

U.S. DEPARTMENT OF EDUCATION

GreenRibbonSchools



# Highlights from the 2016 Honorees



U.S. Department of Education - 400 Maryland Ave, SW - Washington, DC 20202  
[www.ed.gov/green-ribbon-schools](http://www.ed.gov/green-ribbon-schools) - [www.ed.gov/green-strides](http://www.ed.gov/green-strides)



## Table of Contents

Table of Contents.....	2
Introduction .....	7
2016 Director’s Award.....	9
Honorees at a Glance .....	10
2016 U.S. Department of Education Green Ribbon Schools .....	11
Alabama .....	11
A.H. Watwood Elementary School, Childersburg, Ala. ....	11
University of Montevallo, Montevallo, Ala.....	13
California .....	15
Bay Farm School, Alameda, Calif.....	15
Bishop O’Dowd High School, Oakland, Calif.....	17
Los Angeles Unified School District, California .....	19
Manhattan Beach Unified School District, California .....	22
San Francisco Unified School District, California .....	24
Colorado.....	26
Heritage Elementary School, Highlands Ranch, Colo. ....	26
Poudre School District, Colorado .....	28
University of Colorado—Colorado Springs, Colorado Springs, Colo.....	30
Connecticut .....	32
CREC Two Rivers Magnet Middle School, East Hartford, Conn. ....	32



CREC Two Rivers Magnet High School, Hartford, Conn.....	34
King School, Stamford, Conn. ....	36
Delaware .....	38
Wilmington Montessori School, Wilmington, Del. ....	38
Department of Defense Education Agency .....	40
Kimberly Hampton Primary School, Fort Bragg, N.C.....	40
Van Voorhis Elementary School, Fort Knox, Ky. ....	41
Garmisch Elementary Middle School, Bavaria, Germany.....	43
District of Columbia .....	45
Capital City Public Charter School, Washington, D.C. ....	45
Florida .....	47
Beachside Montessori Village, Hollywood, Fla. ....	47
Alachua County Public Schools, Florida.....	49
Orange County School District, Florida .....	50
Georgia .....	52
Atlanta Neighborhood Charter School, Atlanta, Ga. ....	52
Pharr Elementary School, Snellville, Ga.....	53
Paideia School, Atlanta, Ga. ....	55
City Schools of Decatur, Georgia .....	57
Georgia Institute of Technology, Atlanta, Ga.....	59
Iowa.....	62
Spalding Park Elementary School, Sioux City, Ia. ....	62

Hawkeye Community College, Waterloo, Ia. ....	64
Kentucky .....	66
Eastern Elementary School, Georgetown, Ky. ....	66
Russell Cave Elementary School, Lexington, Ky.....	67
Berea College, Berea, Ky.....	69
Louisiana.....	72
Westdale Heights Academic Magnet, Baton Rouge, La. ....	72
Baton Rouge Magnet High School, Baton Rouge, La. ....	74
Benjamin Franklin High School, New Orleans, La.....	76
University of Louisiana at Lafayette, Lafayette, La. ....	78
Maryland .....	80
Sligo Middle School, Silver Spring, Md.....	80
Broadneck High School, Annapolis, Md. ....	82
Anne Arundel County Public Schools, Maryland .....	84
Massachusetts .....	86
Littleton Public Schools, Mass.....	86
Minnesota.....	88
Glendale Elementary School, Savage, Minn. ....	88
Henry Sibley High School, Mendota Heights, Minn. ....	89
Macalester College, Saint Paul, Minn.....	91
Montana .....	93
Hellgate High School, Missoula, Mont.....	93

Two Eagle River School, Pablo, Mont. ....	95
Nebraska.....	96
Prescott Elementary School, Lincoln, Neb. ....	96
Alfonza W. Davis Middle School, Omaha, Neb. ....	98
Irving Middle School, Lincoln, Neb. ....	100
New Jersey .....	101
Whitehouse School, Whitehouse, N.J. ....	101
Egg Harbor Township High School, Egg Harbor, N.J.....	103
Essex County West Caldwell Tech, West Caldwell, N.J.....	105
Triton Regional High School, Camden, N.J.....	107
Raritan Valley Community College, Somerville, N.J.....	109
New York.....	110
Schuylerville Elementary School, Schuylerville, N.Y. ....	110
North Carolina .....	113
Wiley International Studies Magnet Elementary School, Raleigh, N.C.....	113
Sandy Grove Middle School, Lumber Bridge, N.C. ....	115
Elon University, Elon, N.C. ....	117
Ohio.....	119
Urban Community School, Cleveland, Ohio .....	119
Pennsylvania.....	121
Park Forest Elementary School, State College, Pa. ....	121
Slippery Rock University, Slippery Rock, Pa. ....	122

The School District of Jenkintown, Pennsylvania .....	124
Virginia .....	126
St. Stephen's & St. Agnes Middle School, Alexandria, Va.....	126
Charlottesville City Schools, Virginia .....	128
Virginia Beach City Public Schools, Virginia.....	130
Washington .....	132
Columbia Crest A-STEM Academy, Ashford, Wash.....	132
Gaiser Middle School, Vancouver, Wash. ....	134
Lakota Middle School, Federal Way, Wash.....	135
Bethel School District, Washington .....	137
Issaquah School District, Washington .....	139
West Virginia .....	141
Berkeley Springs High School, Berkeley Springs, W.Va. ....	141
Wisconsin.....	142
West Middleton Elementary School, Verona, Wis. ....	142
Glen Hills Middle School, Glendale, Wis. ....	144
Granton Area School District, Wisconsin.....	146
University of Wisconsin-Milwaukee, Milwaukee, Wis. ....	148
Acknowledgements.....	151

## Introduction

This is a special year. With this 2016 cohort, U.S. Department of Education Green Ribbon Schools (ED-GRS) turns FIVE! It is hard to believe that, just a few years ago, I was cooking up recognition award criteria in my kitchen based on input from many organizations and agencies. Now, we have a school award, district award, postsecondary award, Green Strides resources and webinars, and an annual tour.

Here at ED, we work with natural resource and health agencies to share effective resources for school sustainability, and, of course, spotlight the promising practices of our honorees. In the same way that we work together across federal agencies, state education authorities collaborate in exceptional ways with their state health, environment, and energy agencies. The private sector (both for profit and nonprofit) has gotten involved at federal, state, local, and school levels. In this way, ED's recognition award serves as a tool to get government working better to the benefit of students across the nation.

The ED-GRS Pillars of reduced environmental impact and costs, improved health and wellness, and effective environmental education remain the same, whether selectees are schools, districts, colleges, or universities. Increasingly, honorees' efforts are the result of the development of policies at the intersection of environment, health, and learning at state, district, and university levels. We are pleased to see that the award has prompted instructors, parents, students, and administrators nationwide to acknowledge the critical need for students to learn in a manner – and a place -- that will sustain both them and the planet. These green schools, districts, and postsecondary institutions have taught us that it's not just *what* students are learning and *how* they learn; the *where* matters too.

We've been thrilled with the collaborations at the federal, state, and local levels as a result of ED's recognition award. The collaborations that inspire us most, though, are those of our honorees themselves. Apart from progress in all three Pillars – not just one – you'll notice another common thread among our honorees: They have been tremendously resourceful in partnering with businesses, parks, farms, museums, nature centers, sporting facilities, religious institutions, townships, and countless other entities.

Our honorees are not necessarily the wealthiest institutions. In fact, over the last five years, half of our honorees have educated underserved student populations. When it comes to green schools, high-poverty schools come out on top. It is no longer a surprise to us that green school practices continue to be used as a tool to improve the built environments, health, and engagement of students of all ages that might seem to have the slimmest chances for success, and that those students are thriving as a result.





This year's selectees were confirmed from a pool of candidates voluntarily nominated and exhaustively reviewed by 27 state education authority implementation teams, including 25 states, the Department of Defense Education Activity, and the District of Columbia. While selection processes vary from state to state, members of several state agencies as well as outside experts generally comprise selection committees. At the federal level, we have selected 47 schools, 15 districts, and 11 postsecondary institutions that demonstrate promising practices to cut costs, improve health, and ensure that students learn through the most hands-on, engaging means possible.

The U.S. Department of Education Green Ribbon Schools, District Sustainability Awardees, and Postsecondary Sustainability Awardees prove that any school, district, or postsecondary institution can take steps to improve the sustainability, health, and safety of school facilities; ensure nutrition and fitness practices for a lifetime of wellness and productivity; and engage students in authentic, real-world learning.

Schools use sustainability in context to teach important civic values and skills that encourage students to grow into responsible, compassionate, and contributing citizens. Furthermore, working with dynamic environmental, social, and economic systems from an early age nurtures precisely the type of thinking, collaboration, and problem-solving skills that careers of the future require, whether these students graduate from green career and technical programs, green college preparatory schools, community colleges, or liberal arts colleges.

It is with tremendous pleasure that we present the 2016 U.S. Department of Education Green Ribbon Schools, District Sustainability Awardees, and Postsecondary Sustainability Awardees. These honorees are ensuring that their students learn to live, work, and play with sustainability and health in mind, not as an afterthought, but as an integral part of everything they undertake, from cradle to career.

The 2016 Green Ribbons are here. Prepare to be amazed! When you recover, go to our <http://www.greenstrides.org> page and get started using some of the same tools these awardees employ.

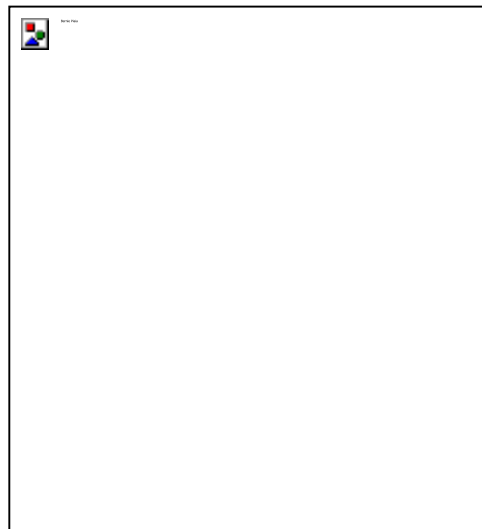
Andrea Suarez Falken  
Director, U.S. Department of Education Green Ribbon Schools and Facilities,  
Health, and Environment Liaison





## 2016 Director's Award

The Director's Award recognizes a state education official's exemplary efforts to administer the U.S. Department of Education Green Ribbon Schools (ED-GRS) recognition award. The ED-GRS Director's Award is given annually to the state education agency official who does the most to advance green schools in his or her state by running a robust competition and nomination process; connecting schools to resources in all three Pillars; amplifying the stories of honorees; helping schools learn from one another; partnering with a variety of entities to bring more resources and expertise into schools; and exhibiting a dedication to exceptional school facilities, health, and environmental education through activities outside of the administration of the award.



ED is delighted to have selected Director of the Office of School Facilities at the New Jersey Department of Education **Bernard E. Piaia, Jr.** as the 2016 U.S. Department of Education Green Ribbon Schools Director's Award Recipient.

Piaia, known to all as "Bernie," piloted ED-GRS in New Jersey and gave the award a permanent home in his state. He hosted a leg of the 2013 Green Strides Tour, and developed mechanisms to incentivize more schools to move toward the ED-GRS Pillars. Piaia has built lasting partnerships with numerous state entities and encouraged his state to participate in the postsecondary competition, in addition to the prekindergarten through 12th grade competition. Every year, Piaia submits his nominees and then immediately looks for opportunities to improve his process in subsequent cycles. Bernie's leadership, dedication, and long-time expertise in school facilities have been integral to the award's success in New Jersey. He has modeled excellence in ED-GRS implementation for other state education authorities to follow.

We commend Piaia for his work to promote environmental stewardship, health, and sustainability, and for inspiring even more schools, districts, and postsecondary institutions to aim high.



## Honorees at a Glance

- 73 U.S. Department of Education Green Ribbon Schools
- 25 states, plus the District of Columbia and the U.S. Department of Defense Education Authority presented nominees
- 47 prekindergarten through 12th grade schools
- 15 districts
- 11 postsecondary institutions
- 41 public schools
- 6 private schools
- 3 charter schools
- 8 magnet schools
- 27 elementary schools
- 18 middle schools
- 14 high schools
- 2 community colleges
- Over 50 percent of institutions serving disadvantaged students



## 2016 U.S. Department of Education Green Ribbon Schools

### Alabama

#### **A.H. Watwood Elementary School, Childersburg, Ala.**

##### *Greening Club Participation to Develop Young Leaders*

A.H. Watwood Elementary School is a place where students are leading the learning. The school's unique culture and climate are the result of "Leader In Me" program paradigm shifts, which demonstrate that everyone can be a leader. The school serves approximately 375 students, in preschool through fourth grade. Watwood is a *Title I* school, and part of the Talladega County School system.

Watwood is committed to energy efficiency, and has been recognized annually as an Environmental Protection Agency (EPA) ENERGY STAR school. Watwood has demonstrated a reduction of greenhouse gas emissions by 16 percent over nine years, and now has a score of 95 in Portfolio Manager for the 45,301 square foot facility, which was built in 1954. Watwood recycles or reuses newspapers, two-liter soda bottles, cans, cardboard, and bottle caps.

Statistics consistently reveal families living in poverty often are food insecure, have higher rates of obesity, and die at an earlier age due to health-related illness. One of Watwood's goals is to combat these startling statistics through education. The school develops healthy eating habits in its population, and promotes a lifestyle that includes fitness among students and faculty. It offers dental health education and vision screening to students, 80 percent of whom are eligible for free and reduced price lunch. Students are served healthy snacks and meals, and the school has received the USDA HealthierUS Schools Challenge Gold award. Teachers who embrace physical fitness and health sponsor the Trailblazers running club and the iFit fitness club. Students in these clubs participated in Club Days at the school, as well as in the Color Me Rad five-kilometer race in Birmingham. Other sustainability and health-minded clubs include Retro Repurposing Club, Let's Move It Club, First Tee Club, Awesome Archers Club, and Kiwanis K-Kids.

One very popular practice at Watwood is Club Day, in which everyone participates. Activities are centered on fitness; promoting healthy lifestyles; and teaching students to reduce, reuse, and recycle. This year, all clubs have projects centering on a green theme. For example, the Curb Appeal Club is responsible for campus enhancements, such as the outdoor classroom area. The Green Thumb Club takes care of all the planters and gardens on campus, and learns about the ecological benefits of gardening. Students are learning how to conserve water, along with the



health benefits of growing your own fruits and vegetables. Projects teach the dangers and risks of chemicals used for cleaning and pesticides. Students have opportunities to explore other healthy options for cleaning, and ways to create natural pesticides. Each club has a different recycling project.

After receiving extensive professional development in project-based learning (PBL), Watwood teachers create projects that infuse environmental awareness, health, and wellness, and teach sustainability as it relates to environmental education. The PBL model provides experiences filled with communication and collaboration challenges, and involves community partners. For example, Home Depot is a community partner that provided supplies and assisted in building raised beds and planting a vegetable garden. A local business, Blair Block, donated a concrete table, and the Sylacauga Arts Council awarded a \$500 grant for the project. This enabled students to create a collaborative mosaic tile masterpiece on a concrete table in an outdoor classroom area in the school courtyard.

Environmental concepts are integrated into Watwood's literacy program. The school's reading program provides students the opportunity to learn about topics including health, environmental sustainability, and environmental challenges. Students learn to investigate, collaborate, form opinions, and take ownership of their learning. Through their readings, students learn where fresh, clean water comes from, the importance of recycling and re-purposing, and how objects grow and change over time. Teachers use these texts along with other resources that they find on their own to engage students in the close reading process as described in the Alabama College and Career Ready Standards.

Students participate in the Green Apple Day of Service, cleaning up school grounds; visit tree farms as a field trip; develop, market, and sell recycled products for charity; and build and regularly tend to butterfly and vegetable gardens. Watwood embarked on a one-to-one iPad initiative, which will drastically reduce the need for pencils and paper. Club sponsors purposefully integrate state standards and digital tools in projects. Teachers met the challenge of redesigning traditional tasks to incorporate a new level of rigor and to create new environmental tasks. It is not uncommon to see students using an iPad while working outside on Club Day projects. The school's outdoor classroom features raised beds, bird feeders, and butterfly gardens.



## **University of Montevallo, Montevallo, Ala.**

### *From 19th-Century Beginnings to 21st-Century Stewardship*

Founded in 1896, today the University of Montevallo (UM) is advancing green strategies that reflect all three pillars of ED-GRS. UM was the first university in the state to implement a Green Fund: proposed by the school's Environmental Club, supported by the Student Government Association, and approved by the student body, the Green Fund supports grants to help reduce UM's ecological footprint through a \$5 per semester student fee. This effort, which generates approximately \$30,000 per year, funds projects that cut energy costs, decrease the school's carbon footprint, and reduce waste.

UM has made significant improvements in managing energy use on campus, which has lowered environmental impact and costs. From the use of energy management software, to major upgrades to the central plant, to solar-powered pedestrian crossing signage, the University uses strategies of all magnitudes to reduce effect on the environment.

Renovations and upgrades in existing buildings — including some historic sites — including heating, ventilation, and air conditioning (HVAC) changes; window, lighting, and solar shade installation; and roof and insulation replacements — have resulted in numerous efficiencies and improvements in electricity, gas, and steam savings, as well as reductions in water usage, heat gain, and energy loss. Energy efficient LED lights have been installed on several campus streets, residence hall common areas, and stairwells where lights operate 24 hours a day. The physical plant's use of Green Seal Certified cleaning products also reduces environmental impact. Facilities and security staff employ a growing fleet of electric vehicles.

UM has initiated a project to reactivate an old water well for nonpotable use. This project will save 1.2-1.5 million gallons of water per month. In addition to usage savings, UM is working to prevent plastic waste from water bottles. Water bottle filling stations have been added to help eliminate plastic waste and encourage the reuse of bottles.

The University encourages recycling on campus, collecting approximately 3,000 pounds of aluminum, 18,000 pounds of plastic, and 65,000 pounds of paper annually. Water bottle filling stations have been added to help eliminate plastic waste and encourage the reuse of bottles. UM also recycles other waste including computers and electronics, metal, glass, batteries, and light bulbs. The "Table to Garden to Table" initiative reduces food waste on the UM campus by composting



unused vegetable matter from the cafeteria to fertilize the UM organic community garden, established as a project of the Environmental Club. Gardeners turn the materials, render them usable, and fertilize the garden with the compost. This generates 50 gallons a week in composted materials.

The garden is available for both students and community members. Produce grown in the community sections of the garden is donated to Shelby Emergency Assistance (SEA) to be given to local families in need. More than 1,200 pounds of produce was donated to SEA in 2014. Two mason bee hives were installed in 2014 to encourage local pollinators.

The University operates facilities and offers services for the health and well-being of the UM community, from a host of employee health benefits and wellness programs, to a Falcon Foods program that promotes health and sustainability in UM's dining venues, to a Balanced U online nutrition site. UM's Student Health Center, staffed with a full-time nurse and a licensed physician assistant, provides health services and wellness programs. Through the Hand in Paw program, the center hosts visits from therapeutic animals for stress relief during exams. The Student Activity Center, featuring fitness equipment, an indoor pool, racquetball courts, and fitness classes, is available for all students and employees. UM recently added wellness amenities at University Lake, including canoes, kayaks, and a 1.3-mile fitness trail with 10 exercise stations. UM and the city of Montevallo partnered in 2011 to create the first citywide bike sharing program in the state of Alabama.

Montevallo offers a minor in Environmental Studies (ES) with an option to major through the Interdisciplinary Studies Program. ES incorporates perspectives from the natural and social sciences, the arts and humanities, and business. A total of 610 students have enrolled in ES courses since the program's establishment. Since 2011, the university's Environmental Stewardship Award has honored students for their academic achievement, service, and leadership potential. Efforts like an active Environmental Club, educational summer camps, and a Students' Institute for area youth, help to promote experiential learning and awareness on campus and in the broader community.

The James Shepherd Wylie Observatory (JWSO) is the region's premiere, completely accessible telescope, in a complex designed to meet LEED Platinum standards. JSWO is a model for sustainability: built on a reclaimed construction landfill, it features a 1.4 kilowatt solar generator and a rainwater collection and purification system with a reverse osmosis filter. The restroom facilities include self-composting toilets. JSWO hosts programs that celebrate different sustainability initiatives in the community.



These are just some of the efforts that demonstrate an institutionwide commitment to green policies and practices; together, they make the University of Montevallo a higher education leader for environmental stewardship and sustainability, both in Alabama and in the nation.

## **California**

### **Bay Farm School, Alameda, Calif.**

#### *In Pursuit of Zero Waste*

What began as a program to increase recycling and build a school garden has become a school culture. Efforts to build sustainability into educational programming are like threads running through the fabric that is Bay Farm School. The entire school community works to prove that a school can increase in size and population and still reduce the size of its carbon footprint. Bay Farm School does this by systematically integrating sustainability and outdoor learning into the curriculum, focusing on health and wellness, reducing waste, and engaging students and parents as part of the solution.

In 2008, Bay Farm was a kindergarten through fifth-grade school with 450 students diverting 20 percent of its solid waste by recycling paper, cans, and bottles. Every day after lunch, 250-300 gallons of trash went to the landfill dumpster. The following spring, Bay Farm agreed to be one of five Alameda Unified schools to pilot a program to increase recycling and add composting. As members of the steering committee, Bay Farm teachers helped create a lesson and posters to teach staff and students how to sort trash into three streams: recycling, compost, and landfill. These materials were implemented in the 2009-10 school year to teach students and staff how to sort trash at lunch into new green, blue, and gray bins. Bay Farm's custodian became a champion of the effort, and reported that lunch trash was reduced from 8-10 bags to only one each day.

By spring 2010, compost bins were in every classroom, kitchen, and bathroom. A student club, The Tree Musketeers, made monthly announcements about recycling and saving energy. By 2012, the waste diversion rate at Bay Farm had grown to 69 percent, but the school decided its goal should be 90 percent (meeting the definition of zero waste). Some recycling and organics were still going into the trash. The green team set to work reviewing waste diversion procedures in every classroom. They also worked with staff and parents to reduce waste at large school events. Additional compost bins were placed near the playgrounds.

In January 2013, Bay Farm achieved 73 percent diversion. The school then swapped its 4-cubic-yard dumpster for a 3-cubic-yard model, and increased the size





and number of recycling and organic waste containers. Between fall 2014 and spring 2015, students in the upper grades conducted six different waste audits, focused on keeping recyclables out of classroom and playground trash. By spring 2015, these efforts reduced the school's landfill waste to such a degree that classroom trash cans were replaced with 1-gallon mini waste bins. Today, Bay Farm serves almost 600 students in kindergarten through eighth grades and maintains a diversion rate of 85 percent.

The school garden program at Bay Farm was developed to be an outdoor learning center (OLC) from the outset in 2003, but with mostly volunteers running the program, not all students were benefiting from it. The school's Parent-Teacher Association (PTA) increased investment in the OLC program in 2008 in order to create a staff position for a full-time garden teacher. With renewed interest and increased capacity, teachers and parents planted more gardens. Now, every student in kindergarten through fifth grade receives dedicated garden instruction. All students regularly work, learn outdoors, and eat food they grow in the OLC.

Bay Farm has engaged staff, students, and parents in school greening efforts beginning in kindergarten. Teachers and parent volunteers use songs, games, and puppets to teach these youngest learners how to sort their trash and be "Green Guardians." At an early age, students have ownership for the success of environmental and sustainability programs through service learning. Classroom recycling is a student -- not custodian -- job. All fourth graders serve on teams that monitor lunchtime recycling. In 2005, Bay Farm School was awarded ENERGY STAR certification with a score of 80.

In summer 2013, Bay Farm was chosen to participate in the district's cool roofs program. The entire school had its roof replaced with cool metal roofing, reducing heating and cooling use by approximately 20 percent, while also saving costs. A 2016 lighting retrofit funded by California's Proposition 39 will replace florescent lights with LED lighting in the school auditorium and around the site.

Turf abandonment is a hands-on learning experience for sixth graders. Annually since 2012, students have mulched approximately 1,200 square feet of school property. Working in partnership with educators from the nonprofit Stop Waste, these student action projects include sheet-mulching designated areas of the school, conducting research, collecting data, and then applying the lessons learned by doing educational outreach at home. In February 2016, students will help plan and launch a fourth action project in which areas of school grounds are replaced with mulch, natives, and drought tolerant plants.

Teachers have been effective in increasing health and wellness through the use of outdoor classrooms, increased physical activity, and nutrition education. School



lunch includes a Farm-to-Fork program with a fresh fruit and salad bar, and as many locally-sourced choices as feasible. A local fruit of the month is featured, and 20-25 percent of produce is organic. Staff is provided fresh fruit at meetings, and the PTA provides healthy snack buffets for teachers. Every student regularly tastes and cooks food grown in school gardens. Teachers give extra recess minutes instead of sweet treats as rewards. Physical activity has increased with walking and biking field trips. All students have from 45 to 55 minutes of daily recess in which their play is self-directed and student-led, in addition to 200 minutes of weekly physical education classes. Nearly 100 percent of recess and physical education is outside.

Grades four through seven developed a series of overnight field trips that emphasize outdoor experiences, sustainability, and student action that benefits the community. These include Coloma, Marin Headlands, Motherlode Outdoor Discovery Camp, and Yosemite. The widespread use of public transportation, biking, and walking field trips all have contributed to reduced car use. The PTA has embraced programs that include Paperless PTA, Zero Waste parties, a Go Green website, and installation of a PTA Go Green committee with a budget.

## **Bishop O'Dowd High School, Oakland, Calif.**

### *First Full-time High School Sustainability Director in Northern California*

Bishop O'Dowd High School is a Catholic, coeducational, college preparatory high school administered by the Diocese of Oakland. As part of its mission to prepare skilled leaders committed to justice, peace, and the values of the Catholic Church, O'Dowd is committed to being a sustainable school, and was recognized as a California Green Ribbon School at the Gold Level (2015) and the Silver Level (2014).

Sustainability programs and initiatives at O'Dowd are built around a clear vision for what sustainability is, and how it connects to a Catholic identity. O'Dowd has adapted the Nested Triple Bottom Line framework to connect directly with its core values, which are rooted in charism. O'Dowd also uses the Four-Cs Sustainability Framework (adapted from the Sustainable Schools Project and Plymouth University) to guide their approach to greening the campus and operations, infusing sustainability into the curriculum and educational programming, engaging the community, and integrating sustainability into the overall culture. Ultimately, O'Dowd's approach to sustainability aims to equip students with the tools, resources, and life experiences to create an environmentally sustainable, socially just, and economically viable world.



Despite having a long history of being committed to environmental education, with the 2013 hiring of the first full-time high school sustainability director in Northern California, O'Dowd's commitment to sustainability has become more tangible every year. Campus initiatives outlined in the 2014 Sustainability Management Plan (SMP) point to concrete examples of how O'Dowd has begun to shift behavior and culture so that students, faculty, and staff are able to "walk the talk" of sustainability each day.

The SMP identifies schoolwide benchmarking, long- and short-term goals, implementation steps, evaluation metrics, and responsible parties. Energy is part of the SMP's Resource Conservation section, with a goal to be zero net energy by 2025. Currently, nearly 250 onsite solar panels meet approximately 10 percent of the energy demand. In 2015, O'Dowd partnered with Carbon Lighthouse to do a comprehensive energy audit and to create an energy action plan to be carbon neutral; the plan is scheduled to be implemented in 2016.

O'Dowd's Center for Environmental Studies, completed in 2014, is a LEED Platinum certified building. The campus also supports a four-acre "Living Lab" that has undergone ecological restoration annually since 2000, and has received Bay Friendly certification and Wildlife Habitat Certification. The Living Lab features four different local ecosystems—chaparral, oak woodland, redwood, and riparian pond zone—along with beehives, chickens and rabbits, edibles, and water catchment systems. It is used for field research, experiential learning, and spiritual meditation. The rainwater harvesting capacity at the school exceeds 25,000 gallons.

Large and small sustainability projects help O'Dowd reduce its ecological footprint, save money, and create lasting social change. The 2015-16 school year has been about moving beyond the low-hanging fruit (e.g., sorting waste correctly, implementing a green cleaning program, et cetera), and going after the harder-to-tackle objectives such as shifting purchasing habits and engraining sustainability decision-making into the smallest of renovation projects. Green Gloves, a 2015 partnership with Clean Water Action's ReThink Disposable project, replaced disposable plates and bowls in the cafeteria with reusable baskets, reducing solid waste by 3,376 pounds per year.

The commitment to weaving Education for Sustainability (EfS) throughout the O'Dowd curriculum also has begun to take form as the ninth grade curriculum transitions to taking a deeper look at sustainability topics and issues through the lens of multiple subject areas, and as teachers at multiple grade levels begin experimenting with different EfS techniques and topics. In 2013 and 2014, community engagement on sustainability topics and issues sometimes was met with resistance, but 2015 was a turning point in these efforts. More teachers and staff members have seen the rewards from transforming programs and curriculum and



attendance by students and parents at sustainability-related activities and events has increased significantly.

All ninth graders at O'Dowd take a course called Science and the Environment, which is an interdisciplinary science course that teaches biology, physics, earth science, and chemistry through the lens of environmental science. O'Dowd's Sustainability Certificate Program has place-based environmental education at its core. Students do this hands-on learning in three different tracks: Community Impact Certificates are focused on initiatives on campus or in the greater Bay Area community; Living Lab Certificates make use of the four-acre Living Lab to establish a strong foundation in ecology and provide intense training, knowledge, and skills related to edible and wildlife gardening, animal husbandry, and resource systems; and Junior Ranger Certificates focus on students becoming well-versed in local hiking trails, basic wilderness and outdoor survival training, and wildlife restoration.

The O'Dowd school community has stepped forward eagerly to serve as leaders of a sustainable paradigm shift, and is excited to see what can be accomplished in the future.

## **Los Angeles Unified School District, California**

### *Large District Exemplifies Urban Sustainability*

The Los Angeles Unified School District (LAUSD) is the second largest school district in the nation, serving an extremely diverse population of more than 650,000 students, 76 percent of whom are eligible for free and reduced price lunch, across 700 square miles of the densely urban greater Los Angeles area. The story of sustainability at LAUSD is one of partnerships and teams.

LAUSD has recognized the importance of sustainability beginning at least as far back as 1985, when it officially celebrated the 15th anniversary of Earth Day. The district continually has reiterated its commitment to air quality; water and energy efficiency; the pursuit of alternative energy sources; waste reduction and recycling; the purchase of clean-powered vehicles; the design of high-performance, healthy, and sustainable facilities; the development of school gardens for ecology and curriculum integration; and building awareness of sustainability in the LAUSD community.

The LAUSD Board of Education has expressly committed to becoming the most sustainable large urban school district in the nation. In 2003, LAUSD became the first school district in California to adopt the sustainability standards of the





Collaborative for High Performance Schools (CHPS) for all new schools and modernization projects. LAUSD's Maywood Academy and Charles H. Kim Elementary are featured CHPS demonstration schools. To date, 78 schools have been CHPS certified. In 2009, the District undertook a pilot of Leadership in Energy and Environmental Design (LEED). To date, three new district schools have been certified LEED Gold, and two modernization projects have been certified LEED Silver. The district requires cool roofs on all buildings to reduce heat island effect, and has piloted the use of cool schoolyard coatings, such as high-albedo surfaces.

LAUSD has undertaken a robust sustainability initiative aimed at reducing environmental impact and costs, including high performance design and construction on all new schools and modernization projects; energy audit and energy- and water-efficiency retrofits; use of recycled water; installation of 21 megawatts of solar capacity to date; innovative technology such as ground source heat pumps; low-impact development stormwater management to help recharge the city's aquifers; recycling, reuse, salvage, barter, and composting programs; and conversion of the district's bus and fleet vehicles to clean and alternative energy, including the largest alternative-fuel bus fleet in the state. A crucial aspect of LAUSD's initiatives to reduce environmental impact and cost is behavioral change. In addition to funding and implementing facilities projects, the district works with utility providers, state and federal government agencies, and corporate and community partners to offer awareness programs and resources to its schools.

In 2013, LAUSD restated its commitment to prioritization of educational schoolyard landscapes, greening through existing projects, and improving nutrition and food access, and over the past few years the district has worked with dozens of partners to install new gardens that serve as outdoor classrooms at more than 180 additional schools. The nutritional garden program received a Certificate of Congressional Recognition for outstanding community service, and three school principals won the 2015 L.A. Department of Public Health Champions for Change Excellence Award.

More than 375 schools have one or more onsite gardens maintained by students, staff, and community partners. The district participates in California Thursdays and other farm to school programs; more than 70 percent of food comes from local growers in California. Some 490 schools have been recognized in the U.S. Department of Agriculture (USDA)'s HealthierUS School Challenge. The Nutrition Education Obesity Prevention-LAUSD program (NEOP) and Sustainable Economic Enterprises of Los Angeles (SEE-LA) have partnered to create the unique Bring the Farmer to Your School program, which has local farmers visit *Title I* classrooms to deliver interactive presentations about agriculture, farming as a career, water conservation, and the importance of eating more fresh fruits and vegetables and having an active lifestyle. Students can ask questions, see pictures, and taste farm-fresh, locally grown produce.



A district-level Sustainability Steering Committee comprising stakeholders from Facilities, Food Services, Transportation, Division of Instruction, Career and Technical Education (CTE), the Office of Environmental Health and Safety/Waste Management, Procurement, Legislative, and Communications coordinates sustainability goals and activities. At the school level, each school has a Coordinated School Health Wellness Committee that promotes the physical, emotional, and social health and well-being of LAUSD students. The committees must have representation from health education, physical education, health services, nutrition services, counseling, psychological and social services, safe environment, and parents and the community. The committees work closely with other entities as needed, including the Health Education Program coordinator, the school nurse, and the food service department. The Wellness Committee completes an annual assessment tool, and develops and implements an action plan. LAUSD works with more than 150 partners to inform, educate, and support students, staff and the community in their efforts toward health, wellness, and physical fitness.

The district has more than 50 environmentally-themed magnet schools and academies. Fifty-one high schools offer advanced placement (AP) Environmental Science. The district has more than 100 gardens, which are integrated into the curriculum. Several schools use the district's legacy agricultural areas and greenhouses to offer horticulture-focused experiential programs. Teachers from more than 440 schools have participated in sustainability education professional development workshops. Through California's Proposition 39, high school students receive hands-on experience learning how to conduct building energy audits at their schools. Currently, 29 Proposition 39 projects are in construction, in design, or under audit, with another 20 anticipated.

LAUSD's outdoor education programs offer robust science, technology, engineering, and math (STEM)-related outdoor educational experiences to students throughout the district. LAUSD's Director of Outdoor Education participated in the California Environmental Literacy Task Force that developed the Blueprint for Environmental Literacy for the state. LAUSD has instituted policies that promote environmental awareness; creating school-based programs and curriculum that integrate sustainability concepts across disciplines; developing contests and providing outdoor educational experiences that expose students to the natural environment; providing sustainability-related CTE; advanced learning programs that prepare LAUSD students for success in the careers of the future; and coordinating and cooperating with dozens of nonprofit local and regional entities that bring resources and passion to propel the student body into active participants in developing a more sustainable future.

LAUSD's Susan Miller Dorsey Senior High School is a 2015 U.S. Department of Education Green Ribbon School. Two schools, George K. Porter Middle School and



Westchester Enriched Sciences Magnets, are recognized in the 2016 California Green Ribbon Schools program at the Gold level. The district's sustainability website ("Learning Green") and newsletter impart information on sustainability-related activities and resources. An informal network of school-based sustainability teacher-liaisons act as conduits for information on sustainability programs and initiatives from the district headquarters to the schools.

## **Manhattan Beach Unified School District, California**

### *Grassroots Sustainability Organizing Blossoms into Districtwide Change*

Manhattan Beach Unified School District (MBUSD) students, parents, teachers, and community partners took President Obama's words as their mantra: "Change will not come if we wait for some other person or some other time. We are the ones we've been waiting for. We are the change that we seek."

In 2011, it was MBUSD parents and students who led a site-based effort seeking, and ultimately earning, ED-GRS recognition for Grand View Elementary in the first year of the award (2012). Over the subsequent four years, the green schools movement has continued to blossom in Manhattan Beach, and now it is truly districtwide. MBUSD is a prime example of how a grassroots effort can become the change that it seeks.

The story begins with two groups of parents simply trying to make one school greener. Grades of Green and Growing Great began as groups of MBUSD parent-volunteers working to reduce waste while helping students understand the role of gardens and natural food in our lives. The groups made a difference at one elementary school, expanded to serve all MBUSD schools, and then expanded further to involve districts across the nation. Students and parents have led efforts in waste reduction. Students, dressed up as recycling clowns, starred in films doing the dirty and disgusting, yet fun, work of waste audits, and positioned themselves at campus recycling centers to help fellow students know what to deposit in waste, recycling, or composting containers. MBUSD has cut the number of trash bins it needs in half since 2010. MBUSD's student leaders are of all ages, from primary grades to seniors in high school.

Simple behavior change programs have yielded dramatic results in MBUSD. A single employee's efforts to thank teachers and staff who changed their habits ensured that lights were turned off at night, the swimming pool was properly covered, and electronics were unplugged while schools were not in session. One parent created a clever lunchbox that promotes trash-free lunches. Now every first





grader in MBUSD receives a free trash-free lunchbox, sponsored by Waste Management. It is a clear message that zero-waste is part of the culture in Manhattan Beach. A walking school bus and edible school garden is in place at all five elementary schools in the district.

