



A VISION FOR GREEN SCHOOLYARDS ACROSS CALIFORNIA

Green Technology's Carl Smith interviewed Sharon Danks, Founder of Green Schoolyards America, about the need for living schoolyards and her organization's vision for greening schools across California.

In this interview, conducted in advance of her keynote address at the Green California Schools and Community Colleges Summit in October 2018, Danks describes the benefits that transforming school grounds can bring to students, teachers, and communities.

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I was wondering if you can tell me what green schoolyards are, exactly?

Green schoolyards are rich outdoor environments that strengthen local ecological systems, provide hands-on learning resources, and foster a wide range of play and social opportunities while enhancing health and well-being.

These re-imagined schoolyards look and feel more like parks, and are often open to the local community after hours. Green schoolyards have comfortable microclimates that include shade trees, varied topography, edible and native plant gardens, nature play areas, outdoor classroom spaces, sport pitches, play structures, and elements that have been designed and built by the students at the school.



Many of California’s urban school grounds, like the ones above and below, are completely paved and don’t have trees to provide shade. This type of environment offers children and teachers very few opportunities for learning and play.

Land use in a green schoolyard is very diverse and balanced: Green schoolyards provide an “ecosystem of opportunities” that the children, the school, and the community can use to make the most of this shared public space.

Well-designed “living schoolyards” model the ecologically-rich cities we envision for the future, at a smaller scale, and teach the next generation how to live in an environmentally responsible way. They are places where urbanization and nature coexist and natural systems are prominent and visible, for everyone to enjoy.

When implemented comprehensively and citywide, living schoolyards have the potential to become effective components of urban ecological infrastructure, helping their cities address many of the key environmental issues we are facing, such as climate change, drought, and habitat loss.



Why are living schoolyards needed?

In California, we have about 130,000 acres of public school land for K-12 students, used by more than six million kids every day. That is more people in a single day on our public land at schools than we have in an entire year at Yosemite, where the visitor rates are closer to five million annually. Our infrastructure investment in our public school land doesn’t yet reflect this enormous level of use, and we need to invest in it more heavily to help it meet its potential.

School grounds have a significant impact on the urban environment, since all of the individual parcels of land add up to quite a large amount of public space. Schools are at the heart of almost every neighborhood across the state—and yet we have not been investing in them in a manner that reflects their high levels of use or their importance to the urban environment.

Most California school grounds are heavily paved and have very few trees. In their current, degraded condition, our school ground land is adding to urban heat island problems at a time when they could be used to cool our cities. School ground pavement is also detrimental to stormwater management, since it allows water to run off the site, rather than capturing and storing this precious resource. The barren surfaces of traditional school grounds are also a problem for children and adults’ mental and physical health.

This traditional, paved development pattern was established in the 1940s, when the USA was preparing children for a world war and factory automation. Our grounds are now seriously out of date, and need to be reimagined to provide 21st Century education and alleviate environmental problems.



What led you to found Green Schoolyards America?

I'm an environmental city planner by training, and I worked for about 10 years with a design firm called Bay Tree Design that I co-founded with my colleague Lisa Howard, who is a landscape architect. Much of our work focused on partnering with school communities to design green schoolyards in the Bay Area. Design firms work in depth with one school at a time, and are ideal for crafting a solution to the design problem an individual school presents—but they are not well positioned to address the systemic barriers that are keeping this movement from reaching its potential. Through our work, we encountered many places where traditional systems were not set up to support design, use, and management of green schoolyards. This included everything from the way that school grounds are funded and maintained, to teacher training, and design codes.

I founded Green Schoolyards America to be able to work on the systemic changes that are needed to allow all schools to create park-like green schoolyards. We are seeking out the places where the system gets stuck as school districts try to build green schoolyards, and are working to “unstuck” them. We want to ultimately shift the default design for school grounds to become more park-like, instead of environments that resemble parking lots or prisons.



What are some of the strongest arguments for making these transitions?

Investments in green schoolyards generate benefits across many disciplines. Green Schoolyards America envisions a future in which public school grounds are used strategically to improve the well-being of children, their communities, and the urban environment at the same time.

