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Spring 2019
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Effective environmental education produces ecologically literate citizens who understand and value healthy environments. They understand their connection to and impact on natural environments, and through this understanding become motivated to act as environmental stewards and live sustainable, healthy lives.
EE News and Events
Some of what’s happening in environmental education in and around the Pacific Northwest

Climate Change Education Funding for ESD Teacher Training in Washington

The 2018 Washington State Legislature allocated $4,000,000 of the general fund in Fiscal Year 2018–2019 to provide grants to education service districts (ESDs) and community based organizations (CBOs) for science teacher training in the Washington State Science Learning Standards (WSSLS) (Next Generation Science Standards—NGSS) including climate science education standards (ClimSciEd) (ESSB 6032, Section 501, p. 300 (68)).

Now named ClimeTime, this initiative has quickly become a state-level network building the capacity of science teachers in Washington State. OSPI manages the network and the grant funding as provided by the Washington State budget proviso of $4 million. This funding flows through all nine Educational Service Districts (ESDs) in Washington ($3 million) and seven community-based organizations (CBOs) ($1 million), which are launching programs for science teacher professional learning around Next Generation Science Standards (NGSS) and climate science education.

For more information, contact the Learning and Teaching Science Office, rachel.farrington@k12.wa.us

Sustainability in Higher Education Conference in Spokane WA

Expected to draw approximately 2,000 participants, the Association for the Advancement of Sustainability in Higher Education’s (AASHE’s) annual conference is the largest stage in North America to exchange effective models, policies, research, collaborations and transformative actions that advance sustainability in higher education and surrounding communities. We invite you to join us in Spokane, Washington from Oct. 27 – 30 to share your knowledge, achievements and ideas.

With a theme of Co-Creating a Sustainable Economy, AASHE 2019 is tackling the root cause for the continued rise in carbon emissions: our dysfunctional economic system. The conference seeks to showcase and strengthen higher education’s contributions to the movement for a sustainable economy.

PEI Professional Development: Locally Relevant 3-D Climate Science for Drawdown Storyline Writing

On August 1st, 15 educators from 9 school districts participated in a 3-day workshop with project partners PEI, Braided Education Consulting, Cinnamon Bear Enos, Abby Ruskey, and Laura Tucker to begin designing storylines aligned to NGSS climate science performance expectations for classroom use. Teams focused on the following grades: 4th, 5th, 7th, 8th and high school earth science. Storyline topics included food waste, erosion, and land use. Participants were eligible to earn 18 WA State approved STEM clock hours at no cost.

2019 Marine Education Conference: Voyaging Through Changing Waters

August 11-15, 2019 at Fort Worden State Park in Port Townsend WA

The annual conference of the Northwest Aquatic and Marine Educators (NAME) will feature strands that include Connecting Cultures and Communities; Innovative Teaching, Research, and Restoration; and Place-based Learning. For registration and other information, visit the NAME website at www.pacname.org.
Confluence in the Classroom

For the last four years, Confluence in the Classroom has connected K-12 classrooms with Native artists and tradition keepers to create meaningful projects about the Columbia River system. To help create a confluence of cultures, Confluence in the Classroom uses art as a catalyst to stimulate interaction between artists, students and teachers for a year-long cultural journey. Storytelling, mural painting, mask making, weaving, dance and music encourage a deeper understanding of place, self-identity through cultural experience and relationships between people and their environment.

The program includes at least one field trip to a culturally significant place, including Confluence sites. At the end of the school year, students present their community projects, which embody the exploration, research, sharing and skills acquired during the school year. The majority of the classrooms Confluence are underserved where creative opportunities have diminished just when standardized testing leaves little opportunity for inspired, diverse educational experiences.

If you are interested in learning more about Confluence in the Classroom, please email Program Coordinator Erika Rench at Erika@ConfluenceProject.org

Outdoor School for All!

Diverse Programming and Outcomes in Oregon

is a project of the Oregon Environmental Literacy Program (OELP), which began in 2014 and is supported by the Gray Family Foundation. The intent of the project is to build understanding and knowledge about current outdoor school programming and its intended outcomes.

The Results:

The evaluation was piloted with six outdoor schools of differing length, programming and size — 82 teachers and 680 students participated during the 2017/8 school year. Initial results show significant positive gains and strong influence on many educational outcomes. These include:

- ODE Essential Skills (critical thinking, teamwork)
- 21st Century Skills (problem-solving, collaboration)
- Interest in learning
- Positive school behaviors (paying better attention)
- Students’ self-efficacy
- Legislative requirements (behavior, engagement, performance)
- Student learning: overall and specific to environment
- Environmental attitudes
- Social Emotional Learning Core Competencies (empathy, responsibility)

What’s Ahead?

In spring 2019, the project team is collaborating with OSU-Extension Outdoor School program and program providers to administer this evaluation system throughout the state, beyond the sample of programs used for the pilot study. In addition to this annual evaluation report, participating programs will individually receive a program-specific evaluation report to support their annual reporting needs and program improvement/development.

Anticipated timeline:

- Pilot study evaluation report publicly released: winter 2019
- Program-specific pilot study evaluation reports shared with individual programs: winter 2019
- Initial communication to outdoor school programs supporting participation in full, statewide evaluation: spring 2019
- Full, statewide program evaluation: spring 2019
- Statewide program evaluation report publicly released: winter 2019/20
- Program-specific pilot study evaluation reports shared with individual program: winter 2020

For more information, visit the OELP website at https://extension.oregonstate.edu/outdoor-school
EE News and Events

EEAO Continues to Build Capacity
The Environmental Education Association of Oregon (EEAO) is currently updating its strategic plan to better reflect the organization’s values and vision for a diverse and equitable environmental education community. As part of this process we are accessing how EEAO can best support our community and how we can be a resource and an agent for change in environmental education.

In spring 2019 EEAO received a grant from the North American Association for Environmental Education (NAAEE) to develop a Guidelines Trainers’ Bureau for Oregon. In partnership with other statewide organizations, EEAO will engage and diversify a cadre of facilitators to deliver Guidelines for Excellence in Environmental Education workshops across the state. This team will represent the state geographically and will include educators from marginalized communities. Content will focus on how to facilitate a Guidelines training through a diversity, equity and inclusion lens. Ultimately the goal is for the Trainers’ Bureau to provide workshops across Oregon that are facilitated by educators that reflect the diversity found in our state. Workshops for the Trainers’ Bureau will begin in Summer 2019. Information on these workshops and future trainings across the state will be posted on EEAO’s website.

Please visit our website at www.eeao.org to learn more about joining our board and other ways you can support us. You will find resources, including a directory of organizations and centers that work in the field of environmental education (EE), job postings for EE organizations across the north west, and information about current and past projects. There is also an opportunity to join our listserv to receive EEAO updates and our bi-monthly newsletter.

Theresa Crain
EEAO Administrator
www.eeao.org

E3 Washington Finds Renewed Purpose
2018 was a busy and eventful year for E3 Washington. During the past year, we

• Worked with our partners to help Governor Jay Inslee pass a $4 Million appropriation to support climate literacy through Next Generation Science Standards;
• Co-sponsored the Science, Climate and Environment Day inaugural event drawing students from across WA to showcase their climate research projects at the State Capitol;
• Co-hosted the North American Association for Environmental Education 2018 national conference in Spokane, which drew over 1,400 environmental educators from across the country and around the world.

The E3 Washington Team has been working hard to build our organizational capacity so that we can continue to expand our impact. Following our staff retreat at Camp Waskowitz in January, the board voted to appoint Derek Hoshiko and Sylvia Hadnot to the position of Co-Board Chair. Their joint leadership has already supported E3 in many ways by strengthening our sense of community in and outside of the organization and grounding our focus and our purpose in equity-driven principles.

Our staff, partners and board committee members have helped us to prepare for a number of events. In alignment with the goals of the Educating for a Greener Economy (EGE) project, Pacific Education Institute (PEI) and E3 supported youth voice at the STEM Innovation Alliance and Washington Green Schools meeting on February 27th at the State capitol. 70 students from schools around the state presented their science, climate and environmental projects and also had the opportunity to meet Governor Jay Inslee, who has consistently demonstrated support for climate science education and a transition to a greener economy.

With Spring almost in swing and calendars getting fuller, it’s a great time to network. E3 is planning two Regional Environmental Educator Network Gatherings, which will take place in Central Washington and Puget Sound. The goals of these gatherings will be to promote partnerships which advance initiatives in career-connected learning (EGE) and climate science education. Dates will be announced soon!

Don’t forget to check our website! Events and job opportunities from our members and partners are regularly posted under “Opportunities”, such as this upcoming webinar hosted by NAAEE. Our home page is also a great spot for staying up to date on environmental advocacy efforts and legislation in WA State - the bill for climate science education and a transition to a greener economy.

