GREEN SCHOOLYARD

District Design Guidelines

JULY 2022

Contributors:

Brenda Kessler, Children & Nature Network

Jaime Zaplatosch, Children & Nature Network

Craig Johnson, Interpret Green

Holly Sauter, Metropolitan Water Reclamation
  District of Greater Chicago

Jane Tesner Kleiner, nature + play designs

Kas Kinkead, Osbourne Consulting

Anne-Marie Spencer, PlayCore

Danielle Denk, Trust for Public Land

Advisors:

Amy Wagenfeld, Amy Wagenfeld Design

Anne Mueller, Austin Independent School District

Lisa Howard, BAY TREE DESIGN

Priya Cook, Children & Nature Network

Mikaela Randolph, Children & Nature Network

Sharon Danks, Green Schoolyards America

Marya Fowler, National Wildlife Federation

Crystal Jennings, National Wildlife Federation

Cam Collyer, People and Place Consulting

Acknowledgements:

Table of Contents
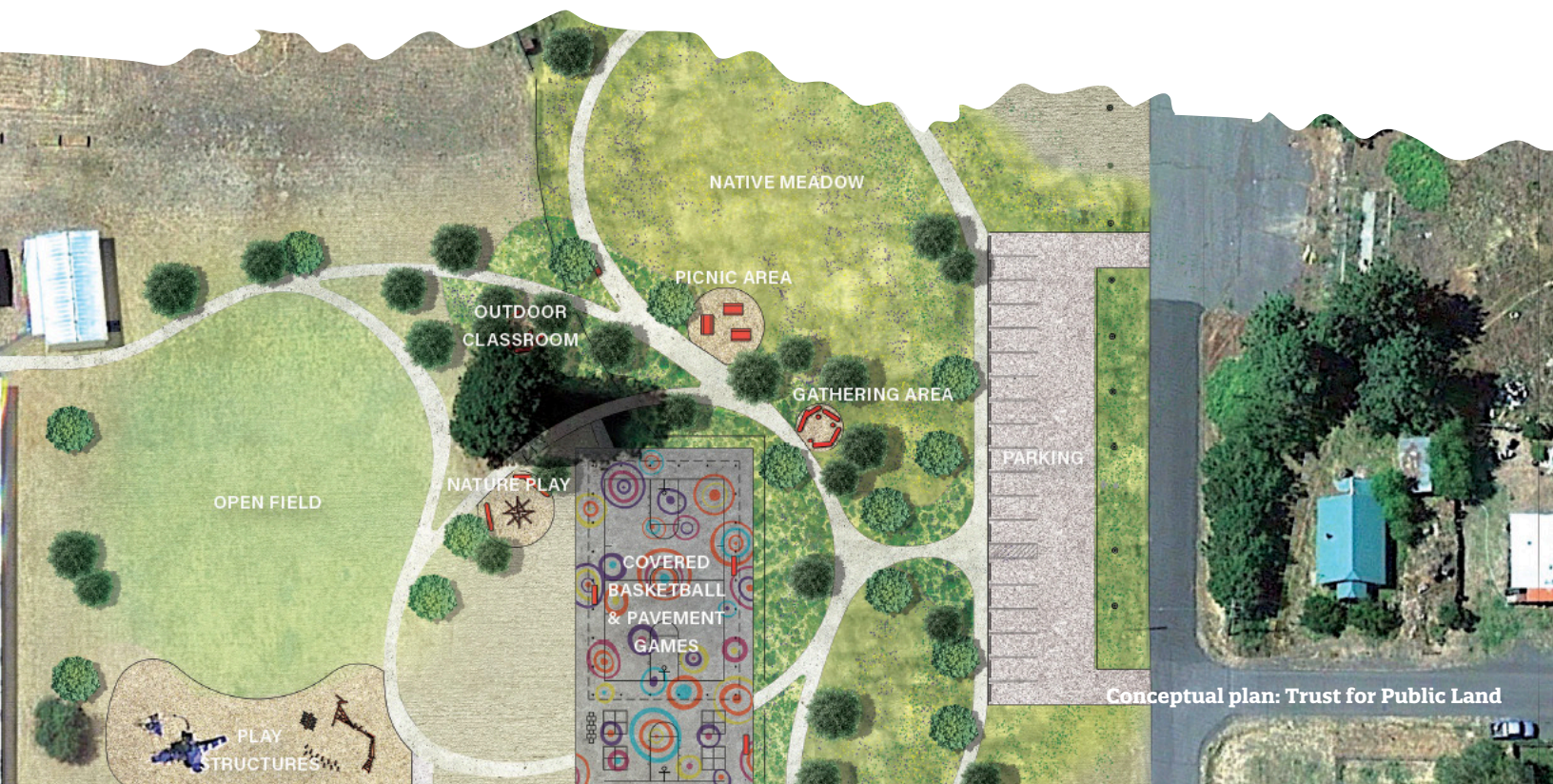
Executive Summary

At the heart of the *Green Schoolyard District Design Guidelines* lies the belief that all children should have regular access to nature at school. This seemingly simple idea can have profound impacts on health and education outcomes for students, staff and the broader school community. For too long, we've overlooked the tremendous potential of schoolyards to support school and staff needs while revitalizing neighborhoods and building stronger communities. The *Green Schoolyard District Design Guidelines* gives school administrators a pathway to help your school district create its own guidelines for infusing nature into childrens' everyday lives by upgrading existing systems or planning and designing new systems. Written with input from experts in the field, we hope this publication serves as a guiding tool to build support, create meaningful partnerships, and innovate the way your district uses outdoor spaces to address the many critical issues K-12 systems face today. We know that nature is not just good for human health; it also improves children's ability to concentrate and learn! Kids who are healthier, calmer and less depleted can learn better. Nature does that and much more.

In the *Green Schoolyard District Design Guidelines* you will find success stories from a range of school communities that have transformed how they use and design (or redesign) the school's outdoor spaces for playing and learning. You will witness how children's intellect, curiosity, and imagination awaken when given the opportunity to flourish. District administrators are key agents for change across the system, but we firmly believe that students and their families should be granted a front seat during and after the transformation process. Some of the most successful U.S. green schoolyard programs to date reflect student and community-driven efforts.

Although this publication was written with school district staff in mind, we hope it serves as a resource for anyone involved in the planning, designing and transforming of the outdoor spaces where children grow, learn and play. Building strong relationships between children and the natural world has never been more critical. Green schoolyards have the power to nurture and develop new generations of children who will be more likely to value and protect the natural world in their adult life. Without children who value nature, there is no life.

We sincerely hope your district will join the movement!

NATIVE MEADOW

PICNIC AREA

OUTDOOR CLASSROOM

GATHERING AREA

PARKING

NATURE PLAY

OPEN FIELD

COVERED BASKETBALL & PAVEMENT GAMES

PLAY STRUCTURES

Conceptual plan: Trust for Public Land

If we want children to flourish, to become truly empowered, then let us allow them to love the earth before we ask them to save it.

— *David Sobel, Author and Environmental Educator*

Background

Where children grow, play and learn matters. All children – regardless of their racial background, family income, or physical ability – deserve to attend schools that provide healthy, positive learning environments that maximize their potential, interests and enthusiasm. Education leaders like you can positively impact the well-being of children for a lifetime to come by creating high-quality learning spaces that promote meaningful experiences. The potential of schoolyards and the surrounding outdoor areas should be included as a learning environment. An abundance of research tells us that nature-filled schoolyards can enhance childhood learning and play experiences while providing connection with the natural world.[1] Learning outdoors and in nature can be traced back centuries but with the rise in technology, urban sprawl, perceived safety concerns, and heavy traffic, children are spending increasing amounts of time indoors. Furthermore, pressure placed on educators to reach certain benchmarks, that often don't align with the way students learn, has limited opportunities for students to learn outside the classroom.

This has resulted in a more indoor, high tech, sedentary lifestyle that is having profound health effects on the mental and physical well-being of young people.[3] Children are more stressed, less physically active, and detached from the natural world. Creating access to nature on school grounds — the only public lands allocated explicitly for use by children — can have a lasting impact on children's health and well-being, especially those who are most vulnerable and from communities experiencing economic disadvantage.

Increased interest in expanding learning opportunities by connecting children to the outdoors, compounded with the need to prepare children and youth for the complex responsibilities of citizenship in modern societies, has catalyzed a greening movement around the country and world. School districts of all sizes and populations are getting creative in finding viable solutions to turn traditional asphalt schoolyards into vibrant greenspaces. All while helping grow healthy, just and more sustainable communities! Many school districts also extend the benefits to community members by opening up the schoolyard during non-school hours.

Turning to schoolyards during COVID-19 and beyond

The COVID-19 pandemic and its variants upended educational and public health infrastructures, forcing educators to think creatively about how to use outdoor spaces – which were deemed safer by experts – for learning. Weeks into the public health emergency, schools sought out solutions to safely return to in-person instruction, including adapting schoolyards into outdoor classrooms. Success stories emerged from all corners of the world, prompting a desire from parents, students and staff for outdoor learning opportunities to continue beyond the pandemic. The COVID-19 Outdoor Learning Initiative was founded to support school leaders, teachers and families with practical guidance for taking learning outdoors. There are many lessons learned from the pandemic, perhaps one of the most important ones is that nature is truly our ally. Now, more than ever, we need green schoolyards to provide quiet, reflective spaces that can help ease the burden caused by long-term social isolation, uncertainty, trauma, and stress. For inspiration and resources on activating outdoor spaces for learning, please visit Green Schoolyard America's COVID-19 Library. It is our hope that these success stories will encourage education leaders to prioritize activating underutilized outdoor spaces and promoting systemic changes that support outdoor learning at all schools.

1 Why Green Schoolyards?

What is the extinction of a condor to a child who has never seen a wren

— *Dr. Robert Michael Pyle, Author and Biologist*

Why green schoolyards?

Currently, only a small fraction of public schoolyards in the United States have any kind of natural outdoor area that children can access. Most are covered with asphalt and have outdated play equipment that is not always engaging or physically challenging. And nature is nowhere to be seen. For many children, these schoolyards are the only outdoor spaces in which they are allowed to play during their daily lives. About 95% of the nation's children and adolescents are enrolled in schools, where they typically spend six hours a day for up to 13 years. Turning asphalt schoolyards into nature-rich spaces that spark children's curiosity, promote physical activity, discovery and fascination is recognized as a powerful strategy for healthy childhood development. Greening schoolyards is about much more than aesthetic enhancements; but should be seen as extensions of the classroom. It is about what happens to children and youth when they are able to see with their eyes and touch with their hands the universal delights of nature. There is significant scientific research that shows the numerous benefits — physical, mental and emotional — that come from students learning outdoors. Studies also reveal a positive relationship between children's access to natural recreational environments and physical health outcomes. Green schoolyard features can be aligned
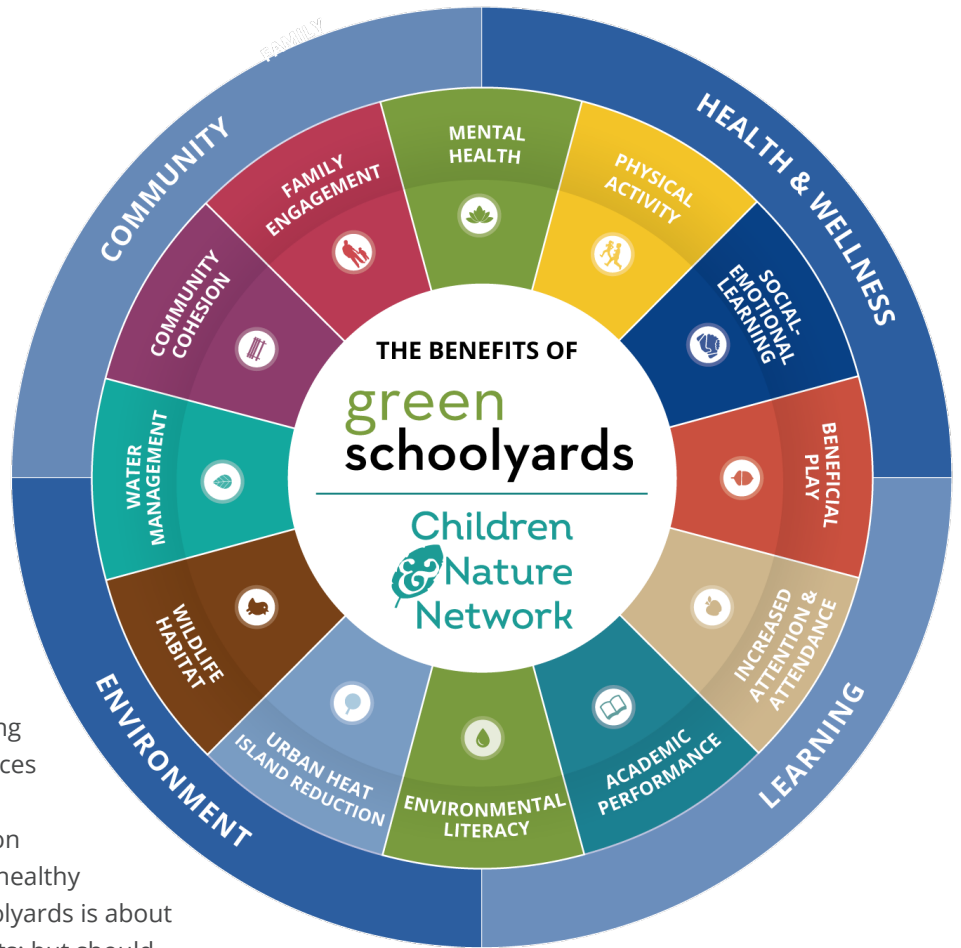
Figure 1. A visual representation of the multiple benefits of green schoolyards created by the Children & Nature Network.

with your district's educational philosophy and used as a resource to bring classroom learning outdoors. Unlocking the potential of America's public schoolyards means creating spaces that inspire future generations and infuse students with an appreciation for time spent outdoors so they can become agents of change.

