U.S. DEPARTMENT OF EDUCATION

GreenRibbonSchools

# Highlights from the 2013 Honorees

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www.ed.gov/green-ribbon-schools - www.ed.gov/green-strides

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# Introduction

Now in its second year, U.S. Department of Education Green Ribbon Schools (ED-GRS) has expanded, recognizing school districts, in addition to schools, for their work to ensure sustainable, healthy school environments and effective environmental education. We have added a companion outreach initiative, Green Strides, to enable all schools and districts, whether applying for the recognition award or not, to move toward our three Pillars.

"Why is it that the U.S. Department of Education has not always been so involved with school health, facilities, and environmental education programs?," we are sometimes asked. While ED has fairly limited authority from Congress in the areas of school facilities, health, and environment, this award has enabled us to work in unprecedented ways with counterparts at the Environmental Protection Agency; the U.S. Departments of Agriculture, Interior, and Energy; and other natural resource agencies, as well as collaborators across the private sector, to share their many effective programs for schools and, of course, spotlight the best practices across the nation of our selectees.

In the same way that we are working together across federal agencies like never before, in order to select their nominees to ED, state education agencies have also collaborated in exceptional ways with their state health, environment and energy agencies. And private sector, both for- and non-profit, has gotten involved at federal, state, local and school levels, working with schools and governments. Through all of this new collaboration, ED's recognition award has become a tool to get your government working better together to the benefit of kids across the nation! Now that's something we can all get behind, whether red, blue...or green!

The ED-GRS Pillars of reduced environmental impact and costs, improved health and wellness, and effective environmental education remain the same. Increasingly, and particularly among the district awardees, honorees' efforts are the result of new, more coordinated policies at the intersection of environment, health, and education at state and district levels -- precisely what we had hoped this award might encourage! We are pleased to see that the award has prompted schools 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 have taught us that it's not just *what* students are learning; the *where* matters too.

In less than two years, we've been thrilled with the new collaborations at the federal, state, and local levels as a result of ED's green recognition award. But the collaborations that inspire us most are those of our school and district honorees that have built alliances to enable their phenomenal work. Apart from progress in all

three Pillars – not just one -- you'll notice another common thread among them: All have been tremendously resourceful in partnering with nearby businesses, parks, colleges, farms, museums, nature centers, sporting facilities, religious institutions, townships, and countless other entities.

Our honorees are by no means the wealthiest schools and districts. In fact, for the second year in a row, more than half of our honorees educate underserved student populations, and not because we have a special award category. When it comes to green schools, these high-poverty schools come out on top when everyone plays together! That green schools' practices continue to be used as a tool to improve the built environments, health, and the engagement of students that might seem to have the slimmest chances for success, and that they are once again, with these efforts, excelling and thriving, as evidenced by their graduation rates, college majors, career plans and test scores was exciting to see, but no longer a surprise to us.

This year's selectees were confirmed from a pool of candidates voluntarily nominated and exhaustively reviewed by 32 state education agency implementation teams. While selection processes vary from state to state, selection committees are generally comprised of members from several state agencies as well as outside experts. In the second step of selection, states' nominees to ED were reviewed by our team of several dozen federal reviewers from across four agencies. This year we have selected 64 schools and 14 districts to spotlight their exemplary efforts to make their schools healthier, safer, more cost efficient, and sustainable – for all to emulate.

Across government, we again were awed and inspired by the efforts undertaken by the schools and districts selected. The U.S. Department of Education Green Ribbon Schools and District Sustainability Awardees prove that any school or district can take simple steps to cut costs and improve the health, safety, and educational adequacy of school facilities; ensure good nutrition and fitness practices for a lifetime of wellness, productivity, and achievement; and use the environment as a lens to engage students in hands-on learning in STEM subjects, languages, social studies, arts, and humanities.

Schools can use this sustainability context not only to boost test scores, but to teach students the important civic values and skills that will encourage them to grow into responsible, compassionate, and contributing citizens. Furthermore, this interest in the natural world and engagement in environmental concepts from an early age nurtures precisely the type of thinking that the technology and sustainability careers of the future require, whether these students graduate from green career and technical programs or green college preparatory schools.

Lastly, this sustainable education doesn't begin in high school -- or end there. This year's announcement site, Mundo Verde Public Charter School in Washington, D.C., reminds us that healthy, safe, educationally adequate school environments, wellness practices and environmental education are for every student, every year, from the earliest learners -- and that all of them deserve that strong foundation. And, just as our pre-K to 12 school and district honorees use resource efficiencies, particularly energy, but also waste and water, to cut millions of dollars in utility costs, the colleges and universities where students continue their studies can very well use the same practices to reduce costs -- and pass these savings onto attendees!

It is with tremendous pleasure and great pride that we present the second annual U.S. Department of Education Green Ribbon Schools and the first-ever District Sustainability Awardees. These schools and districts 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 2013 Green Ribbons are finally here. Prepare to be amazed! We were. When you recover, go to our www.ed.gov/green-strides page and get started using some of the very same tools these schools and districts employ.

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

## Honorees at a Glance

- 78 honorees
- 64 school honorees
- 14 district honorees
- 54 public schools
- 10 private schools
- Seven charter schools
- Five magnet schools
- Four career and technical schools
- 40 elementary, 23 middle and 19 high schools (several with various K-12 configurations)
- 29 states and the District of Columbia represented
- 51 percent underserved populations
- 1 EPA School Flag participant
- 425 EPA Sunwise participants
- 250+ USDA Farm to School programs
- 150+ USDA HealthierUS Schools Challenge participants
- 215 EPA ENERGY STAR certified schools
- 3 Collaborative for High Performance Schools
- 29 LEED certified schools
- 300+ Integrated Pest Management programs
- 300+ Coordinated School Health programs
- 18+ USFS Project Learning Tree participants
- 3 USFS/ Smithsonian Tree Banding Project participants
- 11 Keep America Beautiful Recycle Bowl participants
- 80+ Fuel Up to Play 60 participants
- 300+ school gardens
- 16 certified wildlife habitats
- 3 certified monarch waystations
- 3 ED Carol M. White Physical Education Program grantees
- 1 DOE Better Buildings Challenge Participant
- 2 DOE Wind for Schools Participants
- 1 ED 21st Century Community Learning Center grantee
- 1 ED Investing In Innovation grantee
- 2 NSF INSIGHT Fellows
- 1 EPA Presidential Innovation Award for Environmental Educators
- 1 EPA Presidential Environmental Youth Award
- 3 NASA/ NOAA/ NSF GLOBE participants
- 1 bilingual school, 1 Waldorf school, 1 Montessori school
- Millions saved annually

# 2013 U.S. Department of Education Green Ribbon Schools

## *Alabama*

### Fayetteville High School, Sylacauga, AL

*Linking to community resources and professional development*

Located in southwest Talladega County, Fayetteville High School (FHS) is a K-12 school serving approximately 665 students, 51 percent disadvantaged, in the small, unincorporated community of Fayetteville. In 2006, a new school facility opened, replacing a building that had been in use since the 1920s. Situated on 17 rural acres, the school is a park-like environment used by the entire community. Since opening the new building, FHS has achieved a 42 percent reduction in greenhouse gas emissions and the school received *ENERGY STAR* certification in 2009.

During initial planning for the new school building, the FHS team made efforts to reduce the environmental impact of the new construction. Safety considerations called for a new traffic flow to separate bus traffic from carpool traffic. The placement of the new drive required extensive study to avoid disruption of a certified wetland area on the FHS campus. The wetland area is now the focus of the latest fundraising efforts to build a compatible outdoor classroom and teaching trail. Paving has been kept to a minimum, and new parking areas for students and visitors are comprised of porous natural surfaces that help prevent stormwater runoff. The school uses efficient watering techniques on athletic fields and low-maintenance and drought resistant plant species to reduce irrigation costs.

Partnerships with FarmLinks, Inc., a local family-owned business and Auburn University's horticulture department have provided on-site professional development for teachers in a range of environmental content areas, and have shown teachers how to link environmental content to language arts, design, and technology. In addition, these strategic partnerships have led to the creation of the Fayetteville School Foundation, through which over $250,000 in monetary and in-kind services have been donated to develop planting areas, establish a native tree grove, build a children's sensory garden, provide vegetable plots and local dairy products, and launch recycling programs.

Students engage in effective environmental education across all grade levels at FHS. From fourth graders who research native butterflies and their habitats to high school biology students who use the school's tree grove to learn scientific naming conventions, the FHS family actively seeks opportunities to use the outdoors as a classroom. All teachers receive a two-day training provided by the Alabama Cooperative Extension Service in outdoor classroom educational practices,

Over 300 students, parents, and community volunteers have participated in planting days. Auburn professors and horticulture students, FarmLinks employees, and numerous volunteers have provided expert insight and enhanced learning activities for FHS students, 51 percent of whom are eligible for free or reduced-price lunch. Over 250 trees and 700 shrubs have been planted, and countless truckloads of mulch have been spread. Students also have the chance to compete for internships with FarmLinks, helping the student body become a valued part of the business and its related technical and scientific research.

Improving the outdoor environment has created opportunities for students, staff, and community members to take advantage of healthy outdoor activities. Faculty members participate in walking clubs, with contests to promote taking 10,000 steps per day. Pedometers are provided to all staff members, and are available through physical education classes to students to encourage walking. Teachers set the example of a healthy lifestyle through gardening activities. Students have been delighted to participate in the newly launched swim, golf, and fishing teams, all of which enjoy state-of-the-art outdoor facilities, thanks to community partners.

## Munford Middle School and Munford High School, Munford, AL

*Frogs and birds and tilapia – oh my!*

Munford Middle and High School -- middle and high schools that share one rural campus -- have taken to heart discovering through nature the enchantment of learning. They aim to create a bridge between school and community while providing a practical, active, and ongoing environmental education that enhances science, math, social studies, economics, and language arts instruction. The school encourages students to puzzle through problems, find multiple ways of finding solutions, gather and weigh evidence, and test and apply scientific ideas. Students demonstrate understanding by teaching others. The high-school students teach material to middle school students, who in turn present it to elementary school students, who impart it to their parents. This process develops leadership, learning, and communication skills.

The Munford schools immerse students, 64 percent of whom are eligible for free or reduced-price lunch, in a curriculum that emphasizes strategic teaching and authentic learning. Students have developed a blue bird trail, protected wetlands, encouraged landowners to plant Long-Leaf pine, tracked the migration of the Monarch butterfly, and studied the native species of Alabama. Munford students are working alongside college professors, helping collect data in the field. For example, a biology professor from Jacksonville State University in Jacksonville, Ala., brought a

team of graduate students to the Munford frog pond. With assistance from a Munford biology class, the group electroshocked the pond for species identification and for signs of the chytrid fungus, a potentially lethal skin disease that is threatening amphibian populations around the world. Students are also working with Jacksonville State University professors to raise tilapia in six-1,000 gallon tanks in the greenhouse.

Munford students have a deep understanding of both the financial and environmental value of recycling. The school has four Big Bellys, which are trash compactors for plastic, aluminum, and paper. During the 2011-2012 school year, 400 pounds of paper, 9,882 plastic bags, and 14,026 plastic bottles were recycled. Students create digital announcements displayed on large monitors throughout the schools reminding peers and staff of the effect of recycling and energy conservation. These digital production accomplishments may or may not lead to a career in movie production, but the ownership of the responsibility of going green is evident, and is enjoyed daily by the students and staff.

There is a natural ease with which energy conservation is addressed throughout the Munford school facilities. Energy conservation once was a principal's challenge, but now the entire school community is cognizant of conserving water and paper products, limiting excessive lighting, and moderating thermostat settings. The school community is eating healthier, getting physically active in various outdoor venues, and looking toward a future of green habits. Many community partners collaborate with Munford Schools to produce leaders in a variety of green technologies and career pathways.

## Harriette W. Gwin Elementary School, Hoover, AL

*Banding trees for science and raising flags for healthy air*

Harriette W. Gwin Elementary School (GES) opened in January 1976. A 1992 addition doubled the size of the school, allowing the current enrollment of approximately 564 students. GES emphasizes outdoor, project-based, and hands-on learning, as well as physical fitness and nutrition. A group of GES students have formed a club called Eco-Brains. Organized in 2011, the club is committed to changing the world one community at a time beginning with their own. The group participates in the *USFS / Smithsonian Institution Global Tree Banding Project System.*

The school works with an *ENERGY STAR Portfolio Manager* specialist to reduce the use of energy. Students assess the biodiversity of flora and fauna on school

grounds, surveys student use of transportation, and audit water, energy, and waste. The staff and students are focused on turning off unnecessary lights and unplugging and/or turning off electronic items, and have seen a 37 percent GHG reduction. Students have worked diligently to develop an action plan for each audit and to monitor, as well as evaluate, progress. Community, local, state, and national partners have joined with GES to educate students so that they can make educated decisions about wildlife and natural resources.

GES actively promotes and practices reducing the amount of paper used: email and web-based communications are the norm with parents and staff, paper is reused, and staff is encouraged to reduce the number of classroom photocopies. In addition, the school recycles crayons, bottle tops, inkjet and toner cartridges, cell phones, laptops, and batteries. GES uses many water-reduction techniques, such as low-flow water fixtures, and native, drought-resistant landscaping. Students work in the gardens, carrying out campus clean-up days, making toys from reusable material, and restoring habitats on the school grounds.

Vegetable gardens, wildlife and native plant habitats, rain gardens, an amphitheater, gazebo, playgrounds, nature trail, bird sanctuary, raised gardens and greenhouse provide hands-on learning and service opportunities, and allow students to practice multi-disciplinary skills. GES has been certified as *National Wildlife Federation Schoolyard Habitat*. Numerous teachers have been trained in the *Project WILD* wildlife-focused conservation education program, and use it as a framework for teaching both indoors and out.

The school features a comprehensive nutrition education program that spans in-cafeteria education, in-class lessons, and daily classes in wellness and sustainability. All teachers participate in sustainability professional development through the Wellness, Academics, and You program. GES earned 2008-2009 *HealthierUS Schools Challenge* Silver and the Bronze Award from the *Alliance for a Healthier Generation* for promoting a healthy living.

GES is the first school in the district to implement *EPA Indoor Air Quality (*IAQ*) Tools for Schools* and the first in the state to fly *EPA Air Quality School Flags* outside the school. In an effort to eliminate harmful toxins in the air, the school has a well-publicized no-idling policy and participates in *National Walk to School Day*. In addition, the school district exercises safe options for cleaning and grounds maintenance by using products that are safer for indoor cleaning, and pesticides are not used within eight hours of students being in the building. The school has undergone testing for radon gas and other IAQ risk factors.

## Talladega County, AL

*Really remote location, seriously advanced ideas*

Travel just off Interstate 20 in Alabama at the south end of the Appalachian Mountains and down by the Coosa River to experience quality environmental science activities that are enjoyed by students, staff, parents, citizens, and school partners in the seven communities serving 7,525 students at 17 schools on 15 campuses within the Talladega County School District (TCSD). These stakeholders understand that a quality environment provides a healthy habitat for educationally rich learning activities.

Although 74 percent of the students are eligible for free or reduced-price lunch, the district sees itself as far from disadvantaged. TCSD excels at leveraging on its vast array of natural resources and the quality of life they add to its residents. This approach has been admired even by more affluent neighboring school districts. A successful academic atmosphere is blended into safe, healthy school climates, both literally and aesthetically. Whether it's an elementary playground, middle-school gymnasium, or state of the art athletic complexes for high schools, TCSD schools are providing quality measures supporting green schools' health expectations. Environmental science instruction abounds, as all schools have varied, active outdoor classrooms, and year-round vegetable gardens or greenhouses. You might even find the afterschool students pulling up carrots from the gardens or picking snow peas for healthy cooking classes, as part of their activities in *21st Century Community Learning Centers*.

TCSD works in close collaboration with local businesses and industries in a geographic area that is economically depressed. The district enjoys partnerships with Honda Manufacturing of Alabama and the Talladega International Motor Speedway. In 2001, the Talladega County Schools capitalized on a multi-faceted partnership with the Alabama Forest Commission, the U.S. Forest Service, Georgia-Pacific Lumber Inc., and several other supporters to open an elementary school focused on environmental education that was selected a 2012 U.S. Department of Education Green Ribbon School. Four years later, following teacher, community, and student requests, the Munford High School and Munford Middle School were opened to provide a continuation of the embedded, environmentally rich curriculum to sixth through twelfth grade students.

TCSD school district was driven by financial accountability to save money through energy conservation. The processes to save money resulted in questions of "Why?" which soon led to "Wow!" with thousands of dollars being saved. Staff members and

students across the district got involved, and teachers took the initiative to teach about energy conservation, recycling, and environmental education from new perspectives. Recycling initiatives became competitive within the schools among student organizations, and school principals became competitive about winning *ENERGY STAR* awards. The Energy Manager night watchman became each principal's friend rather than the enemy for checking lights and thermostat setting for the weekends, ultimately resulting in $2.5 million in savings.

These efforts have paid off. Talladega County Schools has been recognized as an *ENERGY STAR* Leader for improving energy efficiency by more than 10 percent since its 2008 baseline and as a Top Performer for achieving an average *ENERGY STAR* energy performance score of 86 across its portfolio of buildings. The district prevents the emissions of more than 860 metric tons of carbon dioxide, which is equivalent to the carbon sequestered by more than 20,000 tree seedlings planted and grown for 10 years.

Even though environmental science and agriculture related courses and lessons were always taught, teachers throughout the district have taken these lessons to exciting new levels by relating energy conservation to a plethora of authentically engaging environmental and healthy lifestyle educational accomplishments. Every school in the district is actively engaged in recycling, but students are fully able to relate recycling to environmental quality for healthy lifestyles. Elementary students throughout the district know how saving trees through recycling relates to cleaner air, soil conservation and wildlife habitats. High school students can connect recycling to water quality and its effects on not only drinking water, but also on fish, frogs, and waterfowl in ecosystems.

One of the district's strengths is its effort to provide healthy meals to students. Because Alabama is ranked second in the nation for obesity, the district has approached the teaching of health education more aggressively and emphasized food preparation to include quality fruits, vegetables, whole grains, low-fat foods, and no fried foods. In tandem, the district's schools are the community hubs that provide venues for physical activities, through team sports, outdoor walking tracks and trails for families and community members, the CATCH program for fitness and nutrition awareness, Get Outdoors Day events, the Let's Get Moving program, and community gardens on the schools' campuses. The gardens are supported and maintained by students in afterschool and summer enrichment programs, as well as through community partnerships and senior citizen groups who share expertise with students. These activities reinforce the committed, competitive and comprehensive involvement within the district that is positively affecting multi-generations through quality environmental initiatives.

## *Arkansas*

### Fayetteville District, AK

*Decades of environmental dedication*

Fayetteville Public School District (FPS) has been involved in the environmental movement for many years, with an energy management system in place since the late 1980s. FPS now has six focus area sustainability program areas, specifically energy conservation, *LEED* construction and education, waste reduction, indoor environmental quality, habitat conservation, and school gardens and Farm to School.

The district has cut air conditioning usage, updated lighting, upgraded heating and cooling units, and replaced windows with high efficiency glass. The district hosts a district-wide energy challenge to educate and engage students and staff in the district's energy saving efforts. Schools have cardboard and paper recycling dumpsters, and frequent pickup of plastic bottles, aluminum, and steel cans. By the numbers, five schools are litter-free zones, four schools have rain gardens, five schools have bioswales to reduce stormwater runoff and eight schools have wooded areas. Eight schools have become *National Wildlife Federation Certified Wildlife Habitats* through partnerships with local environmental organizations.

All FPS elementary schools are *HealthierUS Schools Challenge* Gold awardees, and all schools served whole wheat products, offered salad bars and eliminated chocolate milk before the new USDA guidelines were implemented. All new furniture in the district is *Greenguard* certified, and all paints used are volatile organic compound (VOC) free. Schools are committed to assisting asthma sufferers, with mold and moisture prevention and remediation programs, including staff education.

State science standards from kindergarten through grade seven relate to the environment, and stress hands-on, inquiry-based projects. Professional development in environmental and sustainability education is offered throughout the year for teachers, with garden education occurring monthly, and frequent *Project Learning Tree* training. Junior high students participate in Devil's Den Outdoor Classroom Project, which incorporates science, math, and technologies to investigate land forms, rivers, caves, water quality, fossils, rocks, environmental adaptations of living organisms, after which students develop multimedia presentations.

The district's EAST program (Environmental and Spatial Technology) allows students to learn and apply geographic information systems skills, web design, video editing, and software animation to environmental projects. Student projects in the past two years have included building a website to highlight *LEED* features of a local elementary school; designing, modeling, and constructing a bicycle-powered water pump for a rainwater cistern at a school garden; and creating a solar powered hydroponic growing system for herbs used in cooking classes. Other courses include plant and animal science as well agricultural systems and the integration of technology. Pre-engineering classes help students develop problem-solving skills by tackling real world engineering problems. Through theory and hands-on experience, students address emerging social and political consequences of technological change.

**"Over the last five years, the percentage of our students earning proficient scores on state tests has doubled or nearly doubled in every subject area; in 2009, we were the**

Green teams across the district provide many environmental community engagement opportunities for students. Each of the district's 14 schools has a Green team comprised of students, teachers, parents, and community volunteers working toward greater environmental sustainability both inside and outside the classroom. Representatives from each team form the district FPS Green team, which meets throughout the year to share ideas and resources, support district-wide initiatives, acknowledge school projects, and celebrate annually.

Students provide service by collecting recycling, serving as energy managers, picking up litter, and educating others about environmental topics and conservation actions. Several Green Teams participate in community stream and trail cleanup days, tree plantings, and other community events. Fourth-graders create public service announcements about ways to care for the environment using different types of technology. High-school students work with the City of Fayetteville Recycling Center to develop and deliver recycling lessons to third grade classes. Students pass out reusable grocery bags at University of Arkansas football and baseball games. Schools donate extra school garden produce to the district food bank and a local low-income resource center.

Partnerships are vital to FPS. The Coordinated School Health Committee, which meets monthly to discuss community and school health, includes teachers and staff, administrators, high school students, a school board member, parents, a representative from neighboring Springdale school district, and several community organizations including Apple Seeds, Inc., Northwest Arkansas Tobacco Free Coalition and Ozarks Guidance Center. In addition, the district works closely with

City of Fayetteville Solid Waste and Recycling to provide educational programs to students; with the University of Arkansas horticulture department, Cooperative Extension Service, National Center for Appropriate Technology, Feed Fayetteville, the Boys and Girls Club, and several local chefs for ongoing programs.

## *California*

### Charles Evans Hughes Middle School, Long Beach, CA

*Green service learning: A hallmark of sustainability education*

Charles Evans Hughes Middle School (CEH) campus culture is characterized by environmental service projects by all students, staff, and community members, resulting in hundreds of students actively participating in eco-service projects each year. In 2012-2013 year alone, student service projects included No Trash Day, the America Recycles Book Drive, Campus Work Days, Eco-Gift Workshops and Holiday Bazaar, Rain Barrel Workshops, Backyard Bird Count, the Share the Love Clothing Drive, the Urban Run-off Public Service Announcement Project, a plant sale, the Earth Day Paper, Shred, and E-waste Drive, and a bottle and can drive.

The school's location just five miles from the ocean motivates students to engage in service projects to address litter, urban run-off, and ocean pollution, including Campus Clean-up Days, the February Beach Clean-up, and anti-litter slogan, poster, and video contests. Since 2007, students have planted over 40 campus trees, helping combat air pollution resulting from the school's location near the Port of Long Beach, the 405 and 710 freeways, and Long Beach Airport and Los Angeles Airport. The school's sixth through eighth graders plan the events, create posters and banners, make announcements, speak before City Council, lead peers in workshops, create videos, and maintain the 12 campus gardens. Even the school library is in on the act, by partnering with Spring Street Farm to create "Food for Thought" program, encouraging families to buy locally grown fruit and vegetables, with a percentage of sales benefiting the library.

On the conservation front, CEH works with the Long Beach School District's energy conservation manager, who has reduced district energy consumption costs by an annual average of $3.6 million dollars since 2002. CEH uses electronic thermostats, delamping and changed from T12 toT8 lighting, to yield a 60 percent heat emission reduction and 60 percent energy savings. One hundred percent of the school's landscaping is water efficient and regionally appropriate, and 100 percent of the paper used is post-consumer materials, fiber from forests, and/or chlorine free. The school uses *Safe Routes to School*, and over 81 percent of students use alternative methods of transportation.

CEH has diverted 103 tons from the waste stream since 2009. On average, the school diverts 1,440 gallons of recycling each week. Volunteers recently instituted a lunch recycling program that includes collecting unopened milk and whole fruits for the Salvation Army's soup kitchen, and collecting food scraps for chicken feed at Spring Street Urban Farm. On average, CEH collects 808 pounds of recovered food and food scraps per week. CEH students are active, receiving 4.5 hours of physical education each week, including two mile runs, fitness assessments, and skills training. The school also has outstanding afterschool sports, in which approximately 120 students compete and train for almost 9,600 hours each year.

The campus is covered in interpretive signs outlining the environmental principles in the landscape, like composting, vegetable gardening, xeriscaping, butterfly gardening, recycling, biodiversity, beneficial herbs, and labyrinth walking. In addition, the campus is laden with amenities created by students from reused and repurposed materials, like giant flowers made from wheels, planters from pallet wood or tires, bottle-cap signs, dragonflies with aluminum wings, benches from discarded headboards, and mosaic stepping stones of unwanted tile.

Students learn about environmental career options, with environmental literacy incorporated in language arts, history, physical education, home economics, wood shop, and health courses. In 2012, students designed a Watershed Garden to teach how natural watersheds function and how urban landscapes can be altered to act more like natural environments. The Watershed Garden demonstrates ways the urban landscape can mimic the natural environment, incorporating rain barrels, diffusion boxes, infiltration basins, permeable pavements, and native plants.

CEH is the largest middle school in Long Beach, with the most diverse population economically and ethnically; over 54 percent of students are eligible for free and reduced price lunch. What is possible at CEH is possible city-wide!

## Journey School, Aliso Viejo, CA

*Eco-Waldorf grows the whole child green*

Journey School is a free, public charter school founded in 2000. From its inception, comprehensive green practices have been the norm, and this culture has remained as the school has tripled in size. Journey offers a comprehensive eco-education program where critical and ethical thinking are inherent in the curriculum, the environment is the classroom, and service is a natural extension of the curriculum. Students learn about water conservation, value of soil, reusing solar and wind energy, waste reduction, rain calculations, composting, and energy consumption

through the schools' comprehensive eco-education program, which focuses on critical and ethical thinking, nature and environment, and service.

Simplicity and sustainable living are at the heart of what is learned. A sampling of topics includes: soil building, gardening, composting, vermiculture, biology, ancestral survival skills, water conservation, rainwater harvesting, native and indigenous plant studies, permaculture principles, and eco-leadership. All 8th grade students are required to present a culminating project on a subject that interests them. Fifty percent of the projects last year involved green technologies (solar panels, electric bikes, plastic bag ban/reduction to name a few).

Science is taught in concentrated blocks and is integrated with history, math, and the Arts rather than isolated from other subjects. This approach trains pupils in basic scientific thinking establishing a foundation for inventing green technologies and pursuing environmental science careers. A recent survey of Waldorf high school graduates found that 42 percent major in the sciences or math as undergraduates. Ninety-six percent of all 5th Graders and 81 percent of all 8th graders scored Proficient or Advanced on the science portion of 2012 state examinations. These results are higher than both state and regional averages.

"Ninety-six percent of all fifth graders and 81 percent of all eighth graders scored

80 percent of the school's teachers, all of whom are state-credentialed, will graduate with a joint master's degree and Waldorf certification in 2013. Environmental education, gardening, science, and stewardship are embedded in their graduate-level coursework. Teachers learn best practices for weaving green learning outcomes into their classrooms—ranging from daily student chores, to classroom gardens, to recycling, to science instruction, to projects. Teachers also learn to lead their students through multiple grades using proven developmental teaching practices, as well as, modeling wellness strategies and sustainable living.

The Journey family eats very well, thanks to a partnership with Tanaka Farms, which delivers baskets of fresh organic produce weekly for faculty, students, and parents. Kindergarten students participate in preparing daily organic snacks that include organic fruits or vegetables, grains such as quinoa, and fresh bread. Additionally, an innovative relationship has been established with Wahoo's Fish Tacos to provide healthy lunch options.

Movement activities, dance and forms of creative physical expression are infused into everyday curriculum. There are two recess periods per day for free play. Physical education supports developmental capacities -- providing exercise and activities to build small or large motor skills, organization skills, and teach teamwork.

Classrooms and play yard space are organized to maximize movement opportunities. Students are in the garden weekly for ecoliteracy classes. Students and faculty also get outside, with 100 percent of physical education occurring outdoors. Staff wellness activities include on-site yoga, nature walks, and eurythmy.

The school has established five gardens, which include the front Native Garden with a student designed rainwater harvesting demonstration site; the Green Heart Garden with eight planter boxes; the Sunny Patch for crops, a three-station compost bin and outdoor meeting areas; the Third-Grade Garden with six planter boxes, compost and vermiculture bins and fruit trees; and the Kindergarten Garden with planter boxes and a native playscape. Also on campus is a rainwater harvesting site, created by a student, through which water is re-routed from the roof of an office into a mulch pit that sustains native plants. Assisted by a campus-wide lighting retrofit, the school received *ENERGY STAR Portfolio Manager* ratings of 98 and 99 in 2010 to 2012.

## Redding School of the Arts II, Redding, CA

*Sharing sustainability lessons around the world*

The first school campus worldwide to be certified *LEED Platinum* in 2009, Redding School of the Arts (RSA) is a charter school that achieves high academic standards via an interdisciplinary, thematic approach in a multicultural environment emphasizing visual and performing arts. The school has a 121-kilowatt photovoltaic system, solar water heaters, a wind turbine, and a 175,000-gallon underground water storage tank for rainwater collected from the roof, which is used for 100 percent of school grounds' irrigation. The school promotes monthly city bus passes and cites potential family savings through an e-newsletter, and ridership has increased 20 percent since 2012.

All RSA classrooms meet standards for exemplary performance as required for *LEED* certification. By combining basic design principles such as smart site orientation, operable windows, daylighting optimization and the maintenance of existing trees, and modern technologies such as high efficiency insulated glass, geothermal HVAC, automated energy management, HVAC and lighting systems, RSA uses less than 25 percent of the energy of typical schools of the same size.

The school building isn't just a national model of sustainability; it is a laboratory for students and the community. Students learn about the building's green features by tracking the school's performance via a web-based building dashboard that details how the wind turns the turbine, how the solar panels soak up the sun, how the water

level in the storage tank declines with irrigation, and how the lights automatically dim with bright sunlight. The innovative playground offers areas for imaginative play, organized team sports, and active free-play. RSA partners with the California EPA to pilot a new environmental education curriculum, integrating it with the school's natural setting and building features. Parents and staff have created a school ecology club and a science committee that work with students and staff on the building's green features, the gardens, and new science and sustainability curriculums. Research by a University of Michigan graduate student shows 6th and 8th grade students' environmental awareness and understanding has increased significantly since moving into the new building.

