

U.S. DEPARTMENT OF EDUCATION

# GreenRibbonSchools



## Highlights From the 2020 Honorees



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## Introduction

### *Origins of the U.S. Department of Education Green Ribbon School Program*

In 2011, key leaders from the Campaign for Environmental Literacy, the Center for Green Schools at the U.S. Green Building Council, the National Wildlife Federation, and the Earth Day Network advised some 80 national and state-based nonprofit organizations to request that the U.S. Department of Education (ED) honor schools for their sustainable facilities, health practices, and effective environmental education. The award that evolved from this petition, U.S. Department of Education Green Ribbon Schools (ED-GRS),<sup>1</sup> has had a significant effect on the green school movement and allowed ED an unprecedented platform to address school facilities, health, and the environment.

These leaders ultimately assisted ED in developing a consensus definition of a green school, featuring what came to be known as the Three Pillars of the award:

**Pillar One:** reducing environmental impact, such as waste, water, energy, greenhouse gases, and transportation, encompassing the areas of school facilities, grounds, and operations;

**Pillar Two:** improving health and wellness by promoting a healthy physical environment (including aspects such as air quality, contaminant control, moisture control, acoustics, daylighting, pest management, and thermal comfort) and student and staff wellness practices (such as healthy school food and outdoor physical activity); and

**Pillar Three:** offering effective environmental and sustainability education, including civic learning, green careers, and STEM (science, technology, engineering, and math) connections.

### *How the ED-Green Ribbon Schools Recognition Award Operates*

Going beyond the award requested by stakeholders, ED-GRS has become the federal communications and outreach tool to focus on specific areas that ED had

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<sup>1</sup> ED's award is called "U.S. Department of Education Green Ribbon Schools" and has "District Sustainability Award" and "Postsecondary Sustainability Award" categories. "Green Ribbon Schools" without the "U.S. Department of Education" is not ED's award, but instead is a separate program overseen by another organization.

addressed infrequently until its advent. The award has allowed the agency to use its outreach tools to address matters of school facilities, health, and environment by highlighting innovative practices and sharing useful, free resources in these areas, despite limited authority to run grant programs in these realms.

Annually, state education officials voluntarily participate by nominating their top schools, districts, and postsecondary institutions based on their achievement in ED's Three Pillars. Although ED provides some suggestions to state educational agencies to help them document nominees' work in the Three Pillars, ultimately, states have flexibility in their selection and nomination, so long as they document progress for each nominee in all of the Three Pillars. ED then uses the award to communicate honorees' promising practices and the helpful resources they successfully employ to the nation's schools.

### *Growth of the Initiative's Communications and Engagement Functions*

Over time, ED has added several components to the initial school award, including recognition of school districts and postsecondary institutions, as well as a state educational agency official's award. The program's outreach also has grown, along with its engagement functions, with a resource website, [www.greenstrides.org](http://www.greenstrides.org), and a Green Strides tour spotlighting clusters of honorees around an annual theme. Green Strides, the outreach and engagement arm of the award, includes a website, a newsletter, and social media to get the word out to schools about the Three Pillars, providing information about free resources, programs, grants, and webinars.

### *U.S. Department of Education Green Ribbon Schools by the Numbers*

With the 2020 cohort, some 459 schools, 87 districts, and 49 postsecondary institutions have received an ED-GRS award (see Table 1). In this case, larger numbers do not necessarily indicate broader influence. ED-GRS was never intended to certify thousands of schools. Each year, state educational agencies are invited to nominate up to five early-learning through 12th-grade school or district candidates and one postsecondary institution. These examples allow ED to highlight many innovative practices throughout the country. Institutions — whether school, district, or postsecondary — are eligible to receive this award only once, and award recipients always must state their designation with the year in which they were honored. Once ED has highlighted an institution's practices, it is useful to move on to highlighting other, diverse examples. Schools nominated from districts that already have won the award should demonstrate achievements above and beyond those previously honored in the district application.

*Table 1. Number of U.S. Department of Education Green Ribbon School honorees by year and type\**

<b>Year</b>	<b>Schools</b>	<b>Districts*</b>	<b>Postsecondary*</b>	<b>Total</b>
<b>2012</b>	78	N/A	N/A	78
<b>2013</b>	64	14	N/A	78
<b>2014</b>	48	9	N/A	57
<b>2015</b>	58	9	14	81
<b>2016</b>	47	15	11	73
<b>2017</b>	45	9	9	63
<b>2018</b>	45	6	6	57
<b>2019</b>	35	14	4	53
<b>2020</b>	39	11	5	55
<b>Total</b>	<b>459</b>	<b>87</b>	<b>49</b>	<b>595</b>

\*The District Sustainability Award was added in 2013 and the Postsecondary Award in 2015.

*Number of ED-GRS Participating States*

Despite the exciting efforts ED has highlighted with this recognition award, there is still work to be done to improve school facilities, health, and environmental engagement. Approximately 30 states voluntarily nominate candidates annually for this award (see Table 2). That means that ED does not have a mechanism for highlighting the practices of green schools in the remaining 20 or so states where state educational agencies choose not to nominate.

*Table 2. Number of nominating authorities for U.S. Department of Education Green Ribbon Schools by year\**

<b>Year</b>	<b>Number of Participating Nominating Authorities</b>
2012	30
2013	32
2014	30
2015	30
2016	27
2017	29
2018	26
2019	28
2020	27

\*All states, territories, the District of Columbia, the Department of Defense Education Activity, and the Bureau of Indian Education are invited to nominate.

### *Contributing to the Development of a More Coherent Definition of a Green School*

A key contribution of the award is believed to be that, to some degree and for at least a time, it brought various agencies and organizations together around a common definition of a green school. Rather than one organization using the term “green school” to denote an energy-efficient school, another to refer to institutions offering environmental and sustainability learning, and a third to indicate environmental health or wellness practices, there has been a convergence such that a green or sustainable school must encompass all Three Pillars. There continue to be initiatives that focus squarely on one segment of this work; however, it usually is with the stated understanding that they form part of a broader three-pillar effort.

### *A Spotlight for School Facilities, Health, and Environment Innovations*

In 2011, the term “green school” was a relatively unknown concept across much of the country. Today, there is a growing understanding of what this work entails, at least in small part because of ED’s efforts annually to illustrate this work with the concrete practices of its honorees. ED’s oversight of this award has offered the agency an opportunity to address and engage on such issues as school infrastructure and operational costs; environmental health and school wellness practices; nutritious, local, and student-grown school food; and hands-on, outdoor, project- and place-based, authentic, environmental, civic, and sustainability learning, among other related topics. The award also has allowed ED to highlight unique local, state, and national partnerships and projects where sustainability efforts intersect with equity.

### *A Significant Effect With a Limited Budget and Innovative Collaboration*

Despite the limited availability of funds, the award has facilitated collaborations and connections that have saved resources. For example, both ED-GRS and Green Strides have enabled ED to share the many programs for schools offered by counterparts at the National Oceanic and Atmospheric Administration (NOAA); U.S. Environmental Protection Agency (EPA); U.S. departments of Agriculture, Interior, and Energy; and collaborators across the for-profit and nonprofit private sectors.

In the same way that ED works more effectively across a broader range of federal agencies as a result of the award, many state educational agencies also are collaborating in exceptional ways with state health, environment, and energy agencies to select their nominees to ED. The private sector, both for-profit and nonprofit, also has gotten involved at the federal, state, local, and school levels, working with schools and governments. Through this collaboration, ED’s recognition

award has become a tool to get various parties working better together for the benefit of students across the nation.

### *Green Schools Are Successfully Serving Disadvantaged Populations*

Annually 30–55 percent of ED-GRS honorees have served majority-disadvantaged student populations, as measured by free and reduced price lunch. While this is in part due to award criteria design, which asks states to ensure that at least one of their nominees is disadvantaged, state nominations have exceeded this minimum requirement. With ED-GRS designated schools, districts, and postsecondary institutions providing better education to traditionally underserved students, green school practices may be another tool to advance equal access to a quality education for all students.

### *A Green School Does Not Need to Be Newly Constructed*

To ensure that the award highlights diverse examples of sustainability, the competition assesses candidates based on resources available to them, rather than in comparison to each other. In fact, the award has, over the years, highlighted many older school constructions engaged in low-cost, but highly effective, retrofits and behavioral change. All of these are steps that any school community can undertake, without a new construction that is designed specifically to be resource efficient and environmentally healthy. In this way, the award has helped to educate the public about the broad applicability of green school practices, in both old and new buildings.

### *Creating Incentives for Multiple Pipelines for Sustainability Improvements by All Schools*

Another important consequence of the award has been the refinement of various national and state-specific green school programs that the award has spurred. States have realigned preexisting state green school programs, built new ones, and now recognize runners-up beyond those they nominate to ED, in order to create pathways to the national award, broaden recognition within individual states, and provide incentives for more change.

### *The 2020 Cohort*

This year's selectees were confirmed from a pool of candidates voluntarily nominated and exhaustively reviewed by 27 state education authority implementation teams. While selection processes vary from state to state, members of several state agencies as well as outside experts often comprise selection

committees. At the federal level, we have selected 39 schools, 11 districts, and five postsecondary institutions that demonstrate promising practices to cut costs, improve health, and ensure that students learn through the most hands-on, engaging means possible (see Table 3).

*Table 3. 2020 honorees by type*

Total honorees	55
Early learning through 12th-grade schools	39
Nonpublic schools	11
Charter schools	4
Magnet schools	3
Public schools	28
Districts	11
Institutions of higher education	5
Disadvantaged-serving schools	25

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

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



It is with tremendous pleasure that we present the 2020 U.S. Department of Education Green Ribbon Schools, District Sustainability Awardees, and Postsecondary Sustainability Awardees. These honorees are ensuring that their students learn to live, work, and play with sustainability and health in mind — not as an afterthought, but as an integral part of everything they undertake.

The innovative practices of the 2020 Green Ribbon award winners are described in the remainder of this report. We also suggest that you go to the <http://www.greenstrides.org> webpage to learn more about these innovative practices.

## Director's Award

The Director's Award celebrates an individual's exemplary efforts to administer ED-GRS in their state. Specifically, the ED-GRS Director's Award recognizes a state educational agency official who does the most to advance green schools by running a robust competition process; connecting more schools to resources in all three ED-GRS Pillars; amplifying the stories of honorees; helping schools learn from one another; partnering with a variety of entities to bring more resources and expertise into schools; and exhibiting a dedication to exceptional school facilities, health, and environmental education through activities outside of the administration of ED-GRS.



ED is delighted to have named Elizabeth Schmitz, environmental and sustainability education program supervisor at the Office of the Superintendent of Public Instruction in Washington state, and previously of the Kentucky Environmental Education Council, as the 2020 recipient of the Director's Award. Schmitz hosted the Green Strides Tour in Kentucky in 2014 and in Washington state in 2019. She has spearheaded outreach to underserved school populations to advance education equity and has worked to streamline her state applications. She participated in numerous conferences promoting the award and environmental education, including the North American Association for Environmental Education and the Green Schools Conference and Expo. Finally, she has engaged stakeholders from peer state agencies and the for-profit and nonprofit private sectors in order to share sustainable best practices, select ED-GRS nominees, and celebrate honored institutions.

In sum, Ms. Schmitz has modeled excellence in ED-GRS' implementation for other state education authorities to follow. ED commends Ms. Schmitz for her work to promote environmental stewardship, health, and sustainability and for inspiring more schools to aim high.



## 2020 U.S. Department of Education Green Ribbon Schools

### Alabama

#### **Magnolia Nature School at Camp McDowell; Nauvoo, Alabama**

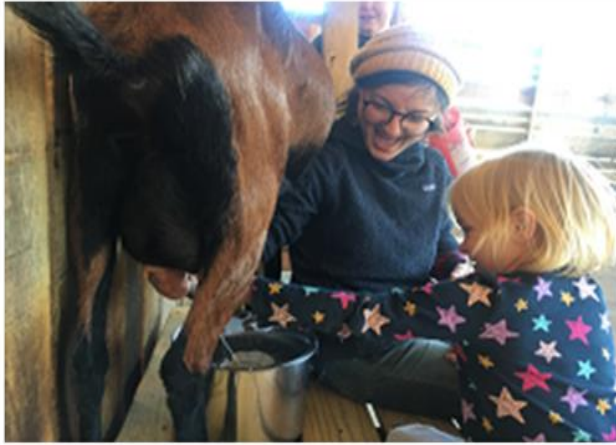
*Growing up wild*

Magnolia Nature School is a nature-based pre-K school housed on the 1,140-acre campus of Camp McDowell in Winston County, Alabama. Camp McDowell is home to Magnolia Nature School, Alabama Folk School, McDowell Environmental Center, and McDowell Farm School. Magnolia is Alabama's first nature preschool and Camp McDowell's youngest summer program. Children ages 3–6 explore the farm, forest, and streams of Camp McDowell. Through hands-on experience and inquiry-based learning, Magnolia is a place where curiosity is welcome and there are never enough answers. Magnolia's goal is to create future stewards of the Earth. The school serves a rural, socioeconomically disadvantaged community and provides a high-quality STEAM-based education that utilizes the natural world as its classroom.

Only in operation for three years, Magnolia has received recognition for its efforts in environmental education. In 2019, Magnolia was awarded the Environmental Education Association of Alabama Best Environmental Education Program award. In 2018, Magnolia was awarded a three-year, \$60,000 grant from The Daniel Foundation of Alabama, whose mission is to strengthen communities within Alabama through the support of effective organizations that are focused on building a healthy and well-educated population living in a vibrant community.

Camp McDowell is making great strides toward energy independence and reducing its carbon footprint. It currently utilizes a geothermal system that helps reduce energy consumption and has three of its busiest buildings, including the Doug Carpenter building in which Magnolia students eat most meals, on this system. Solar arrays provide electricity to five buildings on campus, which saved McDowell \$9,500 in only the first six months of use. The savings from the solar installation are being placed in an energy independent fund, which can only be used to expand and invest in other renewable energy installations at Camp McDowell. The farm is home to solar powered streetlamps as well.

Another exciting addition to McDowell's renewable energy profile is a hydroelectric system called an Archimedes screw, which will soon be installed on an existing dam on the property to allow less dependence on carbon burning systems. During peak water flow, this system will provide more electricity than the entire camp uses. Camp



*Student Betsy and farmer Aubrey Gallegos milk Nix, the goat. Children witness adults making a living by farming, working with wildlife, and other sustainable career choices.*

McDowell will be one of the first facilities in North America to use this technology to produce electricity.

Magnolia takes further steps to increase efficiency by using LED light bulbs; ensuring that lights, air conditioning, and heating units are off when buildings are not being used; and replacing old appliances with ENERGY STAR-rated appliances. The school recently had an energy audit conducted and will be using the analysis to continue to make changes to the campus to further lessen its carbon footprint.

Camp McDowell also makes efforts to promote water quality and conservation. Settling ponds have been constructed on the campus to limit the damaging runoff from nearby lands that were once coal mined. Where once the nearby streams and creeks could not support life, now they are full of healthy invertebrates. Rain catchment systems are placed around buildings and structures on the McDowell farm and will soon be placed around the school building for students to use to water nearby gardens. Students often hike to nearby streams and creeks and are taught about water quality as they collect and study macroinvertebrates. Students also carry reusable water bottles throughout the day and are taught the value of protecting and preserving water sources. Camp McDowell also has a land management plan and a staff member whose primary job is land management and growing foods that can go on the over 120,000 plates that are served annually to guests at McDowell.

Magnolia students participate in Camp McDowell's recycling program for plastics, paper, cardboard, aluminum, and steel. Camp McDowell received a \$30,000 grant in 2015 from the United Thank Offering of the Episcopal Church to build a recycling center, which has a plastics bailer and cardboard press and bailer. They also gather and sell aluminum and steel.

With the McDowell Farm School literally just outside the door of the Magnolia building, the students participate in farm chores. Any leftover fruit, vegetables, or bread from their meals or snacks are fed to the pigs or chickens at the farm,

composted in the farm compost bins, or picked up by farmers to give to their farm animals. The Farm School also has a black soldier fly composting area that can even accept meat scraps. Camp McDowell hosts and feeds large numbers of campers and visitors throughout the year. Kitchen staff also participate in recycling and reduced waste production by composting, feeding appropriate scraps to animals on the McDowell farm, or by giving scraps to local farmers to give to their farm animals.

Several of the children who attend Magnolia, or who have in the past, live on the Camp McDowell campus. Their families often walk or bike to school. Those that do not are encouraged to carpool.

Magnolia, as a part of Camp McDowell, takes great efforts to ensure student and environmental health and safety. Chemical pesticides are not routinely used indoors, and children learn to identify and remove pests in the garden by hand, without the use of pesticides. Sunscreen is applied to all children in the morning and shade cloths are installed in the yard area to limit student's exposure to the sun.

Proper risk management is utilized by teachers in the outdoor classroom. Site assessments are conducted before children play in any space. Teachers recognize hazards and identify them for the children. If an area is deemed unsafe, then the group will not stay there. The extent of risk is understood by the children as risky play is only valuable when children can easily identify it. For example, when applicable, children are warned that rocks are slippery and are instructed to avoid them or walk slowly on them. Teachers have safety protocols to use when children are participating in potentially risky outdoor activities, such as climbing trees, which is an excellent gross motor activity for physical development. It also boosts confidence and self-esteem, helps develop focus and concentration, promotes problem-solving skills, and is a rich sensory experience. Protocols are being established for other risky activities, such as trail hiking, using tools, stream wading, and for being outside in extreme temperatures. Staff members participate in mandatory safeguard training to keep staff and children safe. A camp nurse is available at all times.

Magnolia cares for all aspects of a child's physical and mental health and believes in the documented benefits of outdoor play and learning. Through a partnership with Community Action Partnership of North America (Head Start), Magnolia is able to provide free health screenings, including mental health, vision, dental, and speech, for all children. Children participate in activities that encourage physical development, such as climbing, yoga, hiking, balancing, using balls, and playing active games. Magnolia has three full-time teaching staff who are provided with Blue Cross health benefits.

Magnolia provides breakfast, lunch, and snacks, including fresh fruits and vegetables, for the students daily and follows USDA nutritional guidelines provided by the Community Action Partnership of North Alabama. Sometimes this food is harvested by the children themselves on the farm or from the schoolyard's raised bed gardens. Although the farm is not certified organic, all farming at McDowell is done organically and supplemental organic produce is purchased when appropriate to the budget.

Magnolia Nature school students spend at least 80 percent of the school day outside exploring the farm, streams, and trails. The children feed pigs, milk goats, and check chicken coops. They participate in planting projects and eat food from the raised bed garden that they help maintain. Students water, weed, and harvest lettuce, carrots, and other produce to eat at lunch or as a snack. Children are fed meat from farm animals they helped raise. The garden and the farm are used as a teaching tool to help children understand where their food comes from and the hard work and time it takes to cultivate it.

Teachers and students discuss food chains and plant life cycles. If a deer has eaten carrots from the garden, they may discuss what will happen next. Questions such as "Will anything eat the deer?" "What do the plants need to survive and grow?" or "What would happen to the plant if we did not pick it?" are asked to reinforce learning. Teachers and students also participate in activities and discussions which help them understand ways in which humans use the environment and the need to conserve it.

All teaching staff are given the opportunity to go through biannual professional learning along with McDowell Environmental Center and Farm Staff. These classes include "Down to Earth," which is about coal, what produced it, why it is harvested, and what can be done to conserve energy and reduce dependence on fossil fuels. Another class is called "Sustainability," a class on human environmental impacts and how to become a more sustainable community. McDowell is a member of the Environmental Education Association of Alabama, which is an affiliate of the North American Association for Environmental Education and the Association of Nature Center Administrators. Magnolia Nature school is a member of the Natural Start Alliance (NSA). The school director and a teacher were invited to present at the 2019 NSA national conference about Magnolia's partnership with Head Start. This unique partnership funds quality environmental and outdoor education for a population that could not traditionally afford it.

During the first few weeks of each school year, daily adventures are usually limited to closer to the small school building, but, even then, students have a natural play area with sandbox and shade trees, as well as a short trail through the woods

directly behind the school that they are allowed to travel and explore alone. It is about 75–100 feet long and weaves through some trees and bushes that make the children feel independent, although their teachers can see their little heads bobbing through the trees.

As the children’s endurance builds, the adventures take on more distance. The preschoolers often hike around the 4-acre lake or to some of the amazing sandstone canyons and natural shelters on camp property. They learn about water quality as they wade into a small stream and find tiny macroinvertebrates there. Magnolia Nature School partners with the McDowell Environmental Center to learn about local wildlife and wildlife rehabilitation. The McDowell Environmental Center staff bring in reptiles, amphibians, and birds of prey for students to learn about.

The incorporation of arts and music adds the “A” to STEAM. The coordinator of the Alabama Folk School teaches ukulele lessons and plays for the children’s dance parties. They have pottery classes and create nature art both in the wild and in the classroom. They make recycled paper.

The Magnolia Curriculum is an inquiry-based model, which focuses on exploring nature and encouraging creativity. Children use natural objects to imagine, examine, wonder, create, and count. Teaching objectives align with the Alabama developmental standards for preschool children. Curriculum is shaped to meet these standards through activities in nature. The students are constantly using engineering practices in their building of bridges, sandcastles, forts, and other structures out of items found in nature. Students directly interact with adults with green careers, including farmers, members of Alabama Water Watch, and Environmental Educators at McDowell Environmental Center.

Magnolia Nature School is dedicated to developing civic knowledge and skills in its students. Children are given classroom jobs, such as sweeper, door opener, and tidying up the books. Magnolia children pick up litter from around Camp McDowell property to keep the woods and community clean. As they do this, there are lots of discussions about why they are doing it. The students also help clear and maintain trails for the camp community. Monthly planned family activities provide a sense of community. The parents are invited to bring other children and extended family members.

Magnolia participated in the first annual Camp McDowell Fall Festival, an event for the community that brought in around 700 local people, many who had never been to the camp before. Magnolia collects and donates clothes to children who are in need. The school keeps clothes to lend to children during the day, keeping them comfortable and protected from the weather.

Magnolia students are growing up connected to the natural world and surrounded by adults who are walking the walk each day through environmental career choices.

## **California**

### **Creston Elementary School; Creston, California**

*Hands-on, student-centered, and engaged*

Creston Elementary's team of highly qualified professionals is committed to providing students with meaningful opportunities to learn about their world. Creating change that can be seen daily is at the forefront of Creston's approach and dedication to environmental stewardship. From the introduction of rain barrels and native plants to creating sustainable facilities, Creston has created a learning environment that exceeds traditional classroom learning.

Creston Elementary created its own Energy Conservation Plan to manage and reduce energy consumption. The plan follows the practices of the Atascadero Unified School District's (AUSD) Resource Management Guide and serves as a guiding document for monitoring current energy conservation practices. Energy use at Creston is controlled by a programmable energy management system. Components of California's Blueprint for Environmental Literacy are also used as guiding principles for energy reduction. Staff use these documents to guide and support Creston's goal of providing continual and long-term environmental education — grounded in sustainability — to every one of their students.

In 2019, Creston upgraded school buildings by adding high-efficiency technologies and energy-reducing components, including low emissivity roofing, increased insulation, Low-E glass, and updating lighting fixtures to LED. The school installed Marmoleum on uncarpeted areas and low-flow toilet valves and sink fixtures in restrooms.

The Creston campus utilizes natural areas to enhance learning and their sustainability efforts. The campus has very few paved areas, less than 20 percent. Approximately 65 percent of the remaining surfaces support a green model, including native plants, gardens, grass, trees for shade, and a path for exercise. In 2019, Creston made another environmental stride forward by reducing the heat island effect by re-asphalting all remaining paved areas with materials containing heat sink colors.

The site's landscaping is water efficient and uses native trees, plants, and shrubs. When two large trees had to be removed due to potential hazards, Creston staff

asked AUSD's grounds department to chip the tree into mulch to use around the site. Rainwater is harvested with five rain barrels around the school that students use to water the garden and planter beds.

Creston students undertake three waste audits each year, using waste collected over a two-day period. The waste is then sorted and weighed to determine Creston's waste production. The school has removed waste bins from classrooms; only recycling bins are available for student and staff use in the classrooms. Staff work closely with the district's Maintenance, Operations, and Transportation hub to further Creston's recycling and waste management practices.

Efforts to educate students, families, and staff about the importance of finding ways to reduce fuel consumption and air pollution are an essential component of reaching Creston's goals. To that end, Creston installed three carpool parking signs and no-idling signs. The school added a section to the student handbook on the rules, expectations, and reason for carpooling and no-idling at school. Some school bus routes have been modified to be driven by smaller vans that are more fuel-efficient and decrease air pollution.

Over the past three years, Creston partnered with the San Luis Obispo Council of Government to provide students with Bike Rodeo events. Bike Rodeos give students the opportunity to improve their bike-riding skills, as well as enhance their understanding of bike and pedestrian safety. In 2019, Creston was a recipient of a Safe Routes to School scholarship that enabled the school to provide students with incentives on days they walked or rode to school.

The school only carries waste in proper storage devices, immediately tends to any leaks and cracks, installs barriers and traps, and manages the resources that draw pests to the site. Only after other options are proven ineffective may staff consider pesticides. Staff limits the time spent outdoors when the air quality is poor due to excessive smog or smoke. Chemicals are used only for cleaning purposes, not for educational purposes, and only by trained staff. All art supplies are nontoxic.

Creston staff ensure that healthy food choices, movement, and P.E. play a vital role in their program. Staff regularly exceed the required hours for P.E., and movement breaks are provided throughout the day. Staff also demonstrate the reason behind policies, including showing students the amount of sugar that would be consumed if they celebrated every holiday, special activity, or birthday with sugary treats.

All Creston students participate in the SunWise program to learn sun-safe behaviors, and the school has implemented resources from the Alliance for a Healthier Generation, including "Reimagine Recess" and "15 Minutes to Healthier Habits."

Throughout the day, students participate in brain breaks in the classroom using Go Noodle, Jack Hartman, and other types of developmentally appropriate exercise videos.

Creston implements the “Caring School Community” curriculum, a nationally recognized, evidence-based curriculum that provides students with tools to create healthy relationships with peers and develop essential social skills. The program improves students’ emotional connectedness to school by utilizing a “buddies” program, home-school connection, and a schoolwide component that teaches students respect and ownership for their actions and behavior.

Staff and students engage in conversations about how sustainability affects the culture of learning and thinking at Creston. As a result, many curriculum resources have transitioned from paper-pencil to online. Students and staff use the school’s natural landscape, which is abundant in natural life, animals, and trees, for its ecological resources to implement California’s Next Generation Science Standards. Students receive direct instruction around grade-level specific standards in science, mathematics, and English language arts aligned to outdoor education. The school garden, rain collection barrels, and a collection of new programs and resources provide the Creston community with the opportunity to create and sustain the quality of their environment.

Creston’s partnership with Cuesta College’s Sustainability Resource Center has enlisted resources from the local community college to offer students instruction using hands-on kits from the National Energy Education Development (NEED) Project. Classroom teachers supplement their science instruction using the NEED kits free of charge to provide instruction in renewable energy through the lens of hands-on projects that incorporate math, engineering, reading, and writing.

The school began planting fruit-bearing trees throughout the site in 2019, with students providing input for their location. The main garden is home to a chicken coop, above-ground food beds, two greenhouses, two compost bins, and an outdoor classroom. Creston’s smaller garden — aptly named “Kindergarden”— is intended for use by Creston’s Transitional Kindergarten and kindergarten students.

Beginning in the 2018–19 school year, a student-led, low-cost farmers market was created. There, students sell eggs, vegetables, and fruits. Each month, there is an opportunity for TK–fifth-grade students to volunteer at the school during Gardens



Work Day, where they volunteer their time by raking, shoveling, and cleaning up their school garden.

A Music Garden is comprised of three donated pianos, two donated organs, and a plethora of musical instruments for students to explore. A Sensory Garden is comprised of a sensory path; sound tube; plants for touching, smelling, and eating; and a giant standing xylophone. It also features recycled materials and provides students with a calm place for learning and meditating. Creston's garden projects provide opportunities for students to foster an interest in the process of being conscientious about their environment and the world around them.

Creston uses the Living Schoolyard Activity Guide from Green Schoolyards America to inform instruction, with each grade level using lessons twice weekly throughout the month of May, California's Living Schoolyard Month. These activities cover a range of topics, from social-emotional well-being to watershed stewardship. This year, students will incorporate a science fair and display projects accomplished throughout the school year.



*Creston students make "plant tacos." Creston utilizes approximately 90 percent of its school grounds as learning areas for students, including many gardens.*

Students visit a Monarch butterfly park in Pismo Beach to learn about changing landscapes. Fourth- and fifth-grade students participate in "The Great AGventure" field trip, where they interact at six agriculturally themed stations: farm animals, seeds and plants, fertilizer, meteorology, harvesting and farm machinery, and environmental stewardship. Creston also utilizes Rancho El Chorro Outdoor Schools for a Traveling Naturalist program and an outdoor school. Rancho El Chorro's instructional program is student-centered, hands-on, and engaged all of Creston's TK–fifth-grade students with nature.

## **Edison Elementary School; Alameda, California**

*Reverberating sustainability impact across district and city*

Edison Elementary School has been leading its community and district in sustainability efforts since 2000, when the school initiated a parent-led garden program. These efforts became the seeds for the Alameda School District's (AUSD) Go Green movement, launched in 2004. Environmental themes have not only shaped the culture of the school, but successfully persuaded both the district and the City of Alameda to update policies.

Edison earned ENERGY STAR certification in 2019 with a score of 77. Between the years of 2009 and 2018, Edison documented a 41 percent decrease in greenhouse gas emissions. Staff and student conservation education, Edison's participation with AUSD's energy conservation solution provider Cenergistic, and major campus modernization projects completed from 2018–19 all contributed to this reduction. Edison's electrical energy, purchased from Alameda Municipal Power, is zero-carbon as of Jan. 1, 2020. The school also participates in the utility company's "Power Up for Learning" educational program. In partnership with the Alameda Education Foundation, this innovative initiative has brought to life a STEM Robotics Club for upper grades in Alameda elementary schools.

Edison has reduced its water use by 36 percent since 2009 by installing high-efficiency faucets, diverting water through bioswales, and practicing systematic monitoring. Edison also uses drip irrigation with a three-station timer to reduce watering in the vegetable garden as well as the native and low-water habitats. Adding to water conservation efforts, the Garden Science teacher shows fifth-grade students how to retain water and improve garden conditions through sheet mulch, utilizing organic mulch, cardboard, and burlap bags.

Random surveys of the school's bike cage show that three times as many riders on Walk & Roll (W&R), days and five times as many on Bike to School Days. In addition, several parents lead Edison Bike Buses or Walking School Buses. Parents who must drive during W&R events are encouraged to park a minimum of three blocks away and walk the remainder. Many Edison teachers take advantage of public transportation via AC Transit, Bay Area Rapid Transit, and SF/Alameda ferries for field trips and daily commuting.

The school began monitoring waste service levels in 2013 and demonstrates an 80 percent diversion rate, which is among the highest in both the district and county. After several years of audits, students have found that classrooms now produce so little trash they must weigh it in grams rather than pounds. Three-stream collection

rates are reported to the AUSD Board of Education annually during Earth Month to increase awareness. At the beginning of each year, Edison teaches — and re-teaches — every student how to properly sort compost, recycling, and landfill waste, and how to rescue uneaten food during lunch. Proper sorting includes student-conducted waste audits that were institutionalized and made teacher-led over time through partnership with StopWaste.org. By invitation, Edison presented to StopWaste.org stakeholders about Go Green efforts and their results. Training students, staff, and custodians annually through multiple touchpoints helped to increase Edison’s waste diversion rate by 30 percent over the last 10 years.

Edison does not use pesticides. Students working in the gardens use horticultural soap, along with biodegradable soap, oil, and compost tea. On occasion, neem oil is used on the fruit trees. Edison equips classrooms with acoustical ceiling tiles to reduce airborne noise and to improve sound quality. In 2018, Edison’s new Low-E solar film windows were installed to improve comfort and increase daylight. Overhangs were also built on classrooms with southern exposure to help with heat and glare remediation while allowing in more natural light. All classrooms can open windows for ventilation. A districtwide green cleaning program has, over time, reduced dozens of cleaning chemicals down to only a few Green Seal-certified alternatives. Edison has no parking lot, a well-publicized no-idling policy, and an ongoing tree-planting campaign to improve outdoor air quality around the school.

In 2008, Edison was the first AUSD school to implement a fresh salad bar and influenced other schools to follow. Due to this initial effort, salad bars are now available at all schools in Alameda. Edison has a Food Share Bin where uneaten healthy foods from Food Services can be shared to both reduce food waste and feed others. Food Share Bin items are saved for students in need of snacks, and uneaten foods are donated to local groups.

Edison has an edible garden containing fruit trees, herbs, and vegetables, with a designated space for instruction. Edison students participate in weeding and digging in the teaching garden during their scheduled garden classes, at recess, or during weekend garden workdays. In 2018, an additional outdoor classroom was created for the school. Excess produce from Edison’s school garden is given to staff and Edison families. On occasion, when enough is in season, excess produce is also given to Alameda’s Food Shift Kitchen, a local nonprofit catering business that works collaboratively with communities, grocers, and governments to cook and serve food that would otherwise go to waste.

Every student at Edison has the opportunity to try garden-grown vegetables. This starts with the kindergarten lesson, “Five Senses in the Garden,” which encourages students to taste, smell, and touch what they see growing. Students plant, grow,

harvest, and cook the organic vegetables they eat. At the end of the year, students receive a cookbook of recipes that they made, including pesto, stir fry, salad, rosemary potatoes, cheesy chard, fig jam, salad dressing, roasted pumpkin seeds, and salsa.

Telework Schedule for 4/14/2020 from 6:30 - 3:00 MDT In 2014, AUSD received the California School Boards Association (CSBA) Golden Bell Award for a districtwide Green Schools Program. Edison was one of two model schools during CSBA's

validation process, and several Edison parents and teachers were named as part of this award for their districtwide contributions. Student letter campaigns from 2015 to 2019 to City of Alameda officials and local businesses have been instrumental in moving the needle on numerous local issues, including the implementation of three-stream recycling bins in downtown areas, the creation of the City of Alameda's "Straws on Request" policy, and a compostable foodware ordinance for restaurants.



*Students participate in morning check-in for Walk & Roll to School Day. Since 2018, Edison's biking and scooting trends have tripled.*

Edison's list of assemblies, classroom programs, and community activities weigh increasingly toward environmental and sustainable impact focus areas, including visits from Ms. Resilience, Mr. EcoHero (mreco.org), Imperfect Produce, Alameda County's Waterways Puppeteer, KIDS for the BAY, Lawrence Berkeley Labs, Safe Routes to Schools Bike and Pedestrian Rodeo, and many more. Edison students host a table at the annual City Earth Day events through Community Action for Sustainable Alameda. Many

of Edison's student field trips focus on environmental education, outdoor programs, and science. This includes visits to Lawrence Berkeley Labs (UC Berkeley), Chabot Space and Science Center, California Academy of Science and Aquarium (San Francisco), the Oakland Zoo, the Ardenwood Historic Farm, and Alameda's very own Crab Cove.

The school's annual Earth Week celebrations — sometimes month-long — exemplify the school's environmental leadership by hosting such events as environmental learning assemblies, slide show presentations, zero-waste lunch photo boards of students, campus tree planting, student morning show Green Tips, earth-related mural paintings, Go Green Family Nights, Golden Sneaker Award Walk & Roll days, and the invention of Edison's famous "Recycle Cart" built by the Dad's Club and used by every family at school to dispose of hard-to-recycle items.

Edison's faculty have embraced the integration of environmental education and sustainability concepts across its curriculum. The school employs several policies regarding this work, including a written definition of environmental literacy, which focuses efforts on three thematic areas: Ocean and Bay Science, Watershed Protection, and Ecology and Biodiversity Awareness. Environmental literacy is being integrated into Edison's science instruction via the Full Option Science System (FOSS) Program, a research-based science curriculum for grades K–8 developed at the Lawrence Hall of Science at the University of California in Berkeley. The FOSS curriculum is used schoolwide and ensures that all students are learning about life science in the context of the Earth's connected ecosystem. Students study animals, plants, environments, and living systems.

Edison is motivated to take its environmental and sustainability stewardship as well as its ability to organize and influence other schools and districts to new innovative levels. In November 2019, five students from Edison's new 2019 "Green Otters" student club attended AUSD's Board of Education meeting during which a student-written "Resolution Calling for Climate Crisis Response" was unanimously passed by board members. This move, in conjunction with the City of Alameda's new 2019 "Climate Action & Resiliency Plan" will only strengthen Edison's position to continue scaling environmental impact and education.

### **Anderson W. Clark Magnet High School; La Crescenta, California**

*Flagship sustainable career and tech*

Clark Magnet High School is located within Glendale Unified School District (GUSD) and opened in 1998 as a science and technology magnet school with a mission to prepare a diverse population of students for college and the highly technical careers of tomorrow. Clark Magnet prides itself on its school-to-career philosophy and a commitment to a rigorous and relevant curriculum. More than 80 percent of the school's students are non-native English speakers and over 50 percent live in poverty. These students achieve through a deliberate and strategic program that features individualized instruction structured around high-engagement strategies with a personalized approach to learning.

Clark Magnet is the flagship school of the Career Technical Education program in GUSD. Through articulation agreements and shared grants, the school has close relationships with Glendale Community College and the local California State Universities, as well as collaborative articulation with the district's feeder middle and elementary schools. Students

from the environmental science research class organized a BioBlitz event for the district and the public at Deukmejian Wilderness Park. Clark Magnet students, middle school students, members of the "Human Impacts on the Environment" class at Glendale College, and interested volunteers from the community used the iNaturalist mobile app to catalog biodiversity in the hillside park just blocks up the street from the campus.



*Clark Magnet students have gained extensive experience from field trips on ocean research vessels, particularly off the coast of Ventura and the nearby Channel Islands.*

Clark Magnet is a leader in teaching environmental science research and Geographic Information Systems (GIS) with the creation of the Environmental and Spatial Technology Program in 2003. The program has evolved to include a number of classes, including Marine Science Research, Environmental GIS, and Geology of Disasters.

Geology of Disasters uses the Federal Emergency Management Agency Hazus software for risk assessment, loss estimation, and loss mitigation as a result of natural disasters. Once Clark Magnet students were trained in the use of this software, the City of Glendale asked students to assist with writing the City's Local Hazard Mitigation Plan.

Clark Magnet implements project-based learning through solving real-world problems with a hands-on, practical approach. This work includes the application of core mathematics and science standards in the projects completed in technology-

infused courses. Many facets of the academic and co-curricular programs require students to explore the development and application of science engineering and technology in achieving a sustainable lifestyle for humanity. In each classroom, it is not uncommon to see students dialoguing about global and environmental issues while collaborating on ideas to develop and utilize innovative tools and systems to make positive change. Students have operated the school's robotic underwater remotely operated vehicle and sonar equipment while taking samples of marine life and photographing marine plant growth on the ocean bottom.

Students at Clark Magnet pursue their passions and interests through a Senior Project. The goal is for young people to demonstrate growth — a learning stretch that takes them beyond their comfort zone. In recent years, a student interested in ecological sustainability and conservation designed their own hydroponics system and had it on display at the school. Another student focused on agriculture and designed a microclimate in their own Plexiglas ecosystem. Yet another student worked with several jellyfish species they had researched and bred.

On-site, students conducted a water survey of the campus, including the placement of water spigots and irrigation systems. An early finding is that the current pop-up sprinklers on the athletic field are not long enough to get past the soil and grass, causing inefficiencies in how water is getting to grass and foliage. Students initiated contact with the GUSD facilities department to work on solutions. In addition, students explored the microclimates on campus to identify areas that could be easily covered with shade structures and other barriers to allow students to continue to enjoy the outdoors yet stay protected from the elements.

Students use Xello, a college and career planning software, in the first few years of high school to explore interest inventories and their potential to influence the world around them. Clark Magnet's service-learning requirement also gives students real-world experience and promotes a sense of connectedness to the surrounding community. Technology permeates the campus, allowing students access via computer labs, workstations, industry-standard software applications, and 924 Chromebooks in 23 carts deployed around the campus. The online Q Student and Parent Portals and Google Suite for each student allow a seamless connection between home and school.

Clark Magnet received ENERGY STAR certification in 2010 with a score of 94 and maintains a score of 91. The school achieved a 42 percent reduction in greenhouse gas emissions since establishing a baseline in 2009. On-site solar arrays installed in 2012 meet approximately 55 percent of the school's energy needs and have saved the district nearly \$500,000 to date. Between 2012 and 2018, Clark Magnet reduced outdoor water use by more than 29 percent. The school sought to further these

reductions by installing Weathermatic Smart-Line Controllers for evapotranspiration watering based on weather data and other site-specific factors.

Approximately 70 percent of Clark Magnet students ride the bus. In 2018, school leaders optimized bus routes to eliminate multiple stops, reduce idling, and maximize capacity to fill seats on each trip. As a magnet school, transportation can be a challenging issue. Still, school leaders were able to reduce stops across the city from 22 to 20 and to reduce the number of buses from 17 to 15, reducing the school's environmental impact as measured by vehicle miles traveled and associated emissions. On an annual "Walk to School Day," a team of Clark Magnet student leaders assists the nearby elementary school by walking with students, parents, and staff volunteers to get kids to school safely and to promote a healthy lifestyle.

To prevent asthma triggers around the school, custodial and facilities crews perform all classroom cleaning and disinfecting before or after school hours to minimize staff and student exposure to chemicals. Whenever possible, cleaning is done with water and microfiber rags to minimize volatile organic compounds (VOCs) introduced into the environment. Cleaning products are selected by the district's purchasing department from a list of clean products compiled by the Operation Manager. All school custodians are trained in chemical management and integrated pest management practices.

Access to clean drinking water at Clark Magnet is supplied by the local municipality, Glendale Water & Power (GWP) and is tested weekly internally in addition to tests performed by external laboratories. GWP sends out water quality reports yearly confirming the water delivered meets all state and federal drinking water regulations but also exceeds all standards and health requirements. The drinking water at Clark Magnet was also tested by the City of Glendale.

Nutrition Services sources approximately 65 percent of its produce from local farmers in Ontario, California. GUSD's produce vendor sends out a monthly Farm to School flyer that highlights particular produce items and the farms where they are grown. Sustainably grown California wheat is milled and baked in Los Angeles.

Bike Club members invest approximately 100 hours outside of school during afternoons and on weekends working out and competing in regional cycling competitions. This club is run entirely by adult volunteers and exists due to the generosity of local businesses. As evidence of their hard work, the girls' team competed in the 2017 National Interscholastic Cycling Association State Finals.



Students in Clark Magnet’s Environmental Club led the establishment of a rose garden and have planted California native plants on campus in the interest of attracting bees and other beneficial insects and for the purpose of growing plants that are drought tolerant. Students conducted an analysis of the microclimate at Clark Magnet and started a “living wall” of plants to reduce the heat island effect. Clark Magnet students celebrate senior year with multiple outdoor activities, including senior sunset and sunrise events and an early September trip to Catalina Island, where students hike, cycle, snorkel, fish, and play in the water along the beach in Avalon.

To reduce waste, Clark Magnet implemented a trade-in program for P.E. clothes and combination locks. Typically, these items were discarded in the trash after students completed their P.E. requirements in 10th grade. Now students turn in their clothes, which are donated to local organizations, repurposed, or recycled, and locks are recoded and reissued, keeping them out of the waste stream. This practice has also saved money, which is reinvested into intramural athletics. Students also led and designed a project to install filtered drinking water fountains as an alternative to wasteful single-use plastic bottles.

## **Woodside Priory School; Portola Valley, California**

*Where new technologies meet Benedictine tradition*

The Woodside Priory School (Priory) is a private and independent college preparatory school serving sixth- through 12th-grade day and boarding students. Priory’s motto, “*Ora et Labora*” (Prayer and Work), connects with its history of the monasteries of the Benedictine Catholic tradition. The school’s mission is centered on the ideals of lifelong learning and stewardship. The concepts of Service and Balance are central to the student experience as demonstrated by a focus on student service-learning. Priory encourages the alignment of education, stewardship, and collaboration; this focus is evident in the school’s community life, program, pedagogy, and campus operations.