For children, living schoolyards provide hands-on, outdoor learning areas that work across the curriculum and across grade levels. Children also receive health benefits from green schoolyards that include: physical health, mental health, social-emotional health, and therapeutic landscape benefits that reduce the effects of trauma. If we can green all of our school grounds, we will be able to give all children access to the natural world, every day.

For the community, school grounds can be vibrant, lively centers for their neighborhoods. In California, it often takes a formal joint use agreement to be able to use school ground land as parks after hours. When we do so, we put more green space within walking distance of all community members—and this can touch almost every neighborhood.

From an environmental perspective, paved schoolyards, which are the default in most places in California, are a problem for stormwater management and add to urban heat island effects, harming the climate. Paved school grounds don't provide any wildlife habitat and are problematic for air quality. If we can transform our paved school grounds into living schoolyards, that land will be able to act as green infrastructure and can better manage stormwater, cool urban heat islands, add valuable wildlife habitat, and improve air quality.



School grounds in Berlin, Germany—shown on this page and page 1—used to be asphalt deserts but transformed into leafy park-like spaces 20 years ago. Hundreds of schools across the city now absorb 100% of the rain that falls onsite, and are protected by lush tree canopies. The children and the urban environment greatly benefit from this type of design.





A beautifully crafted and managed preschool yard in Japan.

You've gone all over the world looking at examples of green schoolyards. Is there any country that is setting the standard?

There are interesting things happening all over the world, and different regions have their own specialties. In addition to founding Green Schoolyards America, I'm the co-founder of an organization called the International School Grounds Alliance. It's a collaborative organization that currently includes a board of 63 individuals from more than 20 countries. The organization was founded in 2011.

Through my collaborative work with the International School Grounds Alliance, I'm able to visit colleagues around the world and learn and share best practices and ideas. I would say that many people from other countries (and our own!) look to California and the United States as the leader in school garden and cooking programs. There are several thousand school gardens across California now, and our state has been working to build the school garden movement since the mid-1990s.

Scandinavia and Germany are leaders in green design for school grounds. The city of Berlin, Germany for example, has a stormwater management program that requires every school to absorb 100 percent of the rain that falls on their site, or they pay fees! The fees are high enough that every school in the city—about 400 schools—unpaved their grounds almost entirely, about 20 years ago. This shift in Berlin turned flat asphalt covered spaces into rolling topography planted with trees—and created high quality stormwater benefits and incredibly shady, wonderful school ground “parks” across the city. (See the photos on pages 1 and 3.)

I deeply admire what Berlin has done with its school grounds. They refer to this design philosophy as “sponge school grounds”, because they absorb stormwater, but they're also intended to make the city more climate-resilient with their extensive tree planting.

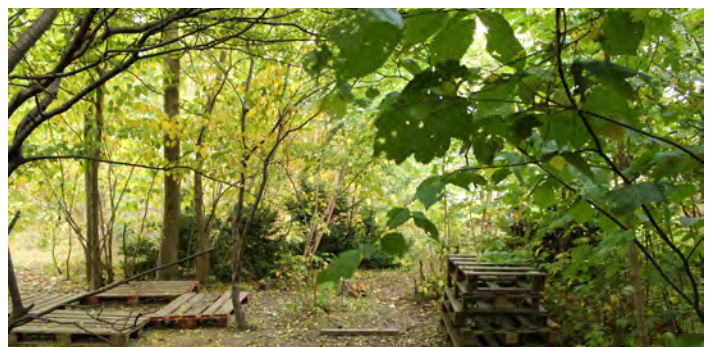
Japan has excellent curricula in which children are taught to be stewards of shared public space. Most schools have limited janitorial and grounds-keeping staff, and instead rely on the hundreds of students at each school to put in a few minutes a day to keep the building and grounds looking good, as part of their stewardship curriculum.

In addition, many of Japan's school environments for preschoolers, in particular, are beautifully crafted with rich attention to detail, accomplished at a scale that puts children's needs and happiness at the center of the design. (See photo, left) This philosophy invests heavily in children's well-being, and preschools in the United States could learn a lot from this approach.

Many school grounds I have visited in Japan have perfected the art of indoor/outdoor relationships in their building design, and are focused on the children they serve. They use natural materials, pay close attention to detail, and emphasize empathy education and stewardship connections between the physical space and the curriculum.