MBUSD consistently and actively demonstrates its districtwide commitment to protecting the environment, and shows no sign of slowing down. In 2014, the Board of Trustees initiated efforts to dramatically reduce the district's ecological footprint by implementing solar panels and changing all lights to energy efficient LED lights. In 2015, the district's Green Committee entered its second year, emerging as an idea-generating center featuring businesses, city officials, volunteer organizations, parent-volunteers, and district and school leaders. District efforts include a first-in-the-nation accomplishment in turning food waste into energy.

MBUSD has documented a 44 percent reduction in greenhouse gas emissions and a 33 percent reduction in nontransportation energy use over six years. Each of the seven schools in the district is ENERGY STAR certified, and six of the seven scored 100. Solar panels installed at the high school provide a whopping 30 percent of the facility's energy needs. The pool has been updated with solar thermal heating, and lunch tables equipped with solar charging stations for student use. California *Proposition 39* funds are being used to fund LED lighting upgrades at all sites, and additional funds are being used to install carport solar shade and rooftop solar structures, auditorium lighting and controls, solar thermal equipment for the pool, HVAC upgrades and an energy management system at the high school, and HVAC upgrades at the middle school.

The goal of the district's environmental education program is to provide students with an understanding of the interactions and interdependence of human societies and natural systems, the ways that natural systems change and how people can benefit and influence that change, that there are no boundaries to prevent matter from flowing between systems, and that decisions affecting resources and natural systems are complex and involve many factors. Since 2004, MBUSD has incorporated California's Environmental Principles and Concepts into the kindergarten through grade 12 history-social science and science curricula with the goal of strengthening the environmental literacy of its students, and providing them with the skills to understand, analyze, and critically evaluate environmental issues.

Students have meaningful outdoor learning experiences at every grade level. In addition, every elementary school has a MakerSpace on campus, and Project Lead the Way is implemented for all elementary grades. MBUSD students learn to be problem-solvers and environmental advocates. In January 2009, 40 MBUSD students in grades three through eighth initiated a successful citywide ban of single-use plastic bags and Styrofoam.



MBUSD administrators have adopted a “say yes” approach to leadership. They seek to say yes when parent leaders want to start a new program, when one individual sets out to change the habits of all employees, when students want to lead, and when community leaders have an idea that will promote healthy living and the environment. MBUSD has said yes to their committed citizens over and over, and the result is a green district that shines as a beacon for the community.

## **San Francisco Unified School District, California**

### *Coordinated Efforts in Environmental Education For More Than 40 Years*

The San Francisco Unified School District (SFUSD) is proud of coordinated efforts to become one of the greenest urban public districts in California. SFUSD's partnerships with the City of San Francisco, local nongovernmental organizations, and universities let the district's 54,000 students in 64 elementary schools, eight kindergarten through eighth grade schools, 12 middle schools, and 18 high schools benefit from sustainable facilities, practices, wellness initiatives, and curriculum.

Coordinated efforts in environmental education rose in tandem with the creation of the Golden Gate National Recreation Area in the 1970s, followed by the creation of the SFUSD Environmental Science Center (ESC) in 1976. The ESC continues to provide elementary overnight environmental learning experiences at no cost for classrooms. In the 1980s, the ESC partnered with San Francisco municipal utilities (water, waste, power, and sewer), beginning the integration of sustainability messages in standardized education work and providing professional development to a large number of elementary teachers. At the same time, many individual school sites began their own relationships with partner providers to develop a sustainability ethic, and a more standardized integrated network of partners emerged as the science collaborative, now known as 4S.

In 2007, SFUSD partnered with the mayor's office, the Public Utilities Commission, and the Department of the Environment to create the SFUSD Department of Sustainability (DS), allowing districtwide coordinated oversight into all facilities improvements and practices. This oversight is connected to bond modernization at all sites, which includes the development of a green schoolyard on each and every campus. In 2011, the DS—in coordination with SFUSD Curriculum and Instruction—began providing environmental liaisons at all sites. Liaisons provide on-the-ground school support, working to reduce utility costs; targeting 100 percent landfill diversion; supporting walk-to-school, roll-to-school, and other wellness campaigns; and promoting professional development opportunities to site staff. Currently, the Next Generation Science Standards are encouraging a prekindergarten through 12th



grade pathway of meaningful environmental experiences that is being developed in partnership with 4S collaborative partners.

Every SFUSD school participates in the district's Shared Savings program, a partnership with the municipal utility companies. The program rewards school sites for reducing their utility use by giving them 50 percent of the savings they generate through conservation for discretionary site-based spending. SFUSD also identifies efficiency projects through ongoing audits of the biggest energy-using sites. All information is available to 100 percent of sites and the public through the district's [www.greenthenextgen.org](http://www.greenthenextgen.org) dashboard tool. In 2003, SFUSD adopted a policy that required all new schools to be CHPS-verified. Seventy-five percent of solid waste from all school sites is diverted from landfills through reduction, recycling, and/or composting.

To promote the health and wellness of students, 63 percent of whom are eligible for free or reduced price lunch, SFUSD partnered with Revolution Foods in 2012. Revolution Foods prides itself on food that is prepared fresh daily; has no artificial preservatives, colors, high fructose corn syrup, or trans fats; and provides fresh fruits and vegetables with every meal. SFUSD has banned BPA containers for food service. Most packaging is compostable, with very little if any packaging sent to landfill. Student and staff wellness benefits from physical education minutes in the form of creative, outdoor, environmentally friendly learning experiences such as walking field trips, bike-rodeo trainings for students, overnight camping trips that include hiking, and the integration of student exercise in outdoor green schoolyards that are continuing to be developed at each school in SFUSD.

SFUSD has been installing cool roofs since 2009, and removing asphalt to make way for green schoolyards at some 60 sites since 2005. In 2011, voters authorized the continued modernization and greening of all SFUSD school sites. As part of the district's modernization program, each building receives a sustainability site audit, including plans for the redesign of campus exterior spaces to improve health and wellness for students and staff. Schoolyard greening has allowed SFUSD to partner with Friends of the Urban Forest, which provides landscaping and fruit trees for all schools that would like to have students help care for them. As a result, 100 percent of SFUSD schools will undergo schoolyard greening. Schoolyard greening elements are determined by each unique school site, yet are guided by the SFUSD published Green Schoolyard Guidelines. In 2015, an organization called Education Outside staffed 40 college graduates at elementary schools across SFUSD. These coordinators are responsible for outdoor schoolyard instruction including science education, English language arts, and nutrition/cooking/gardening/stewardship. Nearly all secondary sites offer gardening/nutrition or CTE pathways.



SFUSD STEM offices have aligned curricula with the environmental and sustainability efforts. An environmental pathway is being implemented that supports prekindergarten through 12th grade meaningful environmental experiences at each grade level. SFUSD continues its 40-year partnership with the National Park Service sponsoring the SFUSD ESC. As of 2015, all ESC programs are aligned with Next Generation Science Standards, supporting grades three, four, and five. These programs remain no-cost for classrooms, and prioritize *Title I* school sites. SFUSD benefits from a rich network of science, stewardship, and sustainability providers that are integrated into the pathway.

To make these experiences equitable, the SFUSD Board recently approved a Science Enrichment Pathway fund. Funding will eliminate barriers such as bussing fees, substitute costs, or entrance fees for students, with a goal of ensuring that all students at all schools can participate in a pathway of meaningful experiences. A pathway coordinator has been hired to connect school sites into the prekindergarten through 12th grade pathway of meaningful science and environmental experiences available from SFUSD partners. These experiences also will align with California's Blueprint for Environmental Literacy, developed by the Environmental Literacy Task Force, which counted SFUSD as a member.

## Colorado

### Heritage Elementary School, Highlands Ranch, Colo.

#### *Staking a Green Flag for Green Schools*

Heritage Elementary School is an example of comprehensive school sustainability, addressing each of the three Pillars of ED-GRS. As a result of its sustainability culture, the school received its Eco-Schools USA Green Flag in 2014, and was named by the National Wildlife Federation (NWF) as one of America's Top 10 Eco-Schools in 2015. Heritage also was a featured stop during the 2014 U.S. Department of Education Green Strides Tour of Douglas County School District, a 2013 District Sustainability Awardee.

Heritage's Energy Team, in collaboration with the Operations and Maintenance department, has worked to reduce the school's impact on the environment. Onsite solar panels provide about 27 percent of the building's energy, and the school has reduced its energy consumption by 14 percent over three years, despite implementing an increase in tech devices from 267 to 850 to provide each student access to iPads, laptops, and Chromebooks. The automated irrigation system, use of native plants, and *hugulkultur* gardening practices all ensure efficiency of water use on school grounds, reducing domestic water usage by eight percent and irrigation by 35 percent.



Students and teachers work diligently to implement waste diversion strategies, including recycling, composting, and using food waste to feed the school's chickens, resulting in a 57 percent diversion rate. Heritage's cafeteria recycling program has made tremendous strides in just two years. Before that time, the school was sending 400 pounds of waste to the landfill. By the second year of the program, Heritage reduced that volume to 200 pounds to the landfill, and, in a third year, averaged 107 pounds of waste to the landfill from the school cafeteria.

Through its Sustainability Incentive Program, the Douglas County School District supports all of these conservation efforts by returning a portion of energy, waste, and water savings to the school to invest in further green school efforts.

About 37 percent of students participate in Walk or Wheel Wednesdays, and no-idle zones are posted and enforced in the car loop. The Heritage Green Team and the school's art teacher create upcycled jewelry, planters, and cheese trays out of aluminum cans, gift cards, and glass bottles. Students sell these items at farmer's markets in the fall and spring, and at the Annual World Market in December. The district's chef works with students for nutrition and agricultural education. After harvesting grapes from the school garden, sixth graders learn the science of preservation with Chef Jason. They then price and sell the jelly at the Spring Farmers Market.

Heritage is actively engaged in Douglas County School District's Healthy Schools Program. Using the "Whole School, Whole Community, Whole Child" model, Heritage has both a Coordinated School Health Team, as well as a Student-Led Health Team. These teams have worked to increase physical activity before, during, and after the school day, use brain boosters throughout the day, increase awareness for mental and physical health, and address bullying.

For six years, Heritage has had a thriving school garden that promotes health and wellness, growing fresh produce for students to taste and experience. A student-tended chicken coop provides eggs that are sold to the school community. The NWF Certified Native Habitat provides an outdoor classroom for science, writing, art, and environmental studies. Outdoor education and a robust health curriculum ensure that students are physically active and engaged in outdoor learning.

Sustainability education is integral to the fabric of Heritage. Teachers across disciplines make use of the school gardens and outdoor classrooms for inquiry, inspiration, and experimentation. Art students use the garden for still life drawing. Kindergarteners and first graders plant an apple orchard in connection with their "Apple" unit, using the school's own compost to enrich the soil. In second grade, students plant a tulip test garden as part of a citizen science project called Journey North. Third graders set up an experiment to see how Native American gardening



practices enhanced corn growth. Sixth graders learn about energy conservation in collaboration with Xcel Energy's Think Energy take-home kits.

All students participate in the cafeteria recycling program, and see the cycle of sustainability through composting and gardening. Students learn how they can affect the environment by producing their own food. Heritage in a partnership with the Rocky Mountain Arsenal National Wildlife Refuge, a ranger visited the school and worked with the sixth grade leadership team, who then visited the Arsenal on a field trip, observing a pollinator garden and participating in prairie restoration.

Heritage's school grounds are a hub for the community to learn about sustainability by helping with the garden, the chickens, and composting. Through these actions, students see the broader effect of their work, and learn the civic applications. Heritage's sustainability champions also support other schools and districts by sharing resources, examples, and mentoring, serving to build the green school community in Colorado and beyond.

## **Poudre School District, Colorado**

### *Decades of Comprehensive, Districtwide School Sustainability*

Poudre School District (PSD) is an award-winning, nationally-recognized leader in energy conservation, green building, and health and wellness. PSD's commitment to sustainability began in 1994 with the formation of the Energy Efficiency Team, a group tasked with coordinating sustainable efforts and defining sustainable goals. After establishing its Green Team in 1999, PSD began researching sustainable products, sustainable design guidelines, energy-efficient commissioning, and building performance, and used this foundation to help support a 2000 bond program that yielded some of the top performing schools in the state: Fossil Ridge High School, Kinard Middle School, and Bethke Elementary School.

The results of the district's efforts have been significant. Since 1994, PSD has completed 260 energy efficiency projects resulting in a utility savings of over \$2 million, and a greenhouse gas emissions have been reduced by over 5,000 tons since 2005. The district has been recognized by numerous local, state, and national organizations, including being the first school district in Colorado to be awarded the Environmental Leadership Award, having the first LEED Gold certified school in the nation, and earning the first ENERGY STAR rating for a school building under the Designed to Earn designation.



Building on the successes of sustainable construction, the district reaffirmed its commitment to sustainability by adopting a Sustainability Management System (SMS) in 2006. This SMS extends the principles of sustainability across district operations, and provides an integrative and collaborative approach to work toward reduction goals while supporting the district's educational mission through fiscal responsibility. PSD builds upon the SMS by publishing its Annual Sustainability Report, which highlights sustainable accomplishments, innovative practices, and goals from departments and schools across the district. Now in its seventh year, this report involves 33 departments and 12 schools, and includes five topic areas: resource conservation, greenhouse gas emissions, sustainable education, transportation, and health and wellness. Among its newest set of goals, the district intends that all new buildings will be designed with the intent of being net zero energy capable by 2025.

PSD integrated health and wellness into its sustainable mission in 2010, acknowledging that health and wellness help to foster and support sustainability goals. The district has worked to develop partnerships with local public health groups, encouraged walking and biking to school, educated students and staff on wellness topics, and recognized how district facilities influence physical and mental wellness as a whole. PSD oversees a robust Safe Routes to School program, including walking school buses, walk and bike to school days, bike safety instruction, and the installation of bike repair stations at middle and high schools. Every school has a salad bar, and PSD's farm to school program has been in place for five years.

Nearly 30 percent of schools have onsite gardens, which are used as outdoor classrooms, with the growing cycle incorporated into science classes. Elementary students participate in The Walking Classroom program, in which students take 20-minute walks while listening to a podcast on topics focused on science, social studies, and language arts; middle school students engage in Global Explorers field trips and river watch activities; and high school teachers incorporate the outdoors into lessons whenever possible, including hands-on experiential field trips.

With student achievement as PSD's first priority, environmental education and sustainability has been integrated into the classroom through collaboration with administrators, teachers, staff, and outside entities to establish learning opportunities. Using the District Ends—policies that establish the vision and direction of the district—as a basis, these learning opportunities focus on four key component areas: foundations for success, success in a changing world, above and beyond, and connections. Sustainability concepts are embedded in the curriculum across all grade levels. For example, science standards require all students to “experience the richness and excitement of observing and understanding the natural world,” and social studies focuses on “understanding of how humans interact with each other and with the environment over time.”



During the 2014-2015 school year, the City of Fort Collins Utilities Department worked with 36 schools to provide hands-on, curriculum-based classes, programs, and events for students related to water and energy. Each of the district high schools has developed a unique STEM/STEAM (science, technology, engineering, art, and math) pathway, including such options as Agriculture and Natural Resources and Bioscience. Across the district, schools participate in activities such as River Week, a citywide children's water festival, Habitat for Humanity home building, gardening and composting, water ecology studies, nature hikes, and informational tours of sustainable school facilities.

PSD now has had three schools selected as U.S. Department of Education Green Ribbon Schools: Leshar Middle (2014), Kinard Middle (2013), and Wellington Middle (2012). All three of these were part of the 2014 Green Strides Tour. Spearheaded by district administration, PSD's sustainability program truly is a team effort, with support and participation coming from students, staff, community members, and outside entities. Past sustainability efforts, awards, and achievements, combined with a vision of a better future, demonstrate PSD's embodiment of ED-GRS Pillars.

## **University of Colorado—Colorado Springs, Colorado Springs, Colo.**

### *A Sustainable Compass Runs Through It*

University of Colorado—Colorado Springs (UCCS) provides leadership by working to institutionalize a culture of sustainability, imparting both the knowledge and practices students can carry into their lives after college. UCCS is a Gold-rated university in the Association for the Advancement of Sustainability in Higher Education's Sustainability Tracking, Assessment & Rating System (AASHE STARS) and uses a comprehensive Sustainability Strategic Plan to guide its efforts. It has conducted four external energy audits, and spent more than \$1.3 million for energy and water retrofit projects, producing over \$4 million of avoided costs. The University was an early signatory to the American College and University Presidents' Climate Commitment, which required a goal of carbon neutrality, along with short term actions to reduce carbon emissions immediately.

Each year, UCCS invests in more renewable energy from onsite solar photovoltaic and thermal systems, wind energy purchases, participation in solar gardens, and purchase of Renewable Energy Certificates. For over seven years, students have directed a student-approved and -funded Green Action Fund to conduct sustainability projects on campus, including a retrofit of showerheads and toilets in housing, resulting in over \$25,000 in savings per year. Seven buildings have achieved LEED Gold certification, one is awaiting certification, and three more are in



process, for a total of 25 percent of UCCS square footage meeting some LEED standard. A 64-panel solar thermal system on the Recreation Center provides the majority of energy required to heat the swimming pool, spa, and showers.

Between 2005 and 2015, UCCS waste diversion increased from five percent to 41 percent, with the implementation of a comprehensive Zero Waste program. Disposable water bottle sales have been banned on campus and replaced with water bottle refilling stations. UCCS placed an office recycling bin with a small sidesaddle landfill receptacle in all new faculty/staff offices to reduce waste, eliminate plastic bag liners, and give ownership of waste to each individual.

Colorado residents are among the most active people in the nation, and UCCS has been a leader with regard to health and wellness. The new student-supported and funded Student Wellness Center, a \$16.3 million addition to the Recreation Center, is an innovative model represented by co-location and integration of recreation, mental health, health, wellness promotion, and nutrition. For the second consecutive year, UCCS faculty and staff participated at the highest rate (over 20 percent) of University of Colorado campuses in the Be Colorado SUCCEED Health Assessment program, the wellness component of the University of Colorado Health Plan.

UCCS has achieved a Bronze level Bicycle Friendly University designation through investment in bicycle infrastructure, safety signage, classes, and incentive programs. The library loans bike locks if a student forgets to bring one. Pedal Perks is a year-long incentive program funded by Kaiser Permanente to increase health by commuting by bicycle and stationary bicycle exercise. UCCS offers a Bachelor of Science in Health Care Science degree with a Health and Wellness Promotion Option, a Master of Science degree in Health Promotion, and will introduce a Bachelor of Exercise Science degree in 2016. UCCS features in-house food service, a campus farm, and greenhouse.

UCCS prioritizes environmental education and sustainability to ensure that all graduates are prepared to contribute positively to the global environment. Comprehensive general education requirements, known as the Compass Curriculum, specifically require a sustainability course and a global diversity course for all students before graduation. Courses address social equity, environmental, or economic aspects of sustainability. The minor in Sustainable Development has been a growing and high-impact academic program on the campus for over ten years. The Geography and Environmental Studies Department offers both undergraduate and graduate coursework in sustainability. The Sustainability Demonstration House, which houses the Office of Sustainability, provides education for students, staff, faculty, and the community on best environmental practices for a contemporary house, as well as ways to reduce environmental impact in general.



The Sustainability Wellness and Learning program is a collaboration between the Office of Sustainability, the UCCS Farm and Greenhouse, the Health Sciences and Nutrition department, and Dining and Food Services to provide experiential education and student learning. Through the UCCS Center for STEM Education, educators and kindergarten through 12th grade students receive hands-on science experiences including workshop field trips to UCCS. Projects include building a solar-powered model car and environmental forensics cases. The Partnership in Innovative Preparation for Educators and Students program seeks to respond to the looming shortage of skilled STEM workers, and the lagging performance of students in science and math, through innovative and supportive partnerships with parents, educators, and professionals.

UCCS offers a wide variety of academic courses that require students to partner with the greater community. The Service-Learning Internship and Community Engagement Center within the College of Letters, Arts & Sciences fosters quality experiential learning opportunities for students, supports faculty in community-based outreach activities, and facilitates campus-community partnerships. The Restoration Club integrates student knowledge with local land restoration. Students for Environmental Awareness and Sustainability work toward creating a more environmentally conscientious campus community.

## **Connecticut**

### **CREC Two Rivers Magnet Middle School, East Hartford, Conn.**

#### *A Windspire and Weather Bug Engage Students in a Living Laboratory*

CREC Two Rivers Magnet Middle School, (TRMS) from the Capitol Region Education Council (CREC) District, is located in East Hartford, Conn. The school serves 652 students in grades six through eight, from 21 towns. Forty percent of the school population qualifies for free or reduced price lunch and 54 percent are minority students.

TRMS was honored as a Magnet School of Excellence by Magnet Schools of America. The school is aptly named for the convergence of the Hockanum and Connecticut Rivers in East Hartford. The location of the school gives its students access to a true living laboratory where they can study all subjects under the theme of environmental science. Between the rivers and the school's pond, students learn about biodiversity of the land and learn to become stewards of nature. Two Rivers couples environmentalism with an emphasis on STEM teachings.

An environmentally themed STEM school, TRMS focuses on environmental awareness through courses like sustainability, environmental ethics, and a field

science class. Lessons on the environment are worked into other classes. For example, when students study Mexican culture they learn about the migration of Monarch butterflies from Canada to Mexico, the butterflies' significance to the Mexican culture, and about threats to Monarchs due to decreasing milkweed populations.

The school's focus on the environment extends beyond the classroom. The TRMS recycling program is run by students, who collect recyclables from classrooms along with data on how classes are doing in terms of accuracy. The school fills 15-20 90-gallon barrels of single-stream recycling per week. After a small-scale compost operation last year, TRMS introduced schoolwide composting. The kitchen staff collects kitchen waste, and sixth graders are piloting a student compost program in which students collect food scraps during lunch. On average, TRMS collects three 90-gallon barrels of food scraps weekly.

Students play an integral role in their own learning and environmental stewardship at TRMS. In 2009, several students and the school's enrichment coordinator began the Project Learning Tree (PLT) modules. Through their work with PLT, students wrote articles that were published in the Hartford Courant and presented at both the Connecticut Science Teacher Association and National Science Teacher Association conferences in Hartford in the fall of 2011. In 2012, TRMS was named the first PLT Green School in Connecticut, and its enrichment coordinator received the first PLT Connecticut Educator of the Year award. Students worked with the facilities director, the town of East Hartford, and the Board of Education to research, approve, and install a windspire on the roof of the building, with funds received through a PLT grant and CREC. The windspire is connected to a computer in the classroom below, so students can collect data on how much energy is generated each day.

In addition to collecting data on waste reduction and energy collection, the school also collects data on the environment around the school. Students participate in Picture Post, a program of the University of New Hampshire and part of the Digital Earth Network, taking panoramic pictures of the school grounds and uploading to compare over time. There is a Weatherbug Station on the roof of the building, so students can compare the picture post photos with the weather reported on those days to look for patterns.

Additionally, students are familiarizing themselves with Cornell University's School of Ornithology program, ebird. Groups of students monitor bird feeders in three different locations around the property, collecting data on the amount of seed left in each feeder as well as the number and types of birds sighted at each feeder. All of these programs provide rich data that is both engaging and informative for students.





TRMS operates a greenhouse and a hydroponic garden. An after school cooking class uses the student-grown herbs as ingredients in their cooking. Several teachers have container gardens in their classrooms. TRMS has a fruit exchange bin for students who choose not to eat their fruit. They can leave it in a bin just past the cash register and other students who are hungry may take the fruit. This supports health and wellness goals and also waste reduction. Through donations from Whole Foods, students in high-risk groups are offered a backpack of food to take home on Fridays. Teachers frequently take students outdoors as part of class or for earned rewards, and students also can earn lunch outside through a positive behavior support system.

## **CREC Two Rivers Magnet High School, Hartford, Conn.**

### *From Brownfield to Multiple Green Career Pathways*

CREC Two Rivers Magnet High School (TRMHS) is an urban environmental science magnet school overseen by CREC in Hartford, Conn. TRMHS currently serves over 395 students in grades nine through 12 from the greater Hartford area. More than 50 percent of the students are eligible for free and reduced price lunch. It has a high English Language Learner (ELL) population, and more than 80 percent of students are minority. The magnet theme is environmental science and sustainability. As a four-year-old school, TRMHS has used the CT Green LEAF guidelines and resources as a green road map for the development of its theme programing. For example, students at TRMHS have participated in courses that teach sustainable green building design, techniques in water quality testing, aquaponic food production, and drone and robotic conservation efforts.

By making use of the CT Green LEAF self-assessment tool, TRMHS added to the School Improvement Plan action steps including environmental STEM pathways, cross-disciplinary environmental science curricula, theme-specific professional development, green school initiatives such as recycling and composting, and a theme-specific senior capstone project. In 2015, TRMHS received the Magnet Schools of America Award as a School of Distinction for efforts promoting the magnet theme of environmental sustainability.

TRMHS integrates the magnet school theme of environmental science and engineering throughout all core, elective, and co-curricular classes. TRMHS offers four exciting theme-specific pathways for students to choose from: Aquatic Studies, Environmental Studies, Environmental Science and Engineering, and Plant Genomics and Biotechnology. Upon graduation, students receive an environmental pathway designation on their diplomas for their specific focus.

Learning occurs in multiple environments, including nearby parks, rivers, coastal and mountain regions, and nature preserves. Social studies classes visit historic sites and analyze how the environment shapes our culture and history. World Language classes create eco-tourism postcards and apply vocabulary related to environmental preservation. In art classes, students create original and expressive pieces by repurposing recycled materials and using multiple media to increase environmental awareness. Music students make and play recycled instruments as they study environmental and cultural issues through world music.

The creation of thematic pathways is enhanced by teacher collaboration on interdisciplinary learning experiences. Examples of environmental science integration in core classes include: a study of alternative energy in physical science class which culminates in a social studies debate on the merits of Tesla's vs. Edison's work; an aquaponics project incorporating the engineering design process; an exploration on energy transformations relating to human nutrition and sustainability; an upcycling project in music using old computer parts to make maracas, and ecological field and aquatic studies at the confluence of the Connecticut and Hockanum Rivers.

TRMHS pursues health and wellness, both in academics and in other activities. It has a diverse curriculum that includes courses such as Environmental Justice and Food Science, as well as maintaining an active student team that assesses the indoor environmental quality of the school using EPA Tools for Schools and PLT's GreenSchools materials. A Wellness Committee addresses staff wellness education and offers quarterly health competitions for staff members. Staff members participate in a community supported agriculture program to bring farm-fresh produce to the school, a program that has expanded to include students' families. The cafeteria offers vegetarian and vegan choices, as well as culturally inspired meals. As an urban school located on a former brownfield site, the school uses local parks for recreation, and walks to many field trip sites.

Currently TRMHS is located in the renovated historic Colt Armory in downtown Hartford. This factory was a former brownfield site that has been rehabbed and revitalized to serve as the campus for three CREC schools. TRMHS has a greenhouse that students use in AP Environmental Science and for their capstone projects. The school adheres to CREC's Ethical and Sustainable Spending Policy for schools and programs, which requests that staff make considerable effort to reduce consumption, waste, and transportation emissions when purchasing supplies and equipment. Many students walk, ride their bikes, or travel to school by city bus. TRMHS has a no-idling rule at the school, which helps to reduce the environmental impact of school buses.



Next year, construction begins on a new facility which will be located on the Farmington River, and is projected to include a solar array that will provide at least 50 percent of TRMHS' electricity needs. TRMHS also is investigating whether geothermal heating and cooling is a good fit for the school. In an after school club and in the green building design course the school is planning to offer, students design low-impact landscapes for the new site, which will include vegetable and pollinator gardens, an educational wetland and trail system, an outdoor aquaponic farm, a nature center for the local community, and a bird sanctuary.

## **King School, Stamford, Conn.**

### *A Sustainability STAR Among Even the Smallest Superheroes*

King School is an independent coeducational college preparatory day school in Stamford, Conn., instructing 672 students from prekindergarten through 12th grade. The breadth of its programs, the challenge of its wide-ranging offerings, and the strength of its community serve its students extremely well.

Two faculty and staff members lead sustainability task forces, with one responsible for promoting environmental stewardship and the other responsible for promoting health and wellness. The parents' association has a Healthy and Sustainable Living committee. Student leaders in the Lower, Middle, and Upper School divisions work directly with faculty to engage the student body on sustainability issues at least twice a month. All task forces and committees are coordinated through King's full-time sustainability director.

King uses STARS to measure best practices in sustainability. The school earned bronze status in 2014, and has adopted a sustainability plan that will bring it to gold status in five years. All King stakeholders, including senior administrators, parents, faculty, staff, and students, were involved in the creation of the sustainability plan.

King defines sustainability in terms of social, environmental, and economic concerns, which means looking beyond reduction of environmental impact efforts to ensure that graduates also are literate in sustainability concepts. To that end, King has adopted Education for Sustainability standards published by the Cloud Institute at all grade levels kindergarten through 12th. Faculty-illustrated cartoons of Environmental Ant, "the world's smallest superhero ever," have been designed to teach Lower School students sustainability lessons.

To communicate and promote sustainability efforts, King designs and disseminates 13 infographics throughout the school year, covering the following topics: waste,



service work, food, curriculum, energy, greenhouse gas emissions, transportation, water, purchasing, affordability and access, support for underrepresented groups, investment, and health and well-being. An infographic is sent biweekly to all upper and middle school advisors, and to lower school homeroom teachers.

Accompanying each infographic are three yes-or-no questions prompting discussion about sustainable behaviors. The results are aggregated and sent back to the sustainability director, and then shared with student leaders of each division.

King is undergoing a comprehensive kindergarten through 12th-grade curriculum review using Understanding by Design strategies. All Upper School departments are working with cross-divisional program leaders, including sustainability, to incorporate standards into their overarching, departmental transfer goals, understandings, and essential questions. Once adopted, departments will use backward design to incorporate sustainability standards even more intentionally into unit planning from 12th grade all the way back to kindergarten.

Students in King's Environmental Science and Sustainability elective course work with the sustainability director to implement a learning environment analysis that includes the EPA's Tools for Schools program. Students in the elective are split into groups, with each group responsible for the data collection in a different campus building. The process engages just about every King employee, and the data is used to inform changes in indoor quality practices. The audit also incorporates a majority of the parameters used by the Collaborative for High Performance Schools in its Operations Report Card.

The food service director has worked to increase King's percentage of sustainably-sourced food using metrics from the Real Food Challenge. Within one year, King doubled its sourcing of sustainably sourced food, and expects to double it again by 2020. To help move the initiative forward, King is leading a group of 10 schools in the Fairfield/Westchester county area, all of whom use the same dining service, to work together in increasing their procurement of sustainably sourced food.

King's Sustainability Task Force on Health and Wellness, which serves all employees at King, provides education, bringing resources to campus, fitness incentives, use of community resources, and stress relief initiatives. For the students, athletic programs are an integral part of their experience. Students in prekindergarten through sixth grade have physical education every school day. In grades seven and up, students participate in sports as a requirement.

King's sustainability plan includes a very ambitious target of reducing carbon emission by 50 percent in five years. A comprehensive greenhouse gas inventory, going back to 2010, was calculated using the Carbon Management and Analysis Platform maintained by the University of New Hampshire's Sustainability Institute.

To reach its carbon reduction goals, King's strategies include increased energy efficiency with infrastructure modifications, increased energy efficiency with -- conservation behaviors, installation of renewable sources, and expanding sustainable transportation strategies.

The school's path toward renewable energy use began this past year in a cooperative, student-led effort between King's Global Education Program and Sustainability Program. Twenty-one students are engaged in feasibility studies in renewable energy topics for King. The topics are solar photovoltaic energy, solar thermal, wind, fuel cells, biomass, geothermal and innovative ways to use kinetic energy. The students will develop requests for proposals, engage businesses in the region, collect proposals, and bring their research to the Global Student Leaders Summit taking place in Iceland in March 2016. They will present results to the board of trustees, giving King the opportunity to decide which renewable sources are most appropriate in the coming few years. Most of the students are using the project as their senior capstone project, which will allow them to earn Distinction in Global Education upon graduation.

## **Delaware**

### **Wilmington Montessori School, Wilmington, Del.**

#### *Fundamental Montessori Values Undergird Daily Green School Practices*

The Wilmington Montessori School (WMS) community makes a great effort to uphold green practices and use materials and systems that will minimize the school's costs and environmental impact. The WMS facilities staff is committed to creating a safe, healthy, and sustainable campus. The nursing and health education staff seek ways to keep students and families as healthy as possible, and WMS teachers and staff are dedicated to teaching students to be good stewards of the Earth. These are fundamental Montessori values.

Staff works together to maintain the natural gifts of the school's 25-acre outdoor classroom, and help all of the students understand how gratifying it is to care for one's own environment and, by extension, the world. WMS has installed gardens and composters. The square foot gardening project is integrated into the fourth through sixth grade curriculum, and extra vegetables are passed on to the Food Bank of Delaware. Toddler students play in a specially designed area that allows them to interact with natural elements such as dirt, seed pods, and water. The teachers provide the appropriate language related to these experiences. Preschool students make feeders for birds, care for plants, and name the stages of the butterfly's life cycle. The monarch butterfly waystation allows students to observe the natural world up close. Lower elementary students learn about the fundamental



needs of plants and animals, along with the underlying processes of the larger natural world.

As a part of the Delaware Valley Green Building Council's Pathways to Green Schools program, a team from the University of Delaware conducted a daylong energy audit to assist the school staff in understanding ways to conserve energy and resources throughout the school. Measures to reduce environmental impact taken at WMS include: the installation of a new roof, approximately 200 energy-efficient windows, 10 energy-efficient exhaust fans, a building automation system, seven energy-efficient HVAC rooftop units, five energy-efficient dishwashers, and six low-flow toilets; the conversion of 220 lighting fixtures from T12 to T8 fixtures and all exterior lighting to LED or compact fluorescent; re-striping of the parking lot; re-insulation of an entire wing; and diverting stormwater runoff to a drainage basin. WMS also participates in the NWF-administered EcoSchools USA.

The WMS community has sponsored several ongoing sustainability projects. Students, families, and staff support shoe, paper, and ink cartridge recycling. Sixth graders have raised funds and awareness for Save the Rain, 350.org, and the UNICEF Tap project. Primary students installed a certified monarch butterfly waystation. Lower elementary students have done extensive study of wind power, water filtering, oil spills, and river preservation, and attended programs at the Delaware AeroSpace Education Foundation to learn about solar power and renewable energy. Students and facilities staff built a small library out of recycled materials, into which donated used books are placed so that students may exchange books. This project has reinforced the concepts of reducing, reusing, and recycling.

Students at all levels participate in the Bash the Trash artist-in-residency program, with workshops in which students learn the physics of sound, orchestral instruments, and ways to use recyclables to create musical instruments. Lower elementary students conduct a study of trees and seeds, through which they have created a field guide of trees, and have grown plants from seed. The upper elementary curriculum includes work with square foot gardening, composting, the design of "land art" projects, and an investigation of watersheds, estuaries, and oyster restoration through Project PORTS, an outreach initiative of the Haskin Shellfish Research Laboratory at Rutgers University.

In 2014-15, WMS opened several maker studios - for the toddler, preschooler, kindergarten, and elementary level students to explore STEAM topics. In the general classrooms and the maker studios, students practice the skills of experimentation, testing, redesigning, and retesting. Students create water filtration systems, build hydroponic planting systems, dye fabric by natural means, and create code for computers.

The Montessori curriculum encompasses many of the key principles of sustainability and conservation. Maria Montessori, the Italian physician and educator who created the education system that bears her name, included materials, activities, and lessons expressly to address the student's innate interest in the environment and the fostering of higher-level thinking about the universe and a child's place in it. She urged teachers to create beautiful indoor classrooms while also teaching in the outdoor classroom, because children feel their connection to the natural world in a profound way. WMS teachers strive to impart to their students the connection and respect for the natural world that Montessori originally envisioned.

## ***Department of Defense Education Agency***

### **Kimberly Hampton Primary School, Fort Bragg, N.C.**

#### *Sharp Students Learning From a Smart Building*

Kimberly Hampton Primary School (KHPS), serving 481 prekindergarten through second grade students in the Fort Bragg district in North Carolina, opened in the fall of 2014. Hampton was designed and constructed to meet LEED Silver certification standards. The school's state-of-the-art design promotes sustainability education and STEAM instruction, and is resource efficient. The building is used as a teaching tool for both students and the community through its exposed infrastructure "bones" and sustainable features, including solar panels, a windmill, and rooftop gardens.

The school has an energy-building automation system that is monitored at the district office. Approximately five percent of the school's energy usage is produced from solar panels located on the school roof. Water is heated as it loops through solar panels on the roof, and then is stored in a storage tank. This looping helps regulate water temperature, resulting in a 35 percent energy savings. Large windows allow natural sunlight in, so the need for artificial light is minimized.

A 10,000 gallon in-ground cistern captures rainwater, which is used to flush toilets in the group bathrooms. Rainwater also is collected in barrels to irrigate Hampton's rooftop gardens, and the landscaping around the school is composed of native drought-tolerant plants and pervious pavers.