The efforts to create a sustainable school began in 2009 with a student-formed Sustainability Club. The student-led club worked with a faculty moderator, leading to the establishment of the Faculty Sustainability Committee in 2010. In 2012, the school appointed the club moderator/committee facilitator to the role of Sustainability Coordinator to collaborate with the school community as well as with representatives from the local utilities. In 2017, the title changed to Sustainability Director to acknowledge the multidimensional aspects of school sustainability, from community life and culture to educational programs and campus operations.

Priory began on-site solar generation in 2007. Today the school generates 30 to 40 percent of its electricity need. Solar panels are arrayed on the roofs of five different buildings along with one ground-mounted array. The most recent implementation of solar photovoltaic generation on campus (2015 and 2017) scaled the size and output of the arrays to building demands to make the spaces energy-neutral or energy-positive.

Collaborative focus and efforts in sustainability have led to many initiatives and achievements. To encourage water conservation, Priory hosted a drought-planning conference for other community stakeholders, completed plumbing fixture retrofits, and installed satellite-controlled drip irrigation in the drought-tolerant campus landscaping.

To reduce waste, the school consistently re-evaluates recycling and waste diversion programs. Priory has a waste diversion rate of 75 percent, and each month diverts an estimated 450 pounds of food waste from landfills. Garden crop waste and kitchen prep waste are collected and diverted from the landfill and used to feed a flock of 50 chickens. Chicken manure, bedding, straw, and other organic waste materials are similarly collected and added to a compost pile within the garden's 800-square-foot student-built composting enclosure. Compost temperatures are monitored and recorded until piles are left to rest. A master composter advises garden staff on composting considerations and best practices. Finished compost is used in the school's garden.

Recent high-performance construction projects include the Benedictine Classrooms (2015; 17,000 square feet), which exceed state green building requirements by 42 percent. This project earned a Sustainable San Mateo Green Building Award for the building's energy efficiency. The school's new STEAM building (2017; 9,400 square feet) exceeds state standards by 49 percent and was awarded an American Institute of Architects of California Design Award and a Savings By Design Award from Pacific Gas & Electric.

The school's focus on sustainability goes beyond the establishment of green buildings. Priory's energy and conservation program involves third-party energy audits, Savings By Design initiatives with the power utility, the development of an energy benchmarking portfolio, subsidized retrofits to building equipment, and participation in the Community Choice Energy Purchase program that allows the school to purchase 100 percent renewable energy.

In 2007, a performing arts theater was constructed on a former parking lot. The theater's living roof reduces the heat island effect. Trees scattered across the 50-acre campus reduce the heat gain on campus roofs and roads. Nearly 30 acres of

the school campus is undeveloped native grassland and mixed oak woodland habitat, and student efforts to improve habitat quality have led to a remarkable resurgence in the diversity of the school's ecological community.

The school has identified principal pest types to be addressed through Integrated Pest Management practices. Plants, insects, and rodents are targeted for prevention, control, and/or eradication. Chemical pest controls are only used as a last resort.

Following the California wildfires of 2018, the school purchased and installed air quality monitoring sensors at two on-campus locations — one indoor and one outdoor. Online reference to these sensors has helped the administration to make decisions about the health implications of keeping school in session — or closing the school — when smoke from wildfires becomes intense and problematic. To prevent asthma triggers, air handlers balance the airflow in all buildings to make rooms pressure-positive to the outside. This means that air flows out of the rooms when the doors are opened, to avoid pulling in dust and other particulates.

Priory's 9,000 square foot Franklin Garden supplies the school kitchen with a daily harvest of fruits and vegetables. Founded in 2013, it has served as a place for community gatherings and educational opportunities. In 2017, the Franklin Garden Pavilion was completed and has raised the profile and appeal of the school's garden and sustainability programs. Recent events attract members from all segments of the school community and have included workshops on canning foods, processing honey, and baking, as well as classes in various food traditions.

Produce from the garden is a daily offering at the salad bar, and the school works with GreenLeaf to purchase local and organic fruits and vegetables for the dining program, which serves lunch daily to all students and other meals to boarding students. Menus are created to support health, consider the ecological impact, and with an awareness of humane animal treatment. Meatless meals are increasingly served to ensure healthy options and reduce the school's environmental footprint. Students are educated about how to make healthy nutritional choices by considering the posted nutritional information.

Balance is the focus of the school's efforts to optimize student health and wellness. In a senior exit survey, students identified anxiety, sleep deprivation, right answer addiction, and cheating as barriers to their success. Specific measures in the form of Structural Reforms, Holistic/Spiritual Reforms, and Pedagogical and Programmatic Reforms for Balance have been initiated as part of a school initiative funded by the Edward E. Ford Foundation. Additionally, the school is a member of Challenge

Success at Stanford University, which has helped the school to establish benchmarks, guidelines, and practices for improving student wellness.

In 2015–16, Priory initiated a codified approach to integrating sustainability themes across disciplines and curricula. The Faculty Sustainability Committee developed Essential Questions and Enduring Understandings for sustainability and stewardship. Priory offers sustainability classes in Ecological Design & Sustainability, AP Environmental Science, Food Production, Discourse of Dining, Plant to Plate, Stewards in Action, and Health and Wellness.

Priory maintains an enduring whole-school sustainability leadership collaboration with the all-girls Daraja Academy in Kenya. The Science Department has partnered with trip outfitters to offer science field trips and summer programs focused on global ecology and sustainability to Australia, Vietnam, Argentina, Costa Rica, Myanmar, and Kenya. The Dean of Students, Campus Minister, and Sustainability Director organize retreats based on campus stewardship and the concept of sustainable communities. Schoolwide assemblies further students' understanding of the social and environmental impacts of biodiversity loss, climate change, and global wealth inequality.



*In 2015, the Eco Design Class at Woodside Priory designed and built a 280-square-foot living wall, visible to all students and staff as they enter the school's dining hall.*

Priory has offered the elective class “Ecological Design and Sustainability” since 2014. This class begins with an introduction to the principles of sustainability and then moves on to become a collaborative project-based class in which the students have designed and built an 800-gallon aquaponics system. In 2015–16, Priory introduced another new elective, “Discourse of Dining.” In this class, approximately one-third of class time is spent in the school garden.

There is an active student-run sustainability club, as well as student sustainability representation in student government. The Sustainability Commissioner role was, in fact, student conceived and originated. The Commissioner oversees the sustainable operations of after-school events — dances, performances, and athletic games. The Sustainability Club was also reborn because of student interest and effort. The club now requires habitat restoration hours as part of the membership and so that members remain committed. The students in the club have identified non-native species on campus and have worked to eradicate them.

Class retreats allow students to focus on environmental problems and sustainability issues at various levels and in various contexts. The sophomore service-learning retreat at Priory is centered on campus service projects. Sixth-graders learn about sustainable agriculture and food sourcing in the school's garden. The senior retreat takes students to an off-site organic farm. Resident students in all levels also complete habitat restoration. Three all-school assemblies in the last two years have focused on opportunities for students to take action regarding biodiversity loss and climate change.

Over the last few years, Priory has emerged as a sustainability leader in the Portola Valley. Priory campus is a common destination for students from other schools to see Priory's garden, student-created aquaponics system, and living wall planter with air-purifying plants. Additionally, Priory hosted a conference for science teachers from the area, and there was a strong interest in visiting both the garden and aquaponics sites.

### **Carmel Unified School District; Carmel, California**

*At this habitat ecoliteracy is cultivated*

Carmel Unified School District (CUSD), which stretches from Big Sur on the Pacific Coast to Cachagua in the Carmel Valley, serves diverse students from across 600 square miles, roughly the size of Rhode Island. CUSD's mission calls out responsibility for the environment as a core belief. This commitment is embodied within the district's organizational structure, facility maintenance practices, programs promoting student health and safety, and connections to the environment in and out of the classroom.

CUSD's Environmental Responsibility Team (ERT) meets regularly to brainstorm ways to reduce their environmental footprint, network, and share accomplishments in environmental literacy and community involvement. The team includes representation from each school, consisting of teachers, site administrators, high school students, and parents. District representatives to the ERT include the

superintendent, the chief academic officer, and the director of maintenance and operations. In 2017, the ERT aligned its goals to the three pillars of U.S. Department of Education Green Ribbon Schools.

The Maintenance, Operations, and Transportation Department monitors water use, indoor temperature, and electricity use, allowing for quick detection and correction of issues. This focus has resulted in a 15 percent reduction in electricity use and a 31 percent reduction in water use districtwide, even as the district added buildings and expanded programs. These efforts helped CUSD to earn the 2019 Association of Monterey Bay Area Governments Energy Watch Champion Award, recognizing the district's work to reduce energy use and related greenhouse gases through the installation of energy efficient equipment.



*Carmel Valley High School's (CVHS) competencies in empirical and quantitative reasoning include and address such environmental projects as owl boxes, water testing, gardening, and restoration projects.*

The district partners with local nonprofit MEarth, to manage The Habitat, a 10-acre parcel adjacent to Carmel Middle School that is dedicated to outdoor learning and environmental literacy. The property features a pond that is home to the threatened California red-legged frog, bird feeders and houses for migrating birds, a bee garden, and a Monarch butterfly garden. In 2012, The Habitat opened the first LEED-certified public school classroom in Monterey County. The 1,600-square-foot flexible classroom is used as a culinary classroom where students from across the district and throughout Monterey County work with MEarth educators on farm-to-table lessons. The classroom is powered by a solar array built from repurposed and recycled materials, and it uses a living roof and captured rainwater to irrigate the many native plants on-site. The Habitat's building collects rain in four 1,500-gallon tanks and uses sprinklers to reduce water use and maximize water absorption.

CUSD implements environmentally preferable purchasing practices, ensuring that 92 percent of paper is Forest Stewardship Council certified and cleaning products are certified as Safer Choice, ECOLOGO, and Green Seal. Furnace filters are replaced quarterly with MERV 8 filters to help remove particles triggering asthma. The gym floor is cleaned with an ionized water-based cleaner to reduce the use of chemicals.

CUSD Board of Education's Wellness Committee provides community-based guidance on the district's comprehensive wellness efforts. The Committee focuses on four areas of wellness: 1) bell schedule adjustments to address issues of adolescent sleep deprivation; 2) stress and anxiety causes and interventions; 3) nutritional needs and improvements; and 4) reduction of the use of illegal substances, including vaping. Schools all around CUSD are implementing these goals.

The elementary schools incorporate instruction in mindfulness, emotional well-being, and anger management using the Second Step social and emotional learning program. The district is piloting a program to address the social and emotional needs of middle school students. First-grade classrooms use the Mind Up curriculum for mindfulness instruction.

CUSD utilizes a consortium of local farms through a woman-owned farm to school business called "Savor the Local." Through this program, CUSD purchases organic strawberries, apples, pears, plums, and seasonal vegetables. Cafeterias provide fresh salad bars. CUSD participates in "California Thursdays," featuring such unprocessed foods from California as walnuts, avocados, vegetables, and dairy foods.

The district's youngest learners approach environmental literacy through STEAM, while making consistent efforts to reduce environmental impact. The Carmelo Child Development Center makes recycled paper and crayons and has a trading post to exchange toys or school supplies in order to reduce consumption. The center limits waste, keeps trash out of the watershed, and practices vermicomposting. Children take field trips to learn about local watersheds and integrate literacy and art with science by reading about sea turtles, looking at and painting pictures of the turtles' habitats and inquiring why they are becoming endangered and what can be done to help.

Environmental integrated teaching and learning are thoroughly interwoven throughout the courses and curriculum. CUSD's curricular approach is aligned with the California Next Generation Science Standards (CA NGSS) and California's Environmental Principles and Concepts (EP&Cs). CUSD's transition to CA NGSS is evidenced by new courses that integrate environmental and sustainability concepts

into core curriculum. All sixth-graders take an Ecoliteracy course and learn about biodiversity, human impacts, and advocacy. All middle school science classes go to The Habitat to study local and migrating birds, native plants, and insects.

All school sites have gardens, and a recent survey revealed that nearly 86 percent of CUSD teachers are making classroom connections to nature or the environment; 60 percent of those teachers do this more than once a month. Elementary schools have designated garden teachers, and middle school students work with MEarth for garden education. Elementary school students have art and a garden-based program integrated into literacy and math. At one school, the kindergarten science program is wholly conducted in the garden, primary students have garden science once a month, and intermediate students have a Garden-to-Table program.

All school sites incorporate composting into their curriculum. Transitional Kindergarten students maintain worm bins and use the compost for gardening or as food for local pigs. Food scraps from lunches are composted in some elementary school gardens, and scraps not fit for the composter are used as chicken feed. Students in the Ecoliteracy class participate in “Friday Farming” each week; with assistance from MEarth staff, students add to, turn, and use compost in the garden. Middle school students pick vegetables from the garden and prepare meals based on the history and culture they are learning at the time in their core, social studies, and world language classes.

CUSD classes integrate the environment into different disciplines and work with the Monterey Bay Outdoor Education Program (MBOE) to connect students to their local environment and increase their understanding of the interconnection between humans and nature. Students are taken to local destinations to study their unique biodiversity and the richness of land-sea connection. Students complete an MBOE journal to develop environmental literacy through math, history, art, poetry, and science.

The Carmel High School (CHS) Environmental Club is the first local Surfrider chapter leading regular waste reduction initiatives. The club partnered with Elkhorn Slough National Research Reserve to raise money to restore native wetlands. Students also partner with the National Oceanic and Atmospheric Administration to screen environmentally themed movies alongside panels featuring local experts in the CHS theater. The club hosts a series called Earth Experts on local television. “This Club Saves Lives” at CHS hosts a “Thirst Gala” each year, raising money to build wells in water-stressed locations. Carmel Valley High School partners with the Big Sur Land Trust as environmental stewards of the Songbird Preserve on the Carmel River. Students remove invasive species, work on native plant restoration, and participate in trail maintenance.



CUSD aims to center environmental literacy in the district's culture by providing a dedicated instructional coach to assist teachers and promote environmental education. Instructional coaches, administrators, and elementary teachers consider and reference California's EP&Cs during curriculum adoption. For the past two years, teachers have attended paid professional learning workshops on the integration of the EP&Cs across the curriculum during the district's Summer Institute.

## Colorado

### **Aspen Prep Academy; Greenwood Village, Colorado**

*Ten acres of wetlands and wonder*

Aspen Academy moved to a 10-acre campus in 2008. Its 80,000-square-foot building and campus were renovated in a manner that maximizes sustainability and offers students innovative learning spaces, including 14 outdoor labs and classrooms and over 50 teaching gardens.

Aspen Academy won the Environmental Leadership Program Bronze Award through the Colorado Department of Public Health and Environment in 2019. The school's annual energy consumption decreased by 45 percent from 2014–15 to the 2017–18 school year due to the installation of LED lights, occupancy sensors, lighting timers, and ENERGY STAR appliances throughout the school campus and parking lots. White roofs, painted between 2011 and 2017, covering 3,260 square meters of the school buildings, have reduced energy use, have reflected 85 percent of the sunlight, and have greatly reduced the total urban heat island effect in the area.

Water consumption was reduced 50 percent since 2011. Artificial turf made from recycled tires was installed in 2012 to cover 1,525 square meters of a field to replace grass requiring irrigation on the playground. The area around the building was graded to improve water drainage and windows were installed in the below-ground middle school classrooms. Automated rain sensors were installed on the irrigation system in 2014 to reduce water usage when there is precipitation. Five water bottle filling stations were installed throughout the school to encourage students to drink filtered water in reusable bottles.

The amount of paper used for printing was reduced by more than 26,500 sheets per school year since 2018 by using electronic documents, including for employee contracts, safety documents, benefits enrollment, and curricular materials. Trex recycled plastic material decking was used to build an outdoor stage and a bridge over the wetlands garden in 2012. Electric hand dryers were installed in all restrooms to reduce the use of paper towels. Low VOC paint and carpet tiles made

from recycled materials are used throughout the school buildings. A coffee maker that brews individual cups of coffee without brewing cups is provided.

Aspen encourages carpooling by students' families. The school community uses the Way to Go app as a way for families to coordinate carpooling. Recent data indicate that 36 percent of families at Aspen carpool. Biking and walking to school are encouraged. There is a no-idling policy in place at the school entrance.

Each student participates in at least one 30- to 45-minute fitness-related class every day. Two mental health professionals and a health and safety manager are on staff and a nurse is on contract. The Aspen Youth Leadership Institute provides a curriculum that addresses the development of emotional and social intelligence as well as community and civic leadership at Aspen. The cafeteria contracts with a local food service that provides locally sourced ingredients. Aspen also offers two extracurricular cooking opportunities: 1) A Journey in Cooking, which focuses on the cultural experience of food preparation and the celebration of sharing food together; and 2) Sticky Fingers, which offers hands-on, real-world cooking classes.

Aspen Academy subscribes to Wellable, an online platform that allows faculty and staff to participate actively in a wellness program that encourages exercise, nutrition, and stress relief. All employees of Aspen have an account with Wellable and are encouraged to use it as often as they can. Staff participate in challenges and classes that include cooking, self-defense, and meditation. In addition, each month staff holds a healthy potluck to which employees share healthy food options.

Fresh air is circulated throughout the buildings using HVAC economizers and classroom windows. Daily maintenance inspections ensure that the campus is free of pests, pollutants, moisture, allergens, and other hazards. Filters are replaced in all HVAC systems on a quarterly basis. Aspen Academy uses Dude Solutions, an operations management software that helps to optimize facility and operations processes.

The National Wildlife Federation recognized Aspen as a Certified Wildlife Habitat. This habitat provides natural sources of food and water for



*The "Toss like a Boss" educational campaign improved the effectiveness of the Aspen Prep Academy recycling program. On average, 400 lbs. of waste is diverted to recycling and compost each month.*

native plants and animals, all without the use of pesticides. These include over 50 teaching gardens, a wetlands garden, and a beehive. Each teaching garden is named for the type of plants it holds (i.e., Sensory Garden, Rose Garden, Colorado Native Garden, etc.) and allows for students to study the specific characteristics of those plants in the ecosystem. In addition to ecological lessons, the wetlands garden provides a quiet place for students to work. The beehive is an essential resource for the fourth- graders in their unit studying the vital importance of bees. Fourteen outdoor classrooms were designed for art, design, theater, and environmental education. The school also features window well reading nooks for the second- and third-grade classrooms to foster a connection with nature.

Environmental and sustainability education is infused throughout the curriculum in all grades. As part of the Full Option Science System (FOSS) curriculum, every unit incorporates journaling in the outdoors. Kindergarteners learn the concept of sharing with their community as they plant, harvest, and produce consumable goods from their “KinderGarden.” Third- graders learn how they can take an active role by participating in various projects focused on reducing, repurposing, and recycling. They created a “waste station” in every classroom consisting of a green bin for compost, blue bin for recycling, and black bin for trash. Students also created educational posters above each waste station to help students decide which bin their waste goes in. The sixth grade completes a project-based unit on renewable and non-renewable resources and designs action plans to reduce energy and water use on campus.

The kindergarten takes a field trip to the Children's Growing Gardens in Boulder to learn about harvesting, insects, and how to make food from gardens. The first grade embarked on a research project to find out why the FOSS science kits use plastic straws instead of a better alternative. They researched and wrote letters to FOSS explaining their concern about using straws and suggesting possible solutions. The fourth grade manages the beehive and participates in the Audubon Society's Backyard Bird Count by learning about and counting species of birds that are in the area. Fifth-grade math classes practice finding the area and perimeter of things in the school's outdoor space. An outdoor scavenger hunt at the end of the school year asks kids to use geometry concepts.

Fifth- through eighth-graders are invited to participate in a weeklong outdoor education program with Expedition Backcountry Adventures during which students are empowered to step out of their comfort zone, develop a robust knowledge of outdoor skills, and cultivate an appreciation and commitment to serving others. Students participate in five adventures: hiking, rock climbing and rappelling, orienteering, mountain biking, and wilderness medicine training. Other trips have taken them to Moab, Utah, for hiking, rafting, and camping; the San Francisco Bay

area for kayaking, hiking, and beach restoration; and Costa Rica for sustainability service projects

## **Connecticut**

### **Middlebrook School; Wilton, Connecticut**

*Taking the lead to grow green*

As a community, Wilton, Connecticut, has a rich history of environmental conservation and sustainability. Led by Wilton’s environmental nonprofits, the town has a focused effort on preservation of the Norwalk River Valley Trail and surrounding waterways, a robust Energy Commission leading the way in solar power, and a successful no-idling campaign. Four years ago, it became clear that Wilton schools were not keeping pace with the town’s established goals for environmental conservation. Recycling was not being implemented in school cafeterias, composting was unheard of, and single use plastics were not even on schools’ radar screen. In response to this profound lag, Middlebrook School decided to take the lead to grow green.

Over the past five years, Middlebrook School has taken its role as pioneer in the sustainability movement very seriously. Middlebrook School’s robust initiatives and programs have become examples of success for neighboring schools and communities and the school is pleased to have created a wave of sustainability initiatives throughout the county. At Middlebrook School, “growing green” was started by just a few teachers who wanted to challenge their students to reflect on environmental habits in the cafeteria. This first idea grew into a full-fledged movement that helped train the entire school district onto a path of sustainability.

By joining CT Green LEAF Schools, the Middlebrook Green LEAF Team embarked on a robust CT Green Leaf school self-assessment. Through a sustained and intentional schoolwide effort, Middlebrook worked hard over the past four years to close many of the school’s environmental and sustainability gaps.

The foundational element of reaching Middlebrook’s environmental and sustainability goals was the development and implementation of a highly successfully sixth-grade Family and Consumer Science class that focuses on school gardening and in-class sustainable cooking. Middlebrook School now boasts a 3,000-square-foot garden and 600-square-foot greenhouse, built with the support of local Eagle Scouts. The outdoor garden is equipped with rain barrels and a drip irrigation system, also installed by Eagle Scouts.

Middlebrook students, teachers, and staff led a behavior and policy change for districtwide composting and recycling. The early success of the Family & Consumer Science class created the impetus for a schoolwide evaluation of cafeteria waste. This sixth-grade class partnered with the school's eighth-grade ISTEM class to develop a prototype for cafeteria waste stations. What started as an academic challenge turned into new waste stations being set up in every school cafeteria throughout the district. This has resulted in the diversion of nearly 2,000 pounds of food waste per week across the district.

Building on the momentum of this sustainability in school cafeterias, the Middlebrook Green Team implemented a biannual Zero Waste Week, designed to bring attention to schoolwide, local, regional, and global environmental issues and maintain the school's focus on environmental stewardship. High interest, unique activities with kid-appeal include, for example, "pay as you throw," "pack your lunch raffle," and "parent zero waste trivia." In order to ensure success, the team enlisted the help of another community partner — Chartwells School Dining Services, the school lunch provider.

The community nonprofit Wilton Go Green provided tremendous financial and volunteer support for Middlebrook's Zero Waste Schools initiative. Beginning in 2016, the local recognition that Middlebrook was receiving for their zero-waste



*Middlebrook School students learn different ways to prepare vegetarian and vegan dishes, such as chickpea curry and baked eggplant fries.*

efforts caught the attention of the Center for EcoTechnology (CET), a Massachusetts-based nonprofit focusing on climate change initiatives. CET chose Middlebrook for a case study and documentary on the school's successful Zero Waste Schools program that is now streaming on their website.

Middlebrook now has a widely used outdoor classroom, pollinator gardens, and rain barrels. In spring 2018, Middlebrook School flipped the switch on their newly installed solar panels to start reducing its carbon footprint and saving the community money on energy. As of September 2019, the district captured 1 million kWh and saved \$70,000. Trout Unlimited, an advocate for Wilton's Norwalk River Watershed, selected Middlebrook School in

2019 for its Stormwater Project to reduce stormwater runoff at the school's 110-acre campus in Wilton.

Middlebrook's Green Team includes a highly visible presence by facilities management. Recent efficiency improvements include low-flow toilets in bathrooms and water filling stations in hallways. A Tools for Schools Committee verifies air quality compliance, green cleaning supplies, and appropriate use of chemicals and pesticides.

Middlebrook supports students' physical health through its robust outdoor Project Adventure course featuring low- and high-ropes courses. Next to Project Adventure is a newly designed outdoor learning center that provides students with an opportunity to engage in active multimodal learning beyond the traditional classroom.

In 2018, as part of a schoolwide initiative to support mental health, school administrators supported teachers' personal health and well-being by introducing meditation, alternative arts, and yoga. These restorative practices have had a positive impact on the overall well-being of the school community. The Middlebrook Family & Consumer Science classes not only includes the sixth-grade course on sustainability, but also gives the seventh- and eighth-grade students an opportunity to perform scratch cooking with healthy whole foods in the culinary kitchen. Seventh-grade tackles baking and pastry arts with a focus on whole grains and creative healthy substitutions, and the eighth-grade culinary arts students study multiple cooking alternatives, including vegetarian and vegan meals.

Many of Middlebrook's teachers have woven elements of sustainability into their classroom curriculum, whether it is art projects made from recycled materials or social studies research into natural resource decimation in the Amazon rainforest. Based on the school's new culture of integrating environmental and sustainability education, Middlebrook's seventh-grade teachers are working to take this curriculum to a new level. Their goal this year is to develop project-based learning that will create real-world applications for students.

Middlebrook School recognizes that its work will continue to evolve and grow as the world adjusts to an ever-changing environment fraught with challenges. The Green Team now has a five-year plan and goal to tackle the issue of single-use plastics in the cafeteria. The next goal is to have dishwashers installed so that Middlebrook can switch to reusable trays and flatware. In support of this goal, staff are involved in ongoing conversations with school administration and Chartwells Dining Services to reduce the amount of single-use plastics brought into schools.

## Delaware

### Odyssey Charter School; Wilmington, Delaware

*Global citizens via sustainable international studies*

Odyssey Charter School, an innovative and diverse dual-language Greek School, was founded in 2006 and is currently the second largest public charter school in



*In addition to supplying the school cafeteria and local pantries, the Odyssey Charter School garden provides staff with free garden shares delivered to their office or classroom.*

Delaware. Odyssey is an all choice lottery school located immediately outside the city limits of Wilmington on the site of a former DuPont business park. Odyssey's mission is to provide its students with a lifelong enthusiasm for learning, help students develop a keen awareness of world citizenship and culture, and establish critical thinking and problem-solving through participation in a foreign language education program.

The Odyssey Green Team, which consists of students, teachers, and parents, is deeply committed to providing the nearly 2,000 students with hands-on and

meaningful real-world opportunities to be environmental stewards of the earth. Odyssey strives to foster the attitudes, skills, and knowledge within students to become responsible and empowered global eco-citizens. This is evident in its student created Eco-Code prominently displayed in the school cafeteria.

All of these efforts have been made through the framework of National Wildlife Federation Eco-School USA, working toward "Pathways" of sustainability. Odyssey Charter is also a participant in the Delaware Pathways to Green Schools program and has worked toward the Sustainable Foods, Energy, Waste and Consumption, Healthy Living, and Schoolyard Habitat Pathways. Most recently, Odyssey earned an Eco-Schools Green Flag in November 2019. Odyssey is thus the first charter school in Delaware and only the fifth public school in the state to earn this prestigious international award.

Odyssey has received over \$30,000 in grant funding. This donor list includes Teaching Tolerance, National Geographic, NEA Foundation, New Castle County, the Delaware Department of Natural Resources and Environmental Control, American Heart Association, Voya, Whole Kids Foundation, and Energize Delaware. Most

recently, Odyssey was chosen to create “upcycled” ornaments for internationally renowned Longwood Gardens.

In 2019, high school students won second place in the Alfred M. Greenfield UNLESS Regional Contest with the Philadelphia Zoo for their project “Ban the Bag, Save the Bat.” Due to Odyssey students’ efforts in collecting plastic film, Odyssey received a TRENCH bench. Not only did Odyssey Charter collect plastic film on campus, they played an active role in advocating for Delaware House Bill 130, the “Plastic Bag Bill.” Students participated in every stage of the legislative process.

Odyssey is one of three schools leading the effort to plan a statewide and student-led Youth Environmental Summit (YES!) to engage at least 200 students. Odyssey strives to make environmental education accessible to students beyond the school community. High school students worked on a joint project with the Louise-Henriette Gymnasium School in Berlin to learn about sustainable food and grassroots activism. In addition, third-grade students participated in a pen pal program with a rural Liberian school to learn about water scarcity and to develop global understanding. Another project included Odyssey fundraising more than \$3,400 to help build a well near the school, improving water access for hundreds of Liberians.

In just three short years, Odyssey has implemented several sustainability initiatives on its urban campus: an edible garden with 24 raised beds (750 square feet), a community chicken coop (10 hens and a rooster), an outdoor classroom, pollinator, milkweed gardens, and an indoor aeroponic garden program. Every season, as part of Odyssey’s Farm to School Program, students consume vegetables harvested from the garden. This bounty is also shared with the local community, and over 1,000 pounds of produce have been donated to local distribution and support programs.

Furthermore, in 2019, the school purchased an interactive and mobile culinary cart to teach students how to be food citizens. High school students in Food Studies participate in weekly cooking labs, and middle school students take an exploratory culinary arts course taught through a Greek lens. Produce from the many gardens serve as ingredients for these innovative courses.

Odyssey’s mission to create global citizens is illuminated by sustainable international studies opportunities. High school students traveled to Germany and Switzerland to learn about innovative sustainability efforts and see state-of-the-art models of renewable energy. Faculty and students bring these experiences back to Odyssey to enhance their learning and course experiences.



Last year, the American Heart Association helped Odyssey to purchase 20 CPR dummies to enable sixth- to 12th-grade students to learn and practice CPR through their general health education curriculum.

In 2018, Odyssey made the switch to compostable trays. To date, 168,000 Styrofoam trays have been prevented from entering a landfill. In spring 2020, Odyssey replaced all single-use plastic cutlery with metal cutlery. Odyssey installed six water bottle filling stations to reduce the consumption of single-use plastic bottles. The school received a \$1,920 grant from Energize Delaware toward a composting project; the equipment allowed Odyssey to further reduce organic food waste. A share table was introduced in the cafeteria, and students are encouraged to reduce waste by placing items they will not eat on the table to share with others.

Odyssey has consistently placed in the top three of the Green Schools Clean Streams pledges, a county program that educates others on what should go down the drain and into the sewer system. The recycling of over 1,000 pounds of single-use plastic bags ensures fewer bags will end up in the environment, such as streams.

In 2017, Odyssey received an energy audit from Practical Energy Solutions. The audit revealed action items to reduce energy use. During the 2017–18 school year, a \$250,000 project to upgrade electricity by replacing fluorescent lights with LED lights (indoor and outdoor) began. Based on the average in 2017–18 and the average in 2018–19, Odyssey’s total number of kWh decreased on average of 42,000 per month. The school sets standard heating and cooling points of 68–70 degrees during the heating season and no lower than 73 degrees for air conditioning to conserve energy. Odyssey has also begun to replace the aging heat pumps with high efficiency boilers.

Students turn off classroom lights and computer monitors, resulting in at least a 18,140-pound savings in carbon dioxide per year. Odyssey’s greenhouse gas emission reduction plan for transportation includes 13 school buses — eight low sulfur diesel buses and five propane buses.

## **Ursuline Academy; Wilmington, Delaware**

### *Caring for a common home*

Ursuline Academy is an independent, Catholic school focusing on developing over 400 students for leadership in a global society. It serves students from pre-K to grade 12 and is located in an urban setting. The school is coed from the Montessori program (ages 3–5) to grade 5 and all-girls from grades 6–12. Following in the

footsteps of 16th-century patron, St. Angela Merici, the values of service, living simply, and helping those in need are emphasized.

Ursuline's Upper and Middle School (grades 6–12) building scored a 79 on ENERGY STAR Portfolio Manager through an energy audit performed in 2017 by Practical Energy Solutions of Philadelphia and a rating of 69 in the Lower School (Montessori–grade 5) building. Beginning in 2018, most of the school buildings have been retrofitted and upgraded with motion sensor lighting and the new Student Life Center has all LED lighting. This building houses the cafeteria, library, chapel, classrooms, administrative offices, and a large two-story atrium lounge with plentiful natural sunlight.

In 2020, Ursuline will be extending its sustainability commitment by embarking on a comprehensive set of energy conservation and renewable energy measures through a project with Seiberlich Trane Energy Services, funded by the Delaware Sustainable Energy Utility with some grants from Delaware Department of Natural Resources and Environmental Control. The project will replace Ursuline's aging HVAC systems in the Lower School and Lower School Annex buildings with a state-of-the-art HVAC system. There will also be a demonstration photovoltaic solar array installed on the Lower School roof that will include real-time monitoring and measurement for display to students, faculty, and visitors. Any lights not already LED will be retrofitted. A comprehensive building envelope and weatherization retrofit will improve building envelope, efficiency, and thermal comfort. Finally, any remaining higher-flow water fixtures will be retrofitted to low-flow fixtures.

A survey of the school community demonstrated that more than 75 percent of students fill reusable water bottles regularly at the nine water bottle refilling stations located throughout the school campus, three of which were purchased through grants from Green Building United and the Great Schools Clean Streams campaign. Faucets in much of the campus are on motion sensors. Drought-resistant native plants are used throughout the campus. The playing fields use Bermuda grass instead of turf.

Ursuline features recycling bins in every classroom of the school as well as the cafeteria, counseling center, library, and offices thanks to Wrigley's Litter Less. Students empty the recycling bins weekly. Ursuline has contracted with Roadrunner Recycling. The paper used in the school is 35 percent recycled with all printers set to double-sided printing. Students in grades 6–12 have laptops and the use of Google Classroom for schoolwork has resulted in a significant reduction in paper usage. More than three years ago, the cafeteria changed from Styrofoam to compostable bowls and plates. Single use dispensers are used for the silverware and napkins. There are no trays or straws.

The cafeteria is focused on healthy choices and removed all sodas more than four years ago. Only healthy drinks are sold, all food is baked and not fried, and there is a good variety of salads and fruits available for purchase. Ursuline has a full-time Safety Coordinator and a full-time nurse who provides training and education for staff in the use of the EpiPen, AED defibrillators, and asthma and allergy education.

Students from age 3 through grade 8 go out for recess one to two times a day. There is a spacious, new playground behind the Lower School and a large grassy field in the middle of the campus. Many students are involved in extracurricular sports with the school providing 12 sports, eight of which are outdoors. Approximately 82 percent of students in the Upper School participate in at least one sport annually.

Four counselors are available to the 410 students. They maintain partnerships with local organizations who also do presentations on topics, such as cyberbullying and internet safety. Clubs, such as Mental Health Advocacy, Spectrum for LGBTQ+ students, Undefined for students of color, and SADD (Students Against Destructive Decisions), help students to maintain a healthy outlook. The Undefined Club in the Upper School also works with children in the Lower School through activities related to self-esteem, concepts of beauty, and historical and cultural knowledge focusing on African Americans.

Students in the Lower School benefit from an outdoor classroom in which students use raised beds for vegetables and herbs, design and build birdhouses, compost with worms, graph rainfall, maintain a wildlife edible Christmas tree, among other activities. The outdoor classroom was certified as a Schoolyard Habitat by the National Wildlife Federation in 2019.

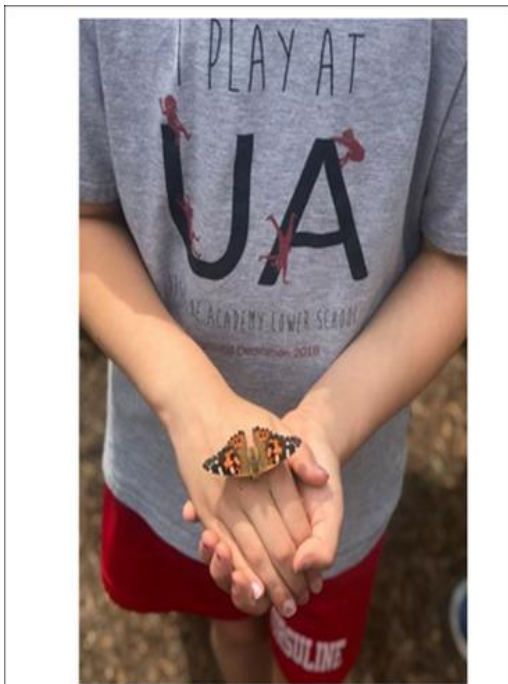
Students in grades K–5 have taken part in the “Wander and Wonder” program, in which students are encouraged to wander outside, learn about a certain topic and then wonder about future questions. For example, students in grade 4 created and tested weather vanes at the nearby reservoir area to see the difference between local, global, and prevailing winds. Then they “wondered” about wind turbines and their negative effect on birds and worked together for ideas that could maybe help solve this problem.

Students in grades 3–6 participated in an energy expo in the spring of 2019 where they were able to see how energy works, experience alternative forms of energy, and learn about energy conservation. This program will be repeated, using high school students to educate the younger grades as they go from station to station during the expo.

Students study ecosystems, climate change, and sustainability in their science classes, including Honors and AP environmental classes at the high school level, but topics also receive attention in many other classes. Students in all of the Upper School world language classes study environmental concerns and good nutritional practices using the native languages. The Global Challenges class studies climate change and the effect from corporations and political decisions. They look at the effect of rising sea levels and tainted drinking water issues in various locations in the United States.

Theology classes have studied Pope Francis' *Laudato Si*, a letter on "Care for Our Common Home," about the importance of ecology and the negative effects of climate change, especially on the poor. In the popular AP Human Geography class, students look at the Green Revolution, the global system of agriculture and the

consequences of agricultural practices, as well as the challenge of contemporary agriculture and urban sustainability. Ursuline also has a strong photography program and eight students have taken first or second place in the National Association of Conservation Districts photography contest in the past three years.



*At Ursuline Academy, each grade has a different topic assigned to "wander and wonder" about.*

Activities, including field trips to outdoor sites, such as zoos, orchards, and farms, and team building camps and gardens, take place at all education levels. Students in second grade and the Upper School environmental club visit the recycling plant run by the Delaware Solid Waste Authority. Ursuline is part of Delaware's Adopt-a-Wetland program and has adopted the Cool Spring reservoir adjacent to the school where students engage in cleanups several times a year. The school is also fortunate to have speakers on environmental issues. Plastic Free Delaware presented the films "STRAWS" and "Bag It" in anticipation of the ban on plastic bags in large stores in Delaware beginning Jan. 1, 2021.

## Florida

### Highland Elementary School; Lake Worth, Florida

*Greenhouse gas emissions down while student population up*

Highland Elementary School is a Title I school, nestled between Interstate 95 and Tenth Avenue North, serving a student body that is 96 percent eligible for free and reduced price lunch. Situated along The Lake Worth Lagoon in Palm Beach County, students have tremendous opportunities to gain an understanding of the water cycle, erosion, weathering, and continental drift. There is scientific evidence on campus to prove that the land where Highland Elementary School is located was once underwater and eroded over time to form the top of a sand dune; hence the name "Highland." Even today, students participating in nature walks on campus come across seashells within the soil. Highland's green team and over 1,000 students have worked together with school administration to also overhaul grounds enhancement, sustainability, health/well-being, curriculum integration, schoolwide green culture, and community involvement.

Originally built in 1954, Highland Elementary School has been renovated over the years. The school was rebuilt in 1998 and complied with the standard Florida energy building code of the time. Even though the student population at the school grew by 6 percent, Highland Elementary reduced their greenhouse gas emissions by 1 percent, or 10 metric tons. All light switches on campus have been labeled with "Turn it Off" stickers and the school participates in a regional, "How Low Can You Go?" energy use reduction challenge. Student Green Team members are identified as Green Champs by wearing badges, such as, "Solid Waste Authority," "Classroom Custodian," and "Energy Saver." The school just received a white roof coating on the portable classroom building in order to reflect sunlight to keep the building cool and reduce energy usage.

With hard work and persistence, Highland's green team transformed the overgrown campus into a recognized Florida Green Apple School, garnering local media attention and the gift of a Bustin Willow tree from the Lake Worth Tree Board. Highland has eradicated the non-native and extremely invasive Brazilian pepper tree species from the school grounds, enabling them to use the vast campus for native plants that are aesthetically pleasing.

Highland organizes a biannual event called Drop Everything and Reduce (DEAR). Every staff member and every student walks the campus in search of trash, litter, or debris. Using a book sale fundraiser, the school generated funds to purchase a water refilling station for Highland. Then Keep Palm Beach County Beautiful

generously donated a second water refilling station to the school. This helped to reduce plastic bottle usage and improve student hydration. Highland uses low-flow faucet and toilet fixtures to conserve water.

The culturally diverse Highland community embraced better management and began participating in campus and neighborhood clean-ups. The school took the lead on calling the city to ensure that streets were swept, crosswalks were painted, and residents received recycling bins that were used appropriately. These changes have helped change student mindsets as well.

The fifth annual Walk to School Day was embraced by Highland students and staff and reinforced through the engagement of many community partners, including the Palm Beach County Fire Department, Sheriff's Department, and Bridges at Highland program. This event helped educate the students and families in the community regarding safe routes to school.



*Not only do Highland students plant in the school garden, but they also enjoy the fruits of their labor by taking home such vegetables as lettuce, radishes, okra, lima beans, and carrots.*

Highland also focused its work on a few health and wellness improvements. The principal invited bus drivers for a luncheon where air quality goals and procedures were explained. Bus drivers now turn off engines while waiting for the students to be dismissed. To maintain healthy indoor air, Highland works with the district's indoor air quality team to quickly report possible asthma triggers, such as mold, so that it can be remediated before causing harm to students and staff.

Highland participates in the American Heart Association's Jump Rope for Heart community service learning program and in the Leukemia and Lymphoma Society Pennies for Patients fundraiser. Healthy hydration competitions and themed "color

[food] weeks” promote drinking water and eating nutritious produce. Highland has its own kickball team, “The Highland All Stars.”

The Highland cafeteria offers students healthy food choices for breakfast and lunch for a balanced diet, including grains, fruits, dairy, and vegetables. Highland has organized a temperature-controlled share table for students to select additional healthy snacks, such as fruits, salad, milk, and juice to supplement their lunch options, consume during snack time, and bring home.

The Highland butterfly garden is full of native and naturalized flora that is a huge boon to the local pollinator population and learning. In spring, students observe native pollinators as well as unique bee species. Students also visit MacArthur Beach State Park, Norton Sculpture Garden, and Grassy Waters Preserve to engage in outdoor learning.

Highland received a \$1,000 grant to support clubs that engage students in an interdisciplinary approach through project-based learning with the use of recyclables and environmental education. Highland Elementary’s green team enhances environmental education through hands-on STEAM activities. Activities include providing students with the opportunity to plant edible foods to share with their families, working with local families and the surrounding community to create backyard gardens, providing students with seeds to explain why particular birds have specific beaks and feet, observing the birds and butterflies that visit the garden, and transferring the outdoor experience to academic tasks in science, literacy, and mathematics. Environmental and sustainability education has become so popular that the green team has expanded into two additional STEAM clubs.

### **Martin County School District; Stuart, Florida**

*A district-run environmental science center that features a floating classroom*

Martin County School District (MCSD) demonstrates commitment to the three ED-GRS Pillars on a daily basis with innovative efforts that have been recognized at local, state, and national levels. Coordinated by Florida Atlantic University’s Pine Jog Environmental Education Center, a regional Green Schools Recognition Program honors local schools that have taken a holistic and innovative approach to greening their campuses and academic programs. Their efforts include school grounds enhancement, resource conservation, environmental curriculum connections, community involvement, and a schoolwide commitment to sustainability.

The District works closely with Waste Management, the vendor for solid waste removal and recyclable materials collection, resulting in successful disposal/processing services. MCSD diverts 35 percent of materials from landfills.

Energy-saving LED indoor and outdoor lighting and lights controlled by occupancy sensors are included in the District's newest projects. The district operates on a four-day week in the summer months. School sites try to limit disruption of natural hydrology and follow South Florida Water Permit regulations that improve water quality, efficiency, and conservation. School sites are developed with native plantings.

