

Environmental Education and Sustainability in U.S. Public Schools

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Introduction

Environmental education and sustainability practices in schools have been emerging as an important trend in 21st century education, and a growing body of research and practice indicates that green schools can save money, improve health, and boost academic achievement. In October 2014 Inverness Associates conducted a comprehensive survey of environmental education and sustainability among public schools in twelve states selected to provide a representative sample including Colorado, Florida, Hawaii, Kansas, Kentucky, Maryland, Massachusetts, Missouri, Oregon, Virginia, Washington, and Wisconsin. The survey sought an understanding of how schools' environmental educational programs develop environmental literacy among students—the environmental knowledge, skills, attitudes and behaviors they need to become environmental stewards. The survey also sought to learn about environmental education and sustainability programs, as reflected in the schools' facilities and operations, curriculum, food program, connections to informal science and environmental education organizations, and community practices. The results provide a detailed portrait of the

successes and challenges experienced by the public schools as they incorporate environmental education and sustainability practices. And they provide a roadmap for how to strengthen this vital area in our schools.

The survey results provide one of the first green school baseline evaluations for public schools in the United States. Surveys were sent to 17,500 traditional and charter public school principals. With 1056 school principals participating, a 6% response rate, the returns are statistically significant, with a 5% margin of error and a 95% level of confidence, which allows for valid generalizations about the views of principals in these twelve states regarding environmental education and sustainability. Analysis of the data indicates the survey was generally representative of the state's public schools in terms of the type of school (traditional, charter), grade level structure, and enrollment size. The survey may overrepresent to some degree schools in larger districts and schools where the principal is very engaged with environmental education and sustainability issues.

BOULDER'S DISTRICT LEADERSHIP

Led by Sustainability Director Ghita Carroll, the Boulder Valley School District in Colorado was designated as one of the first Green Ribbon School Districts in 2013; the Casey Middle School was one of the first to be recognized as a LEED Platinum school.



Central Conclusions

The survey demonstrates that there is significant engagement with environmental education (EE) and sustainability in our public schools. In all areas of operation—overall organization, efficient use of resources, healthy operations, environmental curriculum, food and nutrition, and student leadership—the survey shows that many public schools are working to make environmental sustainability a priority. Yet, the survey also reveals that public schools need to adopt a more systematic and systemic approach to environmental education and sustainability.

Interest in EE and sustainability is strongest among administrators, faculty and students, who are motivated by their concern for the environment. Many schools are organizing around a facilities master plan, green team, and green policies. Nearly forty percent of all schools report having a sustainability coordinator or lead green teacher, who is supported by faculty and parent volunteers. Financial support for EE and sustainability is modest with over three-quarters of the schools spending less than \$5,000 per year on non-construction activities. A majority of schools are working to lower their environmental impact through waste reduction, recycling, composting, energy efficiency, and many have installed ecological schoolyard landscapes and renewable energy. A large number of schools have gardens and are improving their nutritional food offerings. Relatively few schools are incorporating green building practices in new construction and renovation. The integration of EE in the curriculum is beginning but is not well developed. And the data indicate that resources available for EE and sustainability are not equitably distributed, which makes it more difficult for financially disadvantaged schools and districts to become greener.

The survey also points to key challenges that must be addressed to make further progress. Principals would like more money, time, and staff; better organization and designated leadership; greater commitment from the school board and district, an overall sustainability plan for their schools, and outside support; as well as more buy-in, enhanced staff training, and more integration of environmental education into curriculum at their schools.

ECOLOGICAL CURRICULUM

At Larkspur Elementary School in Colorado the curriculum is based on Environment-Based Education and uses the campus as a learning laboratory.

The survey elicited almost three thousand individual comments. Here is a sample of the principals' voices about the overall benefits of green facilities and operations and a green curriculum, the challenges principals face, and the schools' needs.

BENEFITS OF GREEN FACILITIES AND OPERATIONS

"We have students engaged in understanding our environmental footprint and how we as individuals can think wisely about our environment."

"The most important benefit is heightened student awareness."

"SAVING MONEY. "

"Solar panels are great as both positive environmental factors and teaching tools."

"Reducing the amount of garbage collected each day, reducing the cost to the building/district for services."

"Reduced cost of utilities, lowered costs on heating."

"We have saved monies to use on the Instructional Programs; we have changed the mind-set of people regarding the use and savings of energy, reduction of pollution, and public health issues."

"Knowing we played a role in preserving our environment for future generations."

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BENEFITS OF ENVIRONMENTAL EDUCATION

"We are teaching our scholars to be stewards."

"Students realize that nature and learning about the environment is all around them."

"We stress "Leave No Child Inside" at our school; living active, outdoor green lifestyles is a goal of our curriculum."

"Many of our students haven't experienced outdoor programs so this is extremely beneficial."

"The field trips expose rural students in activities they might otherwise not experience."

"Students gain an appreciation for the environment and understanding of the importance of conserving local resources."

"The eco-programming is integrated into much of the curriculum; students develop a practical and holistic sense of the value of thinking and acting in favor of environmental sustainability."