Despite a marginal climate, half of the school's learning space is located in an outdoor, semi-conditioned environment. Staff takes advantage of this and often conducts classes in this space. Combined with non-toxic building materials and cross-ventilation in all classrooms, this has resulted in decreased student and staff illnesses from prior levels. Seasonally, classes grow produce in the school garden, eat it in class, and supply it to the cooking classroom, where students participate in nutrition units, and theme days offer new foods for students to try. Meanwhile, the wellness committee is writing a healthy cookbook, and has organized after school walking teams. Staff participates in walking clubs, biking to work, and healthy produce and recipe sharing.

The whole school community, parents included, participates in an annual outdoor learning experience overnight at area state and national parks. Kindergarten students visit local farms to learn about sustainable farming and animal care. Grades 1 and 2 learn about maintaining clean water and explore water animals such as insects and fish through a creek study at a local environmental camp. Grades 3 and 4 explore fish hatcheries and the water cycle with a more in-depth study of local watersheds. Grades 5 and 6 attend the environmental camp for four days with lessons on nutrition, minimizing waste, and sustainable forest management as ways to improve the planet. Grades 7 and 8 experience a one week sailing trip to learn about oceanography and perform wind and water experiments to demonstrate the need for clean water and energy.

In addition to being a visual and performing arts school, RSA has a Mandarin language immersion program that includes outdoor learning, and maintains a relationship with a sister school in China. Students Skype with their peers in China regularly to share information about what they are learning in both languages, and RSA students often share sustainability concepts with their Chinese peers.

## Prospect Sierra School, El Cerrito, CA

*Connecting compassion and stewardship for a school of the future*

Prospect Sierra School implements a school-wide program that includes efficient water usage, conservation of electricity, and reduction of waste, using, among other tools, the *EPA ENERGY STAR Portfolio Manager* and *UC Berkeley's Cool Climate Calculator* to track energy and water consumption. The school has installed solar panels, waterless urinals, and an energy efficient boiler, and is piloting a new low-emissions transportation system for students to get to school. The facilities manager oversees the safe disposal of batteries and fluorescent tubes. In their place, the school retrofitted lighting that now brightens 44,000 square feet of buildings with energy-efficient ballasts and tubes. In addition, the school is moving away from desktop computers toward laptops and iPads, reducing computer waste.

Prospect Sierra has converted roughly 4000 square feet of asphalt into green space, and has implemented guidelines to use only compostable or reusable eatware at school events. At Prospect Sierra, 75 percent of the landscaping is water-efficient and the students designed a 180-gallon rainwater-harvesting system for their organic garden. The campus has a water-purification system in six of its seven drinking fountains, and installed equipment to transform tap water into an effective chemical-free cleaner by infusing the water with ozone – creating a safe aqueous ozone that cleans surfaces and eliminates germs, odors, and stains. The facilities manager attended an *EPA IAQ Tools for Schools* seminar, resulting in adoption of material safety data sheets to keep records of chemicals used in science classes.

The school's curriculum explores the complex connections between humans and the natural world, including food production, resource usage, and green technology. Students work and learn in two school gardens in science and during electives. Students participate in nature-based day and overnight study trips to locations such as Yosemite, Marin Headlands, Ring Mountain, Community Live Power Farm, and along the San Francisco Bay. First graders visit farms, study local agriculture in their farm to table curriculum and grow vegetables for market day. Sixth graders study organic versus conventional farming and partner with farmers to design solutions to current problems. Prospect Sierra's science curriculum includes: healthy snacks; teeth care; food chains; vitamins, fat, proteins, and carbohydrates; nutritional values; and creating healthy weekly menus.

Students learn about the linkages between environment and economy, and compassion and stewardship at every grade level. Kindergartners experience a sense of wonder at nearby Baxter Creek, becoming stewards and helping to grow native plants, restore frog habitats, and protect ancient Native American petroglyphs. 2nd graders take bird walks and transform their bird paintings into postcards to raise

awareness through collaboration with the Golden Gate Raptor Observatory. Fifth graders did a three year study on the school's paper use, analyzing costs and waste to make persuasive recommendations to school administration, which since have been adopted. Seventh graders partner with Save the Bay for coastal cleanups. The eighth grade classes work in urban gardens during their service trip to L.A. Students explore the geology of Ring Mountain and Fort Ross, complete an in-depth earth science course including hands-on lessons on water quality testing, and take part in various Bay-related projects and a weeklong environmental study trip to Yosemite National Park.

Prospect Sierra's partnerships with organizations, businesses, and individuals have enriched the student program with innovative opportunities to learn about the environment, including workshops with local hydrologists to examine how best to remove dams, creation of an energy efficient stove to help refugees in Darfur, and a partnership with CarrotMob. The school was recognized by the National Association of Independent schools as a Model School of the Future.

## Oak Park Unified School District, CA

*Where ocean education and plant-based nutrition take center stage*

Health and fitness is a major focus in the Oak Park Unified (OPU) School District. All of the district's schools were recognized at the bronze level by the *USDA HealthierUS School Challenge*, all schools participate in *Farm to School*, and the district has a wellness council comprised of teachers, parents, children's nutritionists, and health professionals. OPU participates in fitness activities such as jog-a-thons and Hoops for Heart. An elementary school garden and greenhouse benefits a local free clinic. Students take the foods grown at school to the clinic and explain to diabetes patients how to grow healthy foods.

The District collaborates with chefs at the California Health & Longevity Center to create healthy recipes that appeal to students and offers a variety of fresh fruits and vegetables daily. The District participates in the National Meatless Monday campaign, has vegetarian and vegan options available daily and promotes a plant-based diet. An innovative incentive program where students get points for choosing plant-based entrees and receive prizes at the end of the month is helping change eating habits to benefit the planet and students' health. Food quality standards require that food served contain no additives. The produce vendor used by the District obtains the majority of its produce from regional farmers and the rest from school gardens.

OPU has undertaken facilities and grounds improvements to schools including the installation of bioswale systems in school parking lots that absorb stormwater run-off into an infiltration system, installation of solar panels, the use of "cool roof" designs that reflect sunlight and provide substantial insulation on school buildings, the installation of energy efficient lighting and heating/air conditioning systems, as well as solar powered electric vehicle charging stations at two OPU sites. Recycling programs are in place at all schools and hydration stations are available on all campuses, promoting reusable water bottles to reduce plastic water bottle consumption. The paper used in the schools is 80-percent post-consumer material, and 90 percent of the district's cleaning products meet the *Green Seal* standard. The district recycles lamps through the Edison Lam Tracker Recycling Program, and a food waste composting program is in full effect.

The district sponsors a variety of school and community activities to reinforce sustainability and health concepts, such as Walk to School Days and Big Sunday National Day of Service. During Earth Week, OPU hosts screenings, discussions of films such as *The Electric Car*, and electric car "Driveway Parties," in which community members had the opportunity to test drive electric cars. At the District's Sustainability Super Saturday, student booths, outdoor and environmental organizations, and vendors provide information on environmental issues and products, together with a huge community recycling event where residents can drop off electronic waste, medications, clothing, and paper for shredding/recycling.

Schools in the district partner with a variety of business and non-profits that promote environmental literacy. These include LIFE Animal Rescue, Boeing, AeroVironment, NASA, and Coastal Marine Biolabs, where student interns from the high school spend two weeks each summer learning about the marine environment and even earn their SCUBA certifications. Other partners include Monterey Bay Aquarium, California State Long Beach Shark Lab, the National Park Service, and the National Oceanic and Atmospheric Administration Channel Islands National Marine Sanctuary, where the OPU superintendent serves as a member of the Marine Sanctuary education team and is able to engage students in projects through the Sanctuary.

All 5th graders go to Santa Cruz Island to learn about natural selection, marine ecosystems, biodiversity and conservation. All 6th graders attend Outdoor Education at Pali Camp in the San Gabriel Mountains for four days and do an annual beach clean-up with Heal the Bay. All 7th graders go to the Catalina Island Marine institute for a week. All 8$^{th}$ graders go to AstroCamp for three days. Elementary students take field trips on a regular basis that include whale watching, a Chumash Interpreter trip to learn about local Native American tribes, and local hikes and excursions. All kindergarten students go to TreePeople in the Santa Monica Mountains as part of their unit on trees. District policies state that students need to

have authentic learning experiences and should be outside to maintain overall wellness.

The district maintains a three years of science high school graduation requirement and has developed a marine science matrix to integrate an ocean-oriented approach to teaching science standards. In addition, the district supports the Edison Challenge, the QuikScience Challenge, and the Idea to Impact program, all of which provide environmental projects for student and teacher use. An OPU high school has won national competitions for its work on a NASA project to send a weather balloon to an altitude of over 100,000 feet. Another high school participates in the Solar Boat program, in which a team of students builds a 15-foot, solar-powered boat. The team of students that sponsored the district-wide Week of Whales won the *Presidential Environmental Youth Award* for 2012. Not to play sea-life favorites, the district maintains an active involvement in Shark Week, supporting shark conservation through information booths and movies.

## *Colorado*

### Kinard Core Knowledge Middle School, Fort Collins, CO

*Facility designed to earn ENERGY STAR cultivates designers of the future*

**"Eighty-three percent of students scored proficient and above in the state**

Kinard Core Knowledge Middle School, a 6-8th grade school in the Poudre School District, was built in 2005 with an enrollment of 750 students. Kinard is the only school in Colorado that has earned an *ENERGY STAR* 100 and the first school in the nation Designed to Earn *ENERGY STAR* status and *ENERGY STAR* Labels. In 2012, the school achieved its lowest energy usage – 20.1kBTU/square feet, the lowest in state of Colorado and a 57 percent reduction in GHG from 2006 to 2012. Kinard's energy efficient features include: a geothermal HVAC system, high efficiency building envelope, low-E operable windows, an automated energy management system, and solatubes that maximize natural light to classrooms. In addition, the school purchases all renewable wind electricity.

Through Kinard CARES (Community Action Results Environment Service) students have designed, built and implemented one of the most successful resource management systems in the state. The four stream recycling and composting center which diverts over 20,000 pounds of food waste from landfills each year at a rate of 84 percent. The school operates on-site vermicomposting and heat composting with A1 organics and an e-waste deposit bin for small electronics and batteries. All students ride their bikes, walk, or carpool. Also, students attend the *Safe Routes to School* bike and pedestrian training.

Kinard purchases seasonal fruits and vegetables from local CSAs, including several varieties of organic produce. A school-wide wellness committee oversees nutrition, fitness and overall wellness under both student and staff leadership. Students participate in a 'Mustang Minute' during weekly video announcements to get active in class and the school participates in *Fuel Up to Play 60*.

The curriculum connects state standards to important community sustainability issues regarding air quality, alternative energy, and erosion through project based inquiry. Kinard uses the school as a learning tool, covering science behind a geo-thermal HVAC system, computer automated energy features, and architectural features that maximize natural daylight. The curriculum connects these building technologies to energy, physics, and optics and has students conducting data analysis on building performance and usage. The school is working with Colorado State University to provide environmental and climate change education as part of *NASA* and *NSF* grants.

Students also learn in places as far afield as Catalina, CA, where the environmental leadership program covers ocean kayaking, kelp forest snorkeling, tide pool discoveries, terrestrial hikes, garden and organic farming. The environmental and cultural education program in Costa Rica includes rain forest ecology, beach clean-up, and sea turtle habitats. In addition, the Science Olympiad team participates in regional and state competitions, annual science fairs and robotics teams. State science assessments indicate that 83 percent of Kinard's students are "proficient and above" compared to the state average of 49 percent.

Kinard has established important partnerships, including with CSU, Institute for the Built Environment to design an outdoor learning center; with the College of Natural Sciences to improve water conservation and conduct data analysis; with the College of Business to pilot a student leadership program; with the Environmental Learning Center, Fort Collins for its environmental education curriculum; with the City of Fort Collins for an Alternative Energy Workshop, clean air campaign and service learning; with the Sunrise Ranch for permaculture design and organic gardening; and with High Plains Environment Center for organic farming and service.

## Douglas County School District, CO

*Over $14 million saved in six years*

Douglas County School District (DCSD) is a large, rapidly growing district. Situated over 900 square miles, with 6,800,000+ square feet of building space, 60,000+ students and over 6,500 staff, DCSD is challenged to make large scale changes

across all of its schools. From 1990-2010 DCSD was the fastest growing school district in the top 100 largest in the U.S., growing at 400 percent! As DCSD develops into a truly world-class school district, it is building its sustainability program to support and enhance this conversion. Sustainability provides a solid platform from which to enact the changes needed to transform the district into a 21st century learning system.

DCSD has blended the 10 pathways of *Eco Schools USA* with the three *Pillars of ED-Green Ribbon Schools* to develop a district sustainability plan, which is based on student-led programs. All of these efforts support the three legs of sustainability, specifically social, environmental, and economic. Students develop programs at each school, identify challenges and goals, and build programs to achieve these. Students regularly study the effects of their buildings, develop educational campaigns to teach occupants what they need to do, then implement and lead those programs. In a real-world sense, they run the sustainability program for the district.

**"Our district, the fastest growing of the top 100 largest**

These programs are entirely voluntary; schools only join if they want. The sustainability program has grown from 11 students in one class at one school to over 3,000 students running the energy program across 60+ schools! In many schools, students and staff decide what they want to improve, and build their program from there.

The results these student teams have achieved are truly remarkable! As a district, DCSD saved over $14,000,000 in six years. Electrical use per square foot has dropped over 20 percent. These accomplishments are astounding when coupled with the fact that the district's buildings are 100 percent air-conditioned, and after-school community use amounts to over 60,000 hours per year. What students learn at school also translates to home and work. Students perform behavior audits on local businesses in the type of hands-on learning that can benefit the community, and hold a community-wide summer Recycling Festival that provides an opportunity to turn in hard-to-recycle items. A team of former DCSD students, who are passionate about sustainability, has been hired to perform building energy audits and report to the district environmental manager.

Following the success of the Energy Management Program, the district has grown in many other sustainability areas. Recycling is a growing program, with 87 of 88 sites now participating. DCSD is migrating many schools to durable trays and silverware, eliminating the need for much Styrofoam and plastic. When the superintendent learned of the volume of paper DCSD traditionally has used, she came to the sustainability team to ask how DCSD could reduce that amount dramatically. This was the genesis of the new paper use reduction incentive challenge. Local foods are becoming a bigger part of the menu. The information technology team has

striven to reduce its impact. Server virtualization, remote service, and energy management programs and techniques are part of the standard of business now. Transportation has optimized routes, reduced stops, and improved vehicle efficiency.

Operations and maintenance divisions have focused on running buildings as efficiently as possible while maintaining the healthiest, most achievement enhancing learning environments. The district stocks only 100 percent green cleaning products, 90 percent post-consumer paper and is a *Safe Routes to School* participant. Indoor environmental quality is overseen by district's environmental manager, with rigorous maintenance and aggressive mitigation techniques to ensure healthy air quality. To that end, DCSD's construction team has developed high-performing buildings and earned awards for their work.

Thirty-two district sites have on-site renewable energy (wind or solar). These facilities are a wonderful means to deliver STEM education. Two schools are *DOE Wind for Schools* participants. DCSD support schools with initiatives and grants for school gardens, outdoor classrooms, composting, bird monitoring, and an outdoor education center. There is a strong district robotics team, which has competed internationally, gaining fame for its design of a robot built to save lives in an earthquake. Seventeen percent of DCSD students take AP environmental science.

Nutrition services have greatly improved menus with regard to student health and wellness. DCSD is an inaugural member of Michele Obama's *Chef's Move to Schools* program. The district includes five *USDA HealthierUS Schools Challenge* awardees and four schools that participate in *Fuel Up to Play 60*. Many schools use The Great Body Shop Curriculum, which teaches about healthy living, and the district sponsors a 5K.

## *Connecticut*

### Barnard Environmental Studies Magnet School, New Haven, CT

*Core Curriculum Integration: Water, Energy, Migration and a Local Estuary*

Barnard Environmental Studies Magnet School serves students from pre-kindergarten through 8th grade, including nearly 82 percent minorities, with 62 percent eligible for free or reduced-cost lunch. When you enter Barnard's lobby, far from signs of economic challenge, you see a powerful environmental studies theme that runs throughout the school: student artwork, brightening and inspiring, decorates the corridors and illustrates the school's four overarching environmental

themes: the studies of fresh water, energy, migration, and the Long Island Sound estuary.

The Barnard faculty integrates these themes into the core curriculum so that environmental studies are the vehicle for teaching a full array of subjects. Pre-K-2 meets with the school's own *Park Ranger* each month to enjoy hands on experiences. Classwork includes devising a recycling museum displayed in the cafeteria (5th grade); counting the garden's cherry tomatoes (1st grade); designing and drawing a garden-compost sign (4th grade); and researching and devising environmental-stewardship posters (3rd grade).

The school's courtyard garden, greenhouses, and its nature center are spaces for the students to explore the natural world as they take on the roles of gardener, naturalist, and environmentalist. The school's nature center is adjacent to the West River and these wetlands provide an outdoor classroom for students who go canoeing with the park rangers and actively investigate the habitat of the West River. Through a *Toyota Tapestry* grant, 6th grade students study the health of the river with scientists from Western Connecticut State University before and after the retrofitting of new tide gates downstream.

The school's Yale University sponsored, school-based health center educates students through age appropriate workshops. In the 2nd grade science curriculum, students learn about good nutrition and a balanced diet. They also learn where food originates, studying soil development and plant growth. In a 3rd grade curriculum, students learn about composting. Food preservation is taught to 7th graders, while 8th graders learn about and promote organic gardening by working in the community garden, adjacent to the school. Barnard counteracts childhood obesity with its Bright Bodies program. The program meets twice weekly, five months of the year, and provides students with education about good nutrition coupled with physical activity, guided by specialists in nutrition and exercise.

Students in younger grades are assessed on their environmental knowledge by presenting projects during environmental roundups, biannual assemblies where their knowledge is shared with their peers. Upper-grade students are assessed on their environmental knowledge by completing a capstone project. Some past projects have included tsunamis, carbon footprint, organic food, and the effect of music on teens. Students who graduate from Barnard have the option to graduate with distinction. To qualify, they must do 20 hours of community service, a science fair project and an environmentally themed Capstone Project that exhibits their ability to go forward as environmental stewards to the next level of their education.

Barnard engages many partners to develop unique environmental activities and extensions that enhance the curriculum. For example, Solar Youth works with

teachers and students from grades 2-5 four times a year. They focus their hands-on outdoor educational lessons on the science curriculum of the district for each marking period. The Peabody Museum creates custom, hands-on lessons focusing on the science curriculum for grades 3-8. Topics include climate, natural disasters, ecology, and wildlife habitat.

Barnard teachers attend a variety of workshops sponsored by the National Science Teacher Association, the Connecticut Science Teacher Association, the Connecticut Outdoor Environmental Association, and the Peabody Museum. Barnard mentors other schools seeking to become environmental magnet schools, hosting educators who have traveled from Japan and Korea to study the school's approach to teaching students about the environment that we all share. Barnard School has partnered with the Bioregional Group to host several film events for the community that promote the idea of good nutrition and sustainability, including "Dirt", "Fresh", and "Farmageddon." Barnard School also hosted a conference titled "Best Practices for a Sustainable Future" at the school's nature center.

## Common Ground High School, New Haven, CT

*The nation's first environment-themed charter school*

Over the last five years, the percentage of students at Common Ground High School earning proficient scores on state tests has roughly doubled in every subject area. In 2010, Common Ground students, 50 percent of whom are eligible for free and reduced priced lunch and 80 percent of whom are minority, made larger test score gains than their peers at every other Connecticut high school. With a dropout rate eight points below the state average and 17 points below the New Haven average, more than 96 percent of the last graduating class was accepted to higher education, despite 75 percent reporting no immediate family member who has graduated from college. What's more, over a third of the two most recent graduating classes reported an interest in studying an environmental field in college.

When a Common Ground student graduates, his or her transcript tells a unique story. The school's campus, a 20-acre demonstration farm at the base of a state park in a city, creates a powerful learning laboratory. In Ecología, students practice conversational Spanish, nutrition, and leadership as they work in small student-led teams, cooking and eating from the school's urban farm. In Biodiversity, they measure species diversity in farm, forest, and city, and share their findings through a museum-quality outdoor interpretive exhibit. In Environmental Justice, they help to launch a healthy corner store and examine the effect of particulate matter on the city's asthma rates. Other courses include Environmental Research, AP

Environmental Science, Food and the Environment, and Sustainable Design, alongside more traditional college prep courses. Many of these courses are team-taught blocks, where two teachers from two subject areas integrate core academic content around a compelling environmental theme.

Common Ground works to integrate environmental themes into all courses, not just those with 'environment' in the name. For instance, in drama classes, students partner with actors from the Elm Shakespeare Company for an intensive 12-week residency. Students focus on the role of the natural world imagery in Shakespeare's work, and finish their study through a production in an outdoor classroom. Students learn data analysis by performing periodic trash audits and tracking use of electricity, learn physical fitness by hiking in West Rock Park, and course AP Government by taking on a mock environmental trial in partnership with law professors and students.

**"Our dropout rate is eight points below the state average, and 17 points below the city average. More than 96 percent of our last graduating class was accepted to higher education, even though 75**

As a community organization, and as a small charter school, Common Ground recognizes that community partners are a critical part of sustainability work. Community partners enhance environmental learning opportunities; for instance, Environmental Science and Ecology professors from the University of New Haven and Yale University are guest teachers in science courses, and have helped the school develop lab and field science experiences that prepare students for college-level work. A partnership with *The Nature Conservancy* places students in internships across the country each summer. In collaboration with a Yale Geosciences professor and *Amistad America*, students take part in a semester-long ocean biogeochemistry internship that culminates in a research trip in the Dominican Republic. Through the New Haven Arts Council, students staged an exhibit in a downtown gallery, focused on the theme, "What Sustains Us?" In addition, Common Ground's Green Jobs Corps places students in paid work opportunities in environmental organizations: planting and surveying street trees with the *Urban Resources Initiative*, leading environmental programs in housing projects with *Solar Youth*, and helping operate farmers markets with *CitySeed*.

While the school's first commitment is to the city of New Haven, Common Ground is partners with schools across Connecticut and the country. Specifically, Common Ground has led workshops for the *Green Schools National Conference*, the *Connecticut Partnership for Sustainability Education*, the National Science Teachers Association, and other networks. The school is an active member of *LEAF*, a national network of urban environmental high schools, facilitated by *The Nature Conservancy*. The school is launching a major new school garden resource center

to support the development and integration of educational gardens at schools state-wide through professional development, mini-grants, and curriculum development.

The school composts 100 percent of its organic waste on own campus, and participates fully in new Haven's single-stream recycling program. Students collect data on recycling and waste reduction on a weekly basis, and a paid team of students manages recycling and composting programs. Students travel to school by public city buses, eliminating the environmental impact and costs of school buses. A solar array on the roof demonstrates alternative energy options and provides data for classroom manipulation, and a recent full-school lighting retrofit has cut energy use. Three years ago, students wrote and won a $100,000 grant to fuel campus sustainability efforts. Students developed 36 sustainability proposals, and presented to peers, staff, and community, who selected the highest impact strategies. All proposals were incorporated into the school's 10-year master plan, and the winning proposals – related to rainwater recapture, waste reduction, and electricity – were implemented using grant funding.

The school has begun construction on a model high-performing building, featuring a solar array that will provide approximately 70 percent of electricity, and a geothermal system will meet all heating and cooling needs. Rainwater gardens, an educational wetland, and other features will demonstrate low-impact design.

The school's urban farm grew more 7,000 pounds of fresh, sustainable, local produce last year. It uses this harvest, and food from other Connecticut farms, to provide free, healthy school meals to 100 percent of our students. Common Ground practices organic land care on its 20-acre site, without pesticides, herbicides, or synthetic fertilizers. Students participate in more than a dozen outdoor adventure trips every year, with expeditions at every grade level and field experience across the curriculum, engaging 100 percent of urban students in hiking, camping, and other outdoor experiences.

## Environmental Sciences Magnet School at Mary Hooker, Hartford, CT

*It takes a village: Community partnerships take sustainability to new heights*

Environmental Sciences Magnet School at Mary Hooker (ESM) serves students from pre-kindergarten through the 8th grade in a new, $41,000,000 *LEED Platinum* facility, which includes a planetarium, butterfly vivarium, greenhouse, aquatics lab, and organic community garden. The school shares its exceptional facility with the community through a joint-use agreement. ESM's student population is comprised of 70 percent minorities, and over 75 percent of the student population is eligible for

free or reduced-cost meals. The school equally represents the Hartford urban area and the Hartford suburban community, serving 43 towns in total. The students bring nine different home languages and many cultures, ethnicities, religions, and traditions to the campus.

The school works to have students learn and apply sustainability practices though project-based and service learning. Both of these goals are supported through a collaborative effort of a science magnet coach, resident scientists, Central Connecticut State University, and the Connecticut Science Center. For example, fifth grade teachers wrote a unit on energy consumption and have designed a project that allows students to audit energy use and develop a project to reduce consumption. First grade classes, using the butterfly vivarium and working with a resident entomologist, reared butterflies and released them after tagging them through an organization called Monarch Watch. Students grow flowers in the greenhouse that they can sell in the spring as a butterfly garden. These same students will construct nectar feeders, write information brochures, and donate money to help protect the forested areas in Central America where the insects winter. The ESM service learning projects for other grade levels include recycling and sorting, raising plants to donate, bird diversity, composting, energy audits of classrooms and homes, and trout rearing and release.

ESM partners with Project Oceanology to execute their “Saturday Ocean Sciences Academy” program for students in grades 4 to 6 at ESM and in surrounding districts. Twice a year students participate in a bird-banding research program with a Trinity College professor by collecting data about the birds on school property. CT DEEP Inland Fisheries Division partners on the school’s trout in the classroom program with school visits, a field trip to a state hatchery facility, and the provision of trout, trout eggs, and support during the planned annual release. In addition, the school is sharing best practices with others by hosting representatives from South Carolina as they begin their journey designing an environmental studies magnet school.

The Community Farm of Simsbury assisted the school in beginning a 4th grade cold-crop garden project. Students attend its Summer Gardening Camp, and ESM shares greenhouse space with the farm. A graduate student at Goodwin College helps to oversee and implement ESM’s composting program, and hopes to use the school as a model for others. Knox Parks, a Hartford-based nonprofit dedicated to urban community gardening, has provided the school with garden compost, seeds, trees for the school property, and ongoing encouragement. ESM practices organic methods of gardening, *Integrated Pest Management (IPM)*, and composting; these methods are incorporated into the curriculum at all grade levels and into parent-staff garden workshops. The greenhouse produce is available to students’ families and to staff.

Students participate in Discovery Camp programs in grades 4-7. Each grade spends up to five days at the Discovery Camp's outdoor facility, where they participate in programs focused on team building and outdoor education. Enrichment clusters offered that encourage physical well-being have included trailblazing, EnviRUNmental, hiking and survival skills, first aid, martial arts, organic gardening, and Frank-N-Foods. Afterschool fitness classes are offered to students, parents, and faculty. Classes have included yoga and Zumba. Perhaps the most popular event with both students and faculty is the school's Friday Dance. Every Friday, after each lunch wave, virtually everyone joins in for a 10-minute dance party at which students, parents, teachers, custodians, cafeteria workers and even school police officers all let go and dance!

## *Delaware*

### St. Andrew's School, Middletown, DE

*Rallying against climate change in the capital; protecting health at home*

St. Andrews uses sustainability and the environment as a context for learning STEM thinking skills and content knowledge. Thirty percent of the graduating class took AP Environmental Science and all students scored a three or higher on the exam. St. Andrews obtained a grant from the Greenwatch Institute which has allowed students at the school to work with the University of Delaware to determine water quality trends and best practices for monitoring water quality in the school's Noxontown Pond. Students actively participate in the reforestation of 100 acres that also protects the watershed for Noxontown Pond and work with students at Townsend Elementary to plant plugs and trees at the headwaters of Noxontown Pond.

The school integrates environmental studies into nearly every subject, from chemistry to film to mathematics to the school's project-based physics curriculum. Students have made films designed to educate the community about recycling, have a unit on the environment in a senior ethics class, and learn about the historical origins of the American environmental movement. Chemistry courses study green technology, and students are offered environmental science as a lab course. The school's sports offerings include organic gardening and forestry.

St. Andrews School's orientation includes a class in which students are acquainted with the importance of recycling and energy conservation. Students participate in sustainability trips abroad during breaks and outdoor education in both 9$^{th}$ and 10$^{th}$ grade. Students and faculty of St. Andrews School received the 2012 Governor's Agriculture and Urban Conservation Award. St. Andrews chartered buses and canceled classes to allow students to attend a major climate rally in Washington,

D.C. on Feb. 17, 2013, and participates in the *Green Schools Alliance Green Cup Challenge*. In recognition of Arbor Day, last year's seniors planted 600 native plants and trees on school property.

The school was *LEED* Gold certified for their new Sipprelle Field House, and had the honor of receiving the first *LEED* for Schools Certification in the state of Delaware. The school reduced its utility bill by 36 percent, and reduced greenhouse gas emissions by 19 percent over 8 years. The school has defaults on all computers to print double-sided, uses 100 percent Green Seal certified products, and biodiesel. The school purchases 13 percent local food and participates in composting. The grounds include bioswales and a rain garden to reduce stormwater run-off, protecting local waters and human health. Stormwater runoff was reduced by 94 percent due to the school's unique infiltration bed design.

According to the EPA, the school demonstrates *IPM* best practices on its 2,200 acres of land. The school farms hay which maintains topsoil; irrigates to reduce fertilizer and pesticides; and practices no till. It works to reduce student exposure to pesticides through the following actions: it uses the least toxic pesticides possible when they are necessary; it uses the minimum amount of pesticides often within a given range of recommended application. It uses pesticides only when students are not in the field. It uses a weather station which accurately predicts the direction and intensity of wind during the day which will prevent applications with drift. It employs two school staff who hold certified pesticide licenses and are certified in Delaware nutrient management. The employees are current on certification and education and the school implements principles of *IPM* inside and outside of the building.

## *District of Columbia*

### Mundo Verde Bilingual Public Charter School, Washington, DC

*Rockin' Rock Creek Park from the earliest years*

First opened in August 2011, Mundo Verde is Washington, D.C.'s first public charter school that is explicitly dedicated to being a green school. It is no coincidence that "mundo verde" is Spanish for "green world." Mundo Verde's Habits of Mind -- the behaviors, virtues, and characteristics that all members of the school community strive to practice and embody each day -- explicitly include environmental stewardship. Students learn stewardship skills, knowledge, and values as they take part in the greening of school operations.

During a move to its current building in 2012, the school undertook renovations to replace aged carpets that were not appropriate for use in an early childhood development setting, install high-efficiency toilets and low flow faucets that meet EPA's WaterSense standards, and make the building more energy and water efficient, including installation of clerestory windows to allow for more natural sunlight. A backyard parking lot was converted into play space built with recycled deck material, and a raised bed vegetable garden was constructed in the front-yard. Even in a temporary home, Mundo Verde has made tremendous strides to ensure that its facilities are suitable for early childhood development and elementary school success.

