Educating for Sustainability

Case Studies from the Field PreK-12

Shelburne Farms
Sustainable Schools Project
2016

SHELBURNE FARMS

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Shelburne Farms is a nonprofit education center, 1,400-acre working farm, and National Historic Landmark located in Vermont's Champlain Valley. The Farm's mission is to cultivate a conservation ethic for a sustainable future by practicing the stewardship of natural, agricultural, and cultural resources and educating young people to become ecologically literate and caring citizens who make choices that create a healthy and just world.

Educating for Sustainability

CASE STUDIES FROM THE FIELD, PreK–12

Foreword

When we think about educating for a sustainable future we often think about pedagogical approaches, student outcomes, or simply the content. All of these are critical aspects of Education for Sustainability (EFS). But they don't tell the story of the impact on the learners — both educators and students, and on the community.

The stories shared here represent something much more than pedagogy or content. They truly get at the heart of what it means to learn our way toward a sustainable future. From a preschool classroom learning about mapping in a school garden to a middle school makerspace focused on social justice and food security, these case studies offer a compelling vision of what education could be.

Educating for a Sustainable Future is not just Shelburne Farms' tagline. It's an alternative view of the purpose of education. We think schooling can be a pathway to create healthy and just communities, successful lives, and a more livable world for all. Educators are at the heart of this work, and we believe sharing and learning from each other will transform not just schools, but the world.

Through this series of case studies, each shedding light on promising practices from the field, we hope to:

- inform educators, administrators, policy-makers, and families about the promise of EFS,
- inspire educators to transform their practice and classroom,
- engage a new generation of educators in EFS.

So what does Education for Sustainability look like? At its core, EFS engages learners in their place, using their home turf to illustrate system interconnections and interdependencies. It is student centered, offers an opportunity for action, and, in its best form, is transformational. We see it as an approach to

education rather than a pedagogy itself. It applies a lens of sustainability to the promising practices of place-based, project-based, and service learning. By sustainability we mean the intersection of environmental integrity, social justice and a vital economy.

Shelburne Farms' framework for EFS suggests that when we engage students in place-based learning that transcends traditional disciplines, they stand to gain so much. First, they acquire the knowledge and understanding of the natural and human communities in which they live. They begin to see themselves as active citizens, with the ability to effect changes that begin to build sustainable communities. And, critically, when education holds clear meaning and purpose for students, the growing engagement gap shrinks, along with the rate at which students are pushed out (rather than dropping out) of school.

While educators are at the heart of this transformational work, everyone — and everything — in the learning system must be engaged: architects, building maintenance staff, school nutrition professionals, curriculum directors. The list goes on, spilling out into the community at large. Making the walls of the school permeable both by bringing the learning into the community and the community into the school is essential to fully realizing the power of EFS.

In pulling together these case studies, the educators at Shelburne Farms were inspired by the stories from other educators about what education for sustainability (EFS) looks, sounds, and feels like in practice. Similar books and articles have helped us to think more expansively about what education and EFS look like in a real school, with real children, in a real community. We hope this series of case studies will inspire, engage, and connect educators who want to transform education, their practice, and local places.

Thanks to all the authors who contributed their work to this book and to transforming education!

Jen Cirillo
Director of Professional Learning
Shelburne Farms

Special thanks to the Bay and Paul Foundations for inspiring us with their vision of transforming education and for their support of this project.

Engaging Hearts & Minds

Leaders in Education for Sustainability

Kimberly Corrigan

Kimberly Corrigan is the Vice President for Global Leadership at Global Visionaries and the former Executive Director of Facing the Future. Kim is also a U.S. Affiliate for the Earth Charter Initiative based at the University for Peace in Costa Rica. She holds a master's degree in communication from the Edward R. Murrow College at Washington State University and a Master Certificate for Project Leadership from Cornell University.

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In the following triple case study you'll meet Noah Zeichner, award-winning high school social studies teacher at Chief Sealth International High School in Seattle, Jing Fong, inspiring storyteller and manager of *YES! Magazine*, a non-profit and subscriber-supported independent media organization, and co-founders of The SEED Collaborative, Stacy Smedley and Ric Cochrane, two architects focused on transforming schools into exceptional environments for learning. What do they all have in common? They know that the challenges and opportunities we currently face and will leave the next generation are complex, interdependent and dynamic, so they are devising ways to reflect that reality now in how, what, and where we teach and learn.

In my view, educating for sustainability, by its very nature, demands that we offer our K-12 students hands-on, inquiry-based, interdisciplinary curricula that build core academic knowledge, as well as skills in critical-, creative-, and systems-thinking. It obliges us to offer safe and healthy spaces in which students can grow meaningful service-learning projects, and out-of-school experiences where they are responsible and accountable to themselves and others in positive and empowering ways, and where they have opportunities to engage with appropriate community stakeholders in government, industry, higher education, and civil society. Educating for sustainability also demands that we respect and value our educators, nurture their passion and professionalism, and provide them with the tools and support they need to successfully apply student-centered, democratic, and evidence-based teaching methodologies and best practices inside and outside the classroom.

Before you read about the stories of Noah, Jing, Stacy and Ric, I'll share one context for educating for sustainability: global issues, and suggest a tool to help students and teachers engage in robust discussion and take on action projects using the world as community.

GLOBAL SUSTAINABILITY EDUCATION

Global sustainability education describes the concurrent and

intentional use of global issues, which are interconnected issues that persist across time and boundaries such as poverty, climate change, migration, food, water, health and energy; and sustainability, which is the balancing of social, economic, and environmental interests, as the framework for learning across all academic disciplines and at all levels of schooling. Global sustainability education encourages educators and students to engage together in developing the skills and knowledge needed to understand 21st century challenges, envision effective and equitable remedies, and implement positive solutions that serve the common good and the planet upon which we all rely. While an essential hallmark of educational programs promoting sustainability is a focus on place (most often local and regional), global sustainability education advocates the inclusion of a wider context. It requires diverse international and cultural perspectives to strengthen our ability to understand, work, and live cooperatively and productively with people across the street and around the world.

Today, education for sustainability (with emphases on global, national, regional, and local issues) is growing among U.S. K-12 educators, schools, and districts, as evidenced in national programs such as the U.S. Department of Education's Green Ribbon Schools program, the Center for Green Schools, a myriad of state and national conferences in both K-12 and higher education, and through numerous regional and community initiatives. The roots of this growth are deep. Global summits in the 1980s and 1990s focused the world's attention on environmental degradation, human rights, and equity in economic aid and development, and towards a more critical examination of the impacts of globalization. Principles of sustainable development emerged from gatherings including the 1992 Earth Summit's Agenda 21, the 1995 Beijing Declaration from the 4th World Conference on Women, and the UNESCO ratification of the Earth Charter in 2000. In 2005, the United Nations declared the Decade for Education for Sustainable Development as a means to renew education, teaching and learning and promote the values and principles of sustainable development. Currently, the Sustainable Development Goals (built upon the Millennium Development Goals), will serve as the UN's 2016+ development agenda. Each of these global summits, and dozens more, offer students an opportunity to learn about the trials and triumphs of the democratic process, the art of negotiation and collaboration, the wisdom of learning from history, and the power of envisioning and working towards a more just, sustainable, and peaceful world.

A TOOL TO EXPLORE THE WORLD AS COMMUNITY

> *"As the world becomes increasingly interdependent and fragile, the future at once holds great peril and great promise. We must join together to bring forth a sustainable global society founded on respect for nature, universal human rights, economic justice, and a culture of peace."*
>
> — Preamble to The Earth Charter

The Earth Charter is a ethical statement and declaration of 16 principles created in a nearly decade-long, raucous, global grassroots process by thousands of organizations, cities, and associations representing millions of people across 80 countries. It was ratified by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2000. The four major pillars of these principles are:

- Respect and Care for the Community of Life
- Ecological Integrity
- Social and Economic Justice
- Democracy, Nonviolence and Peace.

The Charter is a powerful and provocative primary document that calls for interdependence and universal and differentiated responsibility for creating a more just, sustainable, and peaceful world.

It is ideal for educators and students to discuss how it was created and what it proclaims, and to debate its vision and values. The basics, in the wise words of elementary teachers everywhere are "be responsible, be respectful, be good to yourself, the earth and others, clean up your mess, share your stuff, play fair, everyone deserves to be heard, and shake hands and make up."

At right is a more specific example of the Charter's vision and values. You can see how rich (and at times difficult), this discussion could be, yet we know that compelling, real-world, global issues — such as poverty — get students' hearts and minds engaged and often lead students to take positive action for change at the local level through community-learning projects.

Teachers and students can also use the 16 principles of the Charter (available in dozens of languages), to learn about other complex topics and perplexing tensions, such as independence and interdependence, individual action and structural change, mitigation and adaption, and the role and value of certain realities often missing from discussions in our particular culture of surety and rugged individualism: realities of limits, doubt, forgiveness, empathy, fragility, insecurity, and impermanence. Teachers can find hundreds of educational resources, lesson plans, readings, action projects and case studies of teachers and students working with the Earth Charter (and writing their own!) at the website *EarthCharter.org*. Students can explore youth projects and join young people around the world through the Earth Charter's Youth initiatives.

The Earth Charter

PILLAR III, SOCIAL AND ECONOMIC JUSTICE, PRINCIPLE 9 AND ITS 3 SUB-PRINCIPLES:

Eradicate poverty as an ethical, social, and environmental imperative.

(a) Guarantee the right to potable water, clean air, food security, uncontaminated soil, shelter, and safe sanitation, allocating the national and international resources required.

(b) Empower every human being with the education and resources to secure a sustainable livelihood, and provide social security and safety nets for those who are unable to support themselves.

(c) Recognize the ignored, protect the vulnerable, serve those who suffer, and enable them to develop their capacities and to pursue their aspirations.

> *"Life often involves tensions between important values. This can mean difficult choices. However, we must find ways to harmonize diversity with unity, the exercise of freedom with the common good, short-term objectives with long-term goals. Every individual, family, organization, and community has a vital role to play. The arts, sciences, religions, educational institutions, media, businesses, nongovernmental organizations, and governments are all called to offer creative leadership. The partnership of government, civil society, and business is essential for effective governance… Let ours be a time remembered for the awakening of a new reverence for life, the firm resolve to achieve sustainability, the quickening of the struggle for justice and peace, and the joyful celebration of life."*
>
> —The Way Forward from The Earth Charter

Let's move forward now with three examples of educational leaders working to transform how, what and where we teach and learn so that we may better prepare the next generation to shape a world with thriving societies, flourishing economies, and healthy environments.

Global Citizenship in the Classroom

Noah Zeichner

Noah Zeichner is a National Board-certified social studies teacher at Chief Sealth International School in Seattle, Washington. He works in a hybrid role, spending part of his day supporting international education in Seattle Public Schools. From 2011-2014, Noah coordinated a student-led, school-wide festival called World Water Week and in 2015, he and his students organized the inaugural Washington State Global Issues Network Conference. For the past two years, he has co-facilitated the weeklong Global Leadership Summer Institute. Noah was honored with the 2013-14 World Affairs Council World Educator Award and was among 50 finalists for the 2015 Global Teacher Prize.

The spark for my career in education came when I was a junior in college studying abroad in Quito, Ecuador. Three days a week, I volunteered as a history teacher in a school in the outskirts of Quito. My class had twelve students, ages twelve to eighteen. The students mostly came from single-parent households and ate their only meals at the school. What struck me most was that all of the teachers in that school shared the belief that the future of their country was in the hands of their children. The teachers' and students' positive energy, despite their tremendously difficult conditions, was contagious. Those twelve kids taught me a lot that year. They taught me the power of education, and they convinced me that I was going to be a teacher.

For two years after college, I worked as a bilingual instructional assistant in an elementary school. I worked with 30 Spanish-speaking students and their families. Many of the students spoke no English before enrolling in the school. I taught them the alphabet, translated parent-teacher conferences, and visited families' homes. Those two years demonstrated to me the importance of building relationships with students and their families.