"People are naturally connected to the outdoor environment; it is brain-friendly and all academics can be taught through it."

"Our students are better equipped to understand the needs on a global scale, and they understand the way the smaller scale of our school impacts the world around them."

"It has sparked college and career interests."

"Care for our community!"



CHALLENGES FACING GREEN SCHOOLS

"We don't have a plan, it is rather haphazard."

"We need time for the competing initiatives for which we are accountable."

"Funding all the initiatives we would like to do."

"Not having budget and personnel to organize/fund/lead proposals."

"All of the organizational efforts are on a voluntary basis for staff; there is no compensated time."

"No real buy in from staff and students."

"Support for a "greener" facility, resources to move our sustainability initiatives."

"Focusing our attention on things that matter rather than standardized scores."

"Too much standardized testing, not enough support for these initiatives, not enough time in the day."

"Not required in curriculum across the grades."

"It has not become a district supported initiative."

"No commitment of funding or resources at the County level."

"Time for PD, and curriculum mapping, to establish logical ways and means to integrate."

"Teachers feel overwhelmed to take care of reading, writing, math and environmental education often feels like a separate topic and therefore there is not the same enthusiasm to participate outside the classroom."

"The school has to be extraordinarily frugal; we are in an impoverished area and funding is not up to par."

"We have 70% poverty and families and students have higher priorities and concerns."



ENVIRONMENTAL STEWARDS

Students develop environmental literacy skills working in school gardens or trail restoration projects like the one underway at Parks Elementary School in Wisconsin (above).

WHAT SCHOOLS NEED TO BE GREENER

"Leadership."

"A clearly articulated strategic vision for the future."

"Sustainability policy."

"A district-wide coordinated plan."

"A sustainability coordinator position."

"Paid time to design and implement a plan for the school."

"Master site use plan so that we know where to locate garden and playground upgrades."

"Knowledge of available programming."

"Teacher/staff training."

"Additional funding for environmental education field trips and camps."

"One resource for environmental literacy in our school system."

"PD on integrating it into the demands on instruction that we already have."

"Have the state set this as a priority."

"Less assessments and mandates."

"Alignment with Common Core topics of global significance."

"More commitment from top-level officials of education."

"District policy regarding environmental education."

"Resources and time dedicated to environmental education."

"More funding for school level staff who focus on environmental education and the promotion of it."

"A guide to help with integration into the curriculum."

"Coordinated curriculum activities with real world context in a field setting."

"Funding to maintain our outdoor classroom and gardens."

"Retro-fitting of old school buildings."

"Better funding for alternative energy sources."

"Ensure that state standards are met through sustainability efforts."

"Integrate environmental education into curriculum."

"Time for teachers to collaborate on curriculum integration."

Detailed Findings

This section reports key findings about the state of environmental education and sustainability in the public schools as viewed by the principals. (Charts of the results can be found in the appendix at the end of the report.)

SCHOOL ORGANIZATION FOR ENVIRONMENTAL SUSTAINABILITY

Schools that have experienced the most success going green share key characteristics. Typically, they have an organized group responsible for developing and monitoring goals and objectives, designated leadership, an environmental sustainability mission statement, and adequate financial support.

Interest level in environmental sustainability is clearly highest among administrators (59% identified as extremely/very interested), then students and faculty (47%, 42%), while non-faculty staff, board and parents are less interested (39%, 32%, 29%); only 6% of these groups have little or no interest.

Commitment by the principal (60%), concern for the environment (59%), and engaged faculty and students (59%) are the main factors identified in greening schools; parents and the PTA and community groups (32%, 31%), desire to save money (30%), the superintendent (25%), the school board (20%), and state or county policies (12%) were less significant factors.

Schools organize their green efforts through a green council or green team (52%) led by a sustainability coordinator or lead teacher (39%), only a small percent being compensated (11%).

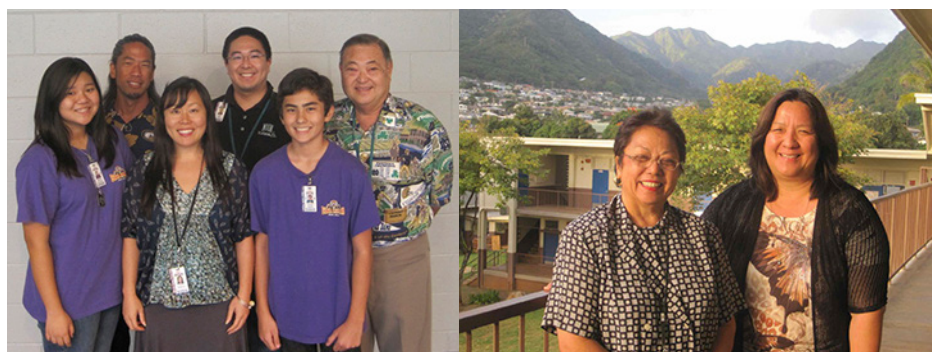
In many schools a small (2-5) group of staff (59%) and parent volunteers (34%) works on sustainability issues and supports motivated students.

