

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 NASA/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 than 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 7th- and 8th-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 *Wecycle*.

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, zoonotic 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



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 cases,

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

100



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

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-8th grade students—60 percent of whom qualify for free or reduced price lunch.

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

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

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.

“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

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 CO₂ 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 green initiatives has

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.

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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-6th 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 *Journey 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*, *Jump 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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