**"Our mission is to foster high levels of academic achievement among a diverse group of students by preparing them to be**

Mundo Verde avoids furniture that may contain allergens, and purchased materials (including paper, furniture, cleaning agents) are always certified as 100 percent recycled, sustainably made, and non-toxic. Through collaboration with Fat Worm, LLC and the DC Office of Recycling, students and teachers' behavioral changes help the school to divert 70 percent of its trash from landfills. The school's kitchen is stocked with reusable utensils, bowls, plates, cups, and mugs for use in cooking classes and by school staff, cutting down on waste from disposable products.

The school community understands that good nutrition supports students' brain function, cognition, learning, and social behaviors, and that lower-income, urban families, including those with limited English, are at great risk for hunger, undernourishment, and nutrition-related health problems. Thus, health and wellness enrichment efforts are closely aligned to the school's sustainability and equity mission, and directly accelerate the growth and learning of students. The school works with Revolution Foods to provide healthy school meals with plenty of fruits and vegetables. Students take cooking classes in which they are taught to make recipes using many fresh vegetables and herbs from the school garden.

Students enjoy plenty of activity through yoga and physical education classes, and enjoy an hour of outdoor time each day. The entire school spends a half-day in Rock Creek Park on the last Wednesday of every month. Students experience daily unstructured play at recess, in addition to structured opportunities, such as organized games/activities, dance, neighborhood walks, and movement activities. Fitness and physical challenge improve not only student health but also classroom behavior; cognitive, social, and motor skill development; character, perseverance, and collaboration.

Mundo Verde's evidence-based wellness curriculum using the *National Education for Sustainability K-12 Student Learning Standards* is implemented during the school

day, extended day, and extended year summer programs. The curriculum consists of developmentally appropriate and participatory garden- and food-centered activities, outdoor play and learning, and student creation of authentic products that support healthy eating and fitness beyond the classroom.

Mundo Verde teachers regularly receive professional development on implementing *Expeditionary Learning* sustainability curricula, which involves students in school-wide sustainability endeavors. Students take on long-term projects called "expeditions," which in the 2012 -2013 school year have included include Waste, in which students measure their trash output, and Composting, in which classrooms set up vermiculture stations. Another notable project had the students writing and illustrating books which they created and gifted to the local library.

The school has been actively involving the community in sustainability projects, partnering with *City Blossoms* and *DC Greens* to improve their building and maintain the school garden, and partnership with *Friends of the Park* to green a public playground. The *U.S. Forest Service*, local horticulturists and Park Rangers have also enhanced the school's nature-related curriculum.

## Washington Yu Ying Public Charter School, Washington, DC

*An outdoor urban oasis*

Washington Yu Ying Public Charter School (Yu Ying) has grown rapidly from 130 students and 22 full-time staff in 2008 to 439 students and approximately 81 full-time and part-time staff in 2012. In the fall of 2011, the school moved into a permanent location on three wooded acres of land, a unique and treasured setting for an urban school. Yu Ying recognizes the rarity of this outdoor space in DC and cultivates it carefully. The school building and playground sit on two acres of land, with the gently sloped and wooded back acre developed into a nature center with trails, a pond, and an observation deck, constructed with the help of partners at *Earth Day Network*. The nature center provides opportunities for students to engage in hands-on outdoor learning, and includes a large school garden, which is used as an outdoor classroom to teach students about sustainable agriculture, nutrition education, and the environment.

A recent renovation involved gutting an existing 30,000 square-foot structure, constructed in 1902, and erecting a 10,000 square-foot addition. Both structures were built to be as safe, healthy and resource efficient as possible, with input from community members – including the D.C. Department of Transportation, the Metropolitan Police Department, the Advisory Neighborhood Council, and

sustainability experts. The school is home to a *National Wildlife Federation Certified Schoolyard Habitat* and participates in the *National Science Foundation's Monarchs in the Classroom*.

Yu Ying's facilities and grounds sustainability measures include minimizing site disturbance by building the addition in the location of a previously demolished building, using recyclable and renewable materials whenever possible, managing stormwater runoff onsite and installing operable windows throughout the building. In addition, the school has ensured that all paints, adhesives, flooring, finishes, and coatings avoid VOCs (many are regionally produced and manufactured); and uses green-certified cleaning materials. The school has developed a Kiss and Ride drop-off system to increase physical activity and safeguard healthy outdoor air.

Yu Ying is working to improve the health and wellness of students and staff, by taking part in the National School Lunch program and complying with the requirements of the DC Healthy Schools Act. The school lunch vendor, *Revolution Foods*, is committed to providing clients with healthy, unprocessed food, and adheres to the school's "no junk food" policy. Students receive at least 210 minutes of physical activity per week, and there are opportunities for students and staff to be healthy outside of the classroom as well. The school offers several after school classes for students dedicated to wellness and physical activity, and the Parent Association's Wellness Committee works with the school to organize activities such as community planting days with *Greater DC Cares*, spring fun days, and staff/parent soccer matches. Students participate in *National Bike to School Day* and staff holds group fitness nights.

The school's use of the International Baccalaureate Primary Years Program curriculum allows for the incorporation of environmental and sustainability topics in many of the six trans-disciplinary themes around which units of inquiry are based. In particular, the "Sharing the Planet" theme explores how to share finite resources with other people and living things. Further, each year there is a unit that corresponds to environmental and sustainability education.

Yu Ying collaborates with local organizations to educate and inform students and staff and to green their grounds. Students accompany *Groundwork Anacostia DC* to clean up trash on the banks of the Anacostia River and install rain barrels with *RiverSmart Schools* to minimize stormwater runoff water contamination. Students tour *ECO City Farms* to hear from experts on sustainable farming techniques. They visit *American University Community Garden* to learn horticulture from garden caretakers. Experts from *City Blossoms* and the *Arcadia Center for Sustainable Agriculture* also bring their presentations to students at Yu Ying.

## Woodrow Wilson High School, Washington DC

*Historic building becomes a sustainability powerhouse*

The massive renovation of an historic building has brought Woodrow Wilson to the forefront of Washington's public school system. The new building, which is *LEED* Gold certified, has achieved a 74 percent reduction in water use and features two green roofs and 30,000-gallon stormwater tanks. A 75-year-old coal- and oil-burning three-story power plant was converted into a highly efficient smaller-scale natural-gas power system that saved so much space that the school was able to convert one story into a state of the art fitness center, now called "The Power House."

The most dramatic transformative feature of the modernized campus is the atrium of the core academic building. The original building had an 11,000-square-foot open-air doughnut hole in the middle that was dead space. Its only purpose was to provide air circulation from the sweltering climate between May and September. A spectacular customized concave glass roof was installed, creating the Atrium, which has become the centerpiece of the school and a beautiful event space. In keeping with *LEED* criteria, The Atrium is bathed in natural light, and has fantastic acoustical treatments and a sophisticated directional sound system.

> "Student attendance is up, truancy is reduced, and club and sports teams have increased participation. Overall GPAs are rising slightly and there are

Two water holding systems were designed: One is a 15,000 gallon cistern that holds rain water and is used to flush 56 toilets and 18 urinals in the main academic building. Another 38,000 gallon stormwater management system controls much of the stormwater from the property, which is at D.C.'s highest point. This prevents water pollution of Rock Creek, the Potomac River and ultimately the Chesapeake Bay, one of the world's most fragile ecosystems, and protects the health of inhabitants of the region. The school purchases 100 percent wind energy.

Another highlight of the renovation is an auxiliary gymnasium that needs only natural light to operate most days, and the new auditorium, which salvaged 850 hardwood seats preserved from the original 1935 auditorium. Visitors marvel at the wonderful blend of old and new. The auditorium, which was created from the old gymnasium, was built using the original steel superstructure. Among the smaller spaces, most classrooms shine with the refurbished original wooden floors, alongside the best in new computer technologies.

The modernized school is used as a teaching tool for students and the community at large. All science teachers incorporate the building into lessons. Wilson students have been trained in all the *LEED* elements of their new campus, and they have hosted over 3,200 local residents, students, and families on green tours that highlight how much of the spirit and structure of the old campus has been preserved in the modernized facility, like the original terrazzo floors that have been matched by modern artisans, who created the same flooring in most of the 70,000 square feet of new space.

Academically, the campus redesign offers a multitude of gifts. It boasts an *EPA EcoLab* that creates any ecosystem on earth and allows for creative environmental studies, and a 2,400-square-foot engineering and robotics lab that houses *Project Lead the Way* supported classes in engineering, computer integrated manufacturing, electrical design, biomedicine and robotics. Wilson's MAC labs allow for an amazing blend of arts and technology. Wilson's first ever TV studio produces six minutes of daily announcements and student documentary pieces. The Black Box Theater, another first, enhances its highly-regarded theater program with a space for experimental theater, open mikes, slam poetry, comedy gigs, debate, and oratory competitions.

Wilson's campus location and design allow for smart transportation choices by all 1,800-plus students and staff, and 80 percent of the student population walks, bikes, or takes public transportation to and from school. The campus is located one block from a light rail train station and bus hub. Staff has coordinated with the *Washington Area Bicycle Association* to have bike racks installed in a secured garage, with incentives provided for bike transportation.

In addition to these building and grounds sustainability feats, Wilson is the only school in DC to offer a career education program in environmental science, encompassing courses in environmental science, sustainable earth, marine sciences, sustainable oceans, urban ecology, and sustainable cities. Working in collaboration, Wilson's Sustainability and International Studies Programs implement a school-wide recycling program with a contract for a commingled recycling dumpster and a school wide composting effort in collaboration with the school's food service provider. The school participates in the *Do One Thing Project* through collaboration with a school in Japan. Students partake in an annual Anacostia Beach Clean-Up with *NOAA* and *NEMO* and the school works on other local conservation, education and school greening projects with *DC Greens*, *Chesapeake Bay Foundation* and the *Anacostia Watershed Society*.

The entire Wilson community, including over 35 percent free and reduced price lunch eligible attendees, is thankful and proud of the modernized facility, which has resulted in increased attendance, reduced truancy, and increased participation in

clubs and sports teams. Overall GPAs are rising, and there are fewer failing grades. There also are fewer student altercations because design changes broke up congested hallways and bottlenecks.

## *Florida*

### Driftwood Middle School, Hollywood, FL

*Wiser than owls when it comes to conservation*

Across the board green practices have led to improved science scores, reduced environmental costs and impacts, and more balanced diets at Florida's Driftwood Middle School Academy of Health and Wellness, where 73 percent of the students are eligible for free or reduced rate lunches. Driftwood's conservation efforts began in 2008 with the launch of its energy reduction challenge, "How Low Can You Go?" Since then, students and teachers have used multiple creative means to effectively reduce its carbon footprint.

**"Our school, serving over 70 percent free and reduced price lunch eligible students, has the highest science**

To encourage teachers to turn off lights after school hours, Green Team students left painted paw prints stating "You've been chilled!" on the classroom doors of those who had not: Greenhouse Gas emissions have dropped 23 percent since then. Water use has also dramatically dropped since 2008 -- by 38 percent -- with 70 percent of the school's outdoor campus landscaped with native plants that thrive on natural rainfall. Forty-five percent of campus-generated waste is recycled, with special needs students taking the lead in collecting bottles and cans. The drama club won the Broward County Public Broadcasting Announcement Video Contest with its "Recycle, Reduce, and Reuse" video.

Forty percent of the school's campus is devoted to ecologically beneficial uses. The outer portions are used as artificial burrows for protected owls, which were funded by Project Perch, Audubon Society and National Fly-Aways Coalition. Students benefit from having a nationally recognized bird watcher on staff, who has documented 46 bird species on campus. Driftwood's Butterfly Garden and hammock areas are used for environmental education and native species habitats and are certified by Broward County Naturescape, National Wildlife Federation, and the North American Butterfly Association.

Students are responsible for the care and harvesting of Driftwood's organic vegetable and hydroponic gardens, and benefit from their nutritional as well as educational value. The gardens' bounty provides enough vegetables to feed

students and staff, as well as struggling families in the local community through donations to a local food pantry. Driftwood also participates in *USDA's Farm to School* and *HealthierUS School Challenge* programs, which led to an 80 percent increase in the use of fresh fruits and vegetables in the cafeteria during the 2011-2012 school year.

Driftwood is a Polar Heart Monitor Showcase School piloting the use of exercise technology in education. Biofeedback such as pedometers, the Tri-Fit computerized testing, and HeartMath Technology are used as fitness assessment tools for students and staff. Driftwood uses a R.O.P.E.S Course outdoor education class on campus that helps to develop leaders and team work. The course emphasizes not only fitness, but responsibility and citizenship.

Driftwood's rich science curriculum also includes hands-on lessons about weather, ecosystems, conservation, water cycles, plant reproduction and solar energy. Students benefit from diverse expert guest speakers, such as sea turtle scientists, shark experts, and beekeepers. Driftwood's green culture and coursework has helped to nurture high science achievement. The school boasts the highest science assessment scores of all Title I schools in Broward County, the sixth largest school district in the nation.

## St. Paul Lutheran School, Lakeland, FL

*Electricity cops on the case of energy that might go to waste*

Student-led initiatives and work with the *USFS Project Learning Tree* (PLT) program are central to the sustainability and health-conscious culture of St. Paul Lutheran School, a private school serving kindergarten through 8th grade. While St. Paul has been integrating PLT throughout its curriculum for six years, it became a PLT Green School in 2010, enabling students, teachers, and staff members receive even more tools, training, and resources for its student-led Green Team.

St. Paul was awarded the 2010-2011 Florida Green School Award for its National Wildlife Habitat Restoration Project. Students had observed a loss of birds and wildlife due to the removal of trees for a road construction project next to the school. In response, native plants were planted to help encourage the return of birds and small wildlife by providing food, water, and shelter, with help from the Southwest Florida Water Management District. Students in fourth grade partnered with 4-H partner and Cornell University to pilot a new curriculum to evaluate bird habitats. Methods learned from those lessons inspired the school to plant more native plants to provide shelter and food, and to install new bird boxes. This year, students are raising money from their recycling efforts to stock the school's ponds to help encourage more wading birds to return to campus.

The Green Team and a middle school science class planned and led activities to reduce the school's energy consumption by 15 percent. They began the effort by investigating current energy usage, and then developed innovative ways to reduce usage. For example, to retrofit lighting on campus with STARR energy saving bulbs, students requested and received matching funds from the St. Paul School Board, splitting the cost with a *PLT Green Works* grant. Fifth graders are "Electric Cops" and graph data on a school wide bulletin board showing which classes conserve energy through practices like shutting lights off when out of the classroom.

Resource conservation education is a strong component of St. Paul's curriculum. Water cycle and conservation is part of the second and third grade curriculum. Water Odyssey, a computer program created by Water Management District, is used in grades 3-5. The fifth graders learn about alternative energy sources and sixth grade completes a unit examining the advantages and disadvantages of different renewable and nonrenewable energy sources. Middle school students have competed in the *Florida Solar Energy Whiz and Innovations* competition.

St. Paul has learning standards related to waste reduction and recycling in kindergarten through sixth grade and collects *TerraCycle* eligible items, such as drink pouches and lunch packaging. Aluminum tabs are also collected and donated to Shriners Hospitals for Children annually. Through recycling, the school decreased trash output by a whole dumpster while participating in the *Keep America Beautiful Recycle Bowl.* Students collected 11,600 pounds of paper and other recyclables, eliminating the need for another dumpster used for waste.

The campus is home to vegetable, herb, fruit, flower, native plant, butterfly, and literature gardens that are used for kindergarten through fourth grade classes in math, science, and health. Rain barrels irrigate all gardens, saving 165 gallons of water each week around campus. Students helped design and build a turtle and rain garden irrigated with rain water from down spouts. Hydroponics gardens were added in 2008 and each grade level cares for a stacker.

Students are offered a variety of fruit and vegetables options daily through a new school-wide lunch program. They also participate and track daily physical activities, including PE classes and afterschool sports teams, as well as activity incorporated in their daily routines.

## School District of Palm Beach County, FL

*$11 million saved on electricity costs alone*

The School District of Palm Beach County, the fifth largest school district in Florida, was one of the first in the nation to employ a full-time sustainability coordinator charged with developing and overseeing conservation initiatives. Since 2008, the district has reduced overall electrical expenses by $11 million even as new buildings and square footage has increased. Recycling program savings have reached $600,000 per year in direct and indirect savings as a result of needing fewer and smaller trash dumpsters. Palm Beach has completed a number of re-lamping projects that have replaced older, less efficient bulbs with new, energy efficient models that not only reduce District energy costs, but improve classroom lighting.

In 2009, the district's school board formally adopted an Energy and Water Use Conservation Policy that mandated *LEED* compliant construction and other cost savings measures. Recent analysis backs up the wisdom of that action, with the energy use at the District's *LEED* 31 percent less than its non-*LEED* schools. The District has over twenty *LEED*-accredited professionals currently on staff. It has established a District-wide Green Team, a Green website and a green newsletter, Recycling Matters to devise, disseminate and monitor sustainability initiatives. Managers are able to control and monitor real-time temperature, relative humidity and exterior lighting using the District's web-based Energy Management System (EMS).

"Since 2008, the District has reduced overall electrical expenses by $11 million, even as new

Palm Beach's indoor air quality program performs over 400 assessments and 100 IAQ related projects each year under the supervision of highly trained, in-house environmental professionals. The district also hired a certified industrial hygienist to assist in the IAQ program. In 2003 and 2007 the program received *EPA IAQ Tools for Schools* awards for its exemplary efforts to improve indoor air quality for students, teachers and staff. A new green cleaning program was established that uses fewer cleaning chemicals, thereby reducing procurement and equipment costs, and with the added environmental and occupant health benefits of less toxic cleaners. The District has implemented an *IPM* program to reduce the use of harmful chemicals which are put into classrooms and partners with the local chapter of the *American Lung Association* to implement the *Asthma-Friendly Schools* program.

In 2012, Palm Beach became the first to achieve the status of a Florida Healthy School District at the gold level from the *Florida Coordinated School Health Partnership* and *Florida Action for Healthy Kids*. The award is based on the eight

component areas of the *CDC Coordinated School Health* model and focuses on district infrastructure, policy, programs, and practices identified from national and state guidelines, best practices, and Florida statutes.

District officials have received individual recognition as national and state leaders. The district was awarded the *ED Carol M. White Physical Education Program* grant and the *Robert Wood Johnson Foundation Healthy Kids Healthy Communities* grant. The *Alliance for a Healthier Generation Healthy Schools Program* provides its schools tools, resources and support to inspire students, staff and families to develop lifelong, healthy habits. The district's food service department has been recognized as a leader at the state and national levels for exceeding the nutrition standards required by the USDA for Child Nutrition Programs. Every day, students have opportunities to select nutritious meals for breakfast and lunch with a variety of fresh fruits and vegetables, whole wheat and whole grain bread products, lean proteins, and low-fat and fat free dairy options. Six schools participate in *USDA's Fresh Fruit and Vegetable Program* which provides each student daily with a fresh fruit or vegetable snack at no cost.

Palm Beach provides numerous tools and opportunities for teachers and students to engage in environmental education. Grade level appropriate lesson plans that tie environmental education to Florida's standards are available to all teachers on the District's website. Energy, environmental science, research, engineering, biotechnology and STEM themed education programs are offered to students at elementary, middle, and high school levels.

## *Georgia*

### Ford Elementary School, Acworth, GA

*Common core in the garden*

Ford Elementary School sits amid more than 20 acres and uses more than 60 percent of the grounds for environmental education and habitat protection. Built in 1991, Ford Elementary was designed to accommodate 900 students, but within three years needed to educate more than 1700 students. Within its first year, Ford became a *National Wildlife Federation Certified Schoolyard Habitat*. After additional schools were built to relieve overcrowding, Ford became proactive in reclaiming its native habitats.

During the summer of 2013, Ford Elementary will undergo its first extensive renovation since the building was constructed. Several energy saving projects will reduce environmental impact and improve the health and safety of students, staff, and the community. Once the project is complete, it will be eligible to apply for

*EPA's ENERGY STAR* certification. Highlights of the project include a new HVAC system and occupancy sensors in each room to more effectively regulate energy usage. At the conclusion of the project, Ford expects its energy efficiency to increase from approximately 80 percent to over 92 percent.

Ford's lunchroom program includes incentive and recognition activities as an approach to educate and promote the importance of making healthy food choices. At least 30 percent of the school's purchased food is fresh fruit and vegetables offered on a daily basis to all students, and Ford participates in a *Farm to School* program. The outdoor food garden classrooms educate their students, staff and community on how to grow and harvest their own crops. Foods from the garden are prepared in the classroom to demonstrate both the life cycle and nutritional value of food crops. At least 50 percent of students' annual physical education takes place outdoors through funds awarded them by the national *Fuel Up to Play 60* nutrition and physical fitness program, which includes several afterschool physical fitness activities that help support continuous movement.

Ford's 18 year commitment to provide relevant environmental education has been a journey that involves staff, faculty and trained volunteers, known as Earth Parents. Working with classroom and Science Lab teachers, Earth Parents facilitate and support the curriculum with enrichment activities that extend into the outdoor learning labs. Curriculum and best practices were developed by Ford staff and volunteers who recently co-wrote the Learning Garden Curriculum with *The Captain Planet Foundation*. Ford was invited to present its award winning program at the Environmental Education Alliance Conference in Georgia, and at the National Children's Gardening Symposium in Denver, allowing the school to share both its challenges and successes with a much larger audience.

Recently, a partnership grant from *Keep Cobb Beautiful* allowed Ford to construct new Math and Social Studies Gardens. Using the new Common Core math standards, Ford teachers wrote curriculum to extend the math concepts into this new outdoor classroom. Ford also created an integrated Social Studies and Language Arts and Math curriculum to help develop Victory Gardens and Three Sisters Gardens as an extension of 3rd and 5th grade Georgia Performance Standards. Now, the school is developing STEM lessons through the Science Lab that will offer authentic learning experiences for Ford students in the outdoor learning labs.

To celebrate the integration of the environmental education and the fine arts, Ford holds an annual Evening in the Garden event to highlight the achievements of students. The community is invited to enjoy a night of performing arts, art shows, poetry reading and creative writing all hosted in the school's gardens. To instill a sense of environmental stewardship in the community, three to four 'Earth Shaking Workdays' are held each year at Ford to build, repair and sustain its outdoor learning

labs, habitats and gardens. Ford has sponsored over 15 Eagle Scout projects and, over the course of one year, Ford organized and hosted over 175 people at a state-wide Learning Garden Conference to support educators in their effort to bring environmental education into their schools and organizations.

Each year, Ford hosts a school-wide Family Science Night to which Ford invites representatives from the *U.S. Forest Service*, the *National Park Service*, *Centers for Disease Control*, Cobb Energy, and the Marietta/Cobb Water Authority to set up hands-on learning stations to share environmental concepts with their students. Recently, Ford was featured in *PBS "*Growing a Greener World" segment, and spotlighted in Dr. Herb Broda's book, *"*Moving the Classroom Outdoors*."*

## Gwinnett County Public Schools, GA

*Saving more than $14 million annually in utility costs*

Gwinnett County Public Schools (GCPS), located in the metro Atlanta area, is the largest school system in Georgia and currently serves over 165,000 students. As the 12th largest school district in the nation, GCPS is committed to encouraging environmental education and outstanding stewardship of resources. With more than 23 million square feet of *EPA ENERGY STAR-certified* areas, GCPS leads the nation for K-12 certified building space with 98 percent of schools, or 125 of them *ENERGY STAR* certified. Due to the efforts of GCPS to meet the highest standards in construction and operation, GCPS has saved 13 million in energy costs per year. The district conducts energy audits in all facilities, focusing on low and no-cost ways of conserving energy.

Through participation in the *EPA Waste Wise program*, GCPS shares its best practices with other school systems across the nation. The school uses low-flow fixtures and xeriscaping to make an irrigation savings of 1.4 million per year. The district has greened operations and maintenance, employing electric not gas tools, paint brushes and rolls, but never sprayers, and fueling all vehicles during the cool of the day.

GCPS has partnered with the *Clean Air Campaign* for nine years and remains committed to improving air quality through a variety of programs. GCPS was the first school district in North America to buy *Low Emission Vehicle (LEV)* diesel engines, and all vehicles over a half-ton use ultra-low sulfur diesel fuel. The district implements *Pool to School* and *Ride the Bus for Clean Air* initiatives. For these efforts, it was named one of the Pupil Transportation Safety Institute's top five school bus fleets in the nation.

The district uses humidity and CO2 monitors and ionization mechanisms in HVAC units to ensure good air quality and tests monthly for contaminants. In addition, each school has an environmental health liaison. The GCPS School Nutrition Program has received several awards over the last three years. GCPS successfully implemented many of the tough new federal nutrition guidelines for school meals in advance, and participates in *USDA Farm to School*. Students learn in outdoor classrooms, gardens, and use safe and healthy art supplies.

Last year, 84 GCPS schools participated in the *Georgia Green & Healthy Schools program*. This program is a system of strategic planning, teaching, learning and doing that results in a greener and healthier natural world. Program components are in alignment to Common Core Standards and national STEM education efforts. The more rigorous standards and quality instruction in environmental science have helped the district outperform the state and metro-Atlanta average on all state assessments for the last five years. GCPS students perform well in AP Environmental Science, with students making up 15 percent of APES test takers in the state and APES teachers attending quarterly training.

**"Our district, the 12th largest in the nation, saves 13 million in**

Another example of STEM education through the lens of environment is the annual GCPS *Focus on Leadership and Advancement in Renewable Energy* (FLARE) competition for K-12 students. FLARE was created in 2010 to teach collaborative, problem-solving that employs STEM thinking skills and content knowledge around sustainability problems. Each year more than 100 teams from approximately 40 schools compete to determine the best and brightest alternative energy engineering team in GCPS. In addition, the district participates in solar cooking and solar powered car competitions. Students from GCPS' School of Mathematics, Science, and Technology serve as interns at businesses throughout the county, including the environmental nonprofit organization, Gwinnett Clean & Beautiful.

## *Indiana*

### Guion Creek Middle School, Indianapolis, IN

*Geothermal savings and nationally recognized pest prevention*

Guion Creek Middle School is located in Pike's Township, a residential suburban community of Indianapolis, IN. The school is one of three middle schools in Pike's Township with over 73 percent of the students receiving free or reduced lunch.

Guion Creek's newly installed geothermal heat pump provides 45 percent of the school's energy consumption, substantially lowering its natural gas use. With the additional benefit of lower maintenance costs and time requirements, school facilities personnel have more time to focus on other needs in the building. The school has reduced water usage by 41 percent, its greenhouse gas emissions by 19 percent and its energy consumption by 50 percent. Ninety-five percent of the property is considered water-efficient.

The school has diverted 25 percent of solid waste from the landfill by recycling. Guion has contracted with a local trash service to recycle paper, cardboard, cans and plastics. 100 percent of the school's paper content is chlorine-free and there is a no idling policy in place for all vehicles. In addition, all cleaning products meet the *Green Seal* Standard. The school has used funds generated from recycling to foot the bill for other school costs.

Guion Creek participates in the *USDA's HealthierUS Schools Challenge* and was awarded Bronze status in 2012. The school district benefits from *ED's Carol M. White Physical Education Program* grant, which has facilitated students' increasing their daily physical activity to 60 minutes and use of pedometers by every student. The school recently revamped its fitness center and partners with the Indianapolis Colts for Fitness Camp. It uses an on-site community garden to facilitate students' learning with the food services department about preparing vegetables to eat. All produce grown in the garden is used in the school cafeteria.

> **"Our health and wellness enrichment efforts are aligned to our sustainability and**

Eighth grade students participate in Career Day on green technology. Green projects such as the school garden allow the students first-hand to see how these programs affect everyone's life. The school's sixth grade curriculum emphasizes the relationships between organisms, habitat, biotic factors, photosynthesis, and the food cycle. Seventh grade students learn how water is a major component in sustaining all organisms, examine the relationships between plant and animal, and venture outside onto the school grounds to validate what they have discovered in the classroom. Meanwhile, eighth grade students put it all together, identifying how human activities affect the biosphere. To encourage further study, a student Science Club allows students to participate in additional sustainability activities. Guion uses its geothermal system and other building features as a learning tool. This installation provided the teachers with a relevant topic to introduce green technologies, and they expanded on this by discussing other technologies such as windmills.

Guion Creek implements the nationally recognized school *IPM* program overseen by the Metropolitan School District of Pike Township. The school does not use harmful pesticides on its property or buildings. The school is inspected for cleanliness on a regular basis and staff is consulted when there is a pest issue. The facilities department offers workshops, educational literature and best practices in keeping the school pesticide free.

## *Iowa*

### Starmont Community School, Arlington, IA

*Vocational agriculture champions renewable energy*

The Starmont Community School is a rural public campus comprised of 627 students in grades Pre-K through high school, which serves 47 percent disadvantaged students. The campus, which consists of three attendance centers (Elementary, Middle, and High School) sits on 74 acres of land and includes a butterfly garden, a fruit and vegetable garden, a flower garden, an apple orchard, and a berry patch.

The entire Starmont campus is an extension of the classroom. Students participate in outdoor activities such as a fall prairie burning and spring reseeding, composting, and on-site gardening. The 17 acre agricultural test plot, green house, and gardens are used for learning experiences. Students engage in service projects such as building benches made from concrete and recycled wood along the campus fitness trail.

Elective classes for older students focus on green building, recycling, renewable energy, and sustainable consumption. The school partners with the University of Northern Iowa Center for Renewable Energy and Environmental Education and offers a vocational agricultural course that incorporates renewable energy.

The school used *American Recovery and Reinvestment Act* funds to convert from T-12 to T-8 lighting, equip areas with occupancy sensors, install demand control ventilation, and replace an outdated steam boiler with two energy efficient boilers. School buses run on biodiesel; 100 percent of paper is post-consumer material; and the campus diverts 39 percent of its waste from landfills through its recycling program.

All students participate in local food taste tests, physical fitness breaks, and interactive cross-age nutrition lessons. Nutrition and fitness is emphasized through the campus' participation in *Fuel Up to Play 60* and through a partnership with the *Northeast Iowa Food Initiative*, a program that provides educational workshops for

teachers and students, an *AmeriCorps* member to assist with food preparation once a week, and guidance on nutrition and active living policies. Starmont encourages healthy eating by providing fruits and vegetables during lunch and by offering healthy chicken wraps and fruit at concession stands.

## Des Moines Independent Community School District, IA

*Post-secondary partners to provide effective sustainability professional development*

Des Moines Independent Community School District (DMPS) serves more than 32,700 students in central Iowa, 77 percent of which are underserved. DMPS, now over 100 years old, is committed to modifying historic buildings into efficient energy models, implementing stringent plans related to improving the health, comfort, and learning environment of students and staff, and executing ground-breaking new initiatives in environmental and sustainability education. In 2012 DMPS received the Governor's Iowa Environmental Excellence Award and an *ASHRAE* Iowa Chapter Technology Award. Des Moines Community School District has been recognized by EPA as an *ENERGY STAR* Leader for improving energy efficiency by 10 percent (2010), then 20 percent (2012), and also as an *ENERGY STAR* Top Performer (2011). In 2012, the district was honored as an *ENERGY STAR* Partner of the Year. DMPS has earned *ENERGY STAR* certification for 52 district buildings.