Facilities master plans or modernization plans (36%) and a set of policies to promote environmental education and sustainability (37%) guide the efforts.

Approximately a quarter (29%) of principals report that environmental education and sustainability is reflected in the school's mission and priorities to a very great/great extent.

Financial support for environmental education over and above capital expenditures—for fields trips, outdoor education, assembly speakers, curricular materials, and professional development—is modest, typically under \$5000 (88%); a few schools are allocating significant funds, greater than \$10,000 (2%).

Nearly a third of schools have been recognized for their sustainability efforts (30%) through LEED, Green Ribbon or other awards such as state or green business certification, Energy Star Schools, or the Green Cup Challenge.



SCHOOL LEADERSHIP. With principal Ed Oshiro and his Green Team leading the way, Ewa Makai Middle School became Hawaii's first LEED Gold school; at Palolo Elementary School, principal Ruth Silberstein and her faculty used environmental education to engage students in a financially disadvantaged school district and significantly improve academic achievement.

REDUCING THE SCHOOL'S ENVIRONMENTAL FOOTPRINT

Reducing environmental impact is clearly a top priority in a large number of schools, however, it is apparent that schools still need to adopt a more systematic effort to measure, monitor and report to the community on resource use. Many schools need to incorporate basic green policies in their operations. To achieve maximum efficiency, schools need to incorporate green building standards and renewable energy options.

Waste reduction, recycling and/or composting programs are widespread (81%).

Numerous schools are pursuing energy efficiency initiatives (76%).

Some schools are working to reduce the use of hazardous chemicals (35%), to install ecological schoolyard landscapes (27%), and to adopt a sustainable approach to landscaping and water use (25%).

Some schools (14%) have installed renewable energy (solar, wind, geothermal).

Green building practices, including LEED/CHPS-certified renovation/modernization (17%) and construction (11%), have been utilized by some schools.

Few schools have a green purchasing policy (11%).

Funding for green facilities and operations initiatives has come principally from the district (61%), school budget (46%), grants (36%), and PTAs (17%).

GREEN PARTNERSHIPS

Andrea Suarez Falken (center) of the U.S. Department of Education heads the Green Ribbon Schools program to encourage best environmental practices in facilities, operations and program. She is pictured here with Robin Organ, Executive Director of Green Schools, and Don Yu from USD OE as they tour Quincy High School, a Massachusetts Green Ribbon School.



FOOD AND NUTRITION PROGRAMS

The school garden movement has clearly engaged many public schools. To maximize the impact, all schools need to provide garden teachers and integrate the garden in the curriculum. Properly positioned, the school's food program can help promote good nutrition, an understanding of where our food comes from, and hands-on experience with the environment for students.

Nearly three quarters of schools have a wellness policy (71%) that guides the development of food and nutrition programs.

Sustainability efforts in a large number of schools feature a garden (57%), and some schools link the garden to the curriculum (33%) and serve garden produce in the cafeteria (30%).

A third of schools offer a cooking class to teach students about food and nutrition (33%).

Less than a fifth of schools offer a nutritional food program with local and/or organic food (19%), and only a few schools have a farm to school program (13%).

ENVIRONMENTAL EDUCATION (EE) IN THE CURRICULUM

While environmental activities in facilities and operations seem to be relatively widespread, EE has yet to move into the curricular mainstream. The most successful schools have defined environmental literacy, used it to evaluate and revise the curriculum, and provided support and professional development for the faculty to integrate environmental education in the academic program.

Few principals indicate their school has achieved a high level of success in integrating environmental education in the curriculum (Extremely/Very Successful 17%; Not Very/Not At All Successful 29%).

For many schools, principals report that a student environmental club is the place where environmental education is taught (52%), suggesting that EE is not yet in the curricular mainstream.

Principals do report efforts at their schools to integrate environmental and sustainability concepts across the curriculum (35%), in an elective class (15%), or in an AP Environmental Science course (12%) in high schools.

Environmental education is offered most often in the context of STEM classes (63%) and to a much lesser degree in the humanities and social sciences (26%).

Outside the classroom, schools report a relatively broad-based approach to environmental education, including outdoor learning experiences (50%), service learning projects (41%), the school garden (40%), using the campus as a hands-on learning laboratory (38%), and civic engagement projects with environmental themes (36%).

To a great extent school-based environmental education utilizes teacher-created curricula (78%).

For curricular programs developed by outside specialists, FOSS science units are used most often (25%), followed by the Education and the Environment Initiative (6%).

School principals indicate there is very little professional development in environmental and sustainability education. (To a small extent/Not at all 68%); only 6% describe EE professional development as excellent or very good.

Few schools have a written definition of environmental literacy (8%), an environmental literacy requirement (7%), or a means of assessing environmental literacy (10%).

INFORMAL ENVIRONMENTAL EDUCATION AND THE CONNECTION TO SCHOOLS

Principals understand that providing opportunities for their students to experience nature is vital to their development as environmental stewards. Effective schools offer a variety of field trips and outdoor education programs and the resources to support them. There needs to be a stronger connection between informal environmental organizations and schools to benefit students and to provide faculty opportunities for professional growth and EE curriculum development.