I carried this wisdom with me when I returned to school to earn a master's degree in secondary education. I was then hired at the school where I continue to teach today. This is my twelfth year working hard to provide a quality education for every student who walks into my classroom. I believe that teaching is the most critical profession in the world and I am committed to doing everything I can to strengthen it so that all children receive the quality education that they deserve.

For the past eight years, I have taught a class called Global Leadership in a Seattle high school. Global Leadership is a course designed to empower and engage high school students. The class was originally developed by Global Visionaries, a Seattle-based nonprofit whose mission is to empower young people to be global leaders in creating a just and sustainable future. In the class, students develop leadership skills through service learning, a problem-based curriculum, and community involvement.

Strategies for creating a more democratic classroom

Building community
Establishing the learning community is the first step to creating a classroom environment where leadership can thrive. Start with the basics. Everyone must know everyone else's name. Then move on to learning about each other's lives and passions.

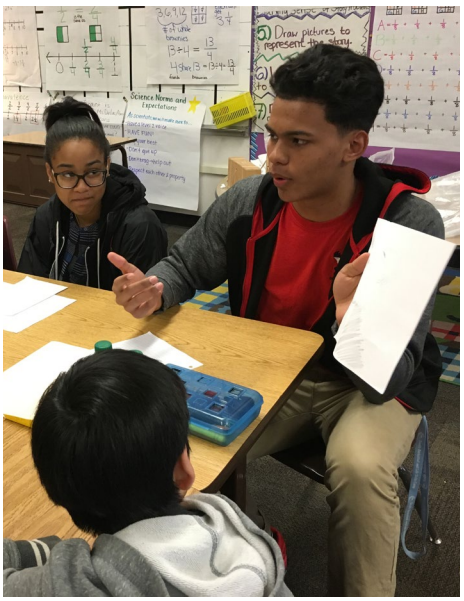
Class meetings
Take 20 minutes a week for students to make decisions about how their class operates and to discuss topics of their choice. In class meetings, students develop ownership for their learning and take responsibility for their actions in the classroom.

Class jobs
Every student has a class job with the goal of making the class work better for all students. Educator and psychologist Rudolf Dreikurs said, "you can't teach responsibility, you can only share it." Jobs can include making seating charts, creating class meeting agendas, organizing celebrations for birthdays and holidays, making thank-you cards for guest speakers, among others.

Group grades
Students in a democratic classroom learn to be accountable and take responsibility for the successes of their classroom community. Using group grades can motivate students to make sure everyone understands what is going on. For example, periodically two students might be selected to take a quiz, and that score is given to everyone. The students come to see the broader impact of their efforts and their sense of responsibility to their classmates and community is reinforced.

Partner with another classroom where your students can teach younger students. In Global Leadership, we call this Adopt-A-Class. Teaching is the most powerful form of learning. Your students will realize their leadership potential and will perhaps even consider teaching as an exciting career option.

See the Resource Packet from the 2015 Global Leadership Summer Institute for more teaching ideas and resources.



A high school student shares what he's learning in the Global Leadership class with elementary students, as part of the Adopt-A-Class Project.

The Global Leadership curriculum explores the social and environmental impacts of complex, interconnected global issues such as water scarcity, climate change, access to education, and food security. Throughout the semester, students engage in research, discussions, debates, role-plays, and collaborative action projects. A key component of the course is the Adopt-A-Class Project, which entails monthly visits to a partner elementary school during which the high school students teach lessons to fourth grade students based on what they learn in our class.

I use a student-centered approach that focuses on the development of students' leadership skills. The curriculum includes activities and pedagogical techniques that give

A key component of the Global Leadership curriculum is the Adopt-A-Class Project: high school students make monthly visits to a partner elementary school to teach what they're currently learning to fourth grade students.

students the opportunity to take ownership of the class as well as take responsibility for the group's learning. Weekly class meetings are held for students to discuss and amend class policies, resolve conflict, and address other issues that affect the group. An emphasis is placed on team building early in the semester to help students develop their communication and collaboration skills.

I believe that classes like Global Leadership are an essential part of education today. In Global Leadership, we address the 21st century skills that students must develop in order to participate in a global society: critical thinking, communication, collaboration, and creativity. Students enter Global Leadership as learners and emerge as communicators, collaborators, and problem solvers.

This course has provided an opportunity for many students who were unsuccessful in previous social studies classes to thrive. Some students needed a more hands-on environment, others just needed an opportunity to activate their leadership skills. Students who never had spoken a word in their other classes because they were learning English or just shy were making speeches in front of large groups of people by the end of Global Leadership.

For the past two summers, I have worked with my colleagues at Global Visionaries to co-facilitate a weeklong Global Leadership Summer Institute for teachers to learn how to create a more democratic classroom. The methods and structures of the Global Leadership class can be applied to any subject or grade level. It is exciting to see second and third grade teachers holding class meetings and empowering their young students to reach their leadership potential.

Building on the momentum of the Global Leadership course, I decided that I wanted to help my school become more oriented toward developing global citizens. Five years ago, Molly, a former Global Leadership student, and I co-founded a school-wide festival called World Water Week. During the festival, all students and staff attended assemblies, participated in a synchronous all-school lesson, and attended workshops during a student conference at the end of the week. Overall, it was a huge success. For each of the following three years, World Water Week focused on different themes. In 2012 it was food security. In 2013 we looked at sanitation and health. In 2014 the festival focused on plastic pollution.

Following the success of the first World Water Week, I worked with a group of teachers to try to integrate the themes of World Water Week into the core curriculum. We developed and implemented an interdisciplinary project that incorporated water and sustainability issues into world history, language arts, and

Students rally as part of a Migration Stories Film Project last year, a component of the Global Leadership class. Students interviewed fellow students who have immigrated from various parts of the world.

science courses. The project is now in its fourth year, and all 300 ninth-grade students participate. One component, a Field Experience Day, includes ten different research trips to community organizations and sites.

More recently, students and I co-organized an international youth conference that took place in March 2015. The conference was a forum for groups of students from twenty different schools representing four states to present global action projects that they had carried out. For two days, middle and high school students shared their visions for building a more sustainable world. One of the highlights was when Molly, my former student, addressed the participants as one of the keynote speakers. She spoke now as a college senior about to enter the "real world." She told the students that they should continue to take action and speak out about the issues they care about. Students left the two-day conference excited to continue learning about global issues and sustainability. The conference will take place again this year at a different high school and it will hopefully continue to bring young leaders together for many years to come.

Very few of the projects that I have carried out in my classroom and in my school would be possible without strong community partnerships. I have enjoyed working with several local organizations over the years, including Global Visionaries, Facing the Future, FEEST (Food Empowerment Education and Sustainability Team), Bridges to Understanding, Seattle Art Museum, Sustainability Ambassadors, among others. My greatest partners, however, are my students.

At the end of each semester, I ask my Global Leadership students to reflect on the course. I look to them for clues for how to improve the class for the next group of students. I always learn from their critical comments and I always smile when I read how they have grown.

What follows are a small sample of the latter:

"…this class is like no other. This class taught me how to be a leader."

— VJ

"Global Leadership is a vital component of our school's academic curriculum… It is more like a family than a class. It is truly a unique way to reach kids and raise awareness about the dire state of our world."

— Kylee

"…I have grown not only as an individual, but as a 'global citizen' as well… I now know I want my future to consist of something more than an average day job. I want to have a greater impact on the world as that 'global citizen.'"

— Anonymous

Paulo Freire, the great Brazilian educator and philosopher wrote, "Education must begin with the solution of the student-teacher contradiction, by reconciling the poles of the contradiction so that both are simultaneously teachers and students." This vision of teachers and students as equals recreating the world together couldn't be more important today. We often tell youth that they hold the keys to the future, that they must figure out how to solve the many problems that we and the generations before us have left for them. That's a lot of pressure. We don't have the luxury of waiting for youth to lead. We as educators have a responsibility to get out of the way and to encourage our students to be leaders not just of the future, but leaders today.

RESOURCES

2015 Global Leadership Summer Institute Resource Packet
www.world-affairs.org/wp-content/uploads/2015/07/Exploring-Global-Issues-packet-Updated-7.22.15.pdf

Tips for building an interdisciplinary project:
teachingquality.org/content/blogs/noah-zeichner/making-interdisciplinary-projects-work

How to sustain projects:
teachingquality.org/content/blogs/noah-zeichner/keeping-good-thing-going-can-innovative-programs-education-be-sustained

Project-based learning opportunities:
sites.google.com/site/globaledwa/international-project-based-learning-opportunities

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The Story Whisperer

Every Student Has a Story that Needs to Be Told

Jing Fong

Jing Fong is the education outreach manager for *YES! Magazine*. The daughter of immigrant parents, Jing is grateful for their fierce love of learning, nature, and family. She has lived abroad three times with her teacher husband and two children. Her ideal day is curling up on the couch to read, hiking in the Olympics, or rolling lumpia with friends and family. Jing recently returned to Bainbridge Island, Washington from a magical year living in Harlem.

Not all of us who work in education for sustainability find ourselves in formal classrooms. Perhaps there is another place you are using the principles of ecological integrity, compassion for life, social and economic justice, democracy, nonviolence and peace… as a parent, community organizer, faith-based healer or seeker, musician?

I feel humbled that I was asked to contribute to this book. I don't consider myself a role model for sustainability — that's the self-effacing part of me speaking. I don't teach students to measure the health of their local watershed through water quality testing. Or encourage little ones to dance like leaves in the woods. Or dig my hands in dirt with a group of middle schoolers who are growing veggies in their school garden.

What I do is share stories.

I am passionate about people being heard. Being heard means being understood. And being understood means being treated justly and humanely.

Being heard also means sharing information and inspiration. And we all could use this at a time when we want solutions for a better world.

That's where *YES! Magazine* — and its stories — is a beacon of inspiration.

If you think adults are overwhelmed by today's news, imagine how young people feel. As education outreach manager for *YES! Magazine*, I see it as my mission to help teachers and students overcome the paralysis of fear and the sense of being overwhelmed — replace it with powerful ideas and inspiration so they can stand up and take action.

It makes it easy when you have *YES! Magazine* as a learning resource

"Blessing in Disguise"

"This adventure with YES! has changed me. Having this experience has unlocked a newfound confidence within me. When I learned the news of my accomplishment it was like a bomb of happiness excitement and pride had just exploded within me. Because of this encounter I am now a better writer and better person."

— Noah Schultz, University Winner Winter 2015 YES! Student Writing Competition

Noah's essay, "Blessing in Disguise," was in response to Akaya Windwood's article, "Letting Go of Worry." Students were asked to think about the things they worry about and answer the prompt: "What is one worry you'd like to throw away?" What would you replace your worry with, and what would you gain by not having that worry in your life?

Noah wanted to honor his father by not worrying if his dad had enough to eat or if he was warm enough in his drafty mobile home. His dad's poverty qualified Noah for financial aid and to be in college — while Noah was incarcerated. At seventeen, Noah was sentenced to 90 months under the terms of Oregon's Measure 11 — a tough-on-crime policy that established mandatory minimum sentences for several crimes, and charged juveniles 15 and over as adults.

Noah made a promise to his mother that he would take advantage of all the resources available to him in prison. He studied for his degree through Oregon State University, and he entered slam poetry competitions and the YES! Student Writing Competition.

In a recent email from Noah, he shared that he gave a TEDTalk back in October, is developing a spoken word poetry workshop to be taught in juvenile detention facilities, and recently published his first collection of poetry. And, oh yeah, he was nominated to be Oregon's next poet laureate.

for middle school students and beyond. For nearly 20 years, *YES! Magazine* has uncovered stories about ordinary people doing extraordinary things for a more just and sustainable world. Stories, such as a predominantly African-American community in Greensboro, North Carolina with nowhere to shop for food when its big box store closed — so they started their own food co-op. Or, Restorative Justice for Oakland Youth helping teachers and schools discipline with dignity, trying healing instead of punishment — part of an effort to end the school-to-prison pipeline. And, how the friendship between a poet and a timber baron kept a grove of California redwoods from being clear-cut. Beyond the magazine, our education outreach program offers resources of its own. It publishes stories from and about teachers, hosts a student writing competition every quarter, and offers curriculum that promotes sustainability.

