

Greening the Curriculum

The green concept has tremendous value in schools, especially when it reflects the central purpose and mission of schools: educating young people to participate and civically engage in society. School communities that keep greening the school on the periphery of their awareness will reap advantages and make advancements, but those that align this idea with classroom content and the curriculum will engage and empower students as proponents of a safer and healthier world.

Of course, environmental study appears in state standards. That is old news. The key to greening the curriculum is to move beyond simply studying the environment to taking purposeful action with youth *applying* what they have learned to their environment while *creating* connections among subjects.

Service learning, a research-based teaching pedagogy, provides a flexible framework for integrating green concepts across interdisciplinary content areas. With service learning, students:

- Investigate issues with authentic research methods
- Prepare themselves for the future with rigorous academics and leadership skills
- Take action that has meaning and purpose, applying new and prior knowledge and skills
- Reflect throughout the process
- Demonstrate to tell the story of the learning (metacognition) and the service.


The following school profiles show how schools are applying these ideas, what they are accomplishing, and what key elements can guide schools toward success.

CITIZEN ENVIRONMENTALISTS

GULF SHORES MIDDLE SCHOOL, GULF SHORES, AL

The Deepwater Horizon oil spill in April 2010 occurred practically in Gulf Shores Middle School's backyard. Students were relegated to being observers rather than participants in the cleanup because of safety issues. Fortunately, middle school science teacher Wil Tuggle attended a student citizen journalist institute that was sponsored by EarthEcho International, where he learned how a service learning framework can help students gain and apply journalistic skills to capture stories of local environmental issues. Tuggle introduced those ideas to his students, and their eagerness to participate in and learn more about

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By combining green learning and service learning, schools can improve student learning and remake their communities.

environmental concerns in their community—and influence others—had an immediate and sustained impact.

Fueled by the students' enthusiasm and an understanding of service learning, Gulf Shores launched the Citizen Environmental Organization (CEO). Tuggle explained, "At the citizen journalist institute, we each received an 'anti-bottle,' a reusable flexible water bottle to help us think about the problems caused by our dependence on oil: more than 17 million barrels are used annually to manufacture single-use plastic water bottles. We were introduced to RandomKid, an organization that supplies anti-bottles to schools to sell. We applied our profits to supporting clean water issues in developing countries and purchasing a recycling cart, our next enterprise. Soon we will purchase filtering units to transform some school water fountains to filtered water hydration stations. The kids are doing it all."

As students' recycling efforts gained momentum, they received support from maintenance manager and former environmental engineer Pete Keasberry, who helps students maintain data about what they are recycling, such as how many pounds of waste they are saving and the resultant decrease in dumpster pickups. Students are able to see how their efforts translate into savings. Already students have recycled about 12 tons of material, mostly paper. Students have also found partners in the school cafeteria who are helping recycle paper waste and compost food. Now the kids are collecting the data and adding math to their science skills. Tuggle said, "Students are teaching their teachers what can and can't be recycled. They are starting to take ownership of the planet. Our parents are reporting how their kids recycle at home."

Principal Phillip Fountain is completely supportive. "Our students take tremendous pride in doing what they can to help the environment," he said. "By moving toward the idea of going green, we take on the responsibility of being conscientious about our environment. I'm proud of what our Gulf Shores Middle School students have accomplished. This collaboration also models for our students what can be achieved with the combined efforts of students, faculty, staff, and community partners."

What's next for the CEO? "Recently we assisted the Clean Coast Partnership in an e-cycle event, adding vast knowledge to our students about hazards of old electronics seeping toxins in our landfill," said Tuggle. "Composting is now leading students to plant

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Students from Gulf Shores Middle School, Gulf Shores, AL

One clear proof that students are learning is that they are transferring their knowledge to new situations.



Students from Discovery High School, Bronx, NY



a community garden; a spot has already been selected on campus. We are also looking at the possibility of doing solar power/wind power with support from Mr. Keasberry and community sponsorship to reduce energy cost. And with all the value already achieved, my principal asked me to teach a CEO elective class this fall.”

ENERGY EFFICIENCY

CARBONDALE MIDDLE SCHOOL, CARBONDALE, CO

When a local company, New Energy Technology, offered the Roaring Fork School District monitoring devices and professional assistance with data collection to help reduce energy costs, Rick Holt, the principal of Carbondale Middle School, wanted to use the devices to get student groups going. And that’s what they did.