The building design and classroom educators of Hampton promote STEAM instruction and learning. Classrooms are open studios that allow collaboration and discovery through the use of PBL, in which students work for an extended period of time to respond to a complex question, problem, or challenge. Teachers are committed to incorporating and emphasizing STEM and 21<sup>st</sup>-century learning skills in these project-based units.





Hampton uses its two rooftop gardens for outdoor learning on life and water cycles, plants, and conservation, and the Garden Club meets on the rooftop gardens weekly. Students use a bicycle-powered pump to water the plants with collected rainwater. Teachers use the school's windmill and solar panels to instruct about alternative forms of energy and sustainability concepts.

Hampton encourages students to ride the bus or to walk with parents to school. The campus population recycles milk cartons, bottles, cans, and paper, and is a worksheet-free school. To support the promotion of having a healthy breakfast, the school offers the National School Breakfast Program, and arranged bus schedules to facilitate participation in the breakfast program. In the classroom, healthy snacks from home are encouraged. Students participate in movement breaks throughout the day, and teachers are encouraged to join morning stretch sessions.

### **Van Voorhis Elementary School, Fort Knox, Ky.**

#### *LEED Silver Leads to Gold*

Van Voorhis Elementary School has a long proven history of providing an outstanding education for the children of military families, 40 percent of which qualify for free and reduced priced lunch. Today, Van Voorhis boasts a rich blend of students from both military and civilian families that reside in on-post housing. Although well-maintained, the 1958 facility was not built with sustainability in mind. As a result, the school has emphasized practices that permit students and staff to be good stewards of the environment by conserving resources. Van Voorhis has undergone renovations to conserve energy and provide a healthy school environment. Curriculum and instruction have been designed purposefully to address the health and educational needs of Van Voorhis students, in order to prepare them to become environmentally aware and responsible citizens.

The current Van Voorhis facility will be closed after the 2015-16 school year. All of the students in prekindergarten through fifth grade will attend what is expected to be a LEED Silver certified school. The new Kingsolver Elementary School plumbing and sewage systems will minimize the use of water, and have both solar and geothermal energy generation capabilities.

Van Voorhis educators, support personnel, military, and civilian partners all are focused on demonstrating conservation practices in an effort to produce caring students that will become 21<sup>st</sup>-century leaders and caretakers of the environment. Some of the school's community partners include: Fort Knox Recycling Center, U.S. Army Corps of Engineers, Fort Knox Meteorological Department, National Energy





Education Development Project, Fort Knox Forestry Department, Fort Knox Division of Wildlife Services, Fort Knox Veterinary Clinic, Kentucky State Forestry Division, and the Hardin County Extension Office

All of these partners have served as environmental educators for Van Voorhis students. For example, partners helped Van Voorhis students create an oil filtration system during STEMposium Week, offering the scientific foundation needed for students to design, build, and test working filters.

Van Voorhis Elementary recently began an initiative to promote healthy eating and horticultural opportunities for engaged learning through the construction of a school greenhouse. Through the support of a caring district maintenance department and DoDEA's STEM promotions, students benefit from opportunities to get their hands dirty as they learn about life science. Students see firsthand how protecting the environment and conserving resources affects their health and quality of life. Health partners from the Ireland Army Hospital and Dental Center, and the military family life consultant work with Van Voorhis' physical education teacher and school counselors to promote student health and well-being. The United States Army Human Resources Command offers support and mentoring for special events that promote being physically fit and active.

Recently, Van Voorhis has secured a master gardener to help expand the school greenhouse program, including increasing its composting efforts. Hands-on investigations in the greenhouse, as well as other outside learning adventures, promote students' understanding of earth sciences and the fragility of natural resources. Students were thrilled to study a mother fox who decided to have her kits under a shed on school grounds. While maintaining a safe distance, the students witnessed her bringing food to her offspring.

A representative from the Fort Knox Energy Office, in conjunction with the local energy cooperative, will be consulting with Van Voorhis fifth graders as they conduct a school energy audit. Students from the school's gifted program work with the Fort Knox Water Division and Conservation Officer to monitor and promote reduction of water use. Second grade students showcase ways to reduce and recycle paper. All students are involved in the creation of imaginary environmental "superheroes" that protect their world. These superheroes are used to promote sustainable living to the community, along with an earth-themed musical production.

Students benefit from receiving focused STEM instruction from a STEM teacher in the district and from classroom teachers, along with specialists that have incorporated STEM, 21st-century learning, and college and career ready math standards and initiatives to drive student instruction and learning. The STEM

teacher conducts monthly STEMposium challenges that promote student and family problem-solving to design or develop an environmentally sustainable solution.

## **Garmisch Elementary Middle School, Bavaria, Germany**

### *A Green School Nestled in the Alps*

By integrating health, wellness, and environmental responsibility into a 21st century learning environment, Garmisch Elementary Middle School (GEMS) embodies not only green living but also green learning and leading. From the school's "Healthy People, Healthy Planet" wellness program to the recycling and composting program, GEMS has created a multi-tiered, comprehensive program that provides students with the 21<sup>st</sup>-century tools they need in order to be responsible, environmentally conscious, and successful members of a global society.

Improving the environment while providing students with rigorous and relevant learning opportunities is a cornerstone of GEMS' green school work. GEMS provides opportunities for students to apply and extend learning in hands-on, practical settings, which directly benefit the community. For example, beyond simply implementing a recycling, composting, and waste reduction program, students at GEMS integrate environmental and sustainability education with STEM concepts. GEMS students designed and constructed compost bins to collect organic waste. Students also developed a campaign focused on waste reduction, and collected and analyzed types of waste generated at GEMS to determine the effect of the recycling and composting program. As a result of the composting project, recycling initiative, and student-led campaign to reduce waste, students determined that the amount of waste going into the regular trash was reduced by 83 percent. Students are designing and constructing a garden, which will be planted in the spring of 2016, using soil generated from the compost. Students demonstrate their commitment to improving the environment by participating in garrison clean-up activities. Classes also have taken on civic projects around specific environmental issue, such as water conservation and water quality.

GEMS is committed not only to protecting the planet, but also to promoting healthy lifestyles. With the implementation of its "Healthy People, Healthy Planet" program, GEMS has made health and wellness a focus for students and staff. The school counselor teaches weekly classes that target social and emotional well-being. The school nurse has developed and implemented a healthy lifestyle and nutrition curriculum that is taught in all classes. Families receive education and information through "Nurse's Notes," a health/wellness newsletter, which is routinely featured in

the school's weekly bulletin. Families can learn more about the benefits of a healthy lifestyle during GEMS's Spring Health and Fitness Night.

The school nurse offers weekly fitness activities, and organizes staff participation in a healthy lifestyle challenge. Staff model healthy living for students by leading active lifestyles; half of the staff regularly walk or bike to school, 47 percent of the teaching staff serve as volunteer instructors for the school's Wonderful Wednesday ski program, and 20 percent of the staff recently competed together in a team endurance race. Students also are committed to improving the environment and engaging in an active lifestyle, with over half of the students walking or biking to school each day.

Located in the Bavarian Alps, in a town that has been recognized internationally for its healthy climate and outdoor recreation opportunities, GEMS' commitment to health and wellness extends well beyond the classroom walls. After school clubs provide students with the opportunity to participate in physical activity and experience some of the outdoor recreation opportunities that exist in the town of Garmisch. Formed through a partnership with Children and Youth Services, the Outdoor Education Club provides middle-school students with a chance to promote teambuilding and problem solving skills through participating in outdoor activities such as hiking, climbing, and geocaching. As evidenced by a 92 percent participation rate, the students love the hands-on learning opportunities that this club provides. With over half the student body participating in the running or dance clubs, GEMS students are enthusiastic about maintaining a healthy lifestyle. GEMS' Turkey Trot Fun Run, Spring Sprint, and Field Day allow students and families additional opportunities to be active. During the winter months, GEMS students learn to ski by participating in weekly three-and-a-half-hour ski lessons. Not only does this program encourage physical activity and increased self-confidence, but it also provides students with an incredible sense of accomplishment in learning new skills.

GEMS is continually identifying ways to further improve and expand the school's commitment to providing a learning environment that promotes green living, learning, and leading. GEMS plans a 2017 renovation with sustainability features that will improve the building's resource efficiency and indoor environment, and will result in cost savings for the school. The expansion also will allow for the addition of a greenhouse/lab, which will be used for hands-on sustainable energy and horticulture studies year round. During the design process, students were asked to be architects and provide input on design elements and features of the school. After the expansion plans were finalized, eighth graders used math and engineering skills to draw up the plans of the new construction. Using surveying equipment, they mapped out the new building site.



GEMS is proud of its comprehensive, authentic, and effective program, which instills not only a commitment to healthy living and environmental responsibility, but also prepares students for successful futures.

## ***District of Columbia***

### **Capital City Public Charter School, Washington, D.C.**

#### *Hands-On Urban Ecology in Our Nation's Capital*

Capital City Public Charter School serves 983 students in prekindergarten through 12th grade in one consolidated LEED Gold-certified building. Seventy-three percent of students are eligible for free or reduced price lunch, and 85 percent are African-American or Hispanic. Capital City's focus on creating a green and environmentally focused program is evident from one glance at the school's building and grounds. Capital City's main school garden encompasses 2400 square feet, includes an outdoor classroom, and is adjacent to the high school entrance for the entire community to see. The grounds also include bioswales and a rain garden. The school employs a part-time school garden coordinator, who works with teachers to design curricula that includes resources from the school garden. The coordinator works with high school students to provide a weekly school garden market in the spring and fall that offers fresh produce from the school garden and a local farm. Students participate in hands-on, project-based, authentic learning "expeditions." From prekindergarten students' expedition on herbs to the 11th graders' Food Justice for All expedition, students are engaging with natural, local foods, and learning why knowing where your food comes from has benefits for health, wellness, equity, and local economies.

In 2012, Capital City underwent a massive renovation of its 1963 building with sustainable practices in mind. The new building has large windows that draw in a significant amount of natural light. This not only reduces energy use, but also helps kids grow and learn better. Lights are on timers throughout the building and recycling bins are in every school hallway, office, and classroom. Students played an integral role in helping develop the green practices now implemented. Prior to the renovations, seventh and eighth graders investigated green practices with assistance from the Alliance to Save Energy and the U.S. Green Building Council (USGBC), as part of a green building expedition. The students then created a book with their suggested green designs, and presented their chosen features to the school's board of directors. Their recommendations are evident throughout the new building in elements such as doorstoppers that prevent outside air from entering the building and slanted ceilings in classrooms to maximize natural light.



Capital City's mission is to "enable a diverse group of students to meet high expectations, develop creativity, critical thinking, and problem-solving skills, achieve a deep understanding of complex subjects, acquire a love of learning, along with a strong sense of community and character....young adults who are self-directed, intellectually engaged and possess a commitment to personal and civic responsibility." In order to accomplish this mission, Capital strives to expose students to their natural environment and to issues that affect their community and the world. All students must take either Environmental Science or Urban Ecology to graduate, and an optional outdoor adventure program includes camping, rock climbing, and hiking. Each expedition includes fieldwork and a service project. For example, the first grade expedition on bees includes fieldwork to a local youth garden and butterfly habitat. Students meet with a beekeeper and a scientist from the USDA who discusses what colony collapse disorder is, and how it affects bees' livelihoods. All of this information is presented to students in an age-appropriate manner that helps them grapple with the issues and develop their own ideas. Students then create beeswax candles and information cards that they sell at two local farmers' markets, and the lower school music teacher works with students to create a bee song that students present at their biannual showcase. Funds from the markets have been used to purchase a bee hive.

Throughout the Capital City curriculum, students are encouraged to take an active role in reducing their carbon footprint. Teachers act as guides, helping students navigate and develop their own beliefs and plans for action. For instance, the middle school Farm to Table elective allows students to read the novel *Seedfolks*, and then plant their own garden mimicking the plants in the book. Students then harvest their food and decide what meals to prepare for their class. The experience allows students to use their own creativity and make informed meal decisions.

As students progress through Capital City, they learn how to expand their civic engagement. This is evident in the 11<sup>th</sup>-grade Youth Food Justice Summit that is organized entirely by the junior class. Students work in teams to develop engaging presentations focused on food justice topics. They draw upon their fieldwork to local farms, work in the school garden, and meet with experts in the food justice field to develop engaging presentations for the nearly 200 attendees to their annual youth summit.





## Florida

### **Beachside Montessori Village, Hollywood, Fla.**

#### *An Out-of-This-World Cosmic Education*

Connecting the child to the natural world is an integral component of Montessori education. Studies and practical life experiences in the natural world are imbedded into the curriculum at an early age. To further strengthen this connection, Montessori encourages leadership by children. Beachside Montessori Village, a public magnet prekindergarten through eighth-grade school, aims to create an environment that inspires children to take ownership of their surroundings and action for change toward a more peaceful and sustainable world. Reducing environmental impact, promoting health and wellness, and integrating sustainability education accomplish this goal.

Beachside's facilities staff, teachers, and students collaborate to reduce environmental impact and costs. To reduce energy use, Beachside participates in the NBA's Miami Heat's How Low Can You Go Energy Efficiency Challenge. Students from Beachside's sustainability elective class visit classrooms to read and discuss environmentally themed books. In an effort to educate and to standardize recycling, the school partners with Recycle Across America. Beachside's Recycle Rangers have placed recycling labels on all bins throughout the school to reduce contamination.

Progressive Waste, the school's hauler, partners to conduct schoolwide assemblies, recycling audits, and art contests. Through a Green Team fundraiser, three water bottle refilling stations have been purchased, saving over 5,850 plastic water bottles in just a few months. Additionally, the Montessori curriculum uses reusable manipulative lessons, student notebooks, and key experiences, reducing the need for single-use materials. To reduce carbon dioxide (CO<sub>2</sub>) emissions on campus, Beachside offers a Green Car Pool, and students oversee a no-idling program. With support from partner On Air Schools-Clean Air Campaign, students collected data to measure the amount of CO<sub>2</sub> and air pollutants produced, then educated parents and asked them to sign a pledge promising not to idle their vehicles.

Promoting health and wellness among students, staff, and the community teaches children to take ownership of their own health. As part of Beachside's peace education, the school begins each week with Mindful Monday, featuring schoolwide guided relaxation. Several teachers have certified yoga teachers volunteer in classes once a week, and others use GoNoodle or other brain break exercises. Beachside is proud of the beautiful stone labyrinth that the school community came together to build by hand, offering students an opportunity for walking meditation.

Beachside's recess area is shared with a community park, so local residents also benefit from the labyrinth.

All over campus, upcycled murals, artwork, and inspirational quotes create a positive, nurturing, learning environment. The school's outdoor environment includes an NWF-certified wildlife habitat. Through classroom gardens and a weekly gardening club, students learn about planting, maintaining, and harvesting organic edibles. Beachside holds an annual food drive and Turkey Trot walk for students and staff, while its PTA organizes a community five-kilometer race. Staff members have an opportunity to participate in various activities from the Nike+ Challenge to a community dragon boat team.

The Montessori curriculum teaches "cosmic education" to help students understand the connections between the world's biodiversity and themselves. Interconnectedness of all things provides a way for children to be able to study math, science, nature, and the universe. Beachside is the first middle school in its district to offer a sustainability elective for students, resulting from a partnership with ASU Sustainability Teacher Academy. Students participate in off-campus, field-based environmental studies at Everglades National Park and Pigeon Key. Off the Canvas, a program run entirely by parent volunteers, cultivates a sustained awareness and interest in art and crafts, using of recycled materials and socially responsible practices through monthly classroom hands-on projects.

The Warriors of Rainbow student green group provides opportunities for school leadership and service learning. The group was chosen to attend the Algalita International Youth POPS Summit, where they presented solutions to the ocean's plastic pollution problem to the city of Hollywood's Green Team, resulting in a partnership to work on this issue. Montessori Model United Nations (MMUN) students research and offer solutions for global environmental issues from climate change to affordable energy services. Resolutions are presented to ambassadors, as well as their peers, at the MMUN conference held at the United Nations in New York.

The Montessori philosophy coupled with strong partnerships and a passionate school community create a unique environment that inspires students to become guardians of the planet.



## **Alachua County Public Schools, Florida**

### *Forty Two Energy Stars Create EnergyWhizzes*

Alachua County Public Schools (ACPS), where approximately 50 percent of students are eligible for free or reduced price lunch, was an EPA 2013 ENERGY STAR Leader and Top Performer District for improving energy efficiency of facilities by more than 10 percent compared to its 2006 baseline, in addition to achieving an average ENERGY STAR score of 77 across its schools.

Every employee and student in the district is fundamental to the success of conserving energy. The ACPS information technology (IT) department monitors and shuts down over 17,000 district computers daily, and received EPA ENERGY STAR Low Carbon IT Campaign Recognition. The ACPS facilities department is involved in day-to-day maintenance, including building automation systems operations for the entire district.

ACPS has 21 school sites with more than two megawatts of photovoltaics installed, ranging from five-kilowatt to 209-kilowatt systems. Three of these projects were provided through partnerships with local utility providers, and are hands-on learning centers for students. Eighteen sites are Feed-In-Tariff programs, which provide a substantial income to ACPS from the rental of roof spaces. In addition, a portion of the solar rental income is earmarked toward funding the North Florida EnergyWhiz Expo event a forum for students to demonstrate their STEM knowledge and skills as they relate to such energy topics as solar thermal, photovoltaics, and hydrogen technology. The event features a Junior Solar Sprint Car Competition and a Solar Energy Cook-Off. In addition, the district has provided a solar energy kit in conjunction with a one-day workshop about solar energy to every school in the county, along with solar energy training for a teacher from each of the 42 schools.

ACPS' Camp Crystal Lake School Year Program sends all second grade students to a sixty acre "classroom without walls" to engage in environmental education. In fifth grade, all students attend overnight campouts onsite to further enhance their understanding of North Central Florida's ecosystems firsthand. ACPS also has implemented a districtwide STEAM robotics program.

The district's award-winning Food and Nutrition Services department has 23 farm to school programs underway. The USDA HealthierUS Schools Challenge has awarded ACPS schools two Gold Awards of Distinction and three Bronze Awards. ACPS provides agriculture, health, and nutrition education opportunities to students,



all while supporting local and regional farmers. Milk cartons are recycled in almost every elementary school.

ACPS now has 100 percent recycling capacity in all schools and ACPS ancillary sites. Preliminary data gathering included an eight-site audit of one day's waste, both rural and urban, for elementary, middle, and high schools in partnership with Alachua County Public Works. The district distributed green recycling bins and dumpsters to all 42 school and ancillary sites, and offered onsite custodial trainings.

## **Orange County School District, Florida**

### *Goal-Setting Toward Sustainable Schools and Community Involvement*

Orange County Public Schools (OCPS), a large urban school district, is the fourth largest in Florida. OCPS is also Central Florida's second largest employer after the Walt Disney Company, with over 23,000 permanent and part-time employees. The nearly 200,000 students, 67 percent of whom are eligible for free or reduced price lunch, come from 200 countries and speak 167 different languages and dialects. The five district goals are: 1) an intense focus on student achievement; 2) a high-performing and dedicated team; 3) a safe learning and working environment; 4) efficient operations; and 5) sustained community engagement. Long range sustainability strategic objectives have been developed to support these districtwide goals.

In both health services and family and community involvement, the district has been highly regarded for its community referral processes, School Health Advisory and Wellness Committee, and continuous recruitment and training for varied volunteer opportunities. OCPS partners with nearly 30,000 volunteers and has 1,035 school-business partnership agreements, which link businesses and organizations with schools to prepare all students for the future. In 2015, the district was awarded the Florida Healthy School District Gold Award for the second time. Last fall, 40 of its schools participated in International Walk to School Day.

OCPS has achieved an impressive inventory of sustainable school facilities, with a total of 36 schools designed and constructed using a sustainable rating system. This includes four LEED ratings, 28 Green Globe certifications, and four Florida Green Building Coalition projects. Another 16 schools currently in the design or construction phases are anticipated to achieve a sustainable rating.

In 1996, OCPS implemented a districtwide indoor air quality management program. The Environmental Compliance Department implements the OCPS Indoor Air



Quality Management Plan, trains OCPS personnel in all aspects of good indoor air quality, assists in the investigation and remediation of potential indoor air quality problems, and verifies the effectiveness of the plan and corrective measures.

The recycling program, which began in 1991, has saved more than \$600,000 over the last three years. The district recycles universal waste, metal, petroleum waste, electronic waste, yard waste, used tires, textbooks, district records, single-stream materials, and construction site waste. Last year alone, the district's recycling program kept over 55 million pounds of materials out of local landfills.

OCPS developed its own districtwide Green Schools Recognition Program (GSRP), an incentivized behavior modification program to create cultures of sustainability. Categories of work include: energy efficiency, transportation, waste, water, health and well-being, school grounds, and innovation. This program has led to outcomes in the areas of nutrition, school gardens, security, air quality, wildlife habitats, and community partnerships.

OCPS celebrated its third annual Green Day by having service learning students from Timber Creek High School design and lead activities for a fun, educational day to celebrate the top green schools in the district. Local municipalities and vendors also participated in the event to help educate students about the environment and community engagement.

The district's Surplus Services division reused over 58 percent of the items that were turned in districtwide during fiscal year 2015. The reissue of surplus furniture and equipment to the schools reduces trips to the landfill and has saved the district nearly \$2.2 million dollars. The total cost benefit through surplus sales and reissue for the 2014-2015 school year was \$3,570,492.

OCPS' energy administration department conducts regular audits in all schools and follows up with efficiency recommendations. The Department uses Energy Cap Pro™ software to manage utility billing data, and identify consumption anomalies and savings opportunities. OCPS has developed a systematic approach to energy rebates by creating an energy rebate matrix to identify and pursue all rebate opportunities that comply with district design standards. These efforts have earned OCPS rebates of over \$1.8 million since starting the program in 2013. These impressive results contributed to OCPS being selected for the Duke Energy Management Award in 2014. The energy rebate is used to fund the district's GSRP.

OCPS has developed and implemented curriculum and choice programs specifically designed to integrate environmental and sustainability topics into the kindergarten through 12th grade academic experience. The district provides numerous tools and opportunities for teachers and students to be engaged in environmental education.





Grade-level-appropriate lesson plans tie environmental education to Florida standards. For example, the middle and high schools have curricula that combine chemistry, the environment, and energy to predict the effect of individuals on environmental systems, and examine how human lifestyles affect sustainability. Environmentally themed, and STEM choice and career education programs are offered to students in elementary, middle, and high schools.

## Georgia

### **Atlanta Neighborhood Charter School, Atlanta, Ga.**

#### *A Project-Based Perfect ENERGY STAR Score*

The Atlanta Neighborhood Charter School (ANCS) is a kindergarten through eighth grade charter school with two campuses formed by the merger of two successful charter schools. Since the school's founding, ANCS has been committed to improving the well-being of the students and community in variety of ways. First and foremost, it strives to reduce the environmental impact of the school through facilities and transportation initiatives. Two separate awards given to ANCS (in partnership with Southface Energy Institute) from the Community Foundation for Greater Atlanta's Grants to Green program resulted in the installation of energy efficient LED lighting, low-flow plumbing fixtures, water bottle filling stations, high performance windows, thermal envelope insulation, and web-based centralized climate control for HVAC units. ANCS reduced greenhouse gas emissions by 28 percent and energy by 50 percent in just one year. These efforts led to one of the building's receipt of an ENERGY STAR certification with a score of 100 in 2015, as well as to participation with the City of Atlanta in the U.S. Department of Energy's Better Buildings Challenge program for sustainable buildings.

The school received a Safe Routes to School infrastructure grant to make walking and biking to school easier through community infrastructure improvements, and now oversees walking and biking school buses. ANCS participates with the Georgia Clean Air Campaign's schools program to encourage cleaner, healthier forms of transit to and from school, along with no-idling policies. The schoolwide recycling and composting program limits the impact of the school's consumption.

ANCS seeks to improve the health and wellness of the students and staff. It has implemented a successful farm to school program providing fresh, locally sourced food for students and staff. During the school day, there are regular periods of daily physical activity for students at all grade levels, and mindfulness practices are incorporated into all classrooms. All staff members are invited to participate in a voluntary wellness program sponsored by Humana. As a school, ANCS organizes and holds an annual five-kilometer road race and health fair for the community.



These environmental and wellness efforts are interwoven with learning. With support from a grant from the Aetna Foundation, a student FitWit club was formed to provide greater learning about health, and also to provide materials to help launch the farm that supports the school's farm to school program with students. Students at the middle school campus are involved in tending the school farm. They have planned out entire meals for the school cafeteria using the school farm -- determining what they would need to plant, when the crop would yield, how they could use cisterns to irrigate the farm, and how they could use as much of the yield as possible in the meal.

ANCS is a project-based learning school, and the major culminating projects for units that include a focus on sustainability and environmental impact. In grades five, six, and seven, students take a major overnight field trip to different parts of the state, where they take part in an outdoor education program to learn more deeply about environmental issues affecting Atlanta and the region. ANCS's partnerships with the Jackson Park Farm, Grant Park Community Farmers Market, and Captain Planet Foundation provide students with a range of learning about gardening, math and science, and civic engagement.

### **Pharr Elementary School, Snellville, Ga.**

*Produce Sprinkled by Solar Energy, Enjoyed by Co-op*

Pharr Elementary School believes it is important to teach students how to become leaders in and out of the classroom. Pharr employs best practices in operations management, ensuring that the school is safe, energy efficient, and well maintained. Pharr follows district policies for hazardous waste, chemical usage, integrated pest management, and ventilation systems.

Pharr is ENERGY STAR certified with a score of 91, nearly a 20 percent improvement in energy use from its initial score of 77. Pharr's energy-efficient upgrades include automated energy management systems with occupancy sensors and lighting retrofits in all classrooms. Teachers practice energy conservation by following the school's unplug-and-put-away protocol prior to leaving for extended breaks.

Pharr embraces the health and wellness of staff and students, 44 percent of whom are eligible for free or reduced price lunch.. Nutrition staff members post monthly trivia questions for students to promote eating healthy, and visit classrooms to offer additional learning opportunities. Pharr has a robust character education program that teaches students about being kind, respectful, responsible, and courageous. It



also teaches students about self-control, perseverance, tolerance, and citizenship. Using the Fitnessgram program, students are assessed annually for flexibility, strength, and endurance. Ninety percent of students are helping to improve air quality by riding the bus or walking to school. Pharr participates in the Clean Air Campaign No-Idling program, which is designed to reduce idling rates in bus and car rider lines. Parents receive magnets to put on their cars to let others know the importance of not idling. The school also encourages students to walk to school by having Walk to School Days through its Safe Routes to School Program.

Pharr's environmental stewardship extends beyond the building and into its outdoor learning areas. Over 40 percent of Pharr's grounds are devoted to outdoor learning areas, which have been funded through the school's PTA, local grants, and Donorschoose.org. These outdoor learning areas include a 1/5 mile walking trail, pollinator gardens, vegetable gardens, an African Keyhole garden, an alphabet garden, and native plantings maintained by students. One hundred percent of Pharr's landscaping is considered water-efficient and regionally appropriate. Pharr's garden had over 800 plants growing in it at the start of the school year. All plants begin as seeds in the greenhouse. Students and teachers water, weed, and nurture the plants, waiting to harvest the crops. Rainwater is collected from the roof and stored in a 650-gallon tank. Solar panels turn on sprinklers to help water garden beds, and students help to hand-water additional beds. Pharr donates over 90 percent of the crops to the local Southeast Gwinnett Co-operative. From June 2015 to September 2015, Pharr donated over 750 pounds of fresh fruits and vegetables from the school garden. Students at Pharr know they are helping to feed families in their community, including some families from Pharr. Students also learn different ways to grow crops using companion planting like the Native Americans did, with the three sisters method (in which plants that grow harmoniously together are planted together), aquaponics, and hydroponics. Pharr recently received a Captain Planet grant, which will provide additional beds for the garden and more learning opportunities for teachers.

In partnership with nonprofit Gwinnett Clean and Beautiful and the Clean Air Campaign, Pharr has a multi-disciplinary team that focuses on waste reduction and recycling, air quality, energy conservation, water conservation, and greenspace preservation. Students collect and recycle difficult-to-recycle items in the cafeteria to send to Terracycle, and the school receives money for the recycling. Students also compost fruit waste daily from the lunchroom.

Pharr incorporates environmental education in prekindergarten through fifth grade that is aligned to new state standards. On the science portion of the new Georgia Milestones Assessment, Pharr's first year baseline data indicates that Pharr students outperformed state, regional, and district results. Pharr has a STEAM special that all students attend weekly. Pharr students are immersed in project-



based learning and engaged in real-world, STEAM activities. Some examples of STEAM learning include: kindergarten students designing and building boats to help a “bear family” cross a river; first grade students showing how water drops can move all over the world; third grade students researching and developing ways to reduce stormwater runoff and reduce pollution; fourth grade students creating circuits; and fifth-graders researching and building earthquake-resistant buildings. Students in all grade levels create murals and art for the garden from recycled materials like bottle tops, records, CDs, and water bottles. Students are able to show projects and artwork at STEAM and garden nights each year.

Pharr teachers and students pride themselves on environmental learning and giving back to the community. These student leaders are getting a world-class education through the Pharr STEAM program, in-school and extracurricular sustainability activities, and by learning the importance of helping in their community.

### **Paideia School, Atlanta, Ga.**

#### *Giving Thanks...With Zero Waste*

Paideia School is a nonprofit, urban, independent prekindergarten through 12th grade school with a commitment to the environment and to social responsibility as part of its Framework of Values. In addition to the school’s expectation that its students exhibit excellence and hard work, it encourages them to take responsibility for the environment and to advocate preservation and protection of the natural world.

Paideia’s commitment is evident throughout the school: in its facilities, construction and renovation, land and resource stewardship, curriculum, and professional development; as well as the Parent Green Team, the Student Green Team, and community outreach. The Georgia Recycling Coalition, Green Schools Alliance, and USGBC are among many organizations that have recognized Paideia’s achievements with commendations and awards.

Since its founding in 1971, Paideia has acted to reduce its impact on the environment. Supporting the adage, “the greenest building is one that is already standing,” it preserves and repurposes existing buildings, retrofitting for energy efficiency. In 2007, it constructed one of the first LEED-certified school buildings in Atlanta. One notable design feature of this building is buried beneath its campus green: a geothermal heating system, which significantly reduces the cost and environmental impact of heating and cooling. When one of the buildings was devastated by fire, the school salvaged materials, pulling granite and bricks from the



rubble to use in new stairs and walkways. That reconstructed facility received LEED Gold certification in 2010.

In addition to minimizing environmental impact via energy efficient construction, Paideia works to lessen water and energy usage, create incentives for green transportation, and minimize waste production. There are bioretention ponds, water wells and cisterns for landscape maintenance, as well as waterless or low-flow restroom fixtures throughout campus. Students and staff enjoy parking privileges if they carpool, leading the majority of Paideia's community to carpool or use alternative forms of transportation to school.

Parent and Student Green Teams collaborate with staff on a comprehensive waste management program, with bins labeled for recycling, composting, and landfill-bound waste throughout campus. Organic matter goes directly to the school farm for composting by students. The school holds an annual Zero-Waste Thanksgiving Feast, feeding almost 1000 people, but producing only a single small bag of trash. Paideia also provides an innovative Reuse-a-Kit (reusable plates, utensils, cups for at least 100) that can be borrowed by anyone in the community, which is used at most parent-hosted social events.

Paideia supports the health of its whole community. From fitness classes for staff to using ecofriendly cleaning supplies, Paideians, as those in the school community are known, engage in all kinds of wellness efforts. After significantly reducing idling at carpool, Paideia was designated a Clean Air School. Healthy vending machines and farm-grown vegetables at school food sales offer students healthy food choices. Science classes explore nutrition, with parents sharing their culture's recipes using produce from the school farm. Physical education classes, a sports policy in which students are not cut from sports teams, and extended outdoor recess help the school's students develop active lifestyles. Flu shots, cardiopulmonary resuscitation, and first aid classes all are offered on campus.

Paideia also supports the community beyond those connected to the school. Students grow and deliver thousands of pounds of organically grown vegetables to local soup kitchens and food pantries, install edible gardens in schools and community gardens in less-resourced neighborhoods, and join forces with both nonprofit and for-profit social enterprises working in the area of food justice. Paideia partnered with a prekindergarten Montessori school in a less-resourced community in order to help them create an edible schoolyard garden. The elementary school library has several dedicated parent volunteers who take surplus materials to two underserved schools. The elementary students also collected gently used items for children from the same schools to choose from, allowing them to give gifts to their families. This event culminated in students from three schools sharing gingerbread and playtime on Paideia's playground. Paideia organizes such events to offer an



awareness in its students about the importance of, and interconnectedness of, people-care, planet-care, and a fair share for all in the community.

The school has had particular success in building a thriving urban agriculture program, which engages students in physical activities, the natural world, and inquiry-based exploration of its green spaces using the scientific method. A full-time urban agriculture coordinator facilitates integrating the farm experience into the curriculum. Teachers use Paideia's farms, forest, and creek areas to teach ecology, biodiversity, and water quality. Elementary students measure, graph, and evaluate waste and consumption; learn about water cycles, from rivers and oceans through how water treatment plants function; and analyze oil spills and their effects. Junior high students take part in a yearlong science and social studies exploration of food, from nutrition through sustainability and food security. High school students may study environmental science, green home design, and ecology, and even may enroll in a course in primitive living.

Paideia intentionally incorporates sustainability concepts throughout the curriculum.

An added benefit of the urban agriculture program is how it develops Paideia's students' sense of social responsibility. Students deliver fresh grown produce to local soup kitchens, and work with local schools to help build gardens, even offering composting classes for other schools. They take on leadership roles and explore career opportunities within the field of sustainability. The deep effect of these lessons on students can be seen in the enthusiasm they show in the myriad sustainable activities on campus: Brownies for Batteries, Reuse-A-Shoe, Creek Clean-Ups, and so many more.

At Paideia, a commitment to sustainability is infused in everything, from curriculum to construction to building community. The Paideia community is proud that these values can be seen throughout the campus in structures and land use, but mostly in the students who will shape the future with their passion for caring for this world.

## **City Schools of Decatur, Georgia**

### *Four Square Miles of Sustainability*

According to its stated mission, the City Schools of Decatur (CSD) is committed to providing safe and inviting schools, including a healthy and vibrant learning environment for students and staff. CSD strives to maximize its resources through responsible operational procedures. The district employs best practices in energy savings to limit consumption and expenditures. CSD supports healthy living through

its Farm to School program, scratch cooking, and walk and roll to school events. The CSD curriculum is infused with learning about the local community and the environment.

CSD has implemented a five-year master plan that will bring the district in line with best practices for energy savings and lower impact on the environment. The district serves just over 4,500 children in a four-square-mile area, in buildings ranging from over 100 years old to less than 18 months old. CSD is experiencing rapid growth. CSD no longer uses harsh chemicals and cleaners, having replaced all products with green supplies. The district's new quarterly energy audit process focuses upgrades where they are most needed. The district has brought the Decatur High School and athletic center, constructed in 1952, to an ENERGY STAR Portfolio Manager rating of 76. CSD's water retention and bio retention cells are located under the new athletic field store, and treat over 121,347 cubic feet of runoff. CSD not only replaces trees on construction sites, but replaces total canopy coverage.

Through a private grant, CSD has implemented a one-to-one iPad initiative in grades four through eight. This initiative has helped reduce the need for textbooks across half of the grades served in the district. Not only has this had a significant cost savings, it also dramatically reduces the need to purchase and dispose of textbooks on a yearly basis. In addition, the iPad initiative reduces the need for supplemental and consumable paper materials. In 2013, CSD made a commitment to use reusable lunch trays and silverware. This has resulted in avoidance of disposal of over 500,000 trays annually.

CSD's staff has worked to build community relationships with local farmers and community groups to provide students with healthy lunches that are sourced from the area. Recently, CSD began to contract directly with local farmers to grow food specifically to district farm to school specifications. The district offers either two salad choices or a portable salad bar in every school, and features a local produce item every month. Over the last two years, the CSD nutrition department increased dollars spent on fresh produce by 48 percent, and increased dollars spent on locally grown produce by 99 percent, as compared to the previous five school years. It is important to note that total food costs did not increase significantly over this period. CSD has seen a rise in students making healthy choices at breakfast and lunch, as well as a rise in overall participation in the nutrition program.

All nine schools in the district have edible school gardens, which are used for teaching farm to school lessons and growing produce for taste tests. Over 60 standards-based farm to school lessons were taught to students in classrooms and school gardens through a partnership with the Wylde Center. The CSD school health program provides seven registered nurses and a registered nurse coordinator for the district's eight schools and the Early Childhood Learning Center. Over 50



percent of CSD students walk or ride a bike to school. This reduces the need for buses and cars, and promotes healthy living. CSD also provides students with a robust staff of physical education teachers, and plenty of time outside of the classroom for play and exercise.

The CSD Expeditionary Learning curriculum provides students in grades kindergarten through five an opportunity to participate in interdisciplinary experiential education opportunities. Expeditionary Learning design principles provide all CSD students the framework to develop a direct and respectful relationship with the natural world, and teaches the ideas of recurring cycles and cause and effect. The International Baccalaureate curriculum encourages students in grades six through 12 to investigate issues through research, observation, and experimentation, while working independently and collaboratively. The curriculum supports interdisciplinary learning in all STEM areas, and focuses on students' relationship with the communities and natural world.