Our teacher stories, called "Your Stories," are first-person narratives about on-the-ground teaching experiences in and outside the classroom. What is going on in the head of a student with Asperger's Syndrome? What does race have to do with teaching? How does permaculture help Hopi youth remember who they are?

Our student writing competition, which we host every school quarter, is a powerful way for students to connect with themselves and their world. Students read and respond to a selected YES! article. Provocative writing prompts push students to deeper questioning of the article's content and their personal experiences and opinions. Students have reflected on the morality of hunting, letting go of worry (see box), simplifying their lives, the value of eating together, joyful (and painful) learning in schools, and how to welcome home war veterans. Other learning resources from YES! engage students in sustainability issues by sharing the "inside story"

on what inspired people to create their thought-provoking, hands-on curriculum — people like marine biologist Riki Ott, who witnessed the Exxon Valdez spill and later wrote the Ultimate Civics Curriculum. Our Visual Learning lessons use an intriguing image — an image without a human being and difficult to guess — to dive deeper into conversation about topics such as how development affects wild animals, the devastation that oil spills have on human and marine life, and who typically is exposed to environmental health risks.

If I can make a teacher's load a bit lighter, I will. It is no secret that teachers have little time to look for curriculum. So, if I can hand over a treasure trove of learning resources, I've done that teacher a huge favor. In addition to offering YES! classroom tools, I sift through a constellation of non-YES! curriculum for the "good stuff" they can use in the classroom with students or for their own personal enrichment. For the most current issue of the magazine, our newsletter highlights ace teaching tools (curriculum, lessons, infographics, projects) to support that theme — all downloadable and free.

Every school year, through the generosity of our donors, over 1,000 teachers and school librarians receive a free year of YES!. If the average class size is 25 students, that's around 25,000 more students each year hearing stories about real people working for a better world.

Since our writing competition began five years ago, over 800 classes representing 21,000 students have written essays. These are students who have taken the plunge to sharpen their writing chops and to share their dreams, fears, and passionate opinions.

While data is powerful — giving concrete evidence that you moved the needle (or not) — I also find anecdotes equally powerful.

Below are several quotes from students and teachers who have been impacted by participating in our writing competition:

"It's funny because at first I didn't even want to enter my essay due to my anxiety about how others may perceive my thoughts and/or beliefs … Winning has reminded me of the love I feel when I write, and the passion I feel after I complete a piece … I'm excited to see what the future holds for me and my writing."

— Karen J., Powerful Voice Winner
therapeutic boarding school, northwestern Montana

"This essay was empowering. Writing about my academic experiences in a classroom was a difficult task, but after a while, I simply felt eager to speak, eager to be listened to. I felt influential and shivers ran up my spine while I spilled my heart out on the paper."

— Jennifer Aguilera, Spring 2015 High School Winner, freshman,
Cristo St. Rey Martin, Waukegan, IL

"I believe this is a true opportunity for students to channel their voice about justice in our society. It is a chance to really see how capable they are and engage in writing that connects to the world outside the class. I am excited for what taking this risk will teach them about justice today and for what it will teach them about themselves."

— Erik Armstrong, English professor
College of the Sequoias, Visalia, CA

RESOURCES

YES!Magazine
www.yesmagazine.org
has over 6,000 online stories about real people working for a better world, plus tools for citizen engagement on issues of peace and justice, planet, new economy, and happiness.

YES! For Teachers
www.yesmagazine.org/for-teachers
Offers curriculum, student writing lessons, and stories from educators.

YES! Student Writing Competition
www.yesmagazine.org/for-teachers/writing-competition-essays
An opportunity for students to write about something meaningful and to write for a bigger audience.

Global Oneness Project
www.globalonenessproject.org
Offers teachers an award-winning collection of films, photo essays, articles, and lessons that explore cultural, social, and environmental issues with a humanistic lens.

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And here is a quote from an author of Your Stories:

> *"My parents (particularly my conservative, Japanese dad) don't really understand the work that I'm doing as it is not anything conventional like lawyer or teacher or doctor. My dad thinks that I wasted my education because I'm "just a farmer" and that I'm a huge disappointment, etc., etc., etc. Now that the article has come out, he has come around and we are on speaking terms again.*
>
> *Thank you again for the article. It has had more of an effect than I could've imagined."*
>
> *— Tasia Yamamura, school garden and nutrition educator FoodCorps and Ma'O Organic Farms, and author of YES! Magazine story, "My Love Affair with Breadfruit (And Other Stories from the Wai'anae Youth Garden)"*

While I am not a teacher, I like to think of myself as a story whisperer. It gives me great joy to learn that our student writing contest has given a student who is incarcerated the opportunity to share his story with the outside world. I am inspired to hear that a student who is overcoming mental health issues had the courage to write about finding an empathetic community online — and feeling strong again. And the bonus? Helping students boost their writing to a higher level. I am elated when a teacher writes about how the writing competition motivated her students to work harder at their writing because they knew that an audience outside their classroom would read their essays.

I love knowing that I can help students, in some small way, be heard, and find their place in this world.

Creating Learning Spaces that Educate and Inspire

Stacy Smedley & Ric Cochrane

Stacy Smedley is Chief Executive Officer of SEED Collaborative. Her "day job" is Director of Sustainability, at Skanska USA Building. Stacy has a degree in architecture and 13 years in the design and construction professions. Her resumé includes the first LEED for Homes Platinum certified project in Washington and the first project in the world certified under Living Building Version 2.0, the Bertschi School Living Science Building. At Skanska, Stacy is Director of Sustainability, leading sustainable initiatives and progressing sustainable construction methods. Stacy is committed to engaging her community in sustainable design and served as founding member of Washington Businesses for Climate Action, Membership Chair for Cascadia Green Building Council, Regional Emerging Professionals Recruitment Chair for USGBC, Sustainable Curriculum Consultant, and 2013 Scholar in Residence for the National Association of Independent Schools. She offers workshops to K-12 schools that engage students in applying sustainable principles to design spaces they can learn in and from. Stacy is a 2012 Living Building Hero.

What if my classroom was living?

What if my classroom got all of its energy from the sun, and its water from the rain? What if it was made of only healthy, nontoxic things? What if my classroom grew food for me to eat and taught me things? What if my classroom was living? This is what a SEED (Sustainable Education Every Day) classroom is and does.

SEED Collaborative is a social-purpose company committed to providing students and teachers with restorative, inspirational learning spaces that use the classroom as a teaching tool and enable diverse and flexible hands-on, experiential learning.

SEED's founders led development of the fourth certified Living Building in the world — the Bertschi School Living Science Classroom. That experience, and the impact on the kids and teachers using the classroom, is the foundation of the SEEDclassroom: a classroom built for experiential, hands-on, sustainable learning and inspiration to empower and educate the next generation of leaders and environmental stewards.

We created the SEEDclassroom as a portal — the classroom itself can and should be a tool for deep inquiry and exploration; every part is a spark of inspiration.

The structure and all systems in our classrooms are intentionally exposed so that students can see how the building functions, better understand the flows of energy and water, and recognize the material resources needed to create buildings. Energy and water meters and hand-pump faucets allow students to engage directly with the functions of the building to better understand how their actions impact the building, and the amounts of energy that are expended to move water and create a comfortable space. Energy meters are incorporated into math classes and used in lessons about climate change. Water catchment is used to examine the composition of rainwater, potable water, city supplied potable

Ric Cochrane is Chief Operations Officer at SEED Collaborative, whose "day job" is as Director of Milepost Consulting. Ric directs SEED operations and business development, forging key strategic partnerships and implementing building and programming initiatives. His passion for sustainability education is based in his own challenges learning in structured environments, and in his belief that systems-thinking provides both diverse opportunities and essential perspectives to help students learn in whatever ways are best for them. Ric is also a Director of Milepost Consulting, a management consultancy focused on transforming the built environment and power utility sectors to sustainable business models. Previously, Ric ran Preservation Green Lab, a national nonprofit that strengthens the fabric of communities by leveraging the value of existing buildings to improve environmental, social, and economic performance. Previous professional experience includes Program Manager for King County GreenTools, where he provided policy guidance for 39 King County jurisdictions and sustainable design consulting for County assets; sustainable design consulting and land-use planning with O'Brien and Company; and real estate development with Catapult Community Developers. Ric holds Masters degrees in both Urban Planning and Public Administration from the University of Washington, and was a 2008 Fulbright scholar in India.

water and greywater. These water sources can be used to water plants, or to raise salmon to see how the fish respond to, and grow differently in different water types. The list of opportunities presented by the SEEDclassroom is continuously growing and evolving as teachers and students explore systems and functions, and come up with additional lessons that we can collect and share.

We use the principles of the Living Building Challenge, rooted in the simple metaphor of a flower, as the basis for design of the classroom and education resources. Students are engaged early in the design and asked what they think a classroom would look and feel like if it acted like a flower. This means it should get all of its energy from the sun, and all its water from the rain and the surrounding site. It should be made of natural and healthy things, and be something beautiful that makes them happy. We have binders full of these rich, unique, and beautiful student designs that we look to for inspiration. It's amazing how freely kids can harness their creativity and individual brilliance when given an opportunity. SEED builds some of the students' design ideas into each SEEDclassroom so there is a unique sense of ownership the moment students walk in and see their ideas realized. Students are then encouraged to take active roles in monitoring and assessing energy and water performance and maintaining their classroom's systems. Questions about how things work and where things come from invite explorations of sustainable practices at multiple scales, from the building itself, to the local ecosystem, to the planet. When students are able to pursue their own areas of inquiry, they stay engaged and take ownership.

SEED Classroom at Phipps Conservatory and Botanical Gardens, Pittsburgh, PA

At the same time, the small scale of our projects influences the ways that people consider the built environment. Our portable-scale classrooms are "seeds" that are planted to demonstrate what restorative design and construction can be, making sustainability more approachable.

When we think of a healthy learning space, we think of the whole system in which the people and structure are integral parts. This is the foundation of sustainability — each part of the system recognizing interdependence and responsibility for the health of the whole. Bit by bit, we are helping build that recognition by using the classroom as a tool to create, educate, and inspire.

We are motivated by many challenges:

- We know that the structured, homogenized public education system is not suitable for many kids, and that more flexible learning and teaching approaches are in demand.
- We see the rapid degradation of education facilities and the temporary fixes that are only exacerbating the problems.
- We see tremendous opportunity in using the space in which students learn and teachers teach as a living laboratory with multiple applied education opportunities.
- We want students to understand their roles and responsibilities in the world — to understand and take ownership of the health of their communities and the ecosystems in which they grow up.
- We see gross inequality in education and broader social structures, and we want to democratize restorative design and construction approaches to help make communities healthy.

The classroom is the de facto hub of American social networks — students form their values at school; parents are invested in the quality of their kids' educations; communities are defined by the quality of their schools. If the school is the hub, then through that there is potential to positively influence other

Bring Sustainable Education Every Day to Existing Schools

We recently completed an enrichment program at a public elementary school in Seattle, funded by the PTA, where we did two week segments focused on energy, water, and materials. We first grounded the kids in where our energy, water, and materials come from, why that might be good or bad, and how we might get each more sustainably. We had them brainstorm and draw how to make their school more sustainable, specific to energy, water, and materials. Then, for each subject area, we collaboratively created one strategy at the school: we connected a cistern to an existing portable classroom's roof; and also plan to install new PVC-free, nontoxic carpet in an existing portable (we have the students color in the design and then our carpet manufacturer makes the carpet to match); and install an energy monitoring device in an existing portable for energy tracking. This was our first attempt at taking pieces of what a SEEDclassroom does holistically and applying it to an existing school infrastructure as a before-school enrichment program. The students who went through the program have asked if they can be our ambassadors and teach the rest of the kids at their school what they learned.

To address water use, a cistern and handpump were installed to collect water off the roof of a portable classroom.

RESOURCES

Living Building Challenge
living-future.org/lbc/about

Thinking in Systems
(Donella Meadows)
www.donellameadows.org/category/thinking-in-systems/

Science for All
teachscience4all.org

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The interior of a SEEDclassroom at Perkins School, Seattle, WA

aspects of our social and physical environments.