With Sylvia Hadnot, M. Ed.
Creative, Healer, Educator
Trilogi Co-Founder
E3 Co-Chair
info@e3washington.org

Idaho EE Teachers of the Year
2019 Idaho Environmental Educators of the Year, pictured here with Board President, Dirk Anderson. (From L to R) Lauresta Welty, Foothills Learning Center (elementary) (award accepted by Alex on Lauresta’s behalf); Melyssa Ferro, Syringa Middle School in Caldwell (secondary); Stephanie Day, Roots Forest School in McCall (non-formal); and Kimberly Semple, Boise Watershed EE Center (volunteer of the year).
Ear to the Ground: Sylvia Hadnot

Sylvia Hadnot is an educator, healer and artist born and raised in Seattle, Washington. Sylvia is one of E3 Washington’s new Co-Chairs, along with Derek Hoshiko. With a background in performance art, environmental education, and organizational change, Sylvia is excited to co-lead Washington State’s environmental educators association into a new season of increased capacity, communication, catalyzing and convening.

What is your current job title?
Recently, I realized that I have come to understand my work as my identity, so I am currently working on understanding myself in terms greater than my work. When people ask me this question, I have been saying Artist and Healer, lately, and allowing that response to open our conversation. It has been fun to break the ice with people this way.

How did you become involved in environmental education?
As a kid, I played outside all the time! I was always coming home with a busted knee or grass stains on my clothing. When I found out that human consumption was incompatible with a healthy Earth, I immediately became passionate about being good to my home planet. I figured if everyone else understood the impact we all have on our home and on each other, they would become passionate about being good to our Earth, too. So, I got into environmental education!

What inspires you? What people have inspired you?
My parents and the stars. At night, I can lay out in a field and look up at the stars and know that I am small and insignificant, yet also infinitely important. It’s almost like the stars remind me of how big my dreams seem to me, but that in the grand scheme of things, they’re pretty small. This makes them feel more accomplishable. Ha! My parents exposed me to everything that I know and produced everything that I am. Without them, I would be nothing. On top of that, they both always tell me to follow my dreams, which leads me back to the stars.

What would you like to accomplish as co-chair of E3 Washington?
E3 is in such an exciting time right now as it grows in its own capacity, while the work of environmental literacy and climate action couldn’t be more important. I hope to ignite the energy that already exists throughout the state and the region to come together as a unified force. There’s a lot of amazing work being done all throughout the region by various stakeholders and interest groups. If E3 can support all of these people throughout Washington in coming together to embark on environmental work together, I’ll consider myself having accomplished a job well done.

What’s book(s) is currently on your nightstand?
The Empath’s Survival Guide by Judith Orloff; The Geography of Malcolm X by James Tyner; A Taste of Power by Elaine Brown; and Hands of Light by Barbara Ann Brennan. (I have a bad habit of reading too many books at one time.)

Do you have favorite places to go when you need to connect with nature?
The sea. I’ve always been intrigued by water. Perhaps it’s because I was born in July and my astrological sign is of the water... Perhaps it’s because I grew up going to Carkeek Park and Alki Beach. Regardless the reason, the sea has always been a place I retreat to.

What kind of a world do you hope your children grow into?
I hope they grow into a society that is ready to receive them on an Earth that is ready to hold them.

Are you hopeful about the future?
Absolutely. The future is as bright as we want it to be. I believe in myself and I believe in you, so I believe in the future. As Buzz Lightyear said, “to infinity and beyond!”
Reclaiming Spaces

Camp ELSO’s founders encountered bias and obstacles as they pursued science careers. Inspired by their experiences, Sprinavasa Brown and Dr. Kellianne Richardson – two women of color – founded Camp ELSO in 2015 to provide Black and Brown children in greater Portland with opportunities to explore nature and environmental professions.

by Sprinavasa Brown

I recall the high school science teacher who doubted my capacity to succeed in advanced biology, the pre-med advisers who pointed my friend Dr. Kellianne Richardson and me away from their program and discouraged us from considering a career in medicine – biased advice given under the guise of truth and tough love.

I remember only three classes with professors of color in my four years at college, only one of whom was a woman. We needed to see her, to hold faith that as women of color, we were good enough, we were smart enough to be there. We were simply enough, and we had so much to contribute to medicine, eager to learn, to improve and to struggle alongside our mostly White peers at our private liberal arts college.

These are the experiences that led Kellianne and me to see the need for more spaces set aside for future Black scientists, for multi-hued Brown future environmentalists.

The story of Camp ELSO (Experience Life Science Outdoors) started with our vision. We want Black and Brown kids to feel comfortable in a lab room, navigating a science library, and advocating for themselves with faculty and advisers. We hope to inspire their academic pursuits by laying the foundation with curiosity and critical thinking.

Creating a sense of belonging

Camp ELSO’s Wayfinders program is our main program for youths in kindergarten through sixth grade. What began as a programmatic response to our community needs assessment – filling the visible gap in accessible, affordable, experiential science, technology, engineering and math (STEM) programs for young Black and Brown children – quickly grew into a refuge space for youth of greater Portland. Wayfinders is all about creating a safe uplifting and affirming space for youth to engage in learning around four key areas: life science, ecology, community and cultural history. While our week-long sessions include field trip sites similar to many mainstream environmental education programs, our approach is sharply focused on grounding the youth experience in environmental justice while elevating the visibility and leadership opportunities for folks of color.

We are creating a special place for Black and Brown youth to have transformative experiences, to create memories that we hope
will stick with them until adulthood. Creating such a space comes with difficulties, the type of challenges that force our leadership to make tough decisions that we believe will yield the best outcomes for youth underrepresented in STEM fields. For instance, how to mitigate the undertones of colonization, nationalism, and co-opting of traditional knowledge – harmful practices ingrained in mainstream environmental education.

To do so, we invest in training young adults of color to lead as camp guides. We provide resources to support them in developing the skills necessary to engage youth of diverse ethnicities, backgrounds, socioeconomic status and family structure. Our guides practice taking topics and developing discussion questions and lesson plans that are relevant and engaging. We know that the more our staff represents the communities we serve, the closer we get to ensuring that Camp ELSO programming is responsive to the needs of children of color, authentic to their lived experience, and is a reflection of the values of our organization and community.

In 2019 nearly 100 children of color from greater Portland will participate in Camp ELSO’s Wayfinders program over spring and summer break, spending over 40 hours in a week-long day camp engaging in environmental STEM learning and enjoying the outdoors. We reach more children and families through our community outreach events like “Introduce a Girl to Engineering Day: Women of Color Panel” and “Endangered Species Day: Introduction to Youth Activism.”

The most critical aspects of our Wayfinders program happens even before we welcome a single child through our doors. With the intent of purifying the air and spirit, we smudge with cedar and sage to prepare the space. When a child shows up, they are greeted by name. We set the tone for the day with yoga and affirmations to the sounds of Stevie Wonder and Yemi Alade as we strive to expose our kids to global music from diverse cultures.

We have taken the time to ask parents thoughtful questions in the application process to help us prepare to welcome their child to our community. We have painstakingly selected what we feel is a balanced, blended group of eager young minds from diverse ethnic backgrounds: Black, Latinx, the children of immigrants, multi and biracial children of various ethnicities, fuego and magic. Our children come from neighborhoods across Portland and its many suburbs. They come from foster care, single-parent households, affluent homes, homes where they are adopted into loving and beautifully blended families, strong and proud Black families, and intergenerational households with active grandmas and aunts. Consistent with every child and every household is an interest and curiosity around STEM, a love of nature and the outdoors.

The children arrive full of potential and the vitality of youth. Some are shy, and nerves are visible each morning. By the end of the week we’ve built trust and rapport with each of them, we’ve sat in countless circles teaching them our values based in Afrocentric principles, values selected by previous camp guides representing the youth voice that actively shapes the camp’s culture.

On our way to more distant Metro sites like Blue Lake and Oxbow regional parks and Quamash Prairie, we play DJ in the van. Each kid who wants to has an opportunity to share their favorite song with the group, and if you know the words, you’d better belt it out. We share food and pass around snacks while some children rest and others catch up with old friends. Many more are deep in conversation forging new friendships.

When we arrive, we remind the kids of what is expected of them. We have no doubts that each and every child will respect the land and respect our leaders. The boundaries are clear, and our expectations for them don’t change when problems arise. We hold them to the highest standards, regardless of their life situation. We respect, listen, and embrace who they are.

We are often greeted by Alice Froehlich, a Metro naturalist. Our kids know Alice, and the mutual trust, respect and accountability we have shared over the last three years has been the foundation to create field trips that cater to the needs of our blended group – and oh, it is a beautiful group.