The Water Wise symposium is an educational opportunity devised by two district schools for all eighth and ninth grade students enrolled in CSD to explore global water issues surrounding access to potable water through multiple perspectives. For four years in a row, Decatur Farm to School has offered a six-week, paid summer internship to three Decatur High School students. The Decatur Farm to School summer program serves two purposes: to offer students a hands-on opportunity to partner with gardeners, farmers, and chefs in the hard work of cultivating fresh local foods and preparing these foods for consumers; and to encourage students to share their ideas about how to increase meaningful Decatur Farm to School activity with high school-aged students. The selected interns worked at farms, gardens, and local restaurants to experience the entire farm-to-table process.

## **Georgia Institute of Technology, Atlanta, Ga.**

### *A Living, Learning Laboratory for Sustainability*

At Georgia Tech, sustainability principles and practices permeate practically every facet of campus life – from the locally sourced produce in the dining halls, to the Game Day recycling program that minimizes the amount of waste sent to landfills during home football games, to the school's Smart Energy Campus program, which is designed to reduce energy consumption and increase building operational effectiveness. The Georgia Tech community is continually aggregating, analyzing, and evaluating data from various programs and initiatives, and designing new strategies for the future, including plans for a future state of carbon neutrality.



Community members believe it is their role to foster an ecosystem of innovation, collaboration, and creativity – where new knowledge, methods, and technologies are tested, developed, and applied for insights and solutions to critical sustainability challenges.

In 2007, Georgia Tech joined the American College and University Presidents' Climate Commitment (ACUPCC), which requires a university to develop an action plan to achieve climate neutrality and to report progress toward that goal publicly. In keeping with the ACUPCC, Georgia Tech made commitments to reduce energy consumption, expand the use of renewable energy sources, and become carbon neutral by 2050. The institution has made strides toward this goal with greenhouse gas reductions – emissions per every 1000 square feet have been reduced by roughly eight percent since 2011 – despite the challenges of operating world-class research and lab facilities with high energy requirements.

At any given time, there are a multitude of sustainability initiatives underway on the Georgia Tech campus. These efforts unite faculty, staff, and students in a quest to provide solutions to the environmental, ecological, and sustainability challenges of our times. Georgia Tech has made the Princeton Review Green Honor Roll (2014, 2015), Sierra Club Coolest Schools, and has earned an AASHE STARS Gold rating. From 2003 through 2015, Georgia Tech built or renovated 23 projects to LEED Silver-level certification or higher, certifying 2.9 million square feet of space.

Conserving energy through efficient systems, demand management, and alternative solutions are core objectives at Georgia Tech. Major solar power arrays on campus buildings not only generate clean electricity, but provide hands-on opportunities for students and researchers to study working photovoltaic system installations directly. Data from energy utility systems all over campus are collected through the Smart Energy Campus initiative. Data analysis, modeling, and simulation tools are used to help maximize efficiencies, reduce costs, and positively affect energy planning and consumption.

After Georgia Tech fully implemented a green cleaning program, cost savings analyses revealed an annual savings of 84 percent over initial baselines, and a 56 percent reduction of chemical use from 2008 through 2014. Georgia Tech was named *American School & University* magazine's 2015 Grand Award winner in the higher education category for the Annual Green Cleaning Award for schools and universities.

The school offers a variety of robust programs to support the health and wellness of the campus community. For example, staff and faculty have access to a comprehensive benefits package with options to meet their diverse needs, and an assistance program — in place for twenty years — that helps maintain work-life





balance. Students, too, have services that support their physical and mental well-being, including a peer counseling program, and the “G.I.T. FIT” — Georgia Institute of Technology Fitness — program, all of which enable participants to learn lifelong skills and increase their fitness levels through over 80 noncredit classes spanning martial arts to golf to personal training. The overall mission is to provide the Georgia Tech community with opportunities to create or sustain healthy lifestyles.

In January 2016, students began to have the opportunity to focus their time and energy on projects centered on creating sustainable communities. As part of the Quality Enhancement Plan for the years 2016 – 2021, Georgia Tech introduced Serve-Learn-Sustain. This program equips students to address sustainability challenges and community-level needs effectively in their professional and civic lives. Students work to develop ways to help make communities more livable, sustainable, and prosperous. This could include developing services for the underserved, deploying community renewable energy, supporting infrastructure for clean water, or developing local, state, and federal environmental policy.

Already, Georgia Tech has 21 endowed chairs and 23 research centers that include a significant sustainability component or focus. Interdisciplinary research centers, corporate partnerships, the National Science Foundation, and Science in Energy and Environmental Design funding all support major sustainability research. Among the academic undergraduate initiatives that support innovative green policy, research, development, and product design are: the Ray C. Anderson Center for Sustainable Business, the Center for Biologically-Inspired Design, the Joint Laboratory of Ecological Urban Design and Urban Climate Lab, the Center for Organic Photonics and Electronics, the Strategic Energy Institute, and the Center for Quality Growth and Regional Development. These institutions explore solutions for communities in five program areas: air quality and the natural environment; community design and architecture; healthy places; land development and regional governance; and transportation and infrastructure.

The wide range of efforts to promote effective environmental and sustainability education also includes internship programs and campuswide engagement events. The school also has many highly referenced (“h-index”) green chemistry award-winning researchers, as well as numerous accomplished graduate and undergraduate researchers in the area of environmental sustainability. The collaborative research environment at Georgia Tech encourages all members of its campus family to join this culture of innovation.

In short, Georgia Tech and the surrounding community have worked together to form a living, learning laboratory for sustainability.





## Iowa

### **Spalding Park Elementary School, Sioux City, Ia.**

#### *Recycling Leaders with Grand Geothermal*

Spalding Park Elementary, part of the Sioux City Community School District, has 650 students in prekindergarten through fifth grades, 56 percent of whom are eligible for free or reduced priced lunch. Spalding Park is in the process of formally becoming an environmental science specialty school. The school campus sits on approximately 12 acres of land, and includes a school garden and 48 newly planted trees. The school property also abuts a five-acre wooded area owned by the city.

Spalding Park Elementary has proven itself a leader in energy conservation within the Sioux City Community School District. When Spalding Park was built, the most up-to-date technologies were used to maximize energy efficiencies. The school houses a bidirectional cascading central geothermal system. This system has saved the district \$46,583 in electrical costs as well as reduced CO<sub>2</sub> by 671.015 metric tons. While the district as a whole has saved 25 percent on energy costs, Spalding Park Elementary has saved 39 percent. The building uses well field irrigation in areas that are not adjacent to the building. Inside the school building, sensors are used at every handwashing station to conserve water. Forty-eight additional trees were planted in May 2015 not only to reduce water runoff, but also to provide energy efficiency to the heating and cooling of the school building. Spalding Park Elementary has avoided 6,587 kilogallons of irrigation water. The school has an ENERGY STAR rating of 100.

Reducing waste and increasing recycling have been a major goal for Spalding Park Elementary students and staff. The fifth grade student council has been at the forefront of this initiative by collecting paper and cardboard for recycling. Spalding Park has led the district's elementary schools by recycling an average of 750 pounds of paper and cardboard per month. Any hazardous materials are disposed of properly off campus with coordinated efforts by the district's operations and maintenance staff and the recycling centers of Sioux City. The school's food service staff has been invaluable in helping eliminate waste by recycling as much as possible. Spalding Park is in the process of implementing a new compost system for the school gardens.

Spalding Park Elementary was built with a Trane bidirectional cascading central geothermal system. This system controls air flow through the school's ventilation system. Outside air is brought in, filtered, and then dispersed throughout the building. The heating and cooling system works as one unit in monitoring moisture levels in the school. The Spalding Park operations and maintenance department

works closely with Presto X Pest Management in providing the safest solutions in preventing pests on school grounds.

As a Blue Zone designated school, Spalding Park created a walking school bus for students. This occurs on Wednesdays during the spring and fall months. A group of volunteers walk into the community and pick up students at prearranged stops and then walk back to school. This program not only has provided additional exercise for students, but also has eliminated a large number of vehicles entering parking lots. Spalding also promotes several bike to school days for students and staff.

Students receive physical education classes twice weekly for 30 minutes each time, and 40 minutes of daily recess. As a result of a \$40,000 grant in 2012, students have access to a traverse climbing wall, a light wall (promotes hand-eye coordination and cross mid-line activities), exercise bikes, weighted bars, and a railyard system that emphasizes motor learning and motor development. Spalding Park has yoga mats and free weights for staff use. Each day classes begin with five minutes of daily mindfulness, and brain breaks are scattered throughout the day. Employee assistance and counseling provide support to staff, and counseling and mental health therapists provide assistance and guidance to students. Incentives are available for staff members who attend fitness facilities. Spalding Park is currently involved in Live Healthy Iowa, a 10-week program for schools to create teams and set goals regarding health and wellness. Spalding Park students participate in a health cart program that provides each student with a healthy snack every afternoon.

In 2015, Spalding Park received a \$5,000 grant through the Department of Natural Resources to plant trees on school property. The school planted 48 trees in one day, in the process that included all 650 students. Spalding Park has created a school garden where students participate with the help of a master gardener from the Iowa State Extension Office. They also follow a curriculum that teaches students about soil quality, proper moisture for plants, and how to prepare and fight weeds.

Spalding Park teachers provide aerospace lessons, learning the mechanics of gravity and creating their own theories. Fourth and fifth grade students have the opportunity to learn about liftoff and air dynamics. Teachers use NASA education programs to help students learn about energy and space. Spalding Park hosts local presenters to discuss wildlife habitats, recycling efforts, and conservation. Classrooms have been using water to investigate sound production and how to identify patterns. Students observe wind waves and how they are formed. They learn how to write their own hypotheses on wave formation and then create experiments. Spalding Park lies adjacent to city owned property that is approximately five acres of wooded terrain with creeks flowing through, where the school will be building outdoor classrooms. The student council helps plan

incentives for the entire school, coordinates the recycling efforts, and mentors younger grades.

## **Hawkeye Community College, Waterloo, Ia.**

### *Accelerating Hands-On Learning in Green Pathways*

Since 2012, energy efficiency initiatives have decreased Hawkeye Community College's energy costs more than \$100,000 annually, and reduced energy usage by 2,191,536 kilowatt-hours. Energy efficiency initiatives including green construction and renovation have allowed the main campus to build an additional 59,548 square feet of space while maintaining energy usage at below pre-addition levels. The Health and Education Services Center (HESC) and Regional Transportation Center were designed to LEED specifications and feature geothermal heating and cooling and floor-to-ceiling windows. Buildings built or renovated since 2009 are equipped with low-flow water closets, urinals, showerheads, and lavatory faucets to conserve water.

The XLERATOR waste reduction initiative was implemented in 2013 to reduce solid waste streams generated on campus. With grant assistance from the Iowa Department of Natural Resources, Xlerator hand air dryers were purchased and installed. The college has also distributed 135 recycling bins across campus. Funds received from recycling paper, cardboard, plastic, and glass bottles have been used to implement a Go Green Scholarship. Preconsumer waste is picked up for composting. The Scrap and Sell Program generates a revenue stream through the removal of scrap materials from nonreusable items such as copper, motors, ballasts, capacitors, lead acid batteries, servers, and motherboards, as well as lithium ion, nickel-metal hydride, and nickel-cadmium batteries. Recycling efforts have resulted in over 50 tons of waste being diverted each year from landfills, with an estimated annual savings of over \$31,600. Alternative transportation on campus includes using electric carts. Hawkeye provides shuttle bus transportation for accelerated commercial truck driving students.

In 2012, the college became the first educational institution in the Cedar Valley to earn the Blue Zones Worksite designation by instituting healthy choices in the cafeteria and vending machines, an ongoing focus on exercise and weight loss programs, the development of new walking paths that encourage employees to move naturally throughout the day, and making stress reduction information and events available to students. The Health Wellness Fair hosted each fall is attended by over 300 students, and includes 50 area vendors that provide wellness services. Hawkeye has hosted multiple five-kilometer run/walks for the community, with

proceeds benefiting student scholarships and the student emergency fund. In addition to making Iowa-grown fresh fruits and vegetables available in the cafeteria, horticulture students partnered with Iowa State Extension and Blue Zones to develop a community garden for the growing influx of Burmese refugees.

The HESC offers free workout space for students, faculty, and staff. Preventive dental treatments and minor restorative care are offered on campus at minimal cost for students, their families, and the community. Counselors work with students to reduce stress and increase success through assistive social services like emergency financial assistance, and high-quality, low-cost, onsite child care.

Hawkeye offers green pathways ranging from certificates to diplomas to Associate of Applied Science degrees. The two most distinctive programs are Agriculture and Natural Resources, and Sustainable Construction and Design. In 2013, Hawkeye received the National Association of Agricultural Educators Outstanding Postsecondary/Adult Agricultural Education Program Award for its quality of instruction, experiential learning, and collaboration. The college's grounds include a 400-acre working farm, pond areas, Native Demonstration Gardens, and the Cedar Valley Arboretum and Botanic Gardens, all of which provide a hands-on environment for students to put the sustainable practices they are learning into action.

Sustainable projects include the installation of solar panels on one of the farm's barns to power the electricity and lights in the facility, and the installation of a small windmill to power the farm's parking area lights. Students in the Agriculture, Landscape and Turf, Construction Equipment Operation, and Natural Resources Management programs incorporated STEM concepts into their collaborative project to remediate two ponds on campus to allow for better stormwater control, provide cleaner water into the natural waterways, and develop better habitats for aquatic, amphibious, mammalian, and avian species. Sustainable Construction and Design students have been constructing an energy efficient tiny house to gain practical and relevant skills in design, layout, and construction, as well as skill in finishing of energy efficient homes. The house will be approximately 220 square feet of living space, and will include solar panels to help offset electricity costs.

Hawkeye helps students cultivate civic skills by cooperating with city, state, and federal agencies on projects. Natural Resources students have assisted with Iowa Department of Natural Resources initiatives including trumpeter swan roundup efforts, fish sampling and seining, and timber stand improvement projects. Sustainable Construction and Design students have helped install smart thermostats in the community, and helped build a home with Habitat for Humanity. Agriculture students have assisted a university in Haiti in using drip irrigation for their crops, performing soil tests to more accurately use fertilizer sources, and identifying sources of organic fertilizer.



## **Kentucky**

### **Eastern Elementary School, Georgetown, Ky.**

#### *Coordinated Health and Energy Conservation*

At Eastern Elementary School, preserving the environment, wellness of students and staff, and effective environmental education are part of the school's daily curriculum and expectations. At Eastern, where 44 percent of students are eligible for free or reduced price lunch, instructors model healthy, sustainable lifestyles. The teachers incorporate environmental studies into their curriculum throughout the year to improve students' understanding and knowledge of ways humans can positively affect the environment through the community, school, and as individuals.

The school has earned awards for achievements in energy use reduction, including EPA ENERGY STAR recognition for a total of six years. Eastern reduced greenhouse gas emissions by 22 percent over five years, and reduced energy use 28 percent over four years. In addition, the school has nearly halved its water use over those five years. Eastern has had several updates to conserve energy since it was built in 1955. A water system was installed outside of the school that dispenses water to keep the moisture constant around the foundation of the building in order to reduce cracking. A geothermal heating and cooling system was installed during a 1998 renovation to help improve energy usage. LED lighting has been placed throughout the school to decrease energy use.

Eastern's staff makes a conscious effort to conserve energy throughout each day. The staff turns off all computers and monitors before leaving each day, turns off lights and projectors when leaving the classrooms, and keeps light usage at a minimum when school is not in session. An energy team patrols the hallways and reminds staff of ways to save energy, and also checks each classroom to make sure all computers and monitors have been turned off prior to the end of the school day. Four years ago, Eastern created a recycling team in hopes of diminishing the amount of waste the school generated. The team collects recyclable materials on a weekly basis and disposes of them in the recycling dumpster located onsite. The energy and recycling teams have allowed students to show leadership in reducing resource use, preserving the environment, and environmental learning.

Environmental and health education are embedded in the Eastern curriculum. The school partnered with Bluegrass Pride / Green Source to enrich teachers' knowledge of renewable energy, nonrenewable energy, and electricity. Educators invite guest speakers, take field trips, and discuss concepts that teach students how they can conserve. The Kentucky Division of Fish and Wildlife Management teaches fourth grade students conservation once a month, and Scott County 4-H offers students



hands-on demonstrations and experiments. Students also have the option of joining science and running clubs.

An outdoor classroom allows classes in all grade levels an opportunity to learn outdoors. Students, 44 percent of whom are eligible for free or reduced price lunch, identify different leaves, discuss plant life, explore ecosystems, learn about weather, and investigate the different types of energy sources. Instructors find that students better retain the information taught to them outdoors. Teachers use outdoor learning as writing practice to connect science learning with reading curriculum and to explore the science curriculum and standards using a hands-on approach that engages students.

Eastern offers a coordinated school health approach. The physical education teacher, the family resource coordinator, and the school counselor sequence lessons together to teach a variety of health concepts to the students throughout the entire year. The school celebrates Red Ribbon Week to promote staying away from drugs, while the physical education teacher correlates lessons to teach the students how drugs harm their bodies. The intermediate grades participate in Jump Rope for Heart to encourage students to live heart healthy and stay active. The school also has started a monthly Move It Thursday event to inspire students to be active throughout their school day and outside of school. An automated scrubber was purchased for the school that transforms water into a power cleaner to clean the floors so chemicals are no longer used to clean the floors. Eastern participates in the USDA fresh fruits and veggies program, which provides healthy local produce to students.

## **Russell Cave Elementary School, Lexington, Ky.**

### *All Hands on Deck for Energy Reduction and Environmental Lessons*

Russell Cave Elementary School, in Fayette County, Kentucky, has achieved a 45 percent greenhouse reduction and 49 percent energy and water reductions over six years. The 1926 facility was renovated to achieve ENERGY STAR certification. The school participates in Kentucky National Energy Education Development, Kentucky Green and Healthy Schools, and the Recycle Bowl; and has received county energy saver accolades. Ninety-two percent of the students ride the bus to school.

Russell Cave, serving 95 percent free and reduced price lunch-eligible students, created a green team to lead efforts to reduce the school's environmental impact and costs. Students audit energy usage at the beginning of the year, and then plan



and implement various initiatives to improve in areas they identify for growth. Russell Cave has been recycling for several years, and regularly recycles more than it throws away. The school reduced copier usage by purchasing composition notebooks for all students. Fifth grade students launched a digital notebook pilot system for their laptops (currently at a 1:1 ratio) in January 2016, and the pilot has added a grade level each month, with 100 percent participation expected by May 2016.

The green team keeps “thank you” and “oops” Post-It notes on them at all times during the school day within team-issued waist bags. As they travel throughout the school during the day, they can leave a thank you note to classrooms that have left their room and turned off lights and projectors, and closed their door. Alternatively, if they come across a classroom that forgot one of these steps, they can leave an “oops” note for that classroom with a reminder of how to improve. Once a month, the Russell Cave school cafeteria has a low-energy day, on which the cafeteria does not use ovens and other electrical equipment to provide lunch. Instead, they provide sack lunches for students, as well as turning the lights off in the cafeteria.

Russell Cave has a part-time nurse that works with teachers and families to help with student needs. The physical education teacher has formed a student and staff health committee. This team brainstorms and implements healthy activities within the school. They also monitor the health policies that stipulate the amount of activity students receive and the types of food that are offered to them. Activities have included Wellness Wednesday, which allows extra movement breaks in the gym, and presentations by the physical education teacher during the morning news show. Russell Cave has physical activity breaks during staff meetings. Teachers are being trained and given access to GoNoodle.com so they can provide a larger variety of activities, along with a motivational system during daily movement breaks. Students participate in physical education class, health class, and a guidance class for emotional and social well-being. Community partners, like the University of Kentucky College of Dentistry and Student Athletes, offer other health programs.

Russell Cave’s science lab provides environmental lessons to all students throughout the year, and also brings in speakers from community partners such as University of Kentucky’s Center for Applied Energy Research, College of Agriculture, and Bluegrass Greensource. Lessons include water quality and conservation, human impact on the environment, and energy education and sustainability. All students kindergarten through fifth grade are taught lessons about where food comes from by green team members who have completed a course with the College of Agriculture. Fourth grade students complete a semester-long unit on energy and work with scientists from the Center for Applied Energy Research to learn about current green technologies. They then design and build an original product that includes more than one energy source, conserves energy in some way, and fills a



niche in the marketplace. An example of a student-made product is a sports hat with rotating pompoms that uses electrical energy via rechargeable batteries with an energy saving switch.

Russell Cave's outdoor classroom, including a vegetable garden, bird sanctuary, and native plant garden, is used by all grade levels. Students tend to eight raised beds, and grow herbs and vegetables from spring through fall. The food grown is sent home to students' families or donated. Kindergarteners complete a scavenger hunt in this space, looking for ways to meet the basic needs of plants and animals. First graders study the structures of plants using the native flowers. Second grade students learn about the ways native flowers are pollinated by animals, wind, and water. Third graders use this space to observe and compare the life cycles of various organisms. Fourth graders search for evidence of erosion. Fifth graders label the four Earth spheres in the garden and the interactions amongst them.

The school participates in Green Apple Day of Service and makes use of PLT resources. Russell Cave's goal is to educate students to become innovative, creative thinkers that are knowledgeable in energy usage and conservation.

## **Berea College, Berea, Ky.**

### *Environmental Integrity as a Mission and a Communitywide Commitment*

Berea College—a private college in Appalachia founded by ardent abolitionists and radical reformers in 1855—promotes sustainability as part of its mission and as one of the eight Great Commitments codified in 1969, “to encourage in all members of the community a way of life characterized by plain living, pride in labor well done, zest for learning, high personal standards, and concern for the welfare of others.”

At Berea, sustainability refers to the capacity of individuals, communities, and societies to coexist in a manner that maintains social justice, environmental integrity, and economic well-being today and for future generations. Berea College is a leader in reducing ecological footprint, environmental impact, and costs. Berea's campus boasts the first LEED-certified building and LEED-certified historic hotel in Kentucky, as well as the first LEED Platinum Residential Building with Living Building Petal recognition from the Living Futures Institute.

Berea's innovative Ecovillage is an ecologically sustainable residential and learning complex designed to provide housing for student families, childcare for campus children, and a living/labor opportunity for students interested in sustainability. The college is well on its way to becoming a net zero waste institution, with a 70 percent



diversion rate for academic year 2014-2015. In addition, with the launch of the school's car and ride share programs in 2014, Berea College was named a top-ranked car share usage school in the nation.

Efforts to reduce environmental impact and costs extend to reducing greenhouse gas emissions, through steps that, in 2006, eliminated the annual use of about 4,000 pounds of coal, and reduced gas use by 39 percent through a new cutting-edge central plant. As signatories with Second Nature, Berea measures and reports publically on emissions each year. The school draws a percentage of energy use from a mix of solar and hydro power as well as natural gas, and creates carbon offsets through the school's 8,000 acre Forest Stewardship Council-certified forest, and through composting. The campus also has worked to reduce water consumption by installing water efficient toilets, sinks, drinking fountains, and dormitory showers, and by employing water efficient landscaping and other measures. This commitment extends to regional water quality improvement efforts, through local stream clean-up projects. Berea also has extensive reduce-reuse-recycle strategies in place to manage waste production.

The Berea community has invested in efforts to improve health and wellness by funding a full-time director to oversee programs and incentives to reduce obesity, smoking, and stress, and improve physical fitness and nutrition. Over 25 percent of the food served in Berea's dining facilities comes from local and organically sourced purveyors, including much from the school's own 400-acre organic farm. The college's Farm Store offers organic produce, meat, and other locally sourced products to the community; provides discounts to students, faculty, and staff; and accepts the Women, Infants, and Children federal food and nutrition program. The school's health and wellness efforts also include counseling and psychological services, a required general education course that helps all students develop healthy habits for a lifetime, and a focus on family and community involvement – including outreach to the area's kindergarten through 12th grade districts and the nonprofit partner HealthCorps, to teach children, teens, and families to make healthier choices. These efforts are especially important in a region – Central Appalachia and Kentucky – that encompasses some of the nation's communities that struggle the most with poor health and related challenges.

When it comes to effective environmental and sustainability education, the school offers comprehensive and creative options. For instance, Berea is one of seven "work colleges" in the U.S., which means that in exchange for free tuition, students (who must be economically disadvantaged) are required to work on campus 10-15 hours per week. This provides a unique opportunity to address environmental and sustainability education both through hands-on work experience and academic programs like Sustainability and Environmental Studies and Agriculture and Natural Resources. Students have the opportunity to work as waste diversion coordinators,





sustainable foods coordinators, and alternative transportation coordinators. The Ecovillage also employs students as gardeners, community outreach coordinators, and childcare workers.

Berea College encourages students to become engaged citizens and good stewards of the land. The Center for Excellence in Learning through Service enables students to volunteer in local nonprofit organizations and schools to solve real-world sustainability problems through actions at the household and community level. Berea also has organized many student protests and marches to raise awareness of the dangerous effects of mountaintop removal—a radical form of strip mining that levels mountains, destroys natural habitats, and pollutes streams—as well as clear-cutting and other unsustainable practices.

Academic opportunities at Berea include programs that integrate sustainability studies with STEM coursework, encourage the development of civic engagement knowledge and skills, and employ interdisciplinary learning, as exemplified by the Sustainability and Environmental Studies (SENS) program. SENS is an interdisciplinary academic program offering both majors and minors that are centered on ecological design – the purposeful integration of human actions with the structures and functions of the natural world. SENS courses emphasize experiential learning and work in close collaboration with other hands-on programs including Agriculture and Natural Resources, Technology and Industrial Arts, Business, and Computer Science.

Additional offerings that provide sustainable interdisciplinary learning include the Agriculture and Natural Resources program and the Technology and Applied Design major – a curriculum that engages students in research, design, and production while emphasizing sustainable practices. Students can select from three concentrations: Technology Management, Artisan Studies, and Engineering and Technology Education.

A dedicated Office of Sustainability helps organize and implement many of the sustainability programs and projects around campus. The Loyal Jones Appalachian Center at Berea College blends scholarship, academics, outreach, and action focused on the needs and assets of this unique region.

The story of sustainability at Berea College is one of creativity and commitment, as well as grassroots organizing and institutional innovation. It is the story of dedicated students, faculty, staff, and administration—literally, the entire campus community—striving to embody sustainability and environmental practices in word, deed, and thought.





## **Louisiana**

### **Westdale Heights Academic Magnet, Baton Rouge, La.**

*Caring for Wild Babies Now, Developing Stewards of the Coast of the Future*

Westdale Heights Academic Magnet (WHAM) is located in the East Baton Rouge Parish School System, which is the second largest public school system in Louisiana. It is a dedicated academic magnet school focusing on environmental science, math, and technology that attracts students from all over the parish using a lottery system. This urban elementary school instructs 450 students, prekindergarten through fifth grade. Ninety-six percent of the parish is eligible for free and reduced price lunch, so, two years ago, the school board started a program to provide free breakfast and lunch for all students. Before this whole-district certification, WHAM had approximately 52 percent of its students qualifying for free and reduced price lunch, and was a *Title I* school. The students come from diverse racial and ethnic backgrounds, and many are children of scientists and professors at Louisiana State University (LSU).

WHAM maintains a close relationship with LSU School of Veterinary Medicine; the Agricultural Center and their Smart Bodies program; and the Coastal Roots program, which has had students planting native tree seedlings in three restoration area. The school also participated in planning and teaching for the LSU Ocean Commotion Day, where students from both public and private schools learned about Louisiana wildlife and rehabilitation. Parents who are scientists at the nearby university help with field study, or come to WHAM to guest teach, bringing their university students along. Through the years, engineers, chemists, biologists, astrophysicists, soil scientists, and oceanographers have taught WHAM students. WHAM participates in two citizen science projects: the Cornell Lab Project Feeder Watch and the Monarch Watch butterfly tagging program.

WHAM students generated funds for Steve Irwin's International Wildlife Warriors, which buys land for wild animals around the world to live and prosper, especially tigers. Students have generated over \$7,000 since 2011 to support local wildlife rehabilitation. The nationally recognized Metamorphosis Children's Garden, begun in 2000, has expanded to two additional garden areas in first grade and kindergarten. School gardens are certified as a Monarch Watch Waystation, a NWF Wildlife Habitat, and NWF Bird Habitat. Under the careful supervision of a local professional farmer, students also grow fruits and vegetables, which they enjoy in the classroom and share with teachers and parents,. Fruit and vegetable waste is fed to science lab pets or composted.



Students construct Garbage Pizzas, that is, pie graphs of the contents of landfills, and participate in a Geaux Green team and two annual STEAM nights. A partnership with a local wildlife rehabilitation center developed as a result of students continually bringing in orphaned animals, overwhelming the science specialist. She turned to a community wildlife rehabilitator, who began working with the students to offer hands-on learning, observation, and stewardship. Students have seen beavers, opossums, skunks, armadillos, squirrels, raccoons, and turtles. The local rehabilitator teaches students to be keen observers of the adaptations and physical features of each animal.

Although its facility dates to 1959, WHAM is focused on green operations and behaviors. The school community began recycling paper and other materials in 2007, filling five large recycling bins weekly. The school conserves electricity by turning off fluorescent lights on sunny days and when leaving the classroom. Most rooms have lights and computers that automatically turn off with no activity. There are new bathrooms with automatic hand basins. No single-use plastic water bottles are allowed on campus. Children bring their own reusable bottles from home and refill with tap water. Materials used to clean and disinfect the school are all approved by OSHA, and are kept in locked closets. Buses and carpool drivers do not idle while waiting for students, and wait in a separate area of campus. Over five years, WHAM has reduced energy consumption by 27 percent and water consumption by 67 percent.

At WHAM, the students' health and wellness comes first. The school uses organic and sustainable farming practices in all of the gardens, using only safe natural pest control methods, like neem oil, diatomaceous earth, and only when absolutely necessary. The school nurse provides teachers with strategies to support students and ensure their safety and well-being. She offers professional development on the use of epi-pens and hand washing at staff and faculty meetings. Students learn about their organ systems and how different foods affect their systems positively or negatively through the science-based, evidence-based, and child-friendly OrganWise Core Curriculum, in which the OrganWise Guys puppets, Organ Annie and Organ Andy, offer fun, entertaining, hands-on human physiology instruction. Students receive a whopping 240 minutes weekly combined physical education and recess time outdoors, and participate in Brain Breaks, Girls on the Run, Jump Rope for Heart, and the Louisiana Kids Marathon. One teacher also conducts evening adult fitness classes for parents and faculty.



## **Baton Rouge Magnet High School, Baton Rouge, La.**

### *Educating Younger Peers with Help from The Lorax*

Baton Rouge Magnet High School (BRMHS) is a kindergarten through 12th grade public school that continually strives to maintain a healthy and sustainable environment for faculty and students, 43 percent of whom are eligible for reduced price lunch. Recent renovations to the 90-year-old building have improved both energy use and water consumption substantially. The Health Centers in Schools initiative, combined with the school's extracurricular clubs, provides students with services and experiences to keep them healthy and well. All of these efforts allow students to have the best possible experiences during their academic career.

The original building was constructed in 1926, and is listed on the National Register of Historic Places. The campus grounds are home to more than 25 live oak trees, which are over 75 years old. The building underwent renovations and reopened to students in 2012-2013, and is now 360,000 square feet. The new renovations allowed for the installation of several types of energy- and water-saving pieces of equipment, leading to a 60 percent reduction in energy use over three years, and a 70 percent water reduction over 12 years. These results earned the school the Professional Grounds Management Society Green Star Merit Award in 2015. Additional design elements such as automated lighting, double-paned windows, and the use of skylights also have contributed to energy usage reduction. A survey conducted to assess student transportation use revealed that roughly 76 percent of students use public transportation (school or city bus) or carpool to school daily. Another innovation came about because the school district does not have a program in place for recycling. Students in the Environmental Science Club assumed the responsibility of coordinating a schoolwide effort.

BRMHS makes every effort to ensure the environmental health and safety of students and staff. The building is equipped with a high-efficiency air filtration system to improve indoor air quality. The science department uses small scale lab practices that help reduce chemical use and waste, and any chemicals are handled and stored in a secure room designated for this purpose. Handling, storage, and disposal procedures follow EPA and Occupational Safety and Health Administration standards.

Specialized staff is available to meet students' physical and mental health needs. BRMHS has a full-time nurse on staff who coordinates hearing and vision checks, the administration of flu vaccinations, and serves as a sponsor for the Healthy Lifestyles club. All four guidance counselors hold graduate degrees, and one is a

licensed clinical therapist. The school's ICare Program provides additional services once a week, which include one-on-one counseling, classroom instruction on alcohol and drug abuse, and education on suicide prevention.

BRMHS offers several curricular and extracurricular programs that are designed to encourage students to make healthy choices and become actively engaged in the community. The Healthy Lifestyles Club has made great progress in bringing many health issues like healthy eating habits and stress reduction to the attention of BRMHS students and faculty. The club coordinates a wellness event to help reduce stress during spring testing, and also offers healthier snack options, such as fresh fruit smoothies, for students who remain on campus after regular school hours for extracurricular activities. SADD (Students Against Destructive Decisions) coordinates several fun and engaging events throughout the year that inform and encourage students to make good decisions about drugs, smoking, driving, and suicide.

The BRMHS athletic department offers the traditional physical and health education courses along with specialized classes for athletes, in which over 63 percent of students are enrolled. All students in Louisiana's East Baton Rouge Parish are provided with a breakfast and lunch at no cost. These meals are planned according to USDA guidelines, and factor in student preferences for healthy food items in order to encourage students to eat school meals. BRMHS is piloting the use of vending machines containing salads, sandwiches, and yogurt parfait (also at no cost to students) to offer more healthy choices in addition to the school cafeteria's hot meal option.

Over the last six years, BRMHS has seen exponential growth in environmental studies. From a humble beginning of just two sections of Environmental Science, the program has expanded to five sections of Environmental Science and three sections of AP Environmental Science. BRMHS now teaches 200 students Environmental Science every year. Students consistently score higher than average on the AP exam. Each year, students from the AP Environmental Science class visit a nearby elementary school to read *The Lorax* to first grade students and provide a hands-on lesson on sustainability. Environmental science teachers present best practices in environmental education at the North American Association for Environmental Education conference.

Students enrolled in environmental courses are required to design and implement a service learning project. Projects cover a variety of topics including litter cleanup, recycling, repurposing, animal welfare, working with the local food bank, proposing new bike lanes, church gardens, educational activities with elementary school after school programs, and painting urban murals. BRMHS students have participated in the Louisiana Earth Day Festival, a statewide celebration with nearly 40,000 visitors





since 2010. The Environmental Science Club placed first twice in the Exxon-Mobil Science Challenge held at the festival, and volunteered for environmental and cultural demonstrations and hands-on activities with the public.

BRMHS is a performing arts magnet school that offers a plethora of opportunities for collaboration. The arts are integrated into the core courses through multi-disciplinary lessons and activities. For example, students produced public service announcements after a unit on ecology to promote awareness about Louisiana's coastal land loss. Videos about National Estuaries Week were shared during the morning announcement period. Environmental Science teachers often collaborate with AP Human Geography teachers to address content such as human population issues. Students participate in several environmentally focused competitions, including Envirothon, Lexus Eco-Challenge, Samsung Solve for Tomorrow, Science Olympiad, the science fair, and the DECA Design Challenge. The BRMHS Drafting and Design Architecture course incorporates projects that focus on current environmental engineering issues (e.g., Solar Car Challenge, Strand Beast Design).

## **Benjamin Franklin High School, New Orleans, La.**

### *Green Society Shines a Sustainable Light on School and Community*

Benjamin Franklin High School was founded in 1957 as a citywide public coeducational college preparatory day school for students of exceptional intellectual potential. The school community believes teacher and staff are at their best when they are facilitating learning rather than dictating it. In August of 2005, Benjamin Franklin High School was seriously affected by Hurricane Katrina. Upon reopening in January of 2006, the priorities of students and staff shifted. The school's active Green Society, which previously had been focused on a multitude of ethical and environmental issues, began to narrow its focus toward rebuilding a school community that was healthier, more sustainable, and environmentally focused.

Benjamin Franklin High School is devoted to creating a sustainable facility, and thus saving money. In 2014, students who partnered with an electrical engineer to conduct an energy audit discovered that it would be environmentally and financially beneficial to use high-efficiency bulbs. They created a lighting facilities phasing plan that they presented to Franklin officials. Benjamin Franklin High School receives sustainable facilities gifts, such as dual-flush toilets, windows that transition their tint according to the temperature and amount of light outside via solar-powered electric technology, and water bottle refilling stations, all of which have saved money, energy, and water.





The diversity garden and vegetable garden are important parts of biodiversity on campus. Managed by Benjamin Franklin students and teachers, the gardens provide cafeteria-approved food and are used as outdoor classrooms. Benjamin Franklin High School has worked to expand what was initially a limited white paper recycling program. What started as a volunteer-based, labor-intensive operation transformed into a partnership with Progressive Recycling, which now averages 69.28 cubic yards of varied recyclable material per year. Students, faculty, and staff practice and promote alternative means of transportation. Students and staff organize carpools, bike, walk, and ride public transportation.