**"Our district has saved $2.4 million in energy costs since 2007, the equivalent**

Many DMPS facilities have undergone tremendous renovation. Large scale energy improvements have included HVAC, building envelope, and electrical upgrades. Thirty-three buildings have replaced the traditional boiler system with geothermal systems. When geothermal was not possible, other steps, such as replacing outdated boilers with high efficiency units, were taken. Other facility upgrades have included the installation of double-pane glazed windows and doors with internal insulation and weather stripping, improvements to lighting systems such as installing high-efficiency T8 and T5 bulbs, LED, and motion sensors, and replacing pneumatic controls with Direct-Digital Control technology which can be set to stagger startup and avoid peak demand. DMPS has saved $2.4 million in energy costs since 2007, the equivalent of 66 first time teachers.

Two years ago, DMPS implemented single stream recycling and purchased additional recycling containers for classrooms. These efforts have increased the amount of recycled solid waste by 65 percent and have diverted nearly 40 percent of DMPS solid waste from landfills.

In order to implement many of the facilities improvements, DMPS has worked with multiple partners, including Johnson Controls, The Weidt Group, MidAmerican Energy, and The Energy Group, to develop and implement efficiency practices district-wide. For example, DMPS has worked with these partners to design and implement building automation and HVAC controls, review energy practices and options for retro-commissioning, auditing systems and energy consumption with cost/benefit analysis, and to take advantage of energy rebate programs.

DMPS is committed to the health and wellness of its students, staff, and administrators. DMPS tests all buildings for lead and radon; has removed all wooden playgrounds from the system; and does not allow any CCA material on new installations. Nine schools participate in *USDA HealthierUS School Challenge*, four schools participate in *Farm to School*, 28 schools participate in I*owa Department of Public Health's Pick a Better Snack* program, and 11 schools have gardens. Many schools also work with *AmeriCorps FoodCorps* and *HealthCorps* members and the Dairy Council's *Fuel Up to Play 60*.

Students, teachers, and administrators have collaborated with partners such as the Center for Bio-Renewable Chemicals at Iowa State University for teacher STEM training. It also collaborates with *Symbi*, the *NSF* and the *George Lucas Education Foundation* in order to connect students and teachers scientists in the field, inspire students in green technology, and introduce a project-based AP Environmental Science course at all five DMPS high schools. Instructors of both AP and regular environmental science have trained with The College Board. Many schools have also developed outdoor classrooms in order to encourage outdoor learning experiences. Hundreds of DMPS students participate in environmentally-focused service learning projects annually.

## *Kansas*

### Bluejacket-Flint Elementary School, Shawnee, KS

*Hands-on STEM insight*

At Bluejacket-Flint (BJF), staff, students, parents, and community members have reduced their environmental impact through projects that include 52 percent reduction in energy use by using *EPA's ENERGY STAR Portfolio Manager* to analyze energy and resource conservation; reductions in waste through composting and recycling; and water quality protection and conservation with the installation of a rain garden and use of native plants that do not require irrigation. All of this has led to a fiscal savings of 29 percent savings from the baseline year in the first year and current a 54 percent savings.

Students, over half of whom are eligible for free and reduced priced lunch, regularly engage in school environmental and health investigations through active participation in *Kansas Green Schools* and on the BJF Green Team. The BJF Green Team leads teachers, parents and students in service learning projects for students to log more than 150 collective service hours and improve the school grounds, neighborhood and larger community with trash patrol, recycling drives and landscaping projects. The BJF parent teacher association invested $50,000 in the development of an outdoor classroom, which serves as a cornerstone of the environmental and outdoor education at the school.

Since 2008, students have engaged in waste audits and action planning, recycling and composting, planning and installing a rain garden and most recently, exploring green technologies. BJF launched multiple initiatives to reduce solid waste with school-wide recycling of more than 125 tons of paper and other materials since 2008, conserving and reusing materials to save more than 150 tons from the landfill. The teams are connected to more than 30 local, state and national partners, including 4-H Youth Development, Kansas Department of Health and Environment, and Kansas Association for Conservation and Environmental Education's Kansas Green Schools network.

Teams of teachers and staff have written and executed more than $45,000 in grants to supplement the curriculum with hands-on projects and inquiry lessons and a speaker's bureau relating to green technology. In reading units, students interpret environmental terms, vocabulary words and phrases as they are used in a text, including determining technical, connotative and figurative meanings. They practice fluency in all text types with environmental and ecological stories. Using communications skills, students help prepare reports for the Shawnee Garden Club on a grant to assist with the composting projects. Students spend time at Kansas State University exploring the current use of sensor technologies, while interacting with a scientist using researching the rainforest. Students apply and extend arithmetic and estimation with an enterprise business unit, in which they study markets and create their own business plans using recycled inputs. Students identify community needs and problems and plan a business as an entrepreneur. They complete the math to churn out a profit for both a goods and service business, often with a plant or animal focus. Then, the profits are donated to Kiva, an international lending service with a multitude of environmental investments in developing nations.

Students' classroom science assessments have improved on average 10 percent with the addition of the *NSF INSIGHT* program, with two teachers selected as fellows. These community-based STEM investigations give a learning experience that offer opportunities with clean-up of neighborhoods, streams and parks in partnership with the Blue River Watershed Association. Students not only cover

watershed concerns, like flooding and water quality, but also reach out to engage the community in addressing these issues. In addition, students engineer recycled robots, design solar ovens, and build biome models. BJF uses classroom resources including *NOAA's Climate Stewards Education Project*, *NEED* (*National Energy Education Development*) and *USDA Agriculture in the Classroom*. BJF holds a Walk to School Day and is a USDA *HealthierUS Schools Challenge* awardee.

## *Kentucky*

### Locust Trace AgriScience Farm, Lexington, KY

*Green CTE: The future of agriculture*

Locust Trace AgriScience is a new, net zero construction that opened in August 2011, featuring permeable pavement, solar energy, solatube daylighting, a green roof, and a waste disposal system that utilizes constructed wetlands the school to reduce its impact on the environment and improve environmental health for building occupants. The school's water conserving and quality protecting roofing systems collect rainwater in underground storage tanks, which is then used to water the school's 6.5 acres of crop gardens and livestock. Locust Trace also has an underground well that serves as a back-up water collection system in case of a drought and features a landscaping design that is 100 percent water efficient.

Locust Trace is an urban high school of grades 10-12, where 36 percent of the students come from a disadvantaged household; however, it maintains a 99 percent graduation rate and 92 percent attendance rate. This small high school of only 175 students has proven its ability to do big things when it comes to modern career and technical education, covering such fields as alternative energies and sustainable agriculture on the 82 acre farm on campus.

Locust Trace students study in one of the school's five programs: Introduction to Agriculture, Plant and Land Science, in which students learn about the land and how to grow and sustain it; Agriculture Power Mechanics, where students might devise a new livestock watering system; Equine Studies, where students learn not only about riding and caring for horses, but also about sustainable pasture practices and land management; Small and Large Animal Science, through which they raise animals and provide food to other schools and local food banks; and Veterinary Science, which covers animal medicine.

The AgriScience Farm provides students the opportunity assist in the development of the farm by engaging in meaningful experiences in sustainability and agricultural

education. For example, math students calculate how many hay bales are needed to feed the livestock in barns while chemistry students build and plant raised bed gardens and monitor the plant growth by type of compost. Students develop a native plant program that includes a walking trail for tours.

Using the school as teaching tool, students host tours of the school's green building features, organize a community sustainability fair, and provide summer programs that extend the regular school year. Students participate in an agricultural communication internship that trains student ambassadors in public relations and community outreach in order to promote the school and its green initiatives.

Locust Trace Agriscience Farm raises and processes organic broilers in order to donate collected eggs and poultry to the Fayette County *Farm to School* program and to sell at the local farmers market. The school does not have a cafeteria; however, produce from the gardens is used in classes so that the students can learn to prepare healthful meals in class or take home. Seventy-five percent of the farm's cleaning products are green certified. Both to get hands on experience and keep fit, students participate in outdoor activities that include horseback riding, stall cleaning, livestock handling, plowing, weeding, mowing, hay bale moving, raking, watering livestock and planting during the year.

The school has many community partners that participate in an annual sustainability fair. These partners include the University of Kentucky Cooperative Extension Service, Salato Wildlife Center, Whole Foods, the Bluegrass Wind Power, and EKU Center for Renewable and Alternative Fuel. Lotus Trace also maintains one of six Governor's Gardens in the state. In addition, the school participates in Kentucky *NEED* and Kentucky Green and Healthy Schools programs.

## Cane Run Elementary School, Louisville, KY

*Math in the garden; Energy education at family math and science night*

Cane Run's vision is that students will achieve success and become productive, cooperative adults who are motivated to protect and respect the environment to improve the school, community, and world. In order to fulfill this vision, environmental literacy is a required part of the curriculum.

All students participate in embedded environmental lessons – frequently set in the outdoor classroom. The school implements Math in the Garden, where gardening serves as a framework for measurement, insects, plant structures and life cycles. Students use math skills and tools to design, build and plant a pizza garden where

each “slice” represents the amount of that ingredient necessary for a pizza. Problem solving and measurement skills allow students to design and make individual bricks to outline the garden. Students put their engineering strategies to work building a greenhouse over a raised bed garden to prolong the growing season. They experiment with technology to design a large butterfly shaped, native plant garden to attract butterflies, bees, and birds. The garden club and environmental club use food from the 30 raised beds and large Three Sisters Native American garden to learn healthy cooking and eating practices and to share their tasty labors with local senior citizens.

Family math and science nights include a free healthy meal, environmental teaching and learning stations, *NEED* activities and math and science activities for each grade level. Parents are also offered resume writing assistance. In a recent survey, students across grades 3-5 indicated high levels of interest in the STEM fields, replacing their earlier focus on sports figures and movie stars.

Cane Run uses resources from the *Kentucky Association of Environmental Education*, the *North American Association for Environmental Education*, National Science Teachers Association, *KY Green and Healthy Schools*, *USDA Agriculture in the Classroom*, the *Center for Green Schools at the USGBC* in its environmental education curriculum.

Other programs help to provide *Breakfast in the Classroom* to all Cane Run students and teachers. It is also a *USDA HealthierUS Schools Challenge* Gold awardee and *Farm to School* participant. The healthy *Fruit and Vegetable Program* teaches nutritional values and provide snacks to students three times per week which helps level the food playing field. Cane Run students spend 150 minutes of supervised physical education per week. The school holds brain breaks of organized movement in the classroom and gets kids commuting actively through *Safe Routes to School*. Cane Run’s After Hours is a program available to students and others living in the nearby community and offers Zumba classes, Yoga, gardening, walking, and the American Heart’s Jump Rope/Hoops program.

Cane Run Environmental Magnet School has been retrofitted, to include geothermal heating and cooling, with geothermal well fields supplying 45 heat pumps and kitchen walk-in refrigeration units. The school has also added occupancy sensors and natural light enhancing Solatubes. With the aid of these facilities upgrades and behavioral and operational changes, the school was *ENERGY STAR* certified in 2010. According to the EPA, the school demonstrates IAQ best practices, in a district that has been honored for its stringent policies to ensure healthy indoor environments.

## Northern Elementary School, Georgetown, KY

*Low-cost retrofits and behavioral changes yield big pay-off*

Northern Elementary has been the star of the Scott County district energy management program, which awards an energy banner each month to the school that reduces its consumption the most from the same period a year earlier. Northern is the leader in this category, winning the energy banner seven times. Northern encourages other schools in the district to become involved with energy management efforts, and serves as an example to schools outside the district as well.

Northern entered the 2011 *EPA ENERGY STAR* National Building Competition. Through behavioral and operational changes, and low-cost retrofits like light bulb changes and insulation additions, the school achieved a 29 percent reduction in energy usage from the previous year, the largest reduction of any building in Kentucky in the contest and, as a bonus, received a $3,500 energy rebate! Northern received the *ENERGY STAR* certification in 2012 and continues to work to improve its rating in *Portfolio Manager* and with *School Dude* software. Northern also has partnered with the local town of Sadieville, Ky, the city council of which has a member on the school energy team.

Northern teaches the energy cycle and how electricity is produced, with the district sustainability manager among the guest speakers who visit students. Students learn the rationale behind efforts to reduce the use of electricity and effect of human activity, using *NEED Project* and *Kids Environmental Education Program* curricula. When students go home, they pass these lessons onto their parents, grandparents, and their neighbors. Students are getting their families to reduce their energy consumption at home as well. In terms of state assessments, Northern, with 44 percent of students who are eligible for free and reduced price lunch, ranked a Highest Performing School with a 93 percent overall and 100 percent in science.

Teachers use Northern's wooded trails and stream to teach nature units, identifying plants and trees, conducting investigations in the on-campus creek, and teaching respect for the world's natural resources. The music teacher wrote a unique song about the environmental concepts and students perform this song at multiple award events. Northern also makes use of neighbor Toyota's environmental nature trail. Teachers use sustainability themes to teach core content areas, such as measuring steps, feet, and yards outdoors in math; teaching physical features of geography in social studies; and using nature as subject matter for journals in language arts. The core content of science and social studies addresses natural resources, and the *NEED* curriculum is used during the study of enetgy and the environment.

Northern sponsors a *Girls on the Run* fitness program, and is a *USDA HealthierUS Schools Challenge* Gold awardee.

## *Maryland*

### Cedar Grove Elementary School, Germantown, MD

*Science buddies help to nurture environmentally literate citizens*

Students at Cedar Grove Elementary School (CGES) model green practices, improving the health of their learning environment and minimizing environmental impact. The school has replaced large portions of carpeting with tile, uses non-toxic cleansers, created no-mow zones, and installed an energy-efficient HVAC system. CGES uses only 100 percent sustainably harvested paper, and printers default to double-sided printing. Students are encouraged to produce their work in alternative formats, moving away from paper to multimedia by way of podcasts, PowerPoints, and videos and CGES distributes school-wide and grade-level newsletters electronically. CGES purchases sustainability-themed books for the media center and nature observation tools for recess, and promotes marked no-idling zones for bus and parent drivers.

Students gather juice pouches and snack bags to be sent to Terracycle, where they are upcycled into school supplies and other useful products. CGES collects gently used clothing and shoes and donates them to *Planet Aid*. Students take ownership of conservation initiatives by monitoring their resource usage. Recycling rates currently stand at 35 percent, and the school has overseen a 39 percent energy use reduction, both of which are graphed and prominently displayed. On any given day, students can be found checking that lights are off in empty rooms and that recycling bins contain only approved items. Students also created signage for bins and lunch carts, toilets and sinks, light switches, and hallways to help them remember their purpose. Each morning the school's commitment is reinforced by the Green Fact of the Day on the student produced televised news show.

The students have won contests with their essays and posters about reducing pollution and the importance of trees, decorated and installed rain barrels, illustrated yearbook covers with environmental themes, and designed the discovery bags that hang on the door of every classroom and contain tools and resources for outdoor exploration. They use a transformed classroom space as their environmentally focused science lab. In 2011, students planted 50 native trees on the perimeter of school property and continue to be involved with monitoring their growth and maintenance, in areas maintained as no-mow zones. Second graders installed a native plant butterfly garden in the courtyard, which is used for science/writing extensions. Other instructional changes include the addition of the Outdoor Lesson

of the Week to weekly team planning, as well as the shift from Reading Buddies to Science Buddies, in which kindergarten and fourth grade classes pair up to do inquiry-based science experiments.

The school ensures that students get daily outdoor recess in all but the most extreme weather conditions. CGES has earned a *USDA HealthierUS School Challenge* bronze level award. According to the EPA, CGES demonstrates robust IAQ best practices.

A group of parents spearheaded the *Green Apple Day of Service* festivities. The PTA has installed and maintained a sensory garden, enhanced the courtyard to promote its use as an outdoor classroom; sponsored several nature- and science-related assemblies; and partnered to produce an Earth Day celebration. Cedar Grove Elementary School embraces every method of communication, including newsletters, video, and Twitter because its population recognizes that multiple avenues are vital in conveying the green message to the community.

## Summit Hall Elementary School, Gaithersburg, MD

*Hands-on environmental education amidst the worms, frogs, and mud*

Summit Hall Elementary (SHES) in Gaithersburg, MD, is a Title I school with a 77 percent free and reduced price lunch eligible and a 50 percent English language learner population. SHES is a committed member of *Maryland Green Schools* through the *Maryland Association of Environmental Outdoor Educators*, and is active in the Montgomery County Public Schools (MCPS) School Energy and Recycling Team, an environmental stewardship and resource conservation program. SHES has seen reductions in greenhouse gases, energy use, and water usage, as well as a 34 percent recycling rate.

Students created and produced raindrop posters that say "Shut off the Faucet," which are placed by every sink in the school. Workshops by the *GreenKids* program and the Teachable Science course conducted by the *Audubon Naturalist Society* (ANS) staff help participants become make educated decisions that affect the environment. Developmentally appropriate activities allow students to interact with the local environment by hunting for leaves, diagramming the lifecycle of frogs, observing the composting of red wiggler worms, collecting acorns to donate to the Maryland state nursery, constructing ecocolumns from 2-liter soda bottles to simulate polluted environments, and supporting the school's energy reduction and recycling efforts by serving as SERT volunteers, where the team acts as recycling role models for younger students during lunch.

All teachers commit to doing Three Green Things. All classes go outdoors on the school grounds or to Muddy Branch, a Potomac River tributary, at the base of the school property. Younger students investigate the area around the school, and older children enter the stream to investigate with guidance from Audubon staff or staff from MCPS' outdoor environmental education programs. The school's news team gives environmentally-themed reports during morning announcements.

Summit Hall benefits from partnerships with local groups. One example is the overgrown butterfly garden in a courtyard. With the cooperation of the ANS, Montgomery County Master Gardeners, and their resident partner, Linkages to Learning (a social service agency of the county's Department of Health and Human Services), students cleared out old vegetation, laid newspaper to suppress weed growth, spread soil, and laid out new plants. The completed project provided a perfect venue for the second grade's release of Baltimore Checkerspots raised from larvae. Other school experiences include: litter clean-up days, invasive-species removal days, mini-Earth Hours, collecting seeds for Growing Native, composting experiments, and use of homemade green cleaners.

According to the EPA, the school demonstrates robust IAQ best practices. The school uses only *Green Seal* cleaning products. Summit Hall participates in the *Fuel Up to Play 60* program. Nutrition education is provided in homerooms, physical education, and through the cafeteria, using *USDA's My Plate* program and the MCPS health curriculum. SHES is a *USDA HealthierUS School Challenge* bronze and silver level award honoree.

## Montgomery County Public Schools, MD

*Leaders in all-ages environmental education*

Montgomery County Public Schools (MCPS) is setting an example for districts with its sweeping green policies and procedures. One of the largest green power purchasers in the nation after increasing its annual green power purchases to 20 percent of its electricity requirements, the district has qualified for *EPA's Green Power Leadership Club,* a distinction given to organizations that have significantly exceeded EPA's minimum purchase requirements.

The School Energy and Recycling Team (SERT) provides solid waste reduction strategies and data through its website in support of the district's efforts. SERT provides outreach and best practices to encourage and teach students and staff about lunch room recycling. Resources for waste free lunches and instruction are shared in lunchrooms and classrooms.

In 2004, MCPS implemented a comprehensive testing program to detect elevated levels of lead in drinking water at schools. At that time, a remediation plan was instituted for those facilities where elevated lead levels were found. Currently, MCPS assesses water quality at locations with potential sources of drinking water not previously included in the program, e.g., additions, modernizations, and new construction. Additionally, MCPS continues to institute EPA's recommendations regarding the routine flushing of all drinking water outlets in order to reduce occupants' exposure to lead in drinking water.

MCPS screens chemicals for use in the school system using standards set forth by the *Green Seal* Organization, and has referenced Green Seal Standards for Adhesives, Degreasers, Cleaners, Floor-Care Products, and Paints. In the selection of low-emitting products and materials, MCPS also references standards published by the *GREENGUARD* Environmental Institute. In 2001, MCPS received the *EPA IAQ Schools for Tools Award* for its comprehensive and proactive IAQ management program.

Nutrition education is provided in homerooms, physical education, and through the cafeteria, using the *USDA My Plate* program and the MCPS health curriculum. Instruction has been supplemented with the *Audubon Naturalist Society's Salad Science* program in first through third grades, healthy eating presentations from officers of the *U.S. Public Health Service* second and third grades, nutrition research projects in second grade, and trips to the Montgomery County Agricultural Farm Park in fourth grade.

Additional fruits and vegetables have been added to the menu, 75 percent of grains are whole grain, all milk is low or fat-free, and students select a fruit or vegetable with each lunch. MCPS promotes locally grown fruits and vegetables, serving local items including apples, melons, celery, green beans, and zucchini. Students learn about where their food comes from, how it's produced, and the benefits of a healthy diet. The district has a wellness specialist who works with students to help make the connection between food items, their origin, and their benefit. All 132 MCPS elementary schools are recipients of the *USDA HealthierUS Schools Challenge* Award at the Bronze level, and 56 elementary schools are recipients at the Silver level.

In 2011, MCPS received a grant from the *ED Investing in Innovation Fund* to develop and pilot the nation's first integrated elementary curriculum, called Curriculum 2.0. This integrated curriculum moves teaching and learning away from mastery of facts to the development of creative and critical thinking skills. The school system has an environmental literacy curriculum in which the eight standards set by the Maryland State Department of Education Environmental Education Curriculum are taught through integration in a variety of subjects. All of the

environmental education standards are addressed in science and social studies lessons, as students advance in knowledge and skill level. In order to graduate, students must successfully complete high-school level courses that include mastery of all eight environmental education standards.

MCPS has for over fifty years assumed a leadership role at the state level in supporting and promoting environmental education in schools. MCPS administrators and teachers were among the principal founders of the Maryland Association of Environmental and Outdoor Education. With thousands of members statewide, including lead environmental educators in MCPS, this organization has the goal of building a citizenry that understands, and is responsibly engaged in, advancing sustainability to address human needs and to conserve the Earth's natural resources. The MCPS associate superintendent of curriculum and instructional programs and the supervisor of outdoor environmental education programs are current members of the leadership team and steering committee, respectively, for the Maryland Governor's Partnership for Children in Nature. The Partnership's goal is to improve and expand opportunities for children to learn about, play in, and experience the natural world.

Other highlights of effective sustainability and environmental education in MCPS include an Environmental Literacy Plan that is continually reviewed, monitored, and improved to ensure that students meet the state graduation requirement in environmental literacy; a systemic residential outdoor environmental education program for every sixth grade student that focuses on the environmental science and stewardship of the local watershed; high school curriculum offerings and career pathways in regular, honors, and AP levels focus on environmental studies, including biology, government, ecology, U.S. history, environmental science, and horticulture; and an established professional development program in the content and methodology of environmental education integrates STEM teaching.

## *Massachusetts*

### Berkshire School, Sheffield, MA

*Studying Transcendentalism from the Thoreau Cabin*

For the 388 students at Berkshire School, sustainability isn't just a part of the science curriculum: it's an educational way of life. When incoming freshman attend orientation, they are first immersed in the environmentally-conscious culture of the school through a sustainability literacy assessment. Then, as matriculated first-year students, they study ecosystem dynamics at permanent study sites on the school's mountain. Sophomores measure water quality perimeters before continuing their education as juniors, when they study transcendentalism in a student-built replica of

the Thoreau cabin. Throughout their time at Berkshire, students tend to the school's organic garden and enroll in elective courses like Sustainability and Resource Management, Advanced Energy, and Advanced Economics. They fuel up on local foods before participating in the school's universal sports programs, which include offerings such as hiking, backpacking, camping, kayaking, canoeing, and fishing, alongside traditional competitive sports.

The school's environmentally-focused academic and community practices are closely monitored by a director of sustainability. The Berkshire staff conducts ongoing classifications and reviews of courses to determine which are sustainability-focused and to assess the number of sustainability standards covered. To further their understanding of green concepts, students compete in school-wide contests like the *Green Schools Alliance Green Cup Challenge* and the *Keep America Beautiful Recycle Bowl*. Berkshire also encourages participation in *National Wildlife Federation EcoSchools* and *DoSomething.com* award competitions, from which the school has received honors in 2007 and 2009.

While the students are learning at high levels, the building that houses them is performing well, too. A whopping fifty percent of the school's electricity needs are met by its generation of solar energy. Since 2005, Berkshire has reduced its waste by 39 percent and, since 2008, reduced its emissions by 31 percent. Of the school's 182,276 square feet of constructed space, 26 percent meets *LEED* Gold standards. To fund its green practices, the school established a loan fund for projects that have a quantifiable monetary savings or a return such as energy efficiency, renewable energy, or conservation.

Berkshire uses web-based programs and tools to further its sustainable reach and promote its programs to school, local, and national communities. It has created a carpool map using Google Map Maker which displays commuting routes and contact information of all off-campus staff, faculty, and day students. To reduce unnecessary paper processing, the school uses *SchoolDude* to file and track maintenance requests from staff and faculty. Finally, the school is creating a web-based dashboard to monitor and display energy usage, build a platform for sustainability and track progress toward sustainability goals. The dashboard will serve as an external communications tool to improve collaboration and align stakeholders through increased transparency of the school's environmentally-conscious initiatives.

## Manchester Essex Regional Middle High School, Manchester By-the-Sea, MA

*Green scholars program provides intensive sustainability focus*

Manchester Essex Regional Middle High School isn't just a facility that educates 826 extraordinary students in the suburban community of Manchester; it's also one of the most efficient and sustainable schools in Massachusetts. The *Collaborative for High Performance Schools* certified building, constructed with recycled materials and energy-efficient design principles, is home to a 650 gallon rainwater collection tank and over 100 donated plants and trees. The school achieved an impressive 90 percent reduction in waste through the installation of a state of the art Lucidomatic waste sorting system and the implementation of a printing limits program through PaperCut software. Manchester Essex, which has reduced its heating per square foot by nearly 58 percent over three years, meets 5 percent of its energy needs through on-site solar panels.

In the sustainable building, environmentally-conscious students learn through the school's flagship Green Scholars program, an honors course offered at the high school level. Green Scholars integrates science, technology, engineering, arts, math (collectively known as STEAM), 21st-century skills, environmental literacy, experiential education, inquiry-based learning, project management, and service learning into a single class. Following the success of its predecessor, a Green Scholars Junior program opened in 2012 to middle school students. While Junior Scholars is not part of the middle school's core curriculum, it nonetheless provides students with the opportunity to explore a modified version of the high school course through the management of recycling and composting efforts and the maintenance of the school's edible garden.

While the intensive Green Scholars program is for students particularly passionate about sustainability, Manchester Essex offers environmental education to all students. AP Environmental Science, Engineering, Chemistry, Ceramics, and Biology incorporate sustainability and environment into their curriculum and assessments. While students are traditionally immersed in environmental concepts in science classes, at Manchester Essex, ecological concepts come alive through nature walks that inspire English assignments and school-wide assemblies from the *Alliance for Climate Education*. Physical Education, Project Adventure, Global Studies, Speech, Health, and Debate courses also explore environmental health topics.

Manchester Essex's efforts are working: of the students who took the AP exam for environmental science in 2012, 100 percent scored a three or higher. By 2015,

Manchester Essex expects sustainability literacy to be part of the school's graduation requirements.

Students fuel their healthy, sustainability-focused studies with fruits, vegetables, and proteins that are primarily grown and raised locally. Approximately 30 percent of the school's food is purchased in New England and 60 percent is sustainably sourced. Manchester Essex also is home to an on-site edible schoolyard, which supplements the school's dining hall with fresh produce. The edible schoolyard is a community-building and educational tool that offers students and parents the opportunity to work with the garden during the summer to raise awareness about local food and organic gardening. Fruits and vegetables reaped in the garden nourish not only students at Manchester Essex, but at other district schools as well.

## Quincy High School, Quincy, MA

*Built environment facilitates teaching and learning across disciplines*

Environmental education extends far beyond the walls of a traditional science classroom at Quincy High School, a career and technical school. Through the Great Ideas Program, Quincy students learn about the environment and the effect humans have on it in chemistry, social studies, culinary arts, broadcasting, environmental science, automotive skills, mathematics, and Asian world history classes. The building's design allows for collaboration among AP biology and environmental science students and their peers who are pursuing Nursing or Applied Medical Technology specialties. As freshman, students complete a Career Connections class that not only explores possible professional and educational pathways, but also fosters interest and understanding of the world around them.

Summer Leadership Camp, which pairs upperclassmen with incoming 9$^{th}$ grade students, offers an outdoor learning experience that builds friendship and leadership skills. Beginning with an outdoor picnic, students travel to Blue Hills Reservation for a climb to the mountaintop upon which a celebration activity takes place.

Quincy collaborated with the city's planning department to participate in the *USGBC Center for Green Schools Green Apple Day of Service*, which provided real-world instruction about the importance of energy reduction and implemented a *NWF* Cool Schools Energy Audit. Partnerships also bring experts from local corporations and universities to the school to prepare students in diverse, 21$^{st}$-century fields like biotech engineering, environmental science, alternative energy, and green chemistry.

As a member of Urban Ring, a purchasing cooperative, Quincy orders locally grown produce. The school's STEM wing is home to a greenhouse, where students are actively involved in learning how to grow their own food. Culinary students are responsible for front- and back-of-house service at the wildly popular President's Café, where student-grown herbs are used in recipes. In physical education classes, students further their understanding of healthy living through unique offerings like yoga, cardio dance, and weight training. The student body, of which 47 percent qualify for free- and reduced-price lunch, is afforded the opportunity to receive a personal workout that focuses on three individually designed goals.

The school's nutrition and fitness programming supports its commitment to creating students who are healthy in both mind and body. While Quincy recognizes that in-classroom learning is essential, it also hosts a science fair for over 200 participants that builds the foundation for award-winning projects at both the regional and state levels. Students complete "Service to School and Community" hours that allow them to focus on how singular responsible actions can benefit the larger environment and affect the sustainable practices of other members within the community.

**"Being a Green School District means we acknowledge the responsibility not to only consider how well our children are prepared for the**

A real-life application of reduced environmental impact, Quincy is designed to benefit from the latest sustainability-focused construction standards that minimize environmental impacts and reduce energy costs. The school was certified by the Massachusetts *Collaborative for High Performing Schools* in 2009 and *EPA ENERGY STAR* in 2008. The school has continued its efforts by retro-commissioning the building to ensure that it performs as intended.

## Acton Public Schools and Acton-Boxborough Regional School District, MA

*Partnering to shape the world*

Like humans and their environment, Acton-Boxborough Regional School District and Acton Public Schools partner to shape the world we live in. The districts' combined 5,424 students in preschool through 12th grade prove that environmental consciousness is not limited by age. Beginning in preschool, Acton-Boxborough and Acton teach children life science by studying schoolyard animals and hosting nature walks; by high school, students take AP Environmental Science in which sustainability provides the context for the exploration of growth, energy, resource

use, agriculture, waste, pollution, and climate change. Immersed in environmental study from an early age, 98 percent of high school students who took the AP Environmental Science exam scored a 3 or higher in 2012.

District wide events promote student interaction with and protection of their environment. Middle and high school students, for example, attend a biennial "reverse science fair." Led by volunteers, the fair provides information about STEM programs, green technology, and eco-friendly innovations. High school students also work with their sixth-grade counterparts to host an annual Energy Fair through which younger participants learn about energy and conservation through interaction and activities.