Green Teams at schools sponsor activities like No Idle Zones, Bike to School promotions, and National Walk to School Day. The fleet of approximately 100 school buses are fueled by ultra-low sulphur diesel, and the Superintendent's Office uses a hybrid car.

The District employs the EPA Tools for Schools Indoor Air Quality Program. Conditions adversely affecting moisture control are also addressed using Tools for Schools guidelines and are identified and repaired on a timely basis. Students with asthma are eligible for an Individual Education Plan evaluation. Any asthma triggers are removed from the student's space. MCSD consistently conducts integrated pest management, including the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are justified and reduce or minimize risks to human health and the environment.

MCSD leverages student-led mental health programs and community partnerships while building the capacity of school-based mental health professionals. A comprehensive



*Students from Indiantown Middle School, in Martin County School District, traveled to Jonathan Dickinson State Park for a hands-on environmental field trip in November 2019.*



set of 27 programs helps all students develop appropriate cognitive, behavioral, and emotional skills. Health and safety are emphasized during Healthy Snack Day, after-school gardening clubs, and CPR training provided for sixth- graders. Annual fitness activities include track meets for all grades and events such as Jump for Love. The Employee Wellness Program improves the health and wellbeing of staff and their dependents through information, preventive screenings, and popular activities such as the recent Chopped Cooking Contest.

Food and Nutrition Services professionals have been honored for promoting healthier eating habits, such as through their Crunch Crew initiative. These efforts were supported by a federal grant from the USDA Fresh Fruit and Vegetable Program. Food and Nutrition Services recently produced a video for parents to assist with school meal choices for diabetic children. The Martin County School District completed the Florida Healthy School District Assessment in 2018, achieving Silver Status.

High school students in MCSD participate in the Regional and Florida Envirothons. There are five study areas: aquatic ecology, forestry, soils and land use, wildlife, and a current environmental issue. RiverKidz provides second-grade students with a standards-based curriculum that increases their understanding of the community's ecosystem and encourages them to become active in preserving local waterways.

All students from kindergarten through seventh grade, as well as high school marine and environmental science classes, visit the Environmental Studies Center (ESC) to participate in hands-on environmental education. Students explore the St. Lucie Estuary, Indian River Lagoon, Hutchinson Island's beaches, mangrove swamps, freshwater ponds, and wetlands. They receive instruction in the Center's indoor and outdoor interactive classrooms, science labs and museum, and, at different grade levels, experience ESC's floating classroom, a 30-foot T-Craft boat. Each summer the Center offers Camp WET (Water, Environment, Technology) for students entering fifth and sixth grade with the goals of raising environmental awareness, increasing knowledge of natural habitats, and developing sustainable behaviors among students and their families.

Annually the District's fourth-grade teachers participate in professional development using the Everglades Foundation Curriculum so that they can provide students with a hands-on environmental learning opportunity. Additional community collaboration takes place courtesy of Florida Power and Light, which sponsors in-school presentations by Captain Wattage and provides solar stations for several schools. Inwater Research Group, Inc. provides free experiential conservation education through their traveling Turtle Trunk Program. Martin County School District's Hobe

Sound Elementary School is the first in the nation to be a fully certified Audubon Sanctuary Program.

The District provides a Career and Technical education program at the high school level in Landscape Operations, leading to a certification by the Florida Nursery, Growers and Landscape Association as a Certified Horticultural Professional. Coursework and on-site career experiences prepare students for postsecondary training as well as employment opportunities in the field. Environmental and sustainability topics are important program elements.

Team Green Martin is a school-based program that brings together students in both exceptional student and general education classrooms to work toward conservation goals and environmental preservation by focusing on recycling. Students4H2O is a districtwide effort and students in all grades participate. Each year, the group collaborates with the City of Stuart and the Humane Society of the Treasure Coast on Waterfest, a free, community-wide event that promotes awareness of water conservation and environmental stewardship and is attended by hundreds.

Modern Energy Solutions, Inc., created by student entrepreneurs, presented at Launch X's 2019 Global Demo Day at MIT. Their energy-saving invention currently has a patent pending.

## Georgia

### **Kennesaw State University; Kennesaw, Georgia**

*Sustainably stronger together*

A member of the University System of Georgia, Kennesaw State University (KSU) is the third-largest university in the state and one of the 50 largest public institutions in the nation — a comprehensive, residential institution with 13 colleges on two metro Atlanta campus locations. On Jan. 6, 2015, the Board of Regents of the University System of Georgia approved the consolidation of Kennesaw State and Southern Polytechnic State University. The new Kennesaw State University houses a wider variety of academic specialties than either original institution. The university has been named among one of the most environmentally responsible colleges in the United States and Canada by the annual edition of *The Princeton Review's Guide to 322 Green Colleges*.

The KSU Climate Action Plan has set out proposals and initiatives for promoting behavioral changes, enacting university policies, and initiating projects in the areas of transportation, energy consumption, water use, and solid waste removal. There

are now 22 LEED certified buildings across both campuses. There is over 15 kW of installed solar capacity minimal solar arrays on the Marietta campus — a 5-kW rooftop system on the Engineering Technology Center building and a 10-kW ground-mounted system in front of the greenhouse. There are also solar picnic charging tables near the lab buildings. Additionally, Marietta campus hosts the Alternative Energy Innovation Center and offers a minor in Renewable Energy Engineering Technology. The center has focused on photovoltaic, solar thermal, and energy storage systems. KSU has been exploring strategies to expand its renewable energy portfolio.

The Office of Campus Planning and Sustainability works to improve sustainability outcomes on KSU campuses in a number of ways. The Energy and Water Dashboard is a joint initiative of the Office of Sustainability and Maintenance and Operations to allow students, staff, and faculty to view real-time and historical utility data for select buildings. The university has installed low-flow fixtures, meters the water consumption of many individual buildings, has a stormwater management plan in place, and is working to collect rainwater.

The university has updated design standards for new building and major renovations and created operating standards that include sustainability provisions and energy and water use intensity goals. KSU's ENERGY STAR purchasing policy was instituted in 2008. The University System of Georgia Board of Regents awarded Kennesaw State the 2012 Sustainability Award for Energy Performance.

In 2007, Kennesaw State signed onto the American College and University Presidents' Climate Commitment, which is now Second Nature's Carbon Commitment. As part of the agreement, Kennesaw State pledges to proactively engage students, faculty, and staff in measuring and reducing the carbon footprint of the campus. Despite enrollment increasing by about 8 percent, greenhouse gas emissions were reduced by nearly 6 percent in that same two-year period.

Commuting accounts for 76 percent of KSU's annual greenhouse gas emissions. The university offers a number of alternatives, including the Big Owl Bus public transit; off-street bike paths and amenities; walking campuses; carpooling, ridesharing, and Zipcar facilitation; telecommuting, compressed work week, and flextime; and Georgia commute options.

Landscaping practices work to reduce space devoted to lawns and maximize xeriscaping using native plants to reduce the need for watering.

The university student dining hall, The Commons, has garnered national accolades for its Farm-to-Campus-to-Farm Program. The KSU Farm-to-Campus-to-Farm

program expanded in 2013 to an additional 25-acre farm in collaboration with the Georgia Department of Transportation, located approximately two miles from the Kennesaw Campus. The KSU Field Station has been used to grow up to 20,000 pounds of produce, such as lettuce, annually for the Commons dining hall at KSU. The farm arm has implemented low-cost, energy-efficient technology-based approaches for high-yield crop production. Now four greenhouses also dot the landscape. Each one has its own unique attributes to help extend the growing season year-round. The first greenhouse, called the propagation lab, is the most important since this is where plants are reproduced through seedlings or through tissue culture. Two others are high tunnel structures, which feature conventional in-ground growing. The most high-tech structure is the hydroponics lab.

Twenty-five years ago, KSU set aside part of the campus's original forest on Marietta Drive as a natural resource where students can study centuries-old trees, learn about density, the distribution of trees and plants and natural history.

Interactive GIS-based sustainability maps for Kennesaw and Marietta campuses offer information about sustainability features at KSU, such as solar photovoltaic installations, LEED-certified buildings, Zipcar locations, bike trails, bus routes/stops, and sustainable dining options

KSU boasts two compact, walkable campuses with access to an extensive county-wide trail network, an on-campus and off-campus bike share program, and on-campus amenities, such as a bike shop, showers, fix-it stations, and numerous bike racks. In recognition of Kennesaw State's commitment to sustainability and achievements in promoting and enabling safe, accessible bicycling on campus, the University has been designated as a Bicycle Friendly University by the League of American Bicyclists.

The university represents high standards of synchronized efforts on health, nutrition, outdoor P.E., counseling, and psychological services for students, faculty, and staff. KSU Health Promotion and Wellness is a unit of the Division of Student Affairs and serves to improve the balance of the intellectual, emotional, physical, social, environmental, and spiritual development of students through awareness and education. To support a healthy learning environment for students, Health Promotion and Wellness offers a variety of services and programs at a free or discounted cost. The programs and services offered support students' overall wellness through health promotion workshops and events including, but not limited to, stress management



programs, nutrition consultations and workshops, risk reduction education, and CPR certification.

Kennesaw State is one of the first schools in the nation to establish a new program to help its homeless student population. Campus Awareness, Resource & Empowerment collaborates with the community and other departments across KSU, such as admissions, financial aid, and campus housing, to provide students a wide range of offerings in addition to the food campus pantry, one-on-one case management, personal care items, temporary housing, job coaching, temporary job placement, scholarships, and volunteer opportunities.

The Environmental Health and Safety Department has been KSU's source of expertise and assistance on environmental and occupational safety matters and continuously works to keep KSU in compliance with applicable federal, state, and local environmental health and safety laws, rules, and regulations. KSU adopted a no-idle policy in 2009 to reduce tailpipe emissions.

Kennesaw State has a presidential commission on sustainability, which serves as an advisory body at the university to promote and support collaborative efforts of faculty, staff, and students toward sustainable development goals within and across KSU's colleges, departments, and external partners. The Commission's efforts are designed to promote and support innovative sustainability education and sustainable practices.

One of the commission initiatives is the KSU Annual EQUINOX Week dedicated to the United Nations Sustainable Development Goals (UN SDGs). Established in 2017, the initiative seeks to catalyze and advance pathways of multidisciplinary scholarship and partnership among institutions of higher education, policymakers, and community members. Throughout that week in March, a diverse set of multidisciplinary programs are organized on both campuses, including symposia, exhibits, and awards related to the UN SDGs.

Kennesaw State creates and maintains strategic, interactive partnerships in professional and civic communities. Multidisciplinary partnerships provide deeper understanding of the real-world issues on sustainability, such as climate action and energy conservation, to open up multiple green career pathways.

On both KSU campuses, there are growing demands and interests in multidisciplinary education on sustainability, as well as civic skills and impact of

sustainability. The sustainability director offers workshops and fellowships to faculty to engage them in sustainability across the curriculum.

Across campuses, KSU promotes the use of the living learning spaces by faculty, staff, and students, including the KSU Hickory Grove Farm, The Oasis outdoor classroom, the KSU Dining garden, the Living Wall in The Commons, the permaculture garden, the arboretum, the greenhouse, and the solar photovoltaic system. These living learning spaces provide sustainability related experiential learning experiences and supply opportunities for students to address real-world issues and applications.



*Students work on the 25-acre site of Kennesaw State University Field Station, the university-wide initiative to enhance environmental research and scholarship through expanded experiential learning opportunities that are aligned to real-world applications.*

The Oasis, a hands-on outdoor classroom built in a previously unused courtyard space, is one of most unique and innovative laboratory spaces on campus, enabling biology students to study native Georgia plant life.

The Hickory Grove KSU Farm offers opportunities for student learning and faculty research,

including for piloting innovative solutions to real-world challenges. The KSU Farm provides transformational experiential learning for students of every discipline through opportunities to apply knowledge and skills learned in the classroom to real-world issues.

The Field Station provides a living laboratory for researchers, educators, and students, promoting an interdisciplinary learning environment conducive for experiential academic experiences and strategic collaborations within the university community and beyond. The Field Station also provides space for research in biology, ecology, geology, and other relevant fields to improve the quality of life.

KSU is home to some 20 student clubs related to sustainability. EcoOwls is a student organization that gives students leadership opportunities by taking charge of

student-led projects that make a positive change in the environment; groups like the Green Ambassadors are leaders in sustainability and spread knowledge and awareness of sustainability at KSU through their sustainability campus tours; and OwlSwap Clothing Recycling encourages sustainable fashion alternatives, conscientious consumerism, and worker rights. The Office of Campus Planning & Sustainability hosts internships for students interested in advancing specific projects in sustainability. Other sustainability-minded clubs include: Students for Environmental Sustainability; Social Culinary Society; ENACTUS, focused on socially responsible entrepreneurship; and Engineers for a Sustainable World.

## Hawaii

### **SEEQS: The School for Examining Essential Questions of Sustainability; Honolulu, Hawaii**

*Stewards of the earth, citizens of the world*

The School for Examining Essential Questions of Sustainability (SEEQS) is a public charter middle school where students have powerful learning experiences, facilitated by passionate educators, that connect them to the place they live in so they can make meaningful change in their lives and for the planet. Students take ownership of their learning and do real work, with real impacts. Over the course of their middle school experience, each student engages in three yearlong investigations into a sustainability topic, presents related project work at six public project exhibitions, and compiles a portfolio of these accomplishments.

SEEQS is located on the campus of Kaimuki High School, a Hawaii Department of Education school. This arrangement enables both SEEQS and Kaimuki High School to take advantage of efficiencies of scale related to energy consumption and facilities maintenance. SEEQS manages its environmental impact and costs through the use of two semi-permanent classroom structures primarily cooled by natural breeze and requiring minimal energy consumption.

Students take an active role in supporting SEEQS's efficient use of water. For example, students transformed previously unused plots of land into rain gardens designed to capture and hold rainwater. This reduces the need for irrigation, decreases flooding impacts, and contributes to the health of the local watershed. They considered water conservation when installing drip irrigation systems for gardens and incorporated flow meters to track use.

SEEQS's urban location enables students and faculty members to travel to school using public transit or human-powered options. SEEQS has installed bicycle and

skateboard racks to support anyone who chooses these forms of transportation. Some students also travel to and from school by foot.

Students maintain raised garden beds, aquaponics, and field systems on campus. Students learn about the impacts of their food consumption choices and study the issues of food security and food independence in the islands. The food produced is offered to families at no charge through a weekly farm stand.

SEEQS has shifted away from the use of Styrofoam lunch trays, implemented a one-to-one Chromebook program to reduce paper waste, and instituted a (student-championed) ban on single-use plastic drink containers on campus. SEEQS uses recycling bins for paper, plastic, and glass, and students maintain a composting system for food waste that is collected during lunch. Students also collect compostable materials from nearby restaurants to maintain proper balance of nutrients in the compost.



*SEEQS students remove invasive fish species from the Manoa-Palolo stream near campus.*

SEEQS has built-in structures to support both the physical and mental wellness of students. These include a focus on intentional community-building based on a number of social-emotional learning frameworks, a student schedule built to accommodate adolescent sleep needs, and school lunches that meet state nutrition



guidelines. Most days begin with physical activity to stimulate the body and brain, including gardening, hula, or basketball.

A facilities manager and part-time custodian oversee the maintenance and care of facilities and grounds, including regular cleaning and maintenance to manage dust, bacteria, and mold, as well as regular inspection of doors, windows, and other physical structures. In addition, families are encouraged to shut off engines while waiting to pick up students to reduce emissions and protect air quality.

Where SEEQS excels most, however, is in its delivery of environmental and sustainability education. Every student enrolls in one of three yearlong, project-based, interdisciplinary Essential Question of Sustainability (EQS) courses, each designed around an essential question on a topic relevant to Hawaii. Past questions have included, “How do humans and the oceans impact each other?” or “Why harness energy, and how?” Each EQS course meets four afternoons per week for two hours and is co-taught by five teachers from a variety of disciplines.

Courses focus on interconnections between humans and the environment, create a real-world context to apply disciplinary knowledge, engage community members as partners in learning, empower students to choose the focus of their projects, and motivate students through authentic public project exhibitions. Student project work has included the construction and maintenance of rain gardens, raised garden bed, aquaponics, and composting systems on campus as well as regular conservation work at the nearby Manoa-Palolo stream.

Each semester begins with EQS Camp, a series of day-long field studies off-campus, in collaboration with local community partners, that launches students into their investigations. Through these experiences, students become familiar with the real work already being done in the field and begin to consider the aspects of the broader topic that resonate most. Each semester culminates in a public EQS Project Exhibition, where students present their work to an authentic audience. Project work is first scaffolded by teacher-led group projects in the first semester, followed by student-led individual and small group projects in the second semester.

Students regularly spend time at the Manoa-Palolo stream, which runs alongside the SEEQS campus and is a central feature of the local watershed. They learn about the factors that contribute to stream health, participate in projects to study water quality and remove invasive species, and have hosted two Aloha Aina community work days that resulted in the removal of an estimated 2,000 pounds of trash and 35 cubic yards of invasive flora from the stream.

SEEQS partners with Watershed Investigations Research Education and Design (WIRED), an organization that connects sixth- to 12th-grade students and their teachers with university researchers, graduate students, undergraduate students, and private and public sector entities, such as the Department of Land and Natural Resources. WIRED supports SEEQS by providing access to specialized equipment; access to lab space; and expertise in stream, estuary, and ocean assessment.

## Illinois

### Joseph Sears School; Kenilworth, Illinois

*Sustainability learning takes root in an outdoor classroom*

Joseph Sears School is a one-school district that serves students across grades JK–8. The school's commitment to sustainability began in 2002 when the student council initiated a paper recycling program and then students formed a green club. Embracing student leadership and citizenship, the school collaborated with an Eagle Scout to establish composting at Sears School in 2008. The student not only received the Eagle recognition, but he was awarded the Illinois Governor's Volunteer Service Award in 2011 for his efforts in expanding Sears School's recycling and environmental education programs. Today that program has developed into an innovative schoolwide waste reduction program that includes recycling and composting throughout the school.

With the support of the organization Go Green Illinois Schools, the school has hosted meetings and shared best practices with area teachers, administrators, parents, and students. The district has worked with the Solid Waste Agency of Northern Cook County for many years to complete waste audits and improve waste reduction efforts. A student green club, Planet Panther, is co-led by the Sustainability Coordinator and two junior high science teachers to implement school sustainability efforts. Recently, the club worked to eliminate plastic straws by switching to paper straws and also sold reusable straws, donating their proceeds to the World Wildlife Fund. Sears has one-to-one iPads, encouraging students and teachers to frequently use Canvas, Notability, and Google Docs to reduce paper usage. All paper products are compostable.

During various renovations, Sears added new energy efficient boilers and cooling systems. Lights are replaced with LED bulbs; smart boards and flat screens are under centralized control for power; projectors turn off at the end of the day; 75 percent of rooms have light occupancy sensors; and weekly emails go out to staff to remind them to turn off equipment when not in use. The school has installed automatic flushing toilets and shut-off faucets in restrooms. In the outdoor

classroom, rain barrels in the garden have significantly decreased the need for irrigation. The school has installed four water bottle filling stations.

In a town that has a total area of 0.61 square miles, most students — between 60 and 90 percent on any given day — walk, bike, or roll to school. This number is tracked during Bike and Walk to School week and during Earth Week.

Another milestone moment for the school was in 2012, when an outdoor classroom garden was established and became a collaborative community project. In addition to rain barrels, the garden has composting bins, a peace pole, a Native American Trail Marker Tree, and organic beds to build a sense of stewardship and education for the environment.

The outdoor classroom has a dedicated faculty coordinator who works directly with the building and grounds director, chief education officer, and superintendent to ensure curriculum, maintenance, and daily needs of the space are met. The coordinator also collaborates with parent volunteers, and a community fall harvest celebration is held in the garden each year. The area includes native and prairie plants, rain and butterfly gardens, organic vegetable beds and fruit trees, a Native American trail marker tree, a compost bin, a peace pole, and a sundial to support hands-on learning and appreciation of nature. This garden has grown substantially, leading the way for more interest and an increased commitment to integrating sustainability education in the curriculum and daily activities.

In 2017, the school hired a sustainability coordinator, who is a faculty member. In 2018, this sustainability coordinator established a faculty Sustainability Committee that meets twice a month. The work of this committee, in combination with past initiatives and the results of a recent sustainability audit, has provided the school with a clear path to improved sustainability. The pillars of sustainability prompted alignment of the school's activities, subject matter, achievements, and objectives with common sustainability goals. Recommendations from all three pillars have been implemented by faculty, students, and staff. Furthermore, sustainability goals and vision statements have been accepted by the Board of Education.

A Wellness Committee supports employees in making healthy choices, offers an annual fitness challenge, staff cooking groups, Pilates, and yoga. A daily Mindful Minute after lunch allows students and teachers time for quiet mindfulness. Additionally, five Mindful Mornings throughout the year allow for a longer exploration of mindfulness by students and teachers alike. This effort is coordinated with support and instruction from the Social Emotional Learning Committee. Movement Minutes allow for all JK–8 students to have an additional 20 minutes of movement throughout the day.

Sears offers P.E. every day for 30 minutes for students in grades K–5 and 40 minutes per day for students in sixth to eighth grades. In addition, during lunch, students have 40 minutes (20 minutes to eat and 20 minutes of recess). Kindergarten students have a 50-minute lunch, including outdoor play. Outdoor recess occurs when the temperature feels higher than zero degrees with wind chill. The gym features a new climbing wall and high-ropes course. Local produce is provided when possible through the food vendor. Additionally, the outdoor classroom coordinator offers fresh produce from the school garden for students to taste during lunch, in practical arts recipes, and for staff and faculty.

Chemicals and pesticides are not used in the outdoor classroom and organic gardens, with an integrated pest management plan overseen by a contractor. Recently a new custodial company was hired that uses Green Seal Certified products. Interior paints are water-based, nontoxic, and zero VOC. The school has completed radon testing and has carbon monoxide sensors. The school has a proactive schedule for testing water and soil and for monitoring ventilation systems and asbestos in the 1914 building that had a wing added in 1944. An HVAC software control system monitors the classrooms and building to maintain fresh air standards.

District policy mandates that natural resource conservation must be taught across grade levels. This includes ecology, endangered species, and the interconnectedness of species and the environment. In their first full year at Sears, kindergarten students help set up habitats for fish, worms, and bugs in their classrooms and take care of them. They also create recycled and reused art projects throughout the year. In World Language, Latin students create plant labels, including common name, identifying photos, and botanical name. In junior high, students conduct a case study investigation of how pesticides disrupt food webs through biological magnification. In sixth-grade science, they complete a research project on endangered species and engineer plastic sculptures of their animals from recyclable and nonrecyclable items.

The outdoor classroom has a teacher sign-up to support environmental education use across grade levels and subject areas. Some of these outdoor classroom uses by grade level include junior kindergarten study of birds; kindergarten planting of potatoes to harvest in first grade; second-graders' exploration of plants and insects; third-graders' seed dispersal and seed identification; fourth-graders' collecting isopods and helping with neighborhood cleanup; and fifth-graders' study of food webs, decomposition, and composting. Sixth-graders study a unit on invasive species. Seventh grade completes a unit of study on Native Americans, environment, and three sisters planting methods in the garden. Eighth-graders complete an investigation of seed germination. Students in practical arts classes harvest, cook, and preserve produce. Music classes use the space to practice and

perform. World language classes complete problem-based units on pollution and local birds.

The district has sponsored staff visits to area schools as resources for how to use gardens in instruction, ideas for LEED proposals, approaches to waste reduction in lunchrooms, and involvement with student clubs. The district also sponsored a



*The Sears School outdoor classroom is a laboratory for hands-on, problem-based learning and critical thinking.*

recent visit by local high school Marine Biology students to first-grade classrooms to share books on endangered marine species. A newly constructed school and park district building, the Village House, has become the platform for a social studies problem-based unit in which students developed proposals and created presentations on the reconstruction project. Students have generated

ideas, including sustainable materials, renewable energy, water conservation and quality features, and LEED certification.

Students visit the Grove, Lincoln Park Zoo (where they adopt an animal), Emily Oaks Nature Center, Evanston Ecology Center, Heller Nature Center, and Camp Duncan. In seventh grade, students learn about Chicago architecture on a Wendella Boat tour. Each June since 2014, three full days are dedicated to all grades to experiencing outdoor learning overseen by the outdoor classroom coordinator and led by the organic gardener. Students explore such themes as pollinators, beneficial insects, plant parts, and seasonal and local food.

## **College of Lake County; Grayslake, Illinois**

### *A trail of living labs*

At the College of Lake County (CLC) sustainability, health and wellness, and diversity each have their own council bodies to advise the Governance Coordinating Council (the main decision-making body at the college) to ensure that these areas are considered in governance decisions.

CLC's Climate Action Plan sets aspirational goals for the college to reduce its greenhouse gases (GHGs), with the ultimate goal of GHG neutrality by the year 2042. The Greening Our Campus section of its Sustainability Plan provides interim goals that guide the college along this path of reducing emissions and conserving resources, including building utilities, dining services, grounds operations, purchasing, transportation, solid waste disposal, and water consumption.



*Community colleges are uniquely positioned to utilize sustainable practices on campus as a "living laboratory" for sustainability: saving resources through sustainable building practices, demonstrating learning opportunities for students, and serving as a model for members of the community. At College of Lake County, an Environmental Biology class conducts a field study on the campus prairie.*

In 2019, CLC received LEED Platinum certification from the USGBC for its newest addition, the Science and Engineering Building. In fact, according to the USGBC, CLC's Science and Engineering Building has the most green building points of any new construction project in the state of Illinois. The building features solar photovoltaics, a geothermal heat exchange system, rainwater harvesting, daylighting, efficient variable speed ventilation with 100 percent clean air exchange, and a green roof. Each of these features not only makes the building more efficient, there is also interpretive signage from which students and visitors may learn. The

Science and Engineering Building is not just a building to learn within; the building itself is a learning tool.

On other parts of the campus, the College has invested in classroom technology upgrades, a renovation of core building wings, and a student services one-stop center, and is poised to begin a major expansion of the Lakeshore Campus in Waukegan. The geothermal heat exchange system is heating and cooling three core buildings, greatly reducing HVAC costs and associated GHG emissions. This main geothermal system includes over 80 wells, drilled 500 feet deep, to heat and cool the B and C wings and the new café in the core of the campus. This geothermal heat exchange has been so efficient that another building is being retrofitted onto that system, without having to drill any additional wells. CLC has been taking advantage of rebates through the state to upgrade its lighting fixtures, saving up to 80 percent of energy usage with LED lighting in parking lots and interior streets.

In 2020, a new era of renewable energy production is taking off, with a contract to install 2 MW of solar photovoltaic energy to the Grayslake Campus and up to 285 kW to the Lakeshore Campus in Waukegan. This expanded solar infrastructure takes advantage of state incentives to enter into a Power Purchase Agreement that allows the college to save money on its utilities and promote renewable energy, while selling renewable energy credits on the market to help fund the project.

CLC installed water-conserving fixtures in the faucets, toilets, and urinals in washrooms across all three campuses beginning in 2010. Water filling stations were also installed to encourage students, faculty, and staff to use reusable bottles. The grounds department has been installing native vegetation to reduce or eliminate irrigation. In 2017, CLC completed installation of over 2,500 linear feet of bioswales in its parking lots. These grant-funded bioswales are designed to reduce the amount of stormwater run-off to the parking lots with native plants that absorb and infiltrate the stormwater.

CLC conducts waste audits every couple of years to measure its success in diverting waste from the landfills. Past audits assess the college's recycling rate at 42 percent. CLC has an exhaustive obsolete equipment policy, making sure that any functional equipment first gets used on campus, then is offered to local school districts, offered up for auction, and lastly recycled before being sent to the landfill. CLC is careful to divert its construction waste and any hazardous waste appropriately. Food scraps and coffee grounds from food services are returned to the soil with composting at the farm.

CLC's Grayslake Campus is located in the center of Lake County, making it ideal as the transportation hub for the Pace Suburban Bus Service. CLC has campuses in

both Waukegan and Vernon Hills. Lake County is in the process of building out bicycle trails across the county. CLC is looking for ways to partner with the Village of Grayslake and the Forest Preserves to initiate a bike-sharing program later in 2020.

In addition to providing health center, counseling and referral, and P.E. services, CLC provides health and wellness training and services. The Health and Wellness Promotion Department provides education and experience to empower students to help themselves and others through the principles and practices of illness, injury, and disease prevention and holistic coaching. The program offers an A.A.S. degree in Health and Wellness Promotion and certificates in Personal Training and Wellness Coaching. The Center for Health and Wellness Promotion includes personal training, wellness coaching, and massage therapy services for faculty, staff, students, and community members. The museum contains a most comprehensive collection of health and wellness artifacts, with some dating back as far as 230 B.C.

Indoor air quality is managed by the HVAC Department at the college. HVAC technicians monitor thermal comfort, humidity, CO<sub>2</sub> levels, and fresh air intake remotely from the intranet Delta control system. Thermal comfort and fresh air intake are a priority in maintaining healthy indoor air quality. The new science building provides 100 percent fresh air returns to throughout its space.

The campus farm produces vegetables and herbs, grown without any artificial fertilizers or herbicides. Staff, students, volunteers, and interns at CLC's campus farm harvested nearly 25,000 pounds of produce last year to be sold to Café Willow and at its weekly seasonal farm market. Over 3,000 pounds of produce from the campus farm were donated to nonprofit groups, food pantries, and churches in 2017. CLC officially opened its apiary in September 2016 (a project led by a student in collaboration with faculty and staff) as part of an independent study. Six hives are maintained on the campus farm, providing pollinator services, honey, and educational opportunities. CLC honey is sold in the campus bookstore and used in the café.

CLC spent two years examining how sustainability fits within (and how it can be extended across) the curriculum. By undertaking two years of focused Academic Quality Improvement Projects, CLC was able to explore how sustainability is currently being incorporated into course material and also to develop and provide resources to instructors wishing to strengthen their curricula with sustainability applications.

CLC offers a variety of immersive experiences for students seeking interdisciplinary and applied learning opportunities. Students explore biology, geology, history, and



humanities courses that make the Rocky Mountains, Europe, Asia, or Latin America their classrooms. For example, students can take geology and HVAC technology courses exploring renewable energy in China. Students gain service learning experience in an underserved rural area while also getting to visit the Forbidden City and the Great Wall over a two-week spring break.

The Living Lab Trail helps campus visitors to understand what sustainable technologies are working behind the scenes. The Living Lab Trail is a meta-learning opportunity. It identifies health and wellness concepts while serving as a vehicle for wellness. The Living Lab Trail interpretative signage begins with descriptions of such features as bioswales, prairie restoration, geothermal heat exchange, and the campus farm, among other sites. The second section of the signs connects what visitors see in front of them to similar issues and opportunities in the community. Finally, the signage points to similar issues elsewhere around the world. The signage provides trail-takers opportunities to connect with the world, helping to stimulate critical thinking and to connect technology with meaningful careers.

CLC is a founding member and administrative agent of the Illinois Green Economy Network (IGEN), a consortium of Illinois community colleges working together to share resources, common experiences, and best practices to help grow the new green economy. IGEN helps colleges, such as CLC, to improve resource management on campus, develop new green job training and educational programs, and collaborate with partners in the community and across the state.

## **Indiana**

### **Hamilton Southeastern School Corporation; Fishers, Indiana**

*Fueling CurioCity for the planet*

Hamilton Southeastern School Corporation (HSE) serves more than 22,000 students and is comprised of 13 elementary schools, four intermediate schools, four junior high schools, and two high schools. It is the mission of HSE to be a forward-thinking school district, providing education opportunities to ensure the success of every student, teaching them to become a responsible citizen and to positively influence an ever-changing world community.

In 2017, HSE hired an energy manager with the task of monitoring energy use, increasing efficiency, and engaging students and staff in sustainability endeavors. Since the creation of this position, the district has increased enrollment and opened a new school, but total energy costs have decreased. HSE Schools used fewer kilowatts in 2018 with one more school and 1,000 more students than it did in 2016.

In 2019, HSE installed 4,800 solar panels. These arrays have an annual predicted production of 2,385,600 kWh — enough to power three of the 23 schools in the district. The solar arrays are providing students a first-hand example of sustainability. STEM and Humanities classes have incorporated information from the arrays into curriculum.

HSE Schools has single-stream recycling at every school. Working with Food Services, students and staff helped to eliminate many of the single-use plastics coming from the cafeteria. The students then created an art campaign and engaged the community. A local restaurant began displaying the artwork and removed plastic straws from their establishment. The district has installed more than 60 water bottle filling stations to reduce the use of single-use plastic bottles. The stations contain filtration systems to ensure students and staff are drinking clean water.

As a district, HSE meets or surpasses state and federal guidelines pertaining to indoor air quality and water quality. HSE has won the National Clean Air Award from the National Air Filtration Association two years in a row. The district proactively monitors and tests for lead, radon, and mold in all buildings, exceeding state requirements.



*Hamilton Southeastern School Corporation has a full-time, teacher-in-residence at Conner Prairie who works collaboratively with museum staff to create authentic and hands-on lessons for students.*

HSE has standardized the chemicals used throughout the district by installing centrally located chemical dispensing system instead of single-use spray bottles at every school. This has shown a decrease in the chemicals and water used while maintaining cleaning standards. Custodians perform yearly chemical inventories and partner with Safety-Kleen to remove any unused or unwanted chemicals properly.

Student-led projects have introduced vegetable gardens, rain gardens, pollinator gardens, flower beds, and trails. Several of the schools have created outdoor learning spaces that can be used as an extension to the classroom. Water samples, population studies, soil judging, and macroinvertebrate identification are a few

activities commonly completed in these outdoor spaces. HSE is cultivating a relationship with Flat Rock River Camp in St. Paul, Indiana, to send sixth-graders to study environmental science. During students' seventh-grade year, they travel to Camp Tecumseh in Carol County, Indiana, where they stay for three days and two nights to learn about ecosystem recovery, water quality monitoring, plant identification, and population counts.

HSE has a schedule that replaces older buses with more efficient models. Three-quarters of the fleet has been replaced with newer, more efficient diesel engines. There is a plan to replace the remaining 78 less efficient models within a few years. The new diesel engine buses get 9 to 10 mpg instead of 6 to 7 mpg compared to the older fleet. HSE also pays a premium to fill the buses with 50 cetane diesel gas. This type of fuel starts quicker with less smoke, improves lubricity to reduce fuel injection system wear, and burns cleaner, reducing harmful emissions such as sulfur.

As a district, students are supplied with superior nutrition that meets or exceeds the USDA School Dietary Guidelines. Schools incorporate smart snack a la carte options, such as carrots, broccoli, and tropical fruits. This produce option is provided twice a week and is free to any student, whether they purchased a lunch or not. Food Services also collaborates with school nurses to identify students with health concerns to provide them with alternatives that meet their needs. HSE has partnered with a local food bank to provide students in need with additional meals for weekends and holidays.

In 2017, HSE was awarded the Lilly Endowment Comprehensive Counseling Initiative Grant and was selected to participate in the national Collaborative Improvement and Innovation Network with the Center for School Mental Health. HSE has partnerships with Community Health Network, Prevail of Central Indiana, Fishers Youth Assistance, and the Peyton Reikhof Foundation to help support students, teachers, and community members who need assistance.

The City of Fishers has partnered with HSE to create CurioCity, an online portal allowing teachers to request guest speakers, panelists, apprenticeships, internships, externships, study trips, project-based learning experiences, and service-based learning. Local businesses and stakeholders can also access this portal and submit opportunities that they are willing to host or sponsor. CurioCity has facilitated the pairing of scientists, engineers, political figures, and others to meet with staff and students to share experiences and resources. The HSE Energy Manager utilized the portal to create a guest speaking opportunity to discuss the school's solar array projects. During the first five months of the 2019 school year, this allowed him to speak to more than 1,900 students about solar arrays, renewable energy, environmental impact, and sustainable features at district schools.

As part of the solar array installation, Ameresco provided Hamilton Southeastern Schools two solar powered wagons. These wagons can travel to any school or event that the district hosts to expose the students to solar power and renewable energy. In the first five months of school, the solar wagons were utilized by 16 schools, with seven more school visits scheduled. The solar power wagons allow the HSE Energy Manager to impact classrooms and expand the National Energy Education Development curriculum currently used in the district.

The Hamilton Southeastern Schools Foundation is a great resource for teachers as they focus on implementing environmental and sustainability education. The Foundation is a 501(c)(3) that awards more than \$100,000 per year to teachers in scholarships and grants. Many of the funded projects focus on sustainability. Across the district students are working with greenhouses, beehives, chicken coops, robotics labs, and using equipment purchased through a HSSF grant. They also host a yearly donation drive called PastaBowl through which HSE Schools collected and donated more than 41,000 pounds of pasta to local food pantries in 2019 alone.

STEM is not the only class that focuses on environmental and sustainability education. HSE media specialists, energy manager, and humanities teachers have started to promote and incorporate the American Library Association's Top 10 Sustainability Themed Children Books. The books work with the district's initiative to support the United Nations Global Goals. The incorporation of these goals creates vertical alignment that allows students to grow in their depth of impact and understanding. Common vocabulary, building skills, increased engagement, and collaboration are accomplished by incorporating the Global Goals across the various age ranges. Since the Global Goals were incorporated into the curriculum, HSE has seen an increased engagement in civil action by students on environmental fronts.

Each high school offers a Socratic seminar class through the government program. A large component of this class is to investigate a major political issue. In recent years, more students have selected environmental policies. During several of the third-year foreign language classes, students research, create, and promote an ecotourism guide for a country of their choice. During this lesson, students must also discuss threats to that ecosystem and create a political action plan on how to preserve the ecotourism for future generations. Chemistry courses have also taken steps to reduce their impact on the environment by removing labs and demonstrations that use potentially harmful chemicals. Many of the labs have been modified to reuse chemicals.

## Kentucky

### Redwood Cooperative School; Lexington, Kentucky

*Outdoor classrooms for all*

From its inception in 2014, Redwood Cooperative School has valued environmental sustainability as a key program tenet. Environmental education, literacy, and service learning are so much a part of Redwood that they are embedded in the school's vision statement: "Redwood strives to be a regional leader in child-centric, progressive education that creates global citizens and empowered problem solvers with a commitment to community and environment." Each year, the school's Leadership Team surveys the school classrooms, buildings, and grounds to find identifiable environmental needs. They then plan and implement improvement projects, involving each student in the school in the process.

Redwood has installed LED lights, programmable thermostats, and water-efficient toilets. Leadership team members educate students and teachers about energy saving strategies and perform weekly energy surveys to gauge the school's progress in conserving energy.

For the last four years, Redwood has co-hosted the citywide used cooking oil recycling project, called the Gobble Grease Toss. Redwood partners with Lexington Fayette Urban County Government (LFUCG), the University of Kentucky Center for Applied Energy Research (CAER), and Kelley Green Biofuel to collect and recycle used cooking oil the day after Thanksgiving each year. Over four years, students collected more than 1,200 gallons of used cooking oil from the community and prevented it from being thrown into landfills. Instead, some is used for biofuel research and the remainder is converted into biofuels that are used in Kentucky farm equipment.

At Redwood, reducing solid waste is an ongoing effort. Students are required to bring a water bottle to school. Each student is educated about proper recycling as part of a schoolwide recycling program. In addition to city collection items, Redwood collects and recycles unique items, such as markers, food pouches, and additional plastics that the city does not recycle. During the summer before the 2019–20 school year, the city of Lexington announced that it would no longer be able to collect and recycle paper. Thus, fourth- and fifth-grade students began collecting and recycling or repurposing the paper that Redwood produces. They make paper bead necklaces, fire starters, plant pots, and they even built a chair for the preschoolers! The remaining paper is shredded and used as bedding in Redwood's school chicken coops, the worm bin, and in the regular compost bins. The processed compost is

used to fertilize the school gardens. Additionally, Redwood has begun a cell phone recycling project with a goal of collecting 300 used cell phones to take to the Cincinnati Zoo for their cell phone recycling program that helps protect gorilla habitats.

The space directly outside of every classroom has been turned into outdoor classrooms, so that each class has easy access to outdoor learning as an extension of their classrooms. Teachers use this space to offer an outdoor component to regular lessons, including literacy, engineering, and math; for hands-on environmental learning activities; for enjoying snacks and lunches; and to generally connect with nature. Teachers also utilize other outdoor space on campus to enhance lessons. For example, during a multiplication unit, teachers offered a rotation outside where students played multiplication hopscotch to reinforce multiplication facts.

On Earth Day, students were able to break ground on a rain garden. The leadership team surveyed school grounds during times of rain, measuring and calculating percentages of pervious and impervious surfaces, calculating runoff volume, and determining the ideal size rain garden to handle the volume of watershed runoff at Redwood. They spent the next several weeks building it with the help of community experts. Seeds for the native rain garden plants were started in classrooms and planted in the rain garden.

After collecting and analyzing data on idling habits in morning and afternoon carpool lines (finding that two thirds of cars were idling for 15 minutes or more, even on days with mild weather), students purchased a bike rack and “idle-free zone” signs with raised funds. Students are encouraged to ride their bikes to school and people in carpool line are asked not to idle their engine while waiting for their children.

Redwood does not use any harmful chemicals, such as pesticides or cleaning products. All cleaning products are safe for the environment and children’s health. Plants throughout the building absorb toxins and improve indoor air quality, contributing to the respiratory health of students, families, and staff. The children make natural deterrents, such as using garlic and mint to control mosquitos. The school is piloting the use of beneficial nematodes. Filters are checked regularly, and any identified moisture is mitigated. Water samples from drinking fountains are tested by the water company to ensure optimal drinking water quality.

Redwood built a raised bed garden using free end cuts from a local lumber yard to reduce waste. Each class starts seeds in the classroom and tends to the seedlings until they are ready to be transplanted in the outdoor garden, and all classes tend to the outdoor garden and harvest produce. Some of the produce is enjoyed by

students as nutritious supplements to their snacks and lunches and some produce is donated to local food pantries. Redwood is also home to an aquaponics system with koi and edible plants that the students tend and utilize for food production, data collection, and STEM education. In science class, they are working to colonize mushrooms, which allows them to learn about another type of growing and harvest.

Preschool students tap maple trees in their playground area and process the sap to make maple syrup. The students host a plant sale in the spring each year, selling some of the starter plants that they have grown in the classroom to raise money for their garden, other environmental projects, and to assist Redwood families in beginning their own food production gardens. Last year, Redwood partnered with a local farm to promote community-supported agriculture through weekly farm shares

for participating families. School grounds now include edible berry shrubs throughout the property so these fresh foods can be accessible to students.



*A Redwood Cooperative School student collects fish from the aquaponics tank to measure its weight. This measurement will be used to determine the amount of food to give the fish (2 percent of the total body mass of all fish in the tank).*

Redwood participates in the University of Kentucky Extension egg incubation project. Classes incubate, hatch, and care for the chickens. Students provide food and water and collect eggs from coops on campus. Some classes have used their eggs to make baked goods; others have donated the eggs they collect. Keeping chickens at school allows students and families to connect with farm animals, develop compassion, learn about locally produced foods, and reduce the carbon footprint of

food transportation.

All students, preschoolers through fifth-graders, are provided 90 minutes of daily unstructured outdoor time for social and emotional growth, free play, and nature explorations. Middle school students have 75 minutes of unstructured outdoor time daily. Students and families are involved with neighborhood trash cleanups, community tree plantings, stream studies and exploration of natural areas. Each week, Redwood teachers are provided an opportunity to take yoga and mindfulness classes free of charge.



Teachers are offered professional development and outreach opportunities that help them integrate environmental education curriculum into their classrooms. As a result, 65 percent of all Redwood teachers are certified in a formal environmental education curriculum. In July 2019, Redwood hosted its first annual conference on environmental education. The school welcomed 80 teachers and many professionals in environmental education.

Teachers utilize a model of project-based learning to gather students' input and interests to devise relevant curriculum through thematic units of study. Theme studies support environmental literacy and learning. The first-grade class participated in a long-term study of bats and, after conducting research and building models of bats and bat boxes, students wrote persuasive writing pieces to the administration requesting that the school allow them to build and place two bat boxes on campus. Upper Elementary students held a bake sale to raise money for the first-grade bat boxes. Middle School students used the knowledge they gathered during social studies to launch a social media campaign to help save the rainforests. All families were able to watch the videos they created and engage in the project.