Increasing access to greenspace

Greening schoolyards can help ensure that all children and youth have access to the benefits of nature. Public school districts are usually one of the top landholders in cities. Greening public schoolyards and opening them to all during non-school hours can solve the problem of outdoor access for one-fifth of the nation's 100 million people who currently don't have a park close to home. Read more about our nation's park gap in this report from The Trust For Public Land.
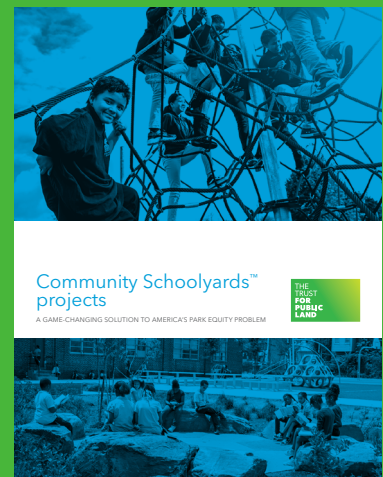
About these guidelines

These guidelines were inspired by and intended to support school district staff (like you!) in creating your own design guidelines – tailored to meet the needs of your region and community and endorsed by your district. Our goal is that your school district creates procedures that meet the needs of your students and staff, align with your district priorities, and benefit members of all ages in your community. In the online resources section at the end of this publication you will find samples of what other school districts have developed. The content of this publication was written with input from experts in the field, including academics, professional landscape designers, and district-level staff from across the country. Whether you are designing a new area or retrofitting existing spaces, the considerations outlined throughout this document

are meant to help you make careful, balanced decisions about how to best integrate nature and other features throughout your school district. By creating practical guidelines that existing school staff, as well as new hires, can turn to for support, you are taking a step in the right direction to creating a successful green schoolyard program.

There are many ways to approach your district's guidelines, as detailed in this document and represented in the green schoolyards benefits wheel above.

We look forward to seeing what your district develops!

What this Guide Is:

☑ Best practices, standards for design and clarity for all project stakeholders on how to create design guidelines for a green schoolyard program

☑ A process improvement tool to enhance and supplement a school's green schoolyard program building strategy

☑ A collection of resources to help integrate health, equity and climate resilience benefits into a green schoolyard program

☑ Guidance on programming to support uses of outdoor spaces for teaching, wellness and play

What this Guide Is Not:

☒ A stand-alone guide that must be followed thoroughly

☒ A prescriptive set of features and strategies for green schoolyard programs

☒ A substitute for subject matter experts on public health and social equity or for education and design experts

Key Terms

Your guidelines should be a unifying document to create a common language throughout every department of a district. Draft language or definitions should be shared at the outset to ensure a shared understanding of what is being discussed. Here, we offer you some key terms that can be useful in this process:

Americans with Disabilities Act: A law that guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, state and local government services, and telecommunications.

Climate resilience: The ability to prepare for, recover from, and adapt to the impacts of climate change.

Compost: Decomposed garden or food material used in planting beds to amend from above and hold moisture where it is needed.

Ecological design: A type of landscape design that is compatible with a site's environment in both appearance and sustainability without negative impacts on the environment.

Ecosystem: A biological community composed of living organisms, all of which function together interdependently within the environment's physical factors.

Equitable nature access: Free, universal access to high-quality nature spaces and experiences where individuals feel welcomed, safe, valued and empowered to participate regardless of race, color, culture, or income.

Green schoolyard: A multi-functional, nature-filled outdoor space that offers students, teachers, parents and community members places to play, learn, explore and grow.

Green stormwater infrastructure (GSI): The use of soils, plants, and other permeable surfaces to mimic natural processes to slow, sink and spread stormwater where it falls, to avoid flooding, pollution, and erosion.

Health equity*: The fair and just opportunity to be as healthy as possible by removing obstacles such as poverty and discrimination, and their consequences, including powerlessness, ack of access to things like good jobs with fair pay, quality education, secure housing, safe environments and health care.

Inclusion: Ensuring that all individuals and groups can be and feel welcomed, respected, supported and valued in the places where they live and learn.

Joint use agreement (also known as shared use or community use agreements): A formal agreement between two separate entities – often a school and a city or county – setting forth the terms and conditions for shared use of public property or facilities.

Impervious surfaces: Surfaced areas which prevent or retard the entry of water into the soil, causing water to run off the surface in greater quantities.

Loose parts: Open-ended, natural materials that can be moved or carried and taken apart in multiple ways and that inspire children's imagination and creativity on their own terms and in their own unique way.

Microclimate: Variations in temperature and growing conditions based on elevation, sunlight, drainage, or wind that differ from those in surrounding areas.

Nature-based learning: An educational approach that uses the natural environment as the context for learning.

Nature play area: A play area that has been designed in accordance with recognized national guidelines to capture the health, developmental and educational benefits of play in nature using natural materials.

* As defined by the Robert Wood Johnson Foundation

Outdoor classroom: An external shelter or space within the school grounds which creates a practical area for outdoor learning.

Participatory design: The act of working together in a spirit of mutual respect, acknowledging that each person brings something of value to an initiative.

Permeable surfaces: Materials that provide stormwater infiltration while serving as structural surfaces.

Place-based learning: An educational approach that leverages the power of place by engaging students in their community, including their physical environment, local culture, and history.

Play-based learning: A type of early childhood education based on child-led and open-ended play.

Pollinator garden: A garden that is planted predominately with flowers that provide nectar or pollen for a range of pollinating insects.

Rain garden: Shallow, vegetated basins that collect and absorb rain and runoff from rooftops, sidewalks and streets.

Rainwater harvesting system: A mechanism to collect and store rainfall for later use. (e.g., rain barrels)

Social emotional learning (SEL): The process through which all young people and adults acquire and apply the knowledge, skills, and attitudes for healthy interpersonal development.

Urban heat island: An urban or metropolitan area that is significantly warmer than its surrounding rural areas due to human activities.

Wildlife habitat: Areas across the landscape that fulfill the basic requirements such as food, water and shelter of native wildlife species.

2 Creating district-wide design guidelines

Conservatory Green

Conservatory Green is a shared school campus for two Denver Public School of Science and Technology schools: Conservatory Green Middle School and High Tech Elementary School. This Learning Landscape includes an outdoor exploratory area with natural materials and numerous native plantings.

Creating district-wide design guidelines

Creating design guidelines for your green schoolyards program will help ensure its long-term success. For instance, when your facilities manager decides to retire or you onboard a new curriculum director, your design guidelines will support the continuity, efficiency and consistency of the program. While guidelines take time to develop, they support a holistic design approach and help ensure that the program and its features meet the competing needs of the school district.

Throughout each section of this guide, you will find case studies about initiatives and collaborations from different school districts that illustrate the guidelines in practice. From city-school partnerships, to policies and maintenance and stewardship plans, these guidelines are also accompanied by supporting resources that provide further insight into each section outlined in the district-wide roadmap below.

District-Wide Roadmap

Forming a team

Vision & Goal Setting

Identifying policies

Developing cross-sector partnerships

Equitable Site-Selection

Connecting to Curriculum

Community Access

Evaluating Impact
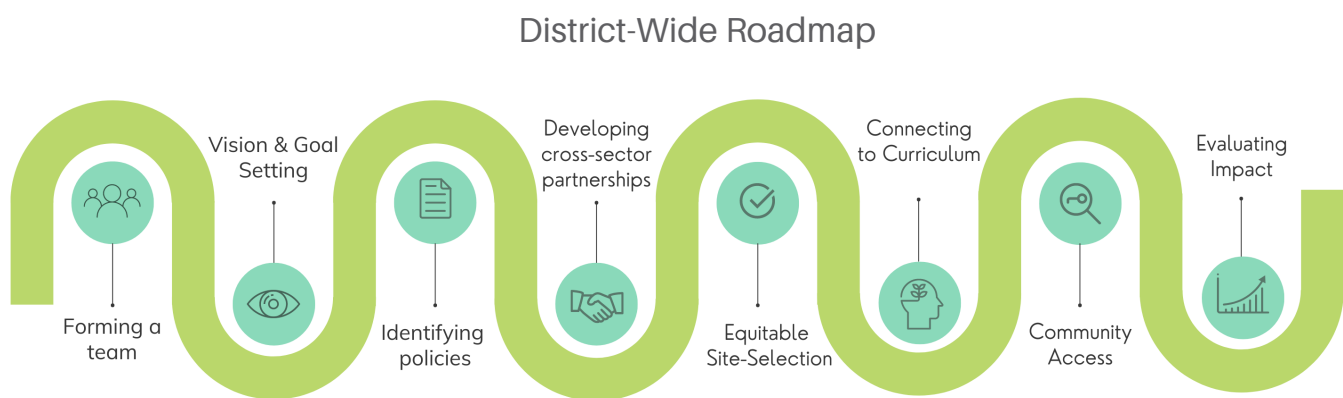
Figure 2. A roadmap outlining the key themes in the process of developing a district-wide green schoolyard program.

Overcoming common barriers

Effecting large scale change requires persistence! Don't get stuck early on in some of these common barriers. There are approaches to help overcome them all and the benefits will be worth the effort!

- **Time:** Set expectations that this work will take time. A little more time planning is worth the effort to get the best project fit for your district

- **Funding:** Many upfront costs for materials can form part of a community-building experience. Tap into local resources, partners and businesses.

- **Long-term maintenance:** Thoughtful planning and adequate design will minimize longer term costs by picking the right materials and plants for the site conditions and anticipated uses.

- **Lack of use:** Great projects without proper coordination may not get used! Coordinate with the intended users early in the planning process to ensure the features support the school community.

- **Ownership:** Who "owns" the new features can get tricky. Discuss how best to spread out the workload so that it is manageable for all of the partners.

- **Voices:** Include student voices, as well as the paraeducators, teachers, specialists, families and community partners when developing policies and projects. When there is broad input the outcome will be that much richer.

- **Top-down and bottom-up approaches:** Advancing work with the support of key leadership is great, but also embrace grassroots support. Both are essential for long-term success.

- **Scalability:** Large projects can feel overwhelming. Start small, plan in phases, keep momentum to add on as teachers, students and families transition through the schools. Small projects can have big impacts!

Team building

Teamwork makes the dream work! A districtwide green schoolyard program has many moving parts and will require a core team of dedicated individuals that can carry forward different tasks along the way. Successful implementation of green schoolyard programs bring together individuals with different skill sets who can help develop a vision, build lasting relationships, care for the new features and most importantly, enjoy every step of the way!

School District **STAKEHOLDERS**

Facilities/ Grounds · Leadership · Curriculum · Communications · Nutrition · Health · Risk Management · Specialty Programs

Figure 3. District stakeholders that play a key role in the development of a green schoolyard program.

Internal stakeholders: Who is at the table?

The support and knowledge from a diverse group of stakeholders are integral to the process of creating your own green schoolyard district guidelines. Each district-level stakeholder (see Figure 2) can provide different perspectives to inform the development of a green schoolyard program for multiple benefits. Principals, teachers, nurses and other school-level staff are great to bring in when the site-level work begins. If your school district is intentional about adding Green Stormwater Infrastructure (GSI), then the water or sewer utility agencies need to partner on the design guidelines because they will have

stringent requirements that can quickly contradict if not discussed upfront. Similarly, park and recreation agencies can often bring in resources for maintenance if the sites are designed to meet their standards.

It is important to identify who is and who is NOT at the table. Being intentional in reaching out to individuals from different expertise, cultural, gender, racial and ethnic backgrounds is key to creating a school culture that values diversity.

? Guiding Questions

How will you communicate with potential stakeholders about your program?

Does the district team need expertise from external experts (i.e., stormwater management) to write guidelines?

How do your team's demographics reflect those of the school community?

Can the team shape engagement to address any gaps between the internal team and the broader school community?

How will you recruit individuals to represent stakeholders who are missing from the table?

Vision and goal setting

Developing a shared sense of purpose will help to ensure that your team moves forward with intention and alignment. Each school district has different yet compelling reasons for creating a green schoolyard program. For instance, a district may seek to prioritize features throughout elementary schools to increase physical activity and promote health and well-being. Others may seek ways to expand hands-on learning opportunities that connect to the science and math curriculum to boost academic achievement. The visioning process is highly individualized and should reflect the purpose, core values and philosophy of your school district. What makes green schoolyards such a powerful investment is that regardless which of the benefits ignites the initial actions, the other benefits will follow.

Clear Communication

A clear vision will allow partners to invest in your project confidently. For a successful vision-setting process, administration support should be clearly communicated to staff, and staff should feel comfortable sharing feedback with the administration. Clear channels of communication and expectations in both top-down and bottom-up approaches can help to pave the road for success!

Photo: Christian Phillips
Photography: Boston Schoolyard Initiative

How will we get there?

Once your team has defined a clear vision, it's time to set some specific goals. Think of your goals as a navigation system that will provide the team control over the destination. Setting measurable goals can facilitate the team's ability to benchmark progress. Outlined below are some common district goals and how scientific research on green schoolyards has shown to help reach these goals.

» Boost academic performance

Research has documented increased standardized test scores, enhanced attitude about school, improved in-school behavior, improved attendance and overall enhanced student achievement when students learn in and about nature.

» Improve health and wellness

Green schoolyards promote physical activity by offering a variety of active play options that engage children of varying fitness levels, ages and abilities.

» Value diversity and inclusion

By serving as local community hubs, green schoolyards offer students and residents safe, trusted and nearby places to connect with nature and with each other.

» Increase community and environmental benefits

Outdoor experiences help students to increase understanding of their natural and human communities, which leads to a sense of place. Through connection to place, students develop stronger environmental attitudes and civic behaviors. cool urban areas increase biodiversity and decrease water pollution by using different types of green stormwater infrastructure.