To support the comprehensive environmental education of its students, Acton-Boxborough and Acton partnered to create and maintain sustainable school facilities. Renewing their emphasis on behavioral changes in students, faculty, and staff, the districts reduced their electricity consumption by 18 percent and overall energy consumption by 22 percent in just three years. Upgrades to lighting, HVAC, and walk-in coolers and freezers have contributed to the school's reduced footprint, which is benchmarked in *EPA's ENERGY STAR Portfolio Manager*. The districts have earned *ENERGY STAR* certification for four schools and committed to purchasing 20 percent of their electricity from renewable sources.

The districts' buses run on ultra-low sulfur diesel and equipped with a shut-off mechanism that enforces no idling beyond five minutes. The district participates in *Safe Routes to School* and facilitate an active *Walking School Bus* at two of its elementary schools.

The districts are home to four gardens, which provide vegetables to the cafeteria and learning experiences to students. All elementary schools participate in the *USDA's HealthierUS Schools Challenge*, with one school earning the Silver level. Acton-Boxborough and Acton are active participants in the annual *Massachusetts Harvest Week*, during which time students husk locally-grown corn that then appears on the cafeteria menu.

Nutritional education at Acton-Boxborough and Acton isn't limited by time of year: during the summer months, a cafeteria manager hosts a local cooking class. Instruction begins at the farmer's market, where students are provided with a list of items they'll need for the week's class. Armed with local produce, student chefs return to the high school to create delicious, nutritious recipes to share with their families and friends.

## *Minnesota*

### Jeffers Pond Elementary School, Prior Lake, MN

*Community connections forge a sustainable context for learning*

At Jeffers Pond Elementary School, creative community connections and a strong commitment to sustainability are incorporated into every aspect of the school's curriculum, extending beyond the traditional school year into an environment education focused camp during the summer. Eco-Camp also provides a professional development opportunity for teachers. With a partnership at the St. Catherine University *EcoStar* program, the school hosts a pre-service teacher for seven weeks each school year for E-STEM education. Other partners include the Spring Lake Watershed District, McColl Pond Environmental Learning Center, University of Minnesota Master Gardeners, City of Prior Lake and local sportsman's clubs. In addition, each year fifth graders participate in a week-long field trip to the Wolf Ridge Environmental Learning Center in Finland, Minn. These partnerships extend the school's environmental curriculum through support from local experts and organizations.

Environmental education and sustainability practices are an integral part of the school day. On a typical weekday morning, the Green Team, a cadre of enthusiastic teachers and staff, meet to plan their annual K-5 environmental education festival; junior naturalists gather with advisors preparing to educate fellow students on their organics recycling program; and students organize snowshoes for an outdoor lesson on observing animal tracks. The school participates in the N*ASA/ NOAA/ NSF Global Learning and Observations to Benefit the Environment (GLOBE)* program. Weekly staff meetings include a dedicated Green Moment.

Daily practices at the school also model environmental stewardship and sustainability. Junior naturalist-trained students and staff participate in a district organics recycling program through a partnership with the Shakopee Mdewakanton Sioux community to minimize non-organic waste and to recycle and compost as much as possible. This integration of outdoor and environmental education into state standards is reflected in the students' level of proficiency on state science assessments. In 2012, 79 percent of Jeffers Pond fifth graders met or exceeded the science standards, and students have consistently scored higher that the state average.

Limiting the school's impact on the environment has been a focus since the school began. It is equipped with an automated energy management system to maintain a healthy environment and reduce unnecessary energy use. All western-facing windows open to the expansive wooded area behind the school, and natural daylight

is used as much as possible throughout the building. The school grounds feature a rain garden, butterfly garden, and outdoor classroom. Classrooms have sets of reusable dishes and students are expected to bring only what they plan to eat. To monitor and reduce consumption, the school has tracked its energy usage with *EPA ENERGY STAR* Portfolio Manager since 2007 and received certification in 2012. For the past three years they have participated in *Schools for Energy Efficiency (SEE)* and received the Outstanding Achievement in Energy Reduction from SEE for 2012 and the *SEE* Milestone Award.

## Heritage E-STEM Middle School, West St. Paul, MN

*Real life connections to the environment in every subject*

Heritage Middle School, with 51 percent of its student body eligible for free and reduced priced lunch and 15 percent limited English proficient, is one of the strongest E-STEM middle school programs in Minnesota. Teachers collaborate to ensure environmental standards and benchmarks are included in lessons taught throughout the school year and to make cross-curricular connections through an environmental lens.

In all grades, environmental careers are incorporated into the curriculum and Heritage works with Dodge Nature Center to make real-life connections to their environment with projects such as water quality testing and nature survival. Dodge Nature Center offers after school naturalist classes for middle school students to take throughout the school year, as well as grade-specific lessons, including bees, trees and water study for fifth-graders; outdoor living skills and outdoor physics for sixth-graders, plant identification and growing techniques for seventh-graders; and water quality and pollutant sessions for eighth-graders. The school's partnership with Dodge Nature Center delivers sustainability content, encourages green careers, provides outdoor learning, and creates professional development opportunities.

Heritage uses the Weatherbug Schools Program to monitor outdoor air temperatures to prepare for outdoor learning experiences that occur throughout the year. All students participate in outdoor learning in the courtyard, which includes a garden, prairie, a stage, butterfly garden and shade plants. The garden is used by consumer science, special education and science classes in particular. Heritage's student green team, LIVEGREEN, raised funds to purchase a filtration station to promote reusable water bottles. The group has a teacher leader who works with students to initiate and support reduced environmental impact and cost throughout the school year. Heritage celebrates *National Environmental Education Week* annually.

Heritage reduced Greenhouse Gas emissions by 21 percent, energy use by 47 percent, and domestic water use by 69 percent from 2007 to 2012 and received *ENERGY STAR* certification in 2008. In order to achieve these dramatic reductions, the school educated occupants about behavioral changes and added automation to heating, cooling and lighting systems, energy efficient windows, as well as motion sensors to reduce water usage on toilets, urinals and sinks. More than 62 percent of the school's solid waste is diverted from landfills and the school has been composting lunch waste for five years. Ongoing education is provided to all students/staff on composting, and visuals are mounted on all receptacles to help with compost, waste, and garbage.

The safety director ensures that the school recycles scrap metal, used oil, oil filters and other hazardous waste. Irrigation systems are monitored to ensure they are free of water leaks and grounds are watered based on weather conditions and necessity. Heritage has an *IPM* plan in place, where methods of application and posting requirements are provided to parents and school employees in accordance with the Janet B. Johnson *Parents' Right-to-Know Act*. All spaces are adequately ventilated with outside air, consistent with ASHRAE standards and guidelines.

The school nutrition program received the 2012 *USDA HealthierUS Schools* Gold award. Students are required to participate in physical education every other day for 55 minutes that is organized and taught by physical education teachers. Students know to come dressed for the weather! They are outdoors so long as it is 15 degrees or above. Heritage participates in a *Safe Routes to Schools* program.

## School of Environmental Studies, Apple Valley, MN

*And you thought your classroom was a zoo…*

Launched in 1995 as a unique partnership between Independent School District 196, the City of Apple Valley, and the Minnesota Zoo, the School of Environmental Studies (SES) educates a community of leaders to enhance the relationships between people and their environments. SES is a public, inquiry-based, interdisciplinary magnet school of 423 juniors and seniors focused on environmental and sustainability literacy, fostering active citizen leaders who are prepared to bring change to the world.

With a wealth of windows and open spaces, the school building connects staff and students to the natural world. The school site, a forested plot adjacent to the Minnesota Zoo and Lebanon Hills Regional Park, offers an exciting learning laboratory for students, and the school places students in the world beyond the school walls. The school features a living wall of plants, an organic garden, an apiary, several aquariums, and students may keep fish or small reptiles at their work stations!

The SES building was designed and constructed in the greenest way possible in 1995, and the SES team continues to work to reduce the school's environmental footprint and maintain energy efficiency. Students are an integral part of the process as they study sustainability concepts and suggest and implement solutions through senior projects. The building's unique heating system uses waste heat from the Minnesota Zoo. Students monitor energy that feeds into the grid from its demonstration wind turbine and solar panels, in partnership with Dakota Electric Association.

**"Our vision is that all students will develop a sense of wonderment, ownership, and**

Waste management is incorporated into the curriculum, resulting in a 76 percent diversion of solid waste. The increased use of web-based systems like Moodle and Google Collab brings SES closer to its goal of being a paperless school. The school's van uses E85 fuel. The school also uses *EPA Design for the Environment* and *Green Seal* certified cleaning products.

SES participates in the *Farm to School* program and is a *HealthierUS Schools Challenge* Silver awardee. The school serves a local lunch once a month and purchases environmentally preferable products, such as Fair Trade and Food Alliance certified produce. In addition, the Diversity Club puts on an international lunch twice a year to introduce students to global cuisine.

Outdoor education is a hallmark of the school and students have the opportunity to hike, bike, canoe and camp as part of the curriculum in SES' canoes or school boat. They learn in the school's native garden, where shoreline plants protect a pond, in a student-maintained trail system, and the school's amphitheater. Field studies and many student-generated clubs, such as yoga club, mountain biking club, climbing club and the Venturing Crew, are fitness-oriented. SES participates in *Walk and Bike to School Days*.

At the heart of the curriculum is environmental literacy. All students take two full years of Environmental Studies, an interdisciplinary course integrating English, social studies, and environmental science, for three hours each day. Juniors explore the relationship between humans and the natural world, and seniors focus on social

and environmental systems and their individual and collective capacity for action and civic participation.

Students engage in authentic assessments that take them out of the classroom, from juniors studying local ponds in conjunction with water resource professionals to seniors studying biodiversity with biologists at Fort Snelling State Park. The Senior Capstone experience includes a personal ethic, an environmental service project, and a public presentation of an environmental issue.

SES is a school "in the world." Students engage in field studies in international venues from Costa Rica to South Africa, as well as local studies in the Boundary Waters and Superior Hiking Trail of northern Minnesota. SES is the only high school in the world that has sent student delegations to United Nations Communication on Progress conferences on climate change in Denmark, Mexico, and Qatar. Students have studied in Bangladesh through the American Youth Leadership Program of the U.S. State Department. Students also work with professionals from organizations such as the Will Steger Institute, the Minnesota Design Team, the Department of Natural Resources, and the Minnesota Zoo, through a mentoring program that creates relationships for students with community professionals in a variety of careers.

## Prior Lake-Savage Area Schools, MN

*Whole district E-STEM integration*

Prior Lake-Savage Area School's (PLSAS) is constantly evaluating the environmental impact and resource efficiency of school buildings, grounds, and transportation systems and seeking opportunities for environmental stewardship. District leaders strategically plan to limit and reduce the effect the buildings, grounds, and transportation systems have on the community and world. PLSAS has been tracking its resource usage in Portfolio Manager since 2007. Five buildings in the district received *ENERGY STAR* certification in 2011 and 2012. Prior Lake-Savage Area Schools has been recognized by EPA as an *ENERGY STAR* Leader for improving energy efficiency by 10 percent (2011), then 20 percent (2012), and also as a Top Performer (2011). Ten of the district's eleven buildings – which together service 7,300 students -- received Outstanding Achievement in Energy Reduction awards from the *Schools for Energy Efficiency (SEE)* program.

In 2011, Grainwood Elementary was named the top recycling elementary school per capita in the state of Minnesota. In addition, bus routes across the district have been consolidated, resulting in four eliminated routes over two years. Furthermore,

PLSAS works to reduce environmental impact on school grounds, with 70 percent of landscaping which is water-efficient and regionally appropriate. Three elementary schools maintain rain gardens and six schools keep butterfly gardens. Sites also include a berm planted with evergreen trees, natural plants and grasses, and a natural bio-retention area maintained on school grounds.

PLSAS participates in the *USDA's HealthierUS School Challenge*. The district takes part in a *Farm to School* program to include local fresh food in meal offerings. Apples, watermelon, cherry tomatoes and rice blends come from local orchards and farms. Fruit, vegetables, and/or a salad bar are offered daily in every school. After a healthy meal, K-12 students and staff members across the district dispose of waste through an organics recycling program, run through a partnership with the Shakopee Mdewakanton Sioux Community. Staff members complete an annual survey regarding IAQ, and enjoy wellness activities and advice put together by their district's Feel Invigorated Today 'FIT' committee.

Environmental education in PLSAS begins in kindergarten and continues through 12th grade. Teachers use outdoor amphitheaters, gardens, bird landings, and water resources to teach interdisciplinary environmental education lessons to all students. Through a partnership with Saint Catherine's University, teachers participate in professional development to include environmental and sustainability lessons within core curricular areas and to take full advantage of local parks, trails, and outdoor learning spaces including areas McColl Pond Environmental Learning Center, Lakefront Park, and Cleary Lake Regional Park. At any given time, PLSAS students can be seen ice fishing, snowshoeing, nature journaling, collecting specimens, fishing, picking up trash, planting gardens, canoeing, or bird watching.

Use of science notebooks also has students reading, writing, and reflecting about their science life. Additionally, eight schools celebrate the environment through a thematic environmental education festival. These events encourage teachers and naturalists to engage students in hands-on lessons designed to meet state standards. Likewise, PLSAS fifth graders attend an extended field trip to Wolf Ridge Environmental Learning Center to immerse themselves in nature exploration and outdoor skills.

In 2012, 68 percent of PLSAS students tested proficient on the state science assessment, compared with the state average of 51 percent proficient. Since 2008, the district's percentage of proficient students on the science assessment has been over 10 percent greater than the state average. In spring 2012, the PLSAS school board approved the implementation of an Environmental Education, Science, Technology, Engineering, and Math focus -- called E-STEM -- for all seven of the district's elementary schools. Through thoughtful professional development for

teachers, and continued high quality instruction for students, PLSAS intends to remain a leader in K-12 environmental education with a developed STEM focus.

## *Mississippi*

### Watkins Elementary School, Jackson, MS

*Following environmental literacy efforts, a 41 percent increase in test scores*

Named a 2012 Environmental Hero by the Mississippi Recycling Coalition and recipient of the 2013 Mississippi Association of Partners in Education Partnership Excellence Award, Watkins Elementary is committed to environmental literacy, reducing environmental impact and costs, and improving the health of the school community. Watkins faculty, staff and students follow energy saving practices, and have made tremendous strides in reduction of greenhouse gas emissions, water and energy usage. Jackson Public Schools works with Siemens to develop strategies to increase energy savings. In the 2011 Siemens Report, Watkins had reduced its greenhouse gas emissions 23 percent, electricity usage by 20 percent, natural gas consumption by 27 percent, and water usage by 35 percent.

Starting in 2010, the school's recycling program was expanded into a fully developed environmental awareness program through a collaborative effort involving administration, faculty, staff, parents, and community supporters. Watkins established a recycling and environmental awareness committee, which includes teachers, school adopters, and specialty partners. It also founded a building committee, which includes administration, custodians, teachers, PTA representatives, and district advisors. Still dedicated to recycling, Watkins won the *Keep America Beautiful State Recycle Bowl* in 2011 and 2012.

Environmental and sustainability concepts are integrated throughout the curriculum at Watkins. All grades participate in environmental learning field trips, including visits to local farms and an agriculture museum. A wealth of professional development opportunities and resources are provided for teachers. Watkins has received multiple grants, providing a sustainable environmental program that includes a student garden, landscaping, composting, environmental outdoor learning activities and school-wide events. The school's garden is particularly notable, with a crop list including okra, collard greens, mustard greens, turnip greens, limes, and more, along with extensive rain barrel use to conserve water.

Environmental concepts are incorporated into school assessments at Watkins, a Title I school, where 96 percent of students are eligible for free and reduced priced lunch. The school's program has had an incredible effect on student performance as measured by the state. Since 2010, the number of students performing at the

proficient / advanced level on the state science assessment increased 41 percent. By 2012, 63 percent of Watkins students scored proficient or advanced.

Watkins has expanded Earth Day into Environmental Awareness Week. Activities include: visits from *Keep Mississippi Beautiful*, guest speakers, the *Great American Clean-Up*, building a wind turbine, and a recycling competition. Watkins and *Fleet Feet* teamed up to take the GreenSneakers Eco-Challenge. Students had the opportunity to sort and weigh sneakers that were collected.

Health and wellness also are a priority at Watkins. Recognizing the obesity concerns of Mississippi, the school initiated the Watkins Playground Project in 2008, using the project as an opportunity to revitalize our physical education, health, and nutrition program. The project thrives on community support, with over 15 local sponsors donating over $100,000 to the effort. In 2011, Watkins won a $25,000 *Project Fit America* grant from Blue Cross and Blue Shield Foundation of Mississippi. PFA includes cardiovascular workstations, training for teachers and students, assessments, and equipment. Up to 92 percent of Watkins participants showed improvement in fitness post assessments.

The *Partnership for a Healthy Mississippi* also has been actively involved the health and nutrition program. Each year, they assist with BMI testing. For faculty and staff, they have offered aerobics classes and workout sessions. Other Watkins health and wellness activities include *Fuel Up to Play 60*, *Reject All Tobacco*, *Just Have a Ball* (free balls for students!). The school is a *USDA HealthierUS Schools Challenge* Gold awardee and participates in *Walk to School Day* as well as *Safe Routes to School*.

## *Nebraska*

### King Science and Technology Magnet Center, Omaha, NE

*Aquaponic roots take hold in urban campus*

At King Science and Technology Magnet Center, a Title I school with 71 percent of students qualifying for free and reduced priced lunch, students lead the effort to health and sustainability. The Green Club, in conjunction with the Service Learning and Science Scholars courses, gathers recyclables weekly from classrooms and tracks the school's waste. Students maintain a courtyard that contains native plants and is a haven for butterflies and an annually returning mallard duck family. They learn about alternative energy, and also volunteer time to clean up Kountze Park, a park across the street from the school that King Science has officially adopted from the city of Omaha.

Students oversee two innovative aquaponic systems that allow for harvesting of produce throughout the year. The system uses tilapia waste to provide nutrients to a soilless grow bed. This technology allows for the harvesting of plants every 4-6 weeks. All produce is donated to local food banks. The students also manage seedlings that are planted in other aquaponic systems at the Solomon Girls Center and Lothrop Elementary School. Students are responsible for teaching elementary students about the technology, and leading educational tours of the project.

Also designed and built by students, the Urban Farm in the back of the school is used to teach students about plant growth, gardening, and healthy eating. The school partners with the non-profit organization Whispering Roots to maintain the aquaponic system, and a volunteer gardener works closely with the after school program to maintain the Urban Farm. When developing and building the farm, the school worked with engineering students from Omaha North High to design the layout and help build the raised beds.

The school sponsors an annual SET for Life Conference, during which all students attend informational sessions regarding science, engineering, technology, and future educational opportunities. At a recent conference, students learned about health issues like the adverse effects on the brain from drug use, jobs in civil engineering, and careers in agriculture.

By tracking its resource use in *EPA ENERGY STAR Portfolio Manager*, King Science has reduced energy and water use and participates in a district-wide Green Schools program. The Omaha Public Schools transportation department has rerouted bus pickups and drop offs, which has a direct effect on King Science, where nearly three-quarters of students ride a bus. The school also participates in *Safe Routes to School*. According to the EPA, King demonstrates best practices in IAQ.

King Science participates in monthly Fitness Fridays, during which students and staff are engaged in a healthy activities ranging from to heart rate management to healthy food choices to yoga to Olympic events. King Science offers exploratory classes in healthy brain workouts, morning fitness, lifetime fitness, wilderness survival, and archery; and sixth graders attend an outdoor overnight camp to the Nebraska 4-H camp where they hike, fish, compete in archery, and engage in outdoor games. All students are enrolled in a physical education class that meets for 45 minutes every other day. Weather permitting, these classes are held outdoors. Part of the district-approved curriculum for physical education calls for the monitoring of a healthy weight and maintaining a physically active lifestyle, so King Science offers club sports, including soccer, swimming, basketball, and football to 5th and 6th grade students, and competitive sports to 7$^{th}$- and 8$^{th}$-graders, including volleyball, cross-country, track, soccer, swimming, wrestling, basketball, and football.

## *New Hampshire*

### Phillips Exeter Academy, Exeter, NH

*Generations-old reputation; Practices that protect the planet for future ones*

Phillips Exeter Academy is a highly selective private college preparatory high school for boarding and day students with an enrollment of over 1,000 located in on 670 acres. It is one of the oldest secondary schools in the United States.

There are many examples of Exeter's efforts to reduce greenhouse gas emissions. The Academy has converted its central heating plant from oil to natural gas, resulting in a reduction in greenhouse gas emissions of 63 percent and installed 40 geothermal wells for heating and cooling of classroom buildings. *LEED* certified buildings include the Phelps Academy Center and faculty housing. *LEED*-based Guiding Principles for Sustainable Construction are being used in the renovation of the Lamont Student Health Center. The renovation includes a green roof, rain gardens, and wetlands for outdoor environmental education and low-impact development best practices.

The Academy eliminated the use and sale of plastic water bottles on campus. Students fill reusable water bottles at filtered water filling stations located through the campus. Students, faculty and staff participate in *Bike to Work Day* to support *Moving Planet*, a day to move beyond fossil fuels. Compost can be brought to food waste totes behind Elm Street Dining Hall and a compost pile that only accepts plant matter is behind the Facilities Building. Food waste is picked up and brought to Brick Ends Farm in Hamilton, MA, where it is composted and resold to farmers and gardeners. Two pump systems take water from the Exeter River to irrigate the campus.

The school uses third party certified cleaning products and a Safety and Environmental Manager oversees chemical use and safety programs on the campus. The manager ensures IAQ and efficient operation of campus systems and building components for the health of students, faculty and staff. The Science Department uses preventative hoods to address potential airborne contaminants. Students often have access to food purchased from local food and suppliers and farmers. The Academy partners with local orchards for apples and cider every fall and serves organic eggs and milk in the dining halls. There is a culture of health and fitness at the school through student participation in junior varsity, varsity, and recreational sports and a myriad of options for outdoor sports and recreation.

A curriculum of indoor and outdoor environmental education is available to students through science, technology, mathematics, economics and humanities. Students

are eligible to study at the Island School in Cape Eleuthera, Bahamas to focus on sustainability and experiential and environmental education. E-proctors are in every dorm and educate the Exeter community about environmental issues. Besides recycling and composting, E-proctors organize demonstrations, tree planting days, and other climate change related events. Students participate in beach and highway cleanups, farm and garden club visits to local farms and maintain campus gardens. They also run a secondhand store that donates profits to charities. The Academy partners with local, state, and federal entities on best practices for sustainability and environmental stewardship and outreach to the community and students with speakers, film series, and campus events.

## *New Jersey*

### Bedwell Elementary School, Bernardsville, NJ

*A tree for each child*

The key to the success of Bedwell's green initiatives is a multi-pronged approach. From an infrastructure standpoint, the school district undertook an investment grade audit and instituted an energy savings improvement program to implement upgrades. Savings have been achieved through efficiency upgrades throughout the entire facility in lighting upgrades, building temperature controls, as well as an energy education program. Environmental education has been emphasized through curriculum integration, environmental clubs, Earth Week activities, and a coordinated environmental awareness/recycling program.

Collaboration across many levels has played a key role in the success of Bedwell's sustainability program. Custodial, maintenance, and cafeteria workers have been trained in energy-saving techniques, as well as energy-efficient operations and maintenance. Additionally, these employees are charged with identifying energy-saving ideas and reporting and fixing any infrastructure problems related to wasted energy or water. Environmentally related professional development also is available for teachers.

Data on the school's energy use is tracked monthly and communicated to staff and students through reports, newsletters, and announcements. Reports showcase successes and identify areas for improvement, reinforcing a culture of environmental awareness. By creating a program which imparts the importance of sustainability to students at a young age, Bedwell has committed to a legacy of environmental stewardship, which grooms students to be environmentally conscious citizens. The success of the energy-efficiency program at Bedwell demonstrates the effectiveness of energy education at the elementary-school level. The school employs SEE, and soon will have solar panels on its roof that generate 20 percent of its power.

Bedwell school community benefits from a *Safe Routes to School* grant, and has saved $239,000 in three years as a result.

At Bedwell, Earth Week is celebrated by raising awareness of environmental concerns, as well as with activities to reduce carbon footprint, including a tree for each child to plant. Some of the year-round activities include lights out hour, no trash lunch days, reusable container contests, and environmental words of wisdom aligned to the daily themes during morning announcements. Students have participated in the "Let's Save Energy" poster contest, litter pick-up outside the building, and "reduce, reuse, and recycle" classroom presentations and projects.

To promote healthy eating among students and staff, the school food service company donated seeds for an edible garden, and the food is served in the cafeteria. The garden will expand due to grants from Lowe's Corporation, and an Eagle Scouting project will improve the facilities and infrastructure during 2013. The garden boasts an impressive variety of produce, including five varieties of blueberries, strawberries, several varieties of tomatoes, zucchini, summer squash, snow peas, three types of potatoes, corn, broccoli, three types of cucumbers, two varieties of onions, string beans, celery, pole beans, 12 species of lettuce, seven types of peppers, two species of eggplant, and radishes.

Faculty members oversee energy and environmental programs in their classrooms and integrate them into existing curricula. Interschool cooperation also is emphasized through collaborative Green Teams and Earth Week projects.

## Summerfield Elementary School, Neptune, NJ

*Trademark environmental literacy programs in a LEED Gold building*

Summerfield uses several unique and innovative technologies to reduce its costs and effects on the environment. Two electric-vehicle charging stations are located in parking spots near the main entrance. A geothermal heating and cooling system uses variable frequency drives, flow control valves, and an energy recovery system to capture energy that normally would be lost through exhaust. Sunscreens placed over the south- and west-facing windows control the effects of sunlight by allowing passive solar heating in the winter, while shading the windows in the summer. Daylighting controls, occupancy sensors, and a building automation system add to the efficiency. The automation system gives the facilities director precise control and timing of heating, air conditioning, and lighting systems remotely through a mobile device 24 hours a day. These all add up to a 33 percent reduction in energy use.

To reduce domestic water use, waterless urinals and low flow toilets were installed. To reduce irrigation, the roof was designed to direct rainwater to an underground collection tank able to store 6,000 gallons. Overflow is passed through soft stormwater infiltration chambers for gradual recharging of the ground water. The collection tank has a level gauge in the school's lobby for the students to read. The tank is connected to lockable and freeze-proof faucets located near the raised beds so that students are able to use the recycled rainwater to irrigate their gardens. The campus also hosts a bio- retention swale planted with native vegetation to help treat on-site stormwater and act as a buffer from the road. These innovations, along with the use of regionally appropriate landscaping, have completely eliminated Summerfield's irrigation cost.

The city of Neptune's commitment to improve student and staff health is evident through its efforts to control and improve IAQ, manage chemical use, encourage fitness both in and out of the building, provide healthy meals, and educate students about nutrition. Summerfield's ventilating system uses under floor air distribution to sweep contaminants continually from floor to ceiling, reducing asthma triggers and the spread of airborne pathogens. The physical education curriculum ensures that the students receive over 150 minutes of physical education each week; over 50 percent of which occur outside.

Three elementary environmental science teachers teach four distinct environmental and sustainability literacy programs that engage the students in Live Event Learning. These include the SummerWood trips, the LEED Green Schools Curriculum, the Gardening Program, and the Marine Science Program. Students participate in a Service Learning Project to remove invasive species from SummerWood, a Green Acres Preserve adjacent to Summerfield's campus. Classes gather and record data for the NJDEP Biological Water Monitoring Program by collecting and identifying benthic macroinvertebrates present in the Jumping Brook Stream, an NJDEP Category One Stream in SummerWood, which is roughly 30 acres of forested land adjacent to the Summerfield campus and is recognized as a Green Acres Preserve. First through third grade students grow perennials to attract and support local fauna. Fourth and fifth graders design and conduct gardening experiments and then have a salad party to celebrate the fruits of their labor. Students travel to Sandy Hook and seine in the bay to collect and identify marine life just like true Marine Biologists

## *New York*

### Crompond School, Yorktown Heights, NY

*Think green, play green, eat green… let us bloom!*

At Crompond School, comprehensive sustainability professional development sets the stage for in-depth environmental learning. Every member of the teaching staff has participated in courses such as Gardening, Environmental Studies, How to Reduce our Carbon Footprint, and Forest Ecology, through the *Board of Cooperative Educational Services* and *Science 21*. Armed with knowledge about integrating outdoor experiences into their lessons, teachers across disciplines focus their lessons on how humans interact with their environment.

The *Education for Sustainability Standards* provide context for fifth grade students, who examine the impact of climate change on the lives of the native people of the Nunavut province in Canada. In addition to exploring connections between humans and nature in far-off communities, Crompond students study methods by which they can reduce their carbon footprint locally. Their investigations become the basis for instruction about persuasive writing, when students write letters to local officials that include their suggestions to protect the environment and their communities' health. During Math lessons, students manipulate data on waste production, recycling, and other environmental factors using bar graphs, histograms, and line graphs. By repurposing and reusing found materials, students in art classes create "garbage art" and "garbage fashion" to reduce the school's waste and carbon footprint.

Through carefully-designed partnerships, Crompond furthers students' understanding of basic and complex environmental concepts. During a six week exploratory science program at a nearby IBM facility, students explore the latest scientific technology that can impact future sustainability discoveries. Each year, two designers from the Ford Motor Company work with teams of students to create reduced environmental impact cars for the year 2020, when students would be eligible to obtain driver's licenses. To complete the project, students research alternative propulsion methods like hydrogen fuel cells, hybrid technology, and solar power.

By changing the way that the school community thinks and operates, Crompond has reduced its impact on the environment. The school uses *Green Seal* cleaning products that contain no toxins and are biodegradable, just like the school's lunch trays. The school's comprehensive recycling program, which places containers for paper products, plastic bottles, and aluminum cans throughout the building, led Student Government to redeem bottles for altruistic endeavors, like Relay for Life. Automated building technologies shut down computers when they aren't in use. The

school's emphasis on making letters, memos, and report cards available electronically has reduced the amount of paper waste Crompond produces. Students blog their homework instead of using paper, which has eliminated several classroom printers.

"Lettuce Bloom," the school's edible garden, is planted, maintained, and harvested by students. While the garden plays an integral role in encouraging students to make healthy food choices, students also commit to wellness during a school-wide "Think Green, Play Green, Eat Green" celebration. At this event, all students take a Green Pledge and participate in Alliance for Climate Education's Day and Wednesday wake-up stretches. The school has earned numerous accolades for its wellness initiatives, including the Bronze level award of the *HealthierUS School Challenge*, The Apogee Fit Kids Challenge Award, the Muriel C. Furlong Award and the Green Star. By partnering with local hospitals, businesses, and community members, Crompond offers students classroom workshops on hygiene, nutrition, safety, and healthy lifestyle choices.

## Hubert H. Humphrey PS 057, Staten Island, NY

*Innovating green solutions to big sustainability challenges*

To elementary students at Hubert H. Humphrey PS 57, learning about the environment and working to save it go hand in hand. The diverse population of the Title I school – of which 100 percent is eligible for free or reduced-price lunch – partners with *MillionTreesNYC* to work in a neighborhood park to care for trees, conduct summer pond clean-ups, and collect water quality data for the EPA. Along with two schools, Margaretville Central – which is located in upstate New York – and Eltingville Lutheran – which is local -- PS 57 participates in science-based Catskill Watershed programs that share curriculum about the importance of protecting the state's communal watershed.