During the study of water quality and research of rain garden features, students took a field trip to a restored stream to participate in macroinvertebrate identification as an indicator of water quality. Students often attend field trips to the Living Arts and Science Center and the UK Arboretum, as well as the Buckley Nature Preserve, Raven Run Park, Bernheim Forest, EKU Planetarium, Lower Howard's Creek Nature Preserve for a stream study, Toyota Manufacturing to view sustainability efforts, and tree planting at McConnell Springs. The Redwood Leadership Team hosts an annual Earth Day Extravaganza, a fair that families and students are invited to attend. They rotate through STEM and environmental learning centers.

## **Fayette County Public Schools; Lexington, Kentucky**

*Unleashing students' ideas and enthusiasm OR It's all about sustainability*

Fayette County Public Schools (FCPS) works to empower students to lead the way through access to data, strategic community partnerships, and national best practices — and has experienced its greatest success when students' ideas and zeal are unleashed. FCPS is a majority-minority school district with 69 schools, 42,000 students, 94 native languages spoken, and 49 percent of students qualifying for free and reduced price meals.

In 2019, FCPS developed Kentucky's first school district sustainability and wellness strategic plan, "It's About Sustainability." The plan is a five-year roadmap that builds upon the district's strengths, momentum, and years of sustainability progress in



building efficiency, environmental literacy, and student and staff wellness. This plan seeks to improve FCPS's stewardship of fiscal, natural, and human resources by empowering students, staff, and families to improve sustainability and wellness on each school campus and reflects a future-oriented perspective on sustainability that is optimistic, emphasizes development and strengths, and focuses on human potential.

The Plan is a living document that is systematically reviewed by the Sustainability + Wellness Steering Committee, a team of diverse stakeholders representing each of the five focus areas. A critical metric will include schools' annual performance on the Sustainability Scorecard, a benchmarking tool organized by the Sustainability + Wellness three pillars: 1) Environmental Literacy, 2) Building Efficiency, and 3) Student Wellness. In addition to a districtwide three-pronged Sustainability Scorecard to provide schools with a tool to benchmark performance and identify opportunities for improvement, It's About Sustainability offers an incentive program called Go Green + Earn Green, divided into four \$200 Power Packs and five Green Culture activities. Through Go Green + Earn Green, schools have the opportunity to earn up to \$1,200 to be reinvested into student-driven sustainability improvement projects through activities, such as a sustainability meeting with district and school personnel, energy awareness campaign, appliance consolidation, and other sustainability improvement projects.

All new FCPS buildings have a target EUI goal of 35 kBtu per square foot or lower. The newest high school, Frederick Douglass High School, achieved a perfect 100 ENERGY STAR score with a sub-20 kBtu per square foot EUI. Since FCPS started monitoring and managing energy consumption in 2011, it has reduced EUI overall by 24 percent. Over that same period, FCPS saw its student population grow by over 4,000 additional students and an additional 800,000+ square feet of building area.

Recycling, increased energy efficiency, water conservation, utility rate audits, and grants have provided a cost savings to the district of over \$16 million since the inception of the FCPS sustainability program. In 2012, Fayette County Board of Education adopted a recycling resolution, acknowledging the fiscal, environmental, and student engagement benefits of comprehensive, districtwide recycling. In 2013, FCPS It's About Sustainability published "FCPS Composting Manual for Schools." Plastic lids are not recyclable in Lexington. In an effort to divert plastic lids from the landfill and in partnership with GreenTree Plastics in Evansville, Indiana, over 20 FCPS schools have collected and upcycled over 20,000 pounds of nonrecyclable plastic lids into campus benches and tables incorporated into their outdoor classroom settings.

In 2016, It's About Sustainability launched the Outdoor Classroom Coalition with the mission to remove logistical and resource barriers to outdoor learning spaces. With support from the district's Coalition, 85 percent of FCPS sites have installed an outdoor classroom.

All plants and landscaping on FCPS properties are regionally appropriate. Twenty-two school campuses have rain gardens to assist with filtration of water runoff. In 2013 FCPS It's About Sustainability published *FCPS Rain Garden Manual for Schools* to include best management practices for rain garden installation and curriculum integration. In plumbing, a reduced pressure backflow preventer is installed at the domestic water entrance, preventing the reverse flow of polluted water from entering into the water supply. Lead-free plumbing components were used during construction of buildings. In all new construction and renovations, water bottle refilling stations are installed to encourage students to hydrate and reduce single-use plastic bottles.

FCPS' chemical management program includes a chemical purchasing policy (low or no-VOC products), storage and labeling, training and handling, hazard communication, spills, and selecting third-party certified green cleaning products. Many schools are moving to reduce or eliminate biohazard waste generated as a result of science dissections. School buildings are kept between 71–74 degrees Fahrenheit during the cooling season, and between 69–72 degrees Fahrenheit during the heating season. Newly renovated schools have CO<sub>2</sub> monitors that regulate the fresh air ventilated into rooms. Schools that do not have the monitors are regularly checked using handheld CO<sub>2</sub> meters.



*Fayette County Public Schools planted more than 60 trees during a citywide Tree Week event.*

In partnership with KY Division for Air Quality, students collect data on afternoon carpool line campus idling. Upon completion, students implement a two-week no idling awareness campaign using newsletter templates, announcement scripts,

posters, and tokens of appreciation. Post campaign, students again collect idling data and install a no-idling sign on campus. Since no idling was launched in 2014, 30 percent of FCPS sites have adopted a no-idling policy.

FCPS purchased health curriculum resources from ETR, the HealthSmart Curriculum and materials. Each school was given texts and workbooks to integrate into their school curriculum. P.E. and Health teachers were then given a full day of professional development to map the curriculum and integrate online resources into the district's portal. All elementary and middle schools have a half-time nurse and high schools currently have a full-time nurse, with the aim of a full-time nurse in each school by 2025. Additionally, there are Federally Qualified Health Clinics (FQHC) in eight FCPS elementary schools, one middle school, and one soon to open in a high school. The district works with partners to offer mobile dental services and mental health screenings, assessments, and services in middle and high schools.

A coalition of community partners, including district nutrition, the county health department, and state extension service, works toward increased locally sourced school food and provides classroom lessons on the environmental, economic, and wellness benefits of local food, primarily through 45-minute, hands-on lessons on each benefit. In 2019, FCPS piloted a Farm-to-School Lunch Challenge, a weeklong effort to raise awareness of the benefits of local food, with locally procured food items on the line every day; competition for increased student participation in school lunch, including prizes; and visits from local farmers. Since 2015, over 2,000 students have been reached by farm-to-school lessons, and cafeteria procurement of locally sourced items has increased by 50 percent.

Leveraging best practices from dozens of local, state, and national partnerships, FCPS supports environmental and sustainability education through Sustain Educate Empower Kentucky (SEE KY), programming that is strategically aligned to the three dimensions of Next Generation Science Standards, with special emphasis on engineering practices and real-world applications and purposefully infused with STEM activities and learning objectives. Each school's SEE KY team is led by a school sustainability coordinator, and curriculum is closely monitored to maintain state academic standards alignment.

In addition to providing instruction and tools, the district's It's About Sustainability program serves as a portal to local, district, state, and national resources, partnerships, and curriculum. Go Green + Earn Green funds may be invested into registration, transportation, and accommodations for green school professional development opportunities or student transportation to environmental education experiences. Each September, It's About Sustainability hosts a full day training for school sustainability coordinators, to include training on data-driven lessons and



community partner speed dating several dozen local and state environmental education partners.

Bluegrass Youth Sustainability Council is a project-based coalition of student leaders from all of Lexington's public and private schools. The 65-member Council meets in person monthly and virtually weekly in Project Committees to design and implement collaborative projects. BYSC offers unprecedented collaborative and leadership opportunities.

## **Maine**

### **Camden Hills Regional High School; Rockport, Maine**

*Oceans of student-driven sustainability*

Camden Hills Regional High School (CHRHS) is a public high school located in coastal Rockport, Maine, serving 720 students in grades 9 through 12. It has a graduation rate of over 90 percent, with almost 70 percent pursuing postsecondary degree programs. Although CHRHS takes pride in its academics and routinely scores among the top 10 high schools in the state, it is how it has allocated resources to respond to an ever-changing world for students that makes the school stand out.

CHRHS policies, budgeting, and its people all focus on ensuring systems that will promote and support healthy students, a healthy school, and a healthy planet. CHRHS serves as a beacon of sustainability throughout the midcoast. Nonteaching staff (facilities and maintenance, school nurse, librarians, food service, counselors, and groundskeepers) actively contribute to continuous improvement as a sustainable and healthy school community.

A student sustainability group, Windplanners, with overwhelming support from district administration and the community, has worked to reduce the environmental impact of the school. Their initiatives include a major study and capital campaign to install the 100-kw wind turbine, working through one of the first power purchase agreements for high school installations in the state for a 159-kw solar array. These two installations provide 30 percent of electricity needs from on-site renewables.

Working with the facilities director, students helped initiate several energy-efficiency projects that have reduced demand by another 20 percent. These projects include full retrofitting of lighting indoors and out to LED, installing a manual switch for a high load transformer, and taking several transformers off-line. The facilities director and district leadership have worked quickly to enter into an agreement to build a solar

farm that will move CHRHS, along with two other schools in the district, to be powered by 100 percent on-site renewable energy before the end of the year.



*Camden Hills Regional High School's student group, the Windplanners, spearheaded an effort to install a 100-kW wind turbine and a 159-kW solar array. These two installations provide 30 percent of electricity needs from on-site renewable energy.*

On transportation day, everyone is encouraged to carpool, ride the bus, walk, or ride instead of driving by themselves. Through an independent STEM project, the Windplanner group built a sensor that allows the school to monitor incoming and outgoing traffic. The school has a no-idling plan in place and is studying ways to make rural routes more efficient and to encourage biking among the closer residing students.

CHRHS' newest initiative involves several staff members and the Windplanners in building an organic waste management system. The aim is to compost 100 percent of the school's organic waste and, eventually, that of two other nearby schools. CHRHS currently produces about 75 cubic yards of compost each year and anticipates this to increase to about 150 yards. Students serve as compost managers and every freshman has a turn at compost duty. The composting system includes paper waste and local horse manure; is used on school gardens and fields; and yielded a \$700 profit in fundraising sales last year. CHRHS also has systems in

place for recycling in every classroom; installed five water bottle filling stations; and shifted from plastic silverware to reusable silverware.

Eight years ago, with the help of some community members and money raised during an annual plant sale, CHRHS installed a terraced garden on some marginal land that was considered a mowing hazard. Each year, the school designs and plants the school garden with the goal of the harvest maturing when school begins in the fall. The school is also home to an orchard and asparagus patch that produce when school is in session. Both of these initiatives have been focused on helping increase the amount of local produce that supplies the school cafeteria.

Students have access to people and resources that support their emotional growth and well-being. This includes schoolwide conversations related to mental, sexual, and physical health, which take place in homeroom groups, as well as all-school assemblies and other special events. Camden Hills actively works to create a safe and open space for its students. This year we have had a focus on sexual consent in the context of sexual assault and mental illness. Students have been involved in presentations and conversations that shed a light on understanding these topics.

CHRHS' library is very responsive to providing a wide variety of activities and stress relieving resources, which is likely why it is one of the most popular places in the school. The library has become a wellness area providing resources like massage chairs, therapy dogs, animal cams to view nature in action, adult coloring pages, and board games.

The school's cafeteria is open every day for breakfast and lunch, with many healthy options. Whenever possible food is locally sourced, or even comes from the school garden. CHRHS offers vegetarian options and implements a meatless Monday initiative. The home cooking station is usually the most popular with fun and different food options daily. Chefs draw inspiration for meals from international cuisine. In addition to the school food program, CHRHS addresses food insecurity through a snack pantry offering healthy choices and available to all students during and after school.

The outdoor classroom has stone benches under a canopy of trees and is heavily utilized by teachers during the warmer months. The 3/4 mile nature trails follow the circumference of the CHRHS campus and allow students and staff to go on walks and enjoy the beautiful woods on the campus while unplugging from the stress of school and getting exercise. Due to the well-studied benefit of outdoor activity on mental health, CHRHS actively encourages students to use the outdoors to

destress. The Nordic ski team, mountain bike team, and cross-country team all use the trails for practice or competition.

A facilities manager is skilled in monitoring, maintaining, retrofitting, and envisioning a sustainable and healthy school building. Building controls allow for remote monitoring of temperature, humidity, and CO<sub>2</sub>. There are regular visual inspections with periodic external evaluations of moisture penetration. Any issues that arise are addressed. CHRHS is currently working to address water leaks in the aging heating system. The school is on a public water supply that is fortunate to have almost 90 percent of its watershed under protected land status. The supply is regularly tested and meets all safe drinking water standards. The organic management of the school's sports playing fields has led to a significant reduction in irrigation water use.

Over 77 percent of teachers incorporate sustainability education in courses. All freshmen Global Science courses cover climate science and sustainability. In this class, about half the course is spent understanding the nature of climate change, including the greenhouse effect, sustainable energy, and even includes an activity in which students engineer sustainable solutions to problems around the town. Students are taught how to calculate their carbon footprint, investigate how carbon dioxide behaves to trap heat, investigate sources of carbon dioxide, learn the chemistry of ocean acidification, and study current NOAA data sets and peer-reviewed consensus studies through collaboration with TUVA Labs. Labs revolve around environment topics; some examples include testing solar home prototypes and testing the effects of ocean acidification on marine shells.

The honors level of this course along with Honors English for freshmen have been redesigned to offer one-half of the year as a collaborative experience with a focused investigation into climate. Connecting to information gained from their science studies, Honors English 9 students analyze authors' use of technique as it relates to climate fiction (cli-fi); write their own cli-fi stories to communicate their understanding, fears, and hopes about current sustainable practices; and practice debating skills.

AP Environmental Science (APES) labs are designed around investigation of the quality of air and water on campus. Students gather water samples at various sites before returning to the classroom and running this water through a series of tests to determine its quality, providing helpful data for the campus facilities director. Additionally, APES students gather data for storm surge research through a probe in Rockport Harbor that is then used in research by the University of Maine.

Gardening and Horticulture includes germination, pest and disease management, propagation, and soil amendments. Students plant and maintain vegetable and

ornamental seedlings in the school greenhouse, which adjoins the school, for a student-run plant sale in late May and for planting in the school gardens for use in the school's lunch program.

Humans in the Environment uses readings on the environment from the past and the present to teach students about the complex choices humans have in how they affect the environment. Outdoor Literature examines the transcendental mindset of philosophic literature (including prose, poetry, fiction, biography, and professional writing) to answer questions regarding human roles in the wilderness, whether it should be conserved, preserved, exploited, or used for recreation.

In both US History and Active Citizenship, students study environmental crises and activist movements in response to them and design their own acts of citizenship. AP Human Geography introduces students to the study of patterns of movement and use of the Earth by humans, covering such material as refugees/asylum seekers, agriculture, sustainability, and history in certain important geographic locations.

In the P.E. course Maine Outdoor Experience, students are outside every class to explore the lifelong fitness and recreation opportunities that the state offers. Students engage in activities that include hiking, sea kayaking, snowshoeing, and wilderness camping with an emphasis on "leave no trace" ethics.

One of the largest annual field trips is to the Common Ground Fair in Unity, Maine, which promotes local, organic, and sustainable lifestyles and practices. Students in AP Environmental Studies are joined by exchange students, transitional life skills students, and others with curricular ties to the event in a collaborative celebration of rural life and sustainable communities. Students can choose more long-term courses or trips rooted in place-based experiences beyond the immediate community. Tropical Marine Biology Seminar is centrally designed around an 11-day summer visit to the Island School/Cape Eleuthera Institute in Eleuthera, Bahamas, where students work in teams to investigate a selected place-based research opportunity. Advanced Marine Ecology is a college-level class that partners with the University of Maine at Machias to teach students about the intertidal species of the Gulf of Maine and the research process. Students conduct environmentally centered research in Machias, Maine, during the summer with a college professor.

## **Mount Desert Island High School; Bar Harbor, Maine**

### *Empowered to take action*

Mount Desert Island High School (MDIHS) is a rural public high school in Maine that draws 542 students from 10 K–8 schools in and around the Mt. Desert/Bar Harbor,

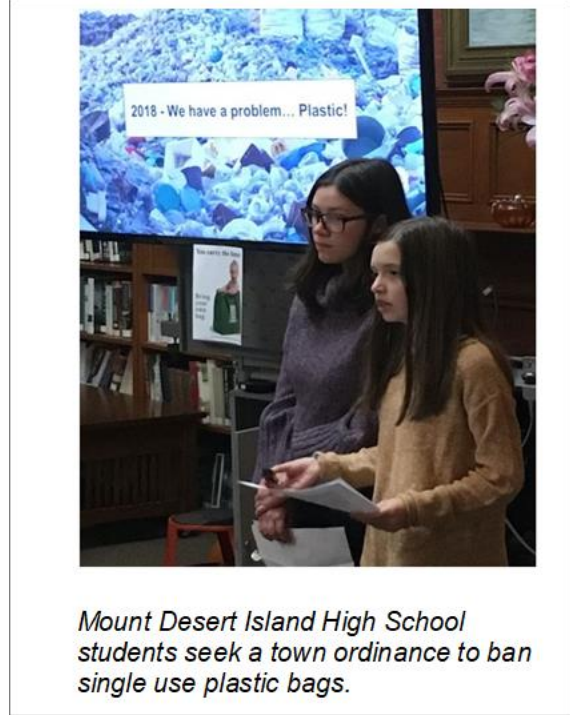


Maine, region, including three tiny schools (3–36 students) from nearby outer islands. Green and sustainability efforts are supported by school and district administrators, school board members, the school’s Environmental Concerns (Eco) team, teachers across departments, and staff, including counselors, custodians, and cafeteria staff. There is widely shared interest in the health and wellness of students and staff, support for educational experiences that prepare students to be active informed citizens interested in the changing world, and an increasing emphasis on environmental sustainability.

Decisions for the past decade have been made with environmental health and efficiency in mind. Most obvious are the 1400+ solar panels on the roof of the high school. MDI High School was the first high school in Maine to generate all of its electricity needs from on-site solar in the fall of 2019. Soon, everyone will be able to see the new electric bus parked outside with its diesel counterparts.

In 2011, energy efficient boilers were installed when replacement of the old boilers was necessary. Two years ago, the school completed a conversion to LED lights inside school and LED “night-sky” compliant lighting in parking areas. The building renovation also completed that year included a focus on improving the building’s insulation to better regulate temperatures and save energy. The new storage building near the athletic field, completed a year ago, was built with smart climate control, solar panels, and restrooms with low-flow toilets, water-on-demand faucets, and electric hand dryers. There is an electric vehicle charging station in the parking lot for staff and students to use.

MDIHS advisory groups and the Eco team oversee recycling of every type. National Honor Society members pick up returnables weekly throughout the building and students manage the recycling in all of the administrative offices as well. This is the fourth year that the cafeteria is using reusable metal instead of disposable plastic silverware. Composting in the cafeteria started at the end of 2018–19. The school contracted with Agri-Cycle to efficiently convert food waste into electricity, fuel,



fertilizer, and other beneficial products. Cafeteria staff participated in the Smarter Lunchroom program to learn additional ways to cut down on food waste.

The custodial staff uses eco-friendly cleaning products to keep the floors buffed, classrooms and bathrooms clean, and the windows sparkling. During the building renovation in 2017, filtered water bottle filling stations were installed throughout the school to reduce plastic waste and promote hydration. As part of the library renovation, the last remaining fluorescent light ballasts will be removed, eliminating what was once an extensive PCB hazard throughout the building. The school was built in 1979, so an asbestos management plan was put into place 20 years ago and staff are trained annually. Drinking water is regularly tested for nitrates, coliforms, lead, copper, and pesticide residue. MDIHS has eliminated the use of toxic substances in the art studios and chemical management is taken very seriously, following the OSHA safety guidance for science labs. There is signage and an ongoing effort to discourage engine idling. The school is set back quite far from the main road, minimizing traffic noise and air quality degradation from passing cars and trucks. There is an integrated pest management plan and practices in place.

MDIHS is home to state-of-the-art fitness center and dance studio, staffing for guidance and counseling, a full-time nurse, and an abundance of choices for P.E. classes and extracurricular athletic options. CPR certification is a part of the required Wellness class. This ensures that approximately 50 percent of the total student body is certified in CPR at any given time. Students have a choice of a variety of classes to complete the P.E. requirement: Foundations of Fitness, Lifetime Activities, Team Sports, Weight Training and Cardiovascular Fitness, Outdoor Activities and Fitness, and Adapted P.E.

An active staff wellness program is led by two teachers who challenge their colleagues each month to improve their physical and mental health through water challenges, movement challenges, morale boosters, and other activities. For many years, the nurse at MDI High School coordinated a small Wellness Fair once a year for high school staff. This has turned into a districtwide biennial Health and Wellness Professional half day held at MDIHS in March to build community, emphasize wellness, and help staff relax and rejuvenate.

During the 2019–20 school year, more than 50 percent of students will be in at least one course that includes a focus on climate change, human impacts on the environment, and/or proposing and designing solutions for problems they identify and research. In comparison with five years ago, all incoming freshmen will graduate having had to use critical and systems thinking to consider the environmental issues facing the planet and how they might respond. For example, MDIHS has completely redesigned the required freshmen biology class to include a strong environmental

focus. Freshmen biology now includes the study of carbon cycling in photosynthesis and cellular respiration through case studies of deforestation and loss of phytoplankton and a study of ecology that includes looking at and discussing trophic cascades, biomagnification of pollutants, and many case studies of human impact on the environment (Aleutian Islands, Willamette River, Yellowstone wolves). The course culminates with a Human Impact Project in which students research and present one way that humans are impacting the earth, such as through the spread of invasive species, poaching, or irresponsible mining.

Most of MDIHS students will engage with the related issues of climate change and human impact multiple times during their high school career, regardless of their pathway to graduation, through traditional classes, advanced classes, experiential learning experiences or other electives, and/or during their senior exhibition capstone project. MDIHS students not only explore climate change and environmental issues in many science classes, they also explore these topics in human geography, current events, AP History, and foreign languages. In addition, students examine topics related to environmental degradation and possible stewardship solutions when engaged in experiential learning.

Students enrolled in the nine-week Farm to Table elective visit local farms and spend some time in the kitchen, learning to prepare and cook locally grown and gathered food. In the Food and Nutrition course students discuss the environmental impact of agriculture and ways that it can be done more sustainably, compare the environmental and economic impacts of eating locally versus globally sourced foods, and explore the nutritional importance of water and impact of global climate change on the availability of clean water. Students in the Clothing Construction course compare natural versus synthetic fibers and fabrics and discuss the environmental impact of each, as well as the impact of mass production of natural fabrics versus organic and/or locally grown fibers. The Guatemalan Studies class, offered every other year since 2012, is a semester-long course combined with two weeks of study, cultural immersion, and service learning in the highlands of Guatemala.

MDIHS students can also apply for school year and summer internships at The MDI Biological Laboratory, where they can study sea life adaptation to the changing climate. The MDI Biological Laboratory also partners with individual MDIHS teachers to have students participate in an ongoing place-based citizen science investigation and data literacy project into arsenic levels in local wells. Another powerful pathway to developing critical, creative thinkers and problem solvers are Design Thinking courses.

It would be easy for MDI High School students, like so many other young people, to be discouraged about slow progress on climate change reform or to be anxious

about the state of the world. They would not be alone. Instead, when interviewed, Eco Team members talk about hope and optimism. Listening to Eastern Maine Skippers' presentations, Senior Ex presentations, and student presentations to the community about plastics pollution or the need to declare a climate emergency, it is clear that MDIHS students feel educated and empowered to take action. Students can study a topic related to how their own lives may be impacted by climate change for their Senior Ex capstone project.

Next steps for students on the Eco Team, staff and administrators include researching the best way to reduce paper waste in the bathrooms, further exploring the implications of the high school cafeteria being part of the Sustainable MDIHS pledge, embarking on an energy benchmarking project, improving recycling signage, and looking into programmable venting and air quality testing. And, of course, evaluating how the new electric bus performs.

## Maryland

### Oakland Terrace Elementary School; Silver Spring, Maryland

*Dual language, sustainable focus*

Oakland Terrace is completing its second year as a dual language two-way immersion school. Students receive 50 percent of their content instruction in English and 50 percent in Spanish. Additionally, Oakland Terrace is home to a Preschool Education Program (PEP), full day pre-K program, and a Social Emotional Special Education Support (SESES) program that serves students with social/emotional and behavioral challenges. As a Maryland Green School that just received its first state program recertification in 2019, Oakland Terrace has successfully engaged all students, staff, families, and community in programs and activities that promote stewardship to improve the health of the planet and make learning more relevant for children.

Oakland Terrace incorporates lessons for improving the planet and human health into instruction and activities within the traditional classroom at every grade level and outside of school. Included as venues for environmental literacy experiences are the schoolyard garden/ outdoor classroom, the specials (Art, Music, P.E., and Media Studies), field trips, recess, lunch, as well as before/after-school activities and clubs.

For example, pre-K classes take nature walks, observe animal life, and discover their community. Kindergarten classes go outside into the wooded areas around the school to observe animal tracks. Through their observations, they make deductions about animal types, behavior, and habitat. First-grade students visit the Montgomery

County Recycling Center to better understand the recycling process, identify what can be recycled, and ways they can increase recycling at home and in their community. Second-grade students participate in the Audubon/Whole Foods Salad Science Program. Students plan the garden, plant seeds, tend the garden, harvest salad greens, and host a salad party.

Third-grade students create woven art pieces using materials that they dye with plants collected outside, as they learn about North American indigenous and colonial peoples. Fourth-grade students study the flow of energy within an ecosystem. They explore interactions of organisms with each other and develop an understanding of the basic needs of plants and animals. They relate these discoveries to their environment and the ecosystem it supports. Students in fifth grade learn how North American indigenous peoples and colonists used plants for food, flavoring, medicine, and personal hygiene products. They learn techniques, such as companion planting and natural ways to increase yields. They work together to design, grow, and plant seedlings in the school garden. Through reflection activities, they develop an appreciation of the resources needed to care for the earth and for survival.



*At Oakland Terrace Elementary School fifth-grade green team leaders manage the care of the schoolyard garden and outdoor classroom, as well as student energy and water conservation education.*

In Art, students make handmade paper using recycled materials and design a reusable canvas tote bag with environmental or social issue messaging. In Music, students participate in “Listening Walks” outside to help them understand how to distinguish between different sounds, thus helping them isolate the various instrumental sounds in music.

Various student green teams design, create, and display water conservation educational posters, manage recycling, and care for the garden and outdoor classroom. Oakland Terrace partners with nearby Brookside Nature Center to offer professional development for teachers and coordinate field trip planning. Each grade level experiences different field trips at the nature center.

Oakland Terrace ES has consistently reduced its energy use by ensuring that the lights are turned off in classrooms when they are not occupied. Many teachers use task lamps at the desk instead of the overhead lighting when the classrooms are

not occupied. Staff and students monitor doors and windows to ensure that they are kept closed to prevent outside air from entering.

Nearly 60 percent of students bike or walk to school. Oakland Terrace participates in a Clean Air School Bus program to retrofit school buses and in a Safe Routes to School program.

The district coordinates school environmental health monitoring, including integrated pest management, drinking water testing, radon, lead paint, indoor air quality, and asbestos. After-school programs include The Audubon Nature Club, The Great Adventure Lab, Basketball Club, Dance Yoga, Tiny Chefs, Girls on the Run, Let Me Run, student Walking Club, and staff Softball, Kickball, and Fitness Challenges. The school is adjacent to a county park and participates in a farm-to-school program that serves local produce in the cafeteria.

Students submit walking-field-trip permission forms at the beginning of each school year. Students can walk to the local creek, Kensington Branch; the woods surrounding the school for environmental education; the adjacent park for picnics and trash pick-up; and local businesses, such as Giant food store, that can provide a valuable learning experience about nutritional choices.

Oakland Terrace maintains two rain gardens installed by the Montgomery County Department of the Environment's Rainscapes for Schools Program. These rain gardens help filter water that washes from the hardscape surfaces of playground areas before entering the Kensington Branch or the groundwater. The school has a large internal courtyard that encompasses approximately one-quarter of the entire green space of the property. That space includes an outdoor classroom, colonial subsistence garden, pollinator garden, aquatic garden, woodland, and sensory garden.

## **Wellwood International School; Baltimore, Maryland**

*Meaningful outdoor learning experiences at every grade level*

Wellwood International School (WIS) began its green school journey in 2013, with many students and faculty members working to promote environmental stewardship. In 2015, Wellwood was honored to receive Maryland Green School certification and then a first recertification in 2019.

Baltimore County Public Schools (BCPS) utilizes Energy Watchdog, an energy management database that tracks all energy bills associated with Wellwood's school building. Between July 2017 and June 2019, WIS reduced greenhouse gas

emissions by 7 percent and non-transportation energy use by 5 percent. Wellwood has gone through building renovations since 2009 that include a roof replacement, a new chiller system, HVAC renovations, and energy performance contract upgrades. All lighting fixtures throughout the building were upgraded to LED motion sensor lights.

In 2016, second-grade students conducted an informal water audit of the classroom and bathroom sinks to identify any dripping faucets and then requested repairs. Students encourage water conservation by posting signs by bathroom and classroom sinks to remind students to turn off the water off after using. Wellwood has installed a rain barrel near the butterfly garden to maintain the garden during the summer months and does not use other outdoor irrigation. Wellwood has tested school drinking fountains for lead since 2016. Wellwood installed new drinking fountains in the winter of 2019. The school also provides reusable water bottle filling stations from water coolers.

Fifty-two percent of students use bus transportation. These buses all run on ultra-low sulfur diesel fuel. WIS has posted no-idling signs in both the bus and carpool loops. Students that reside within one mile of Wellwood are encouraged to walk to school.

Wellwood is one of two elementary schools in the BCPS system to be piloting a compost program for the county. While students at Wellwood have used compostable lunch trays for several years, this year they also partnered with a local veteran owned and operated composting service. Classroom “Recycling Captains” take a leadership role in the cafeteria, making sure their peers are disposing of waste properly.

When students enter the WIS lobby each morning, they are greeted by a Maryland Green School Flag and a horticulture tower garden. This tower garden, used by all students at WIS, teaches children how to grow their own vegetables and then enjoy a healthy salad. The school implements robust indoor air quality and asthma education programs. It has a proactive approach to the safe handling of chemicals and pest management. All students are encouraged to refill their reusable water bottles and to place unopened food items on the cafeteria share table.

Each year, fifth-grade students participate in a BioBlitz program, when citizen-scientists go into an area park to identify as many organisms as they can using field guides and experts. The BioBlitz includes a field study at a local Baltimore County area park for every fifth-grade student, in which they end up hiking up to two miles.

WIS offers yoga, Zumba, flexible seating, movement breaks, and an annual fun run. Students also travel to nature centers, farms, and parks throughout the year for

engaging off-site field trips that allow them to experience all aspects of outdoor education.

As an International Baccalaureate candidate school, Wellwood has established its own unique transdisciplinary curriculum that emphasizes environmental literacy and citizen science in every grade level in a “Sharing the Planet” unit of inquiry. Day-long assemblies and STEM activities with community partner, Elemental Education, have allowed students and families to learn about renewable energy sources, sustainable food choices, and waste reduction. This year, Wellwood will be holding its sixth annual schoolwide Earth Day celebration, with Earth Day themed games, learning stations sponsored by local organizations, and opportunities to teach the community about sustainability.

WIS offers copious professional development on sustainability related topics, such as waste, food, green schools, and environmental education. Each grade has multiple environmental projects throughout the year. For example, kindergarten builds bug hotels. First-grade designed bucket seats from repurposed five-gallon buckets that were donated by Home Depot. Second-grade students studied pollinators while on a field trip to a local farm. Third-grade emphasizes the importance of recycling by designing small race cars using repurposed materials. Fourth-grade oversees the WIS recycling team. Fifth-grade students study building energy use.

Second- and fourth-grade students worked together with the local Pikesville Master



*Wellwood International School students tend to their butterfly garden.*

Gardeners to install a native butterfly garden. Students in a carpentry class at a local high school created benches that were installed by Wellwood teachers, while students helped to spread mulch, in order to establish an outdoor classroom area. Each fall and spring, students care for the WIS no-mow zone by collecting litter. The fifth grade also built and installed bluebird houses. Now, fourth- and fifth-grade students work together to monitor and clean these boxes throughout the spring.

Over the past five years, students have planted over 50 trees on school property and the adjacent parks and recreation field in a partnership with the local environmental conservation group, Bluewater Baltimore. Wellwood’s first-grade students grow and



maintain indoor plants in their classrooms. Students have meaningful outdoor learning experiences at every grade level.

## **Minnesota**

### **School of Engineering and Arts; Golden Valley, Minnesota**

*Real science in a “SEA-cret” forest*

Part of the Robbinsdale Area School District, the School of Engineering and Arts (SEA), is rooted in the STEAM (science-technology-engineering-arts-math) philosophy. SEA’s school traditions, not just the curriculum, are built on the foundation of inquiry and hands-on learning. Originally built in 1970 with an open school concept, SEA was named after Minnesota environmentalist, Sigurd Olson, as it was an environmentally focused school. When it re-opened in 2012, it set out to create a community that broke the traditional educational paradigm, yet fit within the established boundaries for a public school.

SEA tracks utility consumption in SkySpark Analytics. Its solid waste diversion rate is just over 56 percent. Food service uses reusable trays and its produce waste is fed to on-site animals. Building occupants use water bottle filling stations and natural daylight is most often the primary source of lighting within classrooms. The school has led its district in composting and recycling practices. Junior Naturalist student leaders monitor and educate the school community about energy use, recycling, and care of school yard gardens and chickens.

Approximately 95 percent of the SEA population walks, bikes, buses, or carools to and from school each day. SEA ensures that vehicle loading and unloading occurs at least 25 feet from building air intakes, doors, and windows and that this space is staffed to ensure safety. Bus routes are electronically monitored and analyzed on a regular basis to determine efficiency changes. This includes sharing routes with a second elementary school.

SEA has worked to reestablish native plants, orchards, and gardens. SEA does not use irrigation on school grounds. Instead, it focuses on native habitat to balance soil biology, thus reducing the need for water. SEA features 1,600 square feet of native grasses and flowers that literally buzz with action throughout the summer and fall. Approximately 18 percent of the SEA schoolyard is devoted to the Minnesota Department of Natural Resource’s (DNR’s) School Forest program, where students not only learn core content, but also sustainable forest management practices as they work alongside Minnesota DNR Foresters and Minnesota Conservation Corps

members. SEA also partners with Hennepin County Forestry in the creation and management of a 30-fruit tree orchard located on school grounds.

In order to promote a healthy school culture, SEA encourages walking and biking as modes of transportation, trying new fruits and vegetables at lunch, encouraging healthy alternatives to celebrations, and participating in Farm to School programs. At least 50 percent of SEA students' annual P.E. takes place outdoors. SEA is home to an active Fuel Up to Play 60 student leadership group that advocates for in-school health and wellness by creating "Jammin' Minutes" videos on the morning 'news' show. Launched by the NFL, the National Dairy Council, and USDA, the Minnesota Vikings have been to SEA several times to celebrate SEA's successes with Fuel Up to Play 60. These awards have included a \$10,000 grant, being a dance competition winner, and recognition for a creative video focused on encouraging healthy eating habits.

SEA uses a coordinated school health approach to assist in promoting overall health issues. For example, fifth-grade students learn from the Golden Valley Police Department, who provide education promoting healthy living as well as information on chemical substances and advocacy to just say "no." All kindergarten students receive a free breakfast while all other students also have this as an option to start their day. The nurse promotes awareness of allergies within the building. Signs are posted outside of classrooms where students with severe allergies spend time; tables are designated peanut-free in the cafeteria; and the cafeteria serves peanut-free, dairy-free, and gluten-free alternatives.

Students are acknowledged and celebrated weekly as a school community for exhibiting positive behaviors with themselves, toward others, and the world. Many teachers provide movement brain breaks every 15–30 minutes as well as teaching breathing techniques for calm and focus. A team comprised of administration, school nurse, social worker, psychiatrist, and staff meets weekly to discuss students, create a plan of evaluation or reevaluation for services, and/or develop plans of support for social/emotional, behavioral, and/or academic need. School climate is also enhanced through buddy classrooms, whereby each primary grade level classroom is paired with an intermediate grade classroom to participate in various activities.

SEA is located in a diverse and vibrant neighborhood that has fully embraced the school in multiple ways. Many retired neighbors volunteer during the school day in a variety of contexts. These neighbors support SEA school financially with donations as well as always keeping an eye on SEA's outdoor classrooms, gardens, orchard, and chickens. SEA participates in the neighborhood Pumpkin Festival by staffing a pumpkin education table with student Junior Naturalists, participating in the parade, and growing large pumpkins and tall sunflowers. SEA collaborates with a high

school for older students to volunteer to teach scientific concepts in hands-on, applicable ways in a Seeds for Science program.

During their time at SEA, students learn from multiple environmental professionals, including Minnesota DNR Foresters, Fisheries, Invasive Specialists and Conservation Officers; National, State, and County Park Rangers, and Interpretive Naturalists; and numerous scientists and engineers with a broad array of green career focuses. These visitors contribute knowledge and experience in terms of careers, content, and context to real life, especially in terms of sustainability-focused careers and green technologies.

In addition to learning from professionals in environmental careers, students attend environmentally focused field trips multiple times each of their school years with rarely a repeat visit during their six-year tenure. Such locations include Mississippi National River and Recreation Area, where students studied locks, dams, and alternative energies; numerous Three River Parks; the arboretum; zoos; the Minnesota Twins Stadium green tour; the science museum; and Target headquarters. Whether it is at an environmental learning center, a nearby wetland, a national park, or on school grounds, each interaction is unique and powerful for students.

Annually, outdoor, environmental, and sustainability education is part of the required staff professional development, thanks to such agencies as Minnesota DNR, Project Learning Tree, National Fisheries and Wildlife, and Three Rivers Park System, which focus on core content integration. Additionally, staff have facilitated professional development for others wanting more knowledge and experience on environmental and sustainability education at district and state trainings.

Teachers regularly teach required core content in math, language arts, music, art, physical education, and science outdoors. Students learn in the school's prairie, butterfly garden, greenhouse, vegetable gardens, and small school forest, officially known as the SEA-cret Forest per a partnership with the Minnesota DNR. Additionally, students help to raise, make observations, and collect data from animals, including chickens, tortoises, reptiles, a tarantula, and many fish, including 300 rainbow trout per funding from the DNR.

Regardless of the subject, the curricular formula focuses on students developing observations, from which wonders are formed, and, in turn, questions are derived. It is from these student-driven questions, combined with standards, that learning targets are composed. Children learn about different types of pollution, climate change, and how choices as consumers and producers impact the earth. Students



*Twice yearly, fourth-graders from the School of Engineering and Arts biomonitor a local creek in partnership with Hennepin County Hennepin County's RiverWatch Program.*

raise several hundred rainbow trout from hatch to release. They conduct investigations focusing on water quality with aquaponics.

SEA students participate in real science. Fourth-graders volunteer with Hennepin County's River Watch program, collecting and reporting data from an adopted Creek twice annually. Kindergarten students plant tulips each fall and make observations each spring reporting

data to a citizen science website. Students remind teachers and one another to conserve energy and to sort waste into compost, recycling, and trash.

Through all of this, the aim is to create children who are hope-filled, not hopeless, with regard to current and projected environmental challenges.

## Missouri

### Sunrise Elementary School; DeSoto, Missouri

*Where the sun rises daily on a 22-acre outdoor classroom*

Sunrise Elementary School began its sustainability efforts in 2015 by developing educational outdoor spaces and making modifications to the building, grounds, and school curriculum. Since these sustainability efforts began, grant awards have saved the single-school district \$77,000. From 2017–19, Sunrise scored 100 percent on the Annual Performance Report released by the Missouri Department of Elementary and Secondary Education.

Sunrise has participated in the Green Schools Quest (GSQ) program since 2016. The Green Schools Quest is a six-month, project-based contest for Missouri schools

that catalyzes student-driven green projects. Mentors are provided for all GSO schools, cash prizes awarded to the winners, and school green teams work collaboratively to advance toward unique green goals.

The outdoor classroom is now a 22-acre plot that allows for a variety of learning experiences in several ecosystems, including a pond, woodland, and a cultivated vegetable garden. In 2016, Sunrise installed a storm water detention basin that detains approximately 75 percent of the school campus runoff water. Students and staff achieved the National Wildlife Foundation's Certified Wildlife Habitat outdoor classroom designation during the 2018–19 school year. Through an annual schoolwide professional development session, teachers learn ways to use the outdoor classroom space for a variety of subject areas. The space is also utilized for after-school programming and by the community-at-large during after-school hours. Local farmers donate approximately 10,000 pounds of manure to the gardening program per year, which is then mixed with Sunrise's composted food waste.

The Missouri Department of Conservation hosts a three-year training and provides science curriculum for all pre-K through eighth-grade science teachers on their grade-level curriculum free of charge. In addition, the Missouri Department of Conservation funds outdoor field trips for each grade level annually.

The Jefferson County Health Department provides monthly lessons for grades K–2 on a variety of health topics, such as USDA's MyPlate, handwashing, and family health education. Sunrise partners with the University of Missouri Extension to offer



*As Sunrise Elementary School students engaged in gardening, their awareness of the disappearing bee population and the critical issues associated with a decline in pollinators was heightened.*

health education and cooking lessons to every student in preschool through eighth grade. Cooking lessons use school garden harvest and/or tower garden produce. Local farmers provide mini-lessons to specific grade levels based on content needs, and a potato farmer provides produce for first- and fourth-grade students to study roots.

A master gardener offers lessons during the planting season to second grade. The Jefferson County Beekeepers Association partners with Sunrise and worked

alongside the school district to help teach multiple sessions regarding the importance of bees. Two beehives have been installed in the outdoor learning environment, and students maintain the hives, extract honey, and sell it to the community.

The use of water bottle refilling stations, rain barrels, tower gardens, and an aquaponics system all reinforce the value of water conservation for the school community. The rural school uses well water, which is tested and adjusted monthly to ensure water quality.

Sunrise participates in multiple recycling contests. Parents and staff have become increasingly involved by collecting recyclable items from home to add to Sunrise collections. Sunrise participates in a milk carton challenge that has reduced district landfill waste by 35 percent. Sunrise sends hard plastic to a local plant that shreds, melts, and molds it into composite boards used to build raised garden beds for the school garden. The green team of approximately 60 middle school students leads this effort, providing the hands-on labor of rinsing hard plastic, sorting recyclable materials, and weighing items prior to distribution.

Sunrise composts 40 pounds of raw fruit and vegetable scraps on-site per week from the lunchroom, yielding a 2.5 percent reduction of landfill waste. This will soon be extended to collect lunch scraps for a Feed the Pigs program, where local hog producers will come to the school daily to pick up food waste to be used for feed. The goal is to reduce Sunrise lunchroom food waste by 90 percent. The Sunrise Feed the Worms program also helps students engage in responsibly dealing with food waste. Students are sent home with a container to fill with scraps their family generates then return it to school to help feed the worms in the vermicomposting program. Families receive a brochure that teaches them what can and cannot be put in. Seventy-five percent of Sunrise students participate in this program.

Work is also underway to reduce energy use and greenhouse gas emissions at Sunrise. Sunrise installed a geothermal heating/cooling system, and 100 percent of the school building has been converted to LED lighting. The new wing, built in 2017, is equipped with occupancy sensors in its locker rooms, bathrooms, eight classrooms, and office. Beginning next school year, Sunrise middle school science classes will start tracking energy usage through ENERGY STAR Portfolio Manager. New dismissal procedures reduce parent vehicle idling by 50 percent and bus idling by 40 percent.