Germany and Scotland are leaders in nature play and forest kindergarten movements where sometimes the whole preschool program is outside, every day, all day, no matter the weather, all year round. These programs leap out of confining school buildings, allowing forest school students to have classes and spend their days in regional parks.

There are a lot of interesting models in the world and I'm fortunate to be able to visit many places and to see what they're doing. At Green Schoolyards America, we have access to the research and ideas developed in many countries through our colleagues around the world. We are systematically applying what we learn from other places, in ways that fit into our context and school environments in California and the USA.



The grounds of a forest preschool in Sweden offer many opportunities for open-ended, imaginative play and learning.

What kinds of return can schools see if they invest in green schoolyards? Are there actual cost savings?

Investments in green schoolyards benefit the school, but they also benefit the community. Part of what we're trying to do is to understand and articulate those benefits to the community so that we can also ask the community to pitch in, and invest in building and maintaining these spaces.

Your question is, "If a school invests its own money in changing the grounds, what does it get back?" I'm asking the question, "If a community or a state invests in its school grounds, what are the overall benefits it can generate?"

When my colleagues at the Council for Watershed Health did a study of all of the schoolyards in Los Angeles, they found that 20 percent of all schools in the district have 100 percent asphalt and not a single tree!

That's shocking, first of all, but those schools are also in areas where kids are most vulnerable. They're in the lowest income sections of the city, typically, and those are also places that are expected to have the most heat gain as climate change progresses. When you invest in trees, and you put them in those schools in particular, you are investing in the health of the students at those schools and you're investing in climate mitigation for the neighborhood.

The question of who pays for the shift from pavement to a more protective "park" with tree canopy coverage is separate from who benefits. Right now, our system is set up to ask schools and districts to pay for those expenses. I think that it should be a wider, societal investment because we're looking to reap societal benefits. This type of transformation could be paid for more widely with climate mitigation funding, like Cap and Trade funds—or with stormwater management money, since removing asphalt also heals the watershed.

Planting trees and doing landscape work, in themselves, are not more expensive than a hardscape. In Germany, they find it's far cheaper to be investing in living materials than in hardscape. There are maintenance costs for living landscapes that hit schools' maintenance budgets every year, but in Germany they are finding that these costs are less than they would have been to maintain hardscape over the decades.

In the United States, we have the added problem of dividing our money into separate capital and maintenance budgets. We have these siloed in our planning processes and this is a place where we have economic barriers to implementing green schoolyards. Everyone likes to "cut the ribbon" and no one wants to "mow the grass", so we invest more money in initial construction and less than we should in maintenance. From what I understand, the net expenditure is probably the

same or cheaper, but our accounting and budgeting methods don't allow us to see those benefits. Green Schoolyards America and our colleagues are hoping to research that more specifically in the future.

At the school scale, when you do invest in shifting a patch of schoolyard—say 1/4 acre—from asphalt into vegetation, costs vary depending on what you plant. If a school plants a patch of forest, they will make an initial investment to remove asphalt and plant trees, but the trees will not cost very much to maintain over time, once they are established. That's a lot different than putting in a garden on a similar scale, and then needing to employ a garden educator to teach in the garden all year, every year. Green Schoolyards America advocates for asphalt removal and tree planting as



Washington Elementary School in Berkeley, CA is home to a schoolyard forest planted by children in the mid-1970s.

the primary design interventions, since we would like to see schoolyard greening at every school, and we believe this to be a cost effective approach. We have adopted the mantra of our colleagues at Evergreen in Toronto, Canada, which is: "Trees, rocks, and mulch" as the primary materials for shifting asphalt-covered grounds into more park-like environments. We also recommend that schools plant their trees in clusters ("forest groves") to further minimize maintenance costs and to provide stronger microclimate, health, and wildlife habitat outcomes.

Other returns on the investment for green schoolyards are less financially tangible, but very important. Schools with living schoolyards see a lot more volunteers coming out of the woodwork to support them, first with their grounds transformation efforts, but then the volunteers also end up helping kids with reading and other programs where schools need assistance. Typically, schools will also find that green schoolyards boost teacher satisfaction and that sometimes leads to reduced teacher turnover. Teachers also like to have environments that are interesting and pleasant to be in!



How can these kinds of schoolyards support California's efforts to teach environmental literacy?