Led by teachers including a 2012 EPA Presidential Innovation Award for Environmental Educators honoree, students are immersed in project-based learning that explores energy conservation, climate change, and ecological restoration. After student-run teams collect and weigh recyclables, for example, teachers use the collected data in computer, math, and literacy lessons.

The school's robotics team has participated in several projects that increased student understanding of sustainability concepts while helping the environment. Three years ago, the team's fifth graders drafted a plan for a sea wall around Staten Island's low-lying coastal areas to protect the borough from storm surges and floods,

which are expected to increase due to global warming. State legislators, who were impressed by students' extensive research and in-depth presentation, invested $500,000 into a study that addressed beach erosion caused by rising sea levels. To build a solar-powered vehicle, the robotics team learned about renewable energy in science classes, went on a trip to the Solar I museum, and built small solar cars, Lego E-Lab solar scooters, windmills, and watermills. Then, with the New York Power Authority and a local electrician, the team built its own adult-sized solar-powered tricycle that delivers wood chips, flowers, and plants to the school garden.

Using the knowledge they gain from national programs, like *Eco-Schools USA*, *Cool the Earth* and the *Green Schools Alliance Green Cup Challenge*, students lead conservation initiatives that enhance building upgrades to reduce the school's environmental impact, cut its greenhouse gas emissions, and save up to 28 percent on energy usage since 2008. Approximately 30 percent of the school's solid waste has been diverted from landfills due to high-quality composting and recycling programs.

*GrowNYC*, *Grow to Learn*, and *Green Thumb* work with PS 57 students in their 7,350 square foot outdoor garden to plant and grow produce for the school cafeteria. In 2011, PS57 collaborated with Eltingville Lutheran School and the Eagle Scouts to obtain a *Home Depot* grant that allowed a student-built green house to be built from 1,500 recycled plastic bottles in the garden. While the garden provides a valuable resource for teaching students about nutrition, the school also partakes in *Farms for City Kids*, through which students spend a week at a Vermont farm to learn about sustainable agriculture, and healthy eating and cooking.

While an impressive 90 percent of students walk to school, outdoor time at PS 57 isn't limited to the commute. At least half of students' gym time is spent in an outdoor PlaNYC yard that includes basketball, soccer, tennis, and track. To reduce TV and media usage among students, PS 57 implements curricula, like *Student Media and Awareness for the Reduction of Television-viewing (SMART)* and *Fit by 5* and participates in campaigns, like *National TV Turn-off Week*.

## Rye Country Day School, Rye, NY

*Educating and shaping the community with sustainability lessons*

At Rye Country Day School, "sustainability" isn't just a science unit: it's built into the walls of the school. By installing 500 new, low-flow fixtures, a 23 kW solar energy system, and two dual-fuel energy-efficient boilers, RCDS has dramatically decreased its carbon footprint. The school distributes report cards, weekly notes,

campus news, and admissions applications digitally to cut down on paper consumption. To reduce water usage, faucet and toilets and an irrigation system with rain gauge shut-offs were installed. Upper School students host cell phone and battery collections, while the school recycles light bulbs, print cartridges, and electronic waste through *Werecycle*.

At all levels and across disciplines, RCDS strives to develop environmentally-aware students. First graders, for example, write persuasive letters to toy manufacturers urging more sustainable packaging practices, while Upper School students enroll in AP Environmental Science, Environmental Science, and Environmental Chemistry. As teachers explore the connections between environmental issues and related careers in the classroom, RCDS facilitates school-wide assemblies and class-specific presentations that explore the diversity of environmental science, including Dengue Fever, zootonic disease transmission, conservation biology of birds, and the Eco-Entrepreneur. Students use outdoor classrooms at local nature centers and sanctuaries to study ecology, biodiversity, and the effect of the invasive Asian Shore Crab.

Two school gardens at the Lower and Middle Schools allow students to plant and harvest vegetables for use in dining halls. The garden also serves as a teaching tool for Lower School students, who transform leaf clippings and fruit and vegetable scraps into nutrient-rich soil for garden beds. Off-campus, students visit local organic farms to explore sustainable farming techniques.

RCDS limits portion and tray sizes in their dining halls, which allows students to take only what they can eat. By reducing its use of plastic products, using locally-sourced food items, and using school-grown produce, the school's food service provider was presented the Green Restaurant Award with two stars in 2010. Desserts are served only twice a week and students don't have access to junk food, soda, or energy drinks in vending machines. As part of its wellness plan, the school offers Pilates and yoga classes for faculty and students that strengthen the mind-body connection.

The school's environmental impact extends into the community through its Parent Environmental Committee, which sponsors an Eco-Conversations speaker series, Eco-Excursions and writes weekly Eco-Tips. Parents recently presented the movie, "*No Impact Man*," and a discussion with its author. Instrumental in supporting a plastic bag ban ordinance last spring, students handed out recyclable bags to local downtown shoppers after an on-campus screening of the movie "*Bag It*." An alumna helped Middle School students to develop a community garden at a corporate site.

RCDS placed fourth among similar schools in a month-long energy reduction competition, the *Green Schools Alliance National Green Cup Challenge*. To spread energy awareness, Upper School students create a video each year that promotes

responsible energy consumption and includes recommendations from an outside auditor to implement further energy savings plans in the school. Students produce the Going Green Newsletter, which includes information about environmental programs at RCDS, sustainable community service activities, and on-campus workshops and speakers. Student-run organizations also help with campus recycling and participate in coastal cleanup days. RCDS students have been selected to participate in the *Green Schools Alliance Student Climate and Conservation Congress* for the past four years.

To increase awareness of the school's policy, staff wear "No Idling" safety vests to direct arrival and dismissal traffic and students create public service announcements for parents and the community. Nearly 90 percent of the school's students carpool or take public transportation to school.

## *Ohio*

### Kenston High School, Chagrin Falls, OH

*Wind turbine brings alternative-energies course to life*

Kenston High School (KHS), has committed to an Energy Improvement Plan that has helped the school save roughly 30,456 watts through lighting retrofits and 500,000 gallons of water through elimination of most irrigation and the installation low-flow fixtures. Perhaps most notable is that KHS produces 70 percent of its own energy on-site with its Aeronautica 54-750 Wind Turbine. The turbine produces approximately 1.3 million Kilowatt hours per year. The school also installed a solar thermal booster system that produces 79,200 BTU and is used to heat the water system.

In addition to together providing 75 percent of the school's energy consumption, the wind turbine and solar thermal booster system are both used to enrich the curriculum at KHS. The systems provide real-time data that is utilized by students in courses such as Alternative Energies and AP Environmental Science. Conservation is encouraged and taught through the school's participation in the "Schools for Water" initiative through the Blue Planet Network. KHS adopted a school in Kenya and raised money to provide them with clean drinking water.

Along with the school's installation of accessible recycling bins, students efforts have helped increase KHS' recycling rate by 1.6 tons since 2009 through the production of video announcements and participation in the student organization group, *Envirothon*. In addition to recycling, *Envirothon* participation includes beach cleanup, environmental awareness education for elementary students, as well as other projects around campus.

With help from the community, the school recently completed construction on the first phase of Kenston Trails. When finished, the one mile trail will be used by science classes, health classes, athletic teams, and community members. A rain garden, outdoor amphitheater, and outdoor classrooms are also used to enrich the curriculum.

KHS students are encouraged to remain fit and healthy. 35 percent of food purchased is local. KHS is also a three time recipient of the Buckeye Best Healthy Schools Gold Award and a 2013 recipient of the *ED Carol M. White Physical Education Grant*. A significant amount of the money has gone to purchase age-appropriate fitness equipment for students K-12. KHS also hosted a free community fitness day known as, "Play Blue in Motion." The event attracted 1,200 community members and included demonstrations, nutrition workshops, fitness assessments, cooking demonstrations, and much more. The day was so successful that KHS plans to make it an annual event.

## *Pennsylvania*

### Albert M. Greenfield Elementary School, Philadelphia, PA

*Transforming urban schoolyards*

In 2006, Albert M. Greenfield Elementary School in Philadelphia initiated the Greening Greenfield project to transform the existing school into a healthy, sustainable environment for students to learn and grow. Among the school's first tasks was to replace outdated mechanical equipment with new, energy efficient models: in doing so, the school achieved 52 percent energy savings in one year. Greenfield plans to further reduce its energy consumption by transferring from a steam-powered heating system to natural gas heating in 2013. Greenfield's renewed focus on sustainability also led to the installation of a weather station, a photovoltaic array, murals, and outdoor classrooms.

Selected by the Philadelphia Water Department as a pilot site for the *Green City, Green Waters* initiative, Greenfield will use stormwater infrastructure as the primary approach to reduce the incidence and volume of Combined Sewer Overflows. The project has led the school to partner with the *Community Design Collaborative*, AIA Philadelphia chapter, and the school community to dramatically transform the Greenfield schoolyard and then to hold a workshop for other schools, called "Transforming Urban Schoolyards." In 2009 and 2010, the school installed pervious paving, two native plant rain gardens, and a state-of-the-art stormwater management system to capture and treat 97 percent of rainwater.

The new school environment generates increased opportunities for students to participate in hands-on learning. Outside, students explore micro-climates, indigenous plants, rain water absorption, and non-point source pollution. Fifth-grade students learn about solar systems through the rooftop solar installation that includes a real-time display monitor. All students participate in an annual *Earth Day* celebration, when they visit the Schuylkill River Trail to learn about the impact of stormwater management. Throughout the school year, the Fairmount Water Works Interpretative Center provides educational resources about healthy watersheds to students. The *Delaware Valley Green Building Council* selected Greenfield to participate in its Energy Pilot Program through which students will become trained energy auditors, complete an energy audit of the school to identify inefficient practices, and promote energy conservation.

To integrate nutritional and environmental education with hands-on learning, Greenfield partnered with the *Philadelphia Orchard Project* to plant an on-site urban garden. Students tend to the garden while learning about different fruit offerings, including Asian pears, persimmons, peaches, figs and raspberries. Throughout the year, the school holds several healthy food events, such as International Food Day, Fresh Food Fairs, Fruit Smoothie Day, and picnics. The school is a *Fuel Up to Play 60* participant. Members of the school's track club participate annually in the prestigious Penn Relays, while traditional students hike along the Schuylkill River several times per year. Greenfield contributes to the health and well-being of the community at large: after school, the schoolyard is open to the public and has been actively utilized by City Year and a local Tai Chi group.

Through fundraisers, grants, and local partnerships, Greenfield realized these sustainability feats. For example, to purchase the school's photovoltaic installation, Greenfield held a benefit concert by a rock group, the Disco Biscuits, and raised money through an e-cycle day, a silent auction, a penny-drive, and the sales of a student-design t-shirt. Mercury Solar, the photovoltaic designer and builder, donated the installation labor.

## Broughal Community Middle School, Bethlehem, PA

*Post-secondary and health partners make for a sustainable community center*

In the fall of 2009, Broughal Middle School opened in Bethlehem, the seventh largest city in Pennsylvania. The only school in the Bethlehem Area School District to be built for *LEED* Gold certification, Broughal serves an ethnically-diverse student body of which 93 percent is eligible for free or reduced-price lunch. Broughal was conscious of the school's environmental impact from the start, and opted to build on

the site of the former school so that no green space was lost for new construction. The school is home to a 7,600 gallon cistern, which collects rainwater used to flush toilets and irrigate the grounds. Broughal uses waterless urinals, low-flow faucets, and sink and toilet sensors. A highly-efficient HVAC system saves energy each year while motion sensors control classroom lighting. Situated below the school, a parking deck with dedicated parking for hybrid vehicles and carpools assists in limiting water runoff and includes a carbon monoxide monitoring system that controls exhaust fans that maintain safe air quality levels. At its outset in 2010, the building rated a 97 in *ENERGY STAR Portfolio Manager*. Not satisfied with this stellar rating, the school worked with behavioral and operational changes to rate 100 in 2012.

Within the sustainable school, teachers offer STEM-focused courses that replace traditional electives; for example, students enroll in science of foods instead of home economics, and robotics instead of woodshop. Broughal boasts unique offerings, too: students can explore astronomy, television production, and environmental engineering through the school's specially designed curriculum. Science class covers GIS, plate tectonics, energy, climate change and land use.

To apply their in-classroom learning to the real-world environment, students grow healthy foods in the greenhouse and nearby community gardens. Produce harvested by seventh-graders is then used in the cafeteria, where food is served on reusable trays. Through collaboration with the Southside Initiative, students learn about community-based agriculture by raising seedlings to be used in community gardens throughout the south side of Bethlehem. A partnership with Lehigh University allows sixth grade students to use classroom composters, designed by college students, to enrich the soils in both the greenhouse and the community gardens. Additionally, Lehigh provides eighth grade students with the opportunity to monitor air quality in the school and surrounding neighborhoods using portable air monitors.

While Broughal leverages partnerships to create intensive learning opportunities for its students, it also collaborates to bring good things to the entire community. By connecting the school with area hospitals and non-profit organizations, Broughal created a Community School that provides after-school and summer programming to students and coordinates outreach efforts to families in need of basic necessities. Located inside Broughal, the Family Center routinely provides free health and dental care in conjunction with St. Luke's Hospital.

Nearly half of Broughal students walk or ride bicycles to school. Clearly-placed signs alert traffic that the school is a no-idling zone, and buses carrying students to and from Broughal are among the newest, low-emission vehicles in the fleet.

## Westtown School, West Chester, PA

*Friends of the earth sciences*

*A* Quaker school serving students in preschool through 12th grade, Westtown ensures that all students have an opportunity to participate in its rich academic and extracurricular experiences: 35 percent of students receive scholarships totaling $5.5 million. In the suburban community of West Chester, Westtown School offers a sustainability-focused curriculum that begins in Westtown's Lower School, where elementary students explore the rainforest, space, energy, machine construction, and Lego robotics. As seventh-graders, they are immersed in sophisticated concepts of STEM and the environment, including engineering, physics, robotics, aquaculture, and design.

In addition to basic courses offered at the Upper School, students can enroll in Biology II, Evolution, Environmental Science, and Research Ecology. Projects students have pursued include monitoring water quality in nearby Chester Creek, examining bird and turtle ecological relationship with lake and farm habitats, sustainably processing campus gray water, exploring the feasibility of wind generation on campus, and the creation of sustainable food system using raised vegetable beds. From early childhood to secondary education, Westtown's emphasis on developing passionate young scientists leads 22 percent of graduates to pursue a STEM major in college.

Westtown students routinely apply their formal education to the world outside of their classrooms. In the school's environmental club, participants launched "Friends School Day of the Earth" conferences in partnership with 12 other schools in 2007 and 2009. At the event, students formulated workshops and facilitated discussions about the environment and campus leadership. Westtown also participated in the *Green Schools Alliance Recycle Challenge*, for which it earned a 96 percent and was named a Recycling Hero as the school that finished in fourth place nationwide.

The Westtown campus reduced its electricity consumption 15 percent since 2007. By reducing its greenhouse gas emissions by nearly a third, the school has generated over $600,000 in savings in the intervening six years. Under the school's Energy and Green Building Policies, the newly-renovated Facilities building earned *LEED* Commercial Interiors Certification, and 23 faculty homes were weatherized. Two dormitories and five faculty homes are heated and cooled by geo-thermal systems and the solar voltaic array on the school's new athletic center generates 60,000 kWh per year. Campus recycling and composting divert over half of the school's waste from landfills and have cut hauling fees by 50 percent. The grounds are also home to a *National Wildlife Federation* certified medicine wheel and butterfly habitat gardens.

Nutrition and fitness are important components of the school's way of life. The school dining hall serves food harvested by students from the school's 200-acre farm, which has been in continuous operation since 1799. A summer *Community Supported Agriculture* program raised 7,800 pounds of food in 2011 that served 15 families, the Chester County Food Bank, and the school's kitchen. Westtown co-founded the Pennsylvania Association of Independent School Business Officers Association's *Farm to School* initiative, which inspired a network of over 20 member schools to use more local food in their dining halls. In addition to the produce obtained from the school's garden, Westtown purchases 13 percent of its food from locally sourced or organic providers. Staff and student food selections are shaped by a robust and varied menu that includes vegetarian and vegan offerings.

At the Lower School, students partake in outdoor activities up to three times per day, while Upper School students are required to participate on an after-school sports team each season. Students attend daily physical education classes. Westtown conducts Outdoor Adventure Education, which includes a ropes course that connects problem-solving and community-building to physical well-being and the environment.

## Nazareth Area Middle School, Nazareth, PA

*Windows on the world show super savings*

Nazareth Area Middle School (NAMS), built in 2009, serves 7th and 8th grade students of the Nazareth Area School District. Throughout the planning and construction process, the students, staff, and community were fully engaged in the project, offering a vision and providing input on the new school building. With a goal to achieve USGBC *LEED* Silver certification, the NAMS community was proud to receive *LEED* Gold certification due to the installation of a 574 kW solar photovoltaic system.

The building includes a Metasys system that monitors and controls all HVAC and mechanical equipment. A Lutron lighting control system works in conjunction with dimmable ballasts, daylighting shelves in classrooms and on/off sensors located throughout the building and outdoors. These systems have allowed the NAMS to reduce its energy consumption and earned an *ENERGY STAR* Portfolio Manager rating of 94 for 2012. Two additional monitoring and information systems also are integrated into the building and used in the classroom.

NAMS has realized a seven percent reduction in non-transportation energy usage, as well as a 47 percent reduction in GHG emissions from the solar system alone. In

addition, the NAMS recycling and composting program has achieved a 29 percent reduction in solid waste to date. During construction, 75 percent of all construction waste was recycled and diverted from disposal. Materials used had at least 20 percent recycled content, and over 25 percent of the materials were extracted, processed, and manufactured locally.

The 34-acre site maximizes open space and includes walking trails, outdoor classroom areas, and a greenhouse and composting site, as well as numerous athletic fields for PE classes and team sports. An elaborate system of stormwater drainage and retention areas was installed, along with water-efficient landscaping that requires no irrigation. Water conservation occurs inside the building as well, with low-flow plumbing fixtures and faucets throughout the building.

Comprehensive IAQ and *IPM* programs were adopted, and as a result, classrooms and other spaces are tested annually on a rotation basis to ensure the IAQ meets or exceeds standards. The *IPM* program also ensures the use of non-chemical treatments for the removal of pests, and, when chemicals are necessary, students and staff are notified in advance and kept away from the areas as per regulations.

The Windows on the World sustainability information system provides energy management and interactive sustainability education data for use by staff and students. WOW accesses data gathered by the building's gas, water, and electrical meters and consolidates it onto one convenient platform. Displayed on kiosk style touch screen displays and over the Web, WOW allows the building occupants and visitors to learn how the building is designed to conserve resources and preserve the environment. The real-time and historic resource consumption data can be used to compare and translate energy savings into tangible environmental benefits in support of sustainability education. In addition, the building uses a DECK Monitoring system that monitors and tracks the building's solar system performance on a kiosk style touch screen and online. It compares the output in terms of environmental offsets such as gallons of gas saved, tons of CO2 saved, or number of 60-watt bulbs that can be energized for eight hours per day.

Not only do these monitoring systems help buildings perform better, but the building features are a tool for students to use in classrooms to advance their green career and college program preparedness, and have been incorporated into the school's science and math curriculums. For example, science classes use the real-time data from the building's monitoring systems to correlate the effect of temperature, humidity and wind on the consumption of energy to operate the school.

Environmental education is enhanced through community partnerships. Working with an area business, environmental club students compost cafeteria waste and bring it to a local nature center where they created a learning station to describe

their work. Similarly, the *Trout in the Classroom* program is a partnership with Trout Unlimited and the Pennsylvania Fish and Boat Commission, where students receive trout eggs in early November, hatching these eggs and caring for the fish until the release. During the course of the year students are responsible for maintaining high water quality, feeding the trout, and learning about the life cycle of trout. In the spring, the students release the trout into a local water system.

## Lower Merion School District, PA

*Nurturing student growth in the environment*

Situated just minutes from the largest city in Pennsylvania, the Lower Merion School District offers its 7,682 students in preschool through 12th grade an education that extends beyond school buildings and into the environment that surrounds them. First-hand outdoor experiences begin in elementary school, when kindergarten students participate in a year-long learning program, called Project Children Helping and Nurturing Growth in the Environment (CHANGE), which includes nature walks, garden lessons, and art projects.

Students are actively engaged in environmental literacy after school, with 20 percent of secondary students participating in the Technology Student Association, *Science Olympiad*, and *FIRST Robotics*. Harriton, one of the district's high schools, has won 15 consecutive straight championships in the Science Olympiad, which reinforces knowledge about sustainable concepts like forestry, meteorology, and water quality.

Students explore careers in the STEM fields and participate in the It's Not Easy Being Green Team Design Challenge, through which they develop solutions to relevant, real-world environmental problems. The district offers its high school students a variety of sustainability courses, including AP Environmental Science, Meteorology, Geology, Oceanography, Landscape Architecture and Horticulture. Student activists have met with their Congressman to encourage him to improve his voting record on the environment.

Applying classroom learned conceptual knowledge to actual situations, students grow vegetables in the schools' greenhouses and transplant them to community gardens, learn the art of sustainable land use planning and design, based on an understanding of natural and cultural site characteristics. The district's schools utilize solar panels and the Harriton Meadow and Watershed to further understanding and appreciation of sustainability concepts.

Lower Merion launched the Sustainability Expo/Go Green Challenge in 2012, which provides resources to reduce environmental impact, improve health and information on future careers in the green industry to students and community members. As part of the event, students developed and executed an innovative idea that addressed an environmental concern in their community.

The district's School Health Advisory Council, in partnership with the American Cancer Society, implements wellness initiatives and conducts classroom lessons like "The Whole Grain Truth" and "There's a Rainbow on Your Plate." The Council also works with students at three school community garden sites to plant and harvest vegetables. Lower Merion's wellness goals align with the *Surgeon General's Healthy People 2020* initiative, and the district is a member of the *Healthy People 2020 Consortium*.

The district's Comprehensive Environmental Impact Reduction Plan, formulated in collaboration with the Green Council of Lower Merion School District, provides for the ongoing use of best practices in the areas of energy, solid waste, water, soil and conservation management, air quality management, purchasing policies, and IPM. The district recently modernized all ten of its schools to include conservation and health promoting features such as hand dryers, water filling stations, solar panels, green roofs, bio filters, rain gardens, and rainwater cisterns. Two of its high schools were built to *LEED* Silver standards. All schools benchmark resource use in *EPA ENERGY STAR Portfolio Manager*. As one of the first districts in Pennsylvania to incorporate a comprehensive energy plan, Lower Merion has been a leader in the use of alternative fuels since 1995. It added compressed natural gas to its fleet of school buses and boasts the largest fleet of compressed natural gas school buses on the East Coast.

Recognized as one of just four districts nationwide for *American Schools & University's Green Cleaning Award*, Lower Merion has an aggressive chemical management program and ensures 80 percent of its annual cleaning supplies are the healthiest, safest, most environmentally-friendly alternatives. The district's efforts have led to best practice cleaning solutions that improve overall IAQ, reduce exposure to harmful contaminants, and minimize waste and environmental impact.

## *Rhode Island*

### Providence Career and Technical Academy, Providence, RI

*From brownfield to green school*

Providence Career and Technical Academy (PCTA) works not only to educate students about sustainability and the environment, but also to share these unique

opportunities and building systems to spread awareness and education into the community. As PCTA was built on a renovated brownfield site, environmental impact and health has become a part of the school's curriculum. PCTA teaches students about how to choose a building site, and what goes into cleaning up a brownfield.

Through each of the school's five construction-based career and technical education programs, students engage in outdoor experiences learning to complete skills on a job site, focusing on green building technology. In core science classes, students are given the tools to calculate their personal carbon footprint and determine ways that they can reduce their impact. Students measure energy, collect data, and perform experiments with the energy from solar and wind power monitors that are directly connected to the panels and turbines on the roof of the building. In biology, students collect food products, analyze food packaging, research farming practices, and research the transportation used to produce and deliver these items. Students in mathematics go outdoors to analyze the geometry of the world such as the height of our building through the use of clinometers.

In PCTA's electrical program, students learn about different light bulbs and their energy efficiency. They use this information to calculate how much energy and pollution could be eliminated by switching bulbs at a home, versus a school, versus an entire neighborhood, versus a city. The plumbing program teaches students about the impact of waterless water heater tanks compared to traditional water tanks. They use large and small-scale examples to show how much this change can affect the environment and utility costs. The school produces 15 percent of its energy on-site and is a *Collaborative for High Performance Schools* Northeast verified in 2009.

As a technical school, PCTA has unconventional opportunities for recycling in the school, recycling as much as possible from career programs, including all motor oil from the automotive program, cooking oil from the culinary program, and the sawdust from carpentry classes. In the cosmetology program, students learn how to properly dispose of products, through labels describing which products are okay to wash down the sink, while everything else is disposed of separately. Outdoor education programs include soil and biodiversity studies. The construction program recently built an outdoor general construction lab with recycled materials. Many classroom excursions located within the city limits take place on foot, encouraging our students to walk throughout the city.

As an urban school, the majority of students live within walking distance. Students living farther away are provided with free public bus transportation. Energy data, usage and cost are monitored through *EPA ENERGY STAR Portfolio Manager* and data from the National Grid. Recent PCTA renovations included installation of

energy recovery HVAC units, state of the art PDC controls with user interface and solar water heating. Waterless urinals were installed in the boy's rooms. The water used for heating and cooling is tested weekly and chemical treatment is provided to balance pH levels and control germs to comply with Narragansett Water Shed requirements. The controls for the dual temperature system operate pumps, chillers and boilers to optimize efficiency and eliminate waste.

PCTA seeks out partners like Expanding *Minds* and the Apeiron Institute for Sustainable Living, which help to get students interested and excited about a future in environmental studies, and what that future can mean for them. PCTA recently created an Adopt a Farm partnership with Pezza Farm, where 10 acres and almost 30,000 pounds of local fruits and vegetables were harvested from Pezza Farm and served throughout Providence schools. In addition, AP Environmental Science classes travel to the Buckland Point wastewater treatment facility to learn about the effect of human water consumption.

During their senior year, students are required to complete 30 hours of community service, which is directly related to their career and technical education program. Among these projects, every year in the spring, PCTA takes a group of student volunteers to clean up a local river/park/greenway, which runs through the backyard of many students. Members of the school's faculty attend a weeklong sustainability focused professional development course provided by the Narragansett Bay Commission. Faculty members bring back resources to the classroom, and have the opportunity to get students involved with the Narragansett Bay Commission.

## The Compass School, Kingston, RI

*Year-round sustainability punctuated by spring ecofair and fall local foods fest*

The Compass campus comprises 20 acres of historic farmland, with 5 acres of wooded wetlands, a stream, vernal pools, and a variety of local plants and animals. The entire property is used extensively as an outdoor classroom and as an area to take walks and enjoy nature. Students engage in nature journaling and study vernal pools, tree growth, soils, stream habitats, and how farms produce food. Seventh and eighth grade students go on an annual camping trip to a location where they can study the local environment. As a community, Compass recognizes that having frequent opportunities to bond with the natural world nurtures children's physical, cognitive, and emotional health and development

Students in grades K-8 are taught through a project based approach, researching various topics and presenting their learning to others at project shares, or conducting

stewardship projects. Classroom studies involve such topics as a study of waste, energy sources, robotics, solar car construction, biomimicry, aquaponics and aquaculture. The school participates in the *USFS/ Smithsonian Institution Global Tree Banding Project* and is *a* N*ASA/ NOAA/ NSF GLOBE* school. In 2012 Compass students scored in the top two percent of Rhode Island students in science classes. Annually, the school holds an EcoFair for the surrounding communities. The day features student presentations on environmental projects and vendors sharing information on environmental issues.

The Compass School building is a model of sustainable design. The main building has extensive windows in every room providing natural light. An extensive array of solar panels on the roof provides a partial source of electricity for the building and a computer program allows students to monitor output. Updating computers, use of CFL light bulbs, adjustable thermostats in every room, attention to heat loss, and use of windows in warm weather allowed Compass to reduce energy consumption by 30 percent in two years.

Sustainability practices include packing no-waste lunches, regular silverware, and reusable water bottles. Documents are printed on both sides of paper and scrap paper is used for math and art, and shredded for use as bedding in worm compost bins and the chicken coop. Students constructed a bin for Compass families to use for recycling supermarket plastic bags, and another bin is used to collect and send recyclable materials to *Terracycle*. In art and music students make instruments and sculptures from natural and recycled materials. According to parents, this concern for good sustainability practices has carried over into home practices.

The school participates in *Fuel Up to Play 60* and the *USDA HealthierUS Schools Challenge* and hosts a "Celebration of Local Foods" fundraiser event every fall, involving 14 local farmers, restaurants, and wineries that use local foods. The physical education program meets outside all year and includes winter activities such as sledding.

All students tend the school garden, to learn about sustainable agriculture and to connect to the community and natural world. As part of the gardening program, Compass produces and maintains its own compost under the supervision of a teacher who has been trained as a Master Composter. Much of the produce is donated to a local food bank.

Older students from Compass perform volunteer work after school and during the summer for *Rhody Native*. Students participate in planting, weeding, and invasive species removal. The school's proximity to Narragansett Bay also enables Compass students and faculty to work with Save the Bay on projects such as salt

marsh restoration and eelgrass restoration, and with the *Audubon Society* of Rhode Island on beach cleanups.

## *Tennessee*

### Lipscomb Academy Elementary School, Nashville, TN

*A well-tended butterfly waystation*

Lipscomb Academy Elementary School (LEAS) in suburban Nashville features an outdoor classroom equipped with a sundial, a fishpond, a math patio, a butterfly garden, and a covered pavilion. The outdoor classroom is a rich learning environment: a place where the school's pre-K-4 students conduct science experiments, practice gardening, engage in quiet reflection, and hone their drawing skills.

> **"With persistence in establishing the right partnerships, it is possible to build a meaningful program completely free of charge, and in many**

All grade level classes use the outdoor classroom for hands-on environmental learning. Students maintain a *NWF Certified Monarch Butterfly Waystation* which provides a habitat for Monarch butterflies as they migrate through Tennessee. While developing the project, students learned about the butterfly cycle, the web of life, land and water conservation, and the value of recycling. Students rear hundreds of Monarch butterflies in classrooms. They tag the butterflies and release them each fall for migration to Mexico. Kindergarten students compare their Monarch butterflies with those taken to the International Space Station on Space Shuttle Atlantis. Six of the school's butterflies have been recovered in the Mexican overwintering sites. Kindergarten students participate in scavenger hunts in the outdoor classroom.