Teacher Michael Logan took the lead in drawing together a small group of sixth graders who believed in the importance of the cause. “The kids were in charge of everything,” said Holt. “Students developed and ran a school-wide assembly where they challenged the other students to find everything in the building that could be unplugged, and they ran through the school, all of them. Our monitoring devices showed the students an immediate dip in energy usage, and they were hooked. The student leaders said, ‘We can do this all the time. Do you want to get on board?’”

The school district saved a substantial amount of money. But even better, according to Holt, “are the leadership skills the kids picked up. They feel confident and passionate, and use their speaking and organization skills to rally other kids.”

Even in older school buildings, conservation can be considerable. Holt said, “Some of the changes were easy; we didn’t sacrifice comfort for energy savings. We did have monitors to measure lumens in the hallway and found ways to make reductions, still be at the legal limit, and be safe. Our kids learned that our gym lights were running at \$40 an hour and our outdoor track lights cost \$200 an hour. The students led the changes. They would investigate the situation, gather a knowledge base, and come in prepared to make a compelling argument with

all the pros and cons. I could see the learning. I take zero credit. Other than me throwing the idea of getting the kids to be in charge, the kids have done this.”

One clear proof that students are learning is that they are transferring their knowledge to new situations. Students from Carbondale helped elementary students from Crystal River Elementary School participate in the Environmental Protection Agency’s National Building Competition to see who can demonstrate energy efficiency and avoid being the biggest energy loser. The older students guided the younger ones with significant results. Between December 2009 and August 2010, the elementary school saved \$19,000, plus 133 metric tons of carbon dioxide was not dumped into the atmosphere. That’s enough energy to power 11 single-family homes for an entire year!

CAREERS AND GREEN DO MIX

MARSHALL HIGH SCHOOL, LOS ANGELES, CA

Five years ago, teacher Jay Benoit started the School for Environmental Studies, a small learning community, at John Marshall High School. That community became a California Partnership Academy, receiving additional state funds to create a strong career technical program. Having a career emphasis also prepares students for their future. “This was part of our initial vision,” Benoit said. “The push toward green industries will exist for the long haul, with predictable significant job growth and need. We introduce students to careers in green industries from environmental law and medicine to landscaping and wind turbine installation. We have graduates in universities majoring in environmental science and health. Some students attend trade schools to study solar panel installation. In these teenagers’ lifetimes, energy resources will change. With my students, they will absolutely see a move from a petroleum-based society to something else. Being on the forefront is advantageous.”

To introduce students to careers in green industries, the School for Environmental Studies offers specific courses, such as horticulture. “The students also take a design course and intern with a local architecture firm to learn about



green, sustainable buildings,” Benoit said. “They study the reuse of gray water and benefits of low-energy solar panels. Our curriculum extends to our nontechnical classes; in all subjects, we have students reading fiction and nonfiction related to the environment.”

Support from the community has been invaluable. TreePeople, a local group that supports taking responsibility for an urban environment, has helped students learn about xeriscaping—replacing water-consuming nonnative plants with drought-tolerant indigenous ones. The whole campus is being relandscaped by students. Students maintain an edible garden on campus and a small orchard. Benoit said, “Our philosophy is that general landscaping should survive with the local rainfall or it shouldn’t be there, and if you are watering an area, then you should be able to eat what grows.” And students have learned to respond to verifiable community needs. With the support of their local councilman, Tom LaBonge, and in-depth preparation from TreePeople, students assisted in reforesting the nearby Griffith Park with native plants after a fire.

Principal Dan Harrison recognizes the value of and supports those efforts: “The environmental activities the horticulture classes have undertaken are authentic, real-world applications of what is learned in the classroom. The adult connections through organizations such as TreePeople attach significance, and the students work hard to present a professional product. This is a community partnership at its best.”

One challenge for Marshall is the age of the campus. Harrison recognizes that “green was not in a consideration when the school was constructed in the 1930s. The new schools built around us are green certified. Our challenge is bringing the green topics into instruction and being a green school in an 80-year-old facility. With teacher leadership and inspired students, they bring progress, and our community is happy about this.”

GROWING GREEN

DISCOVERY HIGH SCHOOL, BRONX, NY

The Bronx is often labeled a “food desert” because residents lack places to purchase nutrient-

rich foods, but at Discovery High School, Stephen Ritz’s classroom is literally green. Plants are everywhere, and the resulting produce can feed 450 people a gourmet, vegetarian buffet lunch.