» Prepare students with real-world skills required to secure jobs and build careers

Green schoolyards provide real-world planning and implementation for Career Technology Education and other skills-building programs, through architectural, engineering, horticulture, natural resources, and environmental science solutions to add new features to campuses.

» Improve social-emotional development

Social emotional learning helps students manage their personal attitudes and behaviors, as well as their relationships with others. By promoting kindness, sharing and empathy, green schoolyards create a positive learning environment in which children can thrive.

» Increase community engagement

The planning, design, and implementation of green schoolyard projects provide opportunities for school communities to come together to build pride and ownership over their campuses and to showcase local cultures, ideals and qualities.

Identifying policies that support green schoolyards programs

Kids can't play and learn outside if they can't get outside! Assessing the status of policies, plans, ordinances and legislation that support opportunities for green schoolyards is fundamental to ensuring children and staff will indeed use the new schoolyards as intended. School districts seeking systematic ways to effect and sustain outdoor learning opportunities must consider existing and potential policies across public agencies, statutes and codes that could support or deter their efforts. While green schoolyards are yet to be fully integrated into federal infrastructure policies, planning processes, and funding streams, there are numerous federal and state policies that have the potential to support your efforts. We've seen creative strategies across the country to help leverage federal funds, so don't be discouraged!

School leaders have taken a grip on municipal sustainability plans, climate action ordinances, nutrition guidelines, and wellness programs, among others, to help underpin their schoolyard greening efforts.

Public funding opportunities: leveraging federal, state and local policies

Public policies are often tied to funding opportunities. Because green schoolyards provide many different co-benefits, a single project may be eligible for a variety of private and public grant programs. For instance, school districts in coastal areas may seek grant funding for a flood risk reduction project that uses nature-based solutions. This same community could consider applying for coastal resilience grants, habitat conservation grants, and improving water quality grants. Conducting a quick policy scan can provide some baseline knowledge of existing policies and practices that your district could leverage. The Children & Nature Network developed Green Schoolyards Policy Landscape Scan resource to assess the status of policies, plans, ordinances or legislation that support opportunities for equity-based, districtwide, open access green schoolyards.

School leaders have been able to leverage policies at all levels of government to build an equitable, robust, and thriving green schoolyard program. From green stormwater infrastructure to urban forestry, current policies and programs can help you transform asphalt schoolyards into nature-filled, vibrant spaces where children, staff and the environment can thrive.

- Clean Water Act
- Federal Climate Adaptation and Resilience Plans
- 10 Minute Walk Campaign
- USDA School Garden Programs
- EPA Consent Decrees
- Children's Outdoor Bill of Rights (COBOR)
- School Education Specifications
- Environmental Literacy Plans

Check out the "The Youth Outdoor Policy Playbook", a resource that highlights existing and promising policy solutions for increasing youth engagement in the outdoors.

Guiding Questions

Has your school district instituted a public document, public statement, strategy, program or budget allocation that supports systemwide green schoolyards?

What federal and state policies can your district leverage to implement a district-wide green schoolyard program?

What existing school-wide policies support student and staff access to nature and outdoor learning?

Federal policies leveraged in green schoolyard programs

Photo: John Taggart School, a TPL project
in the School District of Philadelphia

The School District of Philadelphia

Philadelphia's public schoolyards presented a unique opportunity to help the city comply with the state's provisions for the Clean Water Act (CWA). The CWA is the primary federal law governing water pollution, which is overseen by the Environmental Protection Agency. Municipalities are often issued permits that limit the amount of pollutants they can discharge into the nation's waters. Stormwater pollution occurs when debris, chemicals, sediment or other pollutants are washed into storm drains and flows into water bodies. The Philadelphia Water Department (PWD) created a Stormwater Management Incentive Program that offered funding for schoolyard projects to reduce

stormwater pollution in Philadelphia's creeks and rivers. Stormwater construction or retrofitting projects allow schools to add features such as rain gardens, bioswales, permeable pavement and other elements that benefit the entire community and the environment.

PWD and its partners developed A Guide to Stormwater Management on School Campuses that discusses what schools can add to manage stormwater while providing educational opportunities. PWD also offers a curriculum guide and teacher resources for connecting students in the classroom with real-world learning based on successful lessons and activities.

State policies leveraged in green schoolyard programs

Photo: Evergreen Public Schools

Photo: San Francisco Unified School District

Washington

The Office of Superintendent of Public Instruction in Washington state established a policy requiring that new state-funded school construction projects greater than 5,000 square feet incorporate high-performance features into their school design and construction. Schools in Washington can use the Washington State Sustainability Protocol, a green building guide for new and modernization school construction that includes credits for updates to campus designs for outdoor learning and landscape elements.

As Vancouver Public Schools implemented the recent capital bond program, the design team used the guidelines to build sustainable schools both inside the building and throughout the campus including multiple outdoor classrooms, hands-on garden spaces, inclusive playgrounds and native plantings.

California

Authored by Assembly member Phil Ting of San Francisco (D), the Living Schoolyard Month resolution (ACR-128) was adopted by state legislators on June 16, 2014. The resolution establishes an annual, statewide celebration of school grounds to be held each year in May and urges the State Department of Education, school districts, county offices of education, and charter schools to continue to prioritize the design and construction of accessible green spaces on school campuses. It also advocates for the integration of green spaces into the teaching of standards-based curriculum. California has been a national leader in the school garden movement since 1995, when then Superintendent of Public Instruction Delaine Eastin collaborated with chef Alice Waters to create the Garden in Every School initiative through the California Department of Education. In 1999, the state established the Instructional School Gardens Program (AB 1014) to support garden-based learning. Since then, tens of thousands of children in California have reaped the multiple benefits of school gardens.

School Policies and Guidelines to Support Green Schoolyards

School boards should consider adopting policies and procedures that enable students and staff to have positive learning and playing experiences outdoors. The absence of clear policies and guidelines that support getting features on the ground or allowing teachers to take students outside can thwart your efforts. Clear guidelines will benefit everyone, including stakeholders who need to identify the level and nature of capital investments required for each facility. Below are some examples of policies that often ensure that your green schoolyard program is successful.

SUBJECT MATTER	DESCRIPTION
Environmental Literacy Plans (ELPs)	ELPs lay out a roadmap to achieving environmental literacy in each state. ELPs are used as a guiding document for the development of an environmental education curriculum. NAAEE State Environmental Literacy Plans: Status Report
School gardening curriculums	
Health-oriented school food policies	Policies that acknowledge that healthful eating helps to improve student, faculty, and staff health, concentration and learning.
Recess and lunchtime policies	Policies and guidelines that support increased outdoor recess times and ensure that recess is not withheld for academic or punitive reasons.
Landscape and tree/vegetation guidelines	Lists of acceptable plants, including which to avoid (invasive/toxic plants), preferred plants and native species selection guide. Tree canopy guidelines can support healthy shade cover for high-use areas such as recess zones (for sunny/hot climates).
Liability risk assessments	Natural play areas that support active physical play must comply with U.S. playground safety guidelines. Your school's risk and safety experts can help create a more informed framework for safety and liability that still allows healthy risk-taking opportunities and gross motor development with natural materials.
Grounds maintenance	Standards that allow more flexibility in planting types and maintenance practices such as no-spray healthy school zones, leaf cleanup (leave the leaves), acceptable plant lists and pruning/weeding standards.
Volunteer stewardship guidelines	Guidelines permitting volunteers and community partners to efficiently support planning, installation and stewardship of green schoolyard features. When volunteers can successfully contribute, they are more likely to support the school in the future.
Joint-use agreements	City-school district agreements to provide community access to school campuses after school hours and on weekends. These can also be called shared use or open access agreements.
Project and features approval process	A clear application and approval system for schools and volunteers to submit and get approval on their projects on campus.
Specific features guidelines	See more in the section on Individual school design process.

19

Photo: iStock Photos

Berkeley Unified School District, California

A pioneer in the school garden movement, Berkeley Unified School District (BUSD) recognized early on the district's role in improving the health and wellness of the entire community. The BUSD Board saw the important connection between a healthy diet, physical activity and a student's ability to learn effectively and achieve high standards in school. In 1999, BUSD established a policy that ensured a school garden was available in every school. The policy gives all district students "the opportunity to plant, harvest, prepare, cook, and eat food they have grown."

The district-wide school garden program ensures that all children across schools have the opportunity to learn about the food system while connecting with nature. The program has its own curriculum that directly supports BUSD learning and teaching goals. The program also has dedicated garden instructors at every school, as well as a growing nutrition and cooking program. The cooking and gardening program is supported by funding from The California Department of Food and Agriculture.

City and school board policies that support green schoolyard programs

Photo: Austin Independent School District
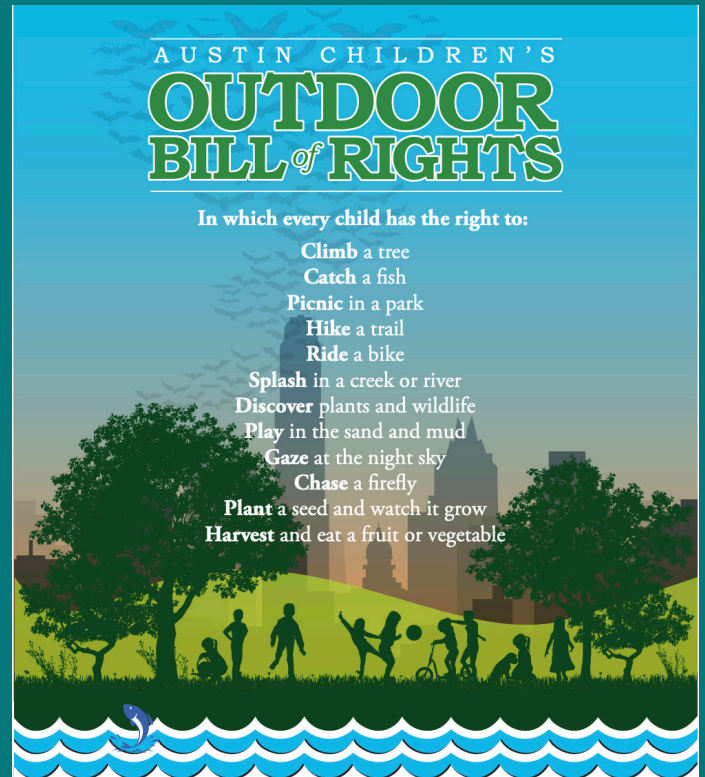
Austin Independent School District, Texas

Austin Independent School District (AISD) developed a districtwide sustainability framework that includes schoolyard improvement projects that support connection to nature and outdoor learning. An established Environmental Sustainability Advisory Committee serves as an advisory body to the superintendent and makes policy recommendations. A key to the success of AISD's school yard greening program was the approved AISD Educational Specifications. The Educational Specifications set the standard for the way educational facilities should be designed and built to support students and teachers. Such guidelines set performance goals for development of appropriate physical space in locations that best meet the needs of learners.

Furthermore, Austin's Cities Connecting Children to Nature Initiative, the Parks and Recreation Department, along with dozens of partner organizations, created the Austin Children's Outdoor Bill of Rights (COBOR). Austin City Council unanimously voted to pass the COBOR on January 26, 2017 with the support of more than 1,000 citizens, key partners such as Austin Independent School District, and Mayor Steve Adler. The Children's Outdoor Bill Of Rights inspired Texas Children in Nature to create a Campus Campout Guide to encourage schools to rethink their school grounds as parks. The Austin Independent School District incorporates the outdoor rights into nature goals within its sustainability plan.

Activate for outdoor learning: connecting to the curriculum

Curriculum and instruction leaders, content area specialists, and teachers play a vital role in the success of green schoolyards. When creating your district guidelines, consider how students at all grade levels can learn about the physical and biological characteristics of their communities in a coherent and contextualized manner. While standards outline a state's expectations for what should be taught, curriculum determines how content is taught. There's a plethora of opportunities to connect curriculum to a green schoolyard across all grade levels. Most elements of a green schoolyard, including the planning and design process, can be used for valuable place-based education and project-based learning opportunities. Examples of this include:

- Connecting your schoolyards with Next Generation Science Standards' Science and Engineering Practices

- Using the schoolyard design process for project-based learning opportunities (i.e., building garden beds or designing a path)

- Supporting a Garden-Enhanced Nutrition Education curriculum

- Allowing children to explore their natural curiosity

- Connecting the schoolyard to youth leadership by giving students decision-making opportunities to direct change

- Adopting place-based education projects that connect learners to their communities

- Encouraging the use of green schoolyard spaces and features in after-school programming

- Support "planting" art in the school gardens in the form of murals, sculptures, mosaics, and mazes

Curriculum Resources:

LifeLab: A national leader in the garden-based learning movement, Life Lab offers workshops, consultations, and professional development for educators across the country. https://lifelab.org/

Evergreen: Evergreen provides a wide collection of free resources to support the outdoor learning practices of educators, parents and caregivers across the globe. https://www.evergreen.ca/

North American Association for Environmental Education (NAAEE): Engage students in local environmental issues, investigate solutions, devise a plan, and take action through NAAEE's resource hub. https://naaee.org/
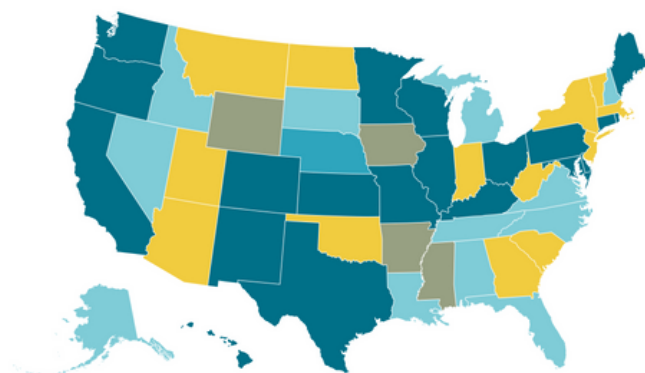
ELP Stages by State

- **Have not yet begun ELP development:**
  AR, IA, MS, WY
- **Drafting stage:**
  AZ, GA, IN, MA, MT, ND, NJ, NY, OK, SC, UT, VT, WV
- **Completed but not adopted:**
  AK, AL, FL, ID, LA, MI, NC, NH, NM, NV, SD, TN, VA
- **Adopted but not implemented:**
  NE
- **Implementation underway:**
  CA, CO, CT, DC,DE, HI, IL, KS, KY, MD, ME, MN, MO, OH, OR, PA, RI, TX, WA, WI

Figure 4. U.S. map of current efforts to adopt Environmental Literacy Plans by state. Credit: North American Association of Environmental Educators (NAAEE 2020)

Photo: Reflo - Milwaukee Public Schools

Milwaukee Public Schools, WI

Milwaukee Public Schools (MPS) has partnered with community organizations and municipal agencies including Reflo Sustainable Water Solutions, Metropolitan Sewerage District, Fund for Lake Michigan, the City of Milwaukee, and the National Fish and Wildlife Foundation to turn asphalt schoolyards into greener playspaces and gardens, with improved stormwater management. The green stormwater infrastructure has been a core component of MPS's green schoolyards program. The site improvements not only help to divert millions of gallons of stormwater runoff from local waterways, but also provide creative opportunities to incorporate STEAM (science, technology, engineering, arts and math) concepts in student learning and promote community engagement

La Escuela Fratney, a citywide dual-language immersion school in the Riverwest neighborhood that serves approximately 500 students, began its multi-year redevelopment process in 2018. The core team ensured that the conceptual plan considered many stakeholder perspectives including those of students, parents, teachers, administrators, maintenance staff, neighborhood residents, and project partners.