A large number of principals believe informal environmental education is extremely or very important in helping students achieve environmental literacy (57%).

Virtually all schools report using a variety of field trip experiences—outdoor programs, science museums, zoos, aquariums, parks and farms—to promote environmental education (91 to 97%).

Many schools report using outdoor (49%) programs and science museums (35%) to develop curriculum, and about a quarter report using zoos, parks and farms for curriculum development.

Environmental organizations that are occasionally used for teacher professional development include outdoor programs (33%), science museums (16%), parks (12%), and zoos (11%).

Schools also report using a wide variety of other informal environmental providers and identified hundreds of such organizations, most within a reasonable distance from campus.

ENVIRONMENTAL LITERACY PLANS

The North American Association for Environmental Literacy (NAAEE) has led the national movement to create environmental literacy plans; over 25 states have completed plans that have been approved by their state's department of education and many more are in the process of creating a charter to enhance environmental education and sustainability.

CHALLENGES AND NEEDS

As the survey findings and comments from principals indicate, the effort to green schools faces challenges from competing priorities, lack of resources, and a need for strong leadership.

Teacher workload and lack of funding (73% each) and schedule/time constraints (69%) top the list of challenges to enhancing environmental education and sustainability programs.

Principals also cite personnel issues—inadequate staffing (40%), lack of training (39%), insufficient buy-in (32%)—as hampering their effort to advance environmental education and sustainability.

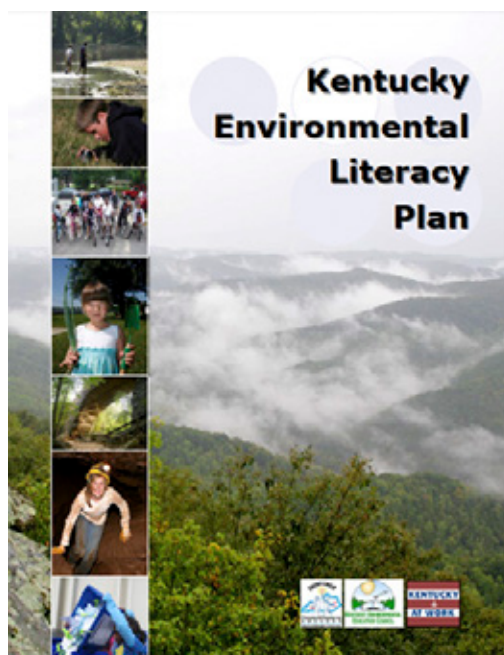
The main challenges to using informal EE specifically in schools are a lack of time, schedule constraints that make field trips difficult, limited funds, and transportation issues.

To address the challenges incorporating environmental education and sustainability, principals would like increased funding, more time, more staff, designated leadership, and a sustainability plan for their schools.

In addition they would like more buy-in, better organization, more staff training, more integration of environmental education into the curriculum, and outside support.

CONCLUSIONS

The survey of environmental education and sustainability in public schools in twelve selected states reveals there is a range of engagement with these issues, with facilities and operations most salient. An awareness of the widespread environmental challenges we face has motivated many principals and their school communities to make an effort to become greener. In all areas of operation—overall organization, efficient use of resources, healthy operations, environmental curriculum, food and nutrition, and community practices—the survey reveals that public schools have begun to incorporate initiatives focused on environmental sustainability. The survey also shows that our schools face challenges in making environmental sustainability a priority, getting organized, providing leadership, funding initiatives, and finding time and resources to devote to the effort. While principals outline a long list of needs, at the same time they identify opportunities for the public schools to strengthen their commitment to environmental education and sustainability.



Recommendations

These ten steps to develop green, sustainable schools are focused on individual schools, working with school districts and informal environmental education organizations.

1. PARTNERSHIPS

Use the resources of the U.S. Department of Education to participate in the Green Ribbon Schools program to benchmark performance in facilities, operations, and program.

2. ORGANIZATION

Make EE and sustainability a high priority, establish a Green Council, craft a green mission, goals, a plan, and report progress on a regular basis.

3. LEADERSHIP

Appoint a compensated Sustainability Coordinator responsible for developing and directing the school's overall sustainability plan.

4. RESOURCE EFFICIENCY

Benchmark and monitor use of electricity, oil/natural gas, water, and waste disposal and make systematic plans to reduce usage and document savings.

5. FACILITIES

Use best practices to renovate or construct buildings that conform to green standards and install renewable power.

6. HEALTHY OPERATIONS

Adopt policies for green purchasing, hazardous waste and pest management, and school wellness.

7. NUTRITIOUS FOOD

Evaluate and improve the school's food program to focus on good nutrition and health and local, seasonal offerings.

8. CURRICULUM

Adopt a definition of environmental literacy and use it to incorporate EE across the academic program with resources such as Education and the Environment Initiative (EEI) while enhancing professional development.

9. EXTRA-CURRICULAR PROGRAMS

Enhance opportunities for students to learn about the environment outside the classroom and in nature, strengthening ties to the informal EE community.