While our ambitions are mighty, we know that we must start small, and personal — each student must be allowed to engage with the system according to her or his unique learning style and interests. Our plan is very humble: to give every kid a chance to identify with the system around them, starting in the space in which they spend their days. Our classrooms and associated learning resources invite students to explore and seek understanding, and this personal connection often leads them to places and issues we couldn't anticipate or force on them, whether that's resiliency, biodiversity, or social equity. Teachers act as guides and co-explorers, promoting critical thinking and collaboration in problem-solving. From there, only good things can happen.

We have three classrooms in place, so our results are thus far anecdotal. A student in our first project asked, "Why can't every building be living?" and that is the most relevant outcome we can point to — and the most commonly voiced. Kids dig in when they are asked to solve problems; they think boldly and intuitively. Imagine if all kids were exposed to this type of learning and grew up thinking that all buildings should be living. Imagine if all students understood that our built and natural environments are interdependent, and that they have the power and inspiration to make these environments holistically restorative. Think about how much better off the world might be, for them and the generations that follow. That's what pushes us forward, and why every SEEDclassroom we build and student we impact matters so much.

Food Systems, Security, and Solutions

Struggles and Progress in Equity, Sustainability, and Resilience

Tarrey Banks

Tarrence "Tarrey" Banks is a founder of The Project School, focusing on design-thinking, sustainability, and social justice, through Project, Problem, and Place-based Learning (P3). Tarrey is currently in his last year of PhD work in the Sustainability Education program at Prescott College and is a Teaching Fellow at Indiana University's Creativity Lab focusing on "Re-Crafting Math" though the makerspace environment. He is the father of Lily and Sam and married to a fellow educator, Heather Banks.

Last fall I attended the School Reform Initiative Winter Meeting in Tucson, Arizona. As a component of the meeting I attended a field experience to visit three elementary schools in the Tucson area that were doing gardening and some form of aquaponic system work. During these visits, I was sending pictures to my teaching partner and my principal. Those visits and photos became the spark for the idea to focus our work on aquaponics. When I returned to The Project School, I began the conversation with my partner about what a project-, place-, and problem-based curriculum (P3) centered around aquaponics could look like.

The Project School (TPS) is a K–8 teacher-designed, project-based, public charter school located in downtown Bloomington, Indiana. TPS was developed by a group of teachers committed to creating a school that engaged students in relevant curriculum connected to and immersed in their local communities.

Over the last few years, our school has been engaged in a long-term partnership with the Indiana University School of Education. Through this partnership, we have become part of the growing "Maker Movement," which is dedicated to small-scale design and manufacturing in a "do it yourself" spirit *(see box on next page)*. Utilizing the expertise of several faculty members who are passionate about "makerspaces," design thinking, and project-based learning, we have transitioned our classroom space at TPS into a makerspace, one that ultimately looks like a fully functioning workshop with tools of all kinds and some high tech components as well (laser cutter, 3D printer, and circuitry materials).

Our classroom makerspace has allowed us to utilize the design process in our curriculum, and as we brainstormed about the aquaponics project, we knew we wanted it to have a heavy emphasis on design and the design process as well.

A "Makerspace" Classroom

Our classroom is a fully functional workshop, also known as a "makerspace." The idea of makerspaces in schools is a direct extension of the Maker Movement, which is and has been picking up steam all over the world. Makerspaces and the Maker Movement are fueled by the "do it yourself" (DIY) spirit of small-scale designing and manufacturing. This can range from crafting to high technology. Makerspaces are thus spaces where people can come together in community to create and inspire each other. Sometimes, those spaces act like a high-tech lab with a fully functional 3D printer and laser cutter. Sometimes they're more like my grandfather's workshop, providing tools for tinkering and building. But regardless of the shape it takes, a makerspace allows students to fully engage in the design process from beginning to end and experience all the highs and lows that naturally occur along the way. Kids are drawn to the design process; they are fully engaged when a compelling design problem is posed and they have the tools and resources to put their best ideas to the test.

During this preliminary brainstorming period last spring, my partner and I were approached by our university partner and one of his teammates about a grant opportunity. The university had launched a request for proposals to set up an on-site makerspace in the School of Education. The grant would be a partnership with schools and youth-serving organizations, and would be project-based, in the sense that any and all equipment and materials purchased would be used to complete a specific project. The opportunity pushed my partner and me to work out the details of the idea we were brainstorming. After a great deal of thinking and talking, we landed on a structure for the project, which was ultimately funded by the grant: students would be placed into teams of six to eight, and each team would have the same basic design challenge: to build a closed-loop, self-sustaining, aquaponic system that would only take up the tabletop footprint of a 20-gallon aquarium.

Students utilized tools and technology at makerspaces in both the Bloomington Project School and Indiana University School of Education.

This unit is multidisciplinary in nature and is connected to a larger and broader year-long study of food systems issues and solutions. Last year, we settled on *The Omnivore's Dilemma* (Pollan, 2006), as a core text for this year-long study, and we decided to focus on it as the literacy component of our aquaponics project, too.

When we had looked for resources last year to help us think through our curriculum, we had stumbled upon a unit of study for *The Omnivore's Dilemma* developed by the Outward Bound Expeditionary Learning Schools organization (Expeditionary Learning, 2014), and liked what we saw. We are using this as a jumping-off point, though we know that we will be modifying, tweaking, and maybe even completely abandoning the unit to follow where our students are going, and where we want to go with the larger project. As a teacher, I'm definitely of the opinion that you don't need to create everything from scratch. There are a lot of groups out there (Outward Bound

being one of them), that are doing great work around project-based learning.

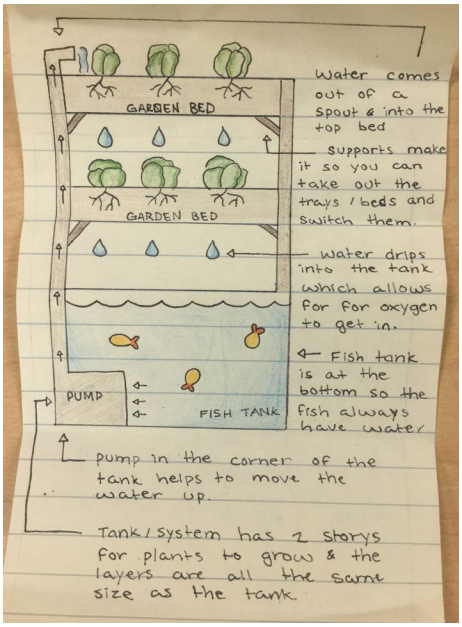
In the first phase of the unit, students will engage in a close reading of *The Omnivore's Dilemma* as a springboard into concepts around sustainability as it relates to food and food systems. They will simultaneously begin an in-depth STEM project focused on aquaponic gardening and farming systems.

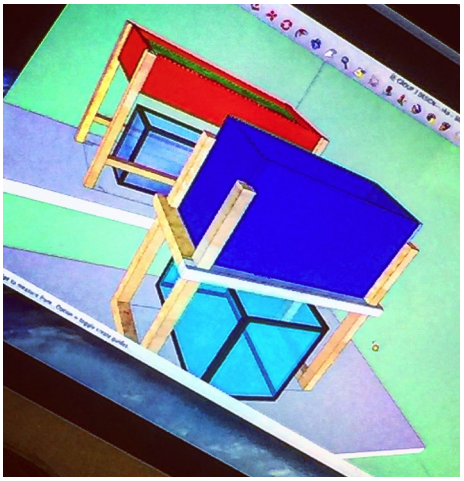
As readers, students will be introduced to strategies for close reading of challenging, nonfiction text, and given time to practice those strategies. In addition to *The Omnivore's Dilemma*, students will be exposed to other nonfiction texts that either share or oppose Pollan's position. Students will analyze Pollan's argument, looking for specific techniques he employs as a writer to prove his points, and to what extent he is effective in doing so. As writers, students will employ these same techniques, along with others, to construct their own arguments on related subject matter. The core literacy content is understanding and being able to demonstrate the ability to analyze and construct a sound and persuasive argument using all the tools and strategies good readers and writers use.

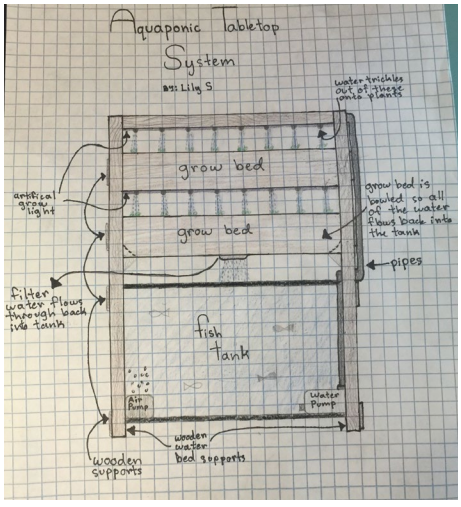
Additionally, students will engage in a two-part, mini-research project of one specific problem connected to food systems. First, each student will research the history and root causes of their chosen problem. Then, she or he will take a peer's research and investigate multiple solutions to *that* problem. Ultimately, this all will loop back to our study of aquaponic farming as a potential solution to global food supply chains and systems.

For the STEM portion of the project, students will be introduced to the concept of aquaponic gardening and asked to compare and contrast it to more traditional methods of farming. In concert with *The Omnivore's Dilemma*, students will analyze the effect food choices have on the environment, as well as how to mitigate those effects. In teams of six, students will design an aquaponic farming system and begin producing vegetables (and potentially fish, as a protein source). They'll learn the basics of selective breeding, as well as the different ways that materials are transformed into usable power and the environmental impacts of each of those methods.

The entire P3 experience is conceived using the lens of sustainability. Shelburne Farms, through its Sustainable Schools Project, has generally defined sustainability as the condition that exists, "when the environmental, economic and social needs of a society are met in the present without compromising the ability of future generations to meet their needs." In the initial

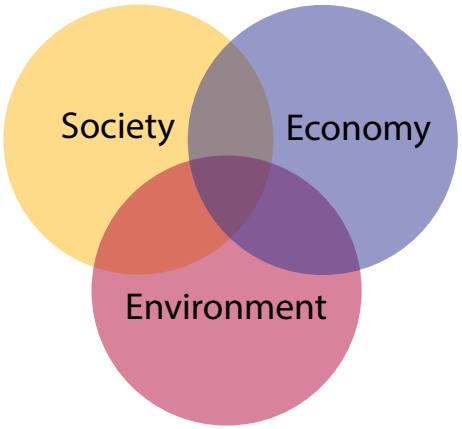






Utilizing the design thinking process, students made detailed working drawings of the aquaponics systems.