Ritz is a self-contained special education teacher. Fascinated by and curious as to why and how plants grew in such unusual and unexpected places as on subway tracks, on rooftops, and off the sides of habitated and abandoned buildings, his students had many questions during a study of food and nutrition. They started growing plants in Ritz’s classroom “Like all kids, these students want to get involved,” he said. “Over six years, we have grown 25,000 pounds of vegetables outdoors and indoors using vertical gardens and technology. We go way past our academic markers as they grow food, eat it, and capitalize on their newfound entrepreneurial skills.”

The students transformed their classroom operation into a farmers’ market that attracted 500 local residents—many of whom are from other countries—who are eager to purchase high-quality produce. Ritz explained, “When you can grow high-quality cilantro, you hear from people you never heard from before. Our kids are getting treated like heroes.”

In Ritz’s classroom, students also learn about LED lighting, T5 lighting, irrigation, and economics. “I expect every student to read, write, do the math, create the graphs, and give me ordinal directions,” he said. “I also expect them to deliver outstanding customer service as they interface with a range of adults they never would have met otherwise.”

Now students are certified to install green roofs and green walls (roofs and walls that are covered with vegetation) for million-dollar homes and are paid a living wage, not minimum wage, and more for the work they do after school, on weekends, and all summer long. Students recently installed a green wall at Rockefeller Center in the heart of Manhattan. “These are kids in the South Bronx, the largest heat island in the city,” Ritz said, “and they are taking down the temperature and reducing urban runoff. A greenhouse is arriving soon, and we envision using the subway instead of trucks to transport our food.”

Students are also making food choices that affect their personal health. “Through our green enterprise, we expand our vocabulary and our palate, so instead of spending a dollar for a sugary drink on the way home from school, students are spending that dollar on a tomato plant to feed their families,” said Ritz. “And we are losing weight!”

Ritz’s classes include students who are homeless, receive special education services, are English language learners, or are in foster care, in addition to general education students. All are coming to school. “Student attendance went from 40% to 93%,” he said. “And they all had summer jobs, plus every graduate of this program is going to college. It looks like we are growing food, but we’re really growing engaged students, graduates, voters, and citizens.”

Discovery High School, called the greenest school in New York City for the success of its vertical farm program, received the first Excellence in School Wellness Award for high schools from the New York City Strategic Alliance for Health. Bronx Borough President Ruben Diaz Jr. said, “With programs like this vertical farm, we are becoming pioneers in green technology and preparing our youth to be the leaders of this new economy.”

Service Learning Concepts

Service learning, a proven, research-based teaching approach, continues to gain momentum as a valued pedagogy across this nation and around the globe. Far from being a random “let’s just do it” approach that usually looks like community service and lacks the benefits of academic connections, service learning has a framework that supports both the acquisition of knowledge and the application of new and prior knowledge to situations that improve communities while showing quantifiable gains and verifiable effects.

The following are several underlying principles common to service learning.

Academic relevance, rigor, and application. Students become excited to see and make connections among curricular areas and recognize the value of lessons learned. Because lessons have

real-world application, students feel internal motivation to learn and often exceed academic expectations.

Social analysis and high-level thinking. Students define an authenticated need by conducting research using varied media, interviewing experts, surveying for opinions and ideas, and having firsthand observation and direct experience.

Student initiative, voice, and choice. With teacher guidance, students have a real voice and choice of what they will do, including how they will make an impact and establish an imperative for participants.

Inquiry based: purpose and process. The invigorating process of asking questions gets center stage. Students want to know. And they find out, leading to opportunities for social change.

Emphasis of intrinsic over extrinsic. Students experience reciprocity and see a win-win solution where everyone involved is a person of value.

Reflection. Students have ample opportunity throughout the service learning process to integrate varied approaches to reflection as they investigate issues, prepare with skills and knowledge, take action, and demonstrate their findings.

Reciprocal partnerships. Partner relationships means interaction with adults in varied roles—such as government, industry, and nonprofit organizations—giving students tremendous opportunity to see different types of careers.

Conclusion

All the schools in this article became successful and sustainable by combining service learning and green learning concepts to improve student achievement and their communities. Students at these schools have learned to be citizens who are engaged in solving global problems and they take pride in their accomplishments. **PL**

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