10. STUDENTS

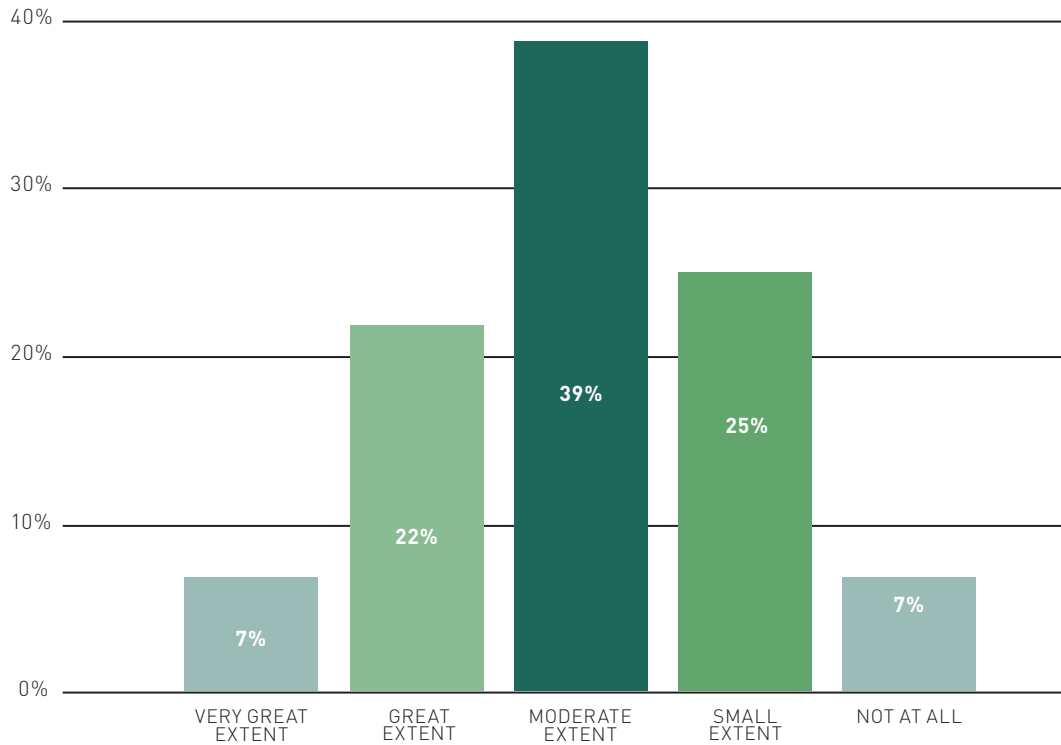
Include students in meaningful leadership roles in making the school more environmentally sustainable.

Looking Forward

The results of the green public schools survey are encouraging, but we need a greater sense of urgency to address the enormous challenges we face. Making environmental sustainability a top priority in our schools requires taking the long view, one focused on where our schools need to be in 2050 to address mounting environmental challenges. We have the means and the imagination to face these challenges and to help ensure that our students will grow into a world of promise and opportunity where the quality of their lives will be at least as good as that we enjoy today. By becoming more green, and environmentally sustainable, our public schools will be doing their part to help raise the next generation of environmental stewards.