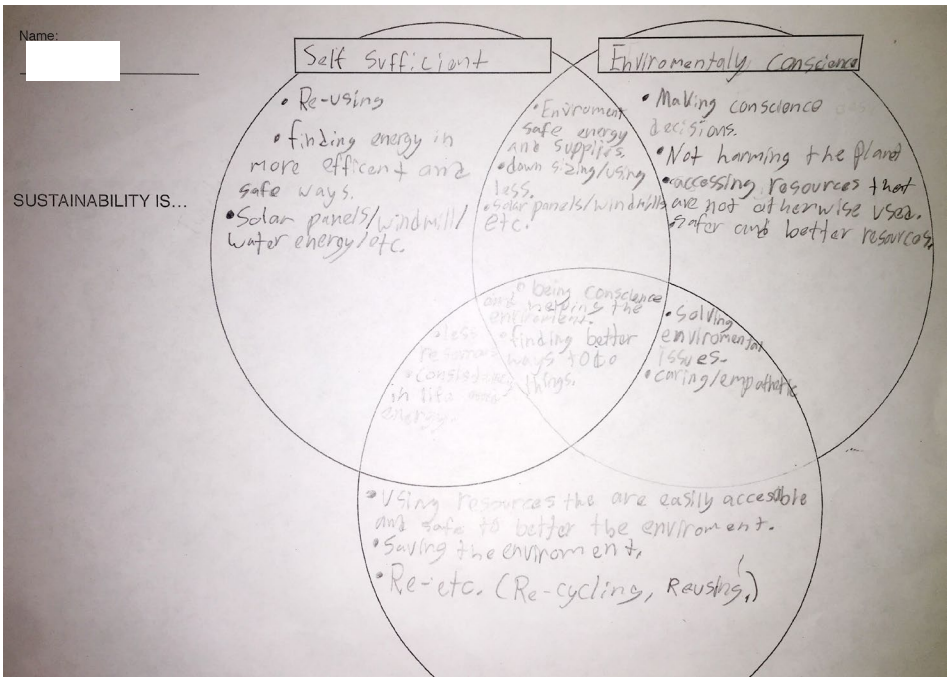
phases of the project, students will be introduced to some common definitions of sustainability, including the one above, as well as the triple bottom line diagram that makes appearances in multiple

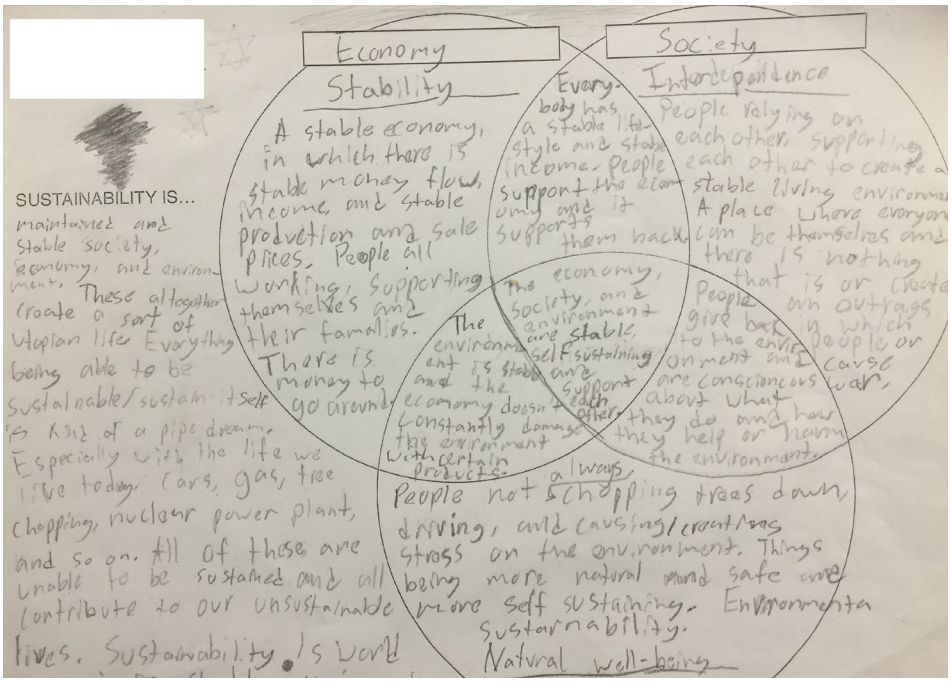


What is Sustainability?

forms, but ultimately depicts the social, economic, and environmental components of sustainability as being intertwined and connected in a Venn diagram-type relationship *(see above)*.

Additionally, the students will be introduced to the four root causes of unsustainability: relatively large flows of material from the Earth's crust, accumulation of substances created by society, physically inhibiting nature's ability to run cycles, and creating barriers to people meeting their basic needs worldwide. This idea of unsustainability comes from a series of videos called Sustainability Illustrated (Sustainability Illustrated, 2015). As teachers, we will be continually using these principles and concepts of sustainability to link to the concepts in our curriculum. All students will be given a pre- and post-assessment on sustainability, as well as ongoing work and assessments throughout the year.





To assess knowledge transfer, students were given a formative and summative assessment on the sustainability triple bottom line.

One way we are gauging the impact of this project is by periodically using the sustainability triple bottom line Venn diagram as a graphic organizer throughout the project. Students were each

given a completely blank copy of the graphic organizer before we did any instruction or even began talking about the project. They were simply asked to fill in the graphic and write their answer to "what is sustainability?" Recently we asked them to do this same exercise again, and we plan to do so a couple more times throughout the project. Looking at one student's before and after graphics *(see photos, p.4)*, it is clear that there has been tremendous growth in this student's knowledge and understanding around sustainability principles and concepts since the beginning of the project. This holds true for the majority of our students. Of note is that I am currently doing an in-depth case study of six students from our classroom during this experience as the basis for my dissertation for Prescott College. This study will be completed and published in the spring of 2016.

I am a progressive, constructivist, experiential educator with a deep belief that when students are engaged in authentic experiences centered around the complex issues that we, as humans, are toiling with, they will construct knowledge, meaning, and understanding that will stay with them as they become adults. My belief is that while human knowledge is acquired through a multitude of experiences, and reflection upon those experiences, the school experience is one that should be structured around authentic, experiential, multidisciplinary learning. Furthermore, I believe that the human need to search for truth and understanding is driven by our need to construct and answer complex, open-ended questions that matter to us. The philosophy and method that most closely aligns with my theoretical framework and epistemology is contemporary, project-based learning that is focused on issues of societal, economic, and environmental sustainability in the anthropocene era. Put simply, I believe that there are no more important questions, problems, and projects for our students to be working with and on than those centered around the relationship of humans with the earth, all its living systems, and each other. My experience tells me that when students are given a properly structured project, what they can come up with is nothing short of inspiring. I feel most alive as a teacher when I'm helping my students struggle through problems that matter.

RESOURCES

Expeditionary Learning (2014). Analyzing Author's Purpose: Industrial Food Chain http://commoncoresuccess.eleducation.org/curriculum/ela/grade-8/module-4/unit-1/lesson-3

Building Background Knowledge: What IS the Omnivore's Dilemma Anyway? http://commoncoresuccess.eleducation.org/curriculum/ela/grade-8/module-4/unit-1/lesson-1

Determining Cascading Consequences Using The Omnivore's Dilemma: Industrial Food Chain http://commoncoresuccess.eleducation.org/curriculum/ela/grade-8/module-4/unit-2/lesson-1

Setting the Standard for Project-Based Learning: A Proven Approach to Rigorous Classroom Instruction. Larmer, J., & Mergendoller, J., Boss, S. (2015). Alexandria, VA: ASCD.

The Omnivore's Dilemma: A Natural History of Four Meals. Pollan, M. (2006). New York: Penguin Press.

Sustainability Illustrated (2015). The 4 Root Causes of Unsustainability sustainabilityillustrated.com/en/portfolio/4-root-causes-of-unsustainability/

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Inventing the Future

The Teaching of Environmental Studies

Brentnall M. Powell

Brentnall M. Powell is currently Dean of Faculty and Academic Program at The Derryfield School, in Manchester NH. He holds a BA in History from Williams College and an MA in History from Brown University and lives with his family in Hopkinton, NH.

Jaimie P. Cloud is founder and president of the Cloud Institute for Sustainability Education in New York City, which is dedicated to the vital role of education in creating awareness, fostering commitment, and guiding actions toward a healthy, secure and sustainable future for ourselves and future generations. It monitors the evolving thinking and skills of the most important champions of sustainability, and transforms them into educational materials and a pedagogical system that inspire young people to think about the world, their relationship to it, and their ability to influence it in an entirely new way.

I began my career as an independent school educator teaching American, European, and World History. Ten years later I switched to teaching Environmental Studies, as I became increasingly concerned with the trajectory of our planet and the intersecting problems of energy, food, water, consumption, sustainable development, and global poverty. I believe we, as Americans, have a unique opportunity and responsibility to participate in creating a future in which all people can reach their highest potential and bring their greatest gifts to the world. This can only be done if we understand our impact and reliance on the natural world.

For the past five years I have been teaching a high school humanities-based Environmental Studies class at The Derryfield School in Manchester, NH. The course began as a series of trimester electives for seniors, but eventually became a year-long class for sophomores to provide earlier exposure to some of the world's most pressing problems. Through the course, my goal is to prepare students to play a role in creating a healthy and sustainable future for all humans and the living systems that support life. Fundamentally, the course is about challenging students to become active participants in their own future and the future of the planet.

We start the year by playing the Cloud Institute's Fish Game to develop an understanding of both the assumptions and mental models we bring to the questions of resource use and to examine how our economic and social systems intersect with the natural world. Only by carefully reflecting on and understanding our thinking can we build a sustainable future for all.

After the introduction, students explore four different topics: energy/climate change; food; water; and waste/consumption/design through a series of readings, case studies, videos, research, and projects. While the overarching question for the course is *What is the Future We Want?*, we apply a number of essential questions to the topics we study. These essential questions, developed in collaboration with Jaimie Cloud of The Cloud Institute, form the backbone

Community Partner Jaimie Cloud of The Cloud Institute worked with Brent Powell of The Derryfield School in Manchester, NH to develop his Environmental Studies course. During the winter of 2013 they met for two days in the Cloud Institute's New York office and then in a series of follow-up sessions. Jaimie comments on the results of that work:

I work in the field all the time. I see happy teachers and beautiful units and courses that educate for sustainability. I see authentic assessment instruments carefully crafted to capture student learning, and I see student work as evidence that children and young people are thinking differently and contributing to sustainability as a result of what they are learning in school. What I don't have the opportunity to see too often are letters like the one below. I am sure this is not a rare occurrence but it certainly is nice when teachers share what happens next. Here is a note to Brent from a parent of one of his students. He shared this with me at the end of the 2014-15 school year, in part as a thank you, and in part as an indicator of just how far this work can take us. (The student's name has been changed.)

Hi Brent,

I thought you might enjoy hearing about the impact you have had on my daughter this year. Anna was studying for her final this afternoon when her grandfather stopped by to visit. He asked her a few questions about the Environmental studies class. [Her response] was initially met with humor and sarcasm as she expected. By the end of a two hour conversation, which attracted my husband and a few other guests, Anna had landed herself a summer job.

Anna will research the cost of putting solar panels on all of the commercial real estate properties her grandfather owns. She challenged her dad and grandfather to really consider changing their environmental footprint. She debated until they really did begin to look at the difference that was possible. So although small changes in lighting were put into place this year, she has encouraged them to consider more. I was impressed and so proud of her.

Thank you.

of the class. They are:

- What has been the thinking that has caused our ecological decline?
- What new thinking is required to create a sustainable future?
- What choices must we make as individuals in order to influence the choices we make as a society?
- What systems are failing us, where are the places for intervention, and what must be done?
- In what ways is a healthy society dependent on a healthy natural world?
- How can we sustain a healthy commons?

The course is also built on the Cloud Institute's Enduring Understandings for Sustainability, which are a set of key foundational principles that create hope and action. Students are routinely asked to consider these Understandings as a basis for their work, and they

build their projects, papers, videos, and presentations around these concepts. The Understandings that have often resonated most powerfully with my students are:

- We are all in this together
- Reconcile individual rights with collective responsibilities
- Create change at the source not the symptom
- It all begins with a change in thinking
- Think 1,000 years
- We are all responsible

Years ago, when I was a high school student, one of my best teachers, A.J. Downs, used to say, "Nothing is learned until it is used." I have always tried to use that mantra in my teaching, as I believe it deepens student understanding. Throughout the year, students role play (representing different countries in the UN Climate Conference or various interests in a town considering a new hydro-electric project), build videos to convince "Foundations" to fund their food or water solution projects, and debate the issues of wind power, natural gas, and GMOs. In this way students are "using" what they learn to move others towards a sustainable future. We never rely on one source for our information but are constantly blending various authors, scientific studies, visual resources, interviews, and quantitative data to build deep and complex understanding. Students are quite engaged when

A few comments from students on what they learned:

"The most important thing I've learned is to be aware of the systems around me. While specific details may fade, I've learned that things taken for granted need to be inspected under a closer lens. Food does not just show up at a supermarket, there's a complex and pretty negative system behind it that needs its rewards weighed against its costs. I paid attention to some details prior [to this class], but not to the degree I will now."

"The most important thing I learned in this class is how to be an aware member of society. I have begun to notice the little things occurring that have a ripple effect. I've noticed that it only takes one person to begin doing something to start a trend. People will help if you just start… I learned how to take a risk and be a leader."