Prioritizing the health and well-being of the Benjamin Franklin High School community is central to the school's mission. New investments in technologies that improve indoor air quality demonstrate the comprehensive approach taken to create an exceptional learning environment. Decisions regarding pest management and chemical storage are approached from a wellness perspective. Although it is not possible to renovate the entire school building immediately, small-scale renovations use safer products like low-VOC (volatile organic compound) paint.

Seasonally, on-campus gardens provide healthy options in the cafeteria and learning options year-round. Vending machines offering organic and less-processed food options were recently added to the cafeteria. Within the rigorous academic environment, Benjamin Franklin High School students and staff have created a multitude of mechanisms and safeguards designed to support the mental health of students. Clubs and organizations support groups of students who traditionally are marginalized. Students design initiatives to help others express themselves in a supportive environment. Benjamin Franklin High School employs a full-time team of accredited counselors, including a social worker, to provide extra support when needed.

The Benjamin Franklin High School population believes community and school engagement are important factors in sustainability efforts. The school also recognizes the importance of encouraging a green mindset in each student, Green Society member or not. Among the most important steps taken to incorporate environmental and sustainability education at the school have been: Earth Love Week, a weeklong recycling drive and celebration of all things green; independent research projects (including an environmental science project requirement for graduation); and Service Saturdays, in which students tend to the gardens and hold recycling drives. The AP Environmental Science classes for juniors and seniors are extremely popular, as students in this course take a marsh restoration field trip for the purpose of educating students on the importance of ecological preservation.

In addition, students work to assist the community in environmental efforts. Green Society members work with Green Light New Orleans, a nonprofit focused on



teaching sustainability and offsetting the human carbon footprint, to provide New Orleans residents with free energy-efficient light bulbs. The school recently implemented two Community Recycling Days per semester, providing New Orleans locals with the opportunity to recycle items like glass, batteries, and electronics through the school. In addition to their other tasks around the school and gardens, Green Society members stay busy volunteering with Animal Rescue New Orleans and participating in an annual beach sweep.

Benjamin Franklin High School's approach to conservation and sustainability is in keeping with the overall school culture. Curriculum, extracurricular activities, and community engagement all are student-centered.

## **University of Louisiana at Lafayette, Lafayette, La.**

### *BeauSoleil Home Lights Up Campuswide Sustainability Movement*

The University of Louisiana at Lafayette (ULL) has been committed to the stewardship of its natural environment since its founding. This long-standing environmental ethic supports the university's mission to explore solutions to national and world issues through instruction, research, service, and exemplary leadership. In 2009, ULL competed in the U.S. Department of Energy's Solar Decathlon. ULL's entry—the BeauSoleil Louisiana Solar Home, a hybrid structure that combines Louisiana culture and lifestyle with modern sustainable technology—took first place in the People's Choice and Market Viability division.

Following the momentum from this recognition, students across campus formed a grassroots movement to implement a campus recycling program in 2010. At the start of 2014, the university's first director of sustainability was hired, and in fall 2014, the President's Council on Sustainability developed the university's first Comprehensive Sustainability Policy. Buildings, grounds, and infrastructure are designed, constructed, operated, and maintained to meet resource conservation regulatory requirements and work toward ecological neutrality. The new LEED Silver Student Union has set the standard for all future construction on campus. Ongoing scheduled maintenance and renovation optimizes older buildings on campus by replacing windows, lighting, and HVAC equipment with more energy-efficient options, installing occupancy sensors, and adding insulation. In 2006, the university began a campuswide condensed work week by closing at 12:30 p.m. every Friday, which led to saving several hundred thousand dollars annually.

University food services are operated in an environmentally responsible manner that reduces food waste and disposable food-serving dishes and utensils. Locally



produced or sustainably harvested products are used whenever feasible. The university introduced Geaux Vélo Bikeshare at the end of January 2016, an automated system that began with 52 bikes at three locations on campus. This dedication to improving the biking culture on campus and around the community earned the university a Bronze Bike Friendly University designation by The League of American Bicyclists—the first university in Louisiana to receive this honor.

Following a 2014 waste audit, the university restructured the waste and recycling systems and developed short-term and long-term goals to drastically reduce solid waste production—first through reduction, then through reuse, and finally through the Geaux R.E.D. recycling program. The university has reduced its landfill waste drastically, and found innovative ways to serve the community while protecting the environment. Students for Sustainability participates in the Food Recovery Network, delivering perishable foods that otherwise would go to waste to those in need.

For seven straight years, ULL has been designated a Tree Campus USA by the National Arbor Day Foundation. In 2015, the university formalized the Campus Forest Management Policy to guide campus design and construction and maintain a zero net loss of trees through preservation and mitigation practices. The grounds staff focuses on reducing the need for landscape water use by planting native landscaping that is drought resistant, and by keeping a heavy layer of mulch on all landscaped beds and around trees. The majority of student housing is equipped with low-flow showerheads and toilets.

From competition-oriented intramural and club sports, to organized paddle and biking trips organized by the Office of Sustainability, students, faculty, and staff have a variety of options to stay active and get involved. The university's beautiful campus benefits from a master plan that prioritizes walkability and a variety of green spaces, while the Campus Forest Management Plan and central Cypress Lake ensure the protection of some of the most-loved natural resources on campus. ULL was profiled in National Wildlife Federation publication *The Campus Wild*, which features postsecondary institutions that are protecting wildlife and restoring habitats. Midweek farmers' markets and a growing variety of healthy, vegan/vegetarian, and local menu options from the campus dining services ensure that students, faculty, and staff have access to proper nutrition that also affects the environment less than many other options.

Many of the favorite campus traditions tie community and sustainability together. The annual Earth Day event, Fête de la Terre, has expanded to a weeklong celebration to include more community partners like local farmers and bayou preservationists. During The Big Event, the school's annual service day, the university has mobilized some 1,000 students to collect litter in and around the city and parish. For Plan Lafayette week, the university facilitated several presentations

and workshops that focused on Smart Growth and better urban transportation planning. Finally, the Office of Sustainability and the Dean of Community Service work with the Office of Orientation to organize one day of service during an event called SOUL Camp. Students work on various projects throughout the community, such as picking up litter, planting tree seedlings, beautifying public parks, and scouting out new locations for bike racks on campus.

The College of Engineering educates new leaders to change the world. Energy is a major research and development focus area, with interests ranging from petroleum resource development to alternative energy process optimization. The interdisciplinary Energy Institute is an internationally recognized comprehensive research unit for energy development, usage, policy, and impact on the ecological and human condition. Examples of cutting-edge research projects include bio-diesels from algae, green chemicals, new reflector materials for solar thermal power production, and waste gas recycling. The school also is home to a Building Design Institute, along with a Coastal Community Resilience Studio, which addresses the complexities of restoration along the coast.

## **Maryland**

### **Sligo Middle School, Silver Spring, Md.**

#### *Stewards of the Creek*

Sligo Middle School (Sligo) enrolls a diverse student body, and approximately 45 percent of its 623 students receive free and reduced price meals. Sligo shares its name with Sligo Creek, which runs adjacent to the school, not far from downtown Silver Spring. The Sligo Creek watershed is part of the Anacostia Watershed, which is a target area for improvement of water quality by the Montgomery County Department of the Environment. Sligo students are actively involved in improving the state of Sligo Creek and its watershed.

When the Sligo community began its sustainability journey three years ago, teachers left lights and Promethean Boards on, and recycling bins were not labeled correctly. The School Energy and Recycling Team students organized a plan to collect recycling materials weekly and place those materials in the correct receptacles, visit classrooms to turn off lights and computers, and reform the recycling practices of staff and students.

Sligo also sought out internal and external partners that could help offer more outdoor environmental education experiences for students, especially those that would foster the health of the local watershed, including the Tower Companies, Montgomery County Department of Environmental Protection, and the Audubon





Naturalist Society – GreenKids Program. Sligo’s partnership with the Audubon Naturalist Society includes Enviroscape lessons, water quality testing, litter collection, and a compost experiment.

During the second year of this work, the school refocused its efforts on connecting all students to Sligo Creek watershed. Among those initiatives, all eighth grade students were able to conduct stream quality testing of Sligo Creek, and an outdoor classroom with gardens in the courtyard was built. The sixth grade teachers invested many professional development hours in the Trout in the Classroom program, and brought this project-based learning opportunity to all students. These efforts culminated in Sligo’s certification as a Maryland Green School in May 2015.

The district’s Environmental Literacy Plan ensures that environmental and sustainability education occurs as a series of learning progressions from kindergarten through grade 12.

In sixth grade, students investigate ecological and sustainability concepts in their project-based units on habitats, going green, and alternative energy. Also in grade six, students participate in three days of outdoor environmental education at a residential site. There, they investigate the answer to the question: How do humans impact the environment? In grade seven, students study hydroponics and its use in modern agriculture. Adaptation and natural selection are big concepts in two of the grade seven units. In grade eight, students gain a better understanding of systems that underlie the interdependence of the living and nonliving environment in a unit on earth materials and processes.

Sligo was awarded a STEAM grant in late 2014 that has provided additional opportunities for students to collaborate in teams, and incorporate the 21st-century skills and competencies they need to learn about and help support the environment (focus areas: creativity, innovation, critical thinking, problem solving, community and team work). Elements of the program include outdoor adventure, artistic creation, scientific exploration, and the process of meaningful multimedia communications; all are integrated through a project-based learning approach.

In the culmination of a yearlong effort by 30 students, Sligo students and teachers hosted the “S”TEAM Sligo Community Day Festival, an event to bring together staff, students, and the community to learn more about the outdoor environment surrounding the school. The event was a huge success, with local press coverage and participation from members of Montgomery County’s Council and Board of Education. The work of these Sligo students had a far-reaching effect, encouraging students, staff, and the community as a whole to care about the environment, and inspiring other educators to provide similar experiences for their students.





Sligo has an outdoor classroom that is used often by students and teachers for classes as well as stewardship activities. It includes a pond, vegetable gardens, a butterfly garden, and a RainScapes garden. As students grow food in gardens at school, they learn concepts such as nutrition, science, and horticulture, along with the interdependency of living things, as they discover the pollinators, the herbivores who come to eat the food, and the predators who eat them. Students eat food from the garden, including kale, collard greens, Swiss chard, and cabbage. Sligo hosts a salad party where students bring various salads to school to share and teach about the nutritional value of each.

## **Broadneck High School, Annapolis, Md.**

### *Signature Sustainability Education on the Bay*

Since 1982, Broadneck High School (BHS) has been an environmentally oriented institution with students and staff participating in civic-minded, bay-focused restoration projects. These early efforts set the tone for the high school. Over the past 30 years, students have led efforts to plant bay grasses, design and implement rain gardens, and develop and plant stormwater restoration projects. In Anne Arundel County Public Schools, each of the high schools has a signature program that serves as a theme around which 21st-century skills are built into curricula, job shadowing, mentoring, co-curricular clubs, and internships. The school's signature program of environmental literacy was chosen in 2010, and is structured to represent the school and its surrounding community. The signature program is designed to reach all students through co-curricular activities such as clubs, guest speakers, and field trips.

AP Environmental Science students conduct annual stream studies of a retention pond on school property over a 10-year time period. Fourteen percent of students took AP Environmental Science, with 60 percent of these earning a three or higher on the AP exam. Over 88 percent of all BHS students passed the Biology High School Assessment (a Maryland graduation requirement), demonstrating a very high schoolwide understanding of environmental literacy standards.

While these specific environmental courses exist, all students are afforded the opportunity to engage in environmental literacy through signature overlays, a means of refocusing existing content so that it can be taught through the lens of environmental literacy. For example, 3D art students research endangered species within the state of Maryland and construct sculptures out of repurposed materials. AP Government students study media literacy and compare the two sides to the hydraulic fracturing argument through media articles. Honors English students



create an environmental children's book on endangered species. Botany classes work with plants in the BHS greenhouse. In Child Development courses, students explore risks to children's health that can stem from human activities, products, and technology found in childcare facilities. U.S. History students examine how local government addresses the effect of urban sprawl on the Chesapeake Bay. Students also reflect on then-President Carter's legendary 1977 speech on energy, and write reflections on its effect on policy today. In English courses, students examine the environmental impact of the Dust Bowl on American history through literature, and research a current environmental issue to discuss how this issue might have future implications. Foundations of Technology students construct wind turbines and examine alternative energy sources.

Students recognized the challenge of recycling, and collaborated with operations staff, custodial staff, and faculty to implement a successful schoolwide program. A recycling club formed in 2014 to assess the needs of the school has evolved into a student-managed recycling program. Student announcements remind teachers to place recycling bins in the hall, and recycling rates have increased. In 2015, district operations tasked BHS students with a cafeteria recycling challenge, and purchased new bins to facilitate a behavioral change. Students modified the design of the bin to better suit the needs of the school, and guest speakers provide education on recycling. From 2007 to 2010, the BHS art department participated in the Rethink Recycling sculpture contest, winning first place in 2009. Since 2011, art students have been successful in Anne Arundel County's Recycled Runway Fashion Show, winning numerous awards. The school engages in walking field trips to reduce transportation use and keep students active.

The Environmental Literacy Explorations course partnered with the Baltimore Gas and Electric company to develop a student-led energy audit. This initiative evolved into a districtwide energy challenge among high schools during times when schools are on extended break. BHS was one of the top three energy savers during spring break 2015, and won first place during the 2015 Thanksgiving challenge. Environmental Literacy Explorations students also participated in the 2014 Power Savers Energy Challenge. The Environmental Club petitioned the district Board of Education to request the remote shut-off of computers overnight and on weekends, an initiative that would save \$500 per day. The Chief Operating Officer agreed to impose automatic shutoff when students are not in a standardized testing window.

Healthy food choices are encouraged through cafeteria initiatives, the Family and Consumer Science curriculum, and organic food labs in Environmental Literacy Explorations. In 2015, the school's Green Team began an organic vegetable garden in the school's courtyard. Bread, milk, and a good deal of produce are sourced locally. The physical education department is committed to engaging students in outside physical education with courses such as Walking for Wellness and Lifetime



Sports, the latter of which offers a unit in fly fishing during which students are able to visit a local waterway to practice. Students can take unlimited fruits and vegetables with their lunches.

BHS partners with the local Watershed Stewards and the Alliance for the Chesapeake Bay to support Project Clean Stream at Cat Branch Creek, which is adjacent to school grounds. Students are encouraged to participate as part of their service learning. BHS Environmental Club hosts a Community Environmental Services Day where community members bring electronic waste, batteries, and paint for proper disposal. Students have participated in a stewardship program teaching bay issues to *Title I* elementary students within the city of Annapolis.

A stream restoration grant partnered BHS with another high school to plant nearly 1,000 trees in both school zones. Eight students were chosen from BHS to act as leaders on this project. These students learned the essentials of successful tree planting, geographical information system mapping, and teaching stewardship principles to younger students. A partnership with Trout Unlimited allows students to raise rainbow trout in their classroom. Students attend a field trip to the University of Maryland Sustainability Department to learn about new degree programs in the sustainability field.

BHS initially certified as a Maryland Green School in 2008 and is completing its recertification. BHS has a longstanding commitment to educating students on how to become environmentally responsible through a variety of programs, opportunities, and curricular content.

## **Anne Arundel County Public Schools, Maryland**

### *Sustainability by Committee Results in Environmental Literacy*

In 2013, Anne Arundel County Public Schools (AACPS) adopted a sustainability policy that put in place a committee to facilitate the development and implementation of sustainability practices and policies. Chaired by the director of facilities and the coordinator of environmental literacy and outdoor education, the sustainability committee connects the business side of the school system with the instructional side. The committee consists of members from purchasing, finance, technology, food service, human resources, transportation, operations, maintenance, design and construction, logistics, curriculum and instruction, principals, and educators.

Support for Maryland Green School certification is a collaborative effort of instruction and facilities. With a goal to have 100 percent of AACPS schools certified, resource



staff provides technical, instructional, and programmatic support. AACPS schools also participate in Eco-Schools USA, and one school was among the inaugural cohort of ED-GRS.

All new construction meets the state's minimum of LEED silver certification. Solar and geothermal are employed, and the district's Energy Conservation Office began benchmarking all facilities in ENERGY STAR Portfolio Manager in 2012. The district also makes use of lighting retrofit projects and school-based competitions, and participates in the U.S. Department of Energy Better Buildings Challenge.

Food and Nutrition Services has developed a video series highlighting local farmers from which the school system purchases fruits and vegetables, as part of their Taste of the Rainbow Program to encourage students to try different fruits and vegetables. All students may take unlimited fruits and vegetables. AACPS' integrated pest management plan was recognized as the fourth school system in the nation to be IPM STAR Certified beginning in 2004 by the IPM Institute of North America. The district also supports such activities as Girls on the Run, Heroes, Mighty Milers, Marathon Kids, and BillionMile Club.

Every grade level has an environmental literacy unit, and has students engaged in outdoor learning, issues investigation, and environmental action, including at the district's Arlington Echo Outdoor Education Center. All 12 high schools offer AP Environmental Science; the STEM magnet high school offers a green technology option; and, in the biomedical program, students are developing a vertical garden. Through the Terrapin Connections program, students in 80 classrooms raise terrapins. Many schools make use of programs offered by nonprofit organizations, such as horseshoe crab raise and release, the Maryland amphibian and reptile atlas, Trout in the Classroom, and other citizen science monitoring programs. The Environmental Literacy and Outdoor Education Office offers yearlong and semester internships for students on topics including submerged aquatic vegetation mapping, wildlife camera trap monitoring, native bee surveys, environmentally themed mural design, and phytoplankton monitoring.

Partnerships play an important role in the implementation and facilitation of sustainability practices in AACPS. The Wellness Council supports sustainability practices through the construction of a wellness toolkit based on CDC's Coordinated School Health model for principals and schools. The local department of public works and AACPS's Facilities Division work together to support the restoration of streams and rivers throughout the county. Nonprofits play a significant role in supporting the environmental literacy curriculum implementation. Chesapeake Bay Foundation, Chesapeake Bay Trust, and the Annapolis Maritime Museum provide environmental programming, grants, and professional development for teachers.



Over the past five years Anne Arundel County Public Schools have received over \$1,000,000 to support environmental literacy and green school efforts.

Anne Arundel County Public Schools continues to strengthen its commitment and resources for building a sustainable community. For a large school district implementation of environmental practices can seem daunting; Anne Arundel County Public Schools has taken on that challenge.

## **Massachusetts**

### **Littleton Public Schools, Mass.**

#### *From Energy Management to Sustainability Across the Curriculum*

The Littleton Public School District (LPS) has been working diligently to reduce energy consumption and to educate students and staff about the benefits of living a sustainable lifestyle. In June of 2008, the school committee of LPS adopted an energy management and conservation policy. To facilitate and implement an energy management and conservation program, the school committee entered into a four year contract with Cenergistic, of Dallas. The foundation of the work began with the tracking of all usage through EnergyCAP software. The town of Littleton also was designated as a Massachusetts Green Community, a program to recognize and finance energy efficiency and renewable energy projects, such as reducing energy in municipal and school buildings or establishing power purchase agreements. The Littleton Public School District works closely with the Littleton Sustainability Committee to research and implement sustainability projects.

To help promote energy conservation, the school community has become an ENERGY STAR Partner, and hired a district energy manager almost a decade ago. As a result of the district's efforts over the past seven years, LPS has reduced electricity and natural gas usage dramatically. The district estimates a total reduction of 6,403 metric tons of CO<sub>2</sub>. The estimated cost savings is \$1,521,601, a 35 percent cost avoidance. LPS staff has been instrumental in reducing energy through their conservation behaviors, removal of classroom appliances, and use of online documents. Students now have assumed the lead role in the district's conservation efforts, as green teams at the middle and high school levels assess LPS energy usage, look for opportunities to eliminate waste, and plan and implement energy savings initiatives.

LPS incorporates opportunities for students to learn about the environment and the importance of resource conservation at every grade level. An engineering club has installed insulated thermostats in the high school; middle and high school students weigh solid waste and determine the rate of reduction that has resulted from the





recycling and composting as part of a mathematics lessons; students create a wiki post on their ecological footprint and connect it to international issues, such as deforestation in the Amazon; and a fourth-grade unit on water culminates in a class trip to the watershed and the electric and water department.

At the after school program, Tigers' Den, elementary students learn how to make compost; and plant, maintain, and reap the harvest of their garden. Middle school students learn about Heifer International and its environmental work, and then take a field trip to Overlook Farm. Littleton High School students can elect to take Environmental Science, but all students receive environmental education across the curriculum. In Graphic Arts, students design an ad campaign in which they address environmental conservation. The history curriculum includes lessons on the near-extinction of the buffalo, environmental concerns worldwide, and the development of the Environmental Movement post-World War II. Creative Writing's reading list includes *Into the Wild*, and English classes include nonfiction articles related to environmental concerns such as Jennifer Price's "The Plastic Pink Flamingo: A Natural History." The French III textbook includes a unit on environmentalism that includes informational readings on French programs to reduce waste and clean up the environment.

Both middle and high schools have established green teams that offer student learning opportunities through schoolwide gardening and composting programs. Cafeteria workers collect waste from food preparation, and students take the waste to the composting bins located at the middle and high schools. Students researched and are working on projects to reduce or eliminate idling at school, and are reducing plastic water bottle consumption by instituting a reusable water bottle program and installing a water bottle refilling station. Middle and high school green teams are working with the school's National Honors Society chapter to establish green teams at both of the district's elementary schools, Shaker Lane and Russell Street.

Students and staff have a wide range of opportunities to engage in healthy living, including healthy dietary options offered at school cafeterias, and athletic opportunities offered to students at every grade level and to school staff as well. Over the past year, Littleton High School has expanded its health and wellness offerings to include a yoga class. School lunches offer a salad bar, featuring greens and other vegetables grown by students, in the onsite greenhouse.

The middle and high school green teams have run schoolwide assemblies to educate all students and staff about the group's ongoing efforts and projects. The district has implemented policies to eliminate the use of chemicals throughout schools and public buildings, including switching to nontoxic, sustainable cleaning agents and pesticides.

## Minnesota

### **Glendale Elementary School, Savage, Minn.**

#### *Adjacent to an Environmental Learning Center Sits an EcoStar*

Environmental education and sustainability practices are integral at Glendale Elementary School. On any given weekday you may find the Environmental Education Committee, a team of eager teachers and the principal, meeting to plan their annual kindergarten through fifth grade E-STEM Festival; Junior Naturalists gathering with their teacher advisors preparing to educate students about their organics recycling program; or a team of grade-level teachers organizing snowshoes for an outdoor lesson to observe animal tracks. These practices and routines are a way of life at Glendale Elementary, and a passion for staff members and students alike.

Limiting the environmental impact of Glendale Elementary School has been a focus since the building's conception. The school is equipped with an automated energy management system for controlling and maintaining a healthy environment, and for running the building efficiently. Natural daylight is used as much as possible in the lunchroom and in classrooms throughout the building. Glendale has butterfly and perennial gardens planted on the school grounds. In addition, there are several bird feeders that are maintained by the Junior Naturalists for student observation.

The Glendale School location is ideal for learning about the environment. The City of Savage owns and manages the McColl Pond Environmental Learning Center. Constructed in 2008, the building is LEED certified and surrounded by prairie grass and pond life. There is a direct walking path to McColl Pond from Glendale, and teachers conduct lessons on plants and animals in all seasons, taking advantage of natural and paved trails, the fishing pier, and wooded areas.

In addition to the building's features and the surrounding grounds, Glendale has been tracked in ENERGY STAR Portfolio Manager since 2007 and was certified in 2012. The school has participated in the Schools for Energy Efficiency (SEE) program, and received ENERGY STAR certification for 2012, Outstanding Achievement in Energy Reduction from SEE for 2012, and the SEE Milestone Award for Most Efficient Use of Energy per Square Footage for 2012.

Daily practices at Glendale also model environmental stewardship and sustainability. Students and staff participate in a district organics recycling program through a partnership with the Shakopee Mdewakanton Sioux Community to minimize nonorganic waste and to recycle and compost as much waste as possible. Glendale has purchased reusable plates, cups, and flatware for school events. Students



receive a birthday book rather than sweet treat, and participate in an Earth Day story walk.

In alignment with the district's mission to increase environmental education and stewardship, teachers began integrating and assessing environmental science standards in 2001 using the Global Learning and Observation to Benefit the Environment program. Teachers use outdoor spaces, such as gardens, bird landings, water resources, and trails to provide students with opportunities for making scientific observations, interacting with nature, and exercising. In addition, for the past seven years, Glendale has held a schoolwide Environmental Education Festival. This festival has been renamed the E-STEM Festival in recent years to incorporate integrated lessons including engineering into the experience for students. Grade-level teachers and specialists plan outdoor, hands-on lessons that engage students in content specific to state science standards. Richardson Nature Center Naturalists partner with the school on that day to teach lessons as well.

Glendale also takes advantage of partnerships within the community to further support student achievement. These partnerships include a collaboration with St. Catherine University's EcoStars program (whereby elementary classroom teachers host pre-service teachers to teach lessons with a STEM focus), and the University of Minnesota Master Gardeners. Each year fifth graders take a weeklong field trip to Wolf Ridge Environmental Learning Center in Finland, Minn.

Glendale's dedication to environmental and sustainability learning is evident in students' proficiency on the Minnesota Comprehensive Assessments in Science (MCAs). In 2015, 76 percent of Glendale fifth grade students met or exceeded the standards on the Science MCAs. Glendale fifth graders have scored 10-20 percent higher than the state average since the inception of the state science assessments.

## **Henry Sibley High School, Mendota Heights, Minn.**

### *Leading the Way to a Greenway*

Henry Sibley High School serves more than 1400 students, 39 percent of whom qualify for free and reduced priced lunch, and nine percent of whom are limited English proficient. Henry Sibley is committed to operating its building efficiently, using B3 Benchmarking and registering a Portfolio Manager score of 82. The school has reduced its greenhouse gas emissions 24 percent and energy use by 23 percent over seven years. It fully supports all of the initiatives of LIVEGREEN, the district's own sustainability program, which promotes energy saving and recycling initiatives throughout all schools and offices. Henry Sibley has a LIVEGREEN Club consisting

of high school students and two teachers. The team helps implement low- or no-cost strategies to reduce energy use, promote recycling and composting, and conserve resources. LIVEGREEN goes beyond a standard energy-reduction program by incorporating right-sizing waste streams, recycling, composting, green cleaners, diesel emissions reduction, paper reduction, behavioral changes, and engineering controls into its initiatives. Through sustainability efforts, Henry Sibley has avoided more than \$600,000 in utility costs since 2008.

Since 2009, Henry Sibley has had single-stream recycling schoolwide and organics collection for lunchroom waste. In 2012, the high school won the statewide Keep America Beautiful Recycle Bowl competition. In collaboration with Dakota County, Henry Sibley conducted a schoolwide waste sort and an event waste sort at Matson Field after a football game. In both cases, the results informed the school community of what it was getting right and what it needed to continue to work on. To help students correctly sort waste in the lunchroom Henry Sibley has a weekly event, called Trash Talk Tuesday, during which volunteers from the school community help by challenging students to sort accurately.

LIVEGREEN events promoted by the LIVEGREEN Club are scheduled throughout the school year and include the Keep America Beautiful Recycle Bowl, MOVEGREEN (a monthly effort to encourage alternative transportation and physical activity), a video contest called You've Got the Power, LIVEGREEN Week, Earth Day, and compost sales. LIVEGREEN is always looking for smart, green, and efficient practices to incorporate into the school. Four water bottle filling stations have been installed at the high school with plans to add more. The first filling station was purchased thanks to the work of the high school LIVEGREEN Club. The club sold reusable water bottles, and the proceeds paid for the hydration station.

Thanks to a generous grant from C. H. Robinson Worldwide, Inc. and the Let's Move Salad Bars to Schools initiative, Henry Sibley operates a salad bar that features a variety of fruit, vegetable, whole grain, legume, and low-fat dairy options during breakfast and lunch. The school was honored with a HealthierUS Schools Silver award in 2012. A Henry Sibley teacher started the first high school indoor garden in the Twin Cities. She used it to teach about indoor gardening and motivate her students to eat healthy foods. Some of the bounty is used by the kitchen staff to bring fresh produce to the lunch line.

The River to River Greenway is part of Dakota County's planned countywide 200-mile greenway network. Henry Sibley High School was part of a greenway gap between Highway 110 in Mendota Heights and Garlough Environmental Magnet School in West St. Paul until 2015. In 2015, construction of a missing greenway segment was completed. The mile-long project provides a nonmotorized trail for recreation and transportation, preserves high-value trees, enhances a degraded





wetland, removes invasive plants, promotes environmental learning, and includes 2,300 square feet of vegetated filter strips for treating stormwater. All physical education classes use the trail, which includes natural prairie and woodland restoration areas for conditioning, walking, running, and team relays. There is a natural amphitheater that provides space for outdoor classroom learning.

All ninth grade social studies classes do a four-week unit on human—environment interaction, consisting of an in-depth study of hydraulic fracturing and its impact on the environment. Students are required to do research and present on a related issue of their choice, such as deforestation, new forms of energy, or effect on wildlife. The documentary “No Impact Man” also is part of the freshman curriculum. Students complete a rural—urban unit that covers environment, and an agriculture unit during which they conduct a case study on food production, commercial agriculture, and factory farming and the effect on the environment. In Physics by Inquiry, a University of Minnesota College in the Schools course, students investigate how electricity is produced by different types of power plants (coal, natural gas, nuclear, wind, solar, hydroelectric, et cetera). They evaluate the costs and benefits of power plant types with respect to the total energy landscape for the U.S. They measure, calculate, record, and evaluate their own daily energy use, and try to implement changes to their routines that reduce their personal energy usage.

### **Macalester College, Saint Paul, Minn.**

#### *Education and Bold Action Create a Culture of Sustainability*

Macalester College has a long-standing tradition of sustainability, which takes on a richer meaning in the context of the school’s broader commitments to internationalism, multiculturalism, and service to society. These sustainability efforts are guided by a campuswide sustainability plan originally developed in 2009. Highlights of the plan include commitments to climate neutrality by 2025 – and zero waste by 2020 – and to education for sustainability.

Macalester has reduced environmental impact and costs through implementing operational goals for green building, energy, transportation, water, and stormwater. As of December 2014, the cumulative savings were \$1.8 million through sustainability projects, primarily through energy or waste reduction projects. The College’s greenhouse gas emissions have also been declining since 2004-2005, meeting the first intermediate greenhouse gas emissions reduction goal of 17.5 percent in 2015.



The school has reduced its environmental impact further by having the first certified LEED Platinum facility on a higher education campus in Minnesota. In December 2015, Macalester began an on-campus solar installation project, and committed to buying the equivalent of 100 percent of its electricity through a community solar garden. Also in 2015, an energy manager was hired to focus on reducing campuswide energy use. Macalester remains conscious of its environmental and social footprint through the innovative Zero Waste by 2020 program; as of 2015, the school reached a diversion rate of over 79 percent. The school also has developed programs for hazardous waste reduction, water use reduction, a sustainable landscaping master plan, and innovative stormwater projects. Strategies to improve walkability, bicycling, and alternative transportation use are also in place, with a target of reducing single-occupancy vehicles commuting to campus by 50 percent by 2025. These present-day efforts draw on a long history of environmental awareness and stewardship: students started the first recycling program, and the college's Facilities Services division began to focus on improving energy efficiency in the 1960s.

The Macalester community also is committed to improving the health and wellness of students, faculty, and staff. An operational example of this is the Facilities Services Department using an integrated pest management system, green cleaning chemicals, and low- or no-VOC paints. Student wellness programs create a campus environment in which students feel empowered to make healthy choices for themselves that contribute to their overall personal and academic success. Wellness programs include free physical education classes, a sleep well first year student initiative, sexual health education, and high-risk drinking prevention. The staff wellness program aims to develop a culture of wellness at Macalester, and promote and support healthy lifestyle choices for faculty, staff, and students. Staff programs include low- or no-cost physical activity classes, lunch educational sessions, a flu shot clinic, blood drives, and a personal training program. Macalester also began a relationship with HealthPartners in 2013, to provide an onsite health coach / wellness program manager.

In 2012, Macalester joined the Real Food Campus Commitment, which requires the college to purchase 30 percent "real food" – options that are local or community-based, fair and humane, and ecologically sound – by 2020. The college food service regularly educates students about the effect of food on greenhouse gas emissions, local foods, and healthy food choices. The student group called Macalester Urban Land and Community Health, or MULCH, grows food and raises chickens on campus, as well as organizing outreach and education on sustainable agriculture. As another step toward managing food production, food consumption, and food waste more holistically, the dining service sends its leftovers to a food recovery program for homeless shelters, and food waste is sent to a nearby hog farm.

Macalester has incorporated education for sustainability into the campuswide sustainability plan. Education is essential for strengthening the culture of sustainability on campus and empowering students, faculty, staff, and the community to take action in the wider world. The college's sustainability plan includes goals for continuously strengthening education inside the classroom, outside the classroom, after the classroom (alumni), and campus and community learning. The college recently received a major grant to support an Educating Sustainability Ambassadors program to increase sustainability in the classroom.

The college has rich experience with incorporating sustainability in cocurricular areas through student life activities and the Civic Engagement Center of Macalester's Institute for Global Citizenship. The Center long has served to connect Macalester students with the larger community through academic service learning, volunteer activities, and off-campus work-study positions – many of which incorporate sustainability themes. Student organizations like MacCARES, MULCH, MacBike, and MPIRG all focus on environmental aspects of sustainability issues. Cultural organizations and social justice organizations focus on the social side of sustainability. Macalester College also offers a unique Sustainability Student Worker network, which empowers and encourages student employees to identify opportunities for their host department to become more sustainable.

More recently, the college has worked to provide students with information about sustainability career options and help them pursue and secure green jobs. In addition, employee outreach has been a focus of the Sustainability Office since 2009. Sustainability goals and resources also are included in new staff orientation, and through educational activities for the entire community.

With a robust track record in all three ED-GRS pillars, and ambitious strategic goals to advance and improve on that record, Macalester College is bringing a 21st century green significance to its 1875 Latin motto – “Nature and revelation are twin sisters of heaven.”

## Montana

### **Hellgate High School, Missoula, Mont.**

#### *On a Mission to S.A.V.E. the Earth*

Hellgate High School, a *Title I* school, has served the community of Missoula, Montana for over 108 years. Natural stewardship and conservation of the land are principal values maintained by the Missoula community. In many ways, Hellgate is an extension of the ethos of care for the environment and nature held by the community. The school building, first constructed in 1908, has undergone five



renovations. The school works to foster sustainability through facilities, wellness of the entire school community, and sustainability learning.

The sustainability initiative at Hellgate High School is guided and driven by Hellgate High School's environmental group, known as Students Against the Violation of Earth (S.A.V.E.). The S.A.V.E student group contains four working committees: recycling, composting, gardening/earth week, and grant writing. Each of these committees has a student chair with supporting member students. Instead of having just one day devoted to sustainability, the school hosts an entire Earth Week of events, including a celebrated Trashion Show.

The school works with local community partners to incorporate sustainable features and programs, such as the rooftop garden and solar panels. Students work with the Montana Conservation Corps to build trails, and Habitat for Humanity to build homes. Hellgate also hosts leaders of sustainability from around the country to speak about sustainability. Recent speakers have included the lieutenant governor, and individuals from the U.S. Green Building Council, NWF, and the U.S. Forest Service.

Hellgate has a well-developed recycling and resource efficiency program that includes solar panels and the use of an Earth Tub composter. The school has used its energy audit and data collection as a basis for ongoing analysis. The resulting analysis has led to the creation of an energy management plan. The school currently has an ENERGY STAR rating of 77.

Hellgate takes a multifaceted approach to wellness that includes incorporating strategic nutrition initiatives, improving student activity levels, and developing emotional wellness programming. Purchasing decisions have allowed the school to eliminate all snacks that are high in fat and sugar. Healthy alternatives are available to staff and students. The school hosted Montana Crunch Time, a statewide celebration of local foods.

Students engage in experiential and place-based learning activities that enable them to incorporate sustainability topics into their life experience. The school offers the International Baccalaureate Diploma Program, and courses that teach biomimicry concepts. Hellgate also offers an independent science study class called Advanced Problems in Science.

A particular strength of the curriculum at Hellgate is the integration of STEM sustainability topics in building 21st-century competencies. One example is the Global Leadership Initiative, in which students are working to develop global competencies and experience through a structured program with the University of





Montana. Students also participate in the university's STEM Fest and Model United Nations.

## **Two Eagle River School, Pablo, Mont.**

### *Fostering Sustainability through Tribal Values and Traditions*

Two Eagle River School is a Bureau of Indian Education school community that is determined to preserve traditional ways of knowing and tribal values through engaging in sustainable practices. The school, serving roughly 100 students, all of whom are eligible for free lunch, is run by the Confederated Salish and Kootenai tribes. Two Eagle River School is located at the base of the Mission Mountains within the Flathead Indian Reservation. This community has a profound relationship with the natural space that surrounds it on all sides.

Two Eagle River is engaged in an ambitious and transformative sustainability initiative that includes conducting its first energy audit with Bonneville Power Administration, developing a comprehensive recycling program, and developing a school garden. The Two Eagle River approach involves students, staff, and community partnerships. Bonneville Power Administration has enabled the school to understand how it uses energy and can conserve energy in the future. The school subsequently added programmable thermostats, power strips, and more efficient lighting.