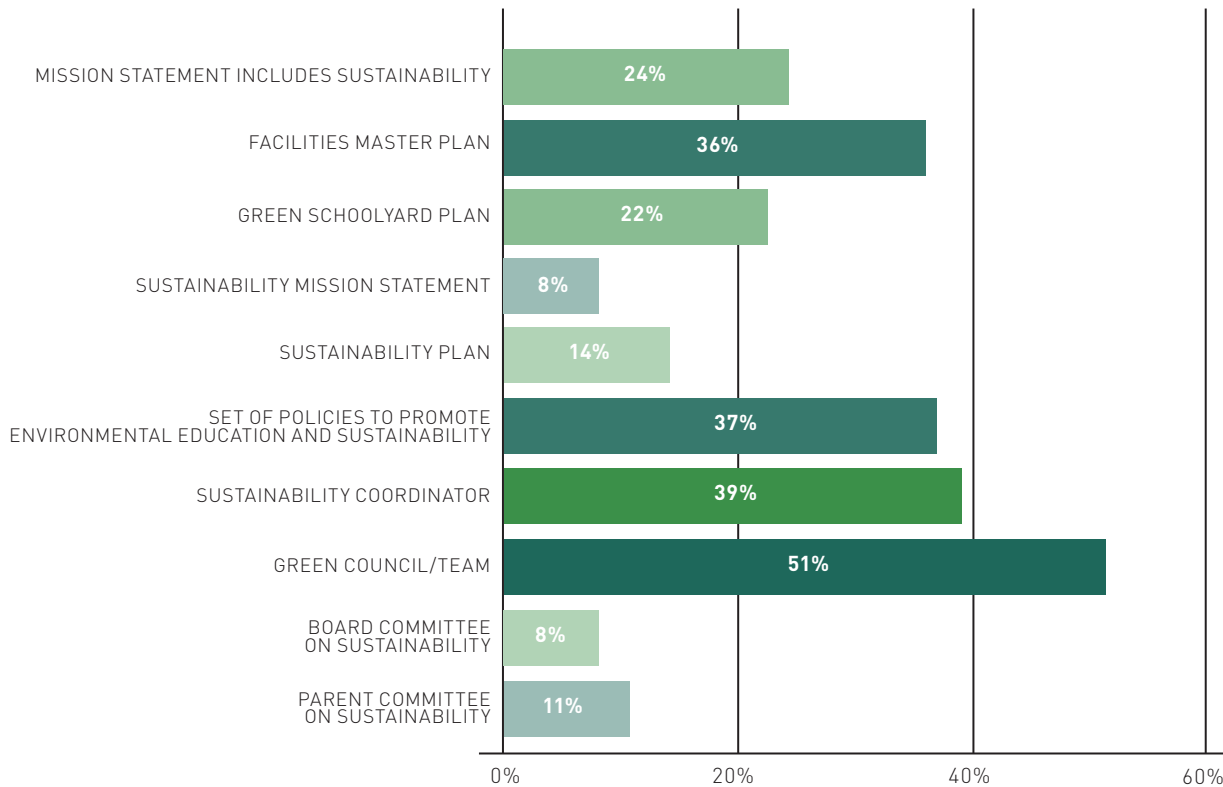
GREEN SCHOOL/DISTRICT MISSION AND POLICIES

Please rate to what extent environmental education and sustainability is reflected in your school's mission and priorities.



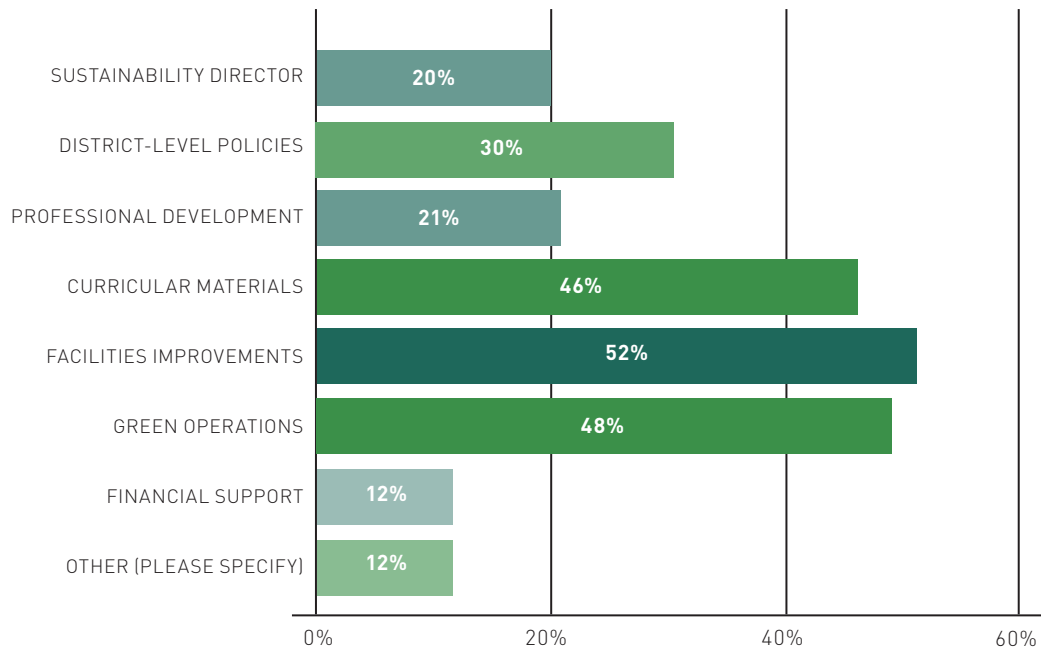
GREEN SCHOOL/DISTRICT ORGANIZATION

Which of the following initiatives does your school have in place?



