

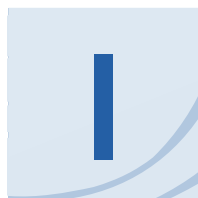
Planting a Seed

My first year as a teacher with CELF

Amy Goods



Amy Goods has taught special education and science in Brooklyn, NY for the past five years. Amy's teaching practice is guided by her belief that all people are agentic beings capable of positively transforming attitudes, practice, and policies that affect them. She has spent her career as a teacher working with students with special needs in the pre-K–12 school setting, where she particularly loves teaching and learning through the sciences. Amy currently resides in Freeport, NY with her husband and daughter and is currently pursuing a PhD in Urban Education at the CUNY Graduate Center in New York City.



In the midst of annual state testing, I received an email asking if MS 447 would be interested in applying to participate in the Children's Environmental Literacy Foundation (CELF) Leadership Training in Sustainability Curriculum project. To be quite honest, I had participated in my fair share of professional development through the New York City Department of Education, and had often left these programs jaded and underwhelmed. But something was different about the CELF opportunity. I was drawn to the organization's idea of "place." The aim was to infuse sustainability into our existing practice; to find a place for sustainability education within our own space.

The freedom this model allows teachers was refreshing. CELF's approach challenged us to think beyond the boundaries of the science standards and enhance our lessons with a blend of meaningful environmental justice. At CELF, there is no prescribed, scripted lesson plan. There are no standards or regulations that must be followed. Instead, there is a spark. There is a collective call to action.

In August of 2014, I attended CELF's Education for Sustainability Summer Institute, along with three of my colleagues from MS 447. Throughout the workshop, we had the opportunity to interact with other school sustainability teams who work with CELF. We were introduced to an elementary school

in Staten Island that was engineering solar-powered cars and building greenhouses from recycled bottles. The students in Staten Island were joining national engineering competitions as second, third, and fourth graders! We also met with teachers from a nearby Brooklyn middle school who were working with their students to raise awareness and student advocacy about water conservation. Their CELF project was an active collaboration to weave water conservation as a theme across different curricula; learning about local water systems in science, and reading novels connected to the theme of water in ELA.

Leaving the CELF Institute, I was inspired. CELF's Partner Schools

were tackling critically important issues, and doing transformational work to engage students in real-life issues with authentic problem-solving skills. Energized for the new school year, I began to think about how I, too, could create life-changing curriculum for my students that would lead to experiences with enduring impact. Ideas of greenhouses and school-wide composting programs swirled in my head.

However, I had a wake-up call when it came to these big projects. I was doing too much too soon. I came to realize that the big glamorous greenhouse project or composting initiative is not always the best place to begin. Learning about sustainability was not about the *product* but all about the *process*. With guidance from the team of CELF educators, I began to shift my focus from: “*How can I make a school-wide composting initiative or greenhouse?*” to “*How can our students construct their own understanding of what it means to be sustainable?*” and, “*How can students make meaning of sustainability in their own space?*”

That fall, I had inherited the school garden from a colleague who had recently retired. I decided to start a new Garden Club, whose main focus would be to care for the garden. The Garden Club included a group of eight middle school students who met every Friday after school. We planted, we watered, and we tended the vegetables, flowers, and fruits

that we were growing. As a teacher, I let go of the big plans and just let the students explore our garden.

The upcoming weekend became not the only highlight of each Friday; now we all enjoyed the weekly surprise of checking on our garden to see what new things were growing and what plants needed tending to. We dug in the dirt looking for “rolly pollies” (pill bugs), and we investigated the strange and still mysterious, big, fat, white grubs we uncovered in the dirt. We tasted the plants such as sorrell, one of the Garden Club favorites, which grows abundantly and tastes of green apple.

As we walked to the dumpster one week to dispose of the debris from the garden, we stopped to learn about a tree that grew in our neighborhood. On another walk, we met a neighbor who showed us his fig tree growing in his front yard and shared some figs with us. It was the first time many of the Garden Club members had ever eaten a fig! We became comfortable in and with our space. The garden became our place.

As the semester wore on, the days got shorter and colder. Soon the first frost came and our harvest began to wilt away. The Garden Club was faced with a new problem: could we bring the garden indoors for the winter?

In a meeting with CELF’s Director

of Education, Alan Cass, who was our project facilitator, I shared our winter garden concerns. Alan suggested that we look into an aeroponics set-up, and he showed me one that I could order for the Garden Club. I studied the design and thought, “Why order, when we can build?”

I took the idea to the Garden Club. Although they loved the idea, their simple question, “How will we get the materials?” posed a challenge for us. The students had an idea for a fundraiser. We could sell plants to raise funds for an indoor garden!

It just so happened that my mother’s small gardening business had a surplus of about 40 succulent plants that she could not keep in the greenhouse for the winter as they would not survive the cold. I picked up the plants from her and brought them to MS 447. The plants, however, were in ugly green plastic pots. This had to be remedied.