Students and staff at Sunrise have implemented an inclusive program to promote health and wellness that affects the school population and external community as well. Sunrise recently held its third annual Health and Wellness Fair open to area

residents. At this event to encourage and support healthy lifestyles, 20 vendors and local agencies showcase their programs. There are also medical professionals on hand to do basic health screenings at no cost. This fair has grown by 40 percent since its inception, and 80 percent of the staff attend every year. This past year, there were also 100 community members in attendance.

## **Mary Institute and Saint Louis Country Day School; Ladue, Missouri**

*Working toward a better future*

Mary Institute and Saint Louis Country Day School (MICDS) is a junior kindergarten through 12th grade nonprofit, independent day school offering nonsectarian education. It is comprised of three divisions across a 100-acre campus, the Lower School, which has 206 JK- through fourth-grade students; the Middle School, which has 400 fifth- through eighth-grade students; and the Upper School, which has 640 ninth- through 12th-grade students. Sustainability is of paramount importance in every sector of MICDS, and efforts are carefully guided by the MICDS Sustainability Committee.

Among MICDS' efficiency achievements are a comprehensive energy audit; installing synthetic turf to reduce mowing, painting, and runoff from the athletic fields and playgrounds; and state-of-the-art irrigation that waters native plantings only during drought conditions using collected rainwater. Other upgrades include lighting, HVAC, and windows that reduce energy consumption.

MICDS opened the STEM Building and Center for Community in 2014 and earned LEED-certification on Earth Day in 2015. Both the facilities and the surrounding landscape have multiple features that create learning opportunities for students and increase environmental and fiscal sustainability. Such features include a greenhouse, an orchard, native plantings throughout 50 percent of the project boundary disturbed by construction; 98 percent of all ornamental plantings on campus are native plants. All landscapes consist of either water-efficient or regionally appropriate plants. There are numerous segmented locations on campus that host native planting, and the most common is local prairie grass.

The STEM Building also boasts a 10,000-gallon rainwater tank and 1,100 gallons-per-day tank that stores greywater. Captured rainwater is filtered with UV light for re-use in drip irrigation in many of MICDS' native plant reclamation gardens that border buildings, with the evaporative cooler in the greenhouse, effectively reducing overall demand for potable water sewage conveyance by 76 percent. The filtered rainwater is also used throughout the building in low-flow toilet room fixtures, which reduce demand for potable water by 64 percent. The building has an over 400 square-foot

solar thermal array used to generate hot water and ventilation air preheat/reheat. The hot water is also connected to the boiler as a preheater.

When at full capacity load, the 100,000-kW solar panel array offsets between 13 percent of the building's electricity and as much as 100 percent of the school's electricity needs on long, sunny days when the load decreases. The facility features passive solar design, technologically advanced heating and cooling systems, and highly insulating building materials.

Across the campus, MICDS maintains high-level efficiency standards, most significantly from a lighting program that occasioned a savings of more than \$50,000



*Mary Institute and Saint Louis Country Day School students engage in water quality monitoring, invasive species removal, native species and tree planting, creek clean-ups, plant identification, and biodiversity hunts, and erosion identification and control measures.*

on the MICDS electrical bill. An abundance of natural light in hallways and classrooms of the U-shaped building and CO<sub>2</sub> sensors reduce the amount of electricity used for lighting, heating, and cooling, and improve the indoor environment. The CO<sub>2</sub> sensors in each classroom detect when the space is occupied and when fresh outside air is required. When classrooms are unoccupied the mechanical units automatically turn down to reduce energy consumption.

These efforts have earned MICDS an ENERGY STAR Portfolio Manager score of 89. In recent years, MICDS has brought online three photovoltaic arrays totaling 220 kW that are fixed on three buildings (one in each division), but most notably, the STEM Building produces more renewable energy than MICDS uses during the summer months. Over 35 percent of the STEM Building materials include pre- and post-consumer

content, reducing the impacts from the extraction and processing of virgin materials, and over 50 percent of this building's materials were sourced within 500 miles of the site.

A change in waste hauler contract provides the opportunity for MICDS' next significant schoolwide student-led initiative of educating the student body to put into practice updated recycling, composting, and landfill waste reduction techniques.



The campus is home to several bioswale retention areas, many of which have been outfitted to be used as a place of academic and social gathering. MICDS encourages healthy physical activity through unscripted recess times, ample sports offerings combined with a two-season high school sports participation requirement, as well as requirements for structured P.E. that exceed the state level.

MICDS offers many healthy food options monitored by a staff of trained nutritionists. All food is made in small-batch form to eliminate food waste. MICDS hosts biyearly faculty wellness fairs in addition to supplying a full-time wellness and counseling staff for all members of the community.

MICDS has adapted its World Language department to pursue the United Nations Sustainable Development Goals. High school students can pursue AP or regular environmental science, among other sustainability focused classes, such as Human Geography, plant sciences, and Sustainable Development. MICDS has supported independent studies on sustainable design, mapping wolf populations in suburban St. Louis, in-depth exploration of the history of U.S. energy policy, using automated farming to study soil with a student built FarmBot, and the study of greenways in the St. Louis region.

The Mars Farm project partnered with a local startup company to develop instructions to build and deploy growth chambers. Upper School students physically built five growth chambers, programmed Arduino microcomputers to control lights and fans, and wired Raspberry Pi microcomputers to remotely capture temperature, humidity, and photographs of the plants as they grow. The Upper School students trained the Middle School students, who served as the “astronauts on Mars” who physically measure the plant leaves, root mass, pH of hydroponic liquid, and communicated with the Upper School students “back on Earth.” After the plants matured, they were shipped to the Upper School where they were prepared for taste testing with Lower School students. All construction, programming, training, communication, and testing was done by students in each division. This successful plant science project will be submitted for publication to several science journals over the summer.

The STEM Building courtyard and patio provide room for conversation and outdoor games. The Middle School lunch grounds were renovated to foster engagement, and the library courtyard encourages outdoor learning and conversation. MICDS also has butterfly gardens, bird observation areas, a tree nursery, ongoing work at a honeysuckle abatement area, and sidewalks meandering through habitats and bioswales to foster learning experiences.

## Parkway School District; Chesterfield, Missouri

*Sparking a new generation of stewardship*

Parkway School District (PSD) promotes a whole-school sustainability approach to conserving natural and fiscal resources, reducing the impact of district operations on the environment, and protecting the health of students, staff, and the community within the goals of a strategic plan. The strategic plan and district mission are the foundations upon which PSD educates students and integrates environmentally, socially, and fiscally sustainable best practices into all areas within the district. The Board of Education has approved various environmental policies related to energy management conservation, sustainable landscaping, and waste minimization. Currently, a robust and comprehensive sustainability policy with associated guidelines is being written to be implemented in early 2020.

The district is 84 percent of the way toward its energy efficiency goal to reduce energy use 20 percent by 2025 from a 2015 baseline through efficient equipment upgrades, proactive conservation behaviors, and expansion of renewable energy technologies. ENERGY STAR Portfolio Manager documents a cumulative districtwide savings of approximately 77,000,000 kBTU and \$960,000 since 2010. Parkway has received 19 ENERGY STAR certifications over the last two years.



*With the implementation of both the composting and recycling programs, Parkway School District was able to cut the amount of landfill dumpsters across the district in half since 2012.*

In May 2012, the board approved the installation of solar panels at each of the district's 33 buildings by Generate Capital. This initial project had a total capacity of 825 kW. In the summer of 2019, a 300-kW expansion across four sites was completed bringing the total district capacity to over 1.1 MW. PSD participates in utility incentive rebate programs to fund the installation of occupancy sensors, LED lighting, building controls, and efficient HVAC equipment to reduce energy use. Through this program, the district has completed 177 projects and received \$1,475,000 in incentives.

By conserving water throughout the district, PSD seeks to achieve 20 percent water-use reduction by 2025 from a 2015 baseline through conservation practices, upgrading plumbing fixtures, and rainwater capture systems. Low-flow aerators have

been installed on faucets across all schools in the district. Dual flush handles have been installed at 11 schools with the remaining schools to soon follow. The landscaping at 15 schools has been replaced in full or in part with drought tolerant, Missouri-native species, with three more sites planned for 2020. There are bioswales and bioretention basins at 11 schools to manage storm water run-off. Permeable pavement systems have been installed at three schools with plans for another site to be installed in 2020. The ENERGY STAR Portfolio Manager confirms that PSD has reduced water use by 9 percent since 2012.

With the implementation of both the composting and recycling programs, PSD was able to cut the amount of landfill dumpsters across the district in half since 2012. All Parkway schools compost their food waste, lunch trays, bowls, utensils, soiled paper, and coffee cups. Weight reports and contamination reports are obtained from the waste hauler regularly. In October 2019, PSD composted 39 tons of organic material from school cafeterias. The district has eliminated the use of plastic straws and continually seeks to eliminate other single-use plastics. All unwanted materials and furniture from schools is placed in surplus at the district warehouse. The warehouse manager reallocates these goods as necessary for reuse across the district.

In 2013, PSD received \$1.5 million in a federal highway grant to acquire 30 compressed natural gas (CNG) buses and build a CNG fueling station. This project made Parkway one of the only school districts in the state to use CNG buses and the fueling station is one of only a few in the region. The CNG buses make up 20 percent of the total school bus fleet of 150, the rest of which are newer, cleaner-burning diesel. An additional CNG fueling station was added in 2019 to allow for two buses to simultaneously fuel and increase capacity for expanding the CNG bus fleet.

PSD requires all appliances and technology equipment to be ENERGY STAR certified. All copy paper purchased by the district is 30 percent recycled content. The paper towels and toilet tissue purchased are Green Seal certified and made with 100 percent recycled content. Office furniture purchased is BIFMA LEVEL certified or certified by comparable rating systems. All paint purchased for the district is zero VOC-containing.

School grounds include produce gardens, rain gardens, pollinator gardens, indoor hydroponic gardens, native plant and animal habitats, outdoor classrooms, and hiking trails that are used as outdoor learning spaces. Schools harvest produce from their gardens; it is collected by Nutrition Services staff for use in the daily menu offerings and salad bars across the district.



Every day, Parkway students at all schools have healthy meal options, including a salad bar filled with fresh produce. Meatless options, such as plant-based chicken, veggie burgers, and beans, are offered daily and advertised as healthy alternatives that reduce the carbon footprint. Each school has a share table that collects whole fruits, unopened milk and juice, and snacks to reduce food waste and provide for hungry students. Before school breaks, all milk and juice cartons are collected and donated to a local community food pantry. Nutrition Services has partnered with culinary classes and other classrooms to provide nutrition education, menu-creation contests, and taste-testing opportunities with vendors.

There is a district wellness committee made up of parents, students, staff, and community members that meets monthly, as well as 32 wellness leaders across the district that put together district health and wellness initiatives. The Employee Assistance Program and employee clinic system with Care ATC, among countless other wellness programs, have earned PSD the 2019 Business Health Culture Award. Various schools feature trails, low-ropes courses, and food pantries. In sixth through eighth grades, students participate in an “Adventure and Outdoor Education” unit in P.E., where they are introduced to the low-ropes course, rock climbing, and team building to promote leadership skills through problem-solving initiatives.

The Environmental Services department oversees integrated pest management control methods that are used to limit the use of pesticides and custodial employees are trained in integrated pest management (IPM) methods. This includes a full-time employee whose primary responsibility is implementing IPM best practices within the district. PSD has an Indoor Air Quality Task Force that regularly monitors and resolves moisture issues in the early stages of detection to prevent mold and/or mildew growth based on the EPA’s Tools for Schools program. PSD follows the Missouri Green Cleaning Guidelines and Specifications for Schools for the purchase of cleaning supplies and equipment.

In 2019, the Board of Education approved the addition of the Parkway Principles of Education for Sustainability to the guaranteed curriculum framework for all K–12 students. A team of passionate teachers, the Sustainability Department, the elementary STEM curriculum coordinator, and staff from the Missouri Botanical Gardens EarthWays Center collaborated to create Parkway’s Principles of Education for Sustainability. PSD is thus one of the first school districts within Missouri to incorporate sustainability into the guaranteed curriculum for all K–12 students.

All 1,300 sixth-grade students across PSD participate in the Outdoor School Program at Camp Lakewood. Students are immersed in hands-on, place-based learning about their impacts on the environment and the interconnectedness of all living things during their four-night stay. Students keep a field guide as they go

through the units, including local geology, horseback riding, tree identification, habitat restoration, survival skills, hiking, soil testing, gardening, water quality testing, stream insects and crustaceans, cartography, and skulls and pelts.

The Parkway Sustainability Department piloted the Sustainable Schools Challenge to increase sustainability learning and meet the district sustainability goals in early 2019. All students and staff can participate in activities that are related to the district goals for energy efficiency, water conservation, waste reduction, sustainable outdoor environments, sustainability, and health and wellness. Each month, the Sustainable Schools Challenge focuses on a different U.N. Sustainable Development Goal through the monthly mini-challenges and newsletters. By submitting activities for points, schools compete for prizes to fund other sustainability projects.

The Spark! program provides high school students in the Parkway and Rockwood School Districts with dynamic, immersion-based student learning experiences to ensure students can understand and respond to an ever-changing world. Within Spark!, students spend five to eight hours per week working to complete projects that they design or in collaboration with business partners to solve real-world problems. There are six strands, including bioscience, engineering, pre-professional health sciences, teaching and learning, technology solutions, and a sports medicine strand that will be available in 2020. Students in these strands shadow industry professionals, participate in internships, complete projects, and gain exposure to a variety of career fields.

Each year, many Parkway schools participate in the Green Schools Quest, a project-based sustainability competition, through the USGBC-Missouri Gateway Chapter. Of the 70 schools participating during the 2019–20 school year, 11 of those are Parkway schools from all grade levels. Participating schools are paired with a community mentor from a wide variety of career fields based on project type.

High school students provide services to the community and other Parkway schools during their annual Day of Service projects. A high school social studies elective, Environmental Issues, allows students to explore the development of the environmental movement and current issues, such as wildlife preservation, air and water pollution, land use, population, and energy options.

## Nebraska

### Mickle Middle School; Lincoln, Nebraska

*Sustainability culture with a champion lead*

At Mickle Middle School, environmental sustainability is integrated across all classrooms and the school grounds. The school's journey began in 2010 with a nonprofit partner helping to establish and support a garden. It was accelerated, in 2017, when the school designated an official sustainability lead.

The Sustainability Champion began by trying to determine how staff and students could better utilize the garden space. Currently, Mickle has a 35 x 35-foot garden, which houses a variety of plants in approximately 1,225 square feet. In 2017, the garden primarily was a weed patch being taken care of by Community Crops instead of Mickle students and staff. With help from administration and other teachers, the sustainability lead created an elective class, called Guided Studies, that allows students to give back to the community and learn leadership skills. This is where the culture of sustainability was formed.



*A sixth-grade science class at Mickle Middle School harvests and learns about garden vegetables.*

During the fall of 2017, the students in this class started picking and washing produce for students in need. Only about eight students, at that time, were taking part in the school's first backpack produce program in a school that has 49 percent of its student body eligible for free and reduced price lunch. As awareness about sustainability at Mickle grew, so did the students' passion for gardening. Mickle implemented a program to help keep the garden running in the summer and staff began volunteering. The Mickle Garden Club was formed.

Now, the garden has 12 3 x 8-foot raised beds, where herbs, beans, lettuce, kale, broccoli, cauliflower, standard and sweet potatoes, peas, onions, peppers, and carrots are planted. There also is a 3 x 20-foot bed for tomatoes with a trellis, and seven 3 x 3-foot raised beds with connecting trellises. The school has a variety of melons and cucumbers from these beds on vertical trellises. The Mickle garden is

also in the process of installing a strawberry bed. There is another section of the garden for popcorn, as well as pumpkins, zucchini, and other vining squash.

Two areas are designated for Nebraska pollinator plants. Other flowering annuals and perennials can be found throughout. Tables with seating serve as outdoor instructional space. In the spring of 2019, four drip irrigation systems were installed using 55-gallon rain barrels placed on raised stands.

That winter, the class turned its focus to reinvigorating the recycling program. Students devised a recycling-in-a-backpack initiative, whereby all recycling, other than paper, is placed in a backpack, then sorted and recycled by students. They wrote and filmed an informational video about recycling for the building. Mickle also participates in Crayola ColorCycle, and garden waste throughout the school year is composted.

In August 2018, Mickle signed on as one of only a handful of schools across the country to pilot the Arc for Schools platform. This platform is a building benchmarking tool that was previously only used for LEED building certification for Operations and Maintenance and was being tested as an educational resource for schools through the USGBC. Arc measures building performance for five categories: energy, water, waste, transportation, and human experience. The district provided the data for the energy, water, and waste categories, and the school distributed the transportation and human experience survey questions. Mickle has an energy score of 94 and a water score of 91. The building benefits from geothermal heating and cooling systems.

Environmental staff complete routine air monitoring at each building on an eight-month cycle. During these visits they gather data (such as temperature, humidity, CO<sub>2</sub>, and CO) from occupied rooms. As part of the Arc for Schools Human Experience score, VOC readings are also taken in the building to understand overall air quality in learning spaces. The district standard requires radon testing at all school facilities and continual retesting on a rotating basis. Mickle's custodial staff is responsible for moisture inspections. The school uses integrated pest management measures to avoid exposure to pesticides in the school environment. It is the policy of Lincoln Public Schools to ensure minimal or no exposure to pesticides in the school environment.

During Sustainability Week, the building is covered in posters about water and energy usage at Mickle. There are daily trivia questions for prizes, sustainability announcements, and guest speakers. Students from the Environmental Science

class at the University of Nebraska develop environmentally sustainable projects to complete with Mickle students.

Sixth grade learns about how seeds pollinate, as well as the reproduction of flowers. Seventh grade learns about renewable and nonrenewable resources and spend a day giving back to the community by picking up trash. In art, students create sculptures using reusable materials. In Spanish, students create identification markers for the garden in both Spanish and English. Life Skills students learn basic communication, trade, and life skills by working in the garden and recycling throughout the building. Guides Studies seventh-graders offer sustainability education to their peers. Family and Consumer Science use produce from the garden in their cooking.

Three years — and many seeds — later, Mickle has a team of staff that run the entire sustainability program under the leadership of the Sustainability Champion. Four dedicated staff members focus on Garden Club with the 20 students that consistently come throughout the school year. Two different staff members are dedicated to recycling within the building once a week.

### **Duchesne Academy of the Sacred Heart; Omaha, Nebraska**

#### *Care for creation*

Duchesne Academy of the Sacred Heart was founded in 1881. It is an all-girls, independent, Catholic high school with an enrollment of 338 students. Located in historic Midtown, the campus is also home to a co-educational preschool. Duchesne Academy is a member of the Network of Sacred Heart Schools in the United States and Canada.

In August 2016, generous donors responded to Pope Francis' environmental encyclical, *Laudato Si*, by offering to underwrite the cost of partnering with the Verdis Group, an Omaha-based



*In September 2017, Duchesne became the first school in the city of Omaha to initiate a composting program. Students place food scraps from lunch in one of the compost bins collected weekly by Hillside Solutions.*



sustainability consulting firm. Students, faculty, and staff embrace sustainability as an integral part of the school's culture, and Duchesne has become a model for private and public schools in the Omaha area seeking to implement sustainability initiatives.

In August 2017, the school became the first in Omaha to implement composting. As a result of composting and improved recycling procedures, the school now has a diversion rate of 77 percent, up from 14 percent. The cafeteria purchased a new dishwasher and transitioned to the use of ceramic plates, metal cutlery, and compostable cups and bowls. The lunch program structures the menu so that leftovers from one day can be prepared as part of meals in following days.

Duchesne requires all students to use iPads at school. With the implementation of the Canvas learning management system, more teachers have moved their classes to paperless where course materials are available online and assignments are submitted electronically. Duchesne has undertaken electronics, holiday light, and plastic film recycling campaigns working with various partners. Students organized a clothing swap.

In the summer of 2017, the school replaced its 1960s era boiler and radiated heat system with high-efficiency heat pumps. In the summer of 2019, the school replaced 178 windows with double-pane, high-efficiency windows and installed LED lighting in many classrooms and offices. In August 2019 the school received a grant to upgrade 150 T8 fluorescent bulbs to LED. It is estimated that 35–40 percent of lighting across campus is LED and this number increases each year. In September 2019, Duchesne installed a 12-kW solar array, becoming the first high school in Omaha to produce renewable energy on campus. On average, the solar array produces enough energy each day to power the school's STEM Lab, Library, and neighboring classrooms. Duchesne has a current score ENERGY STAR Portfolio Manager and received certification in 2016, 2018, and 2019.

Rain sensors have been added to the irrigation system so that sprinklers do not run unnecessarily when ample rain has fallen. Existing toilet tanks are gradually being replaced with 1.6-gallon tanks on an as-needed basis. In 2014, a significant drainage project addressed diverted rainwater runoff to a water retention basin. Since the fall of 2016, the school has retrofitted six traditional water fountains with Elkay "EZ H2O" water bottle fillers.

The school is visited once a month by Orkin, with any treatments conducted outside of school hours. The school is monitored annually for asbestos by an independent contractor. In 2007, rooftop units were added to assist in the exchange of air. In 2017, two additional units were added to monitor CO<sub>2</sub> levels. These levels are

monitored daily through the computer control system that operates the buildings' HVAC units. Air filters are changed twice a year throughout the building. The addition of the new HVAC system provides air conditioning in all classrooms and offices for the first time in the school's history. The project also included new classroom lighting that can be programmed to adjust to the activity level or focus required of students.

Coinciding with Duchesne's commitment to sustainability is an important initiative to improve the overall health and wellness of students and staff. By gathering data through student and parent surveys and consulting extensive educational research on the impact of sleep on brain development for teenagers, Duchesne made significant changes to its daily schedule beginning in August 2019. The start time for the school day was pushed from 7:55 a.m. to 8:45 a.m., and block scheduling was adopted four days a week. Preliminary data gathered from subsequent surveys indicate that student sleep has indeed increased. The school remains hopeful that this will improve student performance and lead to a reduction in stress and anxiety.

The school cafeteria offers farm-to-table lunches through a partnership with Lone Tree Foods, a local food hub that connects local farmers to wholesale buyers in the restaurant industry, to purchase fresh, seasonal produce from farmers in Nebraska and Iowa. A salad bar is offered each day that features local vegetables provided through Lone Tree. Duchesne also serves as a pick-up location for employees and school families who purchase produce boxes through Lone Tree. The cafeteria sources its eggs from an urban garden located in the neighborhood.

In the fall of 2016, the school installed a small garden, which included two espaliered fruit trees and two raised beds on the southeast corner of campus. The following year, an in-ground garden expansion was made to the area and three raised beds were added in the courtyard to grow corn, squash, and beans. In the fall of 2019, the garden received a larger in-ground expansion along the east side of the building, nearly doubling the size of the school's garden space. Additionally, eight fruit trees were planted on the northwest corner of campus. The gardens are planted and maintained by the gardening club and the Finding God in All Foods course.

Students have 200 minutes of P.E. per week each semester. All sophomores are required to take a one-semester health class taught by the guidance counselor. Topics include sections on nutrition, mental health, social media use, drugs and alcohol, sleep, and healthy relationships.

In February 2017, all Duchesne faculty and staff participated in a day of retreat led by the Verdis Group at Fontenelle Forest Nature Center. The purpose of the day was to determine the direction of the future of sustainability at Duchesne. A survey

conducted by Verdis revealed that 94 percent of the school community agreed that Duchesne should adopt more sustainable practices. Through site visits, a waste audit, the establishment of a Sustainability Committee, and guidance at a faculty/staff retreat, Verdis helped the Duchesne community name four sustainability goals: 1) Net Positive Building Emissions by 2030; 2) Zero Waste by 2030; 3) A Sustainable Food System; and 4) Sustainability Curriculum Integration.

In response to Duchesne's sustainability goal of "sustainability curriculum integration," during the 2017–18 school year the principal worked closely with all department chairs and faculty to develop and implement cross-curricular sustainability standards. The standards also include a scope and sequence that addresses how these topics will be included in courses across the curriculum.

On April 1, 2019, in an effort to share the school's passion for sustainability and to help encourage other schools to embrace sustainability, Duchesne created and hosted the "Caring for Creation in Catholic Schools Conference." The conference was attended by nearly 60 students, faculty, and administrators from four Omaha area Catholic high schools and five Catholic elementary schools.

Duchesne sponsors a schoolwide Earth Month to raise awareness for sustainability issues. Earth Month brings the student-led Sustainability Club and the adult-led Sustainability Committee together to plan events for the month. Each year the Sustainability Club also creates an all-school prayer service focusing on "Care for Creation."

Duchesne partners with Omaha's Henry Doorly Zoo's "Zoo Academy." The mission of Zoo Academy is to provide students with knowledge and career explorations relating to life sciences through authentic STEM experiences at the zoo. Students study courses in research and science in the mornings at the zoo and return to their high schools in the afternoons to continue their studies. The Design Academy course based out of the school's DREAM Lab annually provides hands-on opportunities for students to learn about STEM-related topics. DREAM students have overseen tower gardens, Trout in the Classroom participation, and spearheaded the request for solar panels.

The Duchesne preschool has successfully engaged its students and families in implementing sustainability into its curriculum in an age-appropriate fashion. Preschoolers are taught to reduce water and paper towel use and to turn off lights when leaving the classroom. Preschool teachers find creative ways to reuse a wide array of items for craft projects. Recycling and composting are taught and reinforced to all preschoolers, especially during snack and lunch times. The preschool hosts an indoor "tower garden" and harvests lettuce and tomatoes for lunches, and a number

of units are focused around nature lessons, such as the life cycle of plants, bees, and butterflies. The preschool also hosts a weeklong “Little Sprouts and Earth Tenders” summer camp in which participants receive first-hand gardening experience in the school garden, learn about bees and earthworms, and discover fun ways to reduce, reuse, and recycle.

## **Bayard Public Schools; Bayard, Nebraska**

*A student-developed district arboretum*

During the 2011–12 school year, Bayard Public Schools conducted an energy audit as part of the Nebraska Public School Energy Study. The results of the energy audit have helped target investments in energy conservation in the years since. In particular, Bayard Public Schools has been engaged in a multi-year process of replacing all lights with LED. Two of the school gymnasiums have been outfitted with occupancy sensors. The district has also updated the HVAC control systems at the high school and added blackout shades to the elementary school to conserve energy.

Throughout the school district, bathrooms have been upgraded to sensor-based water fixtures, and water bottle filling stations have replaced most of the traditional drinking fountains. Bayard Public Schools has limited areas designated for landscaping. However, where landscaping is present, the school utilizes drought-resistant plants and trees and mulches the areas to conserve the use of water. High school students are planning a re-development of the parking lot to mitigate storm water runoff and create a rain garden or bioswale planted with pollinator friendly vegetation.

In 2016, the school district completed a sustainable schoolyards project to conduct stormwater management through construction of a wheelchair-accessible viewing area and arboretum on a small hillside overlooking the track and football field. Through the sustainable schoolyards program and subsequent partnerships with the Nebraska State Arboretum, ReTree Nebraska, and the North Platte Natural Resources District, students have taken part in planting diverse species of trees in four locations on campus. They are working to label them into an arboretum system.

To reduce waste, the school district has partnered with the local sanitation company to provide an on-site recycling receptacle and has engaged in extensive recycling of obsolete computers and other electronic equipment. Students lead recycling efforts at the elementary and junior high levels. The district has reduced the use of workbooks and printing through the use of Google Classroom. In partnership with

the 21st Century Community Learning Center, the district manages worm and tumble composters and then uses the finished compost in its gardens.

The school district has participated in the Nebraska Diesel Emission Mitigation Program to decommission older school buses and replace them with more efficient buses. Bayard Public Schools has installed bike racks at each building and has partnered with the City of Bayard to provide safe routes to and from school, including several crossing guards.

Efforts to improve health and wellness of students and staff have been extensive thanks to a Coordinated School Health program. These have included implementing



*Bayard Public Schools students repurpose sod to complete a landscaping project at the elementary school.*

a Grab and Go/Breakfast in the Classroom program, developing an after-school snack program, using a recess before lunch schedule, and installing Project Fit America fitness equipment. Staff members participate in a wellness program with opportunities for health monitoring, and the school district has twice been recognized with the Governor's Award for Workplace Wellness.

The school district has participated in the Nebraska school radon testing program. During the 2018–19 school year, a mold abatement project was undertaken to remove and abate mold that was located on the exterior shaded walls of the high school. The district contracts with Johnson Controls for HVAC equipment maintenance and servicing.

The district's curriculum, in alignment with the Nebraska College and Career Ready Standards, includes instruction on weather, climate, and human impacts. The district's geography includes such topics as climate change, renewable versus nonrenewable resources, alternative energy, overpopulation, deforestation, pollution, biodiversity, and land management. Most of this is incorporated in learning about the regions of the world and how they are connected.

Students taking biology or participating in agricultural classes study ecology as it relates to the biosphere, ecosystems, populations, communities and global change,

as well as sustainable agriculture methods. Students taking courses through the agricultural education program have access to hands-on learning that includes traditional farming, an aquaponics system, and a newly constructed greenhouse.

At the elementary level, first grade tours the local landfill to learn about the 3 R's in conjunction with their science curriculum, and the fifth grade utilizes Trout in the Classroom curriculum in partnership with various environmental agencies. Fourth-grade students visit solar and wind energy farms and a solar energy farm during the spring of 2020.

The district has partnered with the City of Bayard to conduct an annual "Community Clean-up Day." Each grade level is responsible for an area of the school property or an area of town to clean. Last year the students cleaned up trees and branches from an empty lot, cleaned two properties owned by citizens of Bayard, swept the Main Street sidewalks, laid sod at the baseball diamonds, and cleaned debris and trash from the Bayard Museum property. City employees provided dump trucks, equipment, and manpower to assist in the cleanup. The school had over 400 staff and students participate in the four-hour event

During the most recent career day, students had the opportunity to learn from professionals sharing experience and insights regarding careers in agronomy, organic farming, zoology, agricultural service, and natural resources.

Bayard Public Schools exemplifies the possibilities that exist in a rural school community for active improvement and achievement in the Three Pillars of ED-GRS. Bayard Public Schools is committed to continuing to be effective and efficient in the use of limited resources in pursuit of educational excellence for students, staff, and the broader community.

## **Nevada**

### **Truckee Meadows Community College; Reno, Nevada**

*One-hundred percent renewable powered*

Truckee Meadows Community College (TMCC) is a comprehensive community college and is part of the Nevada System of Higher Education. The College serves more than 25,000 students each year in credit and noncredit programs at four educational sites and more than 20 community locations. TMCC is committed to responsible stewardship of resources and to demonstrating leadership in sustainability, including current best practices in building design and maintenance,

transportation, and use of renewable and nonrenewable resources to provide a healthy environment for students, faculty, staff, and visitors.

TMCC is a member institution of Second Nature and joined the Resilience Climate Commitment in 2016. Its Sustainability Champions Committee is dedicated to promoting positive, sustainable change to improve the campus environmental impact. Each semester, the Committee reports to the president's and planning council meetings.

One hundred percent of TMCC energy service is now from renewable energy, making it the first institution in the Nevada System of Higher Education to achieve this. With rebates from Nevada Energy, TMCC installed solar panels in 2012 and 2013 at no cost to the College. The arrays can be tracked online and on campus dashboards, making them education tools to provide hands-on training in renewable energy. TMCC also engages in energy conservation practices, such as automatic computer shutdowns and building temperature standardization, energy use benchmarking, and efficient HVAC and appliance upgrades.

TMCC has two electric vehicle charging stations, a free bus pass program, a carpooling bulletin board, a bike-to-work week, and a bike repair station to encourage alternative transportation use. Fill It Forward/Cupanion is a mobile phone app that allows students to reuse, save, and compete in waste reduction/reuse efforts. TMCC recycles all office paper, magazines, newsprint, cardboard, aluminum cans, and plastic and glass bottles. Recycling bins are located in each building of all sites, and requests for pick-ups may also be made for these items.

TMCC has installed 13 hydration stations in multiple locations, improving drinking water quality and reducing the amount of water that is wasted down the drain. A grass-cycling and leaf collection practice converts grass clippings to mulch and compost from planters. An organic soil mulch is used for landscaping. Flowering ornamentals, which require more water than natives, are positioned just at the entries, and native plants are used to transition back to the existing undisturbed landscape, saving water while creating beautiful focal points. Terraced parking lots capture rainwater and rainwater runoff are directed toward landscape beds. All TMCC campuses are pesticide free. Over the past three years 120,000 ladybugs were released to control aphids.

TMCC uses ECOLOGO-certified and Green Seal custodial products. TMCC is equipped with EPA-registered Clorox Total 360 Electrostatic Disinfectant system cleaners through which water is electrically converted into an innovative detergent-free solution for cleaning. The indoor air quality for classrooms and common areas are controlled by Merv10 filters. Staff and personnel are trained to identify mold

areas and procedures are in place to mitigate any situations. Dust mites are abated through daily vacuuming with units fitted with HEPA filters.

The community garden supplies an on-campus food pantry for under-resourced students. A Wellness Committee is committed to a holistic approach to wellness, including physical, psychological, and spiritual wellness. An annual field day promotes fun, fitness, and interdependence between faculty,

staff, and students. The TMCC Equity, Inclusion and Sustainability Office leads efforts to cultivate an inclusionary environment that honors diversity and integration.



*Truckee Meadows Community College students construct a life-size sustainable homeless shelter prototype.*

Prior to fall 2019 semester, TMCC completed construction on a brand-new soccer field. The 170,000 square foot recreational/soccer field includes a three-lane walking/running track and bleacher seating and is located just a short walk from the new 20,000-square-foot Sports and Fitness Center built to LEED Silver standards and opened in spring 2020. The facility features a full-size basketball/volleyball gymnasium, strength and conditioning room, and locker rooms.

Some sustainability courses offered include Design with Nature, Design with Climate, Environmental Health, Ecosystems, and Zero Waste Initiative. TMCC offers associate degrees of applied science in construction and design and energy technologies. TMCC architecture students created several design alternatives for a new building for the local High Desert Montessori School. Chemistry 101 draws upon the daily student lives and their usage of cell phones, automobiles, and individual carbon footprints. The Sustainability Champions Committee has led over 50 one-on-one meetings with teaching faculty focusing on embedding green concepts and best practices into classroom pedagogy.

TMCC excels in award winning service-learning projects that infuse environmental learning with compassion. Architecture, Environmental Health Science, and Environmental Science faculty work with both public and private community members. Students have used these opportunities to engage in real-world problem-solving through the lens of sustainability to address the challenges of the homeless, create interpretive nature trails, study diminishing Monarch butterfly populations,



conduct watershed studies, examine snow levels in the Sierra Nevada mountain ranges, and research bacteriophages along the Truckee River.

## New Jersey

### Cape May City Elementary School; Cape May City, New Jersey

*A Coast Guard community school learns care for the Atlantic*

Cape May City Elementary School (CMCES) serves 150 students, 42 percent of whom qualify for free or reduced price lunch. The school is a Certified Wildlife Habitat through the National Wildlife Federation. Earth Club students, who oversee the edible school gardens and the composting and recycling programs, are currently completing their Sustainable Food pathway through Eco-Schools USA. CMCES has participated in Sustainable Jersey for Schools, beginning in its inaugural year, earning a Bronze and two Silver certifications. This partnership has also resulted in three grants totaling \$6,000 to support recycling, composting, and gardening programs.

In 2012, CMCES was awarded Silver for the Healthier U.S. Schools Challenge, one of only two New Jersey schools to attain this distinction that year. Breakfast is served in classrooms to all students daily. Families are encouraged to take advantage of an in-school celebration ordering system from the school cafeteria,

which offers healthy options.

In addition to daily P.E., students participate in weekly swimming instruction in grades 3–6, an annual field day, a triathlon, fall Walk-a-Thon, and regular brain breaks, such as full school “Stop, Smile, and Move” activities and classroom-specific Go Noodle programming.

Located on 36 acres of diverse habitat, including field, forest, and salt marsh wetlands, CMCES school is fortunate to have such a rich backyard to support student



*Some 30 years ago, with the help of the Nature Center of Cape May, Cape May City Elementary School reestablished a nature trail behind the school so that classes could take advantage of the biodiversity that the campus offers, including meadow, woods, and salt marsh.*

learning, exploration, and appreciation of the natural world. In the library, fourth-through sixth-grade students are involved in a 10-month, county habitat study with a focus on the connections that are discovered during their explorations. In addition, all students learn about the Atlantic coast horseshoe crab/shorebird phenomenon and observing the baby horseshoe crabs as the school participates in the Green Eggs and Sand U.S. Fish and Wildlife Service program.

In the fall of 2015, the school participated in a citywide energy audit, using ENERGY STAR Portfolio Manager. Following this audit, an Energy Savings Improvement Plan resulted in completing the switchover to LED lights in all areas. This change was estimated to save over \$3,000 a year. The school also uses BERT smart plugs, which are programmed to automatically shut off connected electronics from 6:00 p.m. to 7:00 a.m. schoolwide. The estimated savings is \$5,000–\$6,000 a year. The school campus wind turbine produces approximately \$400 in savings. CMCES has become a PowerSave School with the Alliance to Save Energy. Third-graders conduct energy, heat, light, and water surveys and are overflowing with ideas on how the school can improve its conservation efforts. The school is home to a wind turbine and weather station.

While the renovation of the swimming pool, reopened in 2017, after having been closed and under construction for five years, skews year-to-year utility use and savings data, the pool renovation itself included many conservation measures. These measures included an energy-efficient dehumidifier, upgraded locker rooms with automatic-sensing sinks and toilets, and a water bottle filling station. Water-saving drip line irrigation and a rain barrel are used to irrigate vegetable gardens and native plant areas.

One of the school's top initiatives since 2017 has been led by students — the reduction of single-use plastics and Styrofoam. Started by a student studying ocean pollution, CMCES took the steps to make the switch from plastic utensils to metal, phased out plastic straws, replaced Styrofoam soup cups with reusable mugs, and switched Styrofoam coffee cups and plates for compostable paper products. The school is continuing to reduce its plastic waste stream through new reusable salad containers, recycling campaigns, three additional water bottle filling stations, and participation in the TREX Plastic Film Challenge.

CMCES is dedicated to building strong alliances with families and community partners. This not only strengthens the school climate and culture but provides endless opportunities for civic engagement. The school participates in the Coast Guard Community annual festival, which includes sustainability activities. In addition, the school holds an annual, green STEAM festival open to the public with displays,

hands-on activities, and a free eco-friendly raffle. These events provide a chance to educate and encourage participation in environmentally sustainable choices.

The local police sponsor a bike safety event and Coast Guard students arriving on a bus account for 36 percent of students. No-idling signage and a pledge is distributed to families. Nearly all of CMCES' cleaning products are Green Seal certified. CMCES implements an indoor air quality plan and is certified an Asthma Friendly School through the Asthma Coalition of New Jersey.

To reduce paper use, the school incorporates family text messages, emails, and accessible social media/websites. Virtually all staff communications, lesson plans, and evaluation elements are online, as are report cards. The Green Team website features its monthly newsletter, *The Leaf*. This newsletter is designed to increase staff and community awareness/education about sustainability and related actions. Seasonal "Green Challenges" are posted on this website and encourage families to complete such actions as unplugging from screens or completing an outdoor activity bingo board.

Prekindergarten students plant, study, care for, observe, and transplant sunflowers. Kindergarten students visit the milkweed and butterfly garden and learn about Monarch butterflies. First grade examines bees and pollinator gardens. Second grade learns about habitats and uses the outdoor classroom. Third grade learns energy basics. Fourth grade learns about natural resources and state forests. Fifth grade studies water and conducts a fundraiser for wells in South Sudan. Sixth grade engages in problem-based learning about the human effects on ecosystems.

Teachers are increasing their knowledge and understanding of education for sustainability. They have participated in on-site, professional development using the school's natural surroundings as a catalyst for exploration and engagement. They integrate key topics in sustainability, whether it is in a classroom, on the campus nature trail, in the school's pollinator garden, or while leading an energy audit.

### **Readington Middle School; Whitehouse Station, New Jersey**

*A community guided by the triple bottom line*

Readington Middle School (RMS) serves over 500 sixth- to eighth-graders in central New Jersey. Located in the Garden State midway between New York and Philadelphia, the Delaware Water Gap National Park and the Atlantic Ocean, understanding how to balance the needs of people, planet, and profit is ingrained in the everyday lives of the RMS community. It begins with — and is lived and led by — students and staff alike.

The school's physical space — its building, solar installation, and native, rain, and courtyard gardens — provide tangible context for student learning. Teachers, facility staff, engineers, master gardeners, and local environmentalists work side-by-side with students to examine and understand energy usage patterns, the rise of invasive species, and rain gardens as a solution to keep the watershed clean. The school has Eco-Schools USA Silver recognition and Sustainable Jersey for Schools bronze certification.

Students rehabilitate a neglected native garden to examine changes that have occurred over the past decade. They developed a grant application and were awarded funds to create test beds to investigate resource use, carbon footprint, and crop yield of traditional farming as compared with indoor food growth in vertical hydroponic gardens. Students are also designing a regenerative aquaponic food system for the school and are devising a smart solar-powered rain barrel irrigation that senses when watering is needed, based on real-time environmental conditions, to conserve water and optimize food growth.

Though RMS was built more than 60 years ago, the evolution of the physical space and surrounding natural environment is a visible representation of the value RMS places on green technologies and natural features that enhance well-being and environmental and economic health. Nearly 30 percent of the school's energy is obtained from rooftop solar panels and ground arrays. Energy usage and savings data are displayed outside of the cafeteria, and the 1:1 Chromebook initiative allows students and staff to download data and share and submit work electronically, drastically reducing the need for printing and copying. Water fountains have been replaced with water bottle refilling stations. Reusable bottles are actively promoted, and recycling is expected. RMS encourages and supports all to become active stewards of their environment. The school tracks resource use in ENERGY STAR Portfolio Manager.



*In seventh grade, all students and staff at Readington Middle School take a walk in the woods together led by local guides, focusing on ecosystems, as they use all of their senses to identify flora, fauna, and geological rock formations within their own bioregion.*

Due to the school's rural location, all students ride the school bus. Consolidated bus routes put in place in the district in 2015 have resulted in improved efficiency and reduced fuel usage.

Pest issues are handled promptly, in accordance with the school's integrate pest management plan, using low- impact methods, such as proper cleaning techniques, and caulking and weather stripping to reduce pest entrance points. An Indoor Air Quality plan is in place to ensure that HVAC equipment is maintained and filters are cleaned to promote good air quality inside the building. Students from the Global Goals team are developing an environmental monitoring station for RMS that uses sensors to detect environmental data. The students' goal is to research and track markers for climate change. Students are partnered with an MD/PhD from Rutgers University for RMS to become a data collection site for AccuPollen, so that they may likewise track hyperlocal data to gauge if changes in weather (or climate in the long term) can be correlated to a rise in asthma and allergies.

The district green committee is actively led by a board member who is an environmental engineer. The superintendent initiated and supports infusion of social and emotional learning to help cultivate a caring, participatory, and equitable environment. Curriculum supervisors align courses with education for sustainability standards and bolster nonfiction reading. The business administrator, facilities manager, and energy efficiency coordinator all keep an eye on the triple bottom line.

Sixth-grade students study natural laws and ecological principles and the dynamics of systems and changes therein. Seventh-grade students study plant reproduction, interdependent relationships in ecosystems, and biodiversity. Eighth-grade students study Earth's materials and systems, human impact, history of the Earth, adaptation and resilience, weather and climate. Each of these areas reinforce respect for all living things, maintaining balance in ecosystems, interconnectedness, and the importance of reducing, reusing, and recycling in and out of school.

The principal spearheads an annual Student Academy Day, where staff and community members join to host a day of health and well-being workshops, including archery, CrossFit, tai chi, and nature walks. The school health office and food services staff support a coordinated health and nutrition program where recommendations for healthier living have resulted in a salad bar, new menu items, and health education outreach to the school community, working in tandem with counselors and staff for a focus on mindfulness and restorative practices.