The outdoor spaces help build strong classroom communities, promote social emotional learning , provide dedicated space for conflict resolution and support a variety of curricular lessons for K3 through 5th grade students. The ESL teachers are able to support English language development using vocabulary and visuals in the green spaces. Special education teachers have the ability to work with students in small groups in a natural setting to promote focus and increase student engagement.

Developing community partnerships

Strong collaboration and long-lasting partnerships are common denominators among successful green schoolyard programs. Building relationships and partnerships outside of the school community can strengthen the school district's ability to address different priorities and needs. While having internal support for greening schoolyards is fundamental, there must also be an intentional external partnership development process to ensure the program's long-term success. Thriving programs don't rely on one key partner but rather diversify their partnerships and funding streams to achieve multiple goals. Coordinated efforts between school districts, municipal agencies, and community organizations also ensure that resources are maximized for all. Don't shy away from small local businesses. We've seen small organizations offer

expertise, material contributions, grants, volunteers and in-kind donations. In turn, they earn positive recognition from the community that helps support their business. The result: everyone benefits from strengthened relationships between school and the broader community.

Make sure you take some time to identify who is already serving your community. Green schoolyard projects around the country have allowed school districts to build partnerships in unlikely places, such as water and sewage agencies, local hospitals and nearby universities. We look forward to learning who your district will partner with to make your green schoolyard program successful!

MUNICIPAL AGENCIES	COMMUNITY ORGANIZATIONS	SERVICE GROUPS	OTHERS
• Water utility • Public Works • Transportation • Parks and recreation departments • City councils • Mayors caucuses • Multi-agency consortiums	• Environmental organizations • City green teams • Neighborhood associations • Gardening groups • Local arts council • Climate action groups	• Faith groups • Rotary Clubs • Fraternal organizations • Scout groups • Peace	• After-care providers • Education foundations • Local businesses • Community banks • Local universities • Local hospitals

Figure 5. Determining who to bring into the planning process and when will vary across school districts and will reflect your district's unique vision and goals.

Guiding Questions

Which partners are you already working with in your green schoolyards discussions?

Which partners could or should your group be working with?

Which partners are you already working with in your green schoolyards discussions?

Which partners could or should your group be working with?

How involved should a specific partner be? There can be varying levels of involvement for different partners.

What current in-school or after-school offerings and partnerships support green schoolyards?

Photo: Space to Grow: Greening Chicago Schoolyards

Space to Grow: Greening Chicago Schoolyards

Space to Grow: Greening Chicago Schoolyards is a partnership comprising three municipal agencies –Metropolitan Water Reclamation District of Greater Chicago, Chicago Department of Water Management, and Chicago Public Schools and two non-profit partners (Openlands and Healthy Schools Campaign). The program partners spent 18 months building a shared vision and goals for the Space to Grow program, while they piloted four schoolyard transformations that included green stormwater infrastructure.The program uses a unique capital funding model that leverages public investment of resources and expertise from Chicago's water management agencies – the Department of Water Management and Metropolitan Water Reclamation District of Greater Chicago – as part of an integrated and comprehensive solution to managing the city's stormwater and flooding issues. The remaining capital funding comes from Chicago Public Schools. Space to Grow has opened more than twenty-five schoolyards across the city, with a focus on underinvested neighborhoods.

Photo: Grand Rapids Public Schools; Jaime Zaplatosch

Grand Rapids Public Schools, MI

A great example of the potential of private-public partnerships is the work between the City of Grand Rapids and Grand Rapids Public Schools. Burton Elementary and Ken-O-Sha Elementary are two of a series of projects that have benefited from numerous partners coming together to create a better space for students and their families. The City of Grand Rapids has leveraged taxpayer dollars and private grant funding to provide residents with the greatest possible impact. Burton Elementary/Middle received a $101,000 contribution from the city's Department of Environmental Services, which went toward the construction of a wetland area that allows for a more sustainable approach to stormwater management and resulted in a wetland play space with log bridges and stepped boulder pathways. Through these partnerships, students and community members are able to enjoy access to more greenspaces. Other improvements include outdoor classrooms, native gardens and natural playscapes that feature a stump forest made from local trees harvested by the Grand Rapids Forestry Division.

Partnerships and collaboration in Grand Rapids are the only way in which great projects like this happen. Many cities speak about great collaborative efforts. Grand Rapids is the first city in which I've ever lived and worked where collaboration goes much further than just talk.

— *David Marquardt*
Director of Parks and Recreation,
City of Grand Rapids

Common points of disagreement: How to move the guidelines and execution forward?

- Use concise materials, plain language, simple examples and anecdotes to introduce stakeholders to the benefits of green schoolyards.

- Create messages that people can relate to. Tailor your messages to fit the different priorities, interests and backgrounds of the groups and individuals that you are seeking to engage.

- Frame your efforts in a context that is meaningful and lays out the immediate and long-term benefits.

- Anticipate any questions and formulate the answers in advance. This shows the community members that you are prepared to lead the change.

- Lean on the advocates. Not everyone will understand why things look different or messier.

- Consider long-term viability and project sustainability during the early stages of planning to anticipate potential barriers to success.

- Listen to negative feedback carefully to discern the reasons behind the pushback.

- Consider safety and accessibility concerns. Green schoolyards should be welcoming for all users, including BIPOC community members, people with accessibility needs and teachers unfamiliar with teaching outside.

Photo: Space to Grow: Greening Chicago Schoolyards

Site selection with equity in mind

Green schoolyards can be powerful tools to help narrow equity gaps among different neighborhoods. Studies indicate that access to public greenspaces, including parks and nature preserves, varies across racial and economic lines. The early stages of the COVID-19 pandemic reminded all of us the importance of access to high quality greenspaces. Green schoolyards provide countless physical and psychological benefits for urban communities, while enhancing individual and community health resilience during a pandemic and beyond. We encourage selecting and prioritizing sites according to data on school, community and environmental needs and school ground quality, in exchange of interest-based or opt-in models.

School districts should consider existing community assets and the community's most pressing needs. School districts are likely to have more than one school with dire need for improvements. Demographic and socioeconomic indicators can help inform an equity analysis and determine which sites should be prioritized. Below you will find different site selection resources that can assist your team in applying an equity lens to site selection as you continue to write your district design guidelines.

Explore Park Access in Your Neighborhood

Transforming schoolyards into park-like playgrounds can provide access to high-quality greenspaces, especially in communities that have been systematically under-resourced. Parkserve® is a tool developed by The Trust For Public Land that assesses park access for nearly every city and town in the United States, providing communities the information needed to close the park equity gap. School districts can use this valuable tool to determine how many families in their district have access to a park within a 10-minute walk.

Selection criteria: How will your program prioritize school projects?

Selection criteria can be used to identify underserved schools and communities that most urgently need greenspace. Here are some examples of criteria to consider:

- ✓ Inventory and assessment of existing spaces for placement of various green schoolyard elements
- ✓ Risk and liability review of sites' existing features and need for safety/maintenance updates
- ✓ Sites that are open to the public after-hours
- ✓ Sites that can take advantage of neighborhood partner programming (such as Boys and Girls Clubs, Playworks, etc.)

- ✓ Flooding risk and stormwater capture
- ✓ Accessibility to high-quality greenspace
- ✓ Percentage of children receiving free and reduced lunch
- ✓ Current tree canopy
- ✓ Communities particularly vulnerable to the greatest impacts of climate change.
- ✓ School readiness
- ✓ Geographic & socio-economic equity
- ✓ High-priority need for a playground

28

A Story Map

Cities Connecting Children to Nature

Children Population Factors
0 - 999 = 0
1,000 - 4,999 = 1
5,000 - 9,999 = 2
10,000 - 19,999 = 3
=>20,000 = 4

Inverse Tree Canopy Factor by Zipcode

Inverse Tree Canopy Factor
0% - 24% = 0 (all/mostly trees)
25% - 49% = 1
50% - 74% = 2
75% - 99% = 3
100% = 4 (no trees)

Potential for Impact by Zipcode

Total Demographic Ratings by Zipcode
- MHI
- Child Population
- Inverse Tree Canopy

Crime in Parks

Crime Data
Burglary of Vehicle
Simple Assault
Theft
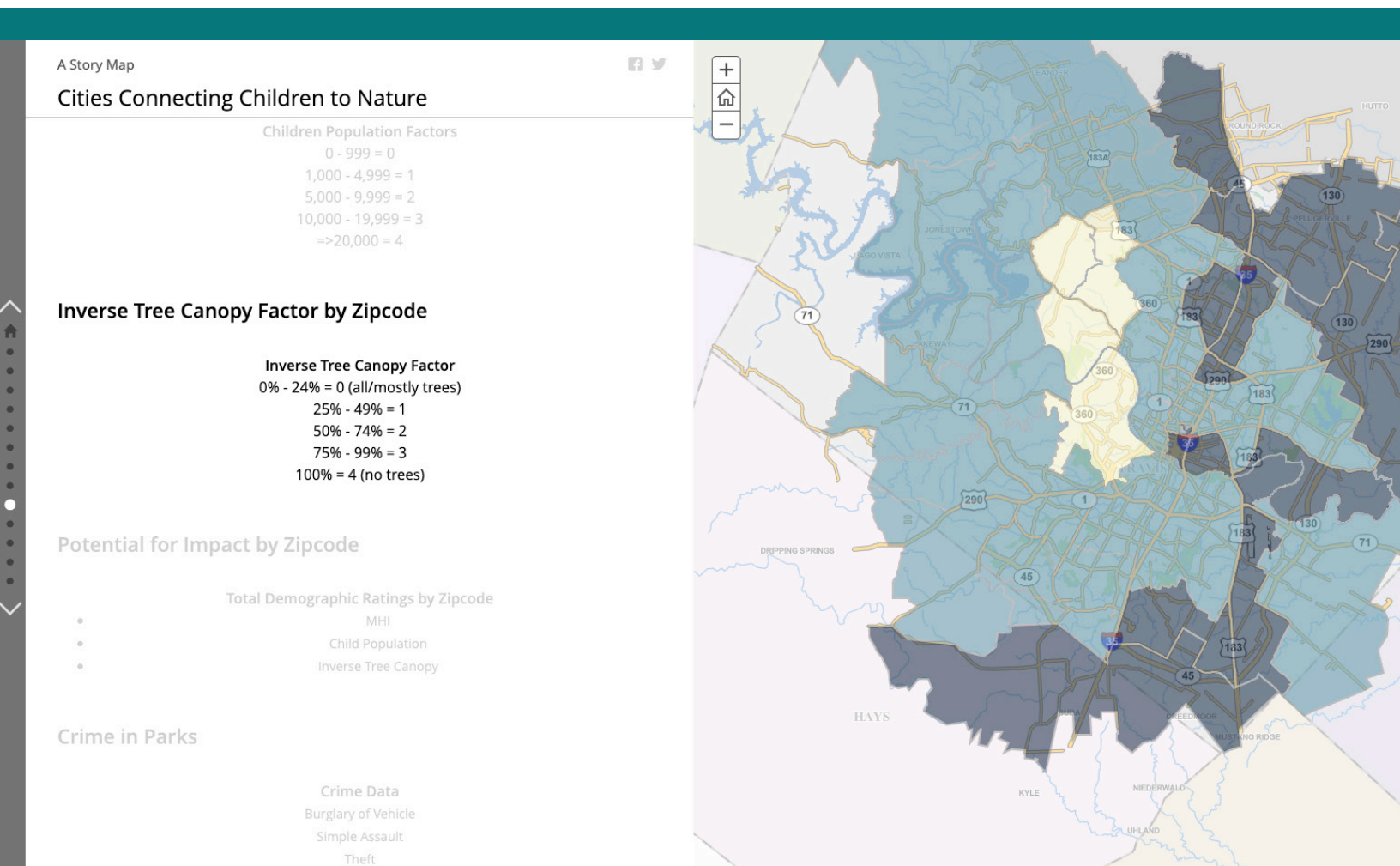
Austin Independent School District, TX

The City of Austin was one of seven cities nationwide selected to receive a planning grant from the project partners for Cities Connecting Children to Nature. The grant funded a six-month strategic planning process that brought together representatives from ten city departments, AISD, the health sector and nonprofit organizations in order to create a 3-year Implementation Plan that identifies how city leadership can provide abundant and equitable access to nature for the children of Austin, with a specific focus on children in low-income communities and children of color. To achieve this goal, data sets from different agencies were added to an ArcGIS map of the city of Austin to create two models. The first model measured the quality of nature in Austin's greenspaces at that point in time, and the second model measured the potential for impact within Austin's neighborhoods. This mapping resulted in Austin's Nature Equity Score, a decision-making tool for determining priority neighborhoods in which to pilot the city's Green School Parks initiative. Interact with the Nature Equity Interactive Map GIS Gap Analysis here.