Sometimes I like to go walk around the Brooklyn Botanic Gardens (BBG) to read, write, and think. Green space can often be difficult to find in the city and sitting in the grass under the trees at the BBG can sometimes feel like coming home. It is a wonderful place to think — I recommend it to anyone. On one trip to the BBG I remembered spying some succulents for sale at the gift shop. The small



ENVIRONMENTAL LITERACY

Children's Environmental Literacy Foundation

Since 2003, the Children's Environmental Literacy Foundation (CEL F) has worked with K-12 schools to prepare students to be active and responsible citizens of a sustainable world. CEL F was founded based on the vision of a citizenry with a deep understanding of the dynamic interdependence between human and natural systems and the critical role education plays in establishing a healthy and equitable future. Through its Clinton Global Initiative Commitment to Action, CEL F is leading a remarkable multi-year effort to recruit and train educators from thirty-three public schools throughout the five boroughs of New York City (NYC), to advance their curriculum, community partnerships, and campus culture through the lens of sustainability. The program, Leadership Training in Sustainability Curriculum, is a significant building block to CEL F's mission: to make Education for Sustainability (EfS) an integral part of every school's curricula and culture, from kindergarten through high school. This project alone has supported over 225 NYC educators and has expanded CEL F's reach to over 22,000 students in NYC public schools and serves as a model for urban schools nationwide.

In the 2014-15 school year, The Math and Science Exploratory School (MS 447), was selected as one of 12 NYC public schools to participate in CEL F's innovative partnership with NYC's Department of Education's Sustainability Initiative. MS 447's long-standing commitment to project-based learning and professional collaboration was immediately evident in their diverse CEL F School Sustainability Team, which included the principal, sustainability coordinator, and teachers of science, health, and Spanish. MS 447's CEL F Team members joined the other 11 participating schools in a three-day EfS Summer Institute held at the United Federation of Teachers headquarters in Manhattan. The Institute engaged educators in intensive professional development led by CEL F Project facilitators with support from one of our Project Partners, Shelburne Farms.

While the Institute's initial impact on teacher practice cannot be underestimated, it is CEL F's belief that changes in teaching practice can impact school culture only through increased direct professional development contact at frequent intervals. To this end, throughout the school year,

CEL F educators provided shoulder-to-shoulder co-teaching for Project teachers, individualized work sessions with Project teachers, and small group work with sustainability teams. CEL F also awarded sustainability school grants to support implementation of teacher and student projects. School team grant proposals required integrating the Big Ideas of EfS into their curriculum.

MS 447 — The Math and Exploratory School's CEL F Sustainability Team

One example that demonstrates the impact of CEL F's project on MS447's STEM curriculum is the eighth-grade "Strawberry DNA Lab." In the lab, students construct their own method of separating DNA from a strawberry. Teachers then discuss genetic diversity and GMOs. The team's interdisciplinary thematic project connects to alternative energy creation through solar power and to the physical science of simple machines and the School's Green Team initiatives. Specifically, the grades 6-8 Garden Club planned and began constructing a 12' x 12'-foot plastic bottle greenhouse for starter plants that would later be re-planted outside in their school garden. The seventh grade science/math

teachers designed their own aquaponic system, growing the same types of plants that were in the outside garden in order to study and compare the growth of each.

Effective sustainable school practices

CELf's extensive experience with schools has helped it identify key indicators common to schools that successfully integrate EfS as the context for learning and culture. Schools that strive to serve as models of "Sustainable Schools" begin with a collaborative inquiry-based school culture in which:

- ▶ school leadership encourages innovative practice among teachers and provides ongoing professional learning,
- ▶ school staff models sustainability practices in the classroom and school facilities (recycling, composting, and collaborative and consensus decision-making),
- ▶ students take responsibility and exercise leadership,
- ▶ students and teachers use the school building and grounds (places outside of the classroom) as places for learning and to apply their understanding through improving campus and/or community practices,
- ▶ students and teachers incorporate community resources in their plans (individuals/speakers, organizations, publications, websites, etc.).

Los Angeles Unified School District

CELf's commitment to engaging schools nationally in EfS has recently led to the establishment of a partnership with the Los Angeles Unified School District (LAUSD). Through an ongoing collaborative process between CELf and LAUSD, they developed an EfS framework customized to both the school cultures and sustainability challenges of the select LAUSD middle schools piloting the program. In October 2015, CELf traveled to Los Angeles to begin piloting the program. CELf visited select middle schools and met with Program School Sustainability teachers and administrators, then subsequently engaged educators in a full-day EfS Institute. In spring 2016, CELf's "East Meets West in EfS" project looks forward to connecting teachers from both coasts through CELf's Online Train-the-Trainer toolkit. The toolkit provides teachers with tools and resources to design EfS curriculum. Teachers will further develop their partnerships when LAUSD project teachers travel to New York in July 2016 to participate in CELf's EfS Summer Institute.

The learning community of teachers committed to introducing sustainability concepts in their classrooms through formal curriculum change and school-wide initiatives

continues to grow. CELf alumni serve as models and inspiration for their colleagues to understand how and where Education for Sustainability fits across disciplines and grade levels. CELf's collaboration with educators empowers them to become stakeholders in an authentic learning community committed to life-long learning, which fuels the hope and agency for a sustainable future.