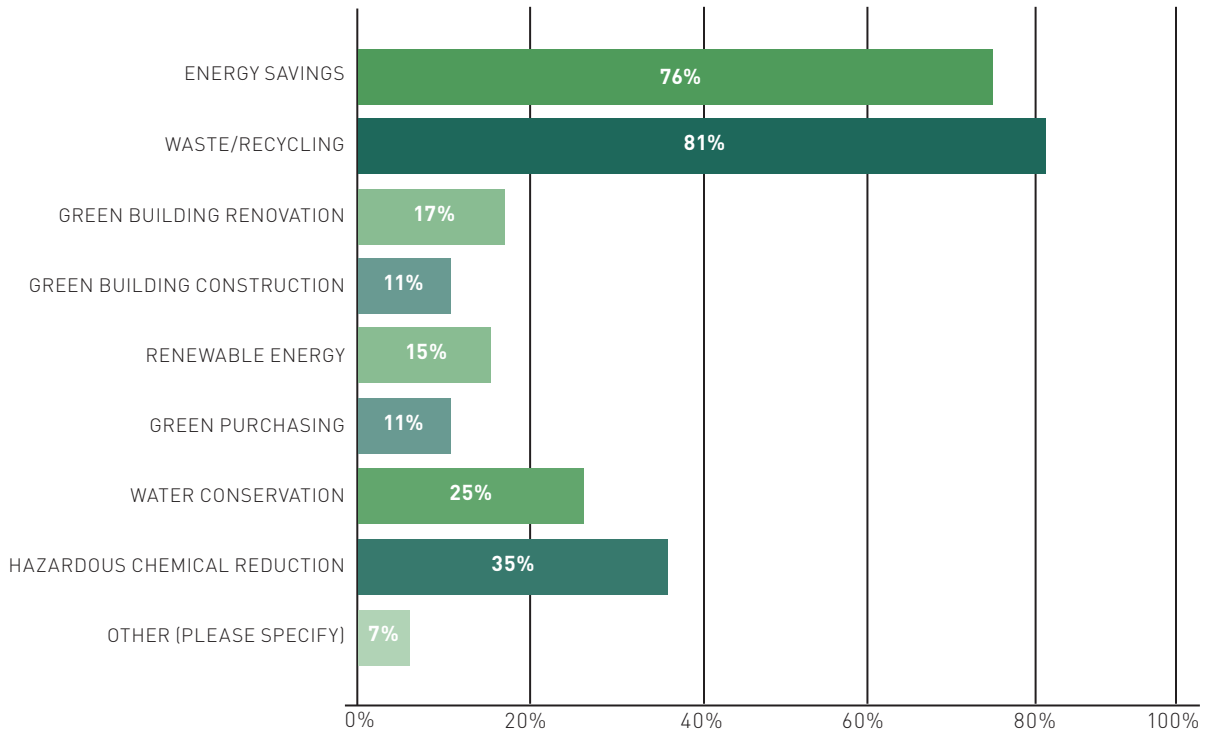
DISTRICT SUPPORT FOR EE AND SUSTAINABILITY

Which factors have contributed the most to supporting and promoting environmental education and sustainability efforts at your school?



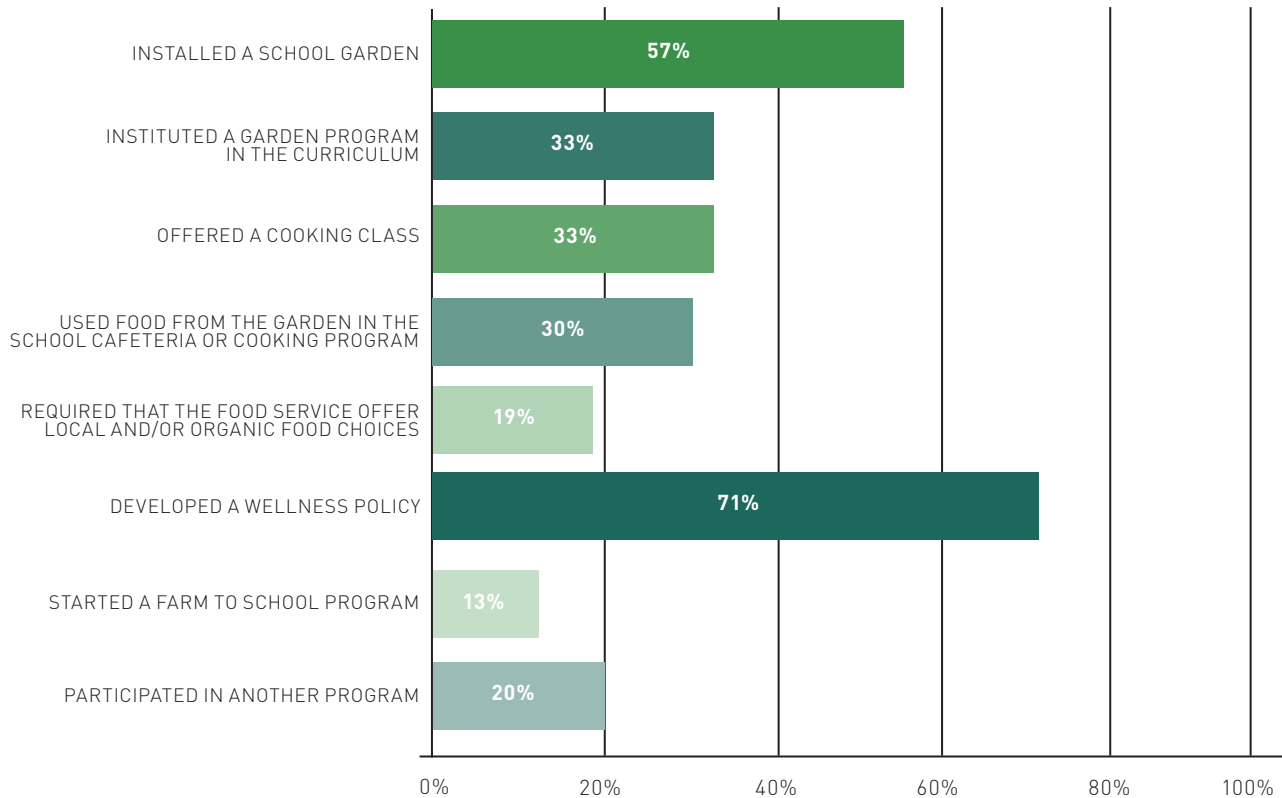
FACILITIES AND OPERATIONS INITIATIVES

Which of the following has your school initiated?