"The most important thing I have learned in this class is how to express my opinion in an assertive way that will be accepted and considered. Before this class, I had a strong opinion that usually was not backed up by facts and I did not express it in a way that could be understood and pondered. The debates in class helped me realize how to form a proper opinion based on facts that I was willing to stand behind. They also taught me how to be a participant in a discussion when someone else felt differently than me. I learned how to say my part correctly and how to consider the other points brought to my attention. Regardless of the future path I choose, this skill will take me farther in life than any information I learn from a textbook."

course concepts appear in the daily news, as this makes the course relevant and important, and they enjoy seeing these debates play-out in real time through real people. This year (2015-16) we paid close attention to the UN Paris Climate Conference and applied the concepts of systems thinking, design thinking, and social entrepreneurship to a Food Design Challenge Project. Students were asked to identify a problem within the food system and design a solution based on empathy, interconnection, and economic viability. They worked to develop a business plan that would be self-sustaining, created a video to "pitch their idea," and then debated the different ideas in front of faculty and student judges.

My hope is that through studying these issues, students discover their own ways to contribute to a more sustainable future. For some, this might mean changing habits around energy use or consumption, for others it means shifting the way they eat, or changing the food-buying patterns of their families. After taking the class, many students report looking at colleges differently and applying to schools which have strong sustainability programs and mindsets. In the end though, just like any good class, the goal is to build relevant and transferable skills and ways of thinking that will serve students well in the future. The biggest challenge I find in doing this work is blending the

A digital poster made by a student as part of the Consumption/Waste/Design Unit.

scale of the problems we face with the innovative solutions that are emerging. Often students can get discouraged when faced with the enormity of the questions — how do we move towards a sustainable, abundant, and equitable future and how do we confront our own unintended complicity in the systems that do us harm? But everyday I work with students who have the energy, creativity, and honesty it will take to tackle these challenges, and everyday I am inspired by their hopefulness for the undertaking. We return often to the famous Albert Einstein quote: *The significant problems we face cannot be solved with the same level of thinking we used to create them.* In that idea, and in the students I work with, I find the hope and the thinking — both individually and collectively — to invent the future we need.

RESOURCES

The Cloud Institute
cloudinstitute.org
An excellent resource for overall understanding of EfS and home of The Fish Game

The Fish Game
cloudinstitute.org/fish-game

EfS Enduring Understandings
bit.ly/205oSYM

Climate Interactive
www.climateinteractive.org
Provides World Climate Simulation and other resources on energy and systems thinking. We use these materials in our Climate Conference role plays

Post Carbon Institute
www.postcarbon.org
We use a number of these readings in our study of energy, food, water, and resiliency

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Moving from Theory to Practice

Emily Hoyler

Emily Hoyler teaches upper elementary grades in Cornwall, Vermont. She moonlights as the curriculum specialist at Shelburne Farms where she works with many of its educational and professional development programs, including the Sustainable Schools Project, and she has served as a visiting lecturer in education at Middlebury College.
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Flooded with sunlight, my first classroom was on the second floor of an old Catholic school. I arrived in August to join the young faculty at a public charter school in Providence, Rhode Island, ready to change the world, one student at a time. By October, my confidence was eroded but my connection to my students was firm. I fervently attempted to infuse my curriculum with sustainability, though I didn't yet have the word for it. My students wrote essays on climate change. We took our "city kids" out to an apple orchard for a day of community building, then returned to the classroom with a slow cooker to make apple sauce. That was the day I discovered the disconnection between my students and the source of their food. One student said to me, "Mrs. Hoyler, this is just like the real applesauce we buy at the store!" I knew that I wanted to help students know the world, know the earth, and know each other, but I wasn't sure where to begin.

I was fortunate to take what I consider to be somewhat of a sabbatical from the classroom when I was hired to become the Curriculum Specialist at Shelburne Farms. It was there that I was formally introduced to Education for Sustainability. I found that the thing that I was trying to do was a Thing. There, I learned about the EFS framework that girds the work of Shelburne Farms and others, and how to articulate this work to others. I also learned about effective strategies to bring this theory to life, such as using place-based education as the context for learning, and project-based learning and service-learning as key pedagogical strategies. After spending several years working in professional development, I was ready to return to the classroom to explore the place where theory meets practice.

I now teach at a small, rural elementary school in the Champlain Valley of Vermont. We serve approximately 75 students in grades K-6, with six, full-time classroom teachers and many other amazing specialists and staff. Most, but not all, students come from fairly affluent families. Our building is an old, cinderblock and brick construction with a roof freshly painted to hide the rust. Technology is decidedly lacking, and the new comput-

Students harvest the annual black bean crop in preparation to make soup for the Harvest Festival.

er-based standardized assessments try the capacity of our bandwidth as well as everyone's patience. The campus is bordered by farmers' fields to the north and west, and tree-lined meadows to the south and east. The school garden lies on the southern edge of campus, with four raised beds for things such as pizza gardens, and additional beds for black beans, potatoes, popcorn, and sunflowers. Beyond the garden, a path winds down to the outdoor classroom, a rustic circle of child-sized boulders and a firepit. In the winter, the place where the parking lot meets the grass erupts into snowbanks that quickly evolve into a world of ice castles and territories, and intricate trade systems develop along with territorial disputes that must be negotiated. One of the things that drew me to this school initially is its thriving farm to school program, which I see as a natural opportunity for EFS. Each fall the entire community comes together for a Harvest Festival featuring a delectable menu of local, student-prepared dishes, many showcasing produce from the school garden. Parents and community members rally to host a variety of activities, from cider pressing to making scarecrows, flower crowns, pumpkin painting, and tractor rides. However, this is just the first rite of passage in a cyclical school year that culminates in the planting of another season's crop.

Our school food service director provides from-scratch meals that highlight a variety of local products whenever possible, and brings students into the kitchen to help with prepare and serve the food. We also have a three-bin hot compost system to collect organic waste.

The food system is also making its way into our classrooms in an ever-growing number of ways. Understanding the complex and crucial connections between humans and the land that provides our food helps students develop an understanding of systems and interconnectedness. These systems provide a rich context for helping students grasp the Big Ideas and Enduring Understandings of EFS. And it can be delicious!

Other practices that embody EFS abound. Our school embraces the Responsive Classroom approach, which not only seeks to build students' academic skills, but highlights the importance of building their social-emotional skill set as well. Each day begins with a Morning Meeting in each classroom,

Students explore the relationship between angle and production of solar energy.

and other Responsive Classroom practices are peppered throughout the day. At the beginning of the year, students articulate their hopes and dreams, and from those students derive our school rules, called agreements. These practices support democratic classroom management, help students develop a voice, and hone their reflection skills.

I have also brought mindfulness to my classroom for several years. After a particularly stressful year teaching middle school, I took a Mindfulness-Based Stress Reduction course as part of my professional development. Experiencing the benefits of responding rather than reacting to the world, I soon sought more training so that I could share this approach with students. For the past couple of years, I have used resources created by the Hawn Foundation. The MindUP curriculum, which is rooted in brain-based science, provides an array of experiences and practices to help students cultivate mindful attention. My students love learning about their brains and practicing "paying attention" — a skill we constantly ask of them, but rarely dedicate time to learning and practicing. I believe this practice helps students know themselves, and grow in their ability to be compassionate and empathetic people. Knowing who we are and what is important to us is essential to doing good work in the world.

EFS is also infused into the core curriculum as well. This year, with the support of our principal, my intermediate grades colleagues and I created and launched a new learning structure for students in grades three through six. We've designed an interdisciplinary, multi-age "Integrated Studies Program," nicknamed "I.S.", that brings students together for learning in a place-based context. Our focus is weaving together knowledge, skills, and understandings from science, social studies, and literacy, with room for the other disciplines when they naturally emerge, into land- and community-based experiences.

This inaugural year, our year-long focus is "How do we shape the land? How does the land shape us?" We launched the year with a study of the four elements: earth, air, fire, and water. We explored states of matter, and read and wrote folktales centered on these elements. In October, we hiked up a local mountain, and were greeted at the

Students practice mindfulness in the outdoor classroom.

Atop a local peak students become inspired by Andy Goldsworthy's art prior to creating their own masterpieces.

top by an expansive view of the Champlain Valley, patchworked with forests, farms, and other development. In the distance, Lake Champlain meets the foothills of the Adirondack Mountains. From this vantage point, we taught students about plate tectonics, thrust faults, geologic time, and the once-upon-a-time Champlain Sea. We looked at land use patterns and how they intersected with water sources, and we ventured into the woods for an Andy Goldsworthy–inspired art class.

This experience launched our first major unit, titled "Earth." From here, we returned to school, where students cycled through a series of two-week mini-units in their grade-level groups. This allowed us to differentiate learning, while exposing students to similar content knowledge. My colleagues led students in learning about the agricultural and geologic history of our community, our climate, and how to use GoogleSlides, while I taught a text-based science unit focusing on natural resources and writing. These mini-units gave students the background knowledge they would need for the final project.

For the final project, we partnered with a local organization, the Vermont Folklife Center (VFC). Students were placed in multi-age groups and matched with a local farm. Their task was to apply their learning to understand "how the farm shapes the land and how the land shapes the farmer." VFC worked with our students to teach them how to take photographs and record audio, and loaned us a set of iPods for students to use on their farm visits. We provided students with an outline of what their presentation should include, then set them loose to drive their own learning (though we did drive them to the farm sites!). As we progressed through the project, we discovered that a big part of the students' learning was figuring out how to

collaborate, both online and in person. We used project-based learning resources, including checklists, group agreement planning sheets, and collaboration rubrics from the Buck Institute for Education to help guide this process. The Farm Project culminated with group presentations to an audience of parents, classmates, and community members. Every student participated in their groups' presentation Afterwards, farmers and families joined us to celebrate the students' work and sample some of the farms' products.

Crucial to the success of this program was the common planning time our principal carved out for us. It began with a day over the summer, and continues throughout the year in twice weekly lunchtime meetings. These meetings are typically filled with logistics and last minute adjustments, so we were fortunate to get a day of release time this winter for a curriculum retreat so that we could plan the rest of our year. There is never enough time, but we make use of what we have, and as my colleague described it, "we're building the plane as we're flying it."

While there have been many lessons learned this year through trial and error, overall the Integrated Studies program has been a great success. One parent shared her feedback with us:

The 2015-2016 EFS Leadership Academy cohort met seasonally at Shelburne Farms for reflection and inspiration.

The Crucial Role of Professional Development

Because I straddle two worlds, spending the school year in the classroom and summers participating in and facilitating professional development, I've come to understand the essential role that professional development fulfills in sustaining my practice. The school year provides little time for big picture planning and reflection, yet the right summer professional development creates space for professional and personal growth. This past year, I had the opportunity to participate in Shelburne Farms' first EFS Leadership Academy. This residential program met five times over the course of the year, building strong community among our cohort and allowing us to inspire and encourage each other in our work. My advice to others would be to find your summer people: connect with a professional learning community outside your immediate cirlce that will allow you to meet others who share your particular passion.

"The Integrated Studies program at Cornwall School has been a wonderful addition to our traditional curriculum this year. My children, in third and fifth grades, have only positive things to say about the experience. They have very different learning styles and yet both love the afternoon integrated studies time. The multiage aspect of the program allows the children to support one-another — to be mentors and role-models, and learn from each other, as well as interact with many students, which in a small school is critical. Additionally, the hands-on learning facilitated by this program is invaluable. The students make connections with the greater community and world. Their minds, bodies and hearts are all engaged through this type of learning, and it is a highlight in both of my children's school day. I am 100% thrilled with this opportunity for my children's learning. The culminating project for the first semester's work was unbelievable; every student was engaged, focused, excited and able to show their learning. Thank you for the work involved in bringing this to Cornwall School!"