The school's science curriculum features a number of creative science projects linked to sustainability. Pre-1st grade students study the polar regions and temperature as they build arctic habitats and make simulated blubber. In addition, to learn about trees and paper production, pre-K students make recycled paper. Kindergarten students have observed the incubation of chicken eggs, and raised money to purchase, through Heifer International, 13 flocks of chickens to donate to families in the developing world. First graders complete a six-week engineering unit, learning about force and motion, flight, electricity, and heat structures. Third graders learn about the celestial environment. They build rockets, use computers to simulate spacecraft landings, spend time in LEAS's portable planetarium, and host NASA astronauts. Third graders use the school's pond to conduct scientific studies of water temperature and participate in a Keep Our Water Clean service learning project. They studied the impacts of medication on soil and water, and created a

PSA campaign featuring a song to educate the public about a Hazardous Waste Drop Off event, which collected 21,768 pills. This project earned recognition as the state winner of the *Disney Planet Challenge*. Fourth graders use a "Skittles experiment" to explore the natural resources of the earth and their uneven dispersion and use. While studying electricity, older students take a Tennessee Valley Authority Home Energy Survey. Four LEAS teachers are trained in *Project Learning Tree*, and one is a PLT facilitator.

The school's afterschool Green Team participates in the *NEED* project. Students study 10 sources of energy using books, simulations, and hands on projects. Students participating on the Green Team have lit a closet using only a 2-liter plastic bottle filled with water and sunlight. They have used biomass energy to make a campfire and cook s'mores, and demonstrated how a dam works or fails using a brownie mix with monopoly houses. And they have studied solar energy by making "light bracelets." The school's *NEED* project won second place in the State of Tennessee for the K-2 division.

One of the most valuable activities in the outdoor classroom is gardening. Beginning in the 2012-2013 school year, each grade level maintains a different garden. Between them they maintain a pizza garden, a healing garden, a flower garden, a "five senses" garden, a gourd garden, and a square-foot garden. The square-foot garden, maintained by the kindergarten class, is divided into square foot parcels. Each student is responsible for tending one of the parcels.

LEAS is the only private school to earn *Tennessee's Green School Recognition* flag. The school is a Three-Star Partner in the *Tennessee Green Star Partnership*, a state recognition program for businesses and organizations that demonstrate a commitment to sustainable facilities practices. For LEAS, this commitment included adopting new sustainable practices, and implementing a number of energy and water efficient improvements to the school's 1960s-era building. The school replaced an old boiler with a new HVAC system. It undertook an energy audit, conducted by a representative from the University of Memphis. It recently installed a new roof which meets *LEED* new construction standards. It cools one classroom with a renewable geothermal unit used in a Tennessee Valley Authority pilot project. LEAS sends newsletters and registration packets electronically, which has resulted in a 44 percent reduction of copy paper ordered in one year. The school has added touchless faucets and energy, is planning a major building renovation, and is exploring strategies to make the project energy efficient.

LEAS has an award-winning recycling program for non-traditional items. The school participates in the *PepsiCo Dream Machine Rally Program* encouraging students to bring in cans and bottles from home and school sporting events. Third graders collect the cans, and tally and chart the school's output. In November, 2012 LEAS

students recycled over 15,000 plastic bottles and cans. The school's program is ranked in the top 20 nationally. LEAS third graders work with *Keep America Beautiful* and *America Recycles Day* to offer a convenient, one-stop recycling drop-off in November of each year. These efforts helped LEAS become Tennessee's 2011 Recycling School of the Year.

LEAS has a paved 1/8 mile track, and participates in events such as 12 Miles to Christmas, Lee Denim Walk Day, Walktober and the Music City Marathon Kids' Marathon. Students practice walking and jogging in the days leading up to the event, and participate in the event with celebrity walkers and students from all over the Nashville area. The school implements the *IAQ Tools for Schools* program, and according to the EPA, demonstrates IAQ best practices.

## Ivy Academy, Soddy-Daisy, TN

*Taking alternative transportation to new heights…and hoofs*

Ivy Academy is an environmental charter school that sits at the mouth of the North Chickamauga Creek Gorge near Chattanooga, bordering almost 40,000 acres of land protected by the State of Tennessee. These public lands are not just a pretty backdrop. They are an important part of the academic experience for the school's grade 9-12 students—more than 65 percent of whom qualify for free or reduced price lunch.

Ivy Academy places a strong emphasis on outdoor learning. Students spend a whopping 30-50 percent of the school day outside, with academic classes commonly held outside. The school has a required daily "activity period" used for gardening, landscaping, and other outdoor activities. Ivy Academy is one of 490 schools partnering with the *USFS and Smithsonian Institution's Global Tree Banding Project* in a worldwide effort to monitor how trees respond to climate. For this project, Ivy Academy students are tracking local tree growth, and providing updates to the Project. Students also partner with the Tennessee Valley Authority (TVA) to monitor water quality in a nearby creek, collecting data and comparing these figures to numbers collected over 50 years by the TVA. This partnership educates students about watershed ecology, and careers in the sustainability fields. Additional partnerships have allowed students to work with *Park Rangers* to monitor the spread of woolly adelgid in the local forest. Students have started a website to raise money to buy beetles to fight the adelgid, and soil drench to protect the trees. In addition to these outdoor learning activities, students have opportunities to participate in hikes and bird watching excursions on the weekends. When teachers hold class outside,

they hold it in shaded areas, to limit UV exposure. Teachers also make sure that students are using sunscreen prior to outdoor activities.

Ivy Academy uses environmental learning as one of four "pillars" for planning instruction. This has helped the school integrate environmental education across the curriculum. For example, Chemistry classes use natural objects as examples of the various forms of matter. English classes have assigned essays on nature, and ask students to identify the species of trees mentioned in "The Legend of Sleepy Hollow." Ivy Academy students are required to take one year of Environmental Science. Environmental Science classes design and build a one gallon solar water heater, and host a "solar day," where students set up the water heater outside, and demonstrate it to teachers. The school awards a special distinction, called an "Ivy Letter," to graduating seniors who participate in activities including an environmental clean-up project and a kayaking trip in a barrier island off the coast of Georgia.

Ivy Academy students are also required to participate in at least one year of service learning courses which focus partly on environmental projects. For one project, students are cleaning up local trails. Service learning courses also investigate the school's energy usage, and conduct surveys of home usage. Every year, all teachers participate in professional development for environmental education, including such programs as *Project Learning Tree*, Project Wet, *Project WILD*, and Leave No Trace. One of the school's teachers receives grant money annually to take colleagues to Sapelo Island, Ga., where they conduct studies on marine life, including the sea turtle.

Ivy Academy students are required to take a wellness class. The school has a "fruit and veggie share box" where students can donate unwanted foods to classmates. In addition, all students go on daily hikes on the trails that run along the North Chickamauga Creek. Every quarter, students participate in a daylong 8-10 mile hike into remote sections of the Gorge. In addition, students maintain an on-campus garden, and participate in a daily gardening class, where they take part in soil preparation, seed germination, planting, weeding, watering, organic pest control, and sustainable harvesting. The school has partnered with the University of Tennessee at Chattanooga to allow students to participate in the Chattanooga Takedown Wrestling Club.

Ivy Academy uses the *EPA's ENERGY STAR Portfolio Manager* to track energy and water usage. The school purchases green-E certified wind energy, which accounts for 50 percent of annual electricity consumption. Ivy Academy's action plan calls for a 17 percent annual increase in renewable energy purchased. Between December 2011 and December 2102, the school reduced water consumption by 23 percent, mainly through the installation of rain barrels on campus, and water usage awareness. Ivy Academy has reduced stormwater runoff by using rain barrels to

catch roof water, and installing a permeable surface rather than pavement for parking. The school uses portable trailers as classrooms, but is planning to construct a permanent building to *LEED* standards. Ivy Academy has a shortened school week, with four extended days rather than five days. This shortened school week has allowed the school to cut electricity costs by 15 percent, and transportation costs by 20 percent. To reduce transportation costs further, Ivy Academy has rearranged bus stops, reducing the number of buses from three to two. The school has a no idling policy, and an Alternative Transportation Day, when students and teachers walk, bike, run, and kayak to school. On one of these days, a student even came to school on a horse. The school has a student-run composting program.

## *Vermont*

### St. Albans City School, St. Albans, VT

> "Yes, we are greener, healthier, and more comfortable, but the biggest accomplishment is not in reducing the

*What difference did you make?*

St. Albans City School has learned the value of hands-on sustainability projects: not only as a teaching method but also as a tool to tackle real-world problems. St. Albans has become one of Vermont's most energy efficient schools with the help of around 750 pre-K-8$^{th}$ grade students—60 percent of whom qualify for free or reduced price lunch.

St. Albans second and third-graders launched a school-wide campaign to reduce paper use and save pencils. Middle school students conducted a science project that demonstrated the value of a waterless cooling condenser—and convinced school officials to buy one. Students have researched bio-diesel, and then worked with a private contractor to reduce the number of school buses and improve route efficiency. Students have worked on the school's photovoltaic prototype which produces energy from solar power. The student-run Energy Committee meets on a regular basis with the nonprofit *Energy Efficiency Vermont*, exploring strategies to reduce energy use. In addition, students helped start a program that sends 100 percent of the school's compostable food stuffs to a local farmer. All students participate in regular green-up days to clean and beautify school and city grounds. St. Albans' sustainability projects have had an impact in the larger community, and even the world. For instance, seventh and eighth graders worked audited all street lights in the city, and recommended efficiency measures that were subsequently undertaken by the St. Albans City Council. In addition, students have worked with non-profits and IBM engineers to develop an eco-friendly machine to compact school milk cartons.

These student-driven projects are not the only thing that has helped St. Albans improve energy efficiency. St. Albans has also completely retooled its 45 year old school building. It has insulated the windows with thermal shades, re-roofed the building and added insulation, and installed the most up to date heating and cooling system available. The once old-fashioned electrically heated school has become a model of natural gas heating and cooling technology that can be controlled by the building supervisor on a laptop. This provides new opportunities to maximize efficiency: the building supervisor monitors temperatures, airflow, and carbon dioxide levels on a daily, and even hourly, basis. St. Albans purchases electricity from a provider that generates 20 percent of its power from renewable sources. The school also participates in a statewide energy efficiency competition called the *Whole School Energy Challenge*. Over the past two years, St. Albans has retrofitted more than 70 percent of its building with energy efficient lights, and replaced all outdoor lights with LED units. These efforts have helped St. Albans reduce electricity use by 26 percent over a four year period. The school uses *EPA's ENERGY STAR Portfolio Manager*, currently rating at 89, and is pursuing the EPA's *ENERGY STAR certification*.

St. Albans has enrolled in the Vermont Department of Health's *Envision Program*. This program requires schools to use environmentally preferable cleaning products, and adopt a school health management plan. An on-site garden and local farms provide fresh vegetables to the school lunch program through a robust Farm to School initiative. St. Albans participates in *Fuel Up to Play 60*, offers afterschool healthy cooking classes, and uses grant funding to provide a daily fruit and vegetable snack. The school cafeteria serves modest calorie entrees with low salt content. These efforts have helped St. Albans win Vermont's Healthy Kids Award, and achieve a Bronze medal in the *USDA HealthierUS School Challenge*. According to the EPA, St. Albans demonstrates IAQ best practices. In addition, to promoting exercise, the school has added dance, taekwondo, and outdoor adventure classes to before and after-school programs.

## Reading Elementary School, Reading, VT

*Students design covered bridges and let their goats roam*

Reading Community School is a resilient elementary school in a small community. The school recently reopened with only 30 students in kindergarten through 6th grade. Last fall, Tropical Storm Irene swept through the village of Reading's main street, crashing against the school, and delaying the start of the school year. Later, the school had to overcome an even bigger challenge: an effort by a small coalition of taxpayers to close the school permanently. A resilient group of supporters forged

ahead under new district leadership to demonstrate the school's worth. The school has survived, and even expanded, enrolling more than 65 students for next school year. Sixty percent of Reading's students are eligible for free or reduced price lunch.

Reading is a small school doing big things. It has adopted the innovative *Education for Sustainability (EFS)* program, which includes lessons on the environment, economics, and equity. Reading has also developed creative hands-on projects. For instance, Reading students researched and designed a covered bridge which allows the school and community to access a woodland area across a stream near the school. Access to this woodland area gives the school approximately eight total acres of outdoor space used to teach STEM-based skills including observation, inquiry, data collection, and analysis. In addition, while working on the bridge, the school discovered poison ivy along the stream. Fifth and sixth grade students researched strategies to eliminate the poison ivy. They decided that the most health and environment protecting pest-eradicator was … goats. They presented the idea to the school board, which dispatched a herd of boar goats that ate the poison ivy in three months, and made friends with the students in the process. Students are also helping to build a walking path.

Reading's 5th and 6th grade teacher coordinates a week long environmental science unit at the Marsh-Billings Rockefeller *National Historic Park*. The unit focuses on the concept of scale—from the micro to the cosmic. Reading has a partnership with nearby Spring Brook Farm for City Kids, a model for sustainable agriculture. This gives students real-world agricultural experience, and allows them to connect with inner-city students hosted on the farm. Students also receive agricultural experience through work on the school's garden beds. With the help of community and parent volunteers, students till the earth, plant seeds, and weed gardens to grow food used by the school's award-winning food staff. Students compost the waste from these meals daily, using them as fertilizer for the community garden. Students have also brainstormed strategies to reduce the school's energy consumption, and raised awareness of energy usage. Reading has developed these practices partly through staff professional development. The school's custodian is green certified, and leads a school-wide recycling program. Teachers and administrators attend a weeklong conference on sustainability, and Reading's food service staff has earned recognition for transitioning to new nutrition standards while increasing use of locally grown food. Reading has also hosted a full day Sustainability Summit professional learning event for educators from Vermont schools.

Reading's health education efforts go beyond district and state standards. More than 75 percent of physical education takes place outdoors. In addition, Reading's *Farm to School* program relies heavily on food produced by students, which provides opportunities to learn about nutrition. Reading also chooses a healthy food of the month, served several times in different forms. Classes have an opportunity to earn

"oatmeal parties," which are similar to banana split parties, but allow students to eat a healthy snack with healthy toppings. From Pre-k through Grade 6 students learn about their bodies, their personal habits, and their daily needs. They understand why Reading uses certain green certified cleaners and not others. They also learn about the positive and negative effects of sunlight exposure. Reading's school nurse collaborates with teachers, to support health education and promote healthy practices in the classroom.

Reading has undertaken a full-building lighting retrofit which includes occupancy sensors and has resulted in significant energy savings. The school uses passive energy for daylighting. It has also started a project to meet the school's electricity needs entirely through solar panels, and even sell some power back to the grid. Reading has used more efficient bus routing to cut the number of school buses to one, reducing fuel consumption by nearly half.

**Shelburne Community School, Shelburne, VT**

*Storytime in the treehouse; cheese-making on the farm*

"Where we really touch the future is with our children inside this healthy environment, where our school mission of developing citizens who learn actively and collaboratively, think creatively and critically

On any given day at Shelburne Community School, there are many opportunities to see a green school in action. Outside the pre-K-8 school are bike lanes, miles of new sidewalk, and 18 class gardens. These are the most visible signs of Shelburne's commitment to sustainability. Yet even more impressive are the signs of Shelburne's commitment found inside the school's classrooms and in the surrounding community. Shelburne is one of Vermont's leaders in sustainability education—a school that uses local farms and a nearby lake and nature reserve to provide regular outdoor field experiences.

Shelburne relies heavily on classroom projects linked to sustainability integrated through the curriculum at every grade level. These topics include recycling and composting, the water cycle, and energy. The school is developing age appropriate units on climate change. The school's environmental science units integrate field experience in a perfect outdoor laboratory: the LaPlatt River Nature Reserve and the shoreline of Lake Champlain, located one mile from Shelburne. Classes take one or two day field trips to nearby Shelburne Farms, where students learn about dairy farming, cheese-making, forestry, maple syrup production, vegetable farming, and animal husbandry. Another farm, New Village Farm, located a half mile from

campus, allows eighth graders to participate in an optional trimester community service internship, supporting the operation of the farm, and serving as educational assistants on field trips with elementary classes.

In the early grades students learn about living and nonliving things, and explore the woodland forest ecosystem surrounding Shelburne, searching for answers to the question, "where is my school?" The kindergarten class uses a treehouse as a reading cubby, and leads the school-wide Arbor Day tree planting celebration. Intermediate classes explore what role man has played in shaping the environment of the Lake Champlain Valley. They have used nearby farms to study the mechanization of agriculture, and compare modern agricultural techniques to those of the 1800s. These grades also use field work to study food chains, and the biotic and abiotic factors of local ecosystems. The school's third grade class has studied the environmental impact of plastic bottles, and helped install a water bottle filling station, which has allowed the school to remove plastic water bottles from the cafeteria lunch selections. Middle school students study how ecosystems change, and learn gardening techniques. Shelburne has a middle school student-run recycling program, which has reduced the school's landfill contribution by over 40 percent in the past four years. The *Four Winds Institute*, a Vermont educational non-profit, trains parent volunteers to teach weekly hands-on environmental science lessons. The school has two teachers who provide ongoing sustainability guidance to colleagues. Teachers also develop sustainability lessons with help from the Shelburne Farms Summer Institute for Education on Sustainability.

Shelburne has reduced electricity usage by 240,000 kWh, or 32 percent, over a five year period. Shelburne has achieved these savings through community education, careful monitoring, and upgrades including interior lighting retrofits, the addition of exterior LED lights, and the installation of a high-efficiency natural gas boiler, which provides all of the school's heating. The school's Air Quality Committee works with the Vermont Department of Health to maintain the school's IAQ. According to the EPA, Shelburne demonstrates IAQ best practices. Shelburne has replaced all carpeting with low-emitting carpet tiles made from nylon, limiting the amount of mold and bacteria commonly in the school flooring. Shelburne only uses cleaning products that are certified as environmentally preferable. Shelburne also has a Table to Farm program which donates over 90 pounds of pure food waste weekly to New Village farm. Volunteers for the *FEED* program visit the school and explain the benefits of the school's food recycling program. Shelburne's flower gardens, maintained by students and parent volunteers, have earned the *National Wildlife Federation's Schoolyard Habitat Certification*. Shelburne has a *Safe Routes to School* program. It offers bike safety classes in collaboration with a nonprofit, and has Walking Wednesdays, encouraging families to walk to school.

Shelburne has been recognized as a *Vermont Fit and Healthy Kids* Gold Award winner. It participates in a *Farm to School* program, which provides local, fresh food. The school's Wellness Action Committee organizes Fitness February, during which students participate in a number of activities including circus yoga, Zumba, and boot camp. An annual May jog-a-thon fundraiser raises money for the school's PTO.

## *Virginia*

### Magna Vista High School, Ridgeway, VA

*Energy conservation saves $250,000*

Magna Vista High School (MVHS) is one of two high schools in rural Henry County, Va. that has experienced difficult economic change with the recent closure of several major employers. Fifty-seven percent of the school's 910 students qualify for free or reduced-price lunch.

MVHS has put in place an innovative energy conservation program which has saved taxpayers almost $250,000 over a three year period. In 2009 the school adopted energy guidelines, partnered with an energy conservation company, and hired an energy manager. The school uses the software program EnergyCAP to maintain accurate records of energy consumption and cost, and has shared these records with the community. From 2009 to 2012, the school reduced energy usage by almost 25 percent, which equates to cost avoidance savings totaling $248,426. These efforts helped MVHS earn the *EPA's ENERGY STAR* certification in 2012, with a score of 86. MVHS also uses EnergyCAP to track greenhouse gas emissions. Since 2009, the school has reduced $CO_2$ emissions by 41 percent. According to the EPA, MVHS demonstrates IAQ best practices.

MVHS has pursued a number of additional strategies to reduce the school's environmental impact, and promote environmental health. It employs daylighting strategies, conserves fresh drinking water, and manages stormwater runoff. It has several hundred iPads, laptops, and other gadgets, which have reduced paper consumption. The school uses laptop carts and iPad carts with time clocks. When teachers return carts to the designated location, the carts are plugged in and all devices charged for a pre-set time period. In addition, the school has made an effort to remove toxic materials, purchase certified green cleaning products, and limit the amount of hazardous waste produced in science classes. MVHS has also converted its athletic fields to warm season Bermuda grass. Research shows that warm season plants require 19.5 gallons of water/per square foot annually, compared to the 30.75 gallons required by Cool Season grasses.

MVHS has also linked environmental conservation to sustainability education. MVHS has nationally recognized horticulture and agriculture programs. Every semester, 20 percent of MVHS students are enrolled in at least one horticulture or agriculture course. The horticulture and agriculture teachers have developed outdoor learning facilities which enable students to practice real-world environmental sustainability skills through projects. For example, the MVHS agriculture and horticulture departments have populated the school's flower and landscaping beds with water-wise perennials and locally adapted plant species, which do not require watering beyond normal rainfall. The MVHS horticulture department has established a garden area that provides a home to fish. The agriculture department has left brush around the livestock area to provide shelter and bedding for turkeys, groundhogs, and deer. MVHS has also partnered with the Dan River Basin Association to grow trout and release them into a local river. MVHS recently started a new program, called Streamside Trees in the Classroom (STIC), that allows students to plant and monitor trees alongside local streams and rivers to provide natural buffering. MVHS has STIC tanks in both the Science and Career and Technical departments. Students also have an opportunity to participate in Piedmont Governor's School for Science and Technology. This program allows them to work on extensive projects which tackle a real-world community issue, and are presented and judged by the community.

> **"As superintendent, I can best state that the overwhelming achievement of our**

Environmental literacy is an important part of the traditional academic curriculum. For example, the Earth Science curriculum emphasizes environmental costs and benefits of renewable and nonrenewable resources, effects of human usage on water quality, economic and public policy issues concerning the Chesapeake Bay, and changes to the atmosphere and climate due to human, biologic, and geologic activity. The biology curriculum includes an entire strand devoted to dynamic equilibria within populations, communities, and ecosystems. It places special emphasis on the effects of natural events and human activities on ecosystems. Several career and technical education courses emphasize environmental sustainability. For example, in Architectural Drawing & Design, students build a model of a garage via CAD and Revit software and incorporate green technology into their design.

MVHS has applied to participate in *USDA's 2013 Healthier Schools Challenge*. It expects to receive the Silver Award level based on student participation and the school's menu. This menu includes produce purchased from a local vendor that procures products locally whenever possible. In addition, to accommodate students with known allergies, MVHS taken measures including serving products with sun

butter as opposed to peanut butter, and occasionally discouraging teachers and students from wearing perfume at school.

## Stony Point Elementary School, Keswick, VA

*Ecology through technology*

Stony Point Elementary School serves 284 students—roughly one-third of whom are economically disadvantaged—on an 11.6 acre site in the Southwest Mountains near the intersection of Route 20 and Route 600 in eastern Albemarle County, Va. The original portion of Stony Point's 40,000 square foot building was built in 1934.

Stony Point has a greenhouse, a nature trail, a student-created Japanese garden, and a cold-weather garden planted by second graders. Students are designing a math garden that will provide hands-on learning opportunities. In addition, students track the weather through Shady Point's weather station. Third graders have created a self-guided iPod tour of the school's nature trail. Fourth graders dissect flowers from the school's garden, and track the growth of their plants by monitoring and measuring the height and weight of various plants. Students have sold flowers grown from the garden for fundraising events. In addition, students use Shady Point's nature trail to create podcasts, and use the Japanese garden for quiet reflection and sketching. These explorations of the environment and natural world are the subject of many Stony Point art projects and writing assignments. For instance, the school's library has hundreds of student-created books on everything from lizards, to identifying trees. In addition, Stony Point teachers have started to use *National Geographic Explorer* magazine to teach reading comprehension through nonfiction coding. Over the years, Stony Point has invested in salon learning, where students at all levels come together, using *Explorer* as an in-common text to explore the natural world.

Shady Point's cafeteria offers tasting days to promote healthy eating habits among students. One of the most popular lunch items is hummus, purchased from nearby Farm at Red Hill, and served on a platter. Hummus is not the only cafeteria item that is locally grown. Shady Point participates in a *Farm to School* program, and buys much of its food from local farms. Stony Point has also integrated nutrition education with outdoor sustainability activities. For instance, second-graders planted a cold-weather garden which includes radishes, beets, and lettuce, and celebrated their work by eating home grown Stony Point salad. The garden also allows students to learn about the various parts of a flower, and how seeds germinate and grow. Many students choose to work in the garden for recess, digging with trowels, watering, and weeding. Students also have opportunities to

participate in club activities including dance, taekwondo, and running. In addition, Stony Point has an Eyes on Nature Club, which engages in outdoor activities including walking, observing, and learning. According to the EPA, Stony Point demonstrates IAQ best practices.

Stony Point has received the *EPA's ENERGY STAR* certification twice, in 2009 and 2011, and currently rates at an 89. From 2009 to 2012, Shady Point reduced energy usage by 17 percent, which equated to utility savings totaling $4,600. In addition, Shady Point has reduced greenhouse gas emissions by 9 percent over a three year period. Shady Point has participated in the *Go Green Virginia Public Schools Challenge*, which rewards schools that take steps to improve energy efficiency, and reduce greenhouse gas emissions. It placed 3rd in 2010, 3rd in 2011, and 2nd in 2012. The school's landscaping consists entirely of native plants that do not require irrigation beyond natural rainfall.

## *Washington*

### Glacier Park Elementary School, Maple Valley, WA

*Young environmental steward-bards star in "Come Back Salmon!"*

Five years ago, Glacier Park Elementary School's principal and head custodian started a school-wide recycling program. Glacier Park formed a Green Team made up of staff and fifth graders, and partnered with local companies which helped compost food waste. The program dramatically reduced Glacier Park's waste—from three weekly garbage pickups to one—and more importantly, it changed the school's culture. It demonstrated the value of sustainability education, and motivated school leaders to explore new ways to reduce Glacier Park's environmental impact.

The school has since re-enveloped its 64,000 square foot building with help from McKinstry Company. It uses many *Green Seal* certified cleaning products, and microfiber mop heads that are laundered on-site. In addition, to reduce stormwater runoff, Glacier Park has partnered with the City of Maple Valley to install a rain garden, and has replaced a section of the sidewalk with permeable concrete. The Tahoma School District is installing programmable thermostats, and replacing damper motors to improve energy efficiency. Catalytic converters are installed on all Glacier Park buses. In addition, Glacier Park uses two water barrels to collect water used to help irrigate the school garden. According to the EPA, Glacier Park demonstrates best practices for IAQ.

Glacier Park provides students with outdoor learning opportunities that help them grow into good stewards of their environment. Students work in Glacier Park's vegetable garden, pick up litter, participate in planning and maintenance of the rain

garden, conduct scientific observations, and are surrounded by examples of efforts by adults and students to sustain the environment. Through these activities, students learn about the environment, and specific topics such as the lifecycles of plants and insects. They also learn that caring for the Earth equates to caring for each other. One example is the food harvested from Glacier Park's vegetable garden. Glacier Park donates the food to the Maple Valley Food Bank. Last year, Glacier Park donated 300 pounds of food. Glacier Park has also adopted nearby King County trail. Glacier Park students visit the trail three times a year to pick up trash and identify maintenance issues to report to the county. Additional off-site field activities include trips to Shadow Lake Bog and an overnight three-day environmental experience in fifth grade.

Students learn about the environment through classwork and curriculum-specific outdoor learning activities. In third and fourth grade, students participate in semester-long integrated units that focus on sustainability. Third graders learn about the challenges of protecting salmon, and visit the Landsburg Diversion Dam on the Cedar River to see how fish ladders work. In fourth grade, students explore sustainability connected to the resources of Washington State. They study forestry, learn about renewable resources, and learn about government legislation to preserve natural resources such as nearby Shadow Lake Bog. Fourth graders also plan a virtual trip to a national park and teach about the importance of sustaining these areas for future generations. Fifth graders participate in a stormwater engineering project. They observe and map stormwater on school grounds, and examine the function of a rain garden. Glacier Park also integrates environmental education with other subjects using activities such as the dramatic production "Come Back Salmon!"

## Sacajawea Elementary School, Vancouver, WA

*Shaping future leaders of watershed congress*

Sacajawea has reduced its environmental impact through waste reduction and energy conservation. It has pursued innovative strategies to link this effort to sustainability education. For instance, Sacajawea is partnering with Clark Public Utilities and the Bonneville Environmental Foundation to install an outdoor classroom and solar panel array. This array installation will reduce the school's overall energy use, and help students to learn about the positive impact of renewable energy. Sacajawea is also installing an energy monitoring kiosk to allow students to track the school's energy generation in real time. This kiosk will build on a past effort which used classroom energy monitors and lessons on energy conservation to reduce energy use by 12 percent. Sacajawea has also partnered

with local organizations to add a native plant garden to school grounds, and implement a successful composting program, aided by student cafeteria monitors who help their classmates recycle and compost every day. In addition, Sacajawea recently has reduced overall water usage by 27 percent, and uses only rainwater for irrigation.

Sacajawea has taken steps to ensure that its school grounds and facilities are healthy and safe. The school's maintenance team actively participates in *EPA* IAQ *Tools for Schools* to improve air quality. The school also has achieved *EPA IPM Star* certification in the past and is working toward recertification. It uses the *EPA Healthy School Environments Assessment Tool*, a software program to help schools manage environmental, safety, and health issues.

Sacajawea provides classroom instruction on making healthy food choices and on the importance of exercise at every grade level. Sacajawea also hosts a biannual mileage club to encourage students to run during daily recess. The school recognizes mileage club runners at a school ceremony, and on a local television station. The school has also worked with the PTA on a *Walking School Bus* that provides 10 percent of the student body with up to one mile of supervised outdoor walking daily.

Sacajawea has an active Green Team made up of 15 percent of the student body. The Green Team hosts school clean-up days, plants native plants in the school garden, and advocates for sustainable practices in the school's classrooms. Green team members have participated in a county audit of Sacajawea's bioswale, and will plant grass and plants on the banks of the swale to reduce the amount of sediment in the swale filter. The Green Team makes graphs tracking the school's energy and water usage over time.

Sacajawea's teachers make environmental education a central part of the academic curriculum. They provide opportunities to read about and research environmental issues, to collect and share data about the health of their local environment, and to use a variety of methods to share their findings with peers and the community. Sacajawea teachers work with community partners to make environmental lessons come to life. Second and fourth graders participate in a stream monitoring program, working with community volunteers to conduct water quality tests and examine macroinvertebrate species. Fourth graders visit a public utility company to learn about power generation. Fifth graders take a field trip to Columbia Springs Environmental Education Center, where they learn about native species, watersheds, and the impact of humans on the natural world. Through outdoor explorations, students study weather, seasons, animal habitats, and local plant species, and frequently report what they have learned on a student created news program. Every year, Sacajawea students attend Watershed Congress, where they

share their explorations of the natural environment with community members and local stakeholders.

## Tahoma Senior High School, Covington, WA

*Outdoor and global academies prepare students for the challenges of the 21st century*

Tahoma Senior High School demonstrates a strong commitment to sustainability—in the classroom and in the management of an 184,500 square foot school building constructed in 1971, where it reduced energy consumption by 33 percent over four years. Tahoma uses solar panels provided by Puget Sound Energy Solar4Schools, and collaborates with McKinstry Company to improve energy monitoring and efficiency. Student leaders have garnered an $80,000 grant to implement stormwater management strategies. Tahoma implements a Waste-Free Wednesday Challenge, recycling and composting efforts. It offers water bottle refilling stations in the hallways.