Opening schoolyards to the community

Tens of thousands of acres of public school playgrounds sit locked outside of school hours. At the same time, more than 100 million people in the United States — including 28 million children — don't have access to a park near their home. Research shows that low-income communities and communities of color consistently have less access to nature-filled greenspaces. Shared use of school grounds is a potent tool to address health and racial disparities because it increases greenspace access opportunities for residents in areas where a lack of funding might prevent upgrading or developing new recreational spaces.

School districts can provide a safe, convenient and cost-effective option to members of the public seeking opportunities to engage in recreational or physical activity. Shared use of school facilities with community residents for unorganized recreational activities during non-school hours can offer multiple benefits. For example, school grounds and city parks within walkable distance from schools are key opportunities for increasing children's day-to-day exposure to nature. By opening access to the public, the school community, neighbors and partner organizations become active members of the green schoolyard and can take part in shaping and caring for their shared public space. Establishing responsibilities through a written agreement can help address concerns about maintenance, safety and liability. There are numerous resources offering guidance for school communities looking to expand access to their schoolyard. For example, ChangeLab Solutions has developed a series of Model Joint Use Agreements.

Consider what barriers exist to opening campuses after hours and what partners can successfully keep "positive eyes" on the property. Green schoolyards have the potential to provide a diversity of uses for multiple activities and age groups, suggesting that families and multi-generational visitors can enjoy the property when visiting after school hours. Consider, for example, grandparents who are helping in the garden areas, while younger kids play on playgrounds or teens playing sports while adults walk laps around the paths.

Design layouts that encourage easy sight lines through the spaces ensure that visitors feel safe and welcome.. Make sure users can easily spot entry and exit points, understand the easiest ways to access the features, and that pathways meet accessibility guidelines.

Other keys to success include allowing spaces to look and operate in a manner consistent with the culture of the school and the surrounding neighborhood. Choose colors, textures and images that look inviting and inspirational. Involve local groups and partners to contribute to the look and feel of the spaces.

❓ Guiding Questions

Are my district's schoolyards currently open to the community after school hours?

How receptive is the school district to adopting a shared use policy?

Who are the key players, in and outside of the district, needed to implement a shared use policy?

How will my district communicate about open access with the broader community?

What foreseeable challenges does my district need to plan for to implement a successful shared use agreement?

What are the risk/liability issues and barriers to opening school grounds after hours?

Who are the neighboring potential users of the campus after school hours and what needs can be met on the school grounds? Can they provide "positive eyes" on the campus after school hours?

GROWING GREEN SCHOOLYARDS ACROSS THE U.S.

2050 VISION
*All U.S. communities offer **green schoolyards** to enhance the health and well-being of children, communities and the environment.*

WHO CAN HELP NATIONALLY

Nonprofits
Funders
Elected officials
Federal agencies
Associations
Policy makers

National activities for reaching scale

Research
Partnership building
Advocacy
Policy
Sustainable funding models
Technical assistance
Peer learning networks

BETTER TOGETHER

National and local partners can advance district-wide green schoolyards programs across the U.S.

WHO CAN HELP LOCALLY

Elected officials
Cities/counties/states
Water utilities
Public health agencies
School districts
Universities
Foundations
Land trusts
Associations
Nonprofits

Local activities for implementation

Partnership building
Advocacy
Policy
Funding
Design
Programming
Curriculum
Management
Evaluation

STORMWATER CAPTURE

Children & Nature Network

VISIT: childrenandnature.org/schools/greening-schoolyards

Figure 6: Growing Green Schoolyards Across the U.S. infographic

3 Individual school design process

Green schoolyards are part of creating the kind of cities we all deserve. They reinvigorate our public spaces, making them community hubs that support students, teachers, parents and community members to play, learn, explore and grow.

— Jaime Zaplatosch, SVP Children & Nature Network

Individual school design process

Congratulations, it's time to design your new schoolyard! In the following sections you will find some of the key steps in moving forward with the design process at an individual school. An important part of the design process is working with students, parents, teachers and school administrators, as well as with the broader community to design and construct each project. From initial design brainstorming sessions, to presentation of conceptual designs and master plans, to volunteer work days during construction, each schoolyard should reflect the cultural heritage of the land it sits on. Whether you are building a new schoolyard or retrofitting an old one, most design teams will only work on one school project within a district at a time. However, some design teams might work on multiple school projects. For districts working on multiple projects simultaneously, hosting a design charrette or workshop for each school project will help teams select common visions, criteria, features and a concept design that best suits a school's context and goals.

Forming a green schoolyard committee

Once a school is selected, the principal or a school leader familiar with the individual campus can help form a committee with teachers, parents, students, and community members to determine what features are most desired and suitable for their school grounds. Invite users who might commonly use the spaces, such as art and STEM teachers, coaches, nurses, lunch providers, and maintenance staff. Traditionally, a landscape architect is hired for each project to help project manage and track input. Keep in mind that your efforts must take into account compliance with local regulations, policies, procedures and codes. Approval processes take time so it is important to lay out the potential timeline to clarify expectations from the start. Make sure you have identified the key people who will ensure your project keeps moving forward. While not necessary, in some cases it can be a good idea to establish roles for committee members (e.g. chair and co-chair, volunteer coordinator and main contact person).

Core team (see team building)

- School leadership
- Key school staff will be users of the features
- City officials
- Partners
- Play resources (recess staff, PE teacher)
- Wellness resources (counselor, therapists, family resource partner)
- Learning resources (subject area experts)
- Parent-Teacher Organizations (volunteers, fundraising, etc.)

Implementation Team

- Volunteers
- Architects
- Landscape contractors
- Plants and gardening experts
- Families
- School staff
- Students
- Fundraising leads

Spreading the news: reaching beyond the school community

Being intentional about reaching as many people as possible about your school efforts can go a long way in the success of the project. The more people know about what you're doing, the better your chances of attracting more volunteers, financial support and overall enthusiasm. It will also help to address potential concerns the community may have early on in the design process.

Green schoolyards are most successful when they are designed by and for the school community. Intentionally designing a green schoolyard that celebrates the cultural heritage of the broader community can have countless benefits. Inviting families from all backgrounds, particularly families that face language or cultural barriers, helps strengthen community relationships. Envision a group of individuals coming together into a warm and welcoming environment where they can feel valued and respected.

Ideas on how to communicate about your green schoolyard project:

- 💡 Tap into school district communications tools:
- 💡 Social networking channels
- 💡 School website
- 💡 School district leadership meetings (i.e.,staff and school board meetings)
- 💡 School newsletters
- 💡 School robo-calls or texts blasts
- 💡 Post community meetings on school marquee
- 💡 Community newspapers and blogs
- 💡 Community social media groups (i.e., parenting groups)
- 💡 On local businesses' bulletin boards

Childhood and Nature: Design Principles for Educators by David Sobel

Renowned American educator and academic, David Sobel, spent many years observing and studying children's behavior in different natural settings, with children of all ages and in a number of different cultures. In his book, "Childhood and Nature: Design Principles for Educators", Sobel suggests seven design principles, or play motifs, that encapsulate common patterns and behaviors in children. These principles, he notes, are not developmental, but rather run through all stages of early childhood, middle childhood and adolescence. Each principle manifests itself in a different way during each developmental stage.

Our hope is that your team considers these principles when designing your green schoolyards. Further in this section you will find specific features that carry out each of Sobel's principles.

PRINCIPLE	WHAT DAVID SOBEL SAYS
Adventure	"Environmental education needs to be kinesthetic, in the body. Children should stalk, balance, jump and scamper through the natural world. Activity with a physical challenge component speaks directly to children via the mind/body link."
Fantasy and Imagination	"Young children live in their imaginations. Stories, plays, puppet shows, and dreams are preferred media for early childhood. We need to structure programs like dramatic play, we need to create simulations in which students can live the challenges rather than just study them."
Animal Allies	"If we aspire to developmentally appropriate science education, then the first talk is to become animals, to understand them from the inside out, before asking children to study them or save them."
Maps and Paths	"Finding shortcuts, figuring out what's around the next bend, following a map to a secret event. Children have an inborn desire to explore local geographies. Developing a local sense of place leads organically to a bioregional sense of place and hopefully a biospheric consciousness."
Special Places	"Almost everyone remembers a fort, den, treehouse, or hidden corner in the back of a closet. Especially between ages 8 and 11, children like to find and create places where they can hide away and retreat into their own found or constructed spaces."
Small Worlds	"From sandboxes to dollhouses to model train sets, children love to create miniature worlds that they can play inside of. Through creating miniature representations of ecosystems, or neighborhoods, we help children conceptually grasp the big picture. The creation of small worlds provides a concrete vehicle for understanding abstract ideas."
Hunting and Gathering	"From a genetic perspective, we are still hunting and gathering organisms. Gathering and collecting anything compels us; searching for hidden treasure or the Holy Grail is a recurrent mythic form. Look at the success of 'Where's Waldo'. How do we design learning opportunities like treasure hunts? "

Steps to a green schoolyard master plan

There are myriad fixed and moveable landscape components that can be woven into a green schoolyard design. The features provided in this document are neither exhaustive nor prescriptive: you know your district best! Some enrichments can be seamlessly integrated into a design concept, while others may require the city's approval, a construction or development permit, and additional funding. Schools should consider integrating design interventions that connect and preserve the community's architectural, environmental and cultural heritage. Whether the priority is to increase outdoor environmental education opportunities or to provide features that boost physical activity, your school district can determine which features will help you achieve your goals best.

Designing with Nature

School districts have the ability to turn their school grounds into healthy ecosystems by letting nature be your guide. Adapting your schoolyard designs to the opportunities and challenges in your particular environment is key to making your efforts workable and successful. How do the desired features fit in with the history of the land? Consider the ecological relationship to the natural landscape through the use of native plants – in turn, you will save time, money, and energy on upkeep. Playing with and learning through nature can help form emotional bonds with plants, flowers, trees, and insects while advancing goals focused on conservation, health, and stewardship.

Picture students in an art class sketching a wildflower from the native garden or students in a science class exploring the green schoolyard's entire ecosystem functions – the learning opportunities are endless. Natural features also provide critical services for communities. Trees and vegetation have a cooling effect, reduce stormwater runoff, and improve air and water quality, underpinning human and environmental health. Additionally, built elements like play systems, benches, easels, and others can complement the natural space and expand opportunities to nurture the child across a continuum of child development stages.

> *Living school grounds are richly layered outdoor environments that strengthen local ecological systems while providing place-based, hands-on learning resources for children and youth of all ages. They are child-centered places that foster empathy, exploration, adventure, and a wide range of play and social opportunities while enhancing health and well-being and engaging the community.*
>
> *— Sharon Danks*
> *CEO Green Schoolyards America*

1 Conceptual planning

An outdoor classroom that isn't supported by programming and curricula, a garden without a sustainability plan, or a playground with no ongoing maintenance support won't be a good investment. Be sure to create a master plan that has the support of the school community and a vision of sustainability. Your school's master plan can encompass several years; it is reasonable to assume that not every feature may be funded in a single year. Consider the following steps when planning a green schoolyard master plan:

- What are the overarching goals for the redeveloped outdoor spaces? Physical education, mental well-being, outdoor learning, and community usage are a few options. Your planning team can identify specific goals for your school.

- What outdoor spaces are needed to meet these goals? Do you envision outdoor classrooms for full classes or small work group spaces? Is there a need for gathering areas, hosting school assemblies and presentations?

- What programming would best support the project's goals, and what is the sustainability plan for ongoing programming?

- Are there any school policy changes needed to support activating the new spaces? What are the current limits for recess and outdoor learning? Is there an opportunity to expand?

- Inventory the existing spaces to be preserved, restored and updated. Consider which areas already feature natural trees and vegetation to keep in the plan.

- Inventory existing spaces that are a hazard or create a safety concern.