I was a member of the Environmental Literacy Task Force that created California's *Blueprint for Environmental Literacy* in 2015. It includes recommendations for hands-on learning, both on-site in a green schoolyard and in the community, in parks and other green spaces.

When teaching environmental literacy, think of school grounds as hands-on, primary source "instructional materials" for schools. They are also "outdoor classrooms" and "learning laboratories" for teaching science and math and art and reading and foreign languages. Almost anything that teachers need to teach, across the curricula and through the grade levels, can be taught outside, in a living schoolyard.

Water conservation is a major concern. Do green schoolyards mean more water, or less water?

We need to use the water we have more wisely. We're seeing more water agencies and school districts partner to unpave asphalt school grounds so that more stormwater will soak into the ground, where it can recharge the water table.

If you are asking about irrigation water, I think there are many ways to look at that question. When I walk around many school grounds in California, I often notice is that school districts are choosing to spend both their water and their maintenance budget on the narrow strip of land between the front of the school building and the street—places for curb appeal, where adults look at the landscape but no one actually spends any time there. Inside the fence line of the same school grounds, you'll often see two to four acres of asphalt that hundreds of children use every day, all day—and it has not a single tree. In my mind, this is a misuse of both water and maintenance resources.

What we're advocating for instead, is smart investments that use tree planting and stormwater management funds to make substantial improvements in the environmental systems on school grounds, while also doing so in the places where children benefit most: on their playgrounds. We believe that adults' needs for curb appeal can be accomplished with native plants that are adapted to local rainfall patterns—and we can move the water budget we would have used on curb appeal to be able to invest it in canopy trees and other green infrastructure that has important benefits children's health and learning.

When we consider future investments on school grounds, we should all ask the question, "who benefits when we make this change?" We should all be looking out for children, and ensuring that they are the main beneficiaries.

As we transform our paved school grounds into parks, and open them on the weekend, those landscapes also benefit the community. We should choose to invest our water in the places where the most people will benefit for the most amount of time.

We can also look at schools' overall water budgets, and consider where they can save water in their building so that they can use more on their grounds. If they have low-flow devices in their bathrooms, that might save enough water to help schoolyard trees get established.

You could sum it up to say it that if you're smart, green schoolyards don't automatically use more water.



The schoolyard greening at Commodore Sloat Elementary in San Francisco, has grown and changed over the years.

How do these programs fit into California's role in fighting climate change?

California is emerging as a global leader in the fight against climate change, but our school grounds are far, far behind and need some serious attention. The ~130,000 acres of school grounds in our state are heavily paved, particularly in our cities, contributing to urban heat island effects rather than mitigating climate change. Almost all of this asphalt, concrete, and rubber surfaces—and California's 6.2 million public school students—are baking in the sun. Across the state, about 60% of our schools have less than 5% of their property shaded by trees! We should be appalled that we have allowed 10% of our schools to have less than 2% tree canopy! We can and should do better for our children, and our climate.

Places like Berlin, Germany and Paris, France are far ahead of us. Berlin, 20 years ago, planted shade trees on every schoolyard and so they now have climate resilient schoolyards everywhere, across the city. Paris recently announced a program called "Project Oasis" to make their school grounds into "islands of cool."

Paris doesn't have as many trees as other cities, and their whole city gets dangerously hot. High temperatures in recent years are threatening the health of elderly residents and other vulnerable people in the community. To address this, they're trying to turn their school grounds into cool oases that are planted with trees, so that community members can seek shelter on unbelievably hot days when it would be dangerous for them to stay at home. That's an incredible concept, and one that is relevant around the world.