At Oxbow, we are also greeted by teen leaders from the Oregon Zoo’s ZAP (Zoo Animal Presenters) program. These teens of color join us each year for what always ends up being a highlight of the week: playing in the frigid waters of the Sandy River, our brown skin baking under the hot summer sun, music in (continued on next page)
the background and so much laughter. Like family, we enjoy one another’s company.

Then we break into smaller groups and head into the ancient forest. Almost immediately the calm of the forest envelopes our youth. The serenity that draws us to nature turns our group of active bodies into quieted beings content to listen, observe, respond and reflect. It doesn’t take much for them to find their rhythm and adjust to nature’s pace. Similarly, when we kayak the Tualatin River or canoe the Columbia Slough, they are keen to show their knowledge of local plants and taking notice as the occasional bird comes into view. We learn as much from them as we do from our guides.

These are the moments that allow Camp ELSO’s participants to feel welcome, not just to fit in but to belong. To feel deeply connected to the earth, to nature and to community.

**Encouragement for my community**

As a Black environmental educator I’m always navigating two frames of view. One is grounded in my Americanness, the other is grounded in my Blackness, the lineage of my people from where I pull my strength and affirm my birthright. I wear my identities with pride, however difficult it can be to navigate this world as a part of two communities, two identities. One part of me is constantly under attack from the other that is rife with nationalism, anti-Brownness, and opposition toward the people upon whose lives and ancestry this country was built.

I am a descendant of African people and the motherland. I’m deeply connected to the earth as a descendant of strong, free, resilient and resourceful Black people. The land is a part of me, part of who I am. My ancestors toiled, and they survived, they lived off, they cultivated, and they loved the land.

As a black woman, my relationship with the land and its bounty is a part of my heritage. It’s in my backyard garden, where I grow greens from my great-grandmother’s seeds passed down to me from my mother, who taught me how to save, store and harvest them. Greens from the motherland I was taught to cook by my Sierra Leonean, Rwandese and Jamaican family – aunts and uncles I’ve known as my kin since I was a child. It’s in the birds that roam my backyard, short bursts and squawks as my children chase them. The land is in the final jar my mother canned last summer when the harvest was good, and she had more tomatoes than we could eat after sharing with her church, neighbors and family.

Our connection to the land was lost through colonization, through the blanket of whiteness that a culture and set of values instilled upon us all as westerners living on stolen Indigenous land and working in systems influenced by one dominant culture. Our sacred connection with outdoor spaces was lost as laws set aside the “great outdoors” as if it were for White men only. These laws pushed us from our heritage and erased the stories of our forefathers, forgetting that the Buffalo Soldiers were some of the first park rangers, that the movement for justice was first fought by Black and Brown folks.

We grew our own food before our land was stripped away. We lived in harmony with the natural world before our communities were destroyed, displaced or forcibly relocated. We were healthy and thriving when we ate the food of our ancestors, before it was co-opted and appropriated. We must remember and reclaim this relationship for ourselves and for our children.

We are trying to do this with Camp ELSO, starting with our next generation. Children have the capacity to bring so much to environmental professions that desperately need Black and Brown representation. These professions need the ideas, innovations and solutions that can only come from the lived experiences of people of color. Children of color can solve problems that require Indigenous knowledge, cultural knowledge and knowledge of the African Diaspora. We want to give kids learning experiences that are relevant in today’s context, as more people become aware of racial equity and as the mainstream environmental movement starts to recognize historical oppression of people of color.

We need more spaces for Black and Brown children to see STEM professionals who are relatable through shared experiences, ethnicity, culture and history. We need spaces that allow Black children to experience the outdoors in a majority setting with limited influence of Whiteness – not White people but Whiteness – the dominant culture and norms that influence almost every aspect of our lives.

Camp ELSO is working to be that space. We aren’t there yet. We are on our own learning journey, and it comes with constant challenges and a need to continuously question, heal, build and fortify our own space.

Sprimavosa Brown is the co-founder and executive director of Camp ELSO. She also serves on Metro’s Public Engagement Review Committee and the Parks and Nature Equity Advisory Committee.
Advice for white environmentalists and nature educators

by Sprinavasa Brown

I often hear White educators ask “What should I do?” expressing an earnest desire to move beyond talking about equity and inclusion to wanting action steps toward meaningful change.

I will offer you my advice as a fellow educator. It is both a command and a powerful tool for individual and organizational change for those willing to shift their mindset to understand it, invest the time to practice it and hold fast to witness its potential.

The work of this moment is all about environmental justice centered in social justice, led by the communities most impacted by the outcomes of our collective action. It's time to leverage your platform as a White person to make space for the voice of a person of color. It's time to connect your resources and wealth to leaders from underrepresented communities so they can make decisions that place their community’s needs first.

If you have participated in any diversity trainings, you are likely familiar with the common process of establishing group agreements. Early on, set the foundation for how you engage colleagues, a circumspect reminder that meaningful interpersonal and intrapersonal discourse has protocols in order to be effective. I appreciate these agreements and the principles they represent because they remind us that this work is not easy. If you are doing it right, you will and should be uncomfortable, challenged and ready to work toward a transformational process that ends in visible change.

I want you to recall one such agreement: step up, step back, step aside.

That last part is where I want to focus. It’s a radical call to action: Step aside! There are leaders of color full of potential and solutions who no doubt hold crucial advice and wisdom that organizations are missing. Think about the ways you can step back and step aside to share power. Step back from a decision, step down from a position or simply step aside. If you currently work for or serve on the board of an organization whose primary stakeholders are from communities of color, then this advice is especially for you.

Stepping aside draws to attention arguably the most important and effective way White people can advance racial equity, especially when working in institutions that serve marginalized communities.

To leverage your privilege for marginalized communities means removing yourself from your position and making space for Black and Brown leaders to leave the margins and be brought into the fold of power.

You may find yourself with the opportunity to retire or take another job. Before you depart, commit to making strides to position your organization to hire a person of color to fill the vacancy. Be outspoken, agitate and question the status quo. This requires advocating for equitable hiring policies, addressing bias in the interview process and diversifying the pool with applicants with transferable skills. Recruit applicants from a pipeline supported and led by culturally specific organizations with ties to the communities you want to attract, and perhaps invite those community members to serve on interview panels with direct access to hiring managers.

As an organizational leader responsible for decisions related to hiring, partnerships and board recruitment, I have made uncomfortable, hard choices in the name of racial equity, but these choices yield fruitful outcomes for leaders willing to stay the course. I’ve found myself at crossroads where the best course forward wasn’t always clear. This I have come to accept is part of my equity journey. Be encouraged: Effective change can be made through staying engaged in your personal equity journey. Across our region we have much work ahead at the institutional level, and even more courage is required for hard work at the interpersonal level.

In stepping aside you create an opportunity for a member of a marginalized community who may be your colleague, fellow board member or staff member to access power that you have held.

White people alone will not provide all of the solutions to fix institutional systems of oppression and to shift organizational culture from exclusion to inclusion. These solutions must come from those whose voices have not been heard. Your participation is integral to evolving systems and organizations and carrying out change, but your leadership as a White person in the change process is not.

The best investment we can make for marginalized communities is to actively create and hold space for leaders of color at every level from executives to interns. Invest time and energy into continuous self-reflection and selfevaluation. This is not the path for everyone, but I hope you can see that there are a variety of actions that can shift the paradigm of the environmental movement. If you find yourself unsure of what action steps best align with where you or your organization are at on your equity journey, then reach out to organizations led by people of color, consultants, and leaders and hire them for their leadership and expertise. By placing yourself in the passenger seat, with a person of color as the driver, you can identify areas to leverage your privilege to benefit marginalized communities.

Finally, share an act of gratitude. Be cognizant of opportunities to step back and step aside and actively pursue ways to listen, understand and practice empathy with your colleagues, community members, neighbors and friends.

Camp ELSO is an example of the outcomes of this advice. Our achievements are most notable because it is within the context of an organization led 100 percent by people of color from our Board of Directors to our seasonal staff. This in the context of a city and state with a history of racial oppression and in a field that is historically exclusively White.

We began as a community-supported project and are growing into a thriving community-based organization successfully providing a vital service for Black and Brown youths across the Portland metro area. The support we have received has crossed cultures, bridged the racial divide and united partners around our vision. It is built from the financial investments of allies – public agencies, foundations, corporations and individuals. I see this as an act of solidarity with our work and our mission, and more importantly, an act of solidarity and support for our unwavering commitment to racial equity.

Sprinavasa Brown is the co-founder and executive director of Camp ELSO. She also serves on Metro’s Public Engagement Review Committee and the Parks and Nature Equity Advisory Committee.
by Shea Scribner

Signals of the shifting seasonal cycle are all around us. Children are especially keen to notice and appreciate the changing colors of leaves, frantic activities of squirrels, and blossoms slowly turning to fruits on apple trees, but how often do they really get to explore these wonders of nature at the place most specifically designed for learning—their school? With so many subjects to teach and standards to meet, how can teachers follow their students’ passions and incorporate environmental education into their curricula? With an entire class of kids but only one or two teachers to supervise, is venturing outside the classroom a safe and productive use of precious class time?