Two Eagle River requested recycling bins from the county. Students sort and audit the recycling, and teachers take it to a center monthly. The school has been able to reduce paper through a grant, making it possible to offer iPads to all students. Two Eagle River has several transportation efficiency strategies in place to reduce unnecessary mileage in its rural area.

The sustainability initiative began with professional development sessions in the spring of 2015 and August of 2015, supported by the Department of Curriculum and Instruction at the University of Montana. The first goal was to provide staff with background information about sustainability, sustainable practices, and sustainability education. The staff continues to receive monthly professional development that combines knowledge of sustainability, technology integration approaches, and strategies for writing across the curriculum. Professional development also extends into classroom visits, guest presentations for students, and individual conferences relating to each individual's experience and role within the sustainability initiative.

After the initial overview of sustainability, faculty and staff began the planning process. The first step was conducting an inventory of sustainable practices. The school community was empowered and inspired by what was already occurring at the school to foster sustainability. Given its tribal focus, the school determined that the sustainability programming would emphasize traditional tribal beliefs, values, and ways of living, including: care for the land, animals, and people; respect for Mother Earth; stories and seasons as ways of knowing; and honoring elders' wisdom.

Staff then developed five committees: energy, gardening, wellness, curriculum, and transportation, and committees brainstormed specific initiatives to organize. Next, Two Eagle River School hosted a schoolwide assembly to provide information about sustainability to students, and to have them engage in sustainability in a meaningful way. Students worked in small groups to create a slogan and mission for the sustainability program at the school, respectively, "To Live Through our Grandchildren," and "Go Green or Die Trying."

The efforts of the wellness committee to increase the nutrition of the food served at the school is evident in the school's Thanksgiving feast. This feast used traditional foods such as elderberry soup, huckleberries, salmon, and bison. This event and others help to boost community engagement, particularly between students and tribal elders. The school also sponsors barbecues, traditional Native American games, and a pow-wow.

Students have engaged in experiential and place-based learning activities, which enabled them to incorporate sustainability topics into their experience. This sustainability integration can be seen in mathematics, as students construct and solve real-life math problems related to the environment, and in their salmon monitoring. Science classes take a weekly field walk. The school connects science, culture, and craft in the butchering and skinning of animals, quilting, and teepee making. Students applied geometry as they constructed school emblem designs on the fence surrounding the school.

## **Nebraska**

### **Prescott Elementary School, Lincoln, Neb.**

#### *Investing in Wellness and Digging for Fossils*

Prescott Elementary, which was constructed in 1922, was renovated with LEED Silver specifications as a reference, and now has an ENERGY STAR Portfolio Manager score of 83. The school, which serves a population in which 67 percent of students are eligible for free or reduced price lunch, has reduced greenhouse gas emissions 29 percent and energy use 23 percent over just three years, and features

ground source heat pumps. Three onsite rain barrels are used to water the school's raised beds, and a rain garden is home to native plants. In 2010, the entire playground of gravel was scraped off and grass seed was planted to provide green space.

Prescott was one of the first schools to participate in the Lincoln Public Schools recycling program in 1998, and has continued recycling mixed office paper, cardboard, plastic, aluminum, newspaper, magazines, and tin cans. To date, Prescott has diverted over 261,000 pounds of recyclables from the landfill. The school encourages use of reusable water bottles and offers water bottle refilling options. Teachers use document cameras, projectors, and white boards instead of printing. Students compost all food waste, paper products, compostable dishes, and milk cartons, in addition to yard waste from the outdoor classroom.

Prescott has been very successful in the Lincoln Public Schools wellness program. For the 2013-14 school year, Prescott won the Lincoln Public School wellness award, a \$5,000 award for the school's wellness approach focusing on students, families, and community; staff wellness; and the establishment of school-based policy and guidelines; combined with Prescott's high participation in districtwide challenges. The award money is invested in items to support further wellness for the school, including indoor and outdoor active space resources.

The school oversees safe walk and bike to school programs and a walking school bus effort. Prescott was a 2013 HealthierUS Schools Challenge awardee, and offers both cooking and gardening clubs. Its wellness committee meets monthly, and the school uses Indoor Air Quality (IAQ) Tools for Schools resources and procedures. In October 2015, Prescott hosted a districtwide farm to school summit, inviting district staff and community members to learn more about the farm to school movement and to explore opportunities for engaging students in outdoor classrooms and garden spaces.

Many innovative practices and partnerships ensure Prescott Elementary students experience environmental and sustainability education at all grade levels. Prescott students experience instructional units in plants, seasons, animals and habitats, soil, prairie, ecosystems, and water and wetlands. First grade uses four types of soil for each classroom for student exploration. Second grade does a recycling unit with materials developed by teachers, including a tour of the landfill. Third grade hatches chicks during an embryology unit. In fourth grade, prairies and owl pellets provide the connection to outdoor learning experiences, culminating with a prairie immersion field trip. The fifth grade covers water and wetlands, and participates in a countywide Earth Wellness Festival focusing on air, water, soil, and habitat.



Teachers receive district support to attend professional development in environmental and sustainability education. Teachers attended 350.org founder Bill McKibben's lecture "The Climate Fight at Its Peak" as professional development.

The highlight of Prescott's efforts to connect students with the environment is the outdoor classroom. Prescott families, staff, and community have collaborated to build and provide a Nature Explore Certified Outdoor Classroom on Prescott Park. A walking path was installed in the spring of 2010 along with a rain garden, followed by a bridge, park benches, plantings, a weather station, raised vegetable beds, designated learning areas, and an arbor throughout the 2011-12 school year. Next, the school added a stage built as an Eagle Scout project, and a gazebo that provides shade and a learning space. Prescott then built a fossil dig area with a large saber cat buried in the pit. This outdoor space has served as an avenue for students to engage with nature and develop skills and knowledge associated with a variety of topics including gardening, nutrition, and environmental stewardship. The outdoor classroom also is available to the community.

### **Alfonza W. Davis Middle School, Omaha, Neb.**

#### *Built for Long-Term Sustainability; Focusing on Wellness*

Alfonza W. Davis Middle School is a state-of-the art LEED Silver building seated on the edge of Omaha among farm fields and open areas. The first middle school in the region to be LEED certified, the building was completed in May 2013, and was designed and built to reduce environmental impact. Everything from the landscaping to the trash program to countertops were created with sustainability in mind. Geothermal wells heat and cool the building and two green roofs reduce the heating and cooling load by providing extra insulation. Native plantings and retention ponds are used to limit water irrigation needs and address water quality and runoff.

Eighty-eight percent of students ride fuel-efficient school buses, many of which use liquid propane instead of diesel. District procedures and LEED building features ensure that best practices are in place regarding school environmental health, including such aspects as asthma triggers, ventilation, and chemical use. Natural light is featured in nearly every space in the building, even in basement rooms that traditionally would have no windows.

Davis recycles unwanted materials in recycling stations throughout the building. All teachers are able to spend time outdoors with their classes on the Davis campus. For example, a reading class might take their books outside to read. Math teachers find ways to do labs and lessons outside so that students can participate in applied



knowledge. The Davis auditorium stage is built so that performances can be done inside the building in the gym, or from the outside using seating attached to the football stadium.

Staff and students, 46 percent of whom are eligible for free and reduced price lunch, focus on wellness each day through the use of outdoor spaces, good nutrition, and wellness activities. One of Davis' school improvement committees focuses specifically on wellness, and has put several innovative measures in place, including a staff wellness in-service day, and a Fitness Fun club for students. Davis' school health office, counseling office, and kitchen are committed to working together with families and the community to improve students' mental and physical health. Partnerships with area physicians, dieticians, and a community counseling program; along with peer-taught lessons about social issues, touch students every day. Wellness information is shared with families via school newsletter and as part of Davis' daily announcements. The closest high school offers a school-based health center that Davis students and families can access at low or no cost. A variety of athletics is offered to all students, and every student participates in physical education class for the entire school year.

In classrooms, students receive education on concepts related to sustainability education, environmental education, and green career pathways in nearly every curricular area. Tech and Living classes, as well as Career Education classes, focus specifically on the green technologies and career pathways. Davis' green roofs are used by math teachers to teach an array of concepts including perimeter, volume, and rate, and by science teachers to teach biology concepts. Effective environmental and sustainability education is embedded into learning for all content areas in the building. Whether it is using an article about the environment as a catalyst for a debate in Social Studies, learning about technical writing in English using a piece on sustainability, or learning about actual sustainability theory in Tech & Living, Davis students are focused on environmental education throughout their days.

Students are taught that sustainability-related subject areas will be booming as they leave high school or college and enter the world of work. In math, science, social studies, and English classes, students learn using examples and applied activities based on wellness and environmental concepts. Students are taught every day about how they can affect the world around them, and how humans and the environment work with and against one another. Units on human geography, economics, and civic skills help students understand their role in these areas. Math teachers use sustainability and wellness concepts as examples in math lessons, classes, and story problems. In Tech & Living class, students apply information and research on sustainability and environmental topics to complete experiments,

analyze data, and produce scaled replicas of green energy machines and vehicles. They understand that dependence on energy will be a challenge for the future.

## **Irving Middle School, Lincoln, Neb.**

### *Partnerships and Culture of Wellness Lead to Sustainability Learning*

Irving Middle School has demonstrated a consistent ability to be a leader among Lincoln Public Schools for waste management and reducing environmental impact. Irving was one of the first schools to participate in the Lincoln Public Schools pilot recycling program in 1998, and has continued recycling paper, plastic, and aluminum. Irving was honored by the Keep Nebraska Beautiful recycling competition, and, to date, has diverted over 258,000 pounds of recyclables from the landfill through their program.

Irving was one of three Lincoln public schools to pilot a compost program in the cafeteria. This program engaged students and was overseen by a group of student leaders called the Food Waste Composting Pilot Team. Since implementing the compost program, and with the help of partner Prairieland Dairy Farm, the school has diverted 93,920 pounds of cafeteria waste, and has increased overall building diversion to 67 percent.

Irving is in the midst of an indoor air quality and renovation project, which focuses on a new energy efficient heating and air conditioning system. The project will significantly improve energy efficiency as well as provide a healthier learning environment for students. The scope of the project includes a geothermal system, LED lighting, and new exterior windows. The project has maintained an 80 percent or higher construction waste management diversion rate, partnering with WasteCap Nebraska. The local nonprofit's expertise has allowed for more materials to be recycled than on any other project in the district.

A culture of wellness persists throughout the school year for Irving, with involvement in quarterly district wellness challenges, school-based Aardvark Activity Challenges, support for the mental health-focused Run to Overcome, the Backpack Walk and the Marathon Cheerfest, to name just a few activities. Each year the school donates barrels of food to the Lincoln Food Bank. The school has a walking club and intramurals for students, and holds several fitness-focused activities for staff engagement. Irving has benefited from cash awards to advance health and wellness from both the district and the national Fuel Up to Play 60 program.



Many innovative practices and partnerships ensure that students, 40 percent of whom are eligible for free or reduced price lunch, experience environmental and sustainability education at Irving. In grades six through eight, students experience environmental science and living organisms units. Irving teachers also receive district support for professional development in environmental and sustainability education. In seventh grade science classes, Irving students partner with Terracycle in efforts to earn money for The Wildlife Rescue Team of Lincoln.

Irving offers outdoor education to all seventh graders during the Lower Platte South Natural Resources District-sponsored annual field trip for environmental studies classes. During this trip, Irving students spend many hours netting bugs and dipping into a pond to evaluate biodiversity. The Nebraska Game and Parks Commission offers contributions to the science curriculum at every level, and also funds projects and provides expertise for professional learning. The Zoetis-LPS-GSK Science Fair is open to all fifth through eighth grade students, and provides an opportunity for over 600 students to engage in science, technology, and society.

## **New Jersey**

### **Whitehouse School, Whitehouse, N.J.**

#### *A G.R.E.E.N. T.E.A.M. Leads Whitehouse to Energy Savings*

Whitehouse School recently was honored as one of only five schools to receive the Silver level of the Sustainable Jersey Schools program. Whitehouse's focus on wellness and efforts to preserve the environment have been supported by the Readington school district, and by the greater community. Whitehouse students arrive at school with a basic understanding of the importance of recycling, reusing, and reducing, and Whitehouse works to enhance this knowledge as it models and teaches sustainable practices that will guide students long past their time at the school.

The districtwide energy efficiency coordinator works closely with Whitehouse School as it endeavors to increase awareness, track, monitor, and communicate progress in the area of energy conservation. The coordinator serves as an invaluable resource as Whitehouse seeks and writes grants for its sustainability efforts. The school's energy management program, SEE, is in its fourth year, and Whitehouse is pursuing funding to develop an energy lab in the school. Whitehouse convened its first school-level green team in 2011, and teachers worked with the students to offer an assembly where an "energy hog" was introduced as an analogy for environmentally unsustainable behaviors.



Approximately 70 percent of Whitehouse school property is school gardens, raised beds, wetlands, forest, and native grasses. Whitehouse has adopted green cleaning policies and procedures, resulting in reduced exposure to harmful chemicals, while concurrently improving indoor air quality. After participating in a New Jersey local government energy audit, Whitehouse implemented cost-saving recommendations, including upgrading fixtures and light bulbs, installing HVAC systems, and furnishing all rooms with motion-sensor lights. Whitehouse has received the 2015 Eco-Schools USA silver award.

Student leaders, teachers, and the principal have worked together to determine how to spend discretionary funds. Suggestions have resulted in various acquisitions for the school vegetable garden: a rain barrel, two weather stations, three composters, sensory garden items, and outdoor air quality flags. Green team students facilitate sustainability projects and promote the team's tenets with a creative acronym: Grow, Recycle, Earth, Energy, Nutrition, Technology, Efficiency, Activism, and Movement.

Whitehouse faculty embarked on a wellness campaign and made significant changes to positively influence students. Staff members received training from the Whitehouse nurse on childhood obesity and healthy living, which served as the impetus for several subsequent initiatives. The nurse shares healthy recipes, such as the currently trendy mason jar salads, and facilitates pre and post-holiday shape-up competitions. The school participates in a local foods program, and students receive over 200 minutes of weekly physical education.

Several Eagle Scouts have used Whitehouse for their projects. They have built a garden shed for the school's tools, created an outdoor classroom in a courtyard, and designed a new landscape plan for the Whitehouse front entrance. Girl Scouts and Daisies help Whitehouse with weeding and sustainability projects, the latest one involving recycling markers. Whitehouse works with master gardeners from Rutgers University to facilitate a schoolwide garden program, which uses a curriculum map that spans the grade levels and is aligned with science units. Whitehouse grows vegetables, herbs, and edible plants and has a composting program. Students harvest the garden and celebrate salad day.

Whitehouse has created a green influence around its annual science fair, and created a green links page on the school website to provide families with sustainability resources. The school invites parents to participate in the school's Terracycle efforts by recycling beauty product bottles. Parents also help Whitehouse receive cash back through the school's participation in Cartridges for Kids, which means collecting and recycling ink cartridges and other approved electronics. The school also uses reusable lunch trays.





## **Egg Harbor Township High School, Egg Harbor, N.J.**

### *A Student-Driven Quest for Green*

Egg Harbor Township High School (EHTHS), a suburban school serving 2,325 students, 47 percent of whom are eligible for free and reduced price lunch, has invested in the development of sustainable practices that foster student environmental stewardship and reduce impact on the environment. The Egg Harbor Township School District has implemented an energy monitoring and savings program, hired a full-time energy specialist, developed both districtwide and building level green teams, and has provided support for building level initiatives. EHTHS has been recognized as the New Jersey High School Sustainability Champion in 2015, Silver Certification (highest awarded) Sustainable New Jersey in 2015, the Nation's Most Improved School in the 2013 Recycle Bowl, and seventh in New Jersey in the 2014 Recycle Bowl.

The green team at EHTHS has developed several programs to raise awareness of environmental stewardship. The green team introduced students to composting during a series of science labs geared toward sustainability. Students took the concept one step further and built a schoolwide program to encourage composting. This program has students collecting, measuring, and monitoring the composting process, from the classroom to the final product for use in the school garden and in lab activities across several fields of study. A school garden is used as an outdoor classroom where students receive hands-on instruction in designing, planting, maintaining, and harvesting the crops. The area also includes a wildlife habitat garden, an educational pond, a rain garden, and an outdoor learning area.

Recycling is another major focus of the green team and the student body. Students have led the way for developing more efficient recycling management techniques in the school. They have identified areas where EHTHS could improve recycling, such as athletic and theatrical events. Recycling bins have been installed at various locations to accommodate for events occurring during and after school hours. Through students' efforts, EHTHS has increased the amount of recycling within the school by over 4,000 percent in the last four years.

Over the last four years, EHTHS has reduced utility costs through energy management, education, developing more efficient HVAC system management techniques, installation of motion activated lights, retrofitting areas with LED lighting, installation of a 454-kilowatt solar array that generates 15 percent of the school's energy needs, and purchasing more efficient equipment. When the solar project first was proposed, science classes from the high school developed public service

announcements that were displayed at various polling locations to encourage support of the bond referendum. Students now use the information and data gathered to work on yearly energy projects. These actions have led to an overall decrease of 35 percent in energy usage. The school also encourages the residents in the township to analyze their personal impact on the environment. The school offers residents a free service called GreenQuest so they can see how their usage compares to other homes in the area. The program provides information on how to reduce monthly bills and energy waste.

EHTHS has adopted an outdoor air quality index flag program. It provides a convenient way for both parents and students to determine whether a student may have trouble breathing while participating in physical education and after school athletics. The air quality index program brings awareness about the importance of reducing pollution and limiting automobile idling. Indoor air quality has been improved through the installation of Guardian Air ultraviolet air purifiers, which help to reduce the number of microbes in the HVAC systems.

Students are exposed to sustainability in various science classes, where they research renewable energy and resource management opportunities. Course sequences in Environmental Science and Oceanography are available to all students, and a new course dedicated entirely to the concept of sustainability will be offered starting in September 2016. Students recognize how globalization affects the quality of life in areas around the world in Contemporary Issues and Economics classes. Art students use recycled materials to create works.

EHTHS offers its staff opportunities for sustainable professional development. Teachers have attended the Kean University Environmental and Sustainability Science Educator Workshop, Sustainable Jersey for Schools trainings and webinars, Public School Works training, school-based and districtwide green team strategy meetings, and district professional learning days.

Students involved in the green team are involved in many environmental activities outside of the traditional classroom. They participate in New Jersey Science League competitions, Recycle-Bowl competitions, and New Jersey Envirothon competitions. Environmental efforts are led by the Key Club, the Honor Society, and the Interact Club.

EHTHS has a wellness committee that meets to develop goals to improve student and staff health. The committee developed a Couch-to-5K program to teach students about diet, exercise, and goal setting. Another program focused on encouraging students to eat breakfast by providing families with educational materials, assemblies, and announcements through the local community cable television channel. The addition of two new breakfast kiosks helped to facilitate the



implementation of this program. A nutritionist was brought in to help students understand how to develop good eating habits and learn about organic foods. EHTHS students are involved in 220 minutes of physical education per week. Guest speakers routinely visit to discuss topics related to health and physical education.

## **Essex County West Caldwell Tech, West Caldwell, N.J.**

### *Environmental Science Class for All; Sustainability in Career Majors*

The West Caldwell Tech (WCT) campus of the Essex County Vocational and Technical School District, serving 78 percent free and reduced price lunch-eligible and 52 percent special education students, has been incorporating sustainable practices and green education over the past five years. This work began with an energy audit to develop comprehensive energy conservation and retrofit measures. Since then, WCT has made substantial efforts to improve resource efficiency, sustainability education, health and wellness, and community outreach.

Highlights include a farm to school lunch program, partnerships, a recycling program, family education, and curriculum changes. Through WCT's green initiatives, the school has reduced greenhouse gas emissions, decreased energy use, and also lowered water consumption. Additionally, WCT has developed key partnerships with businesses that demonstrate a commitment to sustainability to improve local habitats and provide students with hands-on experiences. Furthermore, WCT researched and implemented curriculum changes to expand students' understanding of sustainable practices.

To reduce the school's environmental impact and costs, WCT replaced its boilers for energy-efficient ones, and implemented a one-to-one laptop initiative to reduce paper usage. The school, with an enrollment of 343, also created partnerships with county and state officials for financial support to update lighting fixtures and add alternative energy sources to the school building. Members of the WCT green team met with architects and county officials to assist with the planning process. WCT also partnered with Ricoh USA's West Caldwell office to rid the surrounding areas of the invasive phragmites australis plant, thus helping to promote biodiversity.

To improve health, WCT offers a full year of physical education and health courses. While New Jersey requires 3.75 credits of physical education and health each year, WCT provides students with five credits, and has established a Health and Wellness Family Fun Day event. The school's culinary program incorporates vegetables grown in the school greenhouse, and develops healthier versions of popular recipes. The Retail Career Academy, which operates the WCT school store, replaced many



snack options with healthier alternatives and eliminated sugary drinks altogether. The school cafeteria sources all seasonal fruits and vegetables from local farms.

The school considers the way in which it now educates students as its biggest achievement. The school's mandatory environmental science course covers sustainability, climate change, resource management, smart growth, green design, pollution leading to biomagnification and eutrophication, weather monitoring, and biodiversity loss. The school provides students with ample opportunities to collaborate with professionals regarding environmental issues. For instance, WCT holds a yearly Skype conference with a participant in China to discuss air quality. The school brings in a Watershed Ambassador to speak about point and nonpoint pollution. The WCT biology course covers human impact on the environment, interdependence, and global warming, and reinforces much of what was covered in environmental science.

As a vocational school, WCT also incorporates environmental and sustainability practices into career majors. By doing so, WCT not only provides students with the opportunity to implement what they learn, but also reinforces the importance of sustainability practices in real-world settings. For example, the WCT Culinary Academy participates in a Sustainable Homes and Habitats Gingerbread Contest with the Essex County Environmental Center. Student designs have included solar panels, farms, and windmills. Horticulture and Agriscience students participate in the Trout in the Classroom program in which they raise trout from eggs, monitor tank water quality, engage in stream habitat study, and develop a greater appreciation for ecosystems. These students are in charge of the WCT recycling program as well. The Construction Trades Academy incorporates a sustainable construction curriculum, and a WCT teacher served on the statewide development committee for green career pathways for Sustainable Design, Construction, and Energy.

Ultimately, WCT educational leaders, teachers, students, and community members are deeply committed to making a positive difference on local and global society. The school has developed key partnerships, activities, and outdoor learning spaces to expand the learning environment beyond the confines of the classroom. The district's commitment to sustainable education is evidenced by the adoption of a sustainability policy as well as a wellness and nutrition policy. WCT recently received the Essex County Executive Certificate of Commendation for its green initiatives.





## **Triton Regional High School, Camden, N.J.**

### *Forty-Five Percent Solar; 100 Percent Invested*

Triton Regional High School is invested in environmentally responsible actions and behavior that leads to greater environmental and ecological stewardship and a reduced carbon footprint. Triton, constructed in 1957, recently received an EPA ENERGY STAR certification with a score of 83. The Black Horse Pike Regional School District, as a whole, and Triton, as a school, have a fully operational green team, which consists of students, teachers, administrators, and the community. Triton's green team works collaboratively with the teams from other schools in the district to identify energy inefficiencies and waste reduction possibilities; and prevent the use of excess water, electricity, and other resources. The green team commits to changing behaviors, practices, and products to use resources efficiently and instill environmental stewardship.

Triton emphasizes composting and single-stream recycling in the main dining areas of the building during a common lunch period. The green team has worked to make it easier for students to recognize and identify what belongs in appropriate bins for landfill, recycling, and compost. The school produces 45 percent of its energy onsite with roof-mounted solar arrays. As a result of concerted behavioral modification and facilities upgrades, Triton has reduced its greenhouse gas emissions.

Triton maintains two functioning greenhouses that are used to nurture plants from seeds to supply the organic garden housed at another school in the district, which is maintained by the green team, AP Environmental Studies classes, and Horticulture classes. Triton is in the planning stages of an on-property organic garden. With the use of a job coach, special education students are responsible for helping the maintenance staff maintain the landscaping on the school's property. The green team maintains the Vietnam Memorial courtyard and the butterfly garden so that those areas are available for teachers to do outdoor lessons or for students to enjoy during their lunch.

Over the course of the last four years, Triton has been able to reduce waste and improve overall conditions for the school community through a proactive approach to conservation, recycling, and education. Triton has realized a reduction in utility costs due to the installation of solar panels, high efficiency lighting, changes in refrigeration, heating, and air conditioning practices, shutting off lights and computers when not in use, and structuring responsible irrigation practices. In addition, Triton has discontinued the use of chemicals used to strip flooring, improved indoor air quality by installing filters in HVAC systems, and improved

recycling and composting behaviors with the help of Organic Diversion, a company that mentors students and staff on how to collect materials, reports on collection quantities and strategies to improve composting and recycling efforts. The compost also is used in the Triton science curricula, where students examine it for microbes and decomposition rates.

Triton has made a priority of the well-being of staff and students, 40 percent of whom are eligible for free or reduced price lunch. The school has staff professional development centered on how the entire staff can contribute to a more sustainable school community. The green team students lead efforts beyond the school walls to take action on local and global environmental crises. Students have taken part in the Thirst Project, which collects money to establish freshwater wells in historically malnourished areas of Africa. A wellness coordinator establishes weekly health goals for individual staff members, and works to improve health choices, establish workout regimes, organize biometric screenings, and conduct health risk assessments for various organization personnel. Building administrators and supervisors have created programs for the mental health and overall betterment of both students and staff, and a quarterly stress management program is available for faculty and staff. Triton recently launched a program aimed at assisting the female student population in enhancing self-esteem. Due to the popularity of this program, the school is now devising an analogous program for the male student population. The group will focus on supporting positive male role models in the school community.

The AP Environmental Science class created environmentally sound solutions for unused land in the community, and presented them to the mayor and town council for consideration. Chemistry classes use sustainability concepts to bring the subject to life. For example, the Bhopal disaster is used as an example of chemical use gone wrong. The course also studies new battery technology used in electronics and hybrid cars. Horticulture students learn how to propagate lemon geranium from cuttings, which then are used as a natural pesticide. Nutrition and culinary and hospitality courses discuss nutritional concepts, food contamination, and organic foods. Digital Photography stresses conservation through digital portfolios. Marine culminates the course by studying human effect on the oceans, and sustainable ways to interact with the ocean's resources. Students compete in Envirothon, as well as the Sea Perch competition, whereby students develop a submarine that can simulate a Navy mission.



## **Raritan Valley Community College, Somerville, N.J.**

### *Set Apart by Sustainable Programs and Policies*

Raritan Valley Community College (RVCC) has been an environmental leader since 2007. RVCC has earned a dozen environmental awards, offers innovative sustainability courses and degree programs, and provides extensive community service and health education programs. RVCC is the first community college in the country to sign an environmental stewardship agreement with the EPA, and was the first community college in the country to run an energy-saving cogeneration plant, which has contributed to an emissions reduction of 51 percent since 2005. The college is the first in New Jersey with an AASHE STARS rating, and the first with River Friendly certification. RVCC is the only community college in the state to offer a liberal arts associate's degree with an environmental studies option. The college's award-winning service learning program provides many students with the opportunity to perform environmental and health and wellness work in the community.

RVCC has reduced its environmental impact and costs through a comprehensive program guided by a Memorandum of Understanding with the EPA. The college has reduced greenhouse gas emissions by operating a cogeneration plant, buying 100 percent renewable energy, building to LEED standards, and performing numerous energy efficiency upgrades. The college has improved water quality by adopting integrated pest management and creating no-mow areas and a rain garden. Rainwater is collected for toilets and garden irrigation, and high-efficiency fixtures and a scheduled, moisture-sensing sprinkler system watering only the athletic fields provide additional conservation measures.

RVCC has a 44 percent waste diversion rate, and recently was named a two-year college top performer in waste management by the AASHE STARS program. The contract for custodial supplies requires that all cleaning products be Green Seal or Ecologo certified to the extent possible. The college builds to LEED Silver standards, which promotes high indoor air quality through the use of low-VOC materials, paints, and adhesives, along with 30 percent increased ventilation. The school's new Bateman Center boasts a two-story green wall of plants, which helps filter airborne toxins and creates fresh oxygen.

The college was recently named a Platinum-level Smart Workplace by RideWise for outstanding achievement in creating programs that provide and promote commuting options for employees. RVCC offers premium parking for carpools and free electricity for electric vehicles.

RVCC promotes health and wellness through numerous initiatives. The college has an optical clinic, gardening programs, and a yoga and meditation room. The college's café and cafeteria offer vegan and vegetarian meal options, fair-trade coffee, and locally grown produce when available. Student volunteers are trained to be peer educators for pre-pregnancy education, and to identify victims of domestic violence and connect them with resources.

RVCC's Environmental Science and Biology departments offer introductory, interdisciplinary courses that are popular with nonscience and science majors alike: Plants, Humans, and the Environment, Energy and the Environment, and the nonmajor Introduction to Environmental Studies course. RVCC offers an Environmental Science Associate of Science degree, a Liberal Arts Associate of Arts degree with an Environmental Studies option (unique in New Jersey), and an Environmental Controls Associate of Science degree and certificate, as well as LEED and solar panel installation professional education. The environment and sustainability are incorporated into courses in some 15 departments, including English, Marketing, Philosophy, and Sociology. Instructors emphasize the issues, potential consequences, and solutions to motivate students to learn the relevant STEM material.

Part of RVCC's mission is to encourage social responsibility and engaged citizenship. Through the college's award-winning Service Learning Program, students work on environmental sustainability and health projects for class assignments, extra credit, or their student leadership transcript. Projects include rainforest protection, endangered plant species conservation, land preservation, rain garden maintenance, stream assessments, and beach cleanups. The many partnerships with local environmental organizations support such projects as well as student internships. RVCC is partnering with New Jersey Audubon to conduct education, research, and outreach on forest health in central New Jersey, with the support of a three-year grant from the National Science Foundation's Science Education for New Civic Engagement and Responsibilities Informal Science Education program.

## **New York**

### **Schuylerville Elementary School, Schuylerville, N.Y.**

#### *Green and Healthy Evolution on the Hudson River*

Schuylerville Elementary School, with over 720 students, is located in the rolling hills and fields of beautiful upstate New York, close to the shores of the Hudson River. With a wealth of scenic and agricultural resources surrounding the grounds, striving to be a sustainable is a great fit for the school's mission, as sustainability is a critical





way to ensure that future generations care for and benefit from the natural resources of the area.

Schuylerville's green school efforts began in 2011, initiated by elementary parent volunteers with support from nonprofit partner and neighbor Hudson Crossing Park, and inspired by the Children and Nature Movement and an organization based in Texas called GreenRibbonSchools.org (not affiliated with ED-GRS). The school focuses on embedding the cornerstones of the GreenRibbonSchools.org program, getting young people outdoors, learning from the environment, making sustainable choices, and prioritizing healthy lifestyles.

To date, more than 50 projects have been implemented as part of Schuylerville's sustainability efforts, spanning school years, and sending ripples across the district and community. What began with ideas from parent volunteers has grown as students, teachers, and administrators seek out the green school volunteers for support with projects and programs, and the resulting projects exemplify the creativity, sustainability, and lasting effect of this transformation of the school's vision, operations, and educational goals.

Annually, more than 500 Schuylerville students, teachers, and families participate in the Turtle Count Challenge on World Turtle Day in May. Teachers bring students to the pond on the campus, using observation to build STEM and literacy skills. Having been inspired, students often return with their families to observe the turtles and other wildlife. What once was an overlooked retention pond has become a treasured natural space. This annual program has garnered the attention of the Schuylerville Public Library, leading to collaboration with the school volunteers to plan a story walk. Using the book *In the Small Pond*, pages from the story are posted on a trail around the school grounds and on waterside trails at Hudson Crossing Park, promoting outdoor experiences and literacy. The Turtle Count also has prompted second-grade students to host an awareness event and fundraiser for Blanding's turtle, a local species on the endangered list. Educators from Wilton Wildlife Park and Preserve have assisted the students with educational presentation, and students collected donations for the facility.

Schuylerville has a well-established curriculum at multiple grade levels that includes hatching insects, including butterflies. One of the first projects of the new sustainability volunteer group was to work with teachers and a local Girl Scout troop to plant a butterfly garden, creating an accessible supply of milkweed for the voracious caterpillars, and an appropriate release space for the newly-hatched butterflies. With guidance and donations from five local farm and nursery businesses, the butterfly garden is now an established outdoor learning area. It also serves as a site for more than 200 students participating in Journey North's tulip test gardens citizen science program, and currently is being certified as a Monarch



Watch Waystation as part of a local Girl Scout's Gold Award project. Interest in gardening has grown throughout the school, leading to the cultivation of indoor classroom gardens and the construction of four outdoor raised beds.

Since their inception, the school's greening efforts have been supported by Hudson Crossing Park, a public educational and recreational destination within walking distance of the school. The annual Hudson Crossing Triathlon inspired a summer student and family jogging program called Towpath Tuesdays, as well as an annual Hi-5k Challenge, which invites participants to complete a five-kilometer race in some form, whether walking, jogging, racing, biking, swimming, hiking, or kayaking. In the inaugural Hi-5k, more than 250 students, teachers, and community members reported success in finishing the five-kilometers, including kindergarten students who decided to replace the usual classroom Thanksgiving feast with a five-kilometer Turkey Trot of accumulated laps on the school track. Each year, the five-kilometer race challenges have evolved, including serving as the organized event for the school's contributions to the American Cancer Society's Relay for Life. The Saratoga County Public Health Department chose to replicate the Hi-5k program, challenging all of the youth in the summer recreation programs of the 20 towns and villages in the county.

In an example of teacher leadership in the school's sustainability efforts, some 120 fourth grade students planted a White Pine peace tree in the outdoor classroom. After studying Native American history and anti-bullying, students brainstormed words and phrases that represented weapons of war and buried them under a new five-foot pine tree. By locating this tree in the outdoor classroom, the students made it an accessible symbol of peace for the entire student body, as it is a place that all can visit for inspiration in growing, learning, and leading.

Finally, the school's sustainability efforts have included systemwide improvements to the school's recycling program and energy reduction technology. In 2011, much of the school's waste went to the landfill, including waste from some 50 classrooms, offices, and large gathering spaces, as well as unclaimed items in the lost and found. The school features zero-sort receptacles in every classroom; specialized programs for recycling electronics, ink cartridges, and markers; unclaimed clothing donations that go to a secondhand store serving the community; and a rapidly evolving cafeteria program that diverts 40,000 pounds of food waste to a local pig farm and compost pile, and more than 90,000 milk cartons per year to a recycling facility.

Significant capital improvements since the launch of the school's sustainability efforts include energy conservation measures such as LED, T-8, and motion sensor lighting; hot water heater system upgrades; roof systems and insulation upgrades; replacement windows; and energy management upgrades to direct digital controls;



valve and motor replacements on the gym and cafeteria air handlers; re-insulation of heating lines; replacement of unit ventilators; and upgrading to ENERGY STAR kitchen appliances. To further reduce Schuylerville's carbon footprint, staff have orchestrated prudent scheduling with an energy management system based on building use, including night setbacks and occupancy sensors.

The Schuylerville sustainable schools efforts are growing stronger every year, and are nurtured through investment, ownership, and leadership from a wide variety of stakeholders, ranging from kindergarten students to Hudson Crossing Park board members. Together, Schuylerville Elementary and Hudson Crossing Park are growing tomorrow's leaders with their feet in the grass and their eyes looking forward to a healthy and vibrant community and planet.

## **North Carolina**

### **Wiley International Studies Magnet Elementary School, Raleigh, N.C.**

#### *Where the Go Green Team Enhances Environmental Commitments*

Wiley's International Studies Magnet Program attracts students from many different countries. These face-to-face experiences with other cultures make global studies come alive. Doors of understanding open wide as students, 37 percent of whom are eligible for free or reduced price lunch, learn about varied cultures, speak different languages, and learn to use technologies that are important in our global society. The program is designed to develop understanding of major systems (technological, communications, and cultural), which influence the condition of the global village.

The Wake County Public School System has made some integrative changes to standards in school health, nutrition, and energy cost reductions that have affected the school's practices. Wiley has individual programs for the school that enhance its environmental commitments, and teaches environmental education across all grades.

The Piedmont Savannah garden, a partnership project with the North Carolina Botanical Garden that is funded by a grant from Wake Soil & Water Conservation District, was planted not only to stop soil erosion and improve drainage, but also to educate students about native plant life and a historical slice of the natural area. The spacious hundred-year-old campus has an array of old-growth trees, three gardens, an outdoor classroom, and several birdhouses. The school has reduced its domestic water use by 52 percent over seven years, and uses no water for irrigation, employing instead two 1,000 gallon rainwater storage tanks and garden hoses.



All classes in second, third, and fourth grades have an opportunity for gardening, including weeding, planting, mulching, learning about native plants, rehabilitating the Piedmont Savannah garden, observing newly hatched birds, making birdfeeders from recycled milk cartons, filling hummingbird feeders and the birdbath, and sketching the gardens. First grade conducts read-alouds outside, and science lessons studying organisms and earth materials use the outdoor classroom and campus. Fifth grade identifies trees on the playground using PLT lessons.