In sixth grade, students practice responsible local and global citizenship as they analyze rate and percent math problems relating to pollution, endangered species, and population growth. At the same time in science, they are reading, analyzing, and

creating graphs related to global warming. Through enrichment, they design sustainable cities of the future, envisioning and writing about dystopian, utopian, possible, probable, or desirable futures related to climate change, adaptation, and resilience. They create virtual city simulations and physical models to identify and make visible the interrelationships between social, economic, and environmental systems. In financial literacy, students examine how ethics influence consumer behavior and define what civic financial responsibility means to them. In language arts and social studies, they explore cross-cultural similarities and difference, adopting multiple perspectives to better understand what it means to be a community.

In seventh grade, all students and staff take a Walk in the Woods together led by local guides, focusing on ecosystems, as they use all of their senses to identify flora, fauna, and geological rock formations within their own bioregion. They look for signs of human impact and make connections to such concepts as deforestation and unsustainable farming practices and their consequences for early civilizations they are studying. Students relate their own observations to the present as guest speakers ranging from environmental lawyer to university expert, to New Jersey student climate advocates to watershed conservationist, describe conditions and system change in play today.

In eighth grade, students explore current events through the lens of journalist and reader as they practice establishing objectivity, identifying bias, and evaluating sources in order to prepare students to be educated citizens and to make informed decisions. In math, students take on exponential-growth-and-decay math problems as they relate to environmental factors. While in science, they explore the impact of human activities and the short- and long-term consequences for the health of people and the natural environment.

Students across grade levels work to develop innovative ways to reduce waste, support responsible consumption and production, promote good health and well-being, and build internal and external school partnerships to make it happen. Most recently, the students conducted a waste audit, beginning with the cafeteria, and reported results and proposed actions to the RMS Green Committee. Their suggestions included a student lunch survey, share table, food bank partners, food composting, a la carte menu choices, and enhanced data collection.

## ***New Mexico***

### **Coyote Willow Family School; Albuquerque, New Mexico**

#### *Beavers in the bosque*

Coyote Willow Family School (CWFS) is an alternative K–8 program offered by Albuquerque Public Schools. Students attend a program that combines a half-day or 80 percent of classroom instruction with a half-day or 20 percent of home-based instruction. The magnet school, opened in 2017, places a strong emphasis on problem-based learning, and parent collaboration is an integral part of the learning process. In this structure, not only are students led to discuss issues, such as conservation, but they are encouraged to develop their own lines of inquiry, and end up asking questions, such as “Is the environment for polar bears changing?” Under this framework, exploration of issues relating to energy, the environment, and health are inevitable. These problem-based or inquiry-based explorations are practical and often hands-on.

An ongoing seventh-grade, student-initiated project that involves an inquiry of conservation practices along the Albuquerque riverside “bosque” (forest) alongside professional researchers. Students first learn about the ecology of the area near the river, then study the importance of cottonwood trees in the riverside ecology on site. They learned that beavers chewing on cottonwood trees were causing an ecosystem problem. The students developed a process for protecting trees by wrapping them in chicken wire, solicited donations, then worked to cover the trees and monitor their growth.

In every grade level, students study environmental science from a problem-based or inquiry-based perspective. These studies cover such topics as waste management, energy conservation measures, and nature preservation and are supported by the district focus on Next Generation Science Standards. Phase two of construction is yet another opportunity for sustainability education: The district architect will offer lessons with students about how the photovoltaic panels affect the school, including looking at quantifying the impact on school overall energy use. Parents who work in alternative energy have also made presentations to classes about different types of energy sources and the basic science involved.

The same learning approaches undergird the school’s health achievements. Eighth-graders worked to establish a peer mediation to address communication and other social issues. Learning about health issues is a continuing focus. A health fair last year addressed learning as diverse as dental health to hands-on CPR training. The school environment is designed (and continues to be designed, in the second phase

of construction) as a healthy learning environment: there are safe, outdoor classroom environments for use in the New Mexico environment, which features sunshine typically for over 350 days of the year.

CWFS has instituted a “no junk food policy” and a “water-only” policy that help direct students to snacks and lunches that are nutritious and avoid empty calories. The school has started a gardening program that will expand in phase two of construction in box gardens to include a pollinator garden and an herb garden to provide natural flavorings for drinking water for students and staff.

In particular, Coyote Willow is an example of responsible school design. The school first phase has achieved LEED Silver certification, with a building that is energy efficient, safe, comfortable, and promotes alternative transportation. Building design and construction incorporated low-emitting materials in all paints, adhesives, and sealants. The flooring system is low-emitting, consisting of polished concrete flooring and hypo-allergenic carpet floor tiles. Air circulation is continuous when spaces are occupied, ensuring appropriate class ventilation. HEPA air filters are used, which remove at least 99.7 percent of airborne particles. The school is taking part in a district and state CO<sub>2</sub> survey to sample air quality in classrooms and other areas.

The building envelope design includes consideration of thermal insulation above code minimums and sun control, admitting winter sun as useful while providing needed shade in the summer. LEED documents indicate a resulting energy cost savings of 34 percent. The HVAC system is based on a ground source heat pump. Even in this already efficient building, the school community has worked through behavioral change to improve energy efficiency, reducing electric use by 13 percent from the first to second year of operation.

Lighting systems are all LED, including overhead classroom and administration lighting, high bay lights, exterior lights, and exit lights. Additionally, each classroom has daylighting from either clerestories or skylights, optimized by appropriate building orientation. This



*Coyote Willow Family School seventh-graders are involved in a project exploring the restoration and conservation efforts in the forested riverside areas of Albuquerque.*



eliminates the need for artificial lighting nearly every day. Dual technology occupancy sensors (integrating both passive infrared and ultrasonic technologies) are used to optimize energy savings and meet occupant needs more precisely.

Effective landscaping results in a 50 percent reduction in water as compared with typical landscapes in the region. The building, through use of low-flow fixtures, achieves a 30 percent reduction in water use. The design is geared toward collecting as much storm water runoff as possible and diverting it to the landscape to augment irrigation. All plants are native or adapted to the local high desert climate.

The second phase of the school construction, now underway and due to be completed this year, will incorporate a substantial solar photovoltaic array, and is expected to generate 75 percent of the school's energy needs and to reduce heat island effect by covering 80 parking spaces. CWFS has no natural gas service. Heating is provided by a geothermal heat pump, which is electricity-based.

Students work to reduce the use of paper and recycle or upcycle everything that they are able. Twenty-four percent of building materials are manufactured of recycled content and an effort is being made to separate construction waste in order to recycle it.

## **North Carolina**

### **Lincoln Heights Environmental Connections Magnet Elementary School; Fuquay-Varina, North Carolina**

*Sustainability, expeditionary learning style*

In 2018, Lincoln Heights Environmental Connections Magnet Elementary School (LHECMES) completed a building renovation and initiated a new environmental magnet theme. In the newly renovated spaces, Wake County Public School System (WCPSS) integrated best practices for reducing energy costs and increasing water efficiency and for reducing stormwater runoff. The school has reduced domestic water use by 61 percent and energy use by 29 percent over 10 years. All lights in the building have motion sensors. Thermostats in every room allow for centrally managed climate control, differentiated conditions, and savings.

Most faucets are on timers and have aerators to reduce water use. The renovation brought a new two-story wing to reduce the footprint and impermeable surfaces. The campus has stormwater runoff measures, including a large cistern and rain gardens,

to slow down and spread out runoff before it goes into the storm drains to reduce sediment in waterways. Native plants eliminate the need for an irrigation system.

Recycling encompasses comingled materials, Crayola Colorcycle, Terracycle, and batteries. Art classes use recycled materials. “These Come From Trees” stickers are placed on all paper towel dispensers to remind students and staff not to waste paper towels. LHECMES maintains Bridge Street through parent and community volunteers for the Adopt-A-Highway program. One Environmental Investigations teacher is involved in a marine debris study through which fourth- and fifth-graders analyze the types of litter collected from cleanups.

By changing school carpool procedures, LHECMES has reduced wait time and idling. It added safety patrol student helpers in the morning and uses an online spreadsheet to queue up students more efficiently from the cafeteria to their carpool color cone in the afternoon. LHECMES partnered with Safe Routes of Wake County and the University of North Carolina Highway Safety Research Center along with the town of Fuquay-Varina to implement a variety of improvements for students who walk and bike to school. The nearly \$1 million project included new curb ramps, crosswalk markings, and signs, which improve the accessibility and visibility of the crossings for neighboring students and families to more safely walk and bike to school. LHECMES also celebrates walk/bike to school days biannually with the support of Poe Health Center.

A dedicated team of four custodians monitors and manages environmental conditions in the building. A set schedule is followed for dusting, mopping, vacuuming, and cleaning surfaces to reduce allergens that could impact the health of students. A head custodian performs daily checks and is the “first responder” for any potential environmental or health hazards within and around the building. WCPSS has multiple staff in all areas of facilities to ensure any environmental or health issues are addressed and remediated promptly with professional staff. WCPSS prioritized the use of integrated pest management practices and, thus, strictly limits the use of pesticides.

The LHECMES P.E. teacher facilitates a Jump Rope for Heart fundraiser and manages student qualification and participation in the First in Fitness competition. He organizes a February family engagement night with the theme of Family Fitness. Jump rope, yoga, running, golf, and bike clubs are offered. In April, LHECMES participates in Every Kid Healthy Week, sponsored by Poe Health Center, which showcases different topics each year.

Poe Health Center is also working with the LHECMES cafeteria to encourage healthier eating choices and to discourage food waste. Free breakfast is available

for all students every day. Three tower gardens in the building and raised gardens allow students to grow produce. Students take walking field trips to the neighborhood food pantry to donate produce to benefit those in need. A backpack program provides 33 students healthy and nutritious foods on the weekends.

Restorative practices help create bonds and sense of community within the school. A full-time school counselor visits each classroom at least once a month to teach social emotional lessons. She also holds different groups to help students improve on certain skills. Classroom teachers can submit positive behavior referrals and give character trait awards. An Equity Team is working to address diversity matters.

All classroom teachers and specialists work to improve environmental and sustainability literacy across all curriculum. The entire staff has completed Project Learning Tree and Problem-Based Learning (PBL) training and are participating in yearlong Using the Outdoors to Teach Experiential Science (UTOTES) activities in partnership with the North Carolina Museum of Natural Sciences this year. The Environmental Connections Integration Specialist (ECIS) position focuses on curricular integration, grants, scheduling professional development, guest speakers, and field trips. Environmental Inquiry (EI) teaching positions were created and students have two consecutive days of EI to facilitate PBL. Expeditions are 30-minute clubs at the end of each day to allow students to further investigate environmental theme-related topics of their choice, with offerings changing each quarter.

Teachers use the outdoors for all subjects, not just in science. Many of these connections are due to the cross curricular nature of the Expeditionary Learning modules in Language Arts that focus on environmental topics, such as birds in first grade, pollinators in second, water scarcity in third, animal behaviors in fourth, and the rain forests in fifth grade. In addition, there are many social studies standards across grade level that have connections about human impacts, as well as systems in place to develop better stewards of the environment. Science proficiency has jumped from 52 percent to 76 percent, as measured by standardized test scores.

Kindergarteners find shapes in nature and when practicing counting series of objects. First grade uses natural objects to create math equations. Second-graders research, build, and test a variety of weather instruments and observed weather conditions. Third-grade students use found materials to create a “school” that would last through a rainy weekend, based on a book. When studying geometry, fourth-grade students find parallel and perpendicular lines, rays, points, and angles in nature. Fifth-grade students count how many pine scales are on one pinecone and



*A group of Lincoln Heights Environmental Connections Magnet Elementary School fifth-graders conduct soil tests on a field trip at a local environmental education center.*

then calculate an average of how many pine seeds are dispersed by the 12 pine trees on campus.

Guest speakers have included the President of Wake Audubon, professors and students from North Carolina State University, and local and state park rangers. LHECMES facilitates live video conferences with the State Climate Office and the North Carolina Museum of Natural Sciences and field trips to local environmental education centers, the local landfill, and the North Carolina Aquarium.

LHECMES participates in citizen science using trail cameras to track

and identify wildlife and by monitoring and recording precipitation in the CoCoRaHS network. It cultivates “Shad in the Classroom,” receiving eggs to nurture and then releasing them into the local watershed.

Partners, such as the South Wake Conservationists, tilled and planted native wildflowers in an area for LHECMES’ No Mow Zone. Thanks to UTOTES partnership with the North Carolina Museum of Natural Sciences, the school will soon have a mini-pond and butterfly garden. LHECMES is working with Wake Soil and Water Conservation District to become a Wake Watershed Stewardship School through participation in a Wetlands Poster Contest and by initiating an Envirothon.

Monthly family engagement nights spotlight sustainability. During “Outdoors in October,” environmental-themed activities, nature bingo cards, and bird seed balls motivated participants. The North Carolina Partners in Amphibians & Reptile Conservation coordinated with the LHECMES after-school program to educate students about reptiles, amphibians, and their habitats by bringing live animals for students to study.

## Millbrook Environmental Connections Magnet Elementary School; Raleigh, North Carolina

*Expeditionary learning for all*

The mission of Millbrook Environmental Connections Magnet Elementary (MECME) is to develop sustainability literate citizens who will change the world. MECME students, 76 percent of whom are eligible for free and reduced price lunch, are immersed in nature-based learning, with daily instruction delivered through the lens of environmental science. Millbrook's program offers authentic, hands-on opportunities to investigate and connect with local and global issues outside the school's walls.

MECME became an environmental connections school in the 2017–18 school year. This magnet theme has given the school the ability to connect students daily and authentically to environmental issues and to become proactive agents in reducing the school community's environmental impact. In 2019, gardens (rain, pollinator, and edible) were installed on campus as part of an outdoor learning lab. Students use this engaging space to learn about irrigation, food cultivation, stormwater runoff, impermeable surfaces, and other horticulture, sustainability, and ecology topics.



*Kindergarten students take part in a butterfly release during Environmental Inquiry class at Millbrook Environmental Connections Magnet Elementary School.*

Over 95 percent of MECME's landscaping features native plants and other vegetation adapted to the local climate and annual rainfall, minimizing the need for an external irrigation system. A rain garden was installed to help reduce the stormwater runoff that was flooding areas of the campus and curb erosion. School grounds have been certified by the National Wildlife Federation as a Wildlife Habitat. To be recognized, MECME demonstrated that the campus offers food and water availability, cover, places to raise young, as well as exhibiting other sustainable practices.

MECME's waste and consumption reduction efforts are led by a student team, the Green Bees, which conducted a waste audit. Students weighed the categories of

glass, metal, plastics, paper, cardboard, food, and other types of waste. These data were then compiled and shared with the student body and staff as a means to incite change within the building. The Bees now facilitate a weekly schoolwide recycling program and educate all students about recycling and composting. In addition, their “Every Sheet Counts” initiative has reduced white paper waste by 31 pounds per month. MECME is a 1:1 technology school and uses virtual documents whenever possible.

This year, Green Bees and faculty Eco-Action Team members are working to reduce the school’s carbon footprint through energy conservation. Students conducted a schoolwide energy audit in February and designed an action plan to reduce MECME’s energy consumption. By implementing energy conservation measures and installing energy efficient technologies, MECME aims to yield financial savings and reduced environmental impact.

The school has a full-time custodian, a night cleaning crew, and a schedule that is followed for the cleaning of all surfaces, which reduces allergens that could impact the health of students. The district requires integrated pest management methods before the use of pesticides around campus. Ecolab and Ecologo cleaning and paper products are used. All HVAC filters are changed every three months. Inspections and preventative maintenance are performed annually on all HVAC equipment, and coils are cleaned at least every two years.

MECME has separate bus, carpool, and walker locations. Online technology helps to queue up students when their carpool number is called, and at least four cars are loaded at one time. “No Idling” signs are hung in the carpool lanes. Each year, fifth grade completes a problem-based learning unit focused on air quality at school. Air quality monitors are placed at various locations around the school campus, including at the carpool lane. Students monitor the air quality throughout the day. North Carolina Department of Environmental Quality representatives talk with the fifth-graders about air quality. Then, students use their research to create public service announcements, brochures, and posters to present to parents to educate them on the air quality at school. The school participates in the EPA’s air quality flag program by which a color flag, corresponding to the quality of air that day, is hung on the school’s flagpole to alert students, staff, and community members of the air quality each day.

MECME partners with the Raleigh InterFaith Food Shuttle to use the food garden space in the most efficient and integrative way possible. The InterFaith Food Shuttle has placed a Food Corps volunteer at the school two full days per week, co-teaching garden curriculum, maintaining garden space with student help, and monitoring the cafeteria and composting. Furthermore, MECME currently harvests three indoor

tower gardens. Two Environmental Inquiry classes have the tower gardens and integrate growing and nutrition into their curriculum. The third tower garden is maintained in a hallway space for all students to observe. Additionally, students have the opportunity to participate in several elective courses about gardening, beginning with basic plant anatomy through planting and caring for their own garden.

The school's theme invites all teachers to engage in nature-based learning. In particular, the two Environmental Inquiry classes use the school pond for ecosystem studies, the pollinator garden for connections to literacy, bluebird nest boxes for in-depth study, and campus grounds for hikes. The P.E. teacher designs and implements outdoor field opportunities for all students. Fourth- and fifth-grade students are assessed in a variety of physical challenges in preparation to compete at the county level First in Fitness competition.

The School Health Program supports MECME through case management, health education, and consultation in order to remove health-related barriers to learning. The school nurse promotes health, safety, and education success using evidence-based practice and professional standards of care.

MECME partners with numerous outside organizations in order to support students and families. Counseling services at MECME include individual counseling, group counseling, classroom guidance lessons, and crisis assessments. Students participate daily in "Morning meetings" to foster strong connections to each other. MECME has also adopted the practice of Responsive Classroom, a student-centered, social and emotional learning approach. Students participate in yoga/meditation classes to promote student mental and physical health.

MECME has implemented Expeditionary Learning (EL) curriculum. EL is a comprehensive, standards-based core literacy program that engages teachers and students through compelling, real-world content. Environmental and sustainability concepts are integrated seamlessly through the delivery of core, elective, and special courses (environmental inquiry, art, music, and P.E.) content. Fifth-grade students have a module that focuses on natural disasters. First-graders spend two quarters learning about birds. These modules connect literacy standards with real-life environmental issues, where students and teachers are engaged in work that is challenging and meaningful, and students are encouraged to become active participants in bettering their world.

In addition to core classes, MECME offers environmental and sustainability elective courses. Electives are a way for MECME students to connect to Environmental Science with choice in mind. Through electives, students are encouraged to think,

work, and communicate like botanists, geologists, chemists, physicists, marine biologists, and engineers.

Students attend Environmental Inquiry classes two times per week throughout the school year, where learning is centered on PBL units directly related to environmental and sustainability concepts. First-graders in E-Inquiry complete a PBL unit about waste management where they create videos to teach incoming kindergarteners. Third-graders explore making healthy food choices, by growing their own food, learning ways to prepare it, and sharing it with families. Environmental Inquiry students participate in citizen science. Students use trail cameras to monitor wildlife on campus. They record their observations in iNaturalist and design creative habitat for the wildlife. Students in first grade collect citizen science data for the Lost Ladybug Project on various ladybug species.

The Environmental Connections Integration Specialist (ECIS) meets regularly with different grade levels to assist with planning using an environmental lens. The ECIS helped a fifth-grade teacher develop a math unit using the garden beds to compute area, perimeter, and volume, as well as planned with fourth-grade teachers to have their students write poems about nature. All licensed staff received training from Project Learning Tree, Project Outdoors Wonder and Learning, Growing Gardens, and Critical Friends. Teams of teachers have attended trainings from Project WET, the North Carolina Museum of Natural Sciences UTOTES, and PBLWorks.

MECME implements the Eco-Schools USA pathways and is currently recognized as a bronze-level school. All elective courses are designed around 12 Eco-Schools Pathways. Students travel to local nature/science museums, nature parks, bird sanctuaries, the mountains of Western North Carolina, and the North Carolina coast throughout their time at MECME. When travel is not a viable option, MECME brings the experience to students with guest speakers from all over the state.

## **Walker-Spivey Elementary School; Fayetteville, North Carolina**

### *Sustainability education in an urban environment*

Walker-Spivey Elementary School serves approximately 268 inner city students, in grades prekindergarten through fifth grade. Walker-Spivey is a Title I school with 97 percent of students living below or at the poverty level. Walker-Spivey began its sustainability efforts working closely with the county green school program to reduce environmental impact and cost, improve student and staff health, and provide sustainability education.





Beginning in 2014, a green team executed a plan to conserve resources. First, the school evaluated ways to reduce energy and water use and reduce waste going to landfill. At the beginning of each school year, staff and faculty review ways to reduce waste and annual data on resource use.

Green team members post reminders to power down technology, shut off all lights, and turn off faucets. The school has documented a 22 percent reduction in water use and a 28 percent reduction in energy use over 10 years. Two recycling buckets are placed in each classroom and office. Students oversee weekly pick-up of recyclable materials and promote recycling through contests.

The North Carolina State University Extension Family Health Services provides health and nutrition classes, tastings, and recipes to the school community. Walker-Spivey received a grant, Fresh Health Kids, which introduces fresh vegetables and fruits biweekly to all students. A food backpack program helps with food insecurity. Mental health training and Positive Behavior Intervention Systems promote student well-being, climate, and achievement. The school has seen a drastic reduction in suspension and aggressive behavior. Second-graders attend soccer camp from a nonprofit agency weekly. Teachers use movement at the beginning and end of the day and during breaks throughout the day.

Monitoring of indoor air quality, chemical management, and pest control are district requirements for school custodial staff. The school uses all Green Seal certified cleaning products.

Walker-Spivey features a greenhouse and a school garden that uses rain barrels for irrigation. These serve as spaces for partnering with various community organizations, including PTA, the Old Wilmington Road Group, and Community in Schools, that provide materials and support services. These hands-on gardening activities promote environmental education. The greenhouse also provides opportunities for crossover training with both science and math curriculums, all in a collaborative learning environment.

Students have visited local state parks and gardens focusing on insect and animal life, habits and environments, and changes in these environments. Second-graders are invited to the district's Earth Day celebration. The entire school visited Marbles Museum for hands-on learning, including sustainability, gardening, and active lifestyles. The school took a field trip to the North Carolina Zoo in support of the science curriculum. Other activities include a visit with the Bee Lady, an Animal Extravaganza campus visit, and a local recycling company visit.



*Walker-Spivey Elementary School second-grade students plant potatoes in their school garden.*

Sustainability is integrated into daily learning through the English language arts Wit and Wisdom curriculum. Students are introduced to sustainability concepts through authentic literature such as *The Boy Who Harnessed the Wind*. In second grade, students read about how the land was changed in the prairie in *The Buffalo Are Back*. Fifth-graders use their science lab to understand concepts such as the interconnectedness of plants and animals with their ecosystem.

On the district's digital day, students in second grade Skyped with a fifth-grade class located in a rural community. Students discussed and exchanged ideas focusing on global and sustainability. Classes discussed environmental and global literature. Second- and fifth-graders explored environmental issues affecting people locally, nationally, and globally. Students noted that even children can effect change in their environment.

## **Pennsylvania**

### **Gwynedd-Mercy Academy Elementary School; Spring House, Pennsylvania**

*Showing the planet mercy*

Gwynedd-Mercy Academy Elementary (GMAE) is a private, Catholic, co-educational academy committed to providing a high-quality education integrated with Gospel values. Education and service to others are the two building blocks upon which the Sisters of Mercy were built. Their commitment to others is centered around five critical concerns, focused on caring for the earth, immigration, nonviolence, equity, and women. The school's greatest accomplishments are not just in the tangible changes but in changed mindsets and habits of all who enter the school building.

GMAE has taken great strides to reduce environmental impact and costs. Each classroom is equipped with motion-sensor, energy-saving LED lighting, and valves have been installed on steam radiators to control the temperature more efficiently in each room. The HVAC system is inspected biannually, and the filters are changed

quarterly. Students are not allowed to place books or papers near the vents to ensure there is proper ventilation. Carbon monoxide detectors are used to monitor the gas-fired boilers and gas-fired water heaters. Carpooling is encouraged.

All water fountains have been retrofitted with water bottle filling stations. The school eliminated plastic utensils and dishware in the cafeteria by investing in reusable plates, bowls, silverware, and commercial dishwashers. Plastic water bottles are no longer sold, and cafeteria waste is composted. Weekly communications and student information systems are now all digital. Announcements are displayed on a large screen instead of on paper and the school has 1:1 technology. Classroom printers have been removed, and teachers have codes to print on commercial printers. GMAE donates used textbooks, novels, supplies, uniforms, and furniture to schools in need and partners with local organizations several times throughout the year to hold donation drives for used clothing and household items. When the school upgraded its hardwood floors this past year, the school's development office repurposed the existing floorboards by creating small square wooden keepsakes imprinted with the school shield.



*Gwynedd-Mercy Academy students are enjoying tracking how using refillable water containers helps them save resources and money. Fountain fillers were installed in the 2019–20 school year.*

GMAE has made a dedicated effort to improve the health and wellness of the entire school community. In the spring of 2019, the school celebrated the installation of a greenhouse. Students actively participate in the planting of tomatoes, basil, dill weed, kale, Buttercrunch lettuce, Bibb lettuce, carrots, microgreens, and sunflowers. Led by the middle school science teacher, students have held salad parties to share in the bounty of the crops that have matured and to support healthier eating habits. The director of the greenhouse is responsible for overseeing, managing, and supervising the environmental education and sustainability initiatives related to the greenhouse. Healthy habits are also taught in our kindergarten- through eighth- grade P.E. and health classes, encouraged



by teachers in the cafeteria, and carried over into the athletics program and extracurricular activities.

All cleaning and sanitizing supplies are eco-friendly. No hazardous chemicals are kept or used on campus. The entire school is cleaned and sanitized every night. GMAE implements an integrated pest management plan and contracts with a local pest control company that assesses building and grounds both for culture conditions that may support pest or fungal populations, such as moisture/water infiltration and issues with food debris. GMAE recently conducted a mold and asbestos assessment.

As part of the school's strategic plan, a guidance center supports a full-time, certified school guidance counselor who teaches weekly character education lessons to all primary students and provides opportunities for middle school students to participate in mindfulness practices. In addition, the school guidance counselor sees students on a consultative basis, works with teachers and families to best meet the social and emotional needs of students, and assists in the process for students diagnosed with learning differences. Aligned with these efforts, new flexible seating was purchased for several classrooms to best meet the diverse needs of students. The guidance counselor is also a resource for parents by providing speakers and education workshops for parents to learn more about teenage trends in social media, vaping, and other ways to best support their child.

GMAE is home to an exploratorium for inquiry-based learning in kindergarten through fourth grade, two middle school science labs, a STEM Center, and an outdoor learning area next to the greenhouse. In addition to science lessons supported by Life Lab, a garden-based curriculum, as well as Pearson's Interactive Science series, students develop 21st-century skills in a specialty class called Creative Thinking Skills. Many of these opportunities would not be possible without the support of the GMAE parents' organization, which provides hands-on, project-based learning initiatives. Various grade levels take field trips to the Morris Arboretum, Perkiomen Valley Water Shed, Longwood Gardens, Camp America, and the Science Center in Harrisburg to support experiential learning. Windmill projects, hatching chicks, sustainable living projects, dissecting owl pellets, plantings in the greenhouse, taking care of class pets, and hatching Monarch butterflies are only a few of the ways students actualize their potential to make a difference.

## **Rhode Island**

### **The Grace School at Meeting Street; Providence, Rhode Island**

#### *All-inclusive conservation learning*

Since opening in 2007, the vision of The Grace School has been to become a leader in inclusive education for students in kindergarten through grade 8. Serving a population that includes 32 percent of students enrolled in special education, the school's curriculum was designed "to develop students' understanding, compassion, and care for people, the material world and the natural environment." The building was built on 10 acres of brownfields that were remediated to residential standards in 2006. Working with the Environmental Protection Agency and the Rhode Island Department of Environmental Management, this space is now home to The Grace School at Meeting Street where the campus is comprised of more than 40 percent green space.

Students of all abilities learn in a building that was designed with conservation and education in mind. In 2014, 338 solar panels were installed. They produce about 86 kW which accounts for 12 percent of The Grace School's power usage and saves the school approximately \$12,000 annually. Construction of a new wing has brought many energy-saving features. The increased number of windows and skylights in hallways and classrooms allow natural light to permeate the space. The LED cloud lighting responds to the natural light making it often unnecessary for overhead lighting to be used. Zoned lighting areas in the classrooms also allow teachers to have more control over the amount of light needed at any given time. Water bottle filling stations have saved over 27,000 water bottles from use since 2019 when first installed.

Middle school students kicked off The Grace School bottle recycling program in 2018 with students sorting plastics at lunch. Students visit classrooms and offices to collect paper to be shredded and batteries to be recycled. In the cafeteria, Styrofoam trays and plastic utensils were replaced with reusable trays and silverware. The staff room is stocked with donated plates and mugs. Beginning in 2018, a "Uniform Swap" was designed to allow families to donate gently worn uniform shirts, pants, shorts, and skirts to be given to others who may need extra sets. In 2019, an area was set aside for students to borrow coats, hats, mittens, boots, and snow pants in order to go outside to recess if they did not have the appropriate gear.

The green space includes an accessible playground, walking paths, and outdoor classroom space. Students use the campus both for learning and play. Classes meet outside to conduct observations of the plants and wildlife for science, use the

outdoor classroom space for writing inspiration, and for after-school programs such as the Seedlings Club. This club, for students in grades K–2, meets in the spring to plant seedlings for the school’s raised bed garden. Students care for the plants until the end of the school year. Over the summer and into the fall, students attending the extended school year program tend the gardens and have a chance to experience tastes of different herbs and vegetables.

Students in grades 3–5 are invited to participate in the bike club during the spring after-school program, where they travel to different bike paths and trails across the state to ride. Other opportunities for students include cross-country, wrestling, and basketball teams. The school offers vision and hearing screenings, flu vaccinations, a mindfulness program, and a wellness fair.

The Grace School has adopted the Responsive Classroom approach to social and academic learning. All teachers are trained in Responsive Classroom and Restorative Justice. A school social worker meets with students in grades K-4 once a week based on student need. In grades 5–8, she meets with students once a week for social skills class as well as collaborating with teachers for advisory. School expectations are set around the Positive Behavioral and Intervention Supports structure.

During the extended school year program, students with special needs care for the garden. They have an opportunity to learn about a variety of vegetables and either eat or taste

samples depending on their ability to eat. Some students may have an opportunity to simply touch the food to their tongue while others may take bites. Many students have aqua therapy in their therapy plan, which allows the therapists to work with students individually to stretch muscles and provide students



*At The Grace School at Meeting Street environmental studies thread through the curriculum and the school’s landscape is a tool to teach about the natural world.*

with limited mobility to move. In addition, most of The Grace physical education equipment, including a set of adaptive bikes, is adapted for all students to participate in all P.E. curriculum units.

Environmental studies thread through the curriculum, kindergarten through grade 8. In addition, environmental topics are addressed in The Grace literacy program as students study the craft of writing opinion and persuasive pieces. Topics of inquiry and readings are environmentally based in grades 4–8, culminating in middle school students reading of *An Inconvenient Truth*. Third grade participates in a yearlong education program provided by the Narragansett Bay Commission. Students regularly do fieldwork at Roger Williams Park Zoo and Planetarium. The second grade visits the Rhode Island Resource Recovery Corporation as part of their learning. Every year the Narragansett Bay Commission visits for several weeks to teach the students to keep waterways clean for plants, animals, and humans and to instill in them a curiosity, understanding, and respect for how all these aquatic ecosystems work together. Students learn how to take water samples to complete water quality testing.

In order to expand the use of the outdoor campus and community resources, The Grace School teachers have participated in professional development experiences that enhance their knowledge of the natural world. Bringing this knowledge back to students has brought opportunities for field work in coordination with Roger Williams Park Zoo and the Narragansett Bay Commission. Students visit local waterways to conduct water testing. Middle school science teachers attend the Rhode Island Environmental Education Association’s “Building Climate Literacy for All Students.”

## **South Carolina**

### **Cape Romain Environmental Education Charter School; McClellanville, South Carolina**

*Coastal kids engage in shoreline restoration*

Cape Romain Environmental Education Charter School (CREECS) is located in the rural, coastal town of McClellanville, South Carolina, halfway between Charleston and Georgetown. The school offers a unique outdoor learning environment that fosters stewardship in students. The CREECS campus is located on a tidal creek that connects to the intracoastal waterway and provides students the opportunity to get their hands dirty in real-life scientific explorations.

CREECS is home to an organic garden and a myriad of animals, including chickens, goats, pigs, and sheep. Students are excited to come to school and help feed and

care for the animals. Along with all the traditional subjects, CREECS teaches agricultural education, animal husbandry, responsibility, and compassion for all creatures.

CREECS installed LED lighting in its new buildings and is working to retrofit the older ones as well. The school has a solar-powered weather station and fan in the outdoor classroom and is researching additional on-site solar production. Students, teachers, and staff are encouraged to bike or walk to school. The student council created a bike path from one of the local neighborhoods to make biking safer for students. CREECS also facilitates carpools for students coming from nearby areas and helps to subsidize a bus to minimize the number of cars making the 50-mile round trip drive from Mt. Pleasant each day.

CREECS installed a drip irrigation system in its garden to help reduce water usage and uses rain barrels to water gardens in the front of the school. The school is home to a registered Monarch butterfly waystation, pollinator garden, and rain garden. CREECS manages an active honeybee hive to help with pollination in the school garden and surrounding area. Students plant and care for milkweed along with other plants that attract butterflies. Students installed the rain garden with the help of Clemson Extension's Carolina Clear Program in an area on campus prone to

flooding and uses native plants and a natural drainage system to control stormwater run-off.



*Seventh-grade Cape Romain Environmental Education Charter School students use oil booms attached to their school kayaks to clean the oil from Jeremy Creek.*

CREECS has an active, student-driven recycling program. Students collect and sort recycling every Friday before putting it into the school bin. CREECS composts to help reduce food waste. CREECS strives to be a plastic-free campus. The school has ceased to offer single-use plastic bottles at concession stands and events. CREECS has switched over to entirely compostable silverware, plates, and bowls at all events.



All students are encouraged to bring a waste-free lunch and use bamboo cutlery in their lunch boxes.

CREECS participated in the South Carolina Department of Health and Environmental Control's (SCDHEC) Breathe Better (B2) program to reduce vehicle idling on campus and make sure the air quality is good. CREECS' hallway aeroponic garden and terrariums help filter the indoor air. Two water bottle refilling stations in the school ensure that students stay hydrated and have access to healthy, safe drinking water. CREECS is also a chemical-free campus. It does not use pesticides or fertilizers anywhere on campus and is working to get the school garden USDA certified organic.

Students are outdoors and active at least one hour each day. Along with at least 30 minutes of recess each day, students participate in either P.E. or environmental education for 55 minutes. Students also spend time working with the animals outside during environmental education and playing sports during physical education. In the mornings, CREECS encourages students to walk before the bell rings to jump-start their metabolism and promote a healthy lifestyle.

Through the school vegetable garden and farm, CREECS provides fresh, organic produce and eggs for students and their families to take home. CREECS has received the Whole Foods Whole Kids garden grant twice and teaches the accompanying curriculum, which focuses on gardening, biology, and nutrition in conjunction with the school garden. To promote mental health, CREECS has an electronic-free recess for all grades through middle school to allow students time to move around and interact with each other.

All CREECS students attend environmental education class at least twice per week. Each grade has their own standards-based curriculum designed to be hands-on and inquiry-driven. In addition, each year the school selects one schoolwide project.

Along with general lessons on the local flora and fauna, each grade level has a specialized issue or job that they focus on for the year. Third-grade students focus on animals. They learn about basic husbandry and animal life cycles. Fourth-grade students tend to the organic garden, planning what they want to grow and learning when to plant, transplant, and harvest. Fifth-grade students study the community structure of fouling communities in the nearby "clean" marsh and compares it to the more polluted marsh of Charleston Harbor.

The sixth-grade students run the CREECS recycling and waste-free lunch programs. Seventh-grade students focus on climate change and sustainability with a final project that requires them to create a sustainable product and sell it in a "Shark



Tank"-style symposium. Eighth-grade students focus on marine biology. They conduct a marine-debris project in the community focused on eliminating plastic pollution from McClellanville.

Examples of student-devised projects that CREECS has undertaken include developing covers to protect local honeybee hives from mosquito spraying, designing signs to educate beachgoers about strategies to protect threatened shorebird populations on their local beaches, and printing door hangers to educate the local community about the air pollution created from burning trash.

## **Furman University; Greenville, South Carolina**

### *Taking the long view*

Furman University is firmly committed to reducing environmental impacts, promoting and improving health and wellness, and providing effective environmental and sustainability education. More than two decades ago, Furman recognized that fulfilling its educational mission required its students to attain environmental and sustainability literacy, and that it must operate more efficiently and take greater responsibility for its impact on the environment.

Furman has received national recognition and won numerous national awards for its sustainability efforts, including the Association for the Advancement of Sustainability in Higher Education (AASHE) Sustainability Tracking, Assessment, and Rating System gold rating for campus sustainability, a top 10 national ranking among baccalaureate institutions (the highest ranked institution in the southern U.S.), the 2016 National AASHE Campus Sustainability Achievement Award, and AASHE selection as one of 14 national sustainability academic centers for "Teaching Sustainability Across the Curriculum."

The Shi Institute for Sustainable Communities serves as the University's interdisciplinary academic sustainability hub, promoting the integration of sustainability across the curriculum and the study and practice of sustainability on campus and in the greater community. Originally established as a center in 2008, the Institute analyzes and addresses campus and community sustainability challenges from an evidence-based, solutions-oriented, systems approach that involves interdisciplinary collaboration among campus and community stakeholders. This approach provides unprecedented learning opportunities for Furman faculty, staff, students, and community partners and contributes to the greater campus and community good. Other colleges and organizations regularly visit the Institute to learn about its programs and benefit from its innovative approaches.

The Institute offers a wide array of faculty, staff, student, and community development programs including: 1) an Affiliate Faculty Program, designed to stimulate interdisciplinary conversation, collaboration, and course development around campus and community sustainability, with more than 65 faculty participating; 2) a Student Fellows Program, which has supported over 230 fellows in their sustainability research and action around campus and in partnership with 30 different community partner organizations; and 3) the Community Conservation Corps (CCC), a free home weatherization program for low-income homeowners in the greater Greenville area designed to reduce energy consumption, promote financial stability, and increase environmental awareness. The program has weatherized 138 homes in the Greenville community with the assistance of student volunteers.

In addition to offering programs, the Institute is also responsible for implementing, coordinating, and tracking sustainability for the entire campus. With the guidance of Sustainable Furman, the campus sustainability plan, the Shi Institute has garnered support for sustainability among students, faculty, and staff. Some recent accomplishments include working with the facilities division to implement sustainable landscaping and construction practices, providing opportunities for students to solve sustainability problems on campus, creating a framework for a zero-waste campus, and hosting an AASHE Hub workshop on integrating sustainability into curriculum through campus living/learning laboratories.



*Furman University students conduct environmental research on the six-acre solar farm at the campus's main entrance.*

Regarding curriculum, Furman believes all students should be environmentally and sustainability literate and requires that all students take a Humans and the Natural Environment (NE) course to graduate as part of their General Education Requirements (GER). NE courses emphasize some aspect of the interactive relationships between humans and the natural environment. Furman is also the first, and still only, liberal arts institution in the country to offer a Bachelor of Science degree in Sustainability Science (SUS). The degree program, now eight years old, has been one of the fastest growing majors in Furman's almost 200-year history, with more than 70 declared SUS majors currently enrolled.

In addition to requiring the GER and offering multiple degree programs in sustainability and environmental science, the University also supports multiple, one year engaged living programs, including 1) the Greenbelt Community, an intentional living, learning community intended to foster sustainable living and lifestyle choices among 22 sophomore students living in four eco-cabins on campus, and 2) the Environmental Community of Students, a first-year program focused on global environmental and sustainability issues.

There are many student organizations focused on sustainability and the environment: 1) Heller Service Corps offers students the opportunity to give back to the community and engage in service, and each year the Corps connects more than 1,800 students to over 50 agencies across Upstate South Carolina; 2) Environmental Action Group aims to educate the campus about how to live an eco-friendly life while completing service projects and activities that support this philosophy through the governance of students; 3) Bartram Society brings together students who share an interest in earth and environmental sciences and sustainability science; 4) Millennium Fellows, a student program administered in partnership with the United Nations that empowers students to become agents of change at their schools and to work to address sustainable development goals through applied research projects on campus and in the community; and 5) Furman University Outdoor Club creates and supports a community of students aimed at experiencing the natural world.

A replica of Thoreau's cabin from Walden was built by a 2009 May Experience class. The cabin stands as a testament to desires to better connect with nature and to aspire to simple living. Visits are organized by the English Department, and activities range from literature readings to writing retreats to discussions on simple living.

In the residence halls, Furman's EcoReps program has become the main catalyst for sustainable behavior change. The EcoReps' mission is to instill a sense of sustainability on Furman's campus by promoting sustainable behaviors through education, awareness, and connections with residence life. They host events in and outside of their residence halls that are fun and accessible and encourage the average student to incorporate sustainable behaviors into their daily life.

Operationally, Furman is reducing environmental impacts through energy and water conservation, sustainable buildings, waste reduction, and alternative transportation. As an inaugural signatory of the American College and University Presidents Climate Commitment, Furman declared that it will strive to reach climate neutrality with zero net greenhouse gas emissions by 2026. The University has been diligently working toward this goal by increasing operations efficiency, creating a campus-wide culture of conservation to decrease energy use, creating a more sustainable

transportation system through changes in behaviors and policies, investing in renewable energy projects, and developing offset projects and sustainability-oriented service projects in the greater Greenville community.

Furman tracks its greenhouse gas emissions annually and developed a climate action plan that lays out a path to reduce its carbon footprint. Furman has reduced its overall carbon footprint by nearly 30 percent from its 2007 baseline, even as it has increased building square footage. The Furman facilities team has been working to improve building efficiency and optimize energy use. Furman has installed several renewable energy installations around campus including an extensive geothermal system for its upper-class residences and a 743-kW solar farm on a 6-acre site at the campus's main entrance. This solar array is the largest solar project on a South Carolina college campus and, together with numerous other smaller solar arrays on campus, brings Furman's total solar generating power close to the 1-MW cap set by the state. A locally owned flock of sheep were also added to the solar farm to manage and "mow" the grass.

Furman boasts eight LEED-certified buildings on campus, including the first LEED-certified building in the state of South Carolina. Other innovative campus operations that incorporate sustainable design technologies and provide student learning opportunities include: 1) the Living Machine, a tidal wetland wastewater treatment system that treats campus wastewater and uses the treated water for toilet flushing in the science center; and 2) the organic practice Furman Farm and hydroponic system that provides the dining hall with fresh produce and composts all dining hall pre- and post-consumer food waste for use on the farm.

Now in its third year, the Green Office Certification program aids departments in adopting more sustainable practices. The program outlines 39 sustainable practices, each worth various points for achieving a green office certification level. All 24 academic departments participate in the program.

Furman promotes campus health and wellness through a variety of programs, practices, and educational efforts. All students are required to take a Mind and Body (MB) course to graduate. MB courses support Furman's mission to develop the whole person — intellectually, physically, socially, emotionally, and spiritually. Some new programs include: 1) a student Eco-Reps program that promotes sustainable lifestyle choices within the residence halls and a recently launched residential composting program; 2) FitRx, a student-led program that creates individualized exercise training programs for faculty and staff participants; and (3) a free mindfulness and meditation course that explores mindfulness techniques, personal practice experiences, and strategies to enjoying a mindful presence.



Overall, living sustainably entails taking the long view of an institution's actions and their consequences. Furman University has made institutional sustainability a primary priority, and its efforts have produced very tangible benefits on campus and in the community.

## Utah

### **Bonneville Elementary School; Salt Lake City, Utah**

#### *Air quality champions*

Bonneville Elementary is located along the East Bench of Salt Lake City, with the Wasatch Mountains to the East and the Great Salt Lake to the West. In 2014, the Utah Society for Environmental Education launched its Utah Green Schools program. Bonneville Elementary was one of the first schools to be awarded this recognition and has maintained this participation every year since then. Bonneville school is committed to advancing sustainability and student health, going above and beyond to engage students with real-world, meaningful experiences.