Beginning in 2016, with funding from an Environmental Protection Agency grant (EPA grant #01J26201), Oxbow Farm & Conservation Center’s team of Farmer Educators and Frank Wagner Elementary School’s Kindergarten teachers dug into these questions to co-develop and teach monthly environmental education lessons in the classroom, around the schoolyard, and on the farm. Through intentional relationship-building meetings and workshops with the teachers, we worked to better understand the specific needs and opportunities we could address through the new partnership between our nonprofit organization and their public school. We found that by following the natural curiosities kids have about the world outside their classroom window, we could address curricular and behavioral challenges and build programs that both captivated the student’s attention and nurtured their enthusiasm for learning. The early learner-focused lesson plans and activities, best practices, and key lessons learned from the project now populate an online compendium on the Oxbow website. We seek to share our story with other formal and informal educators who are working to address similar challenges, and spark ideas for how to incorporate seasonal, developmentally appropriate, place-based environmental education into their practice.

The “Earth Connections: Science Through the Seasons” compendium takes the form of a beautiful tree, a fitting metaphor for a natural system where all parts contribute to the tree’s wholeness and growth to reach its full potential. The roots and trunk serve as the main base of support for plants, representing the foundation and core of our growing partnership with the school. Take a peek into the planning process involved in this project, other organizations we partnered with, academic literature which informed our lessons and methods, and best practices for working with students and fellow educators. The branches growing from the sturdy trunk are specific place-based and Next Generation Science Standard (NGSS)-supportive lesson plans, suggested activities, and short videos recorded by the Oxbow educators, linking learning themes throughout the three seasons of the public-school year: fall, winter, and spring. 

Kindergarten students admire a sunflower held by an Oxbow Farmer Educator while snacking on carrots during their fall field trip. Photo credit: 2016 Jess Eskelsen
the overall goals of connecting lessons to the students’ specific environment and building skills of science investigation and inquiry, each experience was additive and built upon to together tackle the NGSS of K-LS1-1: “Use observations to describe patterns of what plants and animals need to survive.”

Much like our tree changed through the seasons, the students involved in the journey with us sprouted, grew, and transitioned throughout the school year. We invite you to channel the mind of a child as we guide you through the journey of a Frank Wagner Kindergartener experiencing outdoor EE with Oxbow and their teachers.

**Fall:**

Throughout this season, the remaining produce is plucked from Oxbow’s farm fields and pumpkins begin to turn from shiny orange to fuzzy black goo. As vibrant native trees and shrubs drop their leaves, humans and critters alike stash away the remaining treats of the season and work to prepare their homes for the cold, dark winter ahead. So too, young people across the region pack their backpacks full of snacks and supplies, bundle up in rain gear, and transition from summer beaches and sunlit backyards into the warm halls of their school every fall.

For some kindergarteners at Frank Wagner—a Title 1 school where many did not have the opportunity to attend preschool—the first time they transition into the fall season in the classroom can be understandably scary. The students are navigating a whole new environment, different schedule, and unfamiliar social expectations, all without the support of the primary caregivers whom they’ve relied on for so many seasons prior. Teachers are faced with the exceptional task of setting routines, helping every student feel safe, and helping students understand their role in their new classroom community. We found that many of the challenges of the early school year can be addressed through activities and practices that focus on building trust, sharing personal stories, and setting expectations for the new relationships students will build with teachers and one another.

Oxbow Educators visited the classrooms in the fall and collaborated with the students to construct a “CommuniTree” contract. Together, we used the structures of an apple tree to guide discussion of what sweet “fruits” both students and teachers hope to reap from their experience at school and on the farm, which “beehaviors” will help those fruits mature, and what obstacles to learning might be acting as big “rocks” in the soil, keeping the class’ roots from growing strong. We then began exploring the concept that learning can happen both in the classroom and outdoors through the Inside-Outside sorting activity. Students were given opportunities to express their own understandings of food and nature through prompted drawings, which we used as a baseline for assessing student growth throughout the school year. The Kindergarteners also came out to Oxbow for a Fall Farm Adventure, an introduction to how food grows and the many plants and animals that call a farm home, stoking their curiosity and excitement about the ongoing Farmer visits throughout the year. The fall season also included an introduction to the concept of “habitat,” a recurring and kindergarten-friendly theme that connected student learning about plant and animal needs throughout the rest of the year.

**Winter:**

For most of us on the west side of the Cascades, winter is cold, dark, and most of all, WET. Farm fields throughout the Snoqualmie River Valley rest quietly under risk of flood while puddles grow into lakes in school parking lots. Rain has shaped the landscape for thousands of years and water continues to connect rural farmland with urban neighborhoods. Dormant plants focus on underground root growth, and many animals must also conserve energy by hibernating or digging deep into warm piles of decomposing fall leaves to survive frosty temperatures.

Building on the relationships forged through the fall, winter was a time to begin channeling students’ excitement toward specific learning targets, helping them dig deeper into their wonderments and explore the systems connecting us to one another, and the greater planet we’re all a part of. With now-established routines and a classroom culture helping kids adhere to behavior expectations, students were ready to build on the basics and learn how to ask specific questions, make and share their observations, and consider new concepts. The weather during the winter months kept most of our lessons indoors, but certainly didn’t keep the kids from hands-on learning opportunities and ongoing nature connections!

Since things are a bit too muddy at Oxbow in the winter, we brought the farm into the classroom in the form of real live

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wiggling worms, giving students a chance to gently interact with the creatures as they sorted through the contents of their habitat during the Soil Sorting activity. Students also identified what components serve as food and shelter for the decomposers to come up with a definition of what “soil is” and then used their observations to design and build a small composting chamber for the classroom. The teachers took this introductory lesson and built on it throughout the winter to address other parts of their curricula and learning targets: helping their students develop fine motor skills by cutting pictures out of seed catalogues and newspaper ads, then sorting the foods into those which worms can eat and those they cannot, and finally gluing their colorful collages onto posters and practicing writing the names of the foods in both English and Spanish. Further exploring habitats and plant and animal needs, we followed student curiosity into the schoolyard to investigate if the schoolyard is a healthy habitat for squirrels and learned how Squirrels and Trees help meet each other’s needs.

The Snoqualmie River flowing past Oxbow joins with the Skykomish River right near Frank Wagner to form the Snohomish River, a perfect natural connection to frame an investigation! As winter transitioned into (a still wet) spring, a Watersheds lesson helped to reinforce the link between farm and school, giving students a chance to work with maps of the actual landscape to trace the route of a raindrop as it would flow down from mountaintops and through interconnected rivers, and illustrate many human and natural features that use and depend on this water.

**Spring:**

With the warmer weather, students were able to spend more time outdoors exploring nature around the schoolyard and came back out to Oxbow to see how the big pumpkins they harvested back in the fall get their start as tiny seeds in the cozy greenhouse. With spring’s official arrival, the time had come for all that fall fertilizing and deep-winter pondering to transition into a growing, independent entity—be it a seedling or an excited student!

Springtime is a season full of vigorous growth and the kindergarteners were practically bursting to share with us all they’d been learning about through the winter. The students were ready to dynamically explore and understand the many connections between their lives, the farmers, and the plants and animals they saw popping up from the warming soils. Lessons in the springtime harnessed this energy by playing active games during multiple field trips to the farm and further investigating the nature around the schoolyard, all with a focus on connecting students more intimately with their sense of place.

Through an early spring field trip focused on Animals in the Water, students participated in a macroinvertebrate study, closely examining the “little bugs” that rely on cool, toxin-free water in the oxbow lake, and played games embodying the flow of nutrients through the freshwater food web these bugs are an integral part of. Their Spring Farm Adventure field trip and Orchard Stations had a focus on lifecycles and natural processes they could observe firsthand: how the buds on the orchard trees would soon (with a little help from the farmers, sunny and wet weather, and pollinators) become summer’s sweet fruits, and how the growing season for most food crops in this region is really just beginning as their school year comes to an end. As an end-line assessment of the student’s change in environmental understanding, we asked the students to again “draw a picture of nature” and were impressed to see the concepts of life cycles, interdependence of organisms, habitat needs, and where food comes from recalled and illustrated so eagerly by the students.

**Our Tree**

Behind every future environmental steward there is a spark of wonder which must be fanned to a flame, often with the support of dedicated educators and an array of tried and tested strategies. The foundation of the tree includes a selection of Best Practices, which are continually growing. These ideas and strategies are intended to prepare students for outdoor science learning and provide teachers with the tools and skills to feel confident teaching in the outdoors.