In kindergarten and first grade, art classes learn about invasive species and draw common examples of these types of plants. Children study and draw the giant Hellbender salamander found in North Carolina rivers, and learn about the effect humans can have on the land when participating in outdoor activities. Second and third grades study the effects of global warming on the polar ice caps and migration. The fifth grade collects weather data for citizen science projects, and the teacher has developed a citizen science weekly publication for other teachers to use in their classrooms.

For the last two years, the PTA Go Green Club has participated in the Environmental Stewardship Challenge sponsored by the North Carolina chapter of the U.S. Green Building Council. Wiley has participated in Green Apple Day of Service, sponsored by the Center for Green Schools, each year. The school's Go Green Club increases awareness of conservation-related behavioral changes students can make through signage, word of mouth, incentive programs, and lessons. The club, which includes students from first through fifth grade, worked to calculate the water usage from hand washing and the amount of water that will be saved by changing the type of aerators used. The school has a current ENERGY STAR score of 89, and has scored above 75 since 2008.

The Wake County Public School System adopted an integrated pest management policy to manage insects and rodents on school property in a holistic, preventive manner. The school also works to prevent exposure to asthma triggers by banning air fresheners and smoking on campus, discouraging idling, and having a custodial policy that works to keep the school free of dust. The Go Green Club is educating students about indoor air quality, and has increased the number of plants in classrooms. Wiley does not sell any candy for fundraising, and instead uses a Boosterthon fundraiser where students are sponsored to run laps. Wiley's PTA has provided new picnic tables so that classes may eat lunch outside.

Wiley works to provide an effective environmental and sustainability education with concepts integrated throughout the curriculum. Kindergarten students learn to plant and care for flowers. In the fifth grade, there is a compost bin and a live tree in the classroom. Two teachers are participating in the state environmental education





certification program, continually taking courses and bringing back knowledge to share with students about North Carolina water, soil, animals, and plants.

## **Sandy Grove Middle School, Lumber Bridge, N.C.**

### *Rural Solar and Geothermal Net Positive Energy Producer*

The Sandy Grove Middle School facility is expected to receive LEED Platinum certification and will save Hoke County approximately \$37 million over the next 40 years. The 76,000-square foot facility combines energy conserving practices with onsite renewable energy generation to produce 40 percent more energy annually than the school requires. Serving a lower-income population in rural North Carolina, Sandy Grove Middle School provides a progressive, top caliber STEM learning environment. Located next to an existing elementary school, the area surrounding the school campus supports the future growth in the county.

Notable innovative design and construction features include photovoltaic and geothermal heating and cooling systems, LED lighting, continuous air barrier, and whole building control of all building systems through the building automation system. The sustainable features control indoor environmental quality, limiting the toxins and pollutants in the air, control for the conditioning of the space for added thermal comfort, and offer outdoor views from 90 percent of the building's spaces. The tight construction and whole-building air barrier limit air and water infiltration in the building, removing water from the building envelope and preventing mold growth.

A photovoltaic solar array of 2,358 roof-mounted panels blankets the entire roof, as well as four striking solar structures that stand 20 feet tall. Combined, the panels produce over 752,000 kilowatt-hours of electricity per year – enough energy to power more than 68 homes. The school alone only used 541,000 kilowatt-hours of electricity last year. This additional 40 percent energy produced is sold back to the local electric utility company to help further offset building operational costs. Other important factors in conserving energy are super insulated wall and roof assemblies coupled with high-performance glazing and extensive use of LED lighting. Fifty percent of the wood used in the construction is certified as coming from responsible sources; 75 percent of construction waste was diverted from disposal; 20 percent of construction materials contained recycled content; and 30 percent was produced in the region.

In an effort to promote healthy lifestyles among students 58 percent of whom are eligible for free or reduced price lunch, Sandy Grove has a coordinated school health team consisting of a school nurse, a school social worker, a school counselor,

health and physical education teachers, a cafeteria manager, and school administrators. This team works collaboratively to encourage students' physical education, positive behavior, and healthy eating habits. The team consults with a school psychologist regarding various mental health issues, and has a Student Assistance Team Program that addresses student behavior and academic issues. Being in close proximity to Fort Bragg, the school has a military family support counselor who provides services to military-connected students.

The Hoke County Health Department provides health presentations on such topics as nutrition and diabetes. The Hoke Cooperative Extension Program's 4-H Specialist provides training in social skills. The school district's Student Support Services Department offers anti-bullying education and social skills instructions for individuals and groups. Nutrition, fitness, and wellness goals are integrated in the school's curriculum. The school participates in a farm to school program, and 50 percent of its food purchases are environmentally preferable. An ongoing in-school fitness program gives various opportunities to students in improving their health through multi-level participation in fitness and sports activities.

The sustainable school facility is used as a state of the art technology teaching lab to emphasize the importance of STEM in preparing students for life in the 21st century. The curriculum at Sandy Grove was developed to engage students in material science, electrical engineering, and chemical engineering, and geochemistry. The staff has embedded the school building's sustainability features into the curriculum to provide hands-on activities and research-based projects for students to apply in real-world scenarios. The students learn about solar energy, energy and water conservation, air quality, geothermal, and recycling. Partnerships between Sandy Grove and the various companies used during the construction process provide the school community with a vast array of resources to contribute to the learning process and to educate students and their families of the green features found inside the school and how they affect their daily lives.

Teachers at Sandy Grove conduct a lesson called Basic Sustainable Energy: Solar Energy and Geothermal Heating and Cooling. The content of the unit project is comprised of higher-level vocabulary words sourced from reading and research, and from technical terms used in the process of building and designing of solar cars and mini-solar powered systems. Collaboration with other students develops students' speaking, listening, and writing skills as they design, build, and test solar cars, gather data, and share their work with their peers in a technology-oriented environment. Students and teachers can monitor energy use and production using an interactive energy dashboard. Teachers at the school have written over 20 hours of energy dashboard-based instruction for all grade levels.



## **Elon University, Elon, N.C.**

### *Serving as a Positive Role Model for Sustainability in Higher Education*

Elon University is reducing environmental impact through energy and water conservation, sustainable buildings, waste reduction and alternative transportation. Energy efficiency and conservation efforts have resulted in a 30 percent reduction in BTUs per square foot, despite the fact that square footage increased by 104 percent and the student population increased 35 percent. Eighty-three percent of water used for irrigation on campus is reclaimed stormwater. Elon adopted a Green Building Policy in 2009, which states that new construction projects and major renovations consisting of 8,000 or more square feet of conditioned, occupied space will achieve a minimum of LEED Silver certification. There currently are 26 LEED certified buildings on campus totaling 624,240 square feet, which is 23 percent of the university's total square footage.

Campus waste reduction efforts include yard and food waste composting. Yard waste is processed by the university into a rich soil amendment and used in the campus landscape. Food waste is composted by a vendor off campus, and the program recently was expanded to collect more post-consumer compostables in retail dining locations and at catered events. About 39 percent of the university's fleet is alternative fueled vehicles, which includes the Elon BioBuses that run on B20 fuel (20 percent biofuel and 80 percent ultra-low sulfur diesel). The Elon BioBus system is free for students, faculty, staff, and community members.

Elon promotes and improves campus health and wellness through a variety of programs, practices, and educational efforts. Indoor environmental quality is ensured in a number of ways, including preventive maintenance on HVAC systems. The landscaping and grounds staff incorporate integrated pest management into their operations with the goal of preserving and protecting the landscape, while minimizing personal and environmental impact, and establishing sustainable landscape management practices. The RN Ellington Center for Health and Wellness houses the Faculty/Staff Health and Wellness Center, Student Health Services, Student Counseling Services and Health Promotion. These offices provide wellness services and educational programming, as well as counseling and health referral services. Campus recreation is another important element of campus health and wellness. Students, faculty and staff can use campus recreation facilities at no cost. Campus recreation also oversees a number of student-led programs that promote fitness and/or overall health. The campus features marked Phoenix Trails, which include one-mile, one-and-a-half mile, two-mile, and 3.1 mile paths for use by the campus and greater community.

The university is providing effective environmental and sustainability education through interdisciplinary learning, and also is using the environment and sustainability to develop STEM knowledge, civic knowledge, and critical thinking skills. All first-year undergraduates are required to take a seminar as part of the core curriculum. A course called The Global Experience examines personal and social responsibility in domestic and global contexts. In developing their own view of the world and its many people, societies, and environments, students evaluate the complex relationships that both promote and obstruct human interaction. The Sustainability Faculty Scholars Program provides faculty with resources and support to incorporate or enhance a focus on sustainable principles and practices in their lessons. Some 45 faculty members have participated in the program from various disciplines ranging from art to biology to business administration.

As part of the undergraduate core curriculum, students are required to take a natural science laboratory course. Many of these courses develop STEM knowledge and thinking skills, using the environment or sustainability topics. Many of the 36 faculty members working on sustainability-related research topics as their own scholarship and/or as faculty mentors to student research are engaged in STEM related projects.

Elon University is a national leader in civic engagement, serving as one of the model campuses for the Carnegie Classification on Civic Engagement. The school also has been recognized as one of the nation's top universities for community service by earning a Presidential Award in the first President's Higher Education Community Service Honor Roll. The Kernodle Center for Service Learning and Community Engagement is the primary gateway for students, faculty, and staff to work with community partners in service that benefits the university and the surrounding community. Based on student self-reporting to the Kernodle Center in fiscal 2014, 3,286 students engaged in 128,869 hours of community service.

Among the resources on campus for experiential learning, the Elon Environmental Center at Loy Farm demonstrates the integration of food and natural systems with the built environment. Its activities and functions include food and farming systems, a design-build studio for responsible architecture, the Piedmont Prairie ecological restoration project, and long-term ecological research. The prairie restoration project is the result of a proposal from students in the school's Restoration Ecology course. The prairie was seeded with seeds native to the region, and now provides an annually maintained refuge for native plants and animals. It also is part of an ongoing research project, assessing changes in vegetation over time.

The Elon University Forest is a 56-acre protected natural area just north of campus that serves as a teaching resource and research site, as well as a service learning site and quiet place for reflection and observation. It is the largest remaining intact forest in the area, and safeguards thousands of species of plants, animals, and



organisms. Some trees in the hardwood sections of Elon Forest, which make up more than 50 percent of the property, are estimated to be 150 to 200 years old. The forest is used by a variety of courses and as a site for faculty-mentored undergraduate research. Sustainability principles are woven throughout the fabric of campus life and learning at Elon University, and the community is crafting even more ambitious plans to shape the future.

## Ohio

### Urban Community School, Cleveland, Ohio

#### *An Outdoor Oasis for Students and Refugees Alike*

Urban Community School is located on the near west side of Cleveland. Urban was founded in 1968 and was once located on two campuses, St. Malachi and St. Wendelin parishes. In 2005, the school relocated to a new building at on Lorain Ave. The 2005 building was built on a brownfield consisting of an unused warehouse and its adjacent property. The building is occupied by 550 students from preschool through grade eight, 74 percent of whom are eligible for free or reduced price lunch. In 2014, the school built an addition for middle school students.

Urban Community School has many building features that translate into a healthy environment conducive to learning and the conservation of the Earth's resources. Urban features natural light in the middle school addition. There are timers on computers that power down devices at night, and lights that turn off when rooms are not occupied. Urban installed ten solar panels, resulting in an 80 percent cost reduction for electricity of the building.

The school encourages carrying reusable water bottles, the middle school wing has refillable water bottle stations, and water fountains throughout the school have filters. The Learning Garden has water retention features, and includes many drought-tolerant species native to Ohio. Recycling is routine throughout the school, and composting has begun in the early childhood wing. Other conservation efforts include recycling ink cartridges and purchasing 100 percent recycled paper products.

In 2014, Urban partnered with The Refugee Response and the Cleveland Botanical Garden to establish the Learning Garden. The half-acre garden is the fruit of a partnership with an organization that assists refugees to establish themselves in the United States. Many of the refugees come with a background in agriculture, and put that expertise to work by helping to maintain the Learning Garden in the summer months in exchange for access to school-owned production gardens. Production gardens are used for produce that is sold to local restaurants. The Cleveland

Botanical Garden staff facilitated the design of the Learning Garden by conducting a series of focus group sessions for staff, students, parents, and Refugee Response staff. The result has been a beautiful garden that students and staff cherish and use frequently. Vegetables from the Learning Garden supplement school lunches, and teachers run a garden club.

KaBoom!, a national nonprofit that works to bring balanced and active play into the daily lives of all children, facilitated the installation of a playground designed for primary students. MetroHealth hospital sponsors a weekly afterschool exercise program, and Urban offers karate classes to students.

Primary grades go to Cleveland Metroparks, Rocky River Nature Center, Huntington Nature Center, and the Cleveland Zoo. Older students have had various trips to the Cuyahoga Valley National Park, including visits to Greenberry Farm, the Ledges, and Towpath Trail.

Middle school students conducted a West Creek water quality project, working with a regional EPA official. They studied the stream ecosystem and water quality. They conducted data analysis, drew conclusions about how humans have affected the site, summarized findings, produced a report, and prepared a presentation.

All students in the sixth grade go to the Cuyahoga Valley Environmental Education Center for a four-day, three-night environmental camp, thanks to support from Conservancy for Cuyahoga Valley National Park. This camp immerses students in watershed and sustainability concepts and issues. Students build knowledge and skills around the topics of water quality, biodiversity, and applying sustainable practices to the design of a building. Students also practice green living by measuring food waste, separating items for compost or recycling, and reusing materials in creative ways. Upon returning from camp, sixth grade students develop and implement a sustainability project. One recent project focused on the pros and cons of various energy sources. Students presented findings to other classes and developed an energy conservation plan for the school to implement. Students encouraged practices such as turning off lights and computer monitors, and analyzed the electricity bill at both the start and end of the project, resulting in a \$900 reduction in electricity charges.



## **Pennsylvania**

### **Park Forest Elementary School, State College, Pa.**

#### *A Green Schoolyard for Park Forest*

Park Forest Elementary School (PFE) strives to be a caring community connecting learning with the world outside. Using the four lenses of community, democracy, inquiry, and environment, PFE works to provide opportunities for all learners to engage meaningfully in authentic learning experiences. As an elementary school, PFE provides the building blocks for teaching and learning the basic tenets that support life and ensure a sustainable environment for generations to come.

PFE has reduced energy use, and tracks resource usage in ENERGY STAR Portfolio Manager, beginning with a score of 73 and progressing to 84. The school has reduced its waste footprint greatly in its move toward zero waste. These efforts have been recognized with nine different Waste Watcher Awards through the Professional Recyclers of Pennsylvania. PFE received a PLT GreenWorks grant that provided seed money to construct an outside compost bin and garden compost program. The school has won grants from Captain Planet and the Pennsylvania Department of Education to support school gardening efforts.

PFE's partnership with Penn State University afforded the school the opportunity to build a greenhouse at that served as a model for two that were built in Kigali, Rwanda at the Star School. The principal worked on the greenhouses both at PFE and in Rwanda, and helped install an irrigation system in the Rwandan greenhouse. PFE's grounds boast vegetable, herb, pollinator, butterfly, and rain gardens. The school participates in the Earth Force service action program, whereby students identify a problem and work collaboratively to address it. Students designed and built a butterfly citizenship garden, and participate in Monarch Watch. They study water conservation and quality, in addition to myriad other environmental topics, in a hands-on, authentic manner.

PFE also garnered a three-year grant from the Pennsylvania Department of Environmental Protection that allowed the school to establish a professional development model that encouraged the use of the school's schoolyard. This work has been enhanced by various Boy Scout projects. Efforts have included a nature trail; the construction of two raised bed gardens; the building of a cold frame to allow for early preparation of plants for the garden; the construction of honeybee hives, which have garnered ongoing support from local beekeepers; the installation of rain gardens and wetlands, with a grant from Environmental Concerns; the development of a pollinator garden that accents new school signage; the installation of bluebird and bat boxes to enhance wildlife on school grounds; an amphitheater as an



instructional area; an interactive sundial; and an animal observation area. PFE has received donations of two separate weather stations.

When the building was reconstructed, it was designed with a southern exposure and a two-story classroom main wing. Lights in all classroom spaces have two different settings, and there are automatic light shutoffs in those spaces when there is no movement. The water in the bathrooms is regulated through motion sensors to reduce water use. PFE has installed a rain garden and wetlands area outside of one of the wings of the school for both a learning area and for the value of the recharge of the water.

PFE participates in district-sponsored health and wellness programs for both students and faculty. Each year, students participate in Apple Crunch Day, Walk to School Day, and Go for the Greens. With the support of a grant, the physical education teacher purchased bicycles to teach bicycle safety and recreational riding to all fifth graders. She also encourages students to be active daily outside of school, and to share photographs for her Wall of Fitness. For the past several years, PFE has worked with a local school psychologist to bring mindfulness practices to the school. Twenty-five percent of food served in the cafeteria is locally grown.

## **Slippery Rock University, Slippery Rock, Pa.**

### *Rocking and Roasting: Taking Campus Sustainability Efforts International*

Slippery Rock University (SRU) signed the American College and Universities Presidents' Climate Commitment in 2009, and participates in the AASHE STARS reporting system to benchmark progress in the three ED-GRS Pillars. SRU has received achievement awards in a number of categories, including the National APPA Sustainability Award in Facilities Management (2015), and Healthiest Employers' One of the Top 100 Healthiest Workplaces in America award (2014). SRU also has been recognized for fostering a campus culture that embraces physical activity, achieving a Gold Level Campus ranking from The American College of Sports Medicine for its Exercise is Medicine program.

SRU has achieved LEED certification for eight buildings, accounting for 32 percent of the total building area. The university uses a variety of tools to assess campus buildings' performance, including an AASHE Climate Action Plan, which includes energy audits and building recommissioning activities to assess the performance of facilities. SRU updates its greenhouse gas emissions inventory annually, and has documented a reduction of 18 percent in emissions since the base year of 2005.



The university also tracks progress in reducing energy use, and has shown a 22 percent reduction in energy use since the base year 2005, despite a 32 percent increase in campus facilities area during this period. These results have been achieved using a variety of strategies, including physical renovation of buildings; replacing aging facilities with new energy efficient facilities, implementing energy service company programs and behavioral change programs, reducing coal use by 71 percent, and installing a central heating plant baghouse that minimizes airborne particulates.

In order to protect the college environment and on-campus Audubon Sanctuaries, SRU uses a Land Use Request Form and process that requires presidential approval of all activities involving campus grounds. SRU also provides Green Fund Grants to fund sustainability and environmental projects proposed by students, faculty, and staff. Other efforts to reduce the university's environmental impact include providing free bus service for on- and off-campus activities; investing in electric maintenance vehicles; producing biofuel from used cooking oil; recycling, composting, and minimizing waste; using local foods and trayless dining in dining halls; using green roofs and an onsite stream and retention pond system to reduce stormwater runoff; and using alternative energy, including onsite demonstration systems and 7.5 million kilowatt-hours per year in purchased electrical renewable energy credits.

A President's Commission on Wellness was created in 2014 to coordinate and facilitate educational opportunities related to healthy lifestyles, and to support free activities such as Zumba and yoga classes, a 10,000 step-a-day walking program, nutrition classes, and a noon jogging club. Staff also can earn "Healthy U. Points" that reduce health insurance premiums. SRU's Student Health Services, which is staffed by twenty health care professionals, is open 24/7 to provide clinical care, health promotion services, and public health services to all SRU students. Students visiting the campus health center for nonemergency care are screened for physical activity participation; if students report fewer than 150 minutes of moderate intensity physical activity per week, they are counseled on physical activity and offered a referral to receive personalized guidance for their own physical activity program.

SRU's President's Commission on Sustainability provides guidance on community outreach activities and development of additional curricular and co-curricular sustainability courses and activities. SRU currently offers 19 sustainability-focused courses, 29 courses that include sustainability components, eight sustainability-focused undergraduate degrees, three sustainability minors programs, and two sustainability-based master's degree programs, including a Master of Education degree in Environmental Education. The university is developing a Sustainability Certificate that students of any major can achieve by completing one course from each of the three triple bottom line metrics of sustainability (social, environmental,



and financial), a capstone experience in principles of sustainability, and 12 hours of stewardship. Immersive, sustainability-focused educational study programs are offered to graduate assistants, student workers, and student volunteers at the 71-acre Robert A. Macoskey Center for Sustainable Systems Education and Research, where they can gain hands-on experience in a wide variety of environmental and sustainability concepts, including alternative energy projects, organic gardening and permaculture techniques, composting, energy conservation, and environmental education.

SRU's general science curriculum includes providing students with a deep understanding of and connection with the life, physical, and earth sciences. For example, the Bachelor of Science degree program in biology includes ecology course components, and the chemistry department offers an environmental chemistry program designed to introduce students to all aspects of the environmental field.

SRU regularly partners with the Slippery Rock Rotary Club, Slippery Rock in Bloom, local schools and businesses, and Sustainable Slippery Rock (SSR), a community organization focused on helping local residents become more aware of sustainable practices and educating them on environmental/sustainability issues.

The SRU Sustainable Energy Accelerator is a unique, SRU-managed nonprofit organization led by the School of Business that partners with many local businesses and nonprofits to provide students with practical experience in helping organizations become more sustainable and energy efficient. One such project is the "Rock Roast" triple-certified coffee program, in which coffee from shade-grown organic coffee plantations will be produced and sold in partnership with the Smithsonian Institution's Migratory Bird Center and Golden Valley Farms. Another Sustainable Energy Accelerator project involves partnering with a nonprofit to research, build, operate, and document best practices for an aquaponics garden that then will be replicated in a village in Ghana.

## **The School District of Jenkintown, Pennsylvania**

### *Where Eagles and Imagination Grove Lead Ecological Action*

Since the spring of 2015, when the School District of Jenkintown was recognized by the Pennsylvania Green Ribbon School program, Jenkintown has redoubled efforts to reduce environmental impact and promote the health and well-being of students and staff in ways that not only are fiscally responsible, but also provide ample educational opportunities for students and the community.

To encourage interest in a student led Eco-Action team, parents, Aramark Corporation, teachers, and the administration participated in a half-day field trip to an Aramark facility that serves the Philadelphia Eagles. The group was introduced to a recycling plan used by the professional football team at Lincoln Financial Field. Students and staff were impressed and left the field trip motivated.

Both the elementary school and the middle and high school participate in the NWF's Eco-Schools USA program. With the intention of participating in one to two pathways per year, the middle and high school started the year by performing a comprehensive waste audit. Science students helped to collect, sort, and measure the waste generated by the school in a 24-hour period. Statistics classes analyzed the data collected, and the student-led Eco-Action Team used the data to formulate an Eco-Action plan with the goal of diverting more waste from the landfill. Then, the elementary school implemented the same process.

Several projects on campus have resulted in a reduction of Jenkintown's environmental impact. The installation of a rain garden adjacent to a new outdoor basketball court ensures that the runoff from the paved area is handled on property, reducing erosion and possible flooding of neighboring fields and yards. The district's Home and School Sustainability Committee collaborated with Aramark to host a native planting project during the 2015 Green Apple Day of Service event. The garden now boasts several pollinator-friendly plantings with signage identifying each species.

Additional measures to reduce erosion and stormwater runoff were taken at the baseball field. An engineering study was conducted in conjunction with Jenkintown Borough engineers to correct infield drainage issues. After extensive regrading, the infield was covered with a pervious substrate to prevent any future erosion. In the spring of 2016, the school district will be in the last phase of planning to redesign the upper field and add infiltration to the design for stormwater runoff.

Inside the buildings, recent upgrades have resulted in increased energy efficiency. An ongoing interior door refurbishment project has improved the thermal efficiency of every classroom within the elementary school. In addition, the replacement of drafty windows within the middle and high school locker rooms with insulated panels and window units with higher thermal resistance has drastically improved the temperature and energy loss formerly experienced in these areas. These efforts, combined with a move in the 2013-2014 academic year to provide Chromebooks for all fifth through 12th graders, and moving to a Google-based academic platform, thereby reducing printing and copying needs, have resulted in a 10 percent reduction in electrical consumption.



Several other initiatives have focused more directly on student and staff health. A recent Green Apple Day of Service project produced classroom kits for each of the elementary school classrooms, as well as the art and science classrooms in the middle and high school. Each kit, assembled by the middle school soccer team, included two plants known for their VOC-eliminating properties, a bottle of vinegar and water, and reusable recycled rags for nontoxic surface cleaning. Additionally, the Jenkintown Walk to School Week event focuses on the health benefits of regular exercise, while also bringing awareness to air pollution and energy issues. Local businesses get involved by donating a gift certificate to be raffled off to a lucky student who had walked or biked to school that day. The annual Jog-a-Thon serves as a major fundraiser while turning every elementary child into an athlete for a cause. Letter writing is incorporated into classroom and homework activities, as the children set goals for themselves for number of laps to be run.

Throughout the year, teachers introduce each environmental initiative to students. For example, grades six and seven use the school garden as an outdoor laboratory to enhance their science lessons. Parent volunteers are encouraged to speak with students about the part insects play in food production. Students are taught on a continuous basis not just what we need to do to preserve the environment, but also why.

The district installed a photovoltaic array on the roof of the school. High school environmental classes and physics classes use the data as part of the instructional program. Instrumental to these efforts has been Jenkintown's partnership with several outside organizations and programs. The Tookany/Tacony Frankford Watershed Partnership supplied information regarding appropriate plantings for the rain garden, and provided education to the students and community at Green Apple Day of Service events. The Jenkintown Borough Environmental Action Committee supports district efforts to convert an overgrown and underused plot of land on Jenkintown property into a schoolyard habitat, filled with native species, pollinator-friendly plants, and fruit-bearing plants. This new area, aptly named Imagination Grove, serves as an outdoor classroom and meditation space, while demonstrating to the community how to transform their own properties with environmental stewardship in mind.

## **Virginia**

### **St. Stephen's & St. Agnes Middle School, Alexandria, Va.**

#### *Green Saints Implement Sustainable Practices on the Potomac*

St. Stephen's & St. Agnes (SSSAS) Middle School embodies a culture of environmental stewardship. As one of three campuses of a junior kindergarten





through 12th grade Episcopalian school in Alexandria, Virginia, the middle school is in its ninth year of sustainable focus and practices. The middle school's 304 students gain knowledge of the interdependent pieces of sustainability, live and learn in a healthy and collaborative environment, and are called actively to take a global view of sustainability through exposure and understanding of communities affected by environmental challenges.

The SSSAS administration and staff has worked for nearly a decade to create more efficient building systems, optimize transportation routes, and reduce solid waste through recycling, improved purchasing and communication. Over eight years, the middle school has addressed energy efficiency in a focused series of building performance projects, which has led to a 41 percent reduction in annual electricity consumption. The recent comprehensive retrofit of light fixtures and a total roof re-insulation project with a white surface to reduce heat absorption are expected to continue reductions in energy use. A 2014-15 ENERGY STAR rating of 64 indicates room for improvement, but also marks significant progress since embarking on energy conservation work in 2007. Many school systems have reduced waste including printing, mailing, and communication methods.

Other notable reductions include the school bus fleet's fuel consumption, which has been reduced by 42 percent. Student vehicle miles traveled have been reduced by seven percent. The diversion rate of waste has increased 21 percent since 2007. Water conservation measures have decreased the water use by 28 percent since the 2010-11 year. Trayless dining and washable dishware have contributed to the decreased volume of solid waste and water as well.

The sustainability curriculum permeates history, science, religion, mathematics, and art. Students compare renewable energy sources to traditional energy sources in laboratory experiments with wind and solar energy; they harness technology to model life in environmentally friendly cities; and they conduct horticultural experiments in the school's greenhouse. Students research the effects of past environmental disasters, as well as the harm to natural resources and populations in procuring and manufacturing for developed nations. Students sequentially learn the biological and cultural systems related to the Chesapeake Bay, a primary focal point in the three grades. Regular excursions and overnight trips to the Bay and its tributaries place the students within some pristine as well as some contaminated areas of the watershed, in order for students to gain a comprehensive perspective on a large environmental issue that affects natural, economic, and cultural systems.

The middle school faculty continues to seek ways to challenge students to understand the need for responsible behaviors related to care of the planet. To heighten student awareness of energy-saving measures and to stay vigilant in the effort to decrease carbon emissions, a real-time energy dashboard is available



online and in the hallways. It reports daily, weekly, and monthly progress of energy consumption. Through the advancement of regional environmental literacy, and the experience of hands-on sustainable solutions, SSSAS students gain a heightened awareness of the challenges that will define their futures.

The health of the student body and faculty is primary to the culture of the SSSAS middle school. Building mechanical systems are cleaned and inspected regularly for optimal performance. Integrated pest management is used, and stormwater from parking lots and walkways is managed through bioretention. A thoughtful physical education program allows students five hours each week of sports and recreational activities and which include proper conditioning, balanced nutrition, and good sportsmanship. Over 40 percent of the faculty is engaged with the students as coaches and leaders of outdoor excursions. Moral and ethical character development is equally important, as the school's honor code invites each student and faculty member to be reminded of their key role within a respectful and honorable community. Discussion and counseling groups are positioned to maintain healthy student mindsets, as well.

The school's director of environmental stewardship coordinates long- and short-term sustainability pursuits with the faculty, administrators, dining, transportation and facilities staff on the 23-member Environmental Stewardship Committee. The director advises on strategic plan initiatives, capital improvements, and community-based initiatives, as well as family education at parent-teacher association speaking events. The Environmental Stewardship Committee runs the annual Students for Sustainability Conference, which brings regional schools together for a day of environmental education and camaraderie. Field trips and outdoor learning opportunities take students to settings that inspire and that serve as the basis for place-based learning.

The middle school makes explicit expectations for responsible habits, and emphasizes a sustainability perspective in all facets of school life. It also seeks to broaden the school community's view of sustainability as a global issue when it examines the needs of other communities challenged and affected by practices that threaten a sustainable lifestyle.

## **Charlottesville City Schools, Virginia**

### *A Web of Partnerships Lead Students Toward Sustainability*

Charlottesville City Schools is an urban school division located in Charlottesville, Va. Of 4390 students, 54 percent are eligible for free and reduced priced lunch, and nine

percent are limited English proficient. Charlottesville City Schools and the City of Charlottesville have a long tradition of environmental stewardship. Charlottesville City Schools students learn about the natural world through experiential learning projects that take them outside within the schoolyard and beyond.

Together, the city and schools have created an environmental sustainability plan and a clean energy plan to assess and reduce energy use and greenhouse gas emissions, along with other resource conservation efforts. Seven of nine Charlottesville City Schools facilities are ENERGY STAR certified. Over 10 years, the division has reduced greenhouse gas emissions by 33 percent, energy use by 27 percent, and water use by 35 percent. The division avoided energy costs of \$1.8 million over the same period.

To make these gains, heating plants in all schools were upgraded from antiquated 60-70 percent efficient boilers to new 90-plus percent efficient equipment. Training city facilities maintenance staff to self-install the solar photovoltaic systems enabled the city to install almost twice the anticipated power generation capacity at a cost of \$3.45 per watt, half the industry standard at the time. Charlottesville City Schools composts over 35 tons of food products. This compost is returned to schools for use in gardens. Schools have worked with multiple Charlottesville city departments to install rainwater harvesting systems and bio-retention areas at four school sites. There are rain barrels at every school, and elementary students have installed rain gardens.

The Charlottesville city school board has adopted a wellness policy to promote physical activity and healthy nutrition among students and staff. The division offers several incentives to all benefit-eligible employees to improve staff wellness in the areas of nutrition and increased physical activity, including subsidized health club memberships and a hike/bike incentive program to encourage alternative transportation. As part of the Safe Routes to School program, Charlottesville has been working to improve the safety of walking and bicycling to school by providing and enhancing sidewalks, crosswalks, pedestrian signals, bike lanes, bike racks, and other multi-modal facilities near its schools.

The Harvest of the Month program provides youth in Charlottesville City Schools with a means to explore, taste, and learn about seasonal vegetables and fruits from the garden, in the classroom, and on the plate. The program highlights a locally available crop each month by providing a fresh, healthy snack to students' classrooms one Thursday each month. Charlottesville City Schools partners with a local nonprofit, City Schoolyard Garden (CSG), to host gardens and environmental education programs. In partnership with the school district, CSG manages seven organic gardens at district schools, and creates experiential garden programming for over 2,750 Charlottesville City Schools youth and their families. The two schools



that are not partnered with CSG have gardens that are 100 percent managed by students through a Farm to Market class.

The division collaborates with different recreation organizations such as Just Swim For Life, The Boys and Girls Club of Charlottesville, City of Promise, and Charlottesville Parks and Recreation to provide additional physical activity opportunities after school hours. Charlottesville City Schools has developed the School Health Advisory Board, which advises the Charlottesville City School Board in the development and evaluation of policies and programs that support the health and well-being of students, families, and school staff.

Charlottesville City Schools is a partner in The Charlottesville Albemarle Coalition for Healthy Youth (CACHY), a collaborative group of community members and agencies who care for and about young people. CACHY convenes to identify needs through available data, harness resources, advocate for services for young people, provide information, and raise awareness about current trends and programs in the community.

Charlottesville offers a number of hands-on environmental education programs so that students can get their hands in the garden, the Rivanna River, or explore their school ground. Students learn about the natural world at school, in the schoolyard, and through project-based learning around the community. For example, fourth graders at Burnley-Moran Elementary School presented evidence to the city council about the threat of Emerald Ash Borers, a small green beetle, to native ash trees. Their information was included as an insert in recent utility bill mailings to customers. All fourth grade students take a field trip to Camp Albemarle to learn about watershed issues through field-based activities. In particular, science teachers have worked to incorporate environmental education and ensure outdoor learning.

## **Virginia Beach City Public Schools, Virginia**

### *LEEDing by Sustainable Example in Virginia*

For over twelve years, Virginia Beach City Public Schools (VBCPS) has been moving toward a more sustainable school model. Three overarching goals drive sustainability throughout the division: 1) develop a sustainable building infrastructure; 2) integrate sustainable practices throughout the division; and 3) educate the public about sustainability.

The first goal is achieved on new construction by designing new buildings to meet LEED certification. To date, VBCPS has completed eight LEED buildings ranging





from basic certification to Platinum. The ninth LEED project is currently under construction, and the tenth is in the design phase. The district addresses existing buildings through performance contract work and ENERGY STAR certification. Since November 2008, VBCPS has spent \$14 million in performance contract work, resulting in \$1.8 million in cost avoidance each year. VBCPS has 31 ENERGY STAR certified buildings. Since fiscal 2006, VBCPS has increased in size by approximately nine percent to over 10.6 million square feet, and yet still has reduced energy use by 24 percent per square foot.

VBCPS has a full-time energy manager and an energy management plan. Many schools offer garden composting, and two schools are piloting whole-school composting. The division is home to several demonstration renewables that serve as learning tools, specifically wind turbines, solar hot water systems, and photovoltaics. All elementary schools are now irrigation-free. The two remaining school sites that require additional water are irrigated with harvested rainwater.

The Sustainable Schools Committee is comprised of representatives from various departments across the division, including custodial services, school plant, transportation, and facilities. This group is responsible for implementing and monitoring sustainable operational programs like green cleaning, no idling, and integrated pest management practices. Each school has a full-time nurse. Students participate in between 150 and 450 minutes of physical education per week, depending on the grade level.

Each school appoints a sustainable school liaison. VBCPS has 64 schools with outdoor teaching gardens, 72 schools with environmental clubs, and over 60 schools that partner with third-party environmental organizations. Participation in various programs and initiatives are promoted through the district's own Sustainable School Recognition Award.

Some examples of sustainability education include meaningful watershed experiences, student participation in an Urban Tree Canopy project, and LEED building features as part of the middle school curriculum. VBCPS benefits from an environmental literacy grant from the Chesapeake Bay Foundation. The district offers an annual sustainability course as professional development for all VBCPS employees, as well as other more specific quarterly options. VBCPS expects all architects, engineers, and consultants working on building projects to provide an educational component to their work. Within the division, 59 percent of students take AP Environmental Science, with 42 percent of these scoring a three or higher. More recently, the division began offering a two-year sustainability career course open to all 11th and 12th graders.



Part of educating the public is making information available. In 2012, VBCPS hired an independent third party to conduct a divisionwide greenhouse gas study. In 2015, VBCPS published a comprehensive emission reduction plan to address GHG emissions identified in the 2012 report. The division hosted and had a key role in planning the 2015 Green Schools National Conference.

## **Washington**

### **Columbia Crest A-STEM Academy, Ashford, Wash.**

#### *Real-Life Outdoor Learning in Rural Washington*

Columbia Crest A-STEM Academy (CCASTEM) is a rural school in the southeast corner of Pierce County. This small kindergarten through eighth grade school serves 200, with 58 percent of students receiving free or reduced price lunch. CCASTEM underwent a transformation from a kindergarten through fifth grade school to a kindergarten through eighth grade applied STEM (A-STEM) academy, doubling its population over the last two years with a wait list of incoming kindergartners for the next three years. This transformation has been the result of a deliberate effort to capitalize on early educational opportunities for students in an outdoor place-based educational campus, incorporating outdoor lab and learning sites.