- Inventory spaces that are under-utilized. Could they be repurposed, updated to meet new goals?
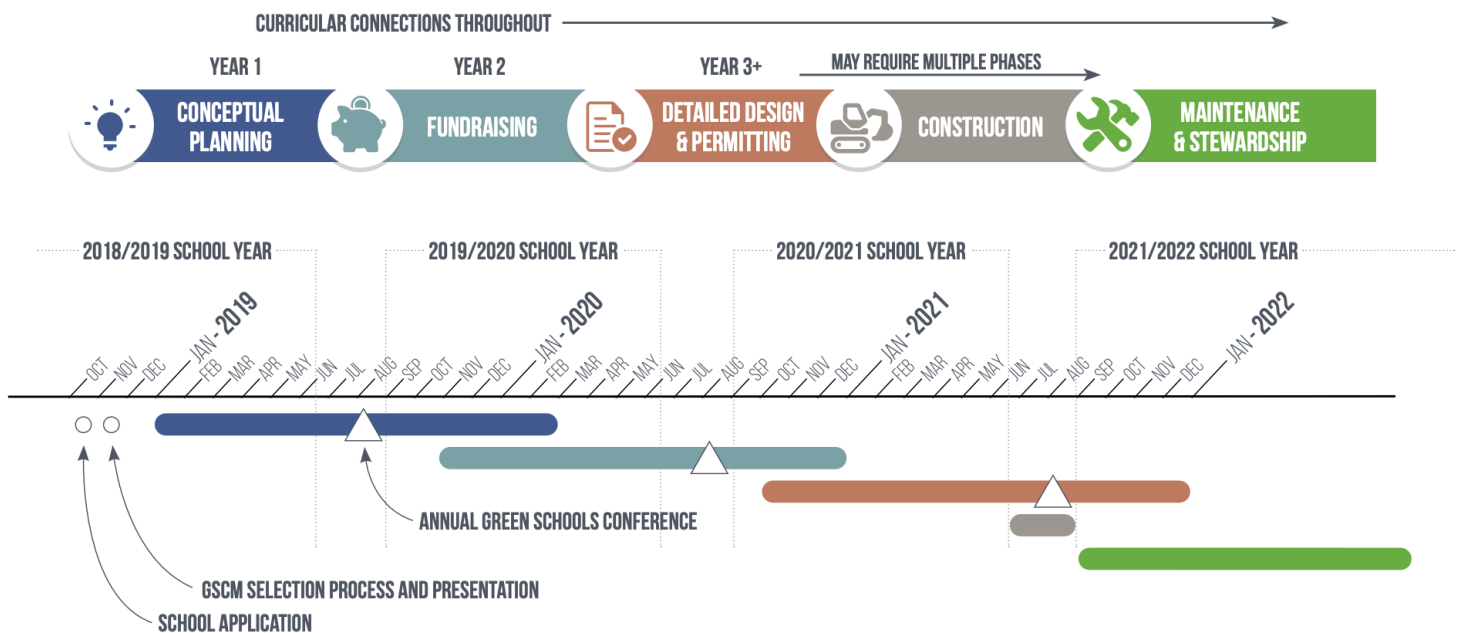

Figure 7: Sample timeline overview for the Green and Healthy Schoolyard Redevelopment Process provided by the Green Schools Consortium of Milwaukee (GSCM).

Participatory planning and design process

Whether you are embarking on a major renovation project or retrofitting a small area, it's a good idea to bring in many perspectives, including children's, early on in the process. Students, teachers and broader community participation builds a strong base for success and provides access to a wide range of perspectives and ideas. Developing 'civic-mindedness' through meaningful contribution at an early age gives children a sense of agency and ownership over the future of the places in which they live and play. A successful participatory process requires individuals to be open, flexible and respectful towards each other's suggestions.

The planning committee should consider various approaches to getting input from different groups. A design charrette is a common approach to engage the broader school community such as parents, neighbors, and school staff. Depending on the number of attendees, you might consider breaking into smaller groups to encourage engagement from everyone. If you are engaging children, however, consider age-appropriate methods to ensure all children have opportunities to contribute their ideas in ways that feel comfortable to them.

Ideas of how to engage children:

- Plan site visits and use aerial maps to help orient children to the site

- Use photographs with captions to prompt children to consider aspects of the site they like or dislike and changes they would like to see in their schoolyard

- Different children respond to different methods. Consider creative prompts such as writing, drawing, painting or model-making to capture student's ideas

- Record site visits through photographs, video, walk-along interviews and conversation transcripts to help capture spontaneous responses.

- Children are digital natives; consider incorporating elements of gamification.

? Guiding Questions

What is the history of the space or property being considered?

What features already exist on the campus? What is working well? What features need changes (for myriad reasons, including safety, accessibility, broken, etc.)?

Where are the areas on the campus that are under-utilized and can be adapted to be useful or even multi-functional?

Are there accessible routes to the areas of campus where improvements are proposed?

What are the likely climate risks in my community?

What are some surrounding opportunities (i.e. parks and fields) that can be assets or complement the current space?

Will you keep the existing play infrastructure, if there is one?

What are some opportunities and limitations of size and shape of space?

Are there other construction plans on the site that may impact the work?

1

Photo: Park Pride

Photo: Park Pride

Atlanta Community Schoolyards

The Atlanta Community Schoolyards model led by Trust for Public Land, Park Pride, Urban Land Institute Atlanta, and Atlanta Public Schools engages parents and community members in the process for developing the schoolyard design. The transformation or new design begins with a participatory design process that involves students in the creation of a green schoolyard. This allows students to learn about environmental challenges and contribute to the solution.

Through curriculum based on state education standards, students practice real life skills and civic engagement while becoming invested in the long-term success of the schoolyard. When the ribbon is cut, they feel a sense of pride & achievement. The schoolyards,

which are open to the community after school hours, provide a welcoming space for community activities. By redesigning schoolyards and making them open to the community after hours and on weekends, the initiative can put a great park within a 10-Minute Walk of all Atlanta residents.

2 Schematic design

Once these steps 1 and 2 have been considered, you can decide on the area "types" you wish to incorporate. It is important to plan this step before deciding on features for the area(s). Note that there is considerable crossover in features. Many features will serve a valuable purpose in several areas, but the way in which they are incorporated with other elements and programming is critical to ensuring each area meets its desired purpose and goal.

- Where are the entrances and exits? Are they accessible to all users?

- What areas are most comfortable for gathering, relaxing, playing and learning?

- What areas are hot and sunny? Which ones are cooler and shady?

- What areas are sheltered from the wind, rain, traffic, noise?

- What maintenance is required for each desired feature, and how will you support staffing for ongoing maintenance needs?

- How does each desired feature meet regulatory, safety, accessibility, equity, space, and budget considerations?

- What teaching or school-level support is required to adequately sustain the desired features?

  - Teacher training or professional development

  - Materials and supplies

- Are funds available to implement all desired features at once or will you work in phases?

CHILOQUIN GREEN SCHOOLYARD
PROPOSED SITE PLAN

SCALE: 1" = 60'   0   20   40   60   120 FEET

NATIVE MEADOW

PICNIC AREA

OUTDOOR CLASSROOM

GATHERING AREA

PARKING

NATURE PLAY

OPEN FIELD

COVERED BASKETBALL & PAVEMENT GAMES

PLAY STRUCTURES

SWINGS

WALKING PATHS

LITTLE KID PLAY

RAISED BEDS

GREENHOUSE

BLOCKINGER ST

Photo: The Trust for Public Land

Potential **areas** to consider in a green schoolyard

Outdoor classrooms

Centralized or scattered seating for students and teachers, depending on teaching aims and pedagogy.

Design Support:

- Seating (benches, stones, or logs),storage for class materials (may be indoors if easily accessed),planting areas for beauty and/or learning), consideration on how to make the classroom mobile to incorporate learning in other parts of the green schoolyard environment.

- Spaces to set up materials, work on projects and stage activities, including tables, display boards, etc.

Photo: Space to Grow: Greening Chicago Schoolyards

Photo: National Wildlife Federation

Photo: Vancouver Public Schools

Gardens and Plantings

Gardens can be built in-ground or use raised beds. Consider adding a greenhouse, especially where weather creates short growing seasons.

Design Support:

- Edible gardens: Designated areas for vegetable, herb and fruit planting of annuals or perennial food sources. These gardens are usually in raised beds, unless they are fruiting shrubs or trees.

- Native and pollinator gardens: In-ground planting areas support local ecology through native plants that attract wildlife. These gardens usually consist of flowering plants and grasses. They can be in small areas near the building or cover large areas on the campus to recreate more natural conditions.

- Stormwater and wetland gardens: In wetland areas gardens can be planted to help manage stormwater and teach children the value of plants in water management. These gardens can include downspouts that discharge to a feature for interactions

- Sensory/tactile gardens that are loaded with textures, smells, leaf shapes, heights and other characteristics invite visitors to get in and explore.

- Shade plantings: Add shade trees and tall shrubs throughout to reduce heat in high-use areas, especially playground equipment, safety surfacing and other easily heated surfaces.

42

Pathways & Trails

Accessible crushed stone or paved paths can support connectivity throughout the schoolyard features, and provide walking and running routes for the entire school community.

Design Support:

- Think of how the trail will be surfaced and what activities children will engage in along the way. For example, low maintenance native plantings can be incorporated into both the trail and the curriculum; benches can offer places for resting, quiet conversations and friendships to be fostered. If room allows, sinuous pathways offer opportunities for discovery around the next curve. Spaces to set up materials, work on projects and stage activities, including tables, display boards, etc.

Photo: John Taggart School, a TPL project in the School District of Philadelphia

Photo: PlayCore

Photo: PlayCore

Play areas

Whether built, natural, or a combination of both, play areas are critical areas for children to develop physically, socially, emotionally, and cognitively.

Design Support:

- Built environments may consist of a central structure or scattered pieces throughout the schoolyard to support physical activity and play. These structures can attract users to benefit from the natural areas. Consider adding loose materials such as logs, sticks, mulch, and other moveable parts that support creative play. You may want to incorporate berms/hills if space, regulations and supervision needs allow.

- Determine the various zones of play, such as active running areas, ball games, play structures, passive play, pavement play games, and quiet calming areas and locate them in a way that minimizes conflict. For example, locate swings to the side of campus play areas to minimize disruption by errant balls or kids running.

- Add different kinds of swings for various abilities and needs, such as saddle, full back, wide disc swings or low hammocks.

- For areas with harsh weather conditions, determine where appropriate play cover would benefit students for rain/snow protections, wind breaks, sun/shade cover and temperature breaks.

Open fields

Open fields are a valuable space for sports, imaginative play, active play and aesthetics.

Design Support:

- If space doesn't allow an open field, consider smaller grassy areas or half courts to incorporate this area into the overall plan. Consider what features and amenities support player and spectator use and enjoyment such as backstops, corner posts, benches, bleachers, spectator hillside, etc. and make sure they address accessible and inclusive design principles.

Photo: O'Keeffe Elementary Space To Grow Site Plan Illustration

Photo: Jane Tesner Kleiner

Native landscapes

Often, especially in the case of new development, there are natural areas (ie. meadows, forests, etc.) already in existence that can provide beneficial play and learning opportunities.

Design Support:

- Work with a landscape architect with school design expertise to understand where these areas may be within your overall space and how they can be incorporated into the green schoolyard plan.

Inclusive design

An inclusive and properly designed green schoolyard should consider surfaces to accommodate people using all modes of travel to and around the different areas. Individuals with disabilities often need hard, smooth surfaces to get around. People with low vision need high contrast and edges to detect borders. How does your design accommodate for different needs?

Photo: PlayCore

44

Photo: Learning Landscapes, Denver Public Schools

Photo: PlayCore

Photo: Space to Grow: Greening Chicago Schoolyards

Photo: Space to Grow: Greening Chicago Schoolyards

Selecting **features** to build out areas

Each feature or amenity commonly found in green schoolyards can be used in multiple areas. For instance, stormwater infrastructure, a cost-effective, resilient approach to managing weather impacts that provides environmental, educational, and community benefits, may be incorporated into several areas to mitigate flooding and serve as a water source for gardens. There may be a central playground structure, but hillside slides may be added to berms in other areas of the schoolyard. All areas will benefit from trees and other plants.

Photo: Christian Phillips Photography
Boston Schoolyards Initiative

Trees and bushes
These plantings are essential for nature integration into schoolyards and provide needed shade. Trees, in particular, provide shade over outdoor classrooms and playground equipment to keep these spaces comfortable and cool for learning and play.

Photo: Christian Phillips Photography
Boston Schoolyards Initiative

Photo: Christian Phillips Photography
Boston Schoolyards Initiative

Plants and vegetation
Consider choosing plants for their play value and educational value, including loose parts, sound, scent, pollinating capacity and others. Don't forget rocks and other landscape enhancements, water features, outdoor ponds, bogs, streams, wetlands, and meadows.

Photo: San Francisco Unified School District

Stormwater capture infrastructure

Intentionally designed, permeable spaces can be installed to capture rainwater. This can include rain gardens, bioswales, permeable pavers, asphalt or concrete, cisterns, native landscaping and downspout disconnection. Greening school grounds supports students and cities by reducing the negative impacts of climate change including urban heat island effect and neighborhood flooding. The Implementing Green Stormwater Infrastructure on Schoolyards report outlines these challenges and highlights examples of partnerships and projects that have had success in addressing them.

Photo: Austin Independent School District

Photo: Austin Independent School District
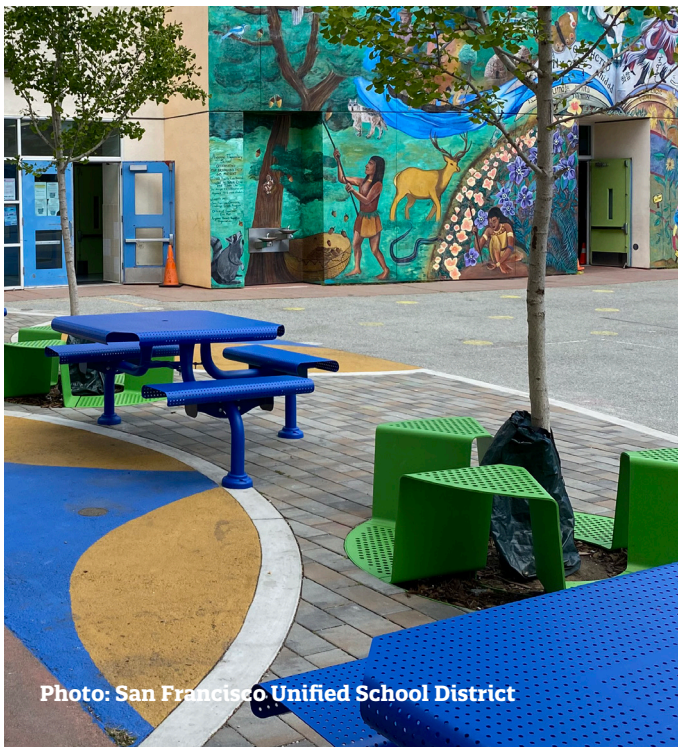
Photo: San Francisco Unified School District

Comfort and well-being features

Fencing, lighting, shade/shelter, seating spaces, trash receptacles, restrooms, and water fountains are all important comfort factors to consider. You might also include labyrinths, reading areas, quiet spaces, etc. Tip: Reach out to your local forestry department for access to free tree parts for seating and work surfaces.