Of course, none of the curricular branches would be strong without the solid structure of the trunk and roots. Building strong relationships with the teachers, school district, and other nonprofit partners throughout the project was integral to understanding the specific needs of the kindergarten classes and how informal educators can best support their in-class learning. We look forward to continuing to work with the students through this spring and beyond as we help build a school garden on their campus, giving students of every grade more opportunities to discover the magic of growing plants, harvesting food, and caring for worms and native wildlife. Our Earth Connections compendium will continue to be populated with additional resources and we hope to hear from educators like you about how you’ve used the materials, your recommendations for improvement, or ideas for expansion!

We are thrilled to share the fruits of this partnership with fellow educators and hope you find inspiration to continue exploring and learning from nature, both inside the classroom and around the schoolyard, maybe even taking a field trip to a local farm or community garden! You can learn more about Oxbow Farm & Conservation Center at www.oxbow.org.

Shea Scribner is an Environmental Education Specialist and Summer Camp Director at Oxbow Farm & Conservation Center in Carnation, WA.
Embracing the Unfamiliar Through Adventurous Eating with an Equity Lens

By Caroline Bargo

As I began exploring the IslandWood campus in August it became abundantly clear that the garden would be one of my favorite places here on the 255-acres available to us to teach. As a graduate student at IslandWood’s Education for Environment and Community program I act as field instructor to groups of students that visit during the School Overnight Program. Although I knew I loved the garden, I fall more deeply in love each week when I am teaching in it and surrounded by delighted children. Sometimes these students are familiar with garden classrooms, and sometimes this is their first exposure to one. Some students come in having tried all sorts of obscure veggies, and some are still skeptical. Regardless of student’s comfort levels walking into the space, it is my goal that each student who visits feels a connection to the soil, decomposers, fruits, veggies and herbs that are growing in the garden.

This year, I have been focused on stewarding my students through exciting and sometimes scary activities. We have climbed a ten-story canopy tower, crossed a suspension bridge and hiked through the forest in the dark of night. I realized after a while, though, that these adventures weren’t replicable in everyday life. One thing that students can do to push their boundaries is to try foods that aren’t familiar to them. Here at IslandWood we have the capacity to grow a unique variety of fruits and veggies, and students are often motivated to try them in the jovial team atmosphere that we foster.

Many Histories & a Delicious Meal

During my first week teaching at the IslandWood School Overnight Program I decided to give my students a feeling of place on Bainbridge Island in both in location and in time. We went through a lesson called “Histories Mysteries,” which places students at IslandWood and poses the question, “What happened here on Bainbridge Island before our field group got here?” We traveled up and down the IslandWood campus, visiting a relief map of the area, the harbor where an old mill boomed during the early 1900’s logging era, and a cemetery where generations of Islanders are interred.

We specifically took interest in the idea of the multiple histories that call the island home; we examined those of the Suquamish tribe who inhabit the land, the multitude of immigrant groups who made their home near the mill, the Japanese-American farmers who lovingly tended the land until their Internment, those who stewarded the land until their return and still today. After our initial day of trekking through history, we came back and watched a video of what the Island’s population looked like and how it has changed over the last hundred years.

The next day we visited the IslandWood garden and participated in a Soil to Snack lesson in which Chef Garreth from the IslandWood kitchen led the group in creating a meal to share. In the spirit of celebrating the history of Bainbridge Island we decided to make veggie sushi, sourced almost entirely from garden vegetables and herbs. Students cooked rice, chopped vegetables, handcrafted wasabi with horseradish grown in the garden. (continued on next page)
garden, rolled their sushi out on their own and washed the meal down with IslandWood grown herbal tea. As we sat down to our meal, I asked the students to share the significance of the meal. They were eager to share with our chef what it meant to eat sushi on this land. Several students connected the fact that Japanese Americans tended this land until their forcible removal in 1942 and upon their return in 1945.

I aimed to incorporate culturally responsive teaching methods into this activity by having students investigate the people that call Bainbridge Island home, the history of their relationships with the land, and partake in appreciating a recipe from just one of those many cultures. The sharing of stories of our own favorite meals from our communities added yet another layer of responsiveness. I was pleased to learn that many of my students had never eaten sushi, much less made it with their own hands.

From Seed to Cookie

Even a familiar delicacy can be made with adventurous ingredients, making it an entirely new experience. My second week of teaching at IslandWood’s SOP I decided to introduce producers and consumers in a unique way. First, we started sorting quinoa grown in the garden, separating seed from hull. This provided a tactile activity for students to absorb themselves in. During the activity, we discussed the origins of the quinoa plant; it grows high in the Andes mountains, has huge cultural significance for many indigenous people in the area, and is often called the “mother of all grains.” Afterward, we ate a chocolate chip cookie made with the beloved grain.

As students enjoyed their cookies, we brainstormed what ingredients went into making them. Students shared experiences of making cookies with family members, and they certainly came in with plenty to share. I was so impressed as my students rattled off all of the different ways they had made cookies in the past. I aimed to engage in culturally responsive teaching methods by sharing the story of quinoa’s importance to Andean culture and asking students to share stories of their own cookie making. This quarter one of my goals has been to consider students lived experiences when using a tool some would think of as a “common” recipe, like a cookie. Students were able to share variations of recipes that were particular to their families and cultures. We listed ingredients on a whiteboard, and when we felt satisfied that we had all of our them down, we divided ingredients into categories that the students designed. One category was plants and the other animal. We talked about where the ingredients come from, how they grow and how they are eaten by creatures to make a new product. We decided that many of our ingredients like the quinoa, sugar and vanilla came from plants. Eggs, milk and butter came from animals that had to eat plants to get their energy; they couldn’t make any of their own. This nicely scaffolded the idea of producers and consumers, and how energy comes initially from the sun and is translated into usable form for life by plants. Students left with an understanding of the beginnings of the cookies they were eating, and of the food they will encounter in the future.

Students Deserve Healthy Food

Students who visit IslandWood may not have the opportunity to try new foods often. A recent study by the U.S. Department of Agriculture found that, “23.5 million people lack access to a supermarket within a mile of their home.”(Treuhaft & Karpyn, 2010). A similar study done in multiple states found that low-income census tracts had half as many supermarkets as wealthy tracts, and another found that eight percent of African Americans live in a tract with a supermarket, compared to 31 percent of whites. (Treuhaft & Karpyn, 2010). By design, IslandWood attracts quite a diverse set of students, and while some certainly have access to supermarkets within walking distance of home, many do not. These areas in which no accessible grocery store is available are called “food deserts.” According to Teaching Tolerance, a program of the Southern Poverty Law Center, because access is limited, residents of food deserts may rely more heavily on
convenience stores and fast food restaurants. In general, these convenient places to get a quick meal don’t offer the variety of fresh fruits, vegetables, dairy products, whole grains and lean meats that make up a balanced diet. (Teaching Tolerance, n.d.). Students may not be presented with options in their everyday lives, but we can use our resources here at IslandWood to expose them to the idea of choice when it comes to food. When we show them that apples are delicious right off the tree, that flowers can be edible, and that sushi isn’t just something that people eat in movies we give students agency to make those choices when the circumstance arises.

“A 2017 evaluation of FoodCorps conducted by the Tisch Center for Food, Education, and Policy at Teachers College, Columbia University found that in schools that provide frequent, high-quality opportunities for hands-on nutrition learning, students eat up to three times more fruits and vegetables at school lunch — regardless of whether or not that food was grown in the garden.” (Shafer, 2018). Dinner at IslandWood is always vegetarian; meals are packed full of greens, whole grains and plant-based proteins. Not all of the ingredients come from the garden here at IslandWood, but many are sourced from local farms. Again the idea of recency prevails. As researched by the Tisch Center for Food, Education and Policy - when students have an opportunity to see where food is grown and understand the energy transfer through the sun to their bodies they are more likely to try new foods when presented with them. (Shafer, 2018).

**Brain Food**

The effect of adding a new food to a student’s repertoire may foster neural plasticity, or the ability to create new connections between neurons in the brain. These new connections are useful to all types of learning, not just about food and not just environmental education. In a study conducted by London’s Global University, participants were asked to study and recall both new and old information. Subjects were far more capable of recalling new information than the old, which was a surprise to researchers. The study concludes with a quote from Dr. Düzel, “When we see something new, we see it has a potential for rewarding us in some way. This potential that lies in new things motivates us to explore our environment for rewards... For this reason, only completely new objects activate the midbrain area and increase our levels of dopamine.” (“Novelty aids learning,” 2006). This research begs implementation with new foods. If students are exposed to new foods, their brains are quite literally open to new possibilities; we can not only use these new neural connections to show them that foods can be exciting, but to incorporate other concepts of science.