CCASTEM was built in 1952, yet has incorporated excellent energy efficiency management for a small rural site. The building is equipped with lighting and HVAC occupancy sensors for security and long-term energy savings. The school system received a \$1,000,000 grant to equip all schools with occupancy-sensitive thermostats and HVAC sensors, which help continue an ongoing decrease in energy consumption. In addition, a propane heater replaced an oil fuel generator, as well as other updates. Staff and students participate in recycling of aluminum, plastic, ink cartridges, and tallow, and use only certified-sustainable paper. In addition, they practice and teach upcycling and Terracycling, and have presented their findings to the school board. Students have lobbied for and received water bottle filling stations, which is unusual for a small rural campus.

In 2014, the dream of having a project-based school site became a reality. CCASTEM is nestled between Rainier National Forest Tahoma Woods 100 acres and the Mount Rainier National Park itself. Students have outdoor labs for stream bed investigations using water flow meters, which were granted to the school last year, and salmon raising tanks. In addition, the school is part of a district that is in the process of visioning with a nonprofit partner, Garden-Raised Bounty (known as "GRuB"), for the future of a 3.2-acre farm that will provide opportunities for growing sustainable crops, and food production for town and school usage. The farm

includes a resident barn owl for organic owl pellet discovery. The school has designated “sit spots” in the woods behind the school that allow students to sharpen their observation skills in an outdoor area. Students record changes in an area from season to season, and study how forest areas evolve over time.

Environmental concepts are integrated into the school’s literacy and math program as STEAM topics are provided every day in an embedded, practical, hands-on learning format with programs such as Engineering is Elementary. The CCASTEM library is fully outfitted with environmental resources including books, videos, and hands-on examples of plants and animals. All staff receive training in Terracycle, building worm bins, worm bin composting, recycling, and insect education.

Students are involved directly with Pierce County environmental educators, national park staff, University of Washington Pack Forest employees, and teachers for sustainability and conservation efforts. Hands-on learning through STEM fairs, engineering challenges, field trips, and outdoor classroom settings give students real life learning and experiences unlike those in a traditional school. Students experience the river, forest, and mountain as a system of cycles by documenting river flow, glacial melt, and turbidity using current tools as well as long-term investigations. The results of climate change, river flows, lahar concerns, and glacial health are tangible and visible with Mt. Rainier only eight miles away. This is not book learning, but real life, with results and consequences that students are able to study in depth.

CCASTEM is fortunate to have multiple partners supporting STEM education. These partners include environmental educators at Pierce County Public Work and Education and Youth Outreach Program with Mount Rainier National Park, Nisqually River Education Project, University of Washington Pack Forest, and Northwest Trek. In 2014, CCASTEM earned the STEM Lighthouse Grant award for the state of Washington, making the school one of fewer than 10 elementary schools in the state with this distinction. Students have a variety of opportunities to get involved in community service with the Nisqually River Educational Project. They plant trees, test water, and remove invasive species.

For the past three years, more than 100 students from first through eighth grades stay after school on Tuesday and Thursday afternoons to be part of after school programs including robotics, Sustainability Club, and sports. The aim of these programs is for students to incorporate STEM activities, such as outdoor investigations and engineering practices, to activities outside of the traditional classroom setting. The school also travels to Northwest Trek, Mt. Rainier National Forest, and Pack Forest University of Washington for nature-based educational opportunities incorporating cutting edge tools, hiking, collaborative nature observations, and collaboration with outdoor organizations.



CCASTEM has a new guidance counselor and nurse to provide monthly guidance classes, along with individual sessions related to bullying, peer relations, and self-esteem. Mental health services are provided through a partnership with Multicare, a local health provider. Students spend at least 150 minutes each week in physical activities, with at least 50 percent taking place outdoors.

## **Gaiser Middle School, Vancouver, Wash.**

### *Everyone's On Board for Resource Conservation*

Gaiser Middle School's work in the area of natural resource conservation and sustainability began in 2009 when two teachers partnered with Washington State University Vancouver scientists in the National Science Foundation's Graduate STEM Fellows in K-12 Education project. This resulted in students' initiating a restoration project involving the removal of invasive species, and replanting native trees, grasses, and roses in an area now referred to as Gaiser Pond. This stepping stone project, involving 200 students, eventually expanded to all of the sixth and seventh grade Gaiser science classes and National Junior Honor Society students. These students completed the school's first Washington Green School-level waste and recycling initiatives in 2011. Since then, the school's National Junior Honor Society has completed five levels of the state certification by focusing on water, transportation, energy, and a healthy building, in addition to their original focus of waste and recycling.

These efforts have distinguished Gaiser as a leader in the area of resource conservation, including through ENERGY STAR certification. Gaiser's sustainability efforts now involve the majority of its 930 students, 68 percent of whom are eligible for free and reduced price lunch, in identifying educational opportunities and integrating sustainable procedures into daily operations while cultivating a culture of conservation. For example, science teachers employ used milk cartons for classroom labs. Gateway to Technology classes promote the use of recycled materials in the designing of their engineering projects. Science and art classes are paper use donated cloth towels, rather than paper towels, which are washed with environmentally safe soap and reused.

Partnership and collaboration are common threads through Gaiser's conservation efforts. The school has partnered with Vancouver Water Resource Center, Waste Management, Washington Green Schools, Clark County Public Utilities, and Vancouver Public Schools facility administrators to reduce use of electricity and natural gas, water consumption, and solid waste production; and increase recycling and composting programs, including food scraps from the cafeteria.





Additionally, Gaiser science students work with county water resource managers to evaluate the results of monthly tests of the water quality of the campus bioswale, Gaiser Pond. Students monitor water quality by testing the phosphates, nitrates, pH, turbidity, fecal coliform, and dissolved oxygen. They communicate their findings to the student body and the community at large by annually participating in the Clark County Watershed Congress. While Gaiser is striving to improve its on-campus water quality, students are committed to monitoring school runoff quality, and are teaching their peers to keep the campus clean to prevent debris from entering the drainage system.

In addition to preserving a healthy natural environment, Gaiser also focuses on sustaining a healthy school environment. These efforts include a comprehensive health and wellness program, which includes both physical and emotional well-being, improvements of indoor environmental quality, and outreach programs such as food and clothing drives and community beautification projects. Gaiser students make connections to this work and their future college and career pathways by through Career Cruising software, which allows them to share their academic accomplishments, health goal achievements, and other successes, all focused on the overarching goal of becoming contributing independent members of the global community.

### **Lakota Middle School, Federal Way, Wash.**

#### *Real-World Sustainability Learning to Benefit a Community*

Lakota Middle School, which has celebrated over 50 years of excellence in educating students in the Federal Way community, rededicated a new building in 2010. Staff and students are very proud to offer 21st-century education within a construction modernized to Washington Sustainable Schools Protocol, including criteria related to site, water, materials, energy, indoor environmental quality, planning, and operations. The building is adjacent to an extensive wetland, and includes the use of photovoltaic roof panels with an instructive feature to educate students about solar energy.

During the 2011-2012 school year, a group of students voiced interest in creating a school within a school that advocated for environmental sustainability, a community garden, and stewardship. The district incorporated this student vision into the Integrated Environmental Sustainability (IES) Academy. The academy provides students with opportunities to construct their own understandings with clear awareness of, and concerns about, economic, social, and ecological interdependence in their local, state, national, and global communities through direct



experiences in hands-on and mind-on learning in a highly engaging place- and service-based environment.

With a student population of nearly 800, of whom 50 percent – and rising – are eligible for free and reduced priced lunch, the idea of becoming economically responsible and socially accountable, as well as providing food from garden to table, encouraged administration and staff to implement a new program. They began by developing a sixth and seventh grade, with two teachers, a part-time coordinator, and 50 students. With the momentum provided by another school in the district being named a 2012 U.S. Department of Education Green Ribbon School, and the creation of the Federal Way Green School Coalition, Lakota began the new academy.

Students learn all core subjects -- language arts, math, science, and social studies -- by solving real-world problems through interdisciplinary, project-based sustainability learning with a service component. They design solutions to issues such as water and energy use, resource conservation, climate change, clean air, sustainable food and product design, all while seeking to maximize the health of their community, social equity, and a sustainable economy. The school's 2015-2016 service- and place-based project involves using the engineering design process and plan to design and create a rain garden to reduce erosion caused by stormwater and garden drainage.

Students created a Green Team in partnership with King County Green Schools Program to reduce environmental impact and costs. Lakota was recognized as a Level One (waste reduction and recycling) King County Green School. Students also attended Islandwood's School in the Woods for outdoor education, and partnered with Federal Way Community Garden Foundation to plan the Lakota Community Garden.

Parents and students advocated that the IES Academy extend to eighth grade with 25-30 openings in each grade level, adding an additional teacher. Curricula were developed around essential questions that are aligned with environmental and sustainability standards defined at district and state levels. Students attended the Make a Difference Summit to present an initiative to create a Foam-Free Federal Way with the hope of eliminating Styrofoam in the school cafeteria. With the help of grants, students were able to attend the Mt. Rainier Institute, beginning a partnership to further provide field experiences and outdoor education with the University of Washington and Mt. Rainier National Park.

By the 2014-15 school year, the IES Academy was able to continue, sustain, and further develop integration of environmental and sustainability education at Lakota in all grade levels. Lakota maintained Levels One and Two while working toward Level



Three (water conservation) with King County Green School program. Staff attended training for Washington Green Schools Program. Lakota received approval from the school district and the Federal Way Green School Coalition to construct an onsite, 10,000 square foot community garden, allowing the school to have a new outdoor community learning space.

Opportunities and adjustments arise with every new academic year. Changes have occurred, but the commitment from administration, PTA, and staff is overwhelming. Eighth grade sciences are taught with a CTE/Sustainable Design/STEM curriculum created in collaboration with two district middle schools. Teachers within the academy work closely in a professional learning community to collaborate on learning experiences and integration of content, meeting the needs of all students.

## **Bethel School District, Washington**

### *Creating a Culture of Conservation Among the Leaders of Tomorrow*

Bethel School District (BSD), serving 18,000 students, 49 percent of whom are eligible for free and reduced priced lunch, is committed to the belief that, by building a strong foundation, it can create a culture of conservation. Over the last 10 years, the Bethel community has proven that this focus helps build students into better leaders along with maintaining a healthy learning environment, all the while saving taxpayer dollars and reducing greenhouse gases.

With superior facilities management techniques, BSD has avoided paying an additional \$7.2 million dollars in electricity, natural gas, and water, a 28 percent reduction in costs. This money is put back into the classroom to enhance student learning and achievement. While BSD's initial focus was on reducing costs and saving precious natural resources, over time it has evolved into a philosophy that permeates the district culture and has achieved additional unexpected benefits. Greater classroom comfort enhances learning. Efforts have saved over 43,000 metric tons of CO<sub>2</sub> in greenhouse gas emissions. These achievements were underscored in one recent Bethel school bond promotion campaign slogans; "Building a better future for all Bethel students," referenced BSD's cost-effective construction, energy efficient buildings and eco-friendly schools. BSD communicates actively that it constructs green buildings and then maintains them using sustainable practices.

Over the last six years, BSD has received \$1.2 million in state energy grant money. This funding, along with an additional \$400,000 in local utility rebates, has been used to fund \$2.7 million in energy efficiency school projects. These upgrades



enabled Bethel to meet the new federal standards for lighting efficiency in 100 percent of its facilities. One portion of the grants upgraded HVAC systems to allow more efficient operating of BSD buildings, creating a better classroom environment. The main portion of the grants enabled Bethel to retrofit 80 percent of district exterior lighting to LED, providing better, longer lighting with a 70 percent reduction in electricity use. This includes a major retrofit of the stadium's field lights to LED, the first high school with this lighting on the west coast.

Whether the building is old or new, BSD oversees an exceptionally efficient resource conservation program. All of BSD's 27 eligible schools are ENERGY STAR certified, with an average score of 93. This continued success has led to other awards. In 2012, the school district was recognized with two ENERGY STAR Leader awards: The Top Performer Award (one of 19 nationwide) and the Leadership in Reducing Greenhouse Gas Emissions Award (one of 13 nationwide). BSD uses both Portfolio Manager and EnergyCAP software to track resource use. This work extends beyond the building, as BSD works with parent and community groups and partners with local businesses.

BSD collaborates with other local government agencies to teach sustainability concepts. Pierce County Recycling has provided free training for staff and students on waste audits. Students participate in collecting, sorting, and weighing material. The information gained is used to plan for future projects and points of emphasis. Results are measured to show improvement or where additional training is needed.

Spanaway Middle School science club did a weeklong collection of Styrofoam lunch trays, during which students collected, cleaned, stacked, and weighed all the lunch trays. After computing costs, it was determined that purchasing and washing reusable trays would pay for itself. The students presented the idea to the school board, where the project was approved and the trays purchased. It turned into a six-month payback on the initial costs, with no noticeable increase in domestic hot water use. An additional benefit was that custodial staff had a daily reduction of two-thirds of the lunchroom trash.

Bethel Middle School's Green Team pioneered a project selling reusable "Bulldog bottles" to help reduce plastic water bottle usage. This led to a partnership with Pierce County Sustainability for a grant to install a water bottle filling station, a story highlighted in a local newsletter sent to the 242,000 homes in Pierce County.

A partnership with LeMay Inc., the local refuse provider, and Toray, a local manufacturing company, provides BSD schools with free repurposed recycling containers. The increase in recycling has yielded big dividends. Since 2009, BSD has avoided paying an additional \$285,000 in trash costs. This 20 percent reduction also prevents BSD from sending an additional 2,300 tons of waste to the landfill.





BSD has an exceptional agricultural program that teaches students how to balance green techniques and concerns with actual business practices. Through the Bethel High School greenhouse, students learn how to run a full-scale commercial greenhouse operation, culminating in a spring plant sale. In Plants and Landscaping class, students learn to take care of a large campus. Students mow, edge, prune, plant, and transplant different species around the school, learning safety, teamwork, and business skills. Students also are involved in state fish hatchery projects, learning conservation with an eye toward the future.

At the high school career fair, BSD's resource conservation manager works with students to promote the green jobs of the future. Students are able to perform walk-around building audits with the resource conservation manager, learning how building systems are designed and operated. They are encouraged to pursue science and engineering careers, and discuss how all areas of study are needed for a more sustainable future.

## **Issaquah School District, Washington**

### *Green Schools Royalty in King County*

The Issaquah School District practices resource conservation, and engages students, staff, and all members of the school community in environmental stewardship. Sustainability is a major focus for the district, where a comprehensive approach includes the following goals: 1) implement and expand waste reduction and recycling practices and other conservation actions by operating environmentally efficient and responsible facilities and departments; 2) involve the whole school community in stewardship by developing strong community partnerships; 3) provide instruction about conservation, natural resources, and the environment at all grade levels in an interdisciplinary manner through science, the social studies, the humanities, and other appropriate curricular areas; 4) increase and improve the leadership capacity in students and staff by developing a model of collaboration, innovation, and creativity.

Issaquah began participating in the King County Green Schools program in 2005. It achieved Level One in 2011, Level Two in 2014, and continues working to achieve Level Three. In addition, every school in the district has also participated in the program, with 23 schools achieving Level One, 17 Schools achieving Level Two, eight schools achieving Level Three, and seven schools achieving Level Four. Issaquah had the first school in King County to achieve level Four. Each school has set a goal to achieve the next level, with the overall goal that all schools and the district achieve Level Four by 2017.



Issaquah has reduced its environmental impact and costs by having a comprehensive waste reduction and recycling program. The district's recycling rate has increased to 50 percent since beginning the program, with seven schools recycling at a rate of 60 percent or more. All 24 schools in the district have implemented a recycling and waste reduction program and, as of 2012, have achieved a combined total recycling increase of 6,091 cubic yards per year and a combined volume garbage decrease of 4,301 cubic yards per year.

The district's energy conservation program has resulted in the district using 4.6 percent less energy even though the district has added nearly 36 percent more square footage in new and renovated school facilities. Due to the district's water conservation efforts, the irrigation rate has stayed the same even though the district added five buildings with new irrigation systems. By installing low-flow fixtures and toilets, the district has had a 30 percent reduction in domestic water use.

Issaquah demonstrates its commitment to improving the health and wellness of students and staff by offering healthy buildings and programs. The district has developed an indoor environmental quality plan, including ways to reduce the level of air pollutants, provide adequate airflow, and reduce the use of chemicals and pesticides. The district also has comprehensive health and nutrition programs, featuring health and fitness education at all grade levels. Students participate in outdoor fitness activities that take advantage of the district's rich environment, such as hiking the trails on Tiger Mountain. The district strongly encourages the sale and distribution of nutrient dense foods at all school functions and activities. By integrating a healthy school environment, nutritional and physical fitness programs with health education, counseling and health services in schools, community and family support for counseling, and psychological and social services, the district is able to provide a holistic support system for the health and wellness of students and staff.

Issaquah has a comprehensive sustainability education program. Sustainability concepts and topics are embedded at each grade level. All of these courses include hands-on, real-life field experiences, where students are collecting and analyzing data and reporting their results. The district has developed strong partnerships with local sustainability organizations to provide professional development to staff. Environmental field trips are common. Several schools are located within walking distance to salmon streams, wetlands, wilderness parks, and lakes. These walking field trips provide interdisciplinary learning about the relationships among ecosystems and human communities.



## **West Virginia**

### **Berkeley Springs High School, Berkeley Springs, W.Va.**

#### *Watershed Education with a View Toward Green Careers in Eastern Appalachia*

Berkeley Springs High School (BSHS), serving 46 percent free and reduced price lunch-eligible students, works to protect its pristine, rural setting in the eastern Appalachian mountains of West Virginia. The school is part of the Chesapeake Bay watershed, which has provided the school with access to watershed education and environmental education funding opportunities.

Within this rural community, there has been a natural interest in the resurgence of local and farm to school movements. Local growers have supported this culture by employing BSHS students and offering options for students to grow produce on campus to be sold to the school district for use in school cafeterias. Local produce from many of the surrounding farms is sourced through the school district, and enhances the commitment to providing local, nutritious produce while contributing to economic development in the community. These practices educate students to become aware of their ability to participate in creating a healthy place to live and grow.

BSHS's facilities management is striving for safety and excellence in the products they choose for use in the school. Faculty and staff alike model behaviors that are consistent with conserving energy and recycling. BSHS has written and received recycling grants. In 2013 Berkeley Springs High School was awarded 150 riparian trees through West Virginia Project CommuniTree. These trees were planted throughout the campus as well as at the county board of education office.

BSHS takes a variety of steps to protect indoor environmental quality, and follows all codes and regulations at all times. For example, BSHS monitors for mold and works with indoor air quality professionals if mold is discovered. The SchoolDude system is used to document the preventive maintenance program and generate any preventive maintenance work orders. BSHS also has a yearly contract with Southern Air, which provides the school district with a year-round Southern Air employee who is dedicated solely to Morgan County Schools. He is responsible for the preventive maintenance of ventilation systems, and helps ensure BSHS adheres to ASHRAE standards.

BSHS incorporates sustainability literacy and learning in a wide variety of classes to address the social, economic, and environmental aspects of sustainability. In economics class, students design, create, and market products in economically sustainable ways. Students in civics learn about current environmental issues like

fracking and climate change and how they influence policy decisions. AP Government students learn about the effect of mountaintop removal in the state. Chemistry classes learn about green technologies and careers, while biology students intensely study ecology, including watershed and wetland health. Students are involved in monitoring and maintaining the health of a nearby stream, using Save Our Streams protocol, as well as planting 150 trees on the BSHS campus to help serve as a riparian buffer.

Students helped construct four raised garden beds for a total of 256 square feet of growing space. One highlight of BSHS's sustainability curriculum is the elective Experimental Design course. This inquiry-based course allows students to design their own ecological experiment. Student projects have included road salt contamination of a local stream, projects with biochar and compost, and projects related to agriculture and increasing carbon dioxide levels. These projects incorporate STEM skills, and even have resulted in students building three small greenhouses and designing an extremely cost-effective heating system inspired by geothermal technology.

In 2009, students in AP Environmental Science developed a plan to retrofit the existing greenhouse at BSHS for the purpose of creating a year-round learning lab. The design incorporated photovoltaic solar panels that were installed on an adjacent building to supply the greenhouse with all of its electric needs, and a solar hot water heater to provide root bed heating to growing tables. The students submitted their project to the State Farm Youth Advisory Board and received a \$41,000 grant for the project. That same year, student interns were hired to support the project. Students were required to create a business plan, which included a growing program at the high school, and a marketing strategy that involved selling produce at the local farmer's market. Student interns successfully implemented their business plans and sold produce at the market.

## **Wisconsin**

### **West Middleton Elementary School, Verona, Wis.**

#### *Resting, Eating, and Moving Sustainably Across All Grades*

West Middleton Elementary School has been a model site in the Middleton-Cross Plains Area School District for energy use and chemical reduction, outdoor learning environments, and student sustainability initiatives, such as composting cafeteria food waste, that benefit the environment and school community. The school strives to provide relevant and engaging place-based learning opportunities for students to develop lifelong habits, problem solving skills, and strategies. West Middleton is working to create a permanent shift in school culture toward daily healthy habits and





sustainability practices. This *Title I* suburban school, located in Verona, Wisc., is part of the Middleton-Cross Plains Area School District, which received the ED-GRS District Sustainability Award in 2015. The school has received Sugar Maple recognition, the highest recognition possible from Green & Healthy Schools Wisconsin. The school is a member of the Wisconsin Green Schools Network.

West Middleton achieved an ENERGY STAR rating every year from 2008 to 2015, and was one of the most highly rated ENERGY STAR schools in the Middleton-Cross Plains district in 2015. Staff and students conserve energy by using daylighting or only one bank of lights in classrooms. In addition, teachers keep their doors closed to maintain room temperature and prevent heating and cooling of the school hallways. Classrooms operate on a heating and cooling schedule, and use motion sensors to ensure efficient energy usage. The school contracts with Johnson Controls for energy management services, audits, and performance projects.

West Middleton teachers have recycling bins in each classroom. Students are taught proper recycling habits to use in the classroom and the lunchroom. A milk carton recycling program has been implemented to properly dispose of hundreds of milk cartons used each day, and food waste is composted. Students go through their lunches and donate unopened milk and packaged food to the local food pantry. West Middleton has a \$737 per month cost avoidance due to this schoolwide recycling program, which keeps over 50 percent of discarded items out of the landfill.

West Middleton uses nearly all green cleaning products, and has developed an indoor air quality plan using the EPA's IAQ Tools for Schools program. Integrated pest management with the goal of changing the conditions that encourage pests rather than chemical use has kept the school safe from repeated pesticide use. The school provides special opportunities for living and maintaining a healthy lifestyle beyond the school day. The school maintains an outdoor education center, with a restored prairie and vegetable garden beds. The integrated physical education / health and wellness curriculum "Rest-Eat-Move" is a kindergarten through 12th grade comprehensive education program and a staff wellness initiative designed to provide skills and resources for achieving and sustaining healthy living for life. The Rest element focuses on three areas: passive rest (how to get a good night's sleep); active rest (daily physical decompression); and mindful rest (strategies for stress reduction). The Eat portion of the program emphasizes the importance of choosing real (rather than processed) foods, and stresses the enjoyment of buying, preparing and sharing meals. The Move portion of the program—for students, athletes and staff—aims at creating bodies that are physically "literate," balanced, and adaptable, rather than simply adapted.

The outdoor and sustainability learning that happens on the West Middleton site is often driven by students on the school's green team. West Middleton staff use the



school grounds, school forests, and outdoor sites for teaching and learning. Every grade investigates the prairie for observation, science activities, or for general inquiry. Trees on the school grounds are used in the tree Full Option Science System unit in kindergarten. First grade studies insects in the prairie. Second grade studies plants outdoors in terms of seeds, bulbs, and roots. Fourth grade also uses outdoor sites to identify plant and animal interrelationships. West Middleton has one of the oldest restored prairies in Dane County with a restoration completed in 1983, and is an Earth Partnership School using the prairie as an outdoor teaching site.

Kindergarten takes field trips to farms, pumpkin patches, and the West Middleton prairie, spanning every season of the year. First grade goes to the Geology Museum to study rocks, and Aldo Leopold Nature Center to learn about insects. Second grade goes to Aldo Leopold Nature Center to study plants and weather. Third grade has been to the Pheasant Branch Conservancy to learn about water concepts, including watersheds, groundwater, and water testing. Third grade also goes to the International Crane Foundation each year to learn about global environmental efforts that saved the whooping crane from extinction. Fourth grade goes to Cave of the Mounds to learn about land forms and rock, and to the Pope Farm Park twice annually.

## **Glen Hills Middle School, Glendale, Wis.**

### *Setting the Bar for Existing Buildings*

Glen Hills Middle School is a leader among Wisconsin schools pursuing sustainability. In 2013, Glen Hills received a LEED Gold for Existing Buildings certification for its 43-year-old facility. The LEED certification process allowed the Glen Hills school community to move into a deeper understanding of what sustainability means, and incorporate concepts in all operations and maintenance at the building. To achieve this rating, the school showed accomplishments in energy use reduction, water efficiency, stormwater control, integrated pest management, sustainable purchasing, waste management, green cleaning, indoor air quality, and innovative operations. Located in a suburb of Milwaukee, this public middle school has shown significant achievement in all three pillars of ED-GRS.

Glen Hills has been working to help improve its energy efficiency. The building has solar panels on the roof that heat the school pool. The school's lighting is LED-based, with motion detectors in all classrooms. The certification process allowed the school and staff to make huge strides in sustainability, awareness of energy savings, recycling, cleaning, and classroom instruction. Water usage in the building meets



LEED standards, with low-flow toilets and energy-efficient water fountains. Glen Hills composts all cafeteria waste.

The school's National Junior Honor Society chapter, comprised of seventh and eighth grade students, holds multiple annual fundraisers to raise money for school beautification projects and improvements, such as purchasing trees and recycling bins, and helping to install pavers to control a muddy area by the pool doors. On top of the pavers, they added wooden benches with planter boxes. The student-led green team conducts classroom audits to hold student and staff accountable for proper waste disposal.

Glen Hills has an indoor environmental quality plan to safeguard air quality within the building. The comprehensive environmental health program is consistent with EPA's IAQ Tools for Schools. The school has an asthma management program consistent with the National Asthma Education and Prevention Program's Asthma Friendly Schools Guidelines, and meets the ASHRAE Ventilation Standard 62.1-2010 for acceptable indoor air quality. The school chooses chemical free and green cleaning options. In 2008, Glen Hills implemented the LEED standard for pest management, and uses low-hazard chemical treatments such as live traps and strips to control pests. The school does not use pesticides outdoors, and uses green cleaners within the school building.

In addition to the health of the facilities, Glen Hills works to improve health and wellness of its occupants. The school has a health secretary who helps to create health plans for students (if needed) and educate the staff about various health needs of students, in addition to assisting students themselves. Students participate in more physical education per week than required by the state. The physical education department provides numerous opportunities for health and wellness including Jump Rope for Heart Health, Fitness Days, and Run a Marathon in a Year. Curriculum focuses on healthy eating, and students are offered salad bar and local produce in the cafeteria. All foods and beverages sold during the school day meet the USDA's Smart Snacks in School nutrition standards, and the school has a policy for healthy classroom snacks.

Education on building equipment maintenance to extend the life and efficiency of the building has been an initiative led by the operations committee and the school board. Sustainability is not only an initiative with the operations staff, but with the Glen Hills teaching staff and curriculum. The district has sent teaching staff to energy and sustainability conferences to bring more to education to the classrooms. Within different grade levels, there are units on energy conservation such as electricity and water usage. Teachers and students monitor energy consumption as well as waste and water. Glen Hills has a green team within the school to involve the student



population in holding classrooms accountable for proper energy usage and waste disposal.

Environmental literacy is taught within social studies and science curricula. In science, students cover a variety of topics such as: the effect of humans on the earth, ecosystems, importance of recycling, and water conservation. In social studies, students are taught about how society can affect the environment, and the repercussions of human impact, both positive and negative. Within the seventh grade curriculum, students learn about and explore soil composition and planting. They also take a yearly field trip to Kettle Moraine State Park to explore how glaciers have shaped Wisconsin's landforms. Students at younger grade levels attend activities at the Audubon Nature Center. Even within the school, students are teaching students about recycling, composting, and care of school grounds through the National Junior Honor Society and student-led green team. National Junior Honors Society students are responsible for classroom audits, school cleanups, and environmental sustainability presentations.

Glen Hills has received Sugar Maple recognition, the highest recognition possible from Green & Healthy Schools Wisconsin. The school also has achieved EPA ENERGY STAR recognition, going from a Portfolio Manager score of 66 to 92, and participated in the Department of Energy's Better Buildings Challenge. Glen Hills is an active participant in the Wisconsin Sustainable Schools Coalition, and is a member of the Wisconsin Green Schools Network.

## **Granton Area School District, Wisconsin**

### *Preserving Produce and Conserving Rural Wisconsin's Natural Resources*

Located in rural central Wisconsin, the Granton Area School District serves a high-need population with 66 percent of its 238 prekindergarten through 12th grade students economically disadvantaged. The school district, housed all in one building, receives *Title I* funds, and its elementary school is designated as a *Title I* school. This school's accomplishments over the past five years serve as an excellent example of making change in all three ED-GRS Pillars with limited resources.

The Granton Area School District green team, consisting of teachers, administration, school board members, community volunteers and students, works closely with the custodial and kitchen staff when developing and implementing any projects or programs to ensure they meet both state standards and regulations and sustainability aims. Working with Cooperative Educational Service Agency 10





Energy Management Services, Granton upgraded lighting, replaced high-demand appliances, and expanded technology to increase energy efficiency. Granton implemented a system to monitor energy consumption in order to track use into the future. Energy conservation and sustainable behaviors are a part of the whole school's culture, and are woven into the curriculum at various levels.

Granton implements a schoolwide composting project. The district has a well-established recycling program through which students are taught to reduce, reuse, and recycle through the PAWS (Positive Attitudes + Work = Success) education program. The district uses the Wisconsin K-12 Energy Education Program (KEEP), Project WET, Project WILD, and PLT materials, and students can enroll in a course titled Alternative Energy Overview for technical college credits. In the natural resources and middle school agriculture classes, students are instructed about how much water is used in the common household. Water education includes wetland lessons, aquatic biotic and water quality studies of the creek, aquaculture, invasive species studies, fish diseases, and pollution.

Granton promotes healthy lifestyles through exercise and healthy eating programs, including offering a salad bar in the cafeteria. Students currently are involved in walk and bike to school and a hoop shoot activity before and after school. The after school program, called the Learning Zone, has a physical activity and healthy snack component to the daily schedule. Staff participates in walking groups with friendly competition and a biggest loser contest. Students and community members can be seen walking, jogging, snowshoeing, or cross-country skiing on the property, and the district is using a "hooked on fishing" program at the pond across the road.

Working with the LEAF program from the University of Wisconsin-Stevens Point, students learn from professionals and inventory species at bioblitz events. On field trips, thanks in part to a generous community donor, students have visited the county forest, Mead wildlife reserve, local forests to watch the processing and harvesting procedure, apple orchards, cranberry marshes, parks, and the zoo. Students can participate in FFA and the community green team, and they plant and maintain Granton's numerous gardens. The school now has 12 raised beds, a few other plots, and even its own roto-tiller, purchased by the green team. Students are learning processing, canning, and preserving produce from community members.

An outdoor classroom, adjacent forest land, and playground facility serve as outstanding environmental education learning labs. Students have developed areas that provide lessons from succession and tree identification, to wildlife habitat, and other forest plants. The outdoor classroom was built by technology students, and agriculture students built 30 Leopold design benches for the facility. The high school agriculture department cleared the trails for the forest and laid gravel on the trails. Students and community members built two bridges and two boardwalks on the



trails for wetland crossings. Granton worked closely with the county forester to develop the school forest management plan. The local FFA chapter is involved in the continued development of outdoor facilities, and has hosted community celebrations on the premises.

The school has been recognized at the Sugar Maple level through Wisconsin Green & Healthy Schools. Granton is an active participant in professional development opportunities through the Wisconsin Center for Environmental Education, and has received both the LEAF Educator of the Year Award and the LEAF Community Supporter Award.

### **University of Wisconsin-Milwaukee, Milwaukee, Wis.**

#### *Living and Learning Within a Sustainable Environment*

The University of Wisconsin-Milwaukee's (UWM) guiding values state a commitment to "Stewardship of resources that promote sustainability, prosperity, and equity for all in the local and global communities." While the Office of Sustainability at UWM coordinates, plans, and delivers the core of the university's sustainability program, it truly is a campuswide effort. Academic departments across campus, such as the master's degree program in Sustainable Peacebuilding—a graduate degree program that prepares students to work with communities on issues such as human development, resource stewardship, and conflict resolution—exemplify the interdisciplinary nature of a sustainable future. Student Affairs delivers co-curricular environmental film festivals, energy competitions in the residence halls, and leadership in green office practices. Facility Services has been a leader in energy conservation and chemical reductions.

Extensive recycling programs, green cleaning, stormwater runoff reductions, and energy conservation have led to cost savings. Performance contracting alone has saved UWM \$11.9 million in avoided energy costs through fiscal 2015. Overall, UWM has reduced its GHG emissions over 20 percent at the main Kenwood campus, and 10 percent overall including all satellite sites between 2008 and 2015. Academic research on stormwater management has been well aligned with the administrative rollout of multiple green roofs, green parking lots, and cistern stormwater catchment that are reducing the combined sewer overflow effect on Lake Michigan. The cleaning industry management standard green cleaning program will save thousands of dollars over years to come, while also offering staff improved labor conditions and training. Between 2005 and 2012, UWM decreased its waste consumption (materials recycled, composted, and disposed of as garbage) per faculty, staff, and students by over 16 percent. In addition, through URT, an E-

Steward certified handler of electronic waste, UWM recycles roughly 10,000 pounds per month of electronic waste.

Campus grounds include ecologically sound features such as the 11.1-acre Downer Woods forest, native prairie plantings in stormwater gardens throughout campus, and natural lawn care. In early 2014, all synthetic fertilizers and pesticides were eliminated from campus grounds, replaced by a new natural lawn care program of composting, overseeding, and aeration.

UWM offers 190 sustainability-focused and related courses across 38 departments. The majority of core STEM-identified departments offer such coursework. The recent opening of the School of Freshwater Science and Joseph J. Zilber School of Public Health are both model examples of building a sustainable, healthy community. Their interdisciplinary nature and cross-community collaborations will enhance the well-being of Milwaukee, all while offering the curriculum and research that students and citizens of the 21st century need. UWM's core STEM program delivers research in advanced battery technology with Johnson Controls, microgrid development as a living laboratory within a UWM complex, and climate change impact on the Great Lakes, to name a few. UWM is also home to an interdisciplinary, sustainability-focused Global Studies program, the School of Architecture's Institute for Ecological Design, the cross-institutional and community-oriented Institute for Urban Agriculture and Nutrition, as well as a breadth of sustainability curriculum across the arts, sciences, and humanities.

While living and learning within a sustainable environment, students, faculty, and staff all have access to a wide variety of health and wellness programs. The Norris Health Center aids students with a clinic, pharmacy, individual and collaborative wellness programs, and different types of counseling. The Outdoor Pursuits program, delivered through University Recreation, builds a unique program for the urban environment, and develops outdoor and lifestyle skills for a wide variety of students. UWM's unique Best Places to Work program addresses the support needed by the university's faculty and staff to live healthy, eat right, and exercise more. UWM is actively addressing campus commuting options, including the Bublr Bikeshare program, which makes biking easier for all. By enhancing community planning, increasing shower access and bike resources, and addressing specific socioeconomic hindrances to alternative transportation, UWM is reducing its emissions while improving the health and well-being of faculty, staff, and students. The campus gardens offer personal and institutional access to fresh, local, and organic food.

The Center for Community-Based Learning, Leadership, and Research moves UWM to the next level by improving the student civic and leadership experience through a holistic and seamless approach to community engagement. Programs available

through the Center include leadership development programs, volunteer programs, and academic service learning programs. Service learning is offered in over 90 courses at UWM, with over 3,000 students each year enrolling in a course with a service learning component.

UWM will continue to strive to be a healthy and environmentally sound institution that is an exceptional place to learn and work for all students, faculty, and staff. UWM campus and community efforts in bicycling, urban agriculture, and campus living laboratory studies have immediate effect on the local community, while its academic programs, such as the master's degree in Sustainable Peacebuilding, offer a truly unique global reverberation. UW-Milwaukee delivers accessible academic and research opportunities for a wide variety of students, and thrives as a prosperous, sustainable institution of excellence.





## Acknowledgements

Here at ED, the Green Team continues to evolve, as we recruit new members and say goodbye to others who have moved on. Over the past year, ED employees Melissa Apostolides, Kathrina Bridges, Malissa Coleman, Ashley Gardner, Jon O'Bergh, Jennifer Padgett, Lizbeth Perez, Elaine Venard, and Bernice Williams all have pitched in to keep this project running on the very slimmest of budgets. This program would not be sustainable without their invaluable assistance.

Of course, this entire award would not be possible without the participation of some 30 state education agencies and their hardworking partners, which have built their own green teams to oversee statewide competitions that select schools, districts, and postsecondary institutions to nominate to ED. They are a most dedicated group of facilities, health, and environmental education professionals, who support the work of the schools, districts, and postsecondary institutions in states across the nation.

Finally, thanks to Adam Honeysett, ED's managing director of state and local engagement, for his unfailing support of ED-GRS and its director.

