each section of this report follows.

Green Schoolyards

Several reports summarize the research on the impact of nature, green space in schoolyards, and outdoor learning on student outcomes, including academic, social, and physical benefits. The Boston Schoolyard Funders Collaborative's "Schoolyard Learning: The Impact of School Grounds" evaluates whether there is information that can correlate the characteristics of well-designed schoolyards with improved learning and child development. "Nature Nurtures: Investigating the Potential of School Grounds" is a comprehensive literature review by Evergreen on the impacts of green schoolyards projects. "A Review of Research on Outdoor Learning" is a literature review of the effect of outdoor learning in the United Kingdom, including but not limited to school grounds projects.

Much of the writing about green schoolyards is practice-focused literature on how to design and implement green schoolyards. Books that discuss strategies for designing and implementing green schoolyards projects, and also provide case studies of successful green schoolyards, include *Asphalt to Ecosystems* by Sharon Danks, and *Natural Learning* by Robin Moore and Herbert Wong. Research and advocacy organizations working on green schoolyards include the Center for Green Schools, the Natural Learning Initiative, Green Schoolyards America, and Evergreen's Greening School Grounds program.

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Place-Based Education

Place-based education draws from a number of different educational reform movements and concepts including, but not limited to: environmental education, environmental literacy, and place- and community-based education.

Much of the literature about place-based education is written by David Sobel at Antioch University of New England. *Place-Based Education: Connecting Classrooms and Communities* by Sobel and *Place- and Community-Based Education in Schools*, co-written by Gregory A. Smith, are excellent resources that both investigate the benefits of these approaches and provide numerous case studies. "The National Green School Guidelines", published by the Center for Place Based Education at Antioch University, offers a comprehensive definition of what a green school could be and a self-assessment tool for schools. The guidelines are based on five criteria: curriculum integration, school grounds enhancement, community-based education, school sustainability, and administrative support. The Place-Based Education Evaluation Collaborative (PEEC) is a partnership of organizations and programs that work together on program evaluation and provide links to research related to place-based education on their website.

The environmental education movement has extensive advocacy and research. "Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning," a report by Gerald A. Lieberman and Linda L. Hoody, introduces the concept of the Environment as an Integrated Context (EIC) for learning and investigates the educational benefits of EIC-based education. *Education and the Environment: Creating Standards-Based Programs in Schools and*

Districts, also by Gerald A. Lieberman, and discusses how to successfully create and implement a cross-disciplinary environment-based education program and provides examples of schools and districts that have implemented EBE curriculum. Organizations like the National Association of Environmental Education and the National Environmental Education Foundation promote and publicize research on environmental education. Finally, organizations like Project Learning Tree, Project WILD, and Project WET offer nationally recognized environmental education curricula.

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Community Schools

The Community Schools movement has a long history, beginning with the writings and work of John Dewey on the importance of education to democracy and civic capacity. Today, the Coalition for Community Schools (CCS), housed at the Institute for Educational Leadership, is the major policy and advocacy organization in the movement. CCS is an alliance of local, state, and national organizations in the community schools movement and also in primary education, community development, health and family services, and government among other areas. CCS publishes much of the research available about community schools and their results. "Making the Difference: Research and Practice in Community Schools" describes the community schools vision and goes over 20 evidence-based evaluations of community school programs. "The Role of Community Schools in Place-Based Initiatives: Collaborating for Student Success," a report by William R. Potapchuk and co-published by CCS, explores the need to align resources designated for a specific "place" to collectively improve outcomes for children, youth, families, and communities.

The Netter Center for Community Partnerships at the University of Pennsylvania is home to a University-Assisted Community Schools Program that has been nationally replicated. *Dewey's Dream: Universities and Democracies in an Age of Education Reform*, by Lee Benson, Ira Harkavy and John Puckett, explores the history and principles of the University-Assisted Community Schools model.

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Appendix B: Resources: Organizations and Programs

This appendix provides a listing of expert organizations and example programs for each program component, for those readers who wish to seek further information or visit successful programs to observe some of our recommended component parts in action.

Green Schoolyards

Expert Organizations

- Green Schoolyards America - http://www.greenschoolyards.org/home.html
- Evergreen - Greening School Grounds - http://www.evergreen.ca/our-impact/children/greening-school-grounds/
- Natural Learning Initiative - https://naturalearning.org/
- The Edible Schoolyard Project - http://edibleschoolyard.org
- Center for Green Schools - http://www.centerforgreenschools.org/
- Community Design Collaborative - Philadelphia, PA - http://www.cdesignc.org
- The Big SandBox - Philadelphia, PA - http://thebigsandbox.org
- The Trust for Public Land - https://www.tpl.org
- Design for Learning - American Architectural Foundation's Center for the Advancement of Architecture - http://www.archfoundation.org/category/design-for-learning/

Example Programs

- Boston Schoolyard Initiative - http://www.schoolyards.org/
- Philadelphia Water Department Green Schools - http://phillywatersheds.org/what_were_doing/green_infrastructure/programs/greenschools
- Edible Schoolyard Berkeley - http://edibleschoolyard.org/Berkeley
- North Carolina Department of Public Instruction (DPI) Outdoor Learning Environments Initiative - https://naturalearning.org/north-carolina-department-public-instruction-dpi-outdoor-learning-environments-initiative

Place-based Education

Expert Organizations

- The Center for Place-Based Education - http://www.antiochne.edu/anei/cpbe/
- The Rural School and Community Trust - http://www.ruraledu.org
- The Place-Based Education Evaluation Collaborative - http://www.peecworks.org/PEEC/PEEC_Inst/
- North American Association of Environmental Education - https://www.naaee.net
- National Environmental Education Foundation - http://www.neefusa.org
- US Environmental Protection Agency's Environmental Education Webpage - http://www.epa.gov/education
- Green Schools National Network - http://greenschoolsnationalnetwork.org/about/

Example Programs

- CO-SEED - http://www.antiochne.edu/coseed/

- The Young Achievers Science and Mathematics Pilot School, Boston, MA - http://www.youngachieversschool.org
- Expeditionary Learning Education Schools - http://eleducation.org
- Environmental Charter Schools - Los Angeles, CA - http://ecsonline.org
- West Philadelphia Landscape Project - http://www.wplp.net
- The Mill Creek Project - http://www.annewhistonspirn.com/teacher/mill-creek.html
- Project Learning Tree - https://www.plt.org//
- Project WILD - http://www.projectwild.org
- Project WET - http://www.projectwet.org

Community Schools

Expert Organizations

- Coalition for Community Schools - http://www.communityschools.org/
- National Center for Community Schools - http://nationalcenterforcommunityschools.childrensaidsociety.org
- Netter Center for Community Partnerships - University of Pennsylvania, Philadelphia - https://www.nettercenter.upenn.edu

Example Programs

- University Assisted Community Schools - Netter Center for Community Partnerships - https://www.nettercenter.upenn.edu/programs/university-assisted-community-schools
- Sayre High School - Philadelphia, PA - https://www.nettercenter.upenn.edu/programs/university-assisted-community-schools/sayre
- Chicago Community Schools - http://cps.edu/Programs/DistrictInitiatives/Pages/CommunitySchoolsInitiative.aspx
- The Federation for Community Schools – Illinois - http://www.ilcommunityschools.org
- SUN Community Schools - Multnomah County Oregon – https://multco.us/sun/sun-community-schools
- Cincinnati Public Schools Community Learning Center - http://www.cps-k12.org/community/clc