**Taking Adventure Home**

Students may not be presented with many opportunities to choose their own foods. In a world where many students eat two to three meals at school each day, the idea of food choice may not be a reality. I would argue that situations such as this are the best time in which to incorporate adventurous eating like we do at IslandWood. Students who have tasted the variety of produce available here at IslandWood leave our campus feeling empowered to try new things, and to advocate for their incorporation into their everyday school meals. Trying these new foods can trigger our learner’s brains to be more receptive to new ideas and use those same adventure muscles as climbing the canopy tower or crossing the suspension bridge.

REFERENCE:


If you are like most Northwesterners, you may know little about Hanford.

Your students probably know even less!
Hanford played an important role in developing STEM fields, from WWII through today. It contributes significantly to Washington’s economy. It is home to some of the last remaining shrub steppe habitat in the state. Whether you teach Social Studies or Environmental Science, the subject of Hanford - the WWII and Cold War plutonium production site in south-central Washington - is ripe for exploration. Primary documents, ranging from newspaper articles to oral histories, are abundant. For high school ELA teachers, comparing information put out by the Department of Energy or regulators with that put out by environmental watchdog organizations, or comparing local news with Seattle news, would be excellent exercises for discussions about rhetoric.

Hanford’s historical importance

Col. Franklin T. Mathias surveyed the area in 1942, looking for a remote location with few people, plenty of water, reliable electricity, and access to rail. Once he deemed it perfect, the war department issued letters giving families in the tiny towns of Richland, Hanford and White Bluffs 30 days to vacate their farms and businesses. Native Americans, who have used the Mid-Columbia for 10,000 years, no longer allowed access to traditional hunting, fishing and gathering places. The top-secret Manhattan Project initially acquired more than 600 square miles on both sides of the Columbia River to ensure a wide security barrier.

People came from across the country, lured to jobs that would help the war effort. Manual laborers, secretaries, cooks, physicists, chemists, and engineers flooded the region to work. At peak employment, about 45,000 workers were there. But what were they working on?

Only a handful knew the secret.

The project was so secret husbands and wives were not even supposed to speak to each other about their job! Despite the fact that only about 5 percent of workers knew the end goal, the first large-scale nuclear reactor, the B Reactor, was finished in only 13 months! Hanford created plutonium by running irradiated fuel rods from B Reactor through various chemical processes. That plutonium became the fuel used in the Trinity test, and the bomb dropped on Nagasaki.

After WWII ended, the U.S. entered the Cold War and continued producing nuclear fuel for our weapons arsenal. During the 50 years of production, various processing systems dumped or spilled billions of gallons of contaminated groundwater to the soil. Boxes and barrels of liquid and solid waste, both chemically and radioactive contaminated, ended up in unlined landfills. The worst waste was stored in huge underground tanks.

Plutonium production saw its peak during the Reagan administration as the U.S. took on a policy of “peace through strength.” In 1986, a safety auditor named Casey Ruud blew the whistle on safety violations and other activities at Hanford that threatened the environment. His congressional testimony ended plutonium production at Hanford.

Environmental cleanup

Since 1990, Hanford has been in cleanup mode under a document called the Tri-Party Agreement (TPA), which sets milestones for cleanup activities. The U.S. Dept. of Energy (Energy) as Hanford’s owner/operator hires contractors who perform work under the regulatory guidance of the US Environmental Protection Agency, and the State of Washington Department of Ecology. Cleanup must follow state and federal regulations and be protective of human health and the environment. Many decisions require the opportunity for public input, students could attend meetings in your region, or comment on proposed changes in how cleanup is done.

Various contractors hired by Energy have dug up old landfills, putting contaminated soil and materials in storage containers and moving them to a modern clean landfill. They’ve also built pump and treat plants to clean up the groundwater.

Remarkably, only about 10 percent of Hanford has contamination or human activity. As such, undisturbed shrub steppe habitat remains and supports healthy wildlife populations, including elk, bats, badgers, and many others. The 52-mile
Hanford Reach has the healthiest Chinook salmon run in the Columbia River system. Since 2001 Hanford’s footprint has been shrinking as land it turned over to other agencies. Oversight of the Hanford Reach National Monument and Arid Lands Ecology Reserve changed hands from Energy to the U.S. Fish and Wildlife Service. Though much of the cleanup is completed, many questions remain about what will become of the site in the future. Cleanup will continue for at least another 40 years, providing your students the opportunity to work there. We will need people with STEM skills such as chemists, hydrogeologists, and engineers, as well as skilled laborers such as welders and electricians well into the future.

The Department of Ecology Nuclear Waste Program is working to develop a graphic novella exploring Hanford’s unique history Manhattan Project to today. Our hope is to have it available online with links to primary source materials. In the meantime, if you would like a guest speaker, or help finding additional teaching materials please contact us at Hanford@ecy.wa.gov.

**Suggested Classroom Activities**

**Elementary & MS Science**

Only about 56 square miles of the surface area at Hanford has human activity or remaining contamination. Much of the rest provides habitat for a diverse array of flora and fauna. This remaining piece of shrub steppe habitat also is home to a large elk herd. Fall Chinook spawn in the Hanford Reach of the Columbia. Some plants and insects are unique to Hanford.

- Using the National Wildlife Federation lesson plan Habitat for Sale, select a shrub steppe creature (good list USFWS Hanford Reach) and write a ‘real estate’ ad. (Search the National Wildlife Federation for ‘habitat for sale’ then visit the US Fish and Wildlife Service site to pick a creature that lives at Hanford. Have students write a ‘real estate’ ad.)
  
  ESS3.C Human impacts on Earth systems

**MS Social Studies**

- Washington OSPI has a new Office of Native Education. Among the tribal sovereignty middle school curriculum links there is a unit on Hanford developed by Jerry Price of Yelm Community Schools. (Visit www.indian-ed.org and search MS curriculum, WA New Technologies and Industries)

**MS ELA**

Visit Daughters of Hanford and Voices of the Manhattan Project websites. Choose stories of (at least) two women involved in, or affected by Hanford’s early years or current cleanup. They may be from the same time period, or different periods of the Hanford experience. Examining primary documents (oral histories, texts):

- Describe how a text presents information (e.g., sequentially, comparatively, and causally). CCSS.ELA-Literacy. RH.6-8.5

- Identify aspects of a text that reveal an author’s point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts). E.g. are they pleased, disappointed, proud, frustrated, or fearful? CCSS.ELA-Literacy. RH.6-8.6

- Distinguish among fact, opinion, and reasoned judgment in a text. CCSS.ELA-Literacy. RH.6-8.8

**HS ELA**

Beginning in December 2017 and continuing into 2018, there were several releases of radiation during demolition of the Plutonium Finishing Plant at Hanford. Descriptions of what happened vary widely. Students are asked to review official documents and media reports and analyze the contents looking for bias, facts, and their ability to understand the technical issues.

- Compare and contrast a major newspaper (Seattle or Los Angeles Times, Portland Oregonian) and Tri-City Herald newspaper articles on a recent incident at Hanford. Then compare the newspaper descriptions to the reports on social media by the non-profit group Hanford Challenge, as well as the Department of Ecology (ecology.wa.gov/hanford) and the US Dept. of Energy (Hanford.gov).

**Suggested events to search:**


CCSSELA-LITERACY.RST.9-10-9

CCSSELA-LITERACY.RST.9-10-2

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Ginger Wireman is Communications and Public Engagement Specialist with the Washington Department of Ecology.
Making Science Engaging at Camp

Connecting art and science helps students find STEM classes more engaging and enjoyable

By Elli Korthuis

4-H is a youth development organization that focuses on helping members, ages 5-19 years, grow as individuals through their mastery of their passions, referred to as their spark. The more traditional 4-H program offers clubs in projects such as sewing, presentations, and livestock. However, 4-H reaches a broader audience through its non-traditional programs including camp and in-school instruction.

We attempt to offer a broad range of classes at our 4-H camps including those in STEM (science, technology, engineering, mathematics). One of the reoccurring themes we see in 4-H camp evaluations is that the science classes are “boring” while the craft classes have remained highly popular. With the growing need for STEM education, we needed to find a way to make these classes more engaging and enjoyable for the youth.

Over 2017, my colleague, Robin Galloway, and I developed a camp class to teach aquatic science, microscope skills, and basic nature terminology. To engage the youth in the STEM themed class, we incorporated art lessons since this was where their interest resided according to past evaluations. It was initially to be taught at the Oregon 4-H Center in Salem for campers in grades 4 – 8 along with their camp counselors. The facility is in a forested region with camp cabins, several buildings for lessons, and a pond.

During the class, we started indoors with a discussion of what organisms and materials could be found in the pond. I opened by asking which youth would want to drink the water from the pond. To my surprise, nearly half the class agreed that it would be safe to drink the unfiltered pond water. Several more said they wouldn’t because it was “gross” but didn’t have an explanation for their answer. We talked about the flora and fauna that may leave their traces in the water all the way down to potential microscopic organisms. Terms were explained along the way but there was nearly always at least one youth that could define a scientific term for the class. It was also an opportunity to gauge how in depth their knowledge was of water particles from different sources.