Bonneville Elementary has earned an ENERGY STAR certification, and the school's energy usage is the lowest in Salt Lake City School District. Bonneville tracks water usage through monthly water bills. The district's building and grounds departments regularly audit the irrigation system for leaks. The irrigation schedule is adapted seasonally. All student restrooms utilize motion sensors on toilets and sinks. All student sinks have aerators. The school has installed a water bottle filling station to encourage the use of refillable water bottles.

Bonneville has two areas dedicated to ecological purposes. The front area of the school has been planted with local, water-wise plants that attract pollinators. The school has partnered with Wasatch Community Gardens to maintain a produce garden. All grades work with the science teacher and PTA to plant and maintain the garden year-round. Produce is collected by the community and some produce is sold at an annual, community STEAM night.

Bonneville partners with Green Fiber for paper and cardboard recycling. All classrooms and common spaces have recycling bins, and the community is encouraged to bring their paper/cardboard recycling to Bonneville, which hosts an annual recycling drive to encourage paper recycling. In 2019, the community gathered 2,200 pounds of paper recycling, while parents from the PTA volunteer to teach and reinforce recycling in the cafeteria. On the first week of school, a parent from the PTA went to every classroom to teach about what lunch materials were recyclable. Parent volunteers also encourage students to donate unwanted,

untouched food to a communal table. Extra food can be picked up by other students in the lunchroom. Extra produce is donated to the faculty. Other leftover food is kept in the PTA room where teachers can grab snacks for kids who are hungry during the day.

Bonneville participates in Crayola ColorCycle to recycle markers and highlighters. A first-grade teacher at Bonneville has started a First-Year Teacher Store to redistribute surplus school materials from teachers throughout the district to first-year teachers during New Teacher Orientation.

Bike racks are regularly full of bikes and scooters, indicating a high number of students are rolling to school on their own muscle power and not burning fossil fuels. Safe pathways have been designated for biking and walking to school. Crossing guards are at nearby intersections to ensure safety.

Bonneville improves the health and wellness of students and staff in multiple ways. One main focus area is air quality. The PTA has created a Clean Air Committee, led by engaged parents. This committee has spearheaded an anti-idling campaign based on the EPA's Idle-Free Schools Toolkit for a Healthy School Environment. The school has anti-idling signs installed and regularly reminds the community of no-idling policies in the school's monthly newsletter. Students have made posters to

remind drivers to turn off their engines if they remain in the drop-off zone. The Clean Air Committee has also established relationships with community organizations and local colleges to learn more about the impact of these efforts.

Chemicals at the school are tracked according to state regulations by the head custodian. The custodial staff uses water-based cleaning products that are VOC-free. All drinking water is sourced from the local utility, meeting all federal, state, and local water



*For the first three weeks of school, a parent was present in the Bonneville Elementary School cafeteria every day to help direct students to the appropriate waste or recycling bin.*

standards. Bonneville's drinking water was recently tested for contaminants by Salt Lake City and was found to be safe. Bonneville has carbon monoxide detectors installed throughout the building to ensure student and staff safety. Bonneville's indoor air quality was recently tested by the Salt Lake County Health Department and found to be safe. Bonneville participates in the AirNow Air Quality Flag Program. Each morning, the air quality is checked by school staff, and fifth-grade students hang the corresponding flags where they are clearly visible to families in both major drop-off areas. Students are kept inside for indoor recess when the air quality is hazardous to student health.

Other health and wellness programs include students engaging in 40–45 minutes of supervised recess daily, participating in 45 minutes of P.E. a week, and having access to lessons on health and healthy eating. Annually, Bonneville hosts a health fair, which established over 70 partners and allows students to not only learn about their health but also to contribute to the well-being of others. Every month, students receive the Project Cornerstone program, a book study curriculum that reflects on literature to achieve lesson objectives in social-emotional learning and bully prevention.

Each teacher in the school teaches at least 12 integrated nutrition lessons per academic year. The school cafeteria offers a salad bar with a variety of produce options for students purchasing school breakfasts and/or lunches. All meals meet federal nutritional standards for National School Lunch and Breakfast programs. In accordance with district policy, teachers do not use food as rewards or motivators. Teachers are encouraged to provide healthy snacks at any class parties.

Salt Lake City School District encourages wellness among faculty and staff through monthly goals. Goals and trackers are sent to every faculty and staff member and tracked by a coordinator in each school. Previous goals have included water intake, exercise, and healthy eating choices. The school district has also partnered with a local counseling center to provide mental health services to all employees. The school district also provides several flu shot clinics for employees and their families.

Although sustainability instruction is not mandated in the state or district, Bonneville has a hands-on curriculum in all grades. Sixth-graders complete labs with the school science teacher on invasive species in ecosystems. At the end of the unit, they discuss how humans have successfully invaded all ecosystems and that we need to think of ourselves as part of the ecosystem and not above it. Sixth grade also researches plastic pollution and creating a citizen initiative to address the issues. Fourth grade learns about the water cycle and discusses Utah's water dilemma. This content was also reinforced in the art classroom. Third-grade students study ecosystems and how living and nonliving things interact. Some classes do animal



research projects to learn about the needs of those animals and how their environment affects them. One class does an in-depth research project about the interactions between all living and nonliving things in an ecosystem of their choice. This learning is then represented in a Lego diorama. Third grade also partners with Thanksgiving Point to participate in the Tulips Journey North program.

Bonneville has a weather station and air quality monitor that can be accessed by all students and community members. The weather station, air quality monitor, and school gardens are regularly used by all students as tools for scientific research. First-grade classes visit the local arboretum and botanical gardens, Red Butte Gardens. Third and fourth grade visit the Jordan Conservation Garden Park to learn about waterwise landscaping and design. Ogden Nature Center sends presenters to Bonneville first-grade students every year for their “Creature Features” program. It is a hands-on experience where the students “become the scientists” and learn to observe what’s in front of them, then classify animals into groups. Students get to touch skulls, feathers, pelts, and even a live animal.

Teachers at Bonneville have completed a variety of professional development training related to environmental studies and sustainability. One first-grade teacher completed a Learning Outdoors training. All three of the first-grade teachers completed the Red Butte Garden’s Grow Lab training. Two teachers, one in second grade and another in sixth grade, are working on the National Geographic Educator Certification. One third-grade teacher has completed a Project Learning Tree seminar.

## **Wasatch Academy; Mount Pleasant, Utah**

### *Driving questions in the desert*

Since 1875, the picturesque 30-acre campus of Wasatch Academy, located in Mount Pleasant, Utah, has been home to a diverse international student body with students from over 35 countries and 30 states. Wasatch Academy has prized its status as a diverse, dynamic, and global community dedicated to sustainability, both in theory and practice, within the school community and the greater world.

In 1994, the Wasatch Academy community expressed its commitment to work toward a sustainable future. At the core of this commitment was a net-zero energy action plan and related project-based learning opportunities for students and teachers. This initiative is a multi-year plan for reducing Wasatch’s carbon footprint through energy and water conservation, a shift to renewable energy sources, and community-based projects in waste management, permaculture-based landscaping,

and sustainability education. In 2012, Wasatch designed and installed a state-of-the-art geothermal system that heats and cools seven campus buildings.

Wasatch Academy was the first secondary school in Utah. While the 15 historic buildings on the campus are an important legacy of the school's history, they also present a challenge with energy efficiency. Five of the historic buildings on campus have undergone major improvements. These buildings have been repurposed and redesigned for new uses and go beyond simply reducing energy use.

The remaining campus buildings are systematically being upgraded to net-zero status, as they are remodeled and mechanical systems replaced, as prioritized on the "Campus Buildings Deferred Maintenance Schedule." New campus buildings are being designed to LEED standards and constructed as net-zero-ready buildings.

As the second driest state with one of the fastest-growing populations, Utah communities are faced with managing increased demands on water supplies. A progressive xeriscaping plan for the campus includes local native plants that assist with keeping invasive weeds down, provide native ecosystems to the wildlife that surround the campus, and are hardy in minimal water conditions.

Wasatch's Sustainability Council is one of the driving forces that promotes sustainability education on campus through student-driven projects and events. Made up of four faculty members and eight student members, the Council meets weekly throughout the academic year to discuss matters related to sustainability education and to plan for upcoming projects, events, and fundraising efforts. In 2017 a new position was created, Director of Sustainability and Experiential Education. Together, the Council, with oversight from the director, have put into place several projects at Wasatch Academy.

In 2017, a campus-wide recycling cooperative was created, and since then students, faculty, and staff have stepped up to work together in cultivating a culture in which everyone is mindful of their consumption and waste management habits. A Ban the Bottle Campaign drastically reduced consumption of bottled water and served as a springboard for the Susty Council to raise money for the purchase and installation of water bottle filling stations for student dorms and other campus buildings.

Funds raised by students have also been used to support a community garden, which was recently expanded and upgraded, allowing the school to integrate the garden into courses through project-based learning. The Susty Council funds have largely been raised from silent auction events where handmade artisan quilts, up-cycled cloth shopping bags, and baked goods are sold. A sustainable events sub-

committee evaluates school events to see how they can reduce their carbon footprint.

Wasatch Academy is home to a 35,000-square-foot Recreation Activity Center, and Wellness Center staffed by certified health professionals. Outdoor recreation offerings include rock climbing, mountain biking, hiking, camping, paddle boarding, rafting, snowshoeing, sledding, skiing, and snowboarding. Wasatch has its own ski cabin and ski hill/terrain park on nearby U.S. Forest Service lands.

Housekeeping uses eco-friendly paper towels in the remaining restrooms that will soon get air dryers. Aerosol spray cleaners are not used. When possible, vinegar is used for disinfecting and cleaning.

The school also has an equine indoor riding arena, a spacious 20-stall barn and turn out pens, outdoor riding pad, and a galloping track. Each student can choose between three riding program options. Students of all skill and experience levels can have fun, learn, and thoroughly enjoy the equine experience with several trail rides in the foothills and mountains. Students also acquire skills and knowledge in such areas as horse health and nutrition, stable management, equine reproduction, and horse training techniques.



*After practice at Wasatch Academy's indoor climbing wall, students put their rock climbing skills to use in Moab, Utah.*

The Sustainability Council works with “Chef Joe” in the school kitchen to offer healthy meals to students and staff and to adopt sustainable practices in the kitchen. Food scraps from meal preparation are collected and donated to local goat and pig farmers, and compostable food scraps from faculty households and student dorms are used in the community garden. Kitchen staff has drastically reduced its use of plastics and Styrofoam in meal preparation and serving.

Wasatch Academy also has a strong residential life program and student advisory program that weave together seven themes — empathy, community, responsibility, accountability, diversity, respect, and safety.

Wasatch Academy partners with several environmental education organizations that offer support for K–12 schools to embrace sustainability education. By pursuing designations as a Utah Green School with the Utah Society of Environmental Education and as an Eco School with the National Wildlife Federation, Wasatch uses the guidance and structure provided by these programs to strengthen sustainability education throughout its curriculum and across campus.

Wasatch Academy provides a 21st-century learning environment where students simultaneously gain knowledge and the capacity to critically and creatively apply knowledge to problem-solving. This is accomplished through project-based learning applied across disciplines. Students learn content by addressing a real problem called a driving question. Lifelong skills, such as collaboration, communication, critical thinking, and creativity, are learned in the process.

Statistics students grapple with, “Can we use data to predict how much food will be consumed during a given meal to save money and limit food waste?” Discrete Math students try to answer the question, “How can Wasatch Academy most effectively move toward a net-zero campus?” Driving questions inspire students with an immediately engaging prompt and provide them the opportunity to dive deeply into investigation, to be creative in their solutions, and to pursue the knowledge that is most relevant to the problem. Recent projects have had students working to reduce food waste and evaluating new energy sources for campus.

Experiential Immersions (EIs) are five-day minicourses offered to all Wasatch Academy students each fall. They are taught by faculty teams from different departments and are designed to create small learning communities made up of students with diverse academic interests and personal backgrounds. They emphasize interdisciplinary, experiential learning focused on real-world topics and projects, and valuable life skills. The EIs comprise five full days of fun, immersive, experiential learning and culminate in a community-wide Exhibition of Learning. For example, students design and build two water catchment tanks to supply rainwater irrigation to the new gardens and constructed wetland area near the engineering building. They repurpose steel culverts set in concrete with plumbing run through the ground. Skills developed in this EI will include plumbing, metal fabrication, concrete work, and landscape design.

All Wasatch Academy students are required to complete 20 hours of community service each year, and many students complete more. Nearly every weekend when

school is in session, community service projects and activities are offered. Also, twice each year Wasatch offers a Community Service Day event that coincides with standardized testing. After a morning of testing, all students engage in an afternoon of community service projects with their advisory group, supervised by their WA Advisor. There are local, regional, national, and global projects that empower students to make personal contributions to ecological and social issues. A few examples are making sleeping mats for the homeless from repurposed plastic shopping bags, picking up trash along local highways, removing invasive plant species from forest service lands, doing yardwork for the elderly, and planting trees on campus.

During the 2018–19 academic year, all students, faculty, and staff at Wasatch Academy worked together to develop a set of “Ethics for a Sustainable Future.” Once finalized, the entire Wasatch Academy community committed themselves to incorporating them into their daily lives, and this commitment is renewed at the start of each year. This set of ethics is posted around campus and serves to inspire the community to adopt habits that support ecological health, social justice, and economic stability for all life, for the long run.

## Virginia

### **Ocean View Elementary School; Norfolk, Virginia**

*Oyster gardeners of the bay*

Ocean View Elementary School (OVES) is a Title I school with 68 percent of students qualifying for free or reduced price lunch. Ocean View Elementary School is a designated Maritime School due to the rigorous environmental programming included in the school curriculum. Within walking distance to the Chesapeake Bay, OVES has engaged students in the natural world around them by providing opportunities for students to consider the environment and conservation as a participatory adventure and inspiring them to action priorities.

More than 20 years ago, OVES began oyster gardening with various community partners that include the Virginia Institute of Marine Sciences, the Chesapeake Bay Foundation, Oyster Reefkeepers of Virginia, and Nauticus. The entire school participates in citizen science by monitoring, collecting data, and releasing oysters onto the Lynnhaven River Sanctuary. OVES is responsible for introducing over a million oysters onto the Lynnhaven Oyster Reef Sanctuary. Maritime Forest exploration and field studies have played a pivotal role in the rich scientific history of OVES. The OVES Maritime Rangers presented at the Elizabeth River Project’s First Annual Resilience Expo in 2019.

In effort to foster career-oriented and 21st-century skills, OVES has established a Maritime Ranger program for fifth-grade students who are interested in STEM. Maritime Rangers apply for the position, become mentors to other students, and facilitate many of the engaging educational projects OVES offers throughout the school year.

OVES is the recipient of a Mid-Atlantic Marine Education Association grant that will enable aquaculture in the maritime lab for 2020. Fish and plants will be raised in the maritime lab where innovative, project-based curriculum will provide meaningful and relevant applications of the Virginia Standards of Learning.

A state-of-the-art ENERGY STAR certified school building opened its doors to students in September 2017. Some of its features include day-lighting windows sized and positioned to create the perfect balance between natural lighting and maximum energy efficiency for the school, light-colored roofing materials, occupancy sensors, highly-insulated building envelope, and low VOC and non-toxic materials that improve indoor air quality.

The school building roof drains and parking areas are designed to treat, prevent, and reduce water pollution and water runoff. Two new trees were planted for every tree that was removed, so that approximately 90 trees were planted as part of this project. Native plants and bushes were planted to ensure habitat and food for local species that include pollinators, seed dispersers, and unique maritime species.



*Ocean View Elementary School students participate in oyster float trips on the Chesapeake Bay. They ultimately release oysters on the Lynnhaven River Oyster Reef Sanctuary.*

OVES has been partnering with TREX for many years to collect plastic film to reduce the harmful single-use plastics. Since working with TREX, OVES has collected thousands of pounds of plastics that TREX repurposes into materials for construction. In addition, when the old building was demolished, the crews minimized the volume of debris sent to the landfill by implementing a carefully structured and strictly managed program of separation and recycling.

Norfolk Public Schools (NPS) is among 16 school divisions throughout Virginia selected to receive electric school buses through a Dominion Energy program. NPS will receive four buses, with the first one being delivered in August in time to transport students back to school in September. The remaining three will be delivered in the fall. In addition to lower operation and maintenance costs, the electric school buses will have a positive environmental impact by reducing the carbon footprint. The school has sidewalks, safety patrols, and bike racks to encourage safe routes to school. Currently 120 of the OVES community, or 22 percent, walk to school.

The last remaining sand dune in the city of Norfolk is adjacent to Ocean View Elementary School in a heavily vegetated maritime forest that locals call Monkey Bottom. Deep within this forest lies a giant, 400-year-old live oak tree that, thanks to the interest of OVES students, was placed on the Virginia Tree Registry as the sixth largest of its kind in the state. The maritime forest is also home to a National Champion buckthorn bumelia tree that is registered on the Virginia Big Trees database as one of the largest trees of its species in the entire country. This tree was identified thanks to the efforts of the staff, students, and volunteer master gardeners who visit the maritime forest several times a year during ongoing forest clean-ups.

Health and wellness offerings include partnering with the food bank for the last three years to provide 54 families with nutritious meals once a week through backpack program. Another new PTA-supported program provides free, locally grown fruits and vegetables to families who attend PTA nights. OVES has been proud to be part of the Girls on the Run (GOTR) program for three years. Since OVES has participated in GOTR, 60 female students and six volunteer coaches have been inspired to be confident, courageous, and connected to the community.

NPS nutrition specialists and cafeteria staff not only provide healthy and nutritious meals to OVES students for breakfast, lunch, and after-school meals, they are also committed to partnering with OVES teachers to enable students to learn about making healthy food choices. Nutrition education specialists have developed a “Blender Bike” program in which OVES students discover the nutritional value of their favorite fruits and vegetables. They learn appropriate serving sizes, daily

allowances, and healthy benefits of the chosen produce. They mix kale, strawberries, bananas, oranges, and yogurt into a healthy smoothie to be enjoyed.

Similar partnerships with cafeteria staff include “Plant Parts” and “Nuts About Science” lessons in which students learn about edible plant parts and tasty “nuts” by identifying edible plant parts (like carrots as roots, celery as stems, tomatoes as fruits and seeds) and then enjoying them with delicious dipping sauces, including “nutty” dipping sauces like hummus.

After students participated in various interactive programs and labs focusing on plant parts, such as “Blender Bike,” “Edible Plant Parts,” and “Nuts About Science,” post-assessments showed that students were able to accurately identify more plant parts per category. In addition, many students tried nutritious foods that were new to them, said they would ask to eat them at home, and continued volunteering to name edible plant parts.

The school is cleaned using products that are biodegradable, nontoxic, and cold water activated. All cleaning supplies are either Green Seal Certified, EPA Safer Choice, or Ecologo. OVES is fortunate to have a full-time school counselor and a part-time counselor to help students employ successful strategies to advance their social and emotional well-being.

## **Rappahannock County Public Schools; Washington, Virginia**

*Small community, big student impact*

Rappahannock County Public Schools (RCPS) is a small, rural school division, nestled within the Blue Ridge Mountains and at the headwaters of the Rappahannock River. There are two schools in the district: Rappahannock County Elementary School and Rappahannock County High School, with a total district enrollment of 801 students.

Rappahannock County’s population of 7,456 residents embraces its scenic environment and strives to preserve the serene nature of the county. RCPS is accurately an extension of the county’s values. RCPS strives to limit the use of natural resources by making school facilities as efficient as possible. Both schools have had the windows replaced with thermal insulated ones. HVAC control systems have been installed at both schools allowing for lower temperatures to be set at the time classrooms and offices are not occupied. All exterior lighting has been replaced with energy-efficient lighting, which also reduces the amount of light pollution the school district produces. Electricity use is tracked on the Rappahannock Electric Cooperative website.



Both schools participate in student-led multi-stream recycling. RCPS technology department recycles all discarded technology equipment. Schools have composting bins and a food-sharing table to reduce food waste. Weekly classroom newsletters, folders, and other communications have gone digital. Cafeterias have reusable plates, and paper towel dispensers have been replaced with hand dryers.

Rappahannock County High School uses rain-harvesting cisterns to collect and then water plants in the greenhouse and school gardens. RCPS operates its sewer treatment plants at each site. Self-operation of the treatment plants enables the school district the assurance that the effluent discharged meets all federal and state requirements.

Pest management includes monthly inspections and treatments to discourage pests in RCPS buildings. Staff are encouraged to keep food out of classrooms, close all doors, and report any issues of pests through RCPS' online ticket system. A list of all chemicals and cleaners are kept in both schools as well as the School Board office. Each nurse and each custodian is given Safety Data Sheets. RCPS works closely with the county landfill to ensure all chemicals and materials are disposed of while meeting all federal and state requirements. Dehumidification systems have been installed on all HVAC equipment. All exhaust fans and fresh air intake have been replaced or serviced. All air filters are changed quarterly, and all external air fresheners have been banned from the district to improve air quality.

All staff are trained in mental health first aid. RCPS employs guidance counselors, a school psychologist, and a licensed social work, who all work cooperatively on the Mental Health Innovators Team. The anti-bullying program OLWEUS is implemented by RCPS to ensure each child has the opportunity to develop his or her social skills and empathy. Teachers are taught mindfulness and mediation so they can implement this with their students.

Commit to Be Fit is a grant-funded program in RCPS, focusing specifically on creating a culture of health and wellness within cafeterias, classrooms, and community. The nutrition strand of the program focuses on promoting accessibility, education, and experiences. Salad bars have been implemented in both schools with 14 percent of the produce coming from local growers. All students are provided Power of Produce bucks to purchase foods from the local farmer's market.

The classroom component of Commit to Be Fit, located at the elementary school, is based on brain research that shows that moving enhances learning for all ages. The Action Based Learning Lab is a series of 10 stations of movement designed to assist in filling developmental movement gaps while enhancing learning. The lab is also used to integrate classroom curriculum to enhance kinesthetic learning. A sensory

pathway has been installed in the primary wing of the elementary school. At the high school, Commit to Be Fit has installed a Neuronasium, with pedal desks, standing desks, glider desks, balance desks, swivel desks, and wobble stools that promote balance and core strength. Teachers bring their students to this classroom for instruction.

Commit to Be Fit offers weekly fitness classes and workshops to all staff, parents, and community members. During the 2018–19 school year, a total of 439 workshops, classes, and events were held at no charge to the participants.

In RCPS, effective environmental and sustainability education begins in kindergarten and continues until the 12th grade. Kindergarten students learn the importance of recycling, conservation, and reusing products. Third-grade students create solar ovens. Culpeper Soil and Water helped sixth-graders build watershed models to explore runoff. RappFLOW and the RCPS STEAM coordinator co-teach a unit to explore ground cover and the impact of erosion and soil conservation. Master naturalists and master gardeners work with students on the importance of pollinators and ways to ensure their survival.

The Trout in the Classroom program is implemented in both schools. Classrooms raise brook trout while researching, monitoring water samples, and working to maintain a healthy environment for the fish to grow. They then release these trout into local rivers. Students monitor two local rivers to compare and analyze how environmental impacts, such as farming, development, and riparian areas, affect the quality of the water.

A new courtyard at Rappahannock County Elementary School includes raised beds for classrooms to grow herbs and vegetables, an outdoor classroom with an interactive monitor, a pond with a waterfall, composting bins, a kiln, a greenhouse, and a labyrinth. A new entrance was installed from the STEAM lab to promote the integration of instruction to allow teachers to bring their students to an outside learning environment. School gardens are located at



*Rappahannock County Public Schools students study environmental impacts on water quality through field trips to local rivers and the state arboretum.*

both schools. Teachers can use the space to integrate into their curriculum, use the outdoor learning area for their lessons, or a healthy break for students.

Designees from the school division participate in multiple professional development opportunities funded by the Chesapeake Bay Trust and Culpeper Soil and Water that focus on topics such as watersheds, water pollution, and ecosystems. Teachers also have the opportunity to participate in Project WET, Project Learning Tree, and Project WILD. These curricula are correlated with national and Virginia science standards of learning, which allows teachers to bring these experiences and knowledge back to the division to benefit students.

Each year, fourth-grade students visit Blandy Experimental Farm in Boyce, Virginia, to participate in various hands-on lessons, including games and writing activities that center around Virginia resources. Fifth- graders take a yearly trip to Shenandoah National Park.

Students participate in an ongoing trash cleanup project on the county roads. Students are actively involved in “neighbors helping neighbors” sponsored by Habitat for Humanity, engaging in cleanups and planting flowers and shrubs. RCPS students recognize they are part of the Rappahannock community and that their participation is visible and valuable to this community.

## **Washington**

### **Carl Sandburg Elementary and Discovery Community School; Kirkland, Wash.**

*A world of endless possibilities*

The Carl Sandburg Elementary and Discovery Community School (Sandburg/DCS) community cares about protecting the planet. As one student said, “We have to be kind to the earth because we live here.” These values drive the missions at Sandburg/DCS. Sandburg/DCS identifies and takes pride in being a green school community. Sandburg and Discovery are officially two schools, but they share one building and work together. The main school is Carl Sandburg Elementary School, but it also houses a small choice school called Discovery Community School (DCS), and together they are one community where environmental stewardship has become a valued cultural norm for teachers, students, and the community. Sandburg/DCS has strong parental support for these programs as well. Having programs and policies that are informed by parent interest and community values helps build community and structural systems that ensure the continuation of school programs beyond the efforts of a single teacher, parent, or principal.

Sandburg/DCS has been recognized by the local program King County Green Schools with Level One (waste reduction), Level Two (energy conservation), and Level Three (water conservation and pollution prevention) designations, and a Sustaining Green School designation for maintaining and building on all of these practices. They are the only school so far in their district to achieve the Sustaining Green School designation, and they have received that recognition four times since spring 2015. This school community received National Wildlife Federation certification as a wildlife habitat in 2015 as well.

Green school efforts all started with some students' and parents' desire to eliminate Styrofoam from the lunchroom. By reducing waste, recycling, and collecting compostable materials in the lunchroom, classroom areas, and offices, the school has achieved a recycling rate of 58 percent as of November 2019. This year, Sandburg/DCS added a food share and donation program in the lunchroom after successfully piloting one last spring. Students may put packaged, unopened food items from the school lunch program that they don't open or eat into a share bin for other students who might be hungry to take and eat. Leftover foods from the share bin are collected and donated weekly to a local food bank. Sandburg/DCS also switched from disposable plastic to reusable utensils in their hot lunch service. For years, they have been using reusable dish sets when they have holiday parties in classrooms.



*Carl Sandburg Elementary and Discovery Community School students ride bikes during class with their P.E. teacher. They also receive 60 minutes of daily outside recess time.*

To benefit the Kirkland Community, students complete annual service projects, such as a hygiene products drive, making lunches for the homeless, and food-sorting programs for the district's Pantry Packs program and Hopelink food bank. All students are involved every day by sorting their own recycling and compost in the lunchroom and classrooms. The student green team helps with collecting the recycling every day. It also takes responsibility for recording quantities of foods in the share bin and storing them. They speak to visitors and educate others about the

importance of sustainability. They stand out at dismissal reminding parents that the school is a no-idle zone to protect air quality in the parking lots.

The PTSA brings in a dance program annually for all students K–5 to learn dance, and the school’s annual fundraiser is connected to a dance-a-thon. Third-grade students participate in an annual swimming lesson program every spring. Sandburg/DCS has a schoolwide positive behavior system with a motto of “Be Kind, Be Safe, Be Responsible,” which they connect to social-emotional well-being, good citizenship, and being responsible stewards of the environment. Students have unlimited access to fresh fruit and vegetables every day at salad bars. Sandburg/DCS implements a program to teach about the dangers of skin cancer and the importance of sun protection. They also have a natural playground on campus where teachers can take their classes to explore and learn outside.

Sandburg/DCS building and grounds are designed with sustainability in mind. The sustainable campus inspires the school to do more to protect the environment. Thanks to native, drought resistant landscaping, they do not use any irrigation. Rain gardens help filter water. In order to reduce their environmental impact, students and parents handle weeding through an herbicide-free landscaping program.

Energy-conservation features include solar panels and a heat pump. In 2013–14, Sandburg/DCS took recordings of their energy usage (electricity and gas combined) and works to reduce usage from that baseline. Sandburg/DCS’s current energy usage is 4,190 kBTU per student per year, or 28 kBTUs per square foot per year. This represents a 13 percent reduction per student and a 12 percent reduction per square foot over their baseline data. The baseline water usage measure was 374,748 gallons, and current water usage is 332,852 gallons, which represents an 11 percent reduction and a 32 percent per capita reduction. The total energy savings from 2014 to September 2019 has resulted in cost savings of \$57,510 dollars for the building and a carbon reduction of 116 metric tons of carbon dioxide equivalent.

Sandburg/DCS also works to bring environmental science learning to students through classroom instruction, with a strong district-supported science curriculum and additional expert presentations brought in by teachers and the school community to enhance this learning. Furthermore, the school’s responsiveness to parental interest in environmental and sustainability education, practices, and programs also directly supports implementation of the Next Generation Science Standards, which call for culturally relevant instruction for students.

Sandburg/DCS integrates environmental education into all grade-level science instruction. The school implemented a curriculum called Amplify Science that is aligned with Next Generation Science Standards and includes robust instruction and

assessment in such areas as needs of plants and animals, changing landforms, environments and survival, energy conversions, earth systems, and ecosystem restoration. In its first year, Sandburg/DCS students scored 76 percent proficient on the WCAS, which is 22 percentage points higher than the state average.

In addition, first-grade classrooms have King County Going Green Workshops in February to teach students about healthy environments and preserving habitats. Third-grade students visit Environmental-Adventure-School on a field trip to learn about food chains, animal survival, and healthy habitats. Nature Vision visits first and second grades to talk about watershed and water conservation. Second-graders put on a music performance with the theme "Assignment: EARTH" that promoted care for the environment. Fourth-graders take an annual field trip to Tiger Mountain and engage in learning about healthy forests and maintaining biodiversity in forests bordering urban areas. Fifth-grade students attend a four-day, three-night residential Outdoor Environmental Education program annually to learn about natural resource conservation, waste reduction, and environmental stewardship. Furthermore, annual assemblies enhance learning about environmental stewardship.

Sandburg/DCS wants their students to understand social responsibility and the ways that their choices can help preserve and sustain the many wonders of nature. This work has become embedded into the identity of the school community. Each year, as a new group of students and families join the community, they learn that this is one of the values, and they help take on the role of sustaining the work.

### **Montessori Children's House; Redmond, Washington**

#### *Nurture and nature*

Montessori Children's House (MCH) provides a holistic educational experience. The school's mission is, "Nurture AND Nature: developing your child's individual passions and strengths. Because today's child is tomorrow's future." MCH is a pre-K–5 private school serving 225 students. The student green team was founded ten years ago and has worked to help the school community think about how seemingly small everyday choices have a broader impact.

The green team has worked with King County Green Schools and received recognition for completing Level 1, waste management; Level 2, water conservation; Level 3, energy conservation; and in 2020 will apply for Level 4, sustaining green school. With King County's help, the green team set clear yearly goals and has made real change in school practices and policies. Now the school has a system in place for tracking energy, water, and natural gas usage. This gives students a tool to reflect on utility consumption as well as brainstorm new ideas about how to reduce



*A Montessori Children's House student takes water samples from the Mercer Slough on a class field trip.*

the natural resources used. Elementary students discuss their own carbon footprint, and the green team is gathering information to find out the carbon footprint of each classroom.

MCH is also using the Eco-Schools USA program to work on specific pathways in their sustainability journey, including energy, water, and transportation. Other improvements that have been implemented in these areas include an appliance purchasing policy, an appliance cleaning schedule, checking for drafts indoors, and monitoring light and heat usage. The school replaced all overhead fluorescent lights with LED bulbs and added motion sensor switches to the lights outside each classroom. MCH posted energy conservation signs on light switches and electronics to remind staff and students to turn them off when not in use. MCH enforces a no-idling policy at drop-off and works to facilitate carpooling.

Campus is home to a wetland, which provides not only beautiful scenery and homes to diverse wildlife, but also a unique opportunity for students to learn about the water cycle. Some measures taken to improve water conservation and keep students and staff healthy include cleaning fixtures, testing well water, posting signs to turn off water, using native plants in landscaping, watering the garden in the morning, and collecting rainwater.

Every classroom has a compost, recycle, and garbage bin. Teachers provide lessons about which items go where and why. There is also a worm bin and a larger onsite composting system. The school collects markers to send to Crayola Colorcycle. This year, the green team entered the Trex plastic film challenge. MCH turned parent newsletters paperless, encourages staff to print double-sided copies, makes "good on one side" paper bins available in classrooms, and provides children with reusable glass mason jars for water and durable metal utensils at meals. Waste Free Wednesdays encourage waste reduction; leftover food is fed to the campus goats and chickens or provided to the worm bins, and all used paper towels are added to the yard waste bin, which is collected and transported to a composting facility. Garden and animal wastes are composted on site.

Having a healthy indoor and outdoor environment is of the utmost importance to the Montessori Children's House. The school has an integrated pest management plan. In addition, the school uses certified safe playground equipment and has a natural outdoor play area. MCH uses certified safe building materials and green cleaning products and has a detailed cleaning schedule that includes dusting often. The school has tested for radon with passing results. In the school gardens, students use all organic materials, including potting soil, seeds, amendments, and fertilizer. The elementary playground was built using all-natural wood, logs, and boulders.

The school has a campus where students can explore, grow food, and play games. The children grow veggies from seed to harvest and can taste the fresh produce daily in the growing season. All the P.E. classes are held outside. Students have access to two playgrounds, a nature trail, and various sport choices, such as basketball, hockey, soccer, jump ropes, hula hoops, balls, bean bags, and tag games.

For over 10 years the school has been pursuing a farm-to-table experience. The school has an extensive organic-based garden program where students discuss nutritional information, such as where food comes from, fruits and vegetables, cooking ideas, and samplings of the garden's produce. The garden program provides outdoor time to students. Early childhood classrooms go to the garden in small groups once a week. Elementary and middle school students go to the garden once a week as well and have daily access to the garden for lessons with teachers or a calming walk in the garden if needed. During the bounty of the season, the garden supplements the snack program with many vegetables, such as green beans, carrots, cucumbers, kale, and lettuce.

Along with keeping the physical environment healthy, the school focuses on teaching children to have a healthy mental space. Students are encouraged to communicate with each other to resolve problems, and all teachers are certified in positive discipline to assist when needed. Each classroom has a Peace Table where children can come together to respectfully discuss any feelings or issues they might be experiencing.

The integrated curriculum covers social studies, history, science, math, and art, connecting these subjects to sustainability concepts. From biomes to ecosystems, our job as citizens of this earth is to understand how human communities can meet their needs in the best possible way. Lessons on waste management, waste reduction, recycling, composting, food and water supply, energy usage, spiritual needs, physical needs, and microclimates around the world provide perspective about how we are all connected. At the elementary and middle school, students





regularly study environmental science. They study climate change, weather patterns, and more to understand the impact of human actions on nature.

The kindergarteners participate in Nature Club for 45 minutes each week. They study the natural environment, covering topics from trees to mountains, flowers to leaves, insects to birds, and moss to mushrooms. Students dissect plants and other non-animal objects, use magnifying glasses, take leaf rubbings, and spend time observing and recording what they find. This opportunity creates a deep love of nature.

Upper elementary grades spend four days at IslandWood on Bainbridge Island annually, where they are immersed in a sustainably focused 280-acre park and learning center. The experience covers lessons and discussions on predators versus prey, identifying species of trees and mushrooms in the forest, garden exploration and compost evaluation, diving deeper into microorganism through microscopes, and an extensive daily discussion of waste management at all meals.

Students and staff carry this message of sustainable thinking into the larger community as well. During school events all are expected to sort trash into compost, recycling, and landfill waste, with signage to educate parents, staff, and students. The school gives back to the larger community by hosting a yearly Hope Link Food Drive. This year, students grew pumpkins for the Harvest Fest event, then donated 220 pounds of pumpkins to the Food Bank.

## **Pullman Public Schools; Pullman, Washington**

*Five days of outdoor ed for fifth*

Pullman Public Schools (PPS) established a sustainability committee to support overall district operations and individual building goals to reduce environmental impacts, improve health and wellness, and enhance environmental and sustainability education. The foundation of this work involves partnering with community organizations with like-minded sustainability missions, to increase the breadth and depth of sustainability education for all 2,815 students in PPS. The committee consists of teachers from each of the district's six schools, several administrators, and a high school student that is passionate about environmental conservation.

In the fall of 2019, the committee approved the expenditure of approximately \$11,000 of district funds toward the important task of an energy audit. The committee worked with experts at McKinstry to complete a baseline energy audit and develop a baseline of energy usage for each school and the district office. With these baseline energy consumption numbers, PPS is carefully looking at

opportunities to reduce energy consumption, improve performance, and develop an informed comprehensive plan for sustainability efforts in the district. More than 50 percent of their energy is from renewable resources such as wind and solar.

The Jefferson Elementary School Green Team conducted a water audit in 2017, and the student team found 44 aerators in the building that were inefficient. The students then teamed up with the City of Pullman to conserve water by replacing the old aerators with newer, water-conserving models. Jefferson students were able to save 1.2 gallons of water for every minute of use at every faucet. The students also marked 10 storm drains around campus to remind students that water ends up in nearby waterways. Finally, the students on the team engaged with their peers and shared what they learned about conservation at a school science fair. In fall of 2018, PPS partnered with the Washington State Department of Health to test and remediate the water from all water fixtures in each school that might provide drinking or food preparation water to students or staff.

PPS students and staff use a company called Recycle Boise to collect outdated or unused electronics. Rather than sending these items to the landfill, Recycle Boise refurbishes many of the district's unused electronics for donations to students and schools that can benefit from them. This initiative is inspiring staff and students to consider both the environment and the needs of other students outside of the Pullman community. As a result of the district's participation in this program, over 1,000 devices were saved from the landfill in 2019. A green team has already been established at Pullman's newest school, Kamiak Elementary. The Kamiak green team partnered with a local grocery store to recycle unused plastic bags into Trex decking.

The district has installed electric car charging at two schools. An annual bike or walk to school day campaign encourages active transportation. All secondary students living within Pullman city limits have access to city bus passes to ride public transit to and from school. Approximately 36 percent of the district's secondary students (grades 6–12) have a bus pass that they use. The district received a grant to fund the purchase of an electric bus.

PPS has been reducing the use of chemicals. In February 2020 the district introduced a green cleaning initiative — all classrooms were offered reusable spray bottles with a soap and water cleaning solution and microfiber cleaning cloths for general classroom cleaning.

PPS has a highly engaged wellness committee that consists of staff members, parents, community partners, and administrators. The committee meets quarterly and revised the district's wellness goals in 2017, encouraging the district to move

toward offering more scratch cooked meals to students. PPS is now in the second year of a scratch cooking program, and the menu is increasingly made up of scratch cooked foods, with an emphasis on locally sourced ingredients. Another accomplishment of the Wellness Committee is the creation and enforcement of a snack policy for schools. To better protect students with allergies and diabetes, Pullman Public Schools now has a specific list of snacks that are approved for classrooms and schools for celebrations.



*In Pullman Public Schools, Jefferson Elementary School students had the opportunity to partner with the WSU Landscape Architecture department to develop an outdoor learning lab for their campus featuring five learning zones, including a small amphitheater, an edible garden, nature journaling area, and pollinator garden.*

Another exciting initiative in Pullman schools that benefits the wellness of students is the implementation of gardens and gardening clubs at several schools. Students learn about gardening and the source of their food and are able to grow vegetables that district kitchens can then use as ingredients for student meals. The gardening programs have been so successful that an additional school, Franklin Elementary, is in the process of developing a garden program.

Elementary students attend 80+ minutes of P.E. classes each week. Much of that time is spent outdoors. In addition, elementary students have recess outdoors two or three times a day depending on the grade level. It is not unusual for teachers to take a class outdoors for instruction when the weather is pleasant. Sometimes the instruction is related to the environment surrounding the school, and sometimes the instruction is outdoors simply to enjoy the fresh air and change of scenery. Lincoln Middle School recently

received a grant that allowed the district to purchase bicycles, helmets, and bike trailers. This new unit will provide students with the opportunity to practice bicycle safety and gain an appreciation for bicycle riding.

PPS has put considerable time and resources toward the mental health and wellness of students. Additional counselors have been hired at the secondary and elementary levels, so that now each school has at least one counselor. Counselors focus on three essential components — academic, career, and social emotional development. In addition, a school-based mental health therapist was recently hired to provide screening and direct services to students. PPS works with several community partners to facilitate students' access to mental health resources and has increased the number and depth of professional development course offerings and presentations available to staff related to mental wellness. The Second Step Social Emotional Curriculum was recently adopted; it is in the implementation stage at all elementary schools and the middle school.

Across the district's six schools, there are a wide variety of unique activities and experiences related to environmental and sustainability education. All second-graders in the district take a field trip to explore a local aquifer site and learn about how it impacts the Pullman community, and how they can care for these resources and reduce consumption. They learn the science behind hives, pollinating, and honey and calculate the hives' carbon footprint.

Jefferson Elementary School partnered with the Washington State University Landscape Architecture program in 2018–19 to design an outdoor learning lab for their campus. The project provided Washington State University (WSU) students with a service-learning opportunity by participating in the architectural design and preliminary construction of the outdoor learning lab. In addition, students from the WSU Center for Civic Engagement assisted with the ongoing construction of the Jefferson Elementary project.

PPS has partnered with Pacific Education Institute (PEI) since 2018 to provide teachers with high-quality professional learning to advance science literacy and deepen student engagement by empowering educators to teach real-world science outdoors. The training started with fifth-grade teachers and then expanded to grades K–12. The FieldSTEM training and commitment provided by PEI staff helped teachers understand the components that make systemic and sustainable FieldSTEM implementation in Pullman Public Schools a reality. Pullman staff and students understand the value of natural resources and the ecosystem and that the economic opportunity they provide are the foundation of the Pullman community.

The Palouse Conservation District partners with PPS to provide high-quality training and workshops for district staff and students throughout the school year. This partnership is ongoing. For example, on Nov. 12, 2019, fifth-grade students learned about the Palouse watershed and the effects of storm water pollution in rivers and oceans. Students from Kamiak, Sunnyside, Franklin, and Jefferson elementary schools participated in a field day at Pullman City Playfields, looking for macro-invertebrates and testing the water quality of the South Fork of the Palouse River.

While PPS proudly weaves environmental and sustainability literacy into components of many courses, units, and lessons. The most exciting example of this is the robust fifth-grade outdoor environmental education camp, a memorable week at Camp Wooten, in Dayton, Washington, where they participate in five days of science lessons and activities, based on the Next Generation Science Standards. In addition, many of the lessons involve and promote energy conservation and sustainability practices.

## **Seattle Public Schools; Seattle, Washington**

### *Equity in environment*

Seattle Public Schools (SPS) serves over 51,000 students across 104 schools. More than 30 percent of students qualify for free and reduced price lunch, and over 5,000 students experienced homelessness during the 2019–20 academic year.

All schools at SPS are encouraged to create green teams and become certified with Washington Green Schools. SPS has certified five schools per year on average for the last 10 years. Currently, 64 schools are certified (25 bronze, nine silver, four gold, one platinum) in the categories of Energy, Healthy School Buildings, School Grounds and Gardens, Transportation, Waste and Recycling, and Water. Funding is available through a dedicated shared savings account, which is established by meeting goals in resource conservation, as well as through waste diversion metrics. Underpinning its work are the district's resource conservation policies and guidelines, which are both aspirational and providing specific guidance in shaping resource conservation at SPS.

SPS has three resource conservation specialists tasked with managing a wide range of utility accounts on behalf of SPS, including electricity, natural gas, water, solid waste, recycling, and compost. This team works alongside school leaders and reviews critical work and initiatives focused on the reduction of environmental impacts and costs across district operations. They also look for and support projects and programs that help reduce energy and water consumption, waste, and promote the reduction of carbon output and GHG emissions.