Photo: Vancouver Public Schools

Photo: Space to Grow: Greening Chicago Schoolyards

Photo: PlayCore

Physical activity features

There are myriad options for exercise and physical education on a green schoolyard, including play structures, berm slides, climbing areas, mounds, fitness stations, freestanding play elements, changeable wall and surface games, sports games, track activities, bike paths, open play areas, pathways and hide-and-seek features.

Photo: Vancouver Public Schools

Photo: PlayCore

Learning-focused features

Outdoor classroom areas and/or STEM labs with stations to promote learning around biodiversity (these may be under shelter or in open areas), earth and water science, environmental awareness (weather stations, monitor systems for air quality, heat index, soil/water, stream gauges and water quality sensors, cameras/blinds to monitor nature, wildlife, weather, and sun movement, observation stations (magnifying devices, telescopes, binoculars, microscopes listening devices) wildlife habitats and observation.

Photo: PlayCore

Photo: PlayCore

Photo: PlayCore

Interpretive signage

Interpretive signs can enhance the user experience by providing interesting facts about the plants and animals found in the area. Consider engaging students in the design and research for the signage as part of a school project.

Photo: National Wildlife Federation

Art and expression

Outdoor instruments, painting studios, performance stages, mural walls, storytelling areas and fairy garden elements can facilitate artwork and creative expression.

Photo: San Francisco Unified School District

Photo: PlayCore

Photo: Jane Tesner Kleiner

Gardening support

Nursery, greenhouse, storage shed, arbors/pergolas, water/irrigation systems, hoses, gardening tools, and composting barrels can contribute to the success of a school garden.

Technical support

Consider adding high-bandwidth Wi-Fi access points and electrical power access to support classroom technology.

3 Construction and Implementation

Wow! You are past some major milestones. You have vision, goals, an initial site, a conceptual plan, and now you are getting ready to implement it. Congratulations! By now, you know that big changes require a great deal of time, resources, and most of all, commitment. Your district's desire and commitment to the improvement of outdoor spaces for students and community is to be celebrated.

Construction and implementation phases will vary widely from project to project. If you are removing hundreds of square feet of asphalt you can anticipate a longer time frame to account for permitting, removal, site clean up, and other major steps that may be required for the project before construction activity can begin. Major renovation projects are often scheduled during the summer months when children and staff are not on campus.

UNDER CONSTRUCTION

Photo: [ReFlo] Anna F. Doerfler School in Milwaukee, WI

Planting and building out features

Now the fun begins! This is often a golden opportunity to rally around the neighborhood and invite parents, grandparents, students, partners, and other local agencies to join in the hard (but fun!) work. It's important to clearly state in your invitation what you are aiming to achieve from your event. Are you building garden beds or are you planting seeds? Setting clear expectations for your event will help you get the right crew. And don't forget to communicate your efforts through good storytelling. Reach out to local media outlets to help your school district advance your mission and vision with the community.

- What tools and resources are required to implement the desired plan?

- What skills are needed to implement the plan and how will you help individuals develop these skills?

- Which internal systems that can help build and maintain the greening project features?
  - Facilities and maintenance teams, grounds crews
  - School teams: class project, high school career tech ed projects, end of semester projects, school green team and others.
  - Community partners: parent- teacher organizations, eagle scout project, faith-based volunteer groups, community give back projects.
  - Non-profit organizations
- Consider creating demonstration spaces to test out at first before undergoing a full transformation.

Photo: Jane Tesner Kleiner

Photo: Reflo – Milwaukee Public Schools

Photo: Jane Tesner Kleiner

4 Maintenance and sustainability

Having a long-term management plan is one of the key drivers of the success of your green schoolyard. Like any other investments, you'll want to take actions that guarantee the long-term sustainability of your new schoolyard. As mentioned in earlier sections, when there are partner organizations involved, maintenance and stewardship responsibilities (who is taking care of what?) should be discussed and agreed to early on in the planning process. It is critical to build support by providing clear communications about the value of these spaces, especially to those that will be directly involved in upkeep. Establishing a joint-management agreement can be an effective strategy to work through the nuances of maintenance needs. Schoolyard maintenance shouldn't fall solely on custodial staff. Strategic planning and thoughtful consideration about maintenance requirements when selecting surfaces, play features, types of plants and play equipment can go a long way in reducing both costs and needs.

- What resources do you have within the school community to assist with maintenance and sustainability needs?

- Is there grassroots support for the project?

- What groups can you reach out to in your community to help with maintenance and stewardship? Are these groups available seasonally or year-round?

- What skills are you looking for in volunteers? Are you able to offer training for specific skills?

- How could you recruit specialty-skilled community members to volunteer their time and expertise?
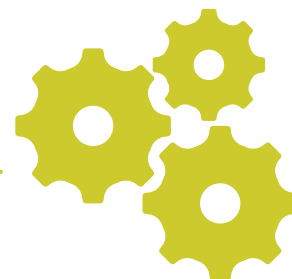
Finding maintenance support while building community

Schools can also find support through summer youth programs, neighbors, community volunteers and other school staff. Creating an outdoor classroom user's guide with specific seasonal maintenance requirements can help support the whole school community in using and stewarding the features in your new schoolyard. When looking for support outside of the school community, be sure to determine your needs and define how volunteers can help. Consider offering training if specific technical skills are needed.

Establish a volunteer program that can include:

- Parents and students
- Conservations associations
- Master gardeners
- Friends of local parks
- Civic groups
- Community service and internship programs
- Scout troops
- Local churches
- Local businesses
- Community college classes
- School garden coordinators

Measure and evaluate outcomes

The following grid, from the Green Schoolyards Evaluation Framework, published by the Children & Nature Network and Green Schoolyards for Healthy Community demonstrates that outcomes can be measured across learning, health and wellness, environment, and community. Using these frameworks to collect and publish data through surveys, data service projects, interviews, and student testing will help make the case for green schoolyards and potentially open/increase funding streams. As with a green schoolyard plan, each school must decide on sustainable outcomes measurement to match their resources. This step should not be overlooked in the overall master plan as a gauge to understand what is working, what could be improved, and what additional resources or assets should be added to promote green schoolyard literacy

green schoolyards POTENTIAL **LEARNING OUTCOMES**

INTERVENTIONS
- Schoolyard greening
- Time outdoors in & out of school
- Views of schoolyards
- School & community involvement in design
- Number & types of programs on schoolyards
- Types of schoolyard elements
- Environmental Literacy Plans
- Every Student Succeeds Act
- Next Generation Science Standards
- Equitable distribution of green schoolyards

SHORT TERM OUTCOMES
- Increased attention
- Increased academic achievement
- Increased student attendance
- Increased word usage
- Increased scientific inquiry
- Increased claims, evidence & reasoning
- Increased motivation to learn
- Increased achievement (ELL, male/female, ADHD)

LONG TERM OUTCOMES
- Reduced rate of teenage dropout & associated societal costs
- Increased literacy
- Increased test scores
- Increased systems-thinking
- Decreased achievement gap (ELL, male/female, ADHD)
- Increased career opportunities

green schoolyards POTENTIAL **HEALTH & WELLNESS OUTCOMES**

INTERVENTIONS
- Schoolyard greening
- Access to green space in cities
- Time outdoors in & out of school
- Views of schoolyards
- Shade (natural & artificial)
- Number & types of programs on schoolyards
- Types of schoolyard elements
- Equitable distribution of green schoolyards

SHORT TERM OUTCOMES
PHYSICAL ACTIVITY & NUTRITION
- Increase in amount of physical activity
- Increase in psychomotor skills
- Improved physical health of entire school community (students, staff, parents, neighbors)
- Improved levels of physical development
- Increase in density & diversity of play
SOCIAL EMOTIONAL
- Increased self-efficacy & action competence
- Increase in mood & mood stability
- Recovery from mental fatigue
- Recovery from stress

LONG TERM OUTCOMES
- Reduction in long-term healthcare costs, including emergency room & uninsured
- Violence reduction
- Decreased effects of trauma (individual & community)
- Decreased bullying
- Socialization skills among peers
- Increased self-esteem

green schoolyards POTENTIAL **ENVIRONMENTAL OUTCOMES**

INTERVENTIONS
- Schoolyard greening
- Number of trees
- Shade (natural or artificial)
- Rainwater capture & green infrastructure
- Types of landcover
- Biodiversity of species & ecosystems
- Park or nature within 1/2 mile of schoolyard

SHORT TERM OUTCOMES
- Decreased energy costs
- Increased stormwater storage & filtration
- Decreased fines for discharge of untreated water into into local waterways
- Lower water bills, increased tax savings
- Increased stewardship of schoolyard

LONG TERM OUTCOMES
- Urban heat island reduction
- Reduced CO_2 emissions
- Positive effects of tree canopy on air quality
- Cleaner local waterways
- Development of environmental advocates
- Increased career opportunities

green schoolyards POTENTIAL **COMMUNITY OUTCOMES**

INTERVENTIONS
- Schoolyard greening
- Access to green space in cities
- School & community involvement in design & art installations
- Multi-generational use
- Shared use agreements
- Number & types of programs on schoolyards
- Park or nature within 1/2 mile of schoolyard safe route to school

SHORT TERM OUTCOMES
- Increased neighborhood safety
- Improved employee recruitment/retention
- Increased stewardship of schoolyard
- Increased parent & community comfort
- Increased community usage of schoolyard during out-of-school time
- Increased partnership capacity of school
- Increased job opportunities
- Increased ownership, self-efficacy & action competence

LONG TERM OUTCOMES
- Decrease in crime rates
- Increased sense of community, social support/ties
- Reduction in long-term healthcare costs, including emergency room & uninsured
- Decreased effects of trauma (individual & community)
- Decreased number of abandoned buildings & vacant properties, increased property value

Figure 8: This Green Schoolyards Evaluation Framework groups potential short- and long-term outcomes of green schoolyards into four categories: health and wellness, learning, environmental and community

Boston schoolyard Initiative

Between 1995 and 2013, the Boston Schoolyard Initiative (BSI) transformed Boston's schoolyards from barren asphalt lots into dynamic centers for recreation, learning, and community life.

Outlier Research and Evaluation at The University of Chicago, conducted an evaluation of the Boston Schoolyard Initiative: Science in the Schoolyard (SSY) program. The goal was to understand how outdoor science was being implemented in Boston Public Schools (BPS) and the relationships between outdoor science instruction, teacher and student outcomes, and the BSI SSY program. In addition, the evaluation sought to provide feedback on the successful implementation to BPS and other districts interested in outdoor science programs.

children & nature
NETWORK

GREEN SCHOOLYARDS
CAN IMPROVE ACADEMIC OUTCOMES

THE ISSUE
Only 1/3 of U.S. 8th graders perform at or above standards for science and math.[1]

SCHOOLS ACROSS THE NATION ARE SEEKING WAYS TO IMPROVE ACADEMIC OUTCOMES FOR ALL STUDENTS

Green schoolyards promote academic achievement through hands-on, experiential learning and by enhancing the cognitive and emotional processes important for learning.

ENHANCING LEARNING
Green schoolyards provide **experiential learning across many subjects**.[2,3]

33 of 40 school garden studies (83%) found

IMPROVED OUTCOMES in science, math & language arts.[2]

BETTER GRADES
A+

HIGHER TEST SCORES

ENHANCED KNOWLEDGE
ACROSS SEVERAL SUBJECTS

2, 3, 4

GREEN SCHOOLYARDS CAN
★ Help students focus attention and regulate behavior [5, 6]
★ Enhance attitudes and engagement with school [7, 8]
★ Support creativity, critical thinking and problem solving [9]

ROOM WITH A VIEW
Seeing nature and greenery from school buildings can foster positive academic outcomes.[10, 11]
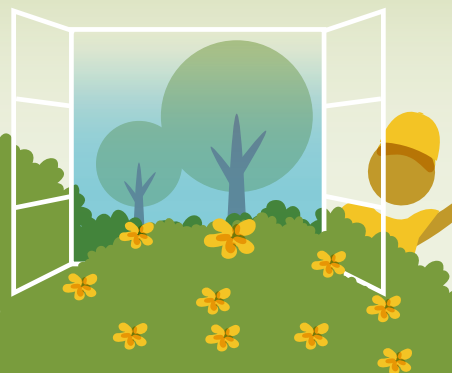
HIGH SCHOOLERS WITH VIEWS OF TREES HAD:[12]

HIGHER standardized test scores

HIGHER graduation rates

HIGHER % of students planning to attend a 4-yr college

SUPPORTING RESEARCH

[1] www.nationsreportcard.gov [2] Williams & Dixon (2013). Impact of garden-based learning on academic outcomes in schools: Synthesis of research between 1990 and 2010. *Rev Educ Res*, 83(2), 211–235. [3] Wells et al. (2015). The effects of school gardens on children's science knowledge: A randomized controlled trial of low-income elementary schools. *Int Journal Sci Educ*, 37(17), 2858–2878. [4] Berezowitz et al. (2015). School gardens enhance academic performance and dietary outcomes in children. *J School Health*, 85(8), 508-518. [5] Berto et al. (2015). How does psychological restoration work in children? An exploratory study. *J Child Adolesc Behav* 3(3). [6] Chawla et al. (2014). Green schoolyards as havens from stress and resources for resilience in childhood and adolescence. *Health Place*, 28, 1–13. [7] Maynard et al. (2013). Child-initiated learning, the outdoor environment and the 'underachieving child.' *Early Years*, 33(3), 212 - 225. [8] Rios & Brewer (2014). Outdoor education and science achievement. *Appl Environ Educ Commun*, 13(4), 234–240. [9] Kellert (2005). *Building for life: Designing and understanding the human-nature connection*. Washington, DC: Island Press. [10] Li & Sullivan (2016). Impact of views to school landscapes on recovery from stress and mental fatigue. *Landscape Urban Plan*, 148, 149-158. [11] Wu et al. (2014). Linking student performance in Massachusetts elementary schools with the ''greenness'' of school surroundings using remote sensing. *PLoS ONE 9(10): e108548: 1-9*. [12] Matsuoka (2010). Student performance and high school landscapes: Examining the links. *Landscape Urban Plan*, 97(4), 273–282.