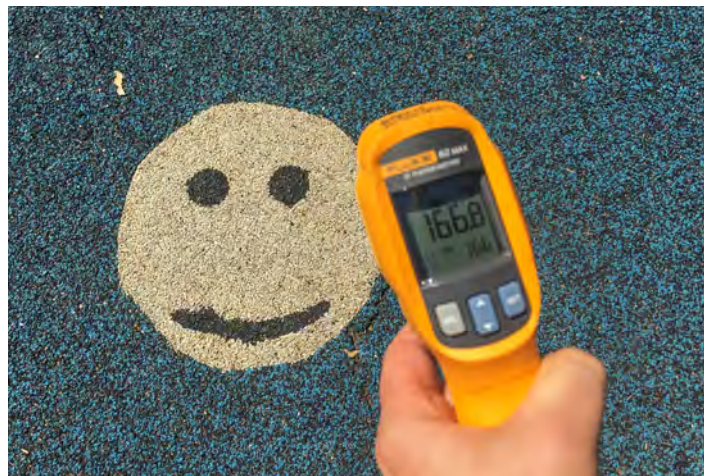
Here in California, we've been measuring school ground surface temperatures, and have also been seeing a huge need to cool our children's environments. For example, on a day when the air is 68°F, we typically see asphalt surfaces at around 120°F. Black rubber "safety" surfaces can be 145°F on a 68°F day. The hottest we've seen were tire rubber-based surfaces, which were an incredible 168°F on a 90°F day! In places where those materials are shaded by tree canopies, we found temperatures that were 60°F to 90°F degrees cooler. Shade is incredibly important.

The need is profound, and we have a lot of work to do. In addition to planting trees, we also need to phase out materials that heat up dramatically in the sunlight. Anything made from petroleum—plastic, rubber, or asphalt gets incredibly hot. The fewer petroleum-based materials we have in our grounds, the better for our climate.

I think we could be a world leader on schoolyard climate resilience if we set our minds—and our policies—on it, but we're very far from that goal. We have our work cut out for us, and we need everyone's help to improve this situation.



Elementary school students are working with Green Schoolyards America to measure schoolyard surface temperatures. Rubber "safety" surfaces are particularly hot.



Do you see signs that interest in green schoolyards is growing?

Definitely. The movement in California has been growing over the last 30 years, but it seems to me that we're hitting a tipping point right now, where a lot of different forces are aligning to help to make this movement grow. There are exciting developments on the education side, like the *Blueprint for Environmental Literacy*, and a new assembly bill, SB 720, that just passed the state legislature and supports environmental literacy education across California.

The Strategic Growth Council has a program called the Health in All Policies Task Force, that has a brand new *Action Plan to Promote Parks and Healthy Tree Canopy*. That plan calls for inter-agency collaboration to create green schoolyards for the benefit of children's health. This is amazing! I'm really excited about it.



Tree planting is also being considered in the newest update of the Division of the State Architect’s standards for school grounds—in school parking lots and other spaces on school grounds. This is incredibly exciting from the design perspective. I hope it results in widespread tree planting in the places on school grounds where children will benefit directly.

San Francisco Unified School District has been working on green schoolyards with bond-funded programs, since 2003 and they’ve invested more than 19 million dollars so far. That has helped them to develop green schoolyards at 90 schools across the city. I worked with them to help set up and implement that program over the course of a decade, and I am so pleased to see it flourish.

Right now Green Schoolyards America is working with the Oakland Unified School District (OUSD) and the Trust for Public Land on a new project to help OUSD create a school board policy, funding strategy, and implementation plans that will help the district to create living schoolyards across the city. Our goal is to help schoolyards become healthier environments that are more climate resilient, provide vibrant places where kids can learn and play, and increase access to green space for the local community, which doesn’t have a park within walking distance of every resident yet.

When you look out over acres and acres of asphalt, and you feel the sun beating down, and see a complete lack of trees—and realize that vulnerable children spend a lot of

time in these places—the need to create green schoolyards is very clear.

We are now at a tipping point for the movement, where we are seeing a shift from creating pocket-size gardens in the corner of a single schoolyard to initiatives that envision infrastructure-scale change across a whole school, a whole city, and our state. Green Schoolyards America is supporting that infrastructure-scale shift, and we would like all planning agencies, designers, and educators to see public school grounds as worthy of large-scale investment. We invite you all to join us in this work.

Thank you!

Environmental planner Sharon Gamson Danks, MLA-MCP, is CEO of Green Schoolyards America, based in Berkeley, California. She is author of Asphalt to Ecosystems: Design Ideas for Schoolyard Transformation and co-founder of the International School Grounds Alliance. Her work transforms school grounds into vibrant public spaces that reflect and enhance local ecology, nurture children as they learn and play, and engage the community.

For more information, please visit:

- *Green Schoolyards America — greenschoolyards.org*
 - *Green Technology — green-technology.org*
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Children play creatively in the schoolyard at Golestan Education in the San Francisco Bay Area.

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