After our discussion, we went as a group to the pond and they could compare their discussion to what they were seeing. We got a bucket of pond water for a water sample and the youth had the chance to identify some of the particulates. Clipboards with water color paper and a pencil were given to each youth and they were asked to draw the macroscopic world they were seeing on the top half of their paper. The drawing time gave us the opportunity to delve into how some of the organisms present could affect us if we drank the water and what other organisms and materials may be present at different sources such as the ocean, a river, or a swimming pool.

The class finished their drawings and we took our supplies and the water sample inside. I put a drop of the water sample on a microscope slide, making sure to include the particulates that had filtered to the bottom of the bucket. We had brought a digital microscope that included a small LCD screen to view the slide. In a larger group setting, this microscope could have been attached to a projector to show a greater audience. With our water sample under the microscope lens, we identified the materials and organisms. One of the highlights was when we found a mosquito larva and were able to use the highest magnification to view the blood platelets flowing through its open circulatory system. It wasn’t an original part of the lesson but an added bonus. Although some youth were disgusted by what they saw, the majority were fascinated and wanted to continue in the discoveries. The class was then asked to draw the microscopic organisms and particulates they had seen on the bottom half of their paper. We wanted to encourage the scientific fascination so after a quick explanation of how to use a microscope, the youth were free to continue searching

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Making Science Engaging at Camp
(continued)

for other organisms if they wished to during the allotted drawing time. We also discussed how some of the organisms they had seen impact our health and environment.

Although many of the youth were comfortable drawing what they saw, there were a few in each class that didn’t feel confident in their drawing skills. We encouraged them in different ways including saying perfection was not the goal and joking that it could be called abstract instead. The time constraint also helped encourage the youth that weren’t as confident drawing because they understood high quality drawings could not be expected in the given time.

Water color pencils were distributed after the initial drawings were done so the campers could fill in the color. While they were coloring, I poured our water sample into several cups and passed them around with paint brushes. The youth then created the water color painting by brushing the water sample over the water color pencil areas. While painting, they remarked on how the particulates from the pond water changed both the texture and color of their painting. We talked about how the results would be different if they had used another water source and they were overflowing with ideas.

Their views on whether they were willing to drink the pond water were drastically different from when we started the class. Not one camper wanted to drink the water and many were quick to offer their explanations why.

We ended with a quick evaluation to gauge how their opinions about both art and science had changed after taking the class. Some of the highlights from the evaluation include:

- 71.11% agreed or strongly agreed science is not boring after taking this class.
- 76.09% agreed or strongly agreed they want to learn more about science as a result of this class.
- 63.64% agreed or strongly agreed they would do more art in their free time because of this class.

The evaluation method was also an experiment for our program. We were trying to encourage higher levels of participation since regular paper survey evaluations are turned down by a large percentage of attendees normally. Instead, we had larger flip chart papers with each evaluation question stuck to the wall with columns for strongly agree, agree, disagree, and strongly disagree. Each youth was given a set of numbered stickers to share their opinion. This made the evaluation more engaging while remaining anonymous and encouraged more honest opinions. It was an extremely successful evaluation method that I will continue to use in the future.

After successfully conducting the class with 4th to 8th grade youth, we decided to offer it at a day camp for youth ages 5-8. The concepts were simplified but the class was still a high level science lesson for youth in this age group. They still discussed what the water sample contained, defined terms such as microscopic and macroscopic, learned how to use a microscope, and exceeded our expectations for their ages. These youth were not formally evaluated but from my individual conversations and the group discussions, I observed that the youth were engaged and excited about the entire class.

Since conducting the classes, this concept has been taught at the American Camp Association (ACA) 2017 Oregon Trail Fall Education Event where camp staff and directors from Washington, Oregon, and Idaho all enthusiastically agreed that they would like to incorporate it in their own classes. It will also be taught at the Western Regional Leaders Forum held in San Diego, CA in March 2018.

I am excited to expand this lesson into several 4-H camp STEM classes in the future. I believe that bridging the gap between art and STEM has proven itself to be a sound method for teaching “boring” science concepts to campers in an innovative and engaging way.

Elli Korthius is a 4-H Youth Development Educator for Benton County, Oregon.
These students are checking out Blakely Harbor on Bainbridge Island, WA with sight, touch, hearing, and smell. Photo Credit: (Glassy, 2018)

Creating a space for all to engage with marine science

By Julia Glassy

I am currently a graduate student of University of Washington over on Bainbridge Island, WA at IslandWood, a non-profit outdoor education center. I am passionate about adventuring outdoors and marine science education. Interacting with the marine ecosystem allows people of all ages to explore a new ecosystem and grow an appreciation for all that ecosystem provides to the plants and animals who live there and for us, as humans.

What exactly is an adventure hike?

To some it may be walking somewhere with style or awe inspiring activities on the way to a location. While for others it may be getting in a car and driving to a location to check it out and explore. Lastly, an adventure hike could be riding a bus to go out and explore an outdoor space. To me, it is all of the above!

What might one do on adventure hike?

This all depends on the mode of transportation to a waterfront or shoreline and the age of the members going. Games you can play include wind storm (everyone needs to find a tree to hold onto or someone else if they are connected to a tree). Also flash flood (where everyone has to be on higher ground then the caller of the flood). Another game is “I-Spy” where you say “I spy with my little eye something that is blank” and you can fill in the blank. Talking as a group work too!

If in a car, then look out the window and take in the nature outside. Play a couple rounds of “I Spy” with all members in the car.

If on a bus, do what Ms. Frizzle does and make the adventure unique and exciting. Ms. Frizzle is a fictional charismatic 4th grade science teacher who takes her students on unique out-of-this-world field trips via her magic school bus.

Public transportation is an eco-friendly option to get to places that are a little farther away where walking is not an option. Also buses bring people together from all backgrounds, ages, cultures, and economic statuses. Taking a bus might not always be the most direct option, but it sure is the most fun as seen by Ms. Frizzle. It is okay to let the inner child out during these adventure hikes and explore in a new way. Aim for getting to the point of being comfortable with saying “We are on another one of Ms. Frizzle’s crazy class trips!” (Cole, 1995, p. 18). Take ownership over the adventure and be like Ms. Frizzle or like her students.

If visiting a shoreline is not feasible

Visiting your local aquarium:

They will have marine organisms that you can check out up close or hands-on. This hands-on experience is important for children of all ages in order to learn and understand similarities and differences among a variety of ecosystems.

Even if you do not have access locally to a marine or fresh water ecosystem that is okay! Books and films are good resources for learning more about an unfamiliar ecosystem. Reference books and documentaries can be purchased online or in store, but many of them can be checked out at your local library.

Getting more out of a visit to the shoreline

Get familiar with shore and ocean creatures and be a part of an investigation with children or adults you take to the harbor as an adventure hike or school field trip. Investigations do not follow the strict procedure of experiments, but instead are informal ways of wondering and discovering something. An investigation can be done in multiple ways, by taking in observations through sight, hearing, touch, or smell, and making guesses, and asking questions. Taking in observations through the different senses allows someone to become familiar with and gain a sense of place. With this new information, you can gain an appreciation for the place or item that was investigated.

Some books to refer to while familiarizing oneself with shore or ocean habitat depending on age are:

**Toddlers:**
On the Beach (Smith and Howell, 2003)

**Young Readers and Explorers:**
In One Tidepool: Crabs, Snails, and Salty Tails (Fredericks, 2002)
Magic School Bus On the Ocean Floor (Cole, 1995)
Ocean (MacQuitty, 2000)
Seashore (Parker, 2000)
Shoreline (Taylor, 1993)

**All Ages-Reference:**
Beachcombers Guide to Seashore Life in the Pacific Northwest (Sept, 1999)

Activities to do at a Harbor, Shoreline, or Beach

Free Exploration:

Free explorations are where someone takes a few minutes or longer of unstructured time to wander or explore a new space or ecosystem. This unstructured time can reduce all aged students’ distraction level and setup for other activities by allowing

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students to self-direct their investigations and learning. This is important because it allows students, children, and adults to build confidence, independence, and a greater understanding about the world around them.

**Crab-itat:**

Crab-itats are a fun, hands-on way to explore and learn the important components that crabs need to survive and thrive. One way to make a crab-itat is to use natural materials from the beach you are on to make a habitat for the crabs found there (IslandWood Education Wiki, 2018). The logistics of this project are up to the person making the habitat, and the habitat could take many forms, and be made with several different natural items. Young students and adults can try to add abiotic (non-living) and biotic (living) items to their habitat and then think and describe their reasoning behind the items they chose.