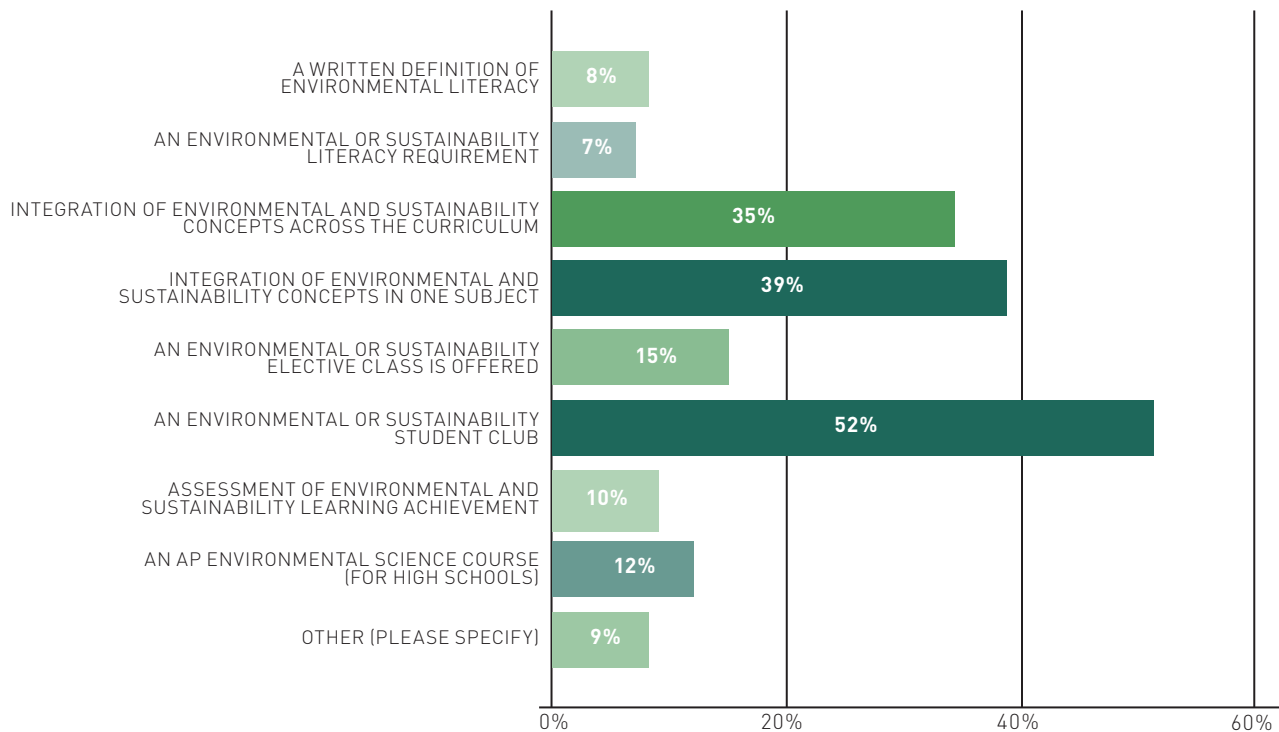
FOOD AND NUTRITION INITIATIVES

If your school has taken any of the following steps, please check all that apply.



ENVIRONMENTAL EDUCATION CURRICULAR PROGRAM ELEMENTS

Which practices does your school employ to incorporate environmental and sustainability education in the curriculum?





OUTDOOR EDUCATION

In Florida middle school students participate in a variety of outdoor education programs to augment their school curriculum; here a group studies marine science (left) and another group (above left) learns about the health of the wetlands.

GREEN TEAM IN ACTION

Principal Paul Chapman is shown here (back row, center) with members of his school's Green Team, who he credits with the successful effort to improve energy efficiency, healthy operations, nutritious food, and an ecological curriculum.



Paul Chapman is Executive Director of Inverness Associates, a consulting group focused on growing greener schools (www.invernessassociates.org). He served as Head of School at Head-Royce School in Oakland, California for 26 years, and before that taught in public and private schools. He is the author of *Greening America's Schools* and *Greening America's Schools 2.0* (2012, 2013), available at www.nais.org. This report is one in a series of surveys of environmental education and sustainability in public and private-independent schools in California and across the country. Deborah Moore of the Green Schools Initiative provided helpful assistance on the survey design and administration, and Nina Zurier was responsible for the report's appealing layout and design.

COVER IMAGE: Students and teachers at South Shore Public Charter School in Massachusetts proudly display the award they received in Scholastic's "America's Greenest School" competition at the Green Schools Summit; the school has also been recognized with a National Green Difference Award by the Green Schools organization.

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