SPS Facilities Management manages over 8 million square feet. The buildings range from one to 108 years old, creating a unique set of challenges and opportunities. Between 2008, when baseline measures were set, and the 2016–17 school year, the district saved approximately \$1.4 million in waste, water, and energy costs. All facilities are benchmarked using ENERGY STAR Portfolio Manager, and 75 percent of schools have received ENERGY STAR certification at some point. Six schools recently added 100kW+ photovoltaic systems with a state Department of Commerce grant, bringing the number of solar schools to 10.

SPS conducted a waste reduction pilot in 2012 to determine how to improve recycling rates without adversely impacting custodial hours. After two five-month trials, containers, custodial equipment and container locations were standardized. Over the summer months in 2013 and 2014, garbage and recycling containers in most schools, including all new schools, were updated to follow the new container standard. Support from Seattle Public Utilities includes recycling posters available in 18 different languages and desktop compost containers for classrooms. In the 2018–19 school year, over 75 percent of the schools either met the waste reduction goal of four cubic feet/student/month or improved from the previous year. Most schools have food share tables located in cafeterias, sharing whole and packaged food with fellow students and after-school programs. Four schools have pilot programs for food recovery with local food banks.

SPS grounds and maintenance staff are critically important for ensuring water conservation through tightly controlled irrigation practices at community playfields. Stormwater features that go beyond code include bioswales, detention ponds, rain gardens, vaults, and other best management practices.

SPS employs a Risk Management team, which includes a risk management manager, a manager of environmental health and safety, and a health and safety coordinator. The team also includes a certified playground safety inspector. SPS employs a team of four recommissioning coordinators, who fine tune all school HVAC systems, regardless of age, for optimum performance. SPS provides a robust water quality program, with extensive water quality testing performed on a three-year cycle for all fixtures that provide drinking water.

Transportation equips buses with tablets for route management, reducing the need for paper and improving accuracy and accommodating changes in schedules. An app called First View allows parents, students, and schools to see bus locations in real time. District policy and procedures prohibit idling to reduce fuel use and air pollution. Bus drivers receive regular training, signs are posted, and parents educated.

The Nutritional Services team serves over 14,000 lunches and nearly 6,000 breakfasts every day and has made a concerted effort to increase healthy ingredients with a focus on availability of fruits and vegetables, whole-grain rich items, and reduced sodium content. A newly implemented soup bar pilot in six secondary schools allows students to choose their vegetables and then add a broth — pho, tortilla, coconut curry, or chicken. Salad bars have been added to all schools, allowing students to choose their favorite vegetables or try something new. SPS offers additional programs for schools with vulnerable populations, including a Fresh Fruit and Vegetable Program at seven targeted elementary schools, with a coming expansion to an additional 18 schools. The after-school snack program allows student clubs to sign up and receive fresh fruits, vegetables, and a grain for participating students. Breakfast After the Bell, Grab & Go, and Second Chance Breakfast programs are offered in over a dozen schools. Nutrition educators are placed in four elementary schools. A Community Eligibility Provision Program offers breakfast at no cost to all students at five schools.

Eighty percent of schools have one or more forms of on-site learning gardens, or regularly visited off-site environmental learning opportunities to support the school's curriculum. The school gardens include edible, permaculture, native plants, ornamentals, rainwater-management, wetlands, and forests. Off-site opportunities adjacent or near a schoolyard include community gardens, urban farms, and forests. Learning is organized in a variety of models, being teacher-led and/or managed by a volunteer or paid garden-coordinator. Depending on the school, students may participate in hands-on “work” on a weekly basis, monthly, and/or during after-school clubs. SPS manages a School Learning Garden Network for the community to support the learning gardens in providing routine information, meeting biannually

and offering an all-day winter workshop every year.



*Seattle Public Schools' Hazel Wolf K-8 Pinehurst School meets Washington State's Sustainable Schools Protocol and includes a living wall of plants.*

Cascade Bicycle Club provides bike and pedestrian safety for every student in grades 3–8. The district works with local rowing clubs on skill and water safety education. Erg Ed brings equipment (indoor rowing machines), technology,

curriculum, and water safety training to middle and high school P.E. students, staff, and community.

SPS has a total of 78 certificated nurses and 10 classified nurses. SPS has 28 school-based health centers. There are five PBIS trained coaches on the behavioral health team.

Student curriculum at SPS aligns science curriculum at K–12 to the 2013 Washington State Science and Learning Standards, also known as the Next Generation Science Standards. The department completed a K–12 curriculum adoption in May 2019 to align core science instructional materials at all schools and grade bands with these science standards and to include environmental and sustainability literacy topics. In partnership with the UW Institute for Science & Math Education, the Learning in Places Grant, implemented in nine classrooms at elementary schools, explores the question: What is our impact on the places we see every day? Approximately 30 of the 74 SPS elementary school grade 5 classes participate in outdoor learning experience through the IslandWood program. Approximately 18 elementary schools participate in the Salmon in the Schools program funded by the city of Seattle.

At the elementary level, the foundations of climate science are taught, beginning with solar energy, weather patterns, and severe weather. Middle school students continue this work in grade 6 with units covering thermal energy; ocean, atmosphere, and climate; and weather patterns to develop an understanding of scientific principles necessary to answer scientific questions and address design solutions related to climate change in the culminating units, Earth's Changing Climate and Earth's Changing Climate Engineering Internship. In high school, semester one biology's final unit is Human Energy Systems. The four preceding units build evidence that students apply to the Human Energy Systems phenomenon of global climate change.

Advanced Placement Environmental Science is offered at seven high schools. Students from several SPS high schools participate in Project Feed 1010, Institute for Systems Biology, catalyzing a new agricultural economy. Cleveland HS has started an aquaponic system, combining fish farming with growing plants in water. Nathan Hale HS offers a Horticulture class with an active greenhouse and an annual plant sale in the spring.

SPS has a strong partnership with the YMCA Earth Service Corps and supports clubs in all high schools. At Ballard HS, the Youth Climate Action team has gone to the state capital to learn more about the legislative process, testify about climate action, and bring those lessons back to students and staff. In 2019, the Earth





Service Corps club at Ingraham High School won the Washington State Envirothon and competed against 52 other schools at the National Envirothon competition held in North Carolina. Throughout the weeklong competition, students demonstrated their knowledge on soils and land use, aquatic ecology, forestry, and wildlife management through written tests and interactive stations featuring North Carolina's natural resources. Since 2011, Chief Sealth High School has hosted the International World Water Week Conference, promoting understanding of the relationship between members of the local community with water in the region and around the world, emphasizing conservation and local action addressing equal access for all global citizens. Several high school clubs have hosted student clothing swaps and donated leftover items.

SPS is committed to eliminating opportunity gaps to ensure access and provide excellence in education for every student.

### **Wahluke School District; Mattawa, Washington**

*Rural sustainability leader*

The Wahluke School District (WSD) is a rural school district in Grant County, an agricultural region of Eastern Washington located near the Hanford Reach National Monument. The district serves 2,563 students, 98 percent of whom are minority and 92 percent of whom qualify for free and reduced price lunch. The district green team is comprised of 20 people, including gardens and sustainability specialists, five department heads (Teaching and Learning, Grounds and Maintenance, Food Service, Custodial, and Transportation), four school administrators, four K–12 classroom teachers (two elementary, one junior high, one high school), elementary specialists, a counselor, a Positive Behavioral Interventions and Support Specialist, and a migrant student advocate.

The WSD maintenance department is successfully applying automation to coordinate HVAC systems around the district. This ongoing project has reduced heating costs by half in the high school. Energy audits by WSD's maintenance director in select elementary portable classrooms provide valuable data to help the district identify inefficiencies and make energy-wise changes as building systems come up for replacement. LED bulbs are being phased in as old bulbs die out. All district electricity comes from renewable hydropower provided by the Grant County Public Utility District. The district has a tree planting plan to further reduce its carbon footprint.

All district irrigation uses non-potable water from the irrigation canal system serving Grant County. The district is designing and converting several irrigated sections of

grass to xeriscape native plantings, which conserve water and provide habitat for native pollinators. All student bathrooms have sinks that turn off after a designated time to help conserve water. Six drinking fountains have been replaced with water bottle filling station fountains.

WSD partnered with the Grant County Transit Authority and Ben Franklin Transit to provide staff with access to carpools to their jobs in Grant County from communities more than 50 miles away. More than 50 staff and substitute teachers participate. This alone helps keep several dozen cars off the road each day.

WSD has established on-site composting at two elementary schools. This process provides educational opportunities for students and supplies valuable soil



*A Wahluke student examines tomato plants in the school district greenhouse, looking for pests or disease.*

amendments for garden projects around the campus. As a result, WSD has achieved a 50 percent reduction in food waste for both schools. A districtwide print management system, PaperCut, is installed on all building photocopy machines to track use and reduce the amount of paper and ink used.

One elementary school garden is established, and another is under development. School gardens allow students access to healthy food and

opportunities to learn about the food system. Produce from local farms is served in school cafeterias. This helps provide students with nutritious food, supports a local farmer, and reduces the carbon footprint associated with food service.

WSD has implemented the PBIS Student Management Model for school discipline. This model is designed to be more equitable than a “zero tolerance” behavior policy and focuses on positive, safe school environments for all. School gardens are a place that school counselors or PBIS specialists can take students to talk, decompress, and provide the self-reflection time that the PBIS model recommends. Elementary school students have three outdoor recesses per day. Junior high

students have the option of going outside for half (20 minutes) of their lunch each day. High school students have access to an outdoor courtyard during their lunch.

WSD's three elementary schools partnered with the Mattawa Community Medical Clinic to provide nutrition classes to the after-school garden clubs. The two clubs serve all students in the district's three elementary schools; one club serves students in kindergarten through second grade, and the other club serves grades 3–5. Two high school students currently serve as mentors for K–5 students in the after-school garden club. Students across all grades have been involved in the pumpkin patch located on district grounds. The pumpkin patch was planted to eliminate the need for elementary students to travel more than 40 miles to pumpkin patches each fall. A local nonprofit organization, The Wahluke Enrichment Organization, donated the plants, junior and high school students help to maintain the patch, and elementary after-school clubs weeded it. In the end, there were enough pumpkins to share with the community.

All Wahluke elementary schools are part of the K–5 Science Education Cooperative through Educational Service District 105, which includes Smithsonian: Science for the Classroom (STC) curriculum and ClimeTime teacher training linking climate science and Next Generation Science Standards. Curriculum includes “How Can We Stop Soil from Washing Away,” “How Can We Provide Freshwater to Those In Need,” and “Protecting Animals When Habitat Changes.” Each unit includes a sustainability-based design challenge as the final project. Elementary schools are currently in the first phase of a four-year implementation plan. Wahluke Junior High recently adopted the Smithsonian: STC curriculum for middle school, which includes the same theme of environmental awareness as the elementary curriculum. Wahluke High School is currently in the curriculum adoption process.

Wahluke Junior High participates in the Salmon in the Classroom program in partnership with the Mid-Columbia Fisheries and U.S. Fish and Wildlife Service. Students observe salmon eggs hatching in their classroom and learn about the salmon life cycle, watersheds, and water quality. Students then take a field trip to release the salmon under the supervision of Fish and Wildlife biologists. The high school offers environmental science, animal science, and natural resources courses.

This year 100 percent (51) of Wahluke K–5 teachers responsible for teaching science received six hours of ClimeTime training from ESD 105 related to their Smithsonian: STC Engineering & Design curriculum.

## **Wisconsin**

### **Lincoln Avenue Elementary School; Milwaukee, Wisconsin**

*A community school spawns bilingual river explorers*

Lincoln Avenue Elementary School is a bilingual (English and Spanish) community school in the Milwaukee Public School District serving 510 students in kindergarten through fifth grade. Ninety-nine percent of students in this urban school are eligible for free and reduced price lunch and more than 30 percent are English language learners. Lincoln Avenue Elementary School strives to offer an equitable, healthy learning environment where students, families, staff, and community members feel engaged, safe, and successful.

After over 100 years of functioning as an elementary school on the South Side of Milwaukee, Lincoln Avenue underwent a transformation by prioritizing sustainability and linking environmental health to academic achievement in science, math, social studies, language, and the arts. The priority of sustainability was born out of becoming a community school within the Milwaukee Community Schools Partnership in 2015. The school is partnered with Sixteenth Street Community Health Centers (SSCHC) in their Department of Environmental Health. In just five years, the school and partner agency have worked hard to transform the outdoor spaces to include green infrastructure and interactive green spaces. Over the last four years, the curriculum for every grade level has been aligned to these outdoor spaces and with the momentum of a close-by river restoration project.

Lincoln Avenue participated in the Milwaukee Better Buildings Challenge and has photovoltaic/solar electric and uses daylighting. The school used Portfolio Manager in 2018 to calculate its energy score of 87.

In 2017, students conducted a study over the course of three weeks to monitor the amount of garbage generated daily in the lunchroom. The results were astounding — students found that Lincoln created over 6,000 pounds of garbage in a school year. As a result, Lincoln began composting with Compost Crusaders and recycling in lunchrooms, reducing the amount of trash from five to six bags to only half of a bag each day. Since 2017, Lincoln has diverted about 12,000 pounds of waste from the landfill thanks in part to green team separation monitoring during lunchtime. Lincoln Avenue won the MPS Recycles 2018–19 challenge, and its recycle team continued into the 2019–20 school year.

The staff at Lincoln Avenue have gone to great lengths to create safe routes to school by working with the city and the neighbors to re-route traffic, install additional

signage, and successfully petition for speed bump installation. In November 2018, SSCHC helped to organize a neighborhood safety/block watch group, and meetings have been hosted monthly at the school since. In winter of 2019, Lincoln received a \$75,000 grant from the City to implement Safe Routes to School and install even more pedestrian safety infrastructure by 2021. The school also has a nationally recognized Walking School Bus program that promotes exercise, reduces traffic and pollution around the school, and improves attendance and punctuality for students. Two routes that run simultaneously on Mondays and Fridays are supervised by teachers, parents, and community members that volunteer their time. Now more than 50 percent of students can walk or bike to school safely.

Lincoln removed impermeable pavement (asphalt) from the school's front and back playgrounds to install a student-designed 2,400-square-foot native prairie plants area, a pergola outdoor classroom, and rain catchment system with two 275-gallon cisterns, a bioswale, a 200-square-foot rain garden, and 10 8-feet x 4-feet raised garden beds, which are open to the community in the summer. The school also removed asphalt from the front of the school and replaced it with permeable pavers and green space. These changes result in water conservation and reduced stormwater run-off to the Kinnickinnic River.

The school's partner agency is the Department of Environmental Health within SSCHC, and their mission is to focus on the environmental determinants of health, and where their patients work, live, learn, and play. Since Lincoln Avenue School is located in the heart of where the patients of the clinic are located, Lincoln Avenue families receive many extra supports, from child lead testing, to learning how to canoe and hike, to activating the limited local green spaces in the neighborhood. The Women, Infants and Children Department conducts outreach to families to enroll them during events such as Open House and the School Carnival. The school also partners with SSCHC's Healthy Choices Program, and a Farm to School Americorps works with lower elementary students every year to teach them about healthy foods and gardening.

At Lincoln Avenue, staff and students are provided with regular opportunities to enhance their own well-being. Staff have participated in a series of trauma and mindfulness trainings supported by the school district, which not only brings awareness to what trauma is and how it manifests in the students, but it also promotes staff self-care. Strategies to improve well-being through the lenses of restorative practice, culturally responsive practice, and the social-emotional learning framework include all-school practices like threshold greetings, a morning meeting, mindfulness exercises, and more individualized support through the school psychologist and social worker. Since the fall of 2018, Lincoln has benefited from a mental health clinic on-site, with a behavioral health specialist seeing a caseload of

high-need students once a week at school. These services are provided through the behavioral health department within SSCHC.

The entire Lincoln community has become proficient in composting and recycling, gardening, water quality, and other green initiatives. In 2014, SSCHC implemented Kinnickinnic River Explorers, biweekly after-school environmental education workshops for students, headed by the SSCHC Education Coordinator. The workshops are held for 2.5 hours a week for 12 weeks, totaling 24 sessions per semester. An average of 20 kids are enrolled every semester. In 2017, this partnership expanded. Sixteenth Street began providing environmental education for second to fifth-graders. Participants canoe, bike, hike, and fish. They also offer bilingual family education workshops on water quality, stormwater management, green infrastructure, habitat, and other sustainability topics. Little by little, the exposure to these activities is resulting in behavioral change and a more sustainable mindset in both Lincoln students and their families.



*Students at Lincoln Avenue Elementary School in the KK River Explorers Program are ready to explore the Kinnickinnic River.*

Lincoln students take field trips often to different sites in Milwaukee to learn about the environment, geography, weather, and history. The school uses a 26-acre community park for learning and water bodies within walking and driving distances to fish or conduct aquatic habitat explorations. All grades participated in a school scavenger hunt within the native planting area. Second-graders use this area to study the migration of butterflies and their role as pollinators. All grade levels use the pergola and outdoor classroom for meditation, journaling, and math lessons.

Classrooms in various grade levels tour the surrounding neighborhood and witness first-hand green infrastructure that is meant to keep the watershed clean and is directly connected to the green infrastructure on Lincoln's playground. Fifth grade explores the KK River restoration and has applied their knowledge of how Earth's spheres interact to support life for multiple native organisms at Pulaski Park. They created a map of the park that included multiple spheres and discussed how the KK River project addressed flood management and was an example of the positive and

negative effects human decisions can have on their local environment. The City of Milwaukee and Milwaukee Harbor are used for learning as well. Fourth grade studied the human impact on natural spaces; waterways, such as the KK River and the inner harbor of Lake Michigan in particular; pollution; erosion; and infrastructure that impacted wildlife. Students were able to draw conclusions regarding humans' positive and negative impact on natural spaces. Since 2017, Lincoln students in grades 3–5 have visited the Menomonee Valley Urban Ecology Center two to three times each year. This partnership enhances the Lincoln science curriculum by providing hands-on, place-based instruction in an outdoor setting.

Staff have voluntarily participated in Latino Earth Partnership Workshops, Green Schools Consortium Conferences, No Teacher Left Inside sessions, Green and Healthy Schools Workshops, Green Schools Network, KEEP (WI K-12 Energy Education Program) courses, and other sustainability professional development.

### **McDill Elementary School; Stevens Point, Wisconsin**

*A tradition of candlelit hikes, owl prowls, and story walks*

McDill Elementary School is a K–6 school serving 413 students in the Stevens Point Area Public School District in central Wisconsin. The school's accomplishments in reducing environmental impacts and costs, improving health and wellness, and increasing environmental literacy serve as a testimony to how parent and community engagement contributes to success.

McDill has upgraded lighting, installed water-saving equipment, and reduced its transportation footprint. In every classroom, there is a student who is responsible for turning the lights off when the class leaves the room. This job changes weekly. Staff shut down computers and monitors at the end of each day.

The campus integrates natural features, such as bioswales, and directs runoff into a groundwater drain. All grade levels visit the Boston School Forest pond and learn about aquatic ecosystems. In second grade, students learn about the water cycle and how water moves on Earth. Fourth grade teaches water-related topics in both social studies and science units, including the water cycle, polar caps/glaciers, lakes and rivers, pollution, logging history, lumberjacks, waterways, and groundwater. Fifth-graders learn about water and our world. They invite a guest speaker in to talk about experiences abroad by engineering ways to provide water to people far away from cities, for example, in Iraq.

The McDill community has reduced waste by implementing milk carton and marker recycling programs and has increased recycling in all classrooms and offices by

using well-labeled bins and instituting recycling education. Students are deeply involved with these efforts and have diverted more than 4,551 markers, 300 pounds of plastic bottle caps, and more than 185,165 milk cartons from the landfill. Student ambassadors and an adult composting team continue to find ways and refine processes to reduce waste in the school cafeteria and kitchen. McDill holds lunchtime after the noon recess and, for many years, has offered a share table where students put unwanted fruit and unopened milk for others to take.

McDill organizes walk and bike to school days and a Walk Across Wisconsin noon recess program. In the spring of 2015, students walked 2,513.75 miles during their Walk Across Wisconsin day, which is the distance from Stevens Point, Wisconsin, to San Diego, California, to Phoenix, Arizona, plus some! Staff meetings often begin with yoga poses and breathing techniques. The school installed two gaga pits for students and families to use.

Every class gets at least a 20-minute recess time during the day, but most days they have two recesses plus before-school playtime. Students attending McDill engage in physical activity at least three times weekly under the direction of a licensed P.E. teacher through diverse activities, including 45-minute P.E. classes, McDill forest outdoor activities, classroom BrainBreaks, coordinated all-school physical fitness, and family activities. Staff coordinate a student running club and lead students on walking field trips.

Fourteen McDill teachers have received their Green Classroom Professional Certificate to help facilitate healthy learning environments. McDill also purchases Green Seal certified products and uses Norwex cloths for classroom cleaning

instead of Clorox wipes. McDill custodians use a GreenSeal cleaner for floors and vinegar on entrance mats to extract salt, instead of using harsh chemicals. Currently, the school is removing all terrazo and fritz tile, which requires a lot of maintenance, such as stripping and waxing with harsh chemicals and replacing them with ceramic tile floors, which do not.



*McDill Elementary School students participate in a Green Apple Day of Service event in the fall of 2015.*



Ample opportunities for teacher professional development, coupled with partnerships with the University of Wisconsin-Stevens Point and parents, support implementation of environmental education at every grade level. Teachers are provided with outdoor classroom packs to make it easy to take learning into one of the two outdoor classrooms.

The McDill campus is home to a community garden, in which plots are rented to community members. An organization called Farmshed in town provides grants to learn about local food sources. A local resident rented a plot on behalf of the McDill school community so that kindergarten and first-grade students can plant and harvest crops as a part of coursework.

McDill property is also comprised of a 5-acre school forest with trails and two outdoor classrooms, which are used by many classes. The school forest includes a story walk with 20 story panels to increase environmental literacy. The McDill courtyard provides a quick and safe way to get students outside to read and write or study aquatic life — such as dragonfly nymphs — in the pond. McDill continues to add features to enhance the schoolyard, such as a pollinator garden that was completed in the fall of 2018. A group of staff and family members comprise the McDill Elementary School Outdoor Planning Team and work on new designs for outdoor spaces.

To celebrate Earth Day each year, the librarian actively communicates environmental literacy through various ways, including a selection of environmental books showcased during the month of April. In 2016, the librarian received a grant from the Bill Cook Chapter of the Izaak Walton League of America to purchase books with a conservation/environmental theme. In addition, K–5 students are invited to design a bookmark on an environmental topic that can be entered into a bookmark contest between K–1, 2–3, and 4–5. Every student gets one of the winning bookmarks.

Students at McDill engage in citizen science. The school has been hosting a SnapShot Wisconsin camera from the state Department of Natural Resources for four years. Photos from the camera are shared with students and families. In 2019, six bluebird nesting boxes were installed on the school grounds. First-grade students had weekly lessons about nesting birds and monitored the boxes to collect data as part of the annual Audubon Bluebird monitoring project.

Each year, University of Wisconsin-Stevens Point Environmental Education/Interpretation students visit classes at McDill and teach lessons ranging from wildlife to water to insects. Many of the classes visit the two outdoor

classrooms in the school forest for their lessons. One lesson includes making outdoor shelters in the woods as part of their survival lesson.

McDill is recognized as a “Sugar Maple School” from Green & Healthy Schools Wisconsin as well as by the National Wildlife Federation Eco-Schools USA and Project Learning Tree’s GreenSchools! Parents from other elementary schools open enroll students to McDill because of its commitment to environmental education, outdoor education assets, and strong sustainability programming.

## **Indian Community School; Franklin, Wisconsin**

### *Caretakers of place and Native culture*

The Indian Community School, Inc. (ICS) cultivates an enduring cultural identity and critical thinking by weaving indigenous teachings with a distinguished learning environment. ICS is a private faith-based intertribal school serving 362 American Indian children, representing more than 200 families, from 4-year-old kindergarten through eighth grade. Approximately 64 percent of students qualify for free and reduced price lunch. ICS has been serving the Indian community of metro Milwaukee for over 49 years. The tribal affiliation of students consists of all Wisconsin tribes as well as other federally recognized tribes — over 30 tribal Nations in total.

ICS’ building, constructed from 2004–07, is located on 178 acres of woodland, prairie, wetland environments. The ICS building was intentionally designed by a team, including an Oneida Nation architect, to enable native teaching and culturally based experiences. Sprawling windows, vaulted ceilings, and all-natural building materials important to the tribes of Wisconsin bring the natural world in and afford all inside ongoing opportunities to be mindful of and make connections with Mother Earth.

The school itself was built into the topography of the land, the ground and space were not just flattened to create the school; it was built in harmony with the environment to the degree possible. It prominently features three materials deeply connected to American Indian culture — wood from the Menominee forest, copper, and stone.

ICS is dedicated to reducing the environmental impact and costs by implementing sustainable technologies, such as motion sensors, building automation, and renewable energy. The school is installing solar panels to provide approximately 10 percent of electricity needs. Daylighting abounds in every classroom. ICS works with Compost Crusaders for composting and waste reduction and has partnered with

Imperfect Produce to utilize produce that cannot be sold in stores but is perfectly safe for consumption.

The schoolyard and parking lots are adorned with native plantings to reduce runoff. ICS is home to an electric vehicle charging station. The school reduces use of salt through a heated sidewalk system for walkways. Students are engaged in protecting the water at home, at school, and in the community. Students create advocacy plans for water rights and protections, such as mining impact on water sources, oil pipelines, water studies around the school grounds, and ways to conserve water in daily use. Students in grades 5 and 8 conduct an audit of water use at home and school and propose solutions on ways that they can conserve and protect the water.

ICS demonstrates its commitment to the health and wellness of students and staff through participation in the fresh fruits and vegetable program, composting, reusing of resources, improving air and water quality, mindfulness, more physical activity, and understanding of self for students or staff. At the center of ICS is the “Our Ways” room — featuring diverse natural resources, providing space for cultural meetings, events, teachings, and meals. When a person walks into the Our Ways room, he or she immediately realizes its purpose is to build resilience, to heal, and to provide an alternative to the colonization often sensed within a contemporary school setting.

ICS focuses on suicide prevention, healthy eating, and mental health to support students, removing barriers to students receiving needed services during the school day. ICS partners with local farmers to use unprocessed food and other nutritionally sound options. ICS offers salad bar to staff for \$1.50 when a personal reusable dish is used.

ICS has integrated environmental literacy through cultural



*The Indian Community School created boardwalks for students to interact with the natural wetlands. There, students can observe, write about, and protect the environment around the school.*

teachings for many years. Students have traveled to Menominee (one of the tribal communities ICS serves) and planted wild rice in their community along the banks of a local river to learn biology, ecology, and civics. ICS also has a partnership with the Great Lakes Indian Fish and Wildlife Commission that provides natural resource management expertise, conservation enforcement, services supporting exercising treaty rights, and culturally responsive and appropriate teachings with students.

In addition to getting out into communities, ICS grounds are home to a 30-acre habitat garden, a 30-foot x 30-foot food garden, a 5-acre adjacent wooded site, and a wetland with boardwalk access to take learning outside. Students can observe, write, and protect the environment around the school. Lesson plans, facility plans, and guest speakers all integrate human connectedness with the environment. Fourth-grade students have been keeping a school garden for more than 10 years, growing the “three sisters” of corn, bean, and squash. They grow ode’iminan (strawberries) and many other plants, including traditional asema (tobacco). They learn the traditional way to offer asema before planting and harvesting. ICS has also planted 50 sugar maple trees so that, when the time is right, students will be able to learn about tapping the trees and harvesting sap to make maple syrup and maple sugar.

The three Pillars of ED-GRS are woven through the school’s strategic plan: “Goal #1: Maximize the cultural identity of every ICS student ... Objective C: Guarantee American Indian Culture is embedded in all elements of the school community and campus. Goal #2: Maximize the academic achievement of each ICS student ... Objective B: Align support services to meet the social, emotional, and behavioral needs of our students and families; Objective D: Ensure that the natural resources of ICS are embedded in the taught curriculum; Objective F: Regularly infuse American Indian culture, history, and traditions in the taught curriculum. Goal #3: Ensure the financial sustainability and resource management of ICS for future generations ... Objective B: Preserve and restore natural habitats on the ICS campus; Objective C: Ensure that all members of the ICS community are responsible stewards of the environment.”

In every grade, ICS addresses “seven generations” thinking and the sustainable Menominee Reservation forestry operations. The ICS “Our Ways” curriculum framework has the following strands: Native Language, Living in a Good Way, Stories, Tribal Connections, Connections to Mother Earth, Tribal Government, Treaties, Indian Law and Policy, and Sovereignty. While all strands connect to the environment, the objectives in the Connections to Mother Earth strand of the Our Ways curriculum include: 1) Articulate what it means to be connected to Mother Earth and why that is important to cultural identity, living in a good way, and tribal sovereignty; 2) Identify animals and plants and describe the role they play in the

interconnected web of life; 3) Be involved in habitat restoration and care for the land and water; 4) Participate in and describe the process of raising traditional foods and medicines; 5) Help to research, plan, and implement a project related to protecting Mother Earth and/or the water; 6) Identify culturally significant landmarks and natural resources on their reservations or traditional homelands; and 7) Explain the processes, traditional protocols, and ceremonies that are important to remember in traditional harvest of animals, plants, medicines, and construction materials.

As caretakers of native culture and this place, ICS' sustainability practices are a nod to past ancestors, as well as those yet to come.

### **School District of Bayfield; Bayfield, Wisconsin**

*A strong connection to nature on Lake Superior*

The School District of Bayfield is situated on the south shore of Lake Superior in northern Wisconsin. This small district is comprised of two buildings serving 365 students from kindergarten through 12th grade, more than 70 percent of whom are economically disadvantaged. Approximately 75 percent of the student body identifies as American Indian. The district has developed a strong partnership with the Red Cliff Band of Lake Superior Chippewa. The district prioritizes culturally sustaining pedagogy, and teacher Rick Erickson and his wife Lorie were awarded the 2019 Human and Civil Rights Leo Reano Award from the National Education Association for impacting education and equal opportunities for Native American students.



*2015 Bayfield Electrathon Team members pose for a professional photo after a successful racing season.*

The School District of Bayfield has two buildings — one serving grades K–12 in the city of Bayfield and one serving grades K–6 on Madeline Island. The central portion of the K–12 school is still the original 1896 building. There have been several major additions/renovations since the original construction and, with each renovation, the district makes an effort to update the HVAC system to increase its efficiency. The school has installed

LED lighting and water bottle filling stations. Lighting for the student and staff parking lot operate on solar energy. The school-owned community recreation center and swimming facility has solar panels on the roof to supplement the energy system. The district works with Cooperative Educational Services Agency 10's Environmental Quality Control program, which includes custodial trainings and all-staff trainings. The district contracts with Johnson Controls and uses the expertise of their staff for HVAC systems, including facility renovations.

Each year, Bayfield High School students operate a maple sugar bush project on school grounds and within the surrounding neighborhoods. The project currently utilizes a wood-burning stove to provide the heat necessary to boil the maple sap into syrup. Three years ago, the students and instructors applied for and received a grant to purchase a reverse osmosis (RO) machine. The RO machine is now used to eliminate half of the water from the sap. As a result, the overall energy consumption and greenhouse gas emissions are reduced.

A rain barrel catches runoff from the garden shed. The garden manager, school staff, and students designed and developed swales and berms to collect and retain rainwater. Annually, students learn about alternative transportation and build an electric vehicle to participate in the Wisconsin Electrathon competition. In 2015, they competed in two races, one at Road America and the other at Wisconsin International Raceway and had top 10 finishes in endurance and maneuverability. The school partners with the Madeline Island Ferry Line and the Town of Lapointe regarding transportation of Madeline Island students to the mainland school.

Students and staff are actively engaged in minimizing landfill refuse. LaPointe School staff and students compost all lunch waste. The middle school science teacher is leading an effort to collect food waste during lunch and breakfast that can be donated to community members who could use the waste for livestock feed and garden composting. One of the mottos at LaPointe School on Madeline Island is "reuse, reuse, reuse." Teachers regularly instruct students on the importance of reusing items and help teach students how to practice reuse. LaPointe School K-6 students upcycle art with plastic to create representations of animals that are affected by climate change.

The School District of Bayfield has a full-time school nurse, a full-time school psychologist, and two full-time school counselors on staff. The district also cultivates partnerships with Red Cliff Community Health Center to provide on-site mental health services for students and Red Cliff Mishomis House to provide alcohol and other drug abuse services and education to high school students. Red Cliff Police Department and Bayfield County Sheriff Department provide coordinated services related to student exposure to potential traumatic experiences.

Middle school students built a gaga ball pit in the Middle School playground. Gaga is a game that is a cross between foursquare and dodgeball; first developed in Israel, it is now sweeping the public school playground system. Bayfield students like it so much that the school district built two more, one for elementary and another for middle school. During the engineering process, students studied geometric shapes and angles, then applied these shapes to building more gaga ball pits in the shapes of an octagon, hexagon, square, and triangle.

The district has an active Farm-to-School program. The district also owns the community recreation facility and offers staff discounts on membership and related incentives for insurance discounts. The Bayfield School and Community Garden (“gitigaan” in Ojibwemowin) includes a high tunnel to extend the growing season for colder northern climate and garden plots for each elementary classroom to tend.

Perennial and pollinator garden space acts as a demonstration space for K–12 students to observe and learn about pollinators, the importance of diversity in the environment, and medicinal plants, both native and non-native. Classes that come to the garden in the fall participate in the harvest and go home with fresh tomatoes and other vegetables. Students of all age levels help with harvesting tomatoes, basil, and peppers to make healthy pizzas using a student-constructed wood-fired clay oven.

With the help of an Americorps Farm-to-School Specialist and UW-Extension FoodWise Program, Bayfield Elementary K–5 classes receive consistent nutrition and gardening lessons throughout the school year. These lessons cover an array of topics, from the Iroquois story of Three Sisters Gardening to healthy foods to the groupings outlined by MyPlate and My Native Plate. The District has also created small plots within the school garden area that are open to local residents. At the La Pointe School, students grow their greens to eat with lunch and much of the school’s produce comes from the plants started in the community garden.

In addition to gardening, the middle school students have assembled and run a small-scale aquaponics system in the design lab. They have raised a variety of plants, such as lettuce, basil, spinach, and peppers. They have also raised perch, walleye, and saugeye. They also learn the Ojibwemoin words for these fish, so it reinforces their Ojibwe culture and language. Not only do they have hands-on experience in running a small-scale aquaponics system, but they have also grown many crops of lettuce and enjoy salad in class.

Approximately 75 percent of the Bayfield students are Anishinaabe, and the district works to incorporate culturally relevant material into curriculum at every grade level. Every teacher is encouraged to incorporate Anishinaabe language and culture into the curriculum and classroom setting. Additionally, the District employs a full-time

Anishinaabe language and culture teacher, an academic resource coordinator who teaches culture and supports students, and a tribal community and school liaison who supports and advocates for Anishinaabe students and their families.

Environmental education is integrated throughout the K–12 curriculum. Each year, middle school and high school teachers develop weeklong courses focused on local environmental topics and environmental literacy. Elementary staff have developed a parallel program called “Week of the Young Child” during which they conduct age-appropriate related activities.

On any given day, it would be typical to find Bayfield students in the school forest, on tribal forested land, within the Apostle Islands National Lakeshore, or in some other local natural green space. Bayfield’s focus on place, especially Lake Superior, has led the district to a connection with people literally on the other side of the world. Students are greatly influenced by the surroundings in which they grow up. In 2013, Bayfield began efforts to connect students with students around the world who have a similar strong relationship with their environment.

One of Bayfield’s most unique partnerships is with Gymnasium 44, a school in Irkutsk, Russia. This partnership connects students and teachers from Lake Superior, the world’s largest freshwater lake by surface area, with students and teachers from Lake Baikal, the world’s largest freshwater lake by volume. Together, Lake Baikal and Lake Superior hold over 30 percent of the world’s surface freshwater. In 2014 and 2018, a group of Bayfield teachers and students traveled to Lake Baikal, lived with the Siberian partners on Lake Baikal, and explored the shores of the “Great Lake.” In 2015, teachers and students from Irkutsk traveled to Wisconsin and stayed with the Bayfield community while the district helped them get to know Lake Superior. Another group of Siberian teachers and students will be visiting in the summer of 2020.

Bayfield High School students participate in an underwater photography project called Zaaga’igan Ma’iinganag (Lake Wolves). In this program, an aquatic biologist partners with the school to teach water ecology and to use photography to address youth mental health issues. Bayfield students have learned to snorkel through this program and have taken underwater photographs in area rivers, along the shore of Lake Superior, and at a shipwreck site in Lake Superior. Students write about their experience, and their photographs and descriptions are displayed in local exhibits. In fact, several students’ photos were included last year in an exhibit at the Great Lakes Aquarium in Duluth, Minnesota.

Through partnerships with the National Park Service Great Lakes Inventory and Monitoring Network, Apostle Islands National Lakeshore, Northland College,



Northern Aquaculture Demonstration Facility, and Red Cliff Treaty Natural Resources, Bayfield has provided high school students with opportunities to conduct authentic independent science research projects. Studies have included Lake Superior ice cover related to climate change, Lake Superior food web studies that involved stable isotope analysis in eaglet blood samples and burbot tissue samples, analysis of birch tree growth related to bark harvesting, and the sustainable harvesting and use of chaga fungus. Research scientists and Northland college professors help students design the studies and statistically analyze the research data.

The Bayfield High School Alternative Education was initiated by teaching staff. The goal of the program is to provide experiential, outdoor learning. The District has provided a minibus dedicated to this program and they supported teachers' effort to obtain a bus license. As a result, students in this program are learning in an outside, natural, and authentic "classroom" almost every day. The middle school alternative education program also engages in a substantial amount of outdoor learning.

### **University of Wisconsin–Whitewater; Whitewater, Wisconsin**

*Native species and a campus nature preserve*

UW-Whitewater is a signatory of the Second Nature Carbon Commitment and a signatory of the American College and University President's Climate Commitment. Starting with the Chancellor's commitment to address greenhouse gases in 2008, University of Wisconsin-Whitewater has responded with a number of projects and programs that make the university a leader in campus sustainability. The Sustainability Office helps administer the program and direct new initiatives across all three Pillars.

As the campus has grown, energy efficiency projects in lighting, building envelope, and HVAC have lowered the overall energy use per gross square foot of space by seven percent. There are two LEED certified constructions on campus. A 32.4 kW solar array provides Hyland Hall with approximately 45,000 kWh of electricity each year.

The campus is a member of Zimride, an online ride-sharing user database. Campus users can create profiles using secure campus log-in information and be automatically matched with other commuters who enter the same schedule. The Sustainability Office maintains an alternative transportation page on the university's website that offers direct links or more information to all the transportation service options available in the campus communities.

Efficiency gains were achieved through water conservation practices, particularly in dining halls and the chilled water plant. A stormwater outreach and education campaign allowed the campus and surrounding municipalities to meet permit requirements at low cost and high impact.

Solid waste reduction practices include efforts to engage the campus community through programs like RecycleMania and operational changes to streamline bin placement and labeling practices. Many other types of waste have alternative methods to landfills established and programs, such as student residence hall move-out waste diversion help reduce this impact further.

Food waste diversion experiments have begun in dining areas to start scaling up a composting program, focusing first on pre-consumer food waste mixed with extra issues of the student newspaper. Food waste in dining halls is recovered on the pre- and post-consumer side and put into industrial grinders for processing at the wastewater treatment plant. Used cooking oil is recycled for use as a biofuel.

University Housing has partnered with Goodwill Industries to coordinate a collection event as part of the move-out activities. The value to Goodwill prompted them to place two permanent on-site collection bins near each residence hall area to facilitate year-round collection. The collection program was expanded by the Sustainability Office in 2019 to include nonperishable food, toiletries, and school supply donations for the Warhawk Pantry, an on-campus food pantry available to all students.

A centerpiece of the UW-Whitewater sustainable landscape plan is the use of native species in landscaping beds. Many native species are harvested as seeds from the reconstructed prairie in the UW-Whitewater Nature Preserve. There are several areas on campus with reduced or eliminated mowing schedules, which helps improve outdoor air quality as well as reducing the carbon emissions and labor costs where more intensive management practices would be needed to maintain turf.

Chemicals and other hazardous waste are properly managed through an inventory for maximum accountability from purchase to disposal. Grounds staff minimizes use of pesticides through integrated pest management eliminating the need for more concerning herbicide products.

The university has adopted a green cleaning policy for several different units on campus and is working to consolidate cleaning chemical purchasing under a vendor with a wider variety of Green Seal certified products in a mixing station distribution system that will reduce the impact of shipping diluted product and plastic waste.



Nearly 69 percent of all janitorial cleaning and paper products were third-party certified to meet recognized sustainability standards.

The university adopted a building standard to implement filtered bottle filling stations in every new construction or renovation project on campus. Additionally, filling stations were retrofitted in buildings with known water quality issues and eventually every building on campus had at least one filling station available for occupants.

University Health and Counseling Services provides a wide range of health offerings that also promote wellness in addition to responding to health needs. On-site therapeutic massage therapy is available to faculty, staff, and students. The Relaxation Room is a private, quiet space to develop and practice relaxation skills to enhance overall well-being using a wide variety of mindfulness resources. Mindfulness group sessions are offered on a weekly basis during the semester.

The Outdoor Adventure Club is a student organization that engages students in a wide variety of outdoor activities, including camping, kayaking/canoeing, rock climbing, and field trips to various locations around the country for these activities.

Since 2013, the UW-Whitewater Campus Garden has served as a hub for community education for gardening techniques and support of public gardening efforts. This includes support for a garden at the UW-Whitewater Children's Center, Lincoln Elementary School in Whitewater, and the Whitewater Community Garden. Additionally, the Department of Continuing Education provides an ongoing Garden Workshop series with local master gardener volunteers and partners with the Sustainability Office and Grounds Crew to provide Garden Landscape Tours each summer to highlight the sustainable practices of campus grounds and highlight garden techniques and answer horticulture questions.

The Sustainability Office helps manage the UW-Whitewater Nature Preserve, a 100-acre tract of land on the north end of campus that features a 40-acre woodland and 55-acre prairie reconstruction project. The trail system in the nature preserve is particularly well utilized among members of the community. A special designation as an Ice Age Trail Campus connects people to a vast resource with the Kettle Moraine State Forest-Southern Unit boasting the oldest and one of the best maintained trail sections throughout the National Scenic Trail.

The most recent revision of the UW-Whitewater general education learning outcomes includes a commitment to personal and civic responsibility. The environmental science major prepares students to face the challenges of a changing world. Courses offer a strong and diverse foundation for a rewarding career in a green future. Three track emphases include Nature Science, Geosciences, or

Environmental Resource Management. The major includes a capstone project to work with a team to solve a real environmental problem in the region.

Interdisciplinary learning continues to be a key feature for UW-Whitewater as well, from the Integrated Science-Business major to intentional efforts to include interdisciplinary connections in community-based research. The Sustainability Council keeps a representative group of people engaged across the campus and community in the spirit of collaborative solutions to problems.

For several students, their sustainability education culminates in engagement with the Sustainability Office directly, either through one of the many project-based



*University of Wisconsin-Whitewater students work in the campus' "living laboratory."*

internships, independent study, or capstone courses that use the campus as a living laboratory.

The Sustainability Office engages volunteers to collect seeds from native prairie plants in the UW-Whitewater Nature Preserve. Seed collection yields an average of 20 pounds of material that is traditionally used to re-seed new areas of prairie

in the Nature Preserve or propagate native plants for use in the landscape throughout the rest of campus.

The Sustainability Office hosts annual stream cleanup events in the local waterway and participates in the Water Action Volunteers citizen science program. Data are collected for three local streams and reported to a statewide platform for ongoing water quality monitoring. Students from across campus are recruited to participate as volunteers in the program. Additional citizen science programs to monitor nutrient contamination, salt contamination, and freshwater mussels have been added to the stream monitoring program.

The Eco-Reps program strives to engage students in peer-to-peer sustainable living tips and techniques through engaging programming and marketing efforts. The Eco-



Reps are student volunteers living in the residence halls and serve as representatives for the Leadership Involvement Team from which they are selected.



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