Figure 9: Green Schoolyards Can Improve Academic Outcomes infographic

GREEN SCHOOLYARDS CAN PROVIDE MENTAL HEALTH BENEFITS

THE ISSUE
1 in 5 children has, or has had, a serious mental health disorder at some point in their lives.[1]

MENTAL HEALTH PLAYS A CRITICAL ROLE IN THE COGNITIVE, EMOTIONAL, & SOCIAL DEVELOPMENT OF CHILDREN AND YOUTH.

Green schoolyards can enhance mental health and well-being and promote social-emotional skill development.

GREEN SCHOOLYARDS HELP KIDS FEEL:

CALMER & LESS STRESSED [2,3]
Views of green landscapes from classroom windows helped high school students recover more quickly from stressful events.[4]

POSITIVE & RESTORED [3]
Forest schools enhanced positive and decreased negative emotions.[5]

RESILIENT [2]
Natural areas enhanced feelings of competence and increased supportive social relationships that help build resilience.[2]

GREEN SCHOOLYARDS PROMOTE SOCIAL-EMOTIONAL SKILLS

PRACTICE

RELATIONSHIP SKILLS [2]
Children demonstrated more cooperative play, civil behavior and positive social relationships in green schoolyards.[6,7]

DEVELOP

SELF-AWARENESS & SELF-MANAGEMENT
- Green schoolyards can reduce aggression and discipline problems.[6,7]
- Gardening at school helped students feel proud, responsible & confident.[2]

SUPPORTING RESEARCH

[1] www.nimh.nih.gov/health/statistics/prevalence/any-disorder-among-children.shtml [2] Chawla et al. (2014). Green schoolyards as havens from stress and resources for resilience in childhood and adolescence. *Health Place*, 28, 1–13. [3] Kelz et al. (2015). The restorative effects of redesigning the schoolyard: A multi-methodological, quasi-experimental study in rural Austrian middle schools. *Environ Behav*, 47(2), 119–139. [4] Li & Sullivan (2016). Impact of views to school landscapes on recovery from stress and mental fatigue. *Landscape Urban Plan*, 148, 149-158. [5] Roe & Aspinall (2011). The restorative outcomes of forest school and conventional school in young people with good and poor behaviour. *Urban For Urban Gree*, 10(3), 205–212. [6] Bell & Dyment (2008). Grounds for health: The intersection of green school grounds and health-promoting schools. *Environ Educ Res*, 14(1), 77-90. [7] Nedovic & Morrissey (2013). Calm, active and focused: Children's responses to an organic outdoor learning environment. *Learn Environ Res*, 16(2), 281–295.

ADDITIONAL RESEARCH USED FOR THIS INFOGRAPHIC AVAILABLE AT childrenandnature.org

Figure 10: Green Schoolyards Can Provide Mental Health Benefits infographic

GREEN SCHOOLYARDS ENCOURAGE BENEFICIAL PLAY

THE ISSUE
8-18 year olds in the U.S. spend an average of 7.5 hrs per day using entertainment media.[1]

KIDS NEED TO PLAY: PLAY SUPPORTS PHYSICAL, SOCIAL & EMOTIONAL WELL-BEING.

Natural areas promote child-directed free play that is imaginative, constructive, sensory rich and cooperative.

ENCOURAGING IMAGINATIVE, COOPERATIVE FREE PLAY

GREEN SCHOOLYARDS CAN:

Accommodate different ages & abilities [2,3]

Sustain children's interest [4,5]

Offer a variety of options that appeal to a wide range of play interests [2]

Strengthen links between play & learning [2,3,4]

Promote cooperation & negotiation [4,6]

GREEN SCHOOLYARDS CAN SUPPORT DIFFERENT TYPES OF PLAY [2,4,7,8]

DRAMATIC PLAY
Loose parts—such as sticks, stones, acorns & pinecones—engage the imagination.

EXPLORATORY PLAY
Natural areas provide opportunities for children to explore.

SOLITARY PLAY
Areas under bushes or other nooks allow children to engage in alone time and contemplation.

CONSTRUCTIVE PLAY
Building things out of natural materials helps children learn hands-on skills.

LOCOMOTOR PLAY
Natural items such as logs and rocks can be carried. Looping paths allow walking, running and biking.

SUPPORTING RESEARCH

[1]Rideout et al. (2010). Generation M2: Media in the lives of 8-18 year olds. Kaiser Family Foundation https://kaiserfamilyfoundation.files.wordpress.com/2013/01/8010.pdf [2]Dyment & Bell (2008). Grounds for movement: Green school grounds as sites for promoting physical activity. *Health Educ Res*, 23(6), 952–962. [3]Stanley (2011). The place of outdoor play in a school community: A case study of recess values. *Child Youth Environ*, 21(1), 185–211. [4]Dennis et al. (2014). A post-occupancy study of nature-based outdoor classrooms in early childhood education. *Child Youth Environ*, 24(2), 35–52. [5]Luchs & Fikus (2013). A comparative study of active play on differently designed playgrounds. *J Adven Educ & Outd Learn*, 13(3), 206–222. [6]Acar & Torquati (2015). The power of nature: Developing pro-social behavior towards nature and peers through nature-based activities. *Young Children*, 70(5), 62-71. [7]Chawla (2015). Benefits of nature contact for children. *J Plan Lit*, 30(4), 433–452. [8]Cloward Drown & Christenson (2014). Dramatic play affordances of natural and manufactured outdoor settings for preschool-aged children. *Child Youth Environ*, 24(2), 53–77.

Figure 11: Green Schoolyards Can Encourage Beneficial Play infographic

GREEN SCHOOLYARDS CAN INCREASE PHYSICAL ACTIVITY

THE ISSUE
Less than 3 in 10 high school students get 60 minutes of physical activity every day.[1]

REGULAR PHYSICAL ACTIVITY ENHANCES WELL-BEING & ATTENTIVENESS IN THE CLASSROOM.

Green schoolyards can promote physical activity by offering a variety of active play options that engage children of varying fitness levels, ages and genders.

MORE OPTIONS, MORE ACTIVITY

85%
OF EDUCATORS AND PARENTS
said green schoolyards support a wider range of play activities than other types of schoolyards.[2]

PROMOTE running jumping climbing lifting[2]

trees logs shrubs rocks

Variety in landscaping increases variety in active play.[2]

MEETING DIVERSE & CHANGING NEEDS

GREEN SCHOOLYARDS COMPLEMENT CONVENTIONAL PLAYGROUNDS WITH OPPORTUNITIES FOR

LIGHT & MODERATE PHYSICAL ACTIVITY

that are more appealing to some children.[3,4]

GREEN SCHOOLYARDS CAN CONTRIBUTE TO

GIRLS' PHYSICAL FITNESS ✿✿✿✿

Physical activity decreases as children grow, especially for girls. Green schoolyards sustain activity as children age and preferences change.[5,6,7]

SUPPORTING RESEARCH

[1]www.cdc.gov/physicalactivity/data/facts.htm [2]Dyment & Bell (2008). Grounds for movement: Green school grounds as sites for promoting physical activity. *Health Educ Res*, 23(6), 952–962. [3]Barton et al. (2015). The effect of playground- and nature-based playtime interventions on physical activity and self-esteem in UK school children. In *J Environ Health Res*, 25(2), 196-206. [4]Dyment et al. (2009). The relationship between school ground design and intensity of physical activity. *Child Geogr*, 7(3), 261-276. [5]Brink et al. (2010). Influence of schoolyard renovations on children's physical activity: The Learning Landscapes Program. *Am J Public Health*, 100(9), 1672–1678. [6]Mårtensson et al. (2014). The role of greenery for physical activity play at school grounds. *Urban For Urban Gree*, 13(1), 103–113. [7]Pagels et al. (2014). A repeated measurement study investigating the impact of school outdoor environment upon physical activity across ages and seasons in Swedish second, fifth and eighth graders. *BMC Public Health*, 14(1), 803.

ADDITIONAL RESEARCH USED FOR THIS INFOGRAPHIC AVAILABLE AT   childrenandnature.org/gsybibliographies

C&NN recognizes that not all studies support causal statements.

©2016 CHILDREN & NATURE NETWORK

Figure 12: Green Schoolyards Can Increase Physical Activity infographic

Endnotes

A robust body of literature indicates that green space around schools could have significant benefits for children and youth. When the spaces are opened up and made available to the broader community, these benefits extend to those living in areas affected by uneven distribution of parks and other outdoor spaces. Access the literature visit the Children & Nature resource hub on Green Schoolyards here.
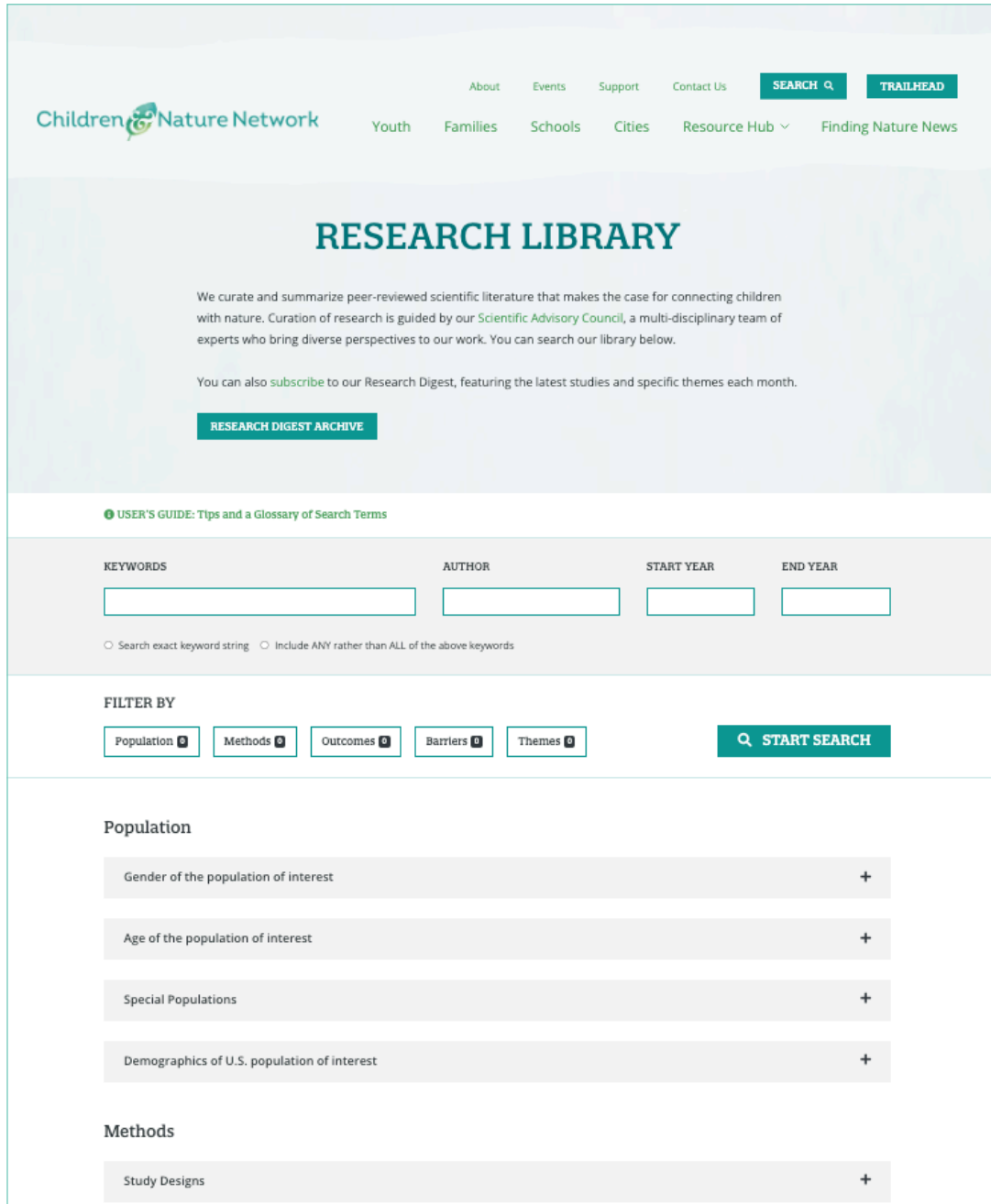
research.childrenandnature.org

Figure 13: The Children & Nature Network's Research Library provides an extensive collection of scientific literature that supports green schoolyards.

Online resources

Examples of Green Schoolyard Design and Outdoor Learning Guidelines:

Baltimore City Public Schools Outdoor Learning Guidelines

Boston Schoolyard Initiative : Outdoor Classroom Design Guide

Space to Grow: Greening Chicago Schoolyards | Design Guidelines

Greening Schoolyards Case Studies:

Baltimore City Public Schools

Education Outside/ San Francisco

Get2Green, Fairfax County Public Schools

Learning Landscapes, CA

Life Lab, Westlake Elementary School

Out Teach

Philadelphia Community Schools

SPARK School Park Program

District-wide Resources

Collaborative for High Performance School

Community Schoolyards: Planning and GIS tool

Community Schoolyards: A Game-Changing Solution to the Park Equity Problem

Green Schoolyards Advocacy Toolkit

Green Schoolyards America

Landscape and Child Development Guide | Evergreen

LEED Green Schools | Center for Green Schools

Trust for Public Land Community Schoolyards

School Resources

American Community Gardening Association

Garden Fact Sheets Database

Garden Mosaics Project

How to Create a Community Schoolyard

Journey North

Kids Gardening

National Gardening Association

Natural Learning Initiative | NC State University

Playcore | Plant Database

Playing Smart: Maximizing the Potential of School and Community Property Through Joint Use Agreements

USDA Plant Database

Children
& Nature
Network

childrenandnature.org