Moving from theory to practice has been challenging, but I'm glad I chose this path (and these colleagues and this school). I knew it wouldn't be easy to bring all that I've learned about EFS into my practice, and I was right. And I still haven't figured it all out yet — I may never! In those rare moments when I do have time to reflect, sometimes I find myself plagued by thoughts of, "Is this what it looks like?" and "Am I doing it right?" But when I connect with others doing this work and we share our stories, I realize that we are doing it. This is what is looks like. We can do this, together.

RESOURCES

The Buck Institute for Education
www.bie.org

Mind UP
thehawnfoundation.org/mindup/

Responsive Classroom
www.responsiveclassroom.org/

Emily's ASCD blog posts:
inservice.ascd.org/learning-to-pay-attention/

inservice.ascd.org/education-for-sustainability-making-the-world-whole/

inservice.ascd.org/nurturing-the-whole-teacher/

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Place-Based Education *is* Education for Sustainability

Ming Wei Koh

Ming Wei Koh has a PhD in Sustainability Education, and is a gardener, teacher, educational consultant, curriculum developer, and organizer. Passionate about Education for Sustainability, she integrates its standards and ecological principles, as well as National Education standards into classroom curriculum, professional development courses, and community outreach programs. Ming Wei is the Ecoliteracy Senior Specialist at Pacific Resources for Education and Learning (PREL), where she develops climate change education projects, place-based teacher trainings, and curriculum to build community resilience in the Pacific Region. Her research includes how the school learning garden experience is a context conducive to teaching core subjects, STEM, and foundational life skills, and has created the Pedagogy of Food to frame the kind of education she believes in and shares. Ming Wei is interested in how different cultures and indigenous communities work to resolve ecological and social challenges through community partnerships, agriculture, food, music and art, and place-based education.

'A 'ohe pau ka 'ike i ka halau ho'okahi.
All knowledge is not learned in just one school.

— Hawaii O'lelo

Ang hindi marunong lumingon sa pinanggalingan ay hindi makakarating sa paroroonan.
The one who does not know how to look back at where one came from will not be able to reach the destination.

— Philippines National Proverb

I work with the Pacific Resource for Education and Learning (PREL) in the Pacific Region with educators whose island homes are being inundated with rising seas and whose cultures are disappearing with their coastlines. In our practice, we approach a place-based education that utilizes Indigenous and Western knowledges and pedagogical practices to improve ecoliteracy. Improving ecoliteracy, we believe, will lead to a personal relationship with nature and thus, care and nurturing of the land/ocean continuum (there is no delineation for Pacific Islanders). We developed a framework with which to work collaboratively as educators on place-based education.

One of the Big Ideas for Place-based education that we developed as we collected stories from educators on their experience of teaching and learning in and about place is:

> *The study of place requires the combination of intellect and experience.*

For us to develop a sense of our place, we need to engage in multiple ways of learning – including observation, experimentation, and opportunities to apply new knowledge (Orr, 1992). This approach allows us to access different sources of knowledge and then create local solutions for local issues, especially when we can rely on experts and elders in our own community, as

well as information from the global community.

Local ecological knowledges (LEKs) can be developed and cultivated in many ways, including:

- **Integrating MULTIPLE PERSPECTIVES: the perspectives, life experiences and cultures of others, as well as our own.** Students will know, understand, value and draw from multiple perspectives to co-create with diverse stakeholders shared and evolving visions and actions in the service of a healthy and sustainable future locally and globally;

- **Strengthening SENSE OF PLACE: the strong connection to the place in which one lives.** Students will recognize and value the interrelationships between the social, economic, ecological and architectural history of that place and contribute to its continuous health.

(These Enduring Understandings are from Cloud Institute for Sustainability Education)

Several communities, for example, are living and reviving the art of traditional navigation. Apprentices learn by watching and studying master navigators as they read the movements of the waves, birds, and stars. Only after observing can apprentices begin practicing their new skills with the help of a master navigator. Transmission of knowledge in this way has been going on for generations. But recently, communities like Waan Aelõñ in Majel (Marshall Islands) and the Polynesian Voyaging Society (Hawai'i) are using traditional navigation and canoe building to address contemporary community needs: providing life skills for youth, perpetuating cultural practices, and bringing attention to our global need for sustainability.

In schools, learning about our place starts with the local – our history, economy, environment, culture, and art. We can invite community experts to partner with teachers and students. And for learners, observing, experimenting, and experiencing is critical because it encourages us to pay attention to changes. We can see patterns, and then sense and respond to issues affecting our place, its people and environment. In this way, we are honoring the past, and utilizing the potential of our place to transform our future.

The following is a story told by Destin Penland, Science Instructor and PREL staff member located in the Republic of Palau, of his experiences with developing LEKs through integrating multiple perspectives, including his own, and strengthen the sense of place.

Ngardok Lake, the largest freshwater lake in Micronesia. In sidebar, Destin Penland writes about reviving the legends surrounding the lake as part of a place-based education initiative in Palau.

Palau and the revival of a place story which was almost lost

Destin Penland

Students in the Science Club of Palau High School visiting a conservation site in our country called Ngardok Lake, the largest freshwater lake in Micronesia.

There are about 50 kids in the Science Club of Palau High School, the only public high school in Palau. One weekend last fall, we took a trip up to Ngardok Lake, the largest freshwater lake in Micronesia. The lake is a PAN (Protected Area Networks) site. PAN is an attempt to establish a national park system in our country.

The lake happens to be in my village of Melekeok, where my mother is from. It's a place I loved to visit when I was younger with my mother, siblings and family members. We would go for hikes through it. It's known to have a lot of saltwater crocodiles. We would walk around on the tips of our toes, on eggshells, being careful, in hopes of not coming across a saltwater crocodile.

With conservation partners, the community has put a lot of effort into turning this place into a conservation area that is accessible to tourists and the local community, while attempting to minimize impacts to the ecosystem.

The Science Club has been visiting over the last three years, and this weekend will mark our fourth year visiting. We've been collaborating with the rangers in advance to create meaningful place-based learning experiences for the children, so that they will walk away appreciating the full depth of experience this place has to offer, both culturally and ecologically.

This place is important culturally to Melekeok and to Palau. But unfortunately, the legend of this place, which conveys its cultural significance as well as protocols for respecting and caring for it, did not continue to be widely disseminated.

There's a new push in Palau to create these PAN sites. The concepts of conservation are Western in nature. In Palau when we are using words like conservation or marine protected area, there's no local translation. The transmission of values through legends instead of through the Western concept of conservation exemplifies the traditional protocols to respect and care for important places in our community.

Luckily we were able to find the one community member, Colin Joseph, who still knew the legend of Ngardok Lake. He was one of the original rangers for Ngardok, prior to its official designation as a

PAN Site. We've been lucky to bring on a cultural expert, Masaharu Tmodrang, who has worked with Colin to document the Palauan legend associated with this site. Both of these individuals were committed to be there this weekend to tell the story to the students at Ngardok. This will be the first time in four years that we can begin our visit with the telling of the legend of this site. I am so excited to not only engage in Western science but also tap into the indigenous knowledge that exists in our community to provide as comprehensive of a place-based experience for our students as possible.

After this visit, several students wrote this article:

The cultural knowledge of the youth of Palau is diminishing. Palau High School Science Club wants opportunities to learn how our environment is foundational to our culture. For youth, our knowledge of Palauan culture has been thwarted by different outside influences; this includes our knowledge of our environment. To counteract outside influences we, the science club, have integrated activities for the students to explore and discover traditional knowledge of our environment and compare and contrast that with a scientific understanding of our unique ecosystem.

One of the great opportunities for the science club was a trip to Ngardok Nature Reserve, found in the great state of Melekeok. When we arrived to the Ngardok Nature Reserve, we were introduced to the most biologically diverse freshwater lake in Micronesia. The Reserve includes many plants and animals that were either native or endemic to the islands of Palau, or are only found at Ngardok itself. Science Club's goal for this trip was to unite a deeper cultural understanding of the value of this ecosystem with a scientific understanding.

During our visit to Ngardok Nature Reserve students participated in four activities to learn more about the cultural and ecological importance of this conservations area. Students had the opportunity to:

- listen to a traditional legend shared by community cultural historians, Masaharu Tmodrang and Colin Joseph, that tells of cultural importance of Ngardok.
- learn about invasive species and the threats they pose to the reserve.
- follow up on reforestation project for seedlings planted last year by collecting measurements and fertilizing them with mulch.
- engage in bird watching to learn about birds as bio-indicators of the health of an ecosystem.

The PHS Science Club looks forward to continuing its partnership with Ngardok Nature Reserve and identifying more ways to learn and support the work of the dedicated Park Rangers.

In closing, a place is so much more than just the physical environment. From urban settings, with big buildings and four-lane highways, to rural areas with lush mountains and mangrove beaches, people and the relationship to their environment defines a place. Culture – the beliefs, customs, and daily practices of our community – are both deeply influenced by and influence our environment and environmental changes. And our community's culture helps individuals to shape self-identity: how we define ourselves and our individual roles in community and the world.

In an increasingly modernized, materialistic, and homogenized world, the unique and particular characteristics of a place are lost through unsustainable development and human-created infrastructure. As more and more people migrate from rural areas to urban settings, or are displaced due to climate change, how can a sense of place transcend the actual biophysical place?

We can use physical senses such as sight, smell, and sound to engage with the biophysical (natural and built) aspect of a place. We can also engage with a place emotionally or spiritually. Certain places with unique biophysical elements immediately evoke an intimate and emotional connection, such as the magnificent vistas of a stormy Pacific Ocean or the beauty of the Sydney Opera House. Places where autobiographical memories are formed, such as a wooded lot or small patch of sand where one played as a child, have specific smells, sights, sounds, and tastes that create deep impressions and attachment.

Socio-cultural aspect of place is where the human practices of each place bonds the individual to the community. Each setting has practices specific to the places, practices that are celebrated only by the inhabitants of the place during specific occasions, such as Fisherman's Day in the Marshall Islands and Cherry Blossom Festival in Kamuela, Hawaii. These practices can form cultural foundations that "root" one in the place and be a lens from which to view the rest of the world.

Place-based education is education for sustainability because knowing place requires integrating multiple perspectives, from the micro to the macro. These perspectives help us to value the interrelationships that lead to visions and actions in the service of a healthy and sustainable future locally and globally.

RESOURCES

Place-Based Education: Elements of Design
Corrin Barros, Ming Wei Koh, Pacific Islands Climate Education Partnership
pcep.prel.org/resources/place-based-education-elements-of-design/

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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

Children's Environmental Literacy Foundation

by Alan Cass, Director of Education, CELF

Since 2003, the Children's Environmental Literacy Foundation (CELF) has worked with K-12 schools to prepare students to be active and responsible citizens of a sustainable world. CELF 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, CELF 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 CELF'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 CELF'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 CELF'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 CELF School Sustainability Team, which included the principal, sustainability coordinator, and teachers of science, health, and Spanish. MS 447's CELF 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 CELF 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 CELF'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, CELF educators provided shoulder-to-shoulder co-teaching for Project teachers, individualized work sessions with Project teachers, and small group work with sustainability teams. CELF 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 CELF Sustainability Team

One example that demonstrates the impact of CELF'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 call *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 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.

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

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

RESOURCES

Engaging the Entire Learning Community: My First Year as a Teacher with CELF
Examples of how MS 447 made sustainability a part of its school-wide initiatives, reached out to the local community through the advisory program, and fostered student leadership through the role its Student Government played in instituting facility sustainability practices.

Curriculum Design Examples
These two lessons, designed by the MS 447's Sustainability Team, demonstrate how teachers can offer students opportunities to practice sustainability skills in science and apply them to local water resource issues.

Garden Club Curriculum Design
Creating a school garden presented several challenges to MS 447, a co-located urban school. This motivated Amy Goods to consider designing and building a Bottle Greenhouse and an Aeroponic Garden System. It shows sustainability problem solving at its best: working with the environmental, economic, and social equity factors of a situation to develop a balanced solution that addresses all three.

All resources available at:
http://www.celfeducation.org/curriculum-exemplars

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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.

Playing, Plotting & Potatoes

Preschoolers Learning in the Garden

Kestrel Plump

Kestrel Plump is the Education for Sustainability Early Childhood Outreach Educator at Shelburne Farms in Shelburne, Vermont. She is pursuing her masters in Early Childhood and Elementary Education at Antioch University in Keene, NH.