Tahoma offers an Outdoor Academy that integrates AP Environmental Science with language arts and health and fitness. Activities include building and maintaining trails, planting native plants, and removing invasive species. In addition, students keep an electronic health and fitness portfolio, and engage in weekly personal reflection about their progress toward achieving fitness goals. This program provides students with opportunities to learn about consumption, waste, and their environmental footprint. Seniors research an environmental topic and teach the topic in creative ways to fourth grade students at local elementary schools. Past topics include global warming, deforestation, energy efficiency, and preserving water resources.

In addition, the Global Academy, in which students focus on the interrelationships between sustainability, the environment, and society, facilitates students in working with local government to learn how it is meeting the requirements of the Clean Water Act. Seniors in this program complete a self-selected 20 hour project. Examples include building signed nature trails, catching and testing fish for pollutants, construction of a solar powered generator and teaching sustainability lessons at a pre-school.

Tahoma offers Human Geography, Environmental Biology, and AP Environmental Science. Tahoma's PC Tech students annually refurbish more than 125 computers, keeping hazardous waste out of the landfill, and giving computers to families in need.

Field learning is a key part of Tahoma's approach to sustainability education. Students visit McKinstry Company to learn about the application of sustainability practices in the energy industry, and Safeco Field, to learn how the Seattle Mariners baseball team manages the waste produced by thousands of fans. Additional field experiences include hiking and trail restoration, working on-site with Friends of the Cedar River Watershed, and helping prepare the well-known Watershed Report. Tahoma's student Sustainability Ambassadors host a booth at the Maple Valley Farmers Market, where they inform the community about the school's recycling programs for batteries, Styrofoam, bottle caps, plastic bags, and cell phones.

Tahoma students and staff worked with community partners, including Home Depot, to build a 900 square foot garden and an 800 square foot greenhouse. The garden is used as an outdoor learning space that allows students to harvest crops to share with staff and donate to a local food bank. Through activities in the garden, students learn about sustainability, composting, crop rotations, and organic gardening practices.

## The Evergreen School, Shoreline, WA

*Citizen scientists conduct research in national parks*

Blanketing the campus of the Evergreen School are forested areas, stream beds, native plant gardens, and a wetland complete with a nature trail, intermittent stream, and outdoor classroom. These natural features make the campus a perfect setting for the K-8 Evergreen School, one of Washington State's 2012 Green Leader Schools, recognized for demonstrating a strong commitment to sustainability education.

Evergreen recently installed a 9.66 kW photovoltaic system, purchased through a grant from the Bonneville Environmental Foundation. The school has also added energy efficient lighting and a digitally controlled HVAC system, which have reduced energy usage. Evergreen participates annually in an energy conservation competition called the *Green School Alliance Green Cup Challenge*, which involves measuring and reducing electricity use and greenhouse gas emissions. The school has achieved a score of 90 on *EPA's ENERGY STAR Portfolio Manager*. In addition, Evergreen has reduced storm runoff with two biofiltration swales and two stormwater detention ponds. Through a partnership with the community transit system, Evergreen provides bus service to students. It also has an incentives program to encourage staff and families to use alternative transportation. Evergreen is a member of the King County Green Schools, Washington Green Schools, and the international *Eco-Schools USA* programs. Each program provides resources,

support, and technical assistance. Evergreen has a school-wide waste management program which has contributed to the school's 90 percent recycling rate. Other waste reduction activities include switching to an electronic school communications and registration system, eliminating disposable plastic utensils and bottled water, and holding freecycle events.

Experiential learning is a key part of Evergreen's approach to sustainability education. Evergreen's school wetland provides opportunities to learn about native plant communities, wildlife habitats, and hydraulic cycles. In addition, students help restore the school's wetland, and participate in the *Salmon in the Schools* program, raising coho salmon to improve the health of the school stream. Students take field trips to nature centers, wildlife parks, old growth forests, a salmon hatchery, and a working organic farm. Students have participated in a citizen science project, in conjunction with formal research conducted by scientists with the *National Park Service* and the University of Washington. Students have conducted a biodiversity audit using a program designed by *Eco-Schools USA*. The school has a Sustainability Coordinator who helps teachers develop sustainability lessons, and connects classes to sustainability activities in the larger community.

According to the EPA, Evergreen demonstrates best practices for good IAQ. Half of Evergreen's physical education classes are conducted outside each week. The school participates in a *Farm to School* program, and obtains over 90 percent of its food from local sources, including Full Circle Farms, a local organic produce delivery service. To promote nutrition, Evergreen uses educational materials provided by USDA and the *Fuel Up to Play 60* program.

## Kent School District, WA

*An enduring commitment to health and safety compliance*

Located in Kent, Washington, part of the Seattle metropolitan area, the Kent School District (KSD) is the fourth largest district in Washington State, with over 27,000 students, more than half of them qualifying for free or reduced priced lunch. KSD is the state's most diverse school district, with 138 languages spoken. For the past 15 years, it has made sustainability a priority. It has adopted sustainable design standards, reduced energy use and costs, improved health and wellness, and strengthened environmental education.

Fifteen years ago, KSD introduced school design plans to minimize the district's carbon footprint. The construction of Millennium Elementary School incorporated a number of sustainable design features. These included a rooftop solar panel

system, a rain water capture system, a nature garden with a wetland habitat, and an energy efficient automated HVAC system using ground source heat and cooling. Millennium has become the "district standard." It has influenced the construction or renovation of other schools including Kentwood High School, Panther Lake Elementary, and Park Orchard Elementary.

The district has continued to build on these early efforts. In 2008 it re-focused on energy reduction. It added energy management systems to 14 school HVAC systems. It partnered with *Energy Education Incorporated*, establishing a district-wide energy conservation program requiring all schools to use the *EPA's ENERGY STAR Portfolio Manager*, conduct routine building audits, and hold conservation awareness training with staff. These efforts helped reduce electricity use by seven percent, and natural gas use by five percent in a single school year.

To reduce water use, the school implements the "Going Gold" program, limiting irrigation and sprinkler use to play fields. It has also installed aerators on all sink faucets, and motion sensors on new faucets. This resulted in a 65 percent reduction in irrigation water use and a 32 percent reduction in domestic water use over four years.

In addition, 90 percent of the district's schools participate in *King County's Green Schools Program*. The program has helped the district reduce the volume of garbage disposed by more than 50 percent, and increase recycling by more than 50 percent over how long. The district oversees a computer recycling program, called "Bridging the Gap," which donates working computers to local families, and keeps them out of the waste stream. The district partners with the company Ecolights to recycle fluorescent light tubes safely. Most of the district's elementary schools have started *walking school buses*, where crossing guards meet students at the pick-up time, and escort them to school.

KSD has had an IAQ management program for nine years. The EPA recognized the program with a *2004 IAQ Tools for Schools Excellence Award*. The district has consistently worked to monitor and remediate environmental health and safety compliance issues. As part of their professional development, teachers are offered environmental health workshops, such as "Hazards on the Home Front."

The district recently partnered with the Washington State Department of Agriculture to develop a *Farm to School* program, funded with a grant from the *CDC Communities Putting Prevention to Work* program. The program has allowed the district to build new relationships with Washington State growers and vendors. As a result, KSD expects to purchase about 25 percent of its fruit and vegetables this year from growers in Washington State and the Northwest.

KSD teaches environmental topics across all elementary school grade levels. It uses *Full Option Science System* kits to integrate environmental education with problem-solving and communication lessons. Elementary schools partner with the City of Kent Parks Department to assist with tree planting. Since 2000, students have planted over 24,000 native trees and shrubs. Each child gets to plant, and take home, a bare root native tree shrub in a 1- or 2- gallon pot. High school environmental science courses emphasize career development and experiential learning. They regularly feature guest speakers, projects, labs, and computer simulations. For instance, in the environmental science program at Kent Meridian High School, students spend an entire quarter focusing on sustainability, design two *National Wildlife Foundation Schoolyard Wildlife Habitats*, plant an edible garden, participate in a habitat restoration, and learn about green careers.

## *West Virginia*

### Hometown Elementary School, Red House, WV

*Small town, big sustainability requirements*

Hometown Elementary School is a small school in Putnam County, 30 miles from Charleston, the capital of West Virginia. The school has the highest percentage of at-risk and disadvantaged students in the county, and many students live with single parents or grandparents. Yet Hometown has earned recognition as a National Distinguished Title I school and a West Virginia School of Excellence, a place where students receive an outstanding education.

This education includes a strong emphasis on sustainability, health, and environmental science. Hometown even has a sustainability literacy requirement: Students must complete several hands-on projects, and compete in the Putnam County Recycling program, a countywide contest to reduce, reuse, and recycle materials. Hometown students have won the contest several times. Students also spend an afternoon with parents and community members weeding, planting, watering, and learning about gardening techniques.

All Hometown students celebrate Earth Week every year culminating in Earth Day activities including planting flowers, shrubs, and trees. Hometown classes observe insects, frogs, and turtles. Hometown's robotics program participants designed and assembled a fuel cell solar-powered small scale model car. Students visited a local Toyota manufacturing plant, where they demonstrated their car to scientists and engineers. The field trip also exposed students to STEM careers as an energy

consultant, production manager, design engineer, scientist, and communication specialist.

Hometown teachers have received professional development through a number of state and national organizations. These include the West Virginia Department of Education, the *Mountain Institute*, *NASA IV & V*, and *Project WET*. During the summer months, upper grade level teachers have participated in the West Virginia Department of Education's Science Kit training focusing on project-based learning in the physical sciences, botany, and microbiology. Teachers also receive training in water management and conservation through the West Virginia Department of Natural Resources.

Hometown makes health and nutrition a priority. The school participates in the *Healthy Hearts* program, the *Hoops for Heart* program, West Virginia University's Be Well nutrition program, *Let's Move! West Virginia*, and the West Virginia *Cardiac Kids* program, which screens and treats students for risk of heart disease. The school tracks student health using *Fitnessgram* assessments. Hometown has an on-site food garden, and participates in a *Farm to School* program, purchasing environmentally preferable food from Gritts Farms in Eleanor, West Virginia. The school is planning to build a greenhouse that will grow healthy food for students. In addition, Hometown participates in the USDA's *HealthierUS School Challenge*, and the EPA's *Sunwise Program*, which educates students about sun safety.

Hometown has had an Energy Avoidance program in place for five years. The program has received county recognition for reducing energy consumption and saving money. Hometown monitors energy consumption with help from energy management companies and saved 10 percent of their normal costs from September 2011 through June 2012. The school helps to keep water utility costs down by collecting rainwater for irrigation. Hometown implements a *Safe Routes to School* program, which encourages students to walk or bike to school using a fenced-off area separated from the main road. Hometown shares two school buses with another school, which has reduced energy usage, and cut transportation costs.

## Petersburg Elementary School, Petersburg, WV

*Garlic mustard stands no chance against these environmentally literate students*

Petersburg Elementary School (PES) serves 644 pre-K-6$^{th}$ grade students — 55 percent of whom receive free or reduced price lunch — in Grant County, an area on the western end of the Eastern Panhandle of West Virginia. The area's natural resources are the engine of Grant County's economy, which relies heavily on

farming, coal mining, and timber production. These natural resources are an asset to Petersburg Elementary, a school that is committed to educating a new generation of stewards that understands how the environment supports their way of life.

PES has integrated environmental education through hands-on citizen science projects. Pre-K, kindergarten, and first-grade students participate in the J*ourney North Monarch Migration* project, observing Monarch butterflies in the classroom and tracking butterfly migrations. Kindergarten students complete a unit of study on trees. They describe trees in the schoolyard, and explore seasonal change through reading and writing projects. Second graders observe insects at different stages of the life cycle. Fifth graders participate in *Save Our Streams* water monitoring program, and installing a rain garden that will eliminate excess standing water, and provide a habitat to birds. Sixth graders create classroom terrariums and aquarium ecosystems used to conduct science projects. For one project, students identify aquarium ecosystems as "stable" or "disturbed," and determine whether the causes of a disturbed ecosystem are natural or man-made.

Students have helped write a plan to plant trees on school grounds. With the help of a local nonprofit, kindergarten and first-grade students are making this plan a reality. Students also visit public lands, and collaborate with the city to write letters and proclamations for Non-Native Invasive Species Awareness Week. Another hands-on activity is the *Great Garlic Mustard Challenge*, where students identify non-native invasive species, and document removal efforts in a local forest. The project has allowed students to map garlic mustard infestations using GPS technology, and write a garlic mustard cookbook. PES has also partnered with the Monongahela National Forest to develop plays that portray invasive plant species, and help students understand how adaptations help these species survive in different environments.

Petersburg relies heavily on robust professional development for sustainability. Teachers participate in West Virginia's Science with Inquiry Modules and Problem-based Learning Experiences (SIMPLE) program, which helps them develop cross-curricular science lessons linked to skills including writing, math and data collection. Teachers have received training through organizations such as the West Virginia Department of Natural Resources, the *Mountain Institute*, *NASA Independent Verification and Validation*, the West Virginia Science Teachers Association, the *West Virginia Environmental Education Association*, and *Project WET*.

PES students have access to nontraditional recreation areas including an outdoor climbing wall, kickball and wiffleball fields, and a walking path on a dike surrounding the school. The school participated in a Guinness Book of World Records event to break the record for the most simultaneous jumping jacks. PES uses an Xbox 360 Kinect to increase physical activity on rainy or cold days. The school's health clinic serves students and families every day through a grant from a local hospital. The

school also participates in *Jump Rope for the Heart*, *Let's Move West Virginia!*, and *Cardiac Kids*, a state initiative to screen and treat students who are at risk of heart disease. Students in third through fifth grade participate in an extension program through West Virginia University that brings a nutrition outreach coordinator to the school to provide hands-on nutrition lessons and healthy snack recipes. In addition, PES participates in a *Farm to School* program, which provides fresh food from local farms.

PES is making an effort to reduce energy consumption. It has retrofitted lighting and replaced windows, which have contributed to a reduction in energy costs. It is launching an energy conservation plan tied to the academic curriculum, and is starting to use the *EPA's ENERGY STAR Portfolio Manager* to track energy consumption.

## Marshall County Schools, WV

*Healthier schools at lower cost (over five million saved) — who can argue with that?*

Marshall County Schools is made up of 13 schools scattered across 312 miles of the Ohio River Valley. The district enrolls 4,728 students, 40 percent of whom qualify for free or reduced price lunch. Marshall County Schools has earned recognition as the second most energy efficient school district in West Virginia, based on a study conducted by the nonprofit Energy Efficient West Virginia.

Marshall County Schools uses green building principles in the construction and renovation of school buildings. One of the district's buildings became West Virginia's first *LEED* certified school in 2009. Another building is applying to become the state's third *LEED* certified school. These buildings account for about one-fourth of the combined square footage of the district's buildings. Between December 1999 and September 2011, according to the district's E-Cap calculations, Marshall County Schools reduced greenhouse gas emissions by a total of 30 percent and 111,433 MT of carbon-- an amount equivalent to the carbon emissions of 7,733 automobiles. This improved efficiency equated to savings of $5,100,000. The district is transitioning to tracking its consumption in the *EPA's ENERGY STAR Portfolio Manager*, which will help it achieve even greater savings. It has also developed on-site solar demonstration projects. One project, undertaken by Cameron Middle/High School, is using solar panels to power greenhouses as part of the school's Agricultural Education program.

Marshall County Schools reduced domestic water use substantially between August 2010 and August 2011. The district has explored using gray water and stormwater

for irrigation and planted natural plant species and perennial plants to reduce irrigation costs. The district's newest buildings gather stormwater, which is added to watersheds at Wheeling and Grave Creek. Marshall County Schools will have access to this recycled water.

The district's schools encourage recycling through PTO organizations, student clubs, and entrepreneurship programs. One school, Hilltop Elementary, has a nationally recognized plastics recycling program, and donates food scraps to local chicken and pig farmers. A group of students won a national award for a business plan that would facilitate profit sharing among schools, solid waste companies, and recycling centers. This achievement has motivated the district to encourage social entrepreneurship programs linked to sustainability. Between 60 and 80 percent of the district's cleaning products meet green cleaning standards. The district's entire school bus fleet uses biofuel technologies. In addition, some of the district's schools give preferential parking to alternative energy vehicles and energy efficient vehicles.

The district received an anonymous $54,000 grant to develop learning sustainability materials integrated across the curriculum. The learning kits teach environmental science and sustainability literacy, with a special emphasis on buildings as a teaching tool, and educate students about careers related to sustainable development. In addition, working with *Sustainable Learning Systems*, the district started a sustainability professional learning community, made up of teachers who meet periodically at each other's schools to audit, plan, and implement sustainability education strategies.

The district has worked with instructors to offer Environmental Science as an elective. It is also planning to offer AP Environmental Science class beginning in the 2013-2014 school year. The district encourages schools to offer walking and hiking programs, and use outdoor classrooms. Career and technical classes are helping design and build an outdoor classroom on a 1850s farmstead near John Marshall High School. In addition, Marshall County's schools participated in the *Green Apple Day of Service*, which ties environmental stewardship to community service. For this event, students worked on a dozen projects including school-wide recycling and clean-up programs, a water efficiency audit by Career and Technical Education students, and a countywide "Energy-Off" weekend to audit and measure energy savings for the entire district.

The district's schools participate in a pilot *Farm to Schools* program, which provides fresh, local food. Some schools have on-site food gardens. For a demonstration project, the district provides staff with food from the food gardens, and offers cooking and gardening classes which prepare food grown by Agricultural Education students. Schools participate in ***Let's Move West Virginia!***, and use *Fitnessgram* and *HEAP*

assessments to track student fitness. In addition, according to the EPA, Marshall County Schools demonstrates IAQ best practices.

## *Wisconsin*

### Jefferson Elementary-Fox River Academy, Appleton, WI

*Integrated sustainability in school wetlands, forest, stream, pond and gardens*

Jefferson Fox River Academy (JFRA) is a public charter school that runs a wetland restoration project on a 36-acre site. This is one of many outdoor learning opportunities afforded to JFRA's K-8 students, more than 40 percent of whom are economically disadvantaged. Students have access to five school gardens and a five-acre wooded site adjacent to the school. The gardens are designed to teach students about different topics such as the life cycle and the interdependency of plants and butterflies. In addition, JFRA is working to register a school forest with the Wisconsin Department of Natural Resources.

Another regular outdoor activity is a citizen science project using Schildt Pond—the site of a previous restoration effort in which JFRA students planted more than 3,000 native plants along the shoreline. Students monitor the stream in September, October, April, and May, collecting data and classifying invertebrates. They learn responsible fishing practices, observe wildlife, and study the pond's hydrology.

The school has integrated sustainability topics to the academic curriculum. These include energy, transportation, recycling, wildlife, forestry, and water conservation. The school uses much of Wisconsin's *K-12 Energy Education Program (KEEP)* curriculum, which teaches energy topics across all grade levels. JFRA has also adopted *KEEP* field experiences such as field trips to a nuclear power plant, and a *KEEP* activity in which students conduct an audit of energy usage in their school building. In addition, JFRA has started a service learning project that will allow students to work with the City of Appleton to attain Bird City USA designation.

JFRA formed a Green Team that engages all students and staff to create a healthy, sustainable learning space. One of the Green Team's projects is to work with the YMCA After Care program to educate students about simple energy conservation measures such as turning off light switches, using natural light from windows, and unplugging appliances during school breaks. In addition, JFRA has held a number of special events including Leopold Weekend Observance; Earth Day celebrations with Paper Discovery Center, Habitat Restore, and Harmony Cafe; and Environmental Education Week observance.

JFRA's Green Teaching Building, which is owned by the city of Appleton, houses fifth- and sixth-grade classrooms. The JFRA community retrofitted the building with green features including technologies for lighting, heating, and water conservation. The building recently installed demonstration solar panels, allowing students to calculate and monitor energy use. In 2010 JFRA received *EPA's ENERGY STAR* certification with a score of 96. The school has installed energy efficient T-8 bulbs and occupancy sensors.

JFRA maintains multiple composting bins, including vermicomposting which allow students to compost snack and lunch waste, and learn about the flow of energy and nutrients. The school composts yard wastes, and uses composted material to enrich the soil for their community garden.

JFRA promotes student and faculty health. It is a *Wisconsin Green and Healthy School* and a member of the *Wisconsin Green Schools Network*, which encourages schools to implement a healthy environment. The school has a comprehensive IAQ program and takes measures to prevent exposure to asthma triggers. It also provides students with fresh fruits and vegetables and whole grain food. JFRA has adopted several fitness programs including intramural sports, *Fuel Up to Play 60*, Movin' and Munchin', Walk to Win, and Healthy Kids. It has used Positive Behavior Intervention System (PBIS) rewards such as basketball, dance, and open gym. JFRA also provides bike racks and awards prizes to students who participate in Ride Your Bike or *Walk to School Day*.

## Racine Montessori School, Racine, WI

*Waste-free every day!*

Racine Montessori is an urban K-8 private school with a healthy commitment and pride in continuing its efforts to maintain a green school and campus. Racine Montessori's commitment to energy efficiency extends into daily practice. Not only has the school installed solar panels, efficient light bulbs, programmable thermostats, and an HVAC system that can be controlled remotely, but students and faculty also change their habits in order to conserve. Teachers move classes outdoors when the weather permits, lights are turned off in rooms not being used, the dishwashers are run only when full, computer monitors are switched off after class, and refrigerator coils are regularly cleaned. Large trees near the school cool the building in the summer and break the wind on the north and west sides of campus. Racine Montessori has reduced water consumption by installing rain gardens, rain barrels, and motion sensor faucets.

The school is proud to house a nature center, peace garden, compost site, fruit trees, and greenhouse, all of which serve as outdoor learning spaces for students. The school has installed bird houses and feeders to attract native species and the campus consists of native prairie grasses that allow students to collect and replant seeds to enlarge the existing prairie.

Recycling bins are clearly labeled and placed next to all trash cans throughout the school and cafeteria food waste is composted, with each child walking his or her waste out to the bin. Racine began with Waste Free Wednesdays but now implements waste free days every day. The cafeteria uses reusable trays, containers, metal silverware, and bottles. The school also purchases recycled paper, paper towels, and tissue and saves paper by emailing the school newsletter.

In order to promote healthy living, Racine encourages students to bring healthy lunches, provides 60 minutes of outdoor time each day, does not allow vending machines, and employs a physical education instructor who is also a licensed nutritionist. Organics and food pyramids are taught as part of the curriculum and the school has cooks in the classroom, student gardens, and nutrition education at all levels. The school gardens supply fresh food to the school cafeteria and the school participates in a *Farm to School* program.

As a recognized *Green & Healthy School* by the State of Wisconsin Department of Natural Resources, Racine provides a well-rounded education that instills love and respect for the environment. Students participate in field trips to a local farms, power plants, wind farms, and volunteer for Habitat for Humanity. Students spend a week at a nature reserve and participate in Earth Day activities. Racine partners with Carthage College to teach students hydroponics and sponsors a Girl Scout troop that focuses on the environment.

## Summit Environmental School, La Crosse, WI

*Partnering with local professionals to make sustainability and science career connections*

Summit Environmental School (Summit) is an urban public school that serves students in grades K-5, more than 50 percent of whom are disadvantaged. Summit has transformed itself with a focus on a redesigned building practice, staff, and curriculum with environmental education integration. In addition, Summit is a member of the *Wisconsin Green Schools Network*, the school's principal received the Wisconsin Association for Environmental Education Administrator of the Year

award, and a staff member is a member of the Wisconsin Association for Environmental Education.

Summit's transition to a green school has included the adoption of new practices and significant facility upgrades. The school replaced old steam boilers with new high efficiency hot water boilers, updated the HVAC system, installed a heat recovery chiller, fitted faucets with timers, adopted the use of rain barrels, and switched to energy efficient lighting in many locations. Summit has also adopted new policies, such as routinely testing water sources, annually auditing facility irrigation systems, removing small refrigerators from classrooms, and identifying additional energy and water saving strategies. These efforts helped Summit reduce energy consumption by 44 percent in one year and allowed the school to receive the EPA *ENERGY STAR* certification in 2009. The school also now boasts a 66 percent recycling rate.

By fundraising some $18,000, Summit has improved its school grounds in order to provide enhanced outdoor learning. Students are able to access and utilize the school's outdoor classroom (built with recycled and natural materials), habitat garden, food garden, wooded area behind the school, local community park, and adjacent flood plain backwaters area of the Mississippi River for learning and study. The school gardens also supply fresh food for the cafeteria, cooking and gardening classes, and the community.

Health and fitness are also important to the students and teachers at Summit. 20 staff members utilize the school gymnasium for a weekly fitness class, a salad bar and fresh fruits and vegetables are offered in the school cafeteria through *Farm to School*, and 10-20 percent of all students bike or walk to school each day. Summit also holds a "walk and roll" several times a year in order to encourage walking to school through the *Safe Routes to School* program.

Summit's teachers receive professional development from the District Energy Coordinator and are certified in *Project Wet*, *Project Learning Tree*, and *Project Wild*. Teachers also utilize the school's landscape features, including floodplains and forests, as a part of regular curriculum and outdoor activities. Each grade level is also partnered with an environmental agency in the community that offers students visits to their workspaces and shares with classrooms their expertise. In addition, Nutrition interns from Viterbo University also visit classrooms to discuss healthy eating and first-grade students partner with a local television station to learn about weather and environmental patterns. Students are playing a role through the Environmental Education club. The club meets every Monday where students collectively identify energy saving practices, present findings to classrooms, draft articles for the school newsletter, and write school recommendations. Club activities

include cleaning up the school forest, building Aldo Leopold benches, and conducting research on environmental topics.

## Westlawn Elementary School, Cedarburg, WI

*A green and healthy school … that's not afraid to get out the chainsaws!*

Westlawn Elementary School (Westlawn) is a small suburban K-5 public school with a strong commitment to the students and community it serves. Westlawn's total energy and water consumption has been reduced by facility upgrades such as installing 85 percent efficient boilers, occupancy light sensors, water barrels, and energy efficient lighting. As a participating *Wisconsin Green & Healthy School*, students conduct audits and collect data such as temperatures in classrooms, number/types of light bulbs and windows throughout the school, appliances used in classrooms, and evaluate the school's heating and cooling costs. From the audit, students then submit their energy saving recommendations to the school. Westlawn has a robust recycling program and includes recycling bins in every classroom.

Westlawn's school grounds have been recognized locally through the Mayor's Beautification Award. The school has a habitat garden, amphitheater-style learning space, and an adjacent wooded area for outdoor learning and exploration. Students are active in protecting the grounds by cleaning up trash and removing invasive plant species which result in a healthier ecosystem slowing runoff and erosion. Students, in collaboration with Riveredge Nature Center and a neighboring church, have planted over 500 native tree species in the Westlawn Woods and constructed birdhouses that attract a wide variety of species. Notably, the school's Dad's Club has been instrumental in clearing the grounds of invasive species, arriving with chainsaws in hand to beautify the school's grounds.

Westlawn actively employs practices to ensure healthy air quality in order to reduce asthma triggers and eliminate mold, dust, and pet dander. The IAQ management program is consistent with *EPA's IAQ Tools for Schools* and the *National Asthma Education and Prevention Program's (NAEPP) Asthma Friendly Schools* guidelines and it follows *Green Seal* custodial practices.

In the cafeteria, students are offered a salad bar, fresh fruits and vegetables, and whole grain foods with restricted access to foods and beverages of minimal nutritional value for lunch. The school garden supplies fresh food for students in the cafeteria, cooking and gardening classes, and the community. Classrooms have also adopted a one-quarter sweet, three-quarters healthy food policy for parties such as Valentine's Day and Halloween, offering veggies, fruit, popcorn, crackers, and

cheese, rather than all sweet treats at these festivities. Students and faculty have access to wellness programs such as *Ride for Reading*, *Hoops for Heart*, J*ump Rope for Heart*, Winter Wellness Challenge, Zumba, and juvenile walk for diabetes. The school gymnasium is equipped with a rock climbing wall, snow shoes, and Dance Dance Revolution in order to make physical fitness interactive and fun. Westlawn also participates in *Safe Routes to Schools*.

## School District of Fort Atkinson, WI

*What kind of world are we creating?*

Fort Atkinson School District is located in rural Wisconsin and consists of six public schools serving students in grades K-12. All Fort Atkinson schools participate in the green schools effort. For their achievements, Purdy Elementary School was honored in 2012 as a U.S. Department of Education Green Ribbon School. The district's energy efficiency plan includes sustainability, conservation, education, retro-commissioning, and building material upgrades. It is a participant of the *DOE Better Buildings Challenge* and the district facilities manager is an active member of the *Wisconsin Sustainable Schools Coalition*.

As of 2012, all six Fort Atkinson schools had achieved *EPA ENERGY STAR* certification, with scores ranging from 75 to 96. In just the 2011-2012 year, schools across the district reduced their energy use by six percent. The district has implemented a water and energy efficient product purchasing and procurement policy. The energy conservation plan is supported by solar panels on school buildings, solar thermal installation at two schools, wind turbines at one school, and geothermal energy production at four schools. Ongoing projects to upgrade school buildings in order to improve resource efficiency and health include installing motion sensor lighting, LED lights in parking lots, reducing all lamps to 28 watts, and low-flow plumbing fittings with automatic shut on/off.

The district also purchases materials containing post-consumer content, has a medication disposal policy to protect local water quality, implements smart irrigation and native landscaping, and provides outdoor classrooms and learning spaces for students. Fort Atkinson evaluates bus routes for fuel efficiency and runs all buses on liquid petroleum gas. Fort Atkinson also boasts a 66 percent recycling rate thanks to efficient waste disposal and robust recycling program. One school utilized recycled tire chips for playground safety.

Fort Atkinson teachers and students play a role in choosing policy and making recommendations. Each school has a dedicated Green Team consisting of teacher

advisors and approximately ten students. The Green Team at one school was responsible for the entire district converting from disposable plastic lunch utensils to reusable stainless steel which has greatly reduced the amount of waste.

Fort Atkinson district maintains a comprehensive environmental health management program that is consistent with *EPA's IAQ Tools for Schools* and meets the ASHRAE standards for acceptable IAQ and also has a district *IPM* Coordinator. To improve wellness of students and staff, food and beverages containing high sugar and fat contents, such as soda, are not sold in schools. The district purchases environmentally preferable food, has participated in a *Farm to School* program since 2009, offers fruits, vegetables, and whole grains at all schools, and has salad bars and exercise rooms available for middle and high school students. All elementary schools participate in *Walk to School Day* and have walking trails. The high school is working on establishing a fruit orchard. The district also collaborates with Fort Health Care and the local hospital on a wellness and weight management program, allowing the district to participate in a "Slim Down Challenge."

Fort Atkinson integrates environmental and sustainability concepts throughout its curriculum for all ages. In younger grades, students learn about the environment through science and using surrounding natural areas for learning. Older students learn about sustainability through projects such as building a high mileage car for gasoline and electricity, participating in the state *Electrathon* competition, growing and selling plants, and AP Environmental Science courses, in which last year every student enrolled received a three or higher. Schools participate in the *Keep America Beautiful Recycle Bowl* and use *Wisconsin's K-12 Energy Education Program* to provide energy education in grades 3-8. Green Architecture and Engineering courses have also been approved as future courses. Throughout the district you can find natural areas with ponds, walking and biking trails, fruit trees, wild plant and animal life (including a duck habitat), wooded areas, and outdoor classrooms, all of which are used for environmental learning and enrichment.

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