Students building planters and planting succulents as a school fundraiser.

succulents were being sold for \$30 or more and were sowed in tiny recycled wood boxes. I thought to myself, “We could do that!”

That weekend, I went to a hardware store and picked up the necessary supplies to construct the boxes: 10 2” x 6” wooden boards, wood stain, wood glue, gloves, hammers, nails, and sandpaper. I cut the boards in my backyard and brought the pieces in for the Garden Club to assemble. The students were thrilled. They sanded the wood, stained it, drilled starter holes for the nails, and nailed the boxes together. We created such a ruckus with our hammering and drilling that students from around the school would come by our room to see what all the commotion was about. We even got a few new recruits!

As the final boxes were being created, a few students designed flyers to advertise the sale of the succulents. They hung the flyers around the school and wrote a morning announcement telling the entire school where to buy the succulents for the “bargain price of \$15.” We sold out in a week and a half.

Now the Garden Club had a budget to work with — our own money, no strings attached — and we had complete autonomy of to decide what we wanted to do with it. While some pretty typical ideas were floated around at first, such as a trip to the movies or a party with pizza and candy, we eventually decided to reinvest our funds in the Garden Club. It was mid-December, and we knew that if we did not come up with some ideas to keep the garden

up and running during the winter months, Garden Club would become pretty boring pretty quickly. And so, the Garden Club began an aeroponic project.

An aeroponic system grows plants without soil. It is very similar to hydroponics, but rather than submerging a plant in water, the roots of the plants are dusted with a mist of water laced with essential nutrients. The plants are held in a medium other than soil (in our case, a substance called *rockwool*), and in theory, as the roots extend through the medium, the constant mist below provides all the water and nutrients a plant needs to grow and thrive. The Garden Club researched different aeroponic systems online, drew up some plans, and we used the money from the

succulent fundraiser to purchase all the necessary supplies: two large Tupperware containers, baskets for the plants to grow in, rockwool, an air pump, tubing, a fish tank aerator (to create a mist), a pH monitor, and a nitrogen-rich nutrient solution for the plants.

When the supplies arrived, we set about building our system. Students measured and drilled the holes in the lid of the giant Tupperware that became the frame for our aeroponic system. Other students began to investigate the nutrient medium that we ordered. It turned out that the medium was intended for large-scale agricultural projects, not our small aeroponic set-up, so we had to put together an experiment. We calculated five different concentrations of nutrient solution to determine the ideal growth ratio. Once we determined this, we planted tomatoes, peppers, peas, and herbs in our new system.

Despite tending to our Aeroponic System every day, nothing grew. It started out strong with the peas sprouting first, but over February break the aerator dislodged from the tubing and the plants dried out. Despite losing our entire crop, the students were not discouraged, and we picked up right where we left off and tried again.

Soon it was warm enough to begin planting outside again. With some



Our aeroponic system: What can be learned from “unsuccessful” experiences?

help from a grant from CELF, the Garden Club purchased a giant barrel to collect rainwater, a compost bin (so we no longer had to throw our garden scraps away), soil to replenish our garden, tomato cages, and equipment for our next endeavor — a greenhouse. I also connected with the organization Grow to Learn and was able to pick up free fruit, vegetable, local flower, and herb seedlings to start our spring garden. Beginning in April, our garden was up and running.

While planting our spring garden, we noticed that the mustard greens from a previous year had returned and were flourishing. We picked some and ate them. The students were shocked at how spicy they were. We looked up some recipes for mustard greens and got cooking. We enjoyed cooking so much that we decided to turn half of our

Garden Club into cooking club. We learned how to chop garlic, caramelize onions, and season with salt and pepper. As our fruits and vegetables ripened we feasted on the harvest. Some students even brought some of the garden vegetables home and showed their families how to cook the dishes that we made.

At the end of the year, a few students took a trip with us to present their cooking at the CELF Sustainability Fair. We packed up our things and headed to Queens, where we toured the CUNY Law Center. For many of the students, this was the first time they had been on a college campus and they were so excited about what they saw. In the hallways were treadmills so that law students could study and run. There was a gender neutral bathroom and a place to do yoga in the

library. The students were also very excited to attend the CELF conference, complete with free pizza and snacks (although one of my students was more intrigued by the gourmet cheese plate). Students got to present their work and be interviewed. All in all, they like rock stars.

The CELF conference was a great way to celebrate such a transformative year. My students and I learned so much being part of CELF. To learn is to cultivate; it is to experience. The fruits of learning were shared as we all engaged in this experience. And not just the children grew from their year spent in the garden club, I was also transformed by this experience.

I learned how knowledge is constructed. It is firmly situated in experience and emerges as we interact with the world, with our place. Knowledge is not something that is finite or definite, it is not an item that can be plucked from the tree of truth, or a sip that can be drunk from a fountain of facts. Rather, true knowledge is something that is grown and cultivated. It is a seed that is planted. The plant emerges and takes on the unique taste of the soil, and beautiful shape from the tenderness in which it is grown. Through our small, emergent experiences in Garden Club, I hope that we have taken away a lifetime of growth.