David Sobel is the Senior Faculty in the Education Department at Antioch University New England. He is the author of many articles and eight books on children, learning and nature, including *Mapmaking with Children: Sense of Place Education for the Elementary Years.*

Ruth Kagle lives in Vermont and teaches early childhood education for the Burlington School District. She runs the preschool program at the Sustainability Academy at Lawrence Barnes, where she draws on EFS principles to develop curriculum and inform her teaching practice.

"Can we play in the garden yet?" asks Annabelle*. We are spending all of choice time in our outdoor classroom today. At morning meeting we explained that we would be working in the garden and making a map of our garden bed just like real farmers do. We have been outside for less than five minutes, and Annabelle is eager to get started.

This bucolic scene is playing out at the Sustainability Academy at Lawrence Barnes (SA) in the city of Burlington, Vermont. SA is the country's first sustainability-themed magnet school for grades Pre-K–5. The Burlington School District is one of the most diverse in the state, with 62% of students qualifying for Free Lunch, 16% receiving English Language Learner services, and 14% receiving special education services (BSD Annual Report). Approximately 240 of these students attend the Sustainability Academy. At the Sustainability Academy, there are 14 languages other than English spoken as first languages in this diverse community, which is a federal refugee resettlement area.

Even though this is our first day plotting our garden, the preschoolers at SA have a pretty firm grasp of what a map is. The past couple of weeks we have been talking about maps, looking at them, and following along on a map as we took neighborhood walks. To underline the representational aspect of maps (which can be a fairly abstract concept for preschoolers), we have been playing with penny maps. To do this, we made a tabletop map of the classroom. One child places a penny on the map. Then, a different student takes another penny and puts it in the location in the classroom as indicated on the map. The other students then locate the "hidden" penny.

Today, we will use their burgeoning map knowledge to map the garden bed in our outdoor classroom. We start with the pieces I have assembled — a large, laminated drawing of an empty garden bed and a drawing of our rhubarb plant and strawberry patch (the plants that have overwintered and are currently growing).

*children's names have all been changed.

Hushmi places her drawings of worms on the map.

We bring the map over to the bed. "OK," I say, laying everything out. "Where is the rhubarb?" Right away Hushmi points it out. "It goes here," she says, pointing to the lower edge of the bed. Yam notices the strawberries growing on the other side of the bed. "What this?" he asks. I tell him that they are strawberries and that he can draw a picture of them for our map if he would like. "I draw these. Strawberries," he says, sitting down, picking up a clipboard, and getting right to work.

While Yam is carefully drawing, Annabelle is bursting to get her hands in the dirt. We look at the map and look at the garden bed and discuss where would be a good spot. I know that her family gardens at home, so she is a seasoned transplanter. We pop a nasturtium out of its sprouting pot and she starts digging a hole for it. While she is working, I ask Hushmi if she could draw a picture of the nasturtiums on paper I brought out. "I can't draw that!" she exclaims, looking at the plant. We talk about the shape of the leaf and agree together that a green circle would be a reasonable representation of the nasturtium because of its round leaves.

Yam draws strawberries for the map.

As Hushmi and Yam finish their drawings and find the appropriate place for them on the map, they are eager to join Annabelle in the planting. Nila comes over to help enthusiastically, clumsily and full of confidence in the way only Nila can be. Plants get smushed, we have to move some things around on the map, but everyone is happy. After a few minutes, Yam runs off to play with some other children. Hushmi notices something missing from our map. "What about worms? I'm going to draw worms," Hushmi declares.

Throughout the rest of the session, a number of other students come over to plant and interact with the map. Abdi shows off his potato drawing, and Meredith, who is a very young three-year-old, investigates the map, pointing at each object. Abdul and Diego join in the planting and watering and place green circles on the map when they finish their planting. Abdi comes over towards the very end of the day. I explain there are no more flowers for him to plant right now, but we talk about the map. I tell him next week we will be planting some vegetable seeds, and he can help us do that. He grabs a clipboard and draws a simple circle on his paper. "A potato", he explains. It's what he hopes we will plant in the garden.

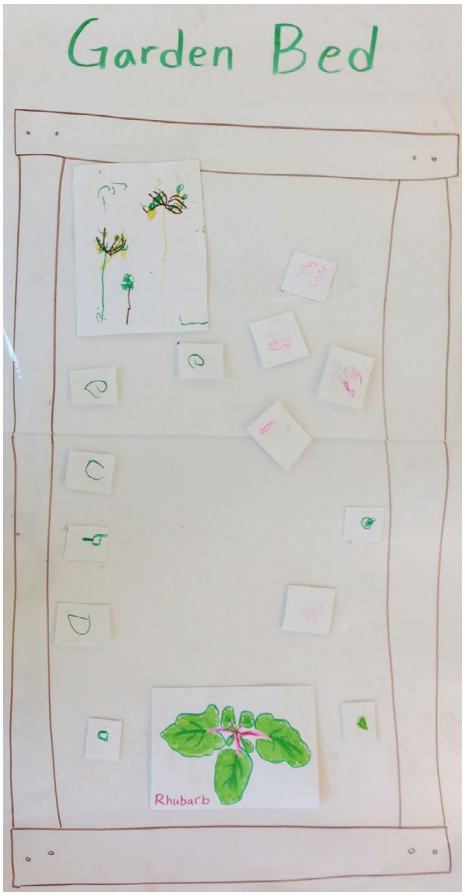
EFS can take many different forms in the preschool classroom; we are always trying to integrate it into our curriculum and our days in myriad ways. The mapping exploration was

EFS as a Lens

EFS doesn't feel like "just one more thing" that we have to cram into our day. Instead, it feels like a lens I can peer through while planning curriculum and carry around in my back pocket while teaching. The connections to EFS can also happen spontaneously: I'll often come up with an idea or follow some thread emerging in the classroom and then go back and see how it connects to EFS, which will in turn spark an idea for continuation. It is a reminder of the larger context, the groundwork we are laying for concepts that will continue to emerge and ultimately, hopefully, enable our students to become better citizens of the world. In many cases, it fits in and enhances what we are already doing. To illustrate this point, below I have included how the various things that transpired during the map-making connect with the Vermont Early Learning Standards.

— Kestrel

Vermont Early Learning Standards	Alignment with Garden Map-making
I. APPROACHES to LEARNING DOMAIN	
2. Curiosity and Initiative Goal, Indicator A Demonstrate an eagerness and interest in learning through questioning and adding ideas.	Working through how to draw the nasturtium, adding the potato drawing, adding the worm drawings.
4. Self Organization Goal, Indicator C Follow through to complete tasks and activities.	Finding the strawberry, drawing it, adding the strawberry drawing to the map.
III. LANGUAGE, LITERACY, COMMUNICATION DOMAIN	
5. Early Writing Goal, Indicator D Use scribbles, shapes, letter-like symbols and/or letters to write or represent words or ideas.	All of the drawing for the map.
IV. MATHEMATICS DOMAIN	
3. Geometry and Spatial Sense Goal, Indicator B Use language to understand the arrangement, order, and position of objects such as: behind, on top of, next to, below, underneath, beside, in front of, etc.	Discussion while placing pictures on map.
V. SCIENCE DOMAIN	
1. Play Goal, Indicator D Investigate different natural habitats.	Planting in the garden, digging in soil.
2. Scientific Knowledge Goal, Indicator A Collect, describe, and learn to record information through discussion, drawings and charts.	Making the map.
VI. SOCIAL STUDIES DOMAIN	
2. Spaces and Geography Goal, Indicator B Begins to create simple representations of their physical environment	Map making



Our map after the first day.

a bit of an experiment this year. It went better than I could have anticipated. It reinforced for me that maps are something that children want to engage in and are able to make on their own. They also gave our class a new way of interacting with the garden and outdoor space.

WHY GARDEN MAPS WITH FOUR-YEAR-OLDS?

David Sobel

In a typical early childhood gardening activity, children will identify overwintering plants, engage their senses, get their hands dirty and participate in the cycle of life. It's spring, the sap is flowing, the worms are wiggling, things are right with the world. Isn't this just fine the way it is? Why complicate it by adding in a mapping component?

There are at least three good reasons for introducing maps into this equation. Of course, from an EFS perspective, the whole point of young children gardening is that it's one way to set them on a path of growing their own food, becoming self-sufficient, living a healthy lifestyle. But good EFS curriculum aspires to cultivate both citizens *and* academic skills. How does that happen here? First, simple maps use a pictorial symbolic language that children understand. The green circle is a nasturtium, the more oval brown circle is a potato. There's a clear connection between the drawn two-dimensional picture and the plant or the vegetable itself. These are the early stages of the reading and writing process. Children are learning that shapes drawn on paper represent things in the real world—an important foundation for understanding that letters represent sounds.

Second, they're developing skills in spatial organization. Three- and four-year-olds are actively starting to understand how the world is organized around them. They're learning where the friendly dog lives in the house at the corner, where the apples fall onto the sidewalk near the park, where their grandmother takes them to buy juice at the market. They're piecing the world together around themselves, like putting together a puzzle, creating the beginnings of mental maps. Making a garden map gets them problem-solving at just the right scale for their young brains. They can see the whole garden bed in their purview and they can see the whole of the garden bed representation on the map, just smaller. One represents the other and it's a developmentally appropriate challenge to figure out that if the strawberries are up here by the rhubarb in the garden bed, where should we place them on the map? They're roughing in their understanding of how to represent the real world on paper.


Meredith explores the map.

Third, mapmaking has an inherent appeal for many children. Observe children in natural play around the world and they do the same things over and over. They make dens and forts, go on adventures, craft small worlds, find shortcuts,

and make maps of the places that intrigue them. Maps are a visual language rooted in our hunting and gathering heritage. Children used to sketch maps in the dirt to show where the crayfish hid in the stream, where the best berries grew, or how to avoid the ground wasp nest on the trail. Maps are one of the languages of childhood. Giving children opportunities to make maps translates their inner impulses into fruitful learning. Note how Hushmi feels compelled to make the picture complete. "What about the worms? I'm going to draw worms!" If there are worms in the garden soil, then there need to be some squiggly lines on the map to represent their presence.

When the map goes inside, it can be used to discuss planting ideas when it's raining outside. Children and teachers can try out alternative plans — should the strawberries stay here by the rhubarb or would they be better over here by the lettuce where they'll get more sun? How many different peas can we plant in this row if they're supposed to be planted two inches apart? Look through these garden catalogues and cut out pictures of flowers we might like to have in the garden. Show me on the map where we could plant them. The map becomes the dream that the teacher and children create together.

THE ROLE OF EFS IN CREATING A CLASSROOM COMMUNITY

Ruth Kagle
Head teacher in the classroom

The pedagogical traditions of early childhood education embrace child- and family-centered practices, and holistic, experiential and interdisciplinary learning. These longstanding practices create a natural foundation for EFS in the preschool classroom. As young children are supported in developing a positive sense of self and healthy relationships within the classroom, they are learning what it means to engage as caring, responsible members of a community beyond their family. As they learn to emotionally self-regulate and to share and care for classroom resources, young children engage in very concrete ways with issues of equity, fairness, and justice. When children discover that food is something that they can grow and harvest, and experience the natural world as a place of discovery, sensory pleasure, and a home that we share, they begin to develop the emotional connections and foundational understandings for environmental stewardship. When children grind corn and wheat to make bread and then visit local markets and bakeries to find different kinds of breads, learning is meaningful and connected to the cultures and community in which they live. Whether recycling and composting after snack time, sorting clothing for a winter clothing drive, chopping vegetables to make soup, exploring snow and ice in the winter, or planting a spring garden, young children demonstrate that they are competent community members capable of solving problems, doing authentic work, asking meaningful questions, and contributing to the well-being of a sustainable community.

RESOURCES

Cultivating Joy and Wonder: Educating for Sustainability in Early Childhood Through Nature Food and Community. Linda Wellings and Emily Hoyler, 2013. www.shelburnefarms.org/our-work/resources/cultivatingjoy-andwonder

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