This process of thinking and then explaining the habitat they created allows for the connection to the survival needs of crabs. You can then relate this learning to any animal or plant in other ecosystems. Another important take away from this activity is for someone to gain a sense of place and appreciation for the beach environment. With this new appreciation the person will feel more inclined to take small steps or community action to help take care of the ecosystem so others can enjoy it too!

**Investigation:**

Step 1: Pick three different locations on the shoreline (ex: sand, rocks, and water’s edge).

Step 2: Make a table similar to this one:

<table>
<thead>
<tr>
<th>Different locations</th>
<th># of crabs found</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trial 1</td>
</tr>
<tr>
<td>Sand</td>
<td></td>
</tr>
<tr>
<td>Rocks</td>
<td></td>
</tr>
<tr>
<td>Water’s Edge</td>
<td></td>
</tr>
</tbody>
</table>

(Cunningham, 2017)

Step 3: Count the number of crabs at each location. The number of trials is up to you.

Step 4: Calculate average of each location, if you have more than one trial. The average will give an area that crabs are more likely to be, providing evidence for a potential claim. Through this investigation, you can gain knowledge of the preferred habitat of the crabs in your area, make observations, form claims with evidence, and be like a scientist. Investigations are important because you can make them relatable or personal to you and then gain skills that you can use at school, work, or other aspects of your life. You can also look for and investigate sea stars, sea anemones, or snails depending on your personal interests and the beach location near you.

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**Finding something new to learn more about:**

This is similar to free exploration, but instead each person or pair can find something they are interested in and use different tools to explore and learn about it. This includes using a Lummi Loupe (a domed magnifier), small containers, magnifying glasses, and/or reference books. For example, a group of fifth graders I was teaching were excited to go to Blakely Harbor on Bainbridge Island so I brought some small clear containers and some Lummi Loupes to the harbor. Some students were excited about barnacles so we picked up a rock with living, but closed up barnacles on it and put it in one of the containers with saltwater. While still at the beach we observed the barnacles in the container. Also the students used the Lummi Loupes to look at the barnacles up close. We then returned the rock to where we found it and put the saltwater back in Puget Sound. Using the different tools to learn something about the organisms through the use of the four senses (sight, smell, hear, and touch) and then referring to a guide to find out the name of the plant or animal allows for more comprehensive learning and understanding.

**Guidelines for Exploring At the Beach**

Gently roll a rock over to see what is underneath and then return to original state. The rock should be no bigger than the size of your head.

Be cautious of picking up animals higher than your knee (that is a long way to fall)

Have a blast exploring the beach and enjoy discovering and learning about something new.

Julia Glassy is a current graduate student of University of Washington over on Bainbridge Island, WA at IslandWood. In addition to taking classes, she teaches 3rd through 6th graders who come over to IslandWood from their schools in the greater Seattle and Bainbridge Island area for four days as a part of the School Overnight Program.
April is National Poetry Month. Can we celebrate it by using poetry to facilitate teaching science as inquiry? What does the flow of thoughts, images of relationships, grammar and syntax, in poetry have that would make it an effective element to use while engaging in the process of science inquiry? Is it possible? Let’s see.

So, what would it look like, engaging a science inquiry in a natural place with the tools of poetry? Might be interesting; might be a flop, depending on my own interest, familiarity, and confidence in science and in poetry. A natural concern, yes, but I do know that my students would become invested in their work when I decided to spring something unexpected on them. How would I go about this now?

One thing I’ve learned from looking for curricula outside my classroom—even in school parking lots—is that curricula of all kinds are actually there, embedded in the world. If you think about it, school is learning about the world outside the classroom. We just insulate our classrooms from the world, then teach about the world from within them. It takes dedicated work to make our curricula connect with the world it teaches about. The arts and humanities do open the mind to clear thinking and good work. We might consider using them more often to make those connections.

Which gets us back to poetry. We are human, all of us; we use the arts and humanities to communicate. Not just writers, artists, musicians, and actors, but suits running a powerpoint for other suits at a table, or a man with a cardboard sign saying, “stranded, anything helps.” Without that grounding, we might stumble through life; and, on a larger scale, lose sight of our on-going move toward a global civilization. We need the arts and humanities as much as we need science and technology.

Does poetry really relate to scientific inquiry in riparian areas?

How do I tell this need for the arts and humanities to a streambank? We can combine the streambank and the arts and humanities as we teach; the place and the tools. My own experience tells me that doing science with the assistance of the arts and humanities does work, does engage students in their studies, and does empower them as persons. When students draw what they observe on-site or at a lab bench, and condense each drawing to a word or phrase, use these to build an illustrated poem, write a story, or draw an accurate “photo” point then return in another season to re-draw and analyze it, they easily attain new concepts, and develop conceptual memories that remain with them. These memories tie the work to a personalized picture in their mind; the laying down

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Utilizing the Tools of Poetry for Science Inquiry

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of a conceptual memory. It is those kinetic, verbal, and visual records of what they experience which help build the strong conceptual memories that they will carry into their lives as something understood; just ‘common sense’.

Poetry, coupled with a drawing, can do this. Here’s a simple example of using the arts and humanities to help clarify conceptions in a stream study:

Students are studying a section of a side-channel of the stream, comparing it with the main channel. You have them start the project by observing a reach they choose along the stream. As they decide on their particular reach, they get to know it by observing things there that they think might play a role in maintaining the main and side channels as habitat. This helps them begin to develop an incipient concept of a riparian area as an integrated organization of collaborating entities.

As they work, you ask them to express what they have observed with an incipient poem about the things, themselves, and their place in the stream; how they think that these things help maintain the work of the stream, and the life it supports. This poem is a work in progress, so they’ll add elements to it as they encounter them; updating it as they discover and understand more. Once they are engaged, you ask them to draw a birds-eye-view map of their reach, from stream bank to stream bank. When this is done, you ask them to use their observations, work, and poem to date, to build a section at the end of their poem that ties the parts of the map together within a conceptual framework to express the life of this stream.

They, not you, pull the work they’ve done on-site, and express it as a conceptual schematum

When their work is done, you bundle up and return to the classroom to begin to pull meaning from the evidence and thoughts they have engaged. And, to present each group’s findings and products to the class. The final presentation begins with a seminar report from each group on their work, results, interpretations, and recommendations. This presentation will utilize students’ data, insights, map, and poem, in a way that works best for them. They may wish to keep the map projected on a screen for their entire presentation, with verses of their poem interspersed to the place where they will fit best, or make the most sense. Some groups may wish to include an artful representation of their map. Others may wish to complete their presentation with a performance of their poem. Others may do the same, but with their map, data, etc., included in the performance in spots where they work well. Your job will be to comment on what each presentation brings to the goals and outcomes you had planned to achieve. The first time through, this is an interesting experience, sometimes with a challenge or two. A perfect learning experience for any teacher! Take notes, and incipient preparations for the next time you do this.

By this time, your students should have reached a place where they own their work, and know it intimately enough to begin to intuitively make decisions about it on their own. After the presentations are completed, each group hangs or posts their map and poem in the classroom. The class can then discuss the information in their posted maps and poems, and in their data and analysis sheets, to come to some consensus about connections among the elements of the stream, its environment, and its channels.

Then, they discuss and comment upon a question posed at the beginning of this article: “Can we celebrate our work in the field and lab by using poetry to facilitate teaching science as inquiry? What does the flow of thoughts, images of relationships, grammar and syntax, in poetry have that would make it an effective element to use while engaging in the process of science inquiry?” They’ll be ready to provide specific examples to support their thinking about this. As they share their thoughts, observe carefully for evidence that they have assumed ownership of the work, involvement and investment in their shared learnings, and personal empowerment. When you see evidence of this, ask some questions about it. How did they feel? When did they know they were on a profitable trail? What most helped them get to where they are? And, what part did the poem play in their inquiry? Was it effective in helping you think about the work, relationships around the components of the system?

Something for you to do:

If you did try this in some form or another, and it worked somewhat, but needed tweaking or major surgery, write a blog about your experience and post it to clearingmagazine.org. Or, post it as a comment here, just below the end of this blog, and I’ll get back to you.

Jim Martin is a retired but still very active science educator who writes a regular blog on science and learning for CLEARING. You can find past entries at www.clearingmagazine.org.
The wild turkeys on my street don’t wear booties in the winter and the mouse in my house doesn’t wear bonnets from a closet! Should environmental education start with realism in the early years?

by Suzanne Major Ph.D.
Anthropology of Early Childhood Education

Books and movies have made animals, insects and plants so charming and sympathetic, and at times so frightfully magnificent and impressive. Can young children do without these entertaining animations and anthropomorphism, that is, making animals, insects and plants look and behave like humans? Do we dress them up, make them talk and have them drink tea from porcelain cups because we don’t know anything about them? Or do we think that young children can’t appreciate them for what they are? Young children across the world easily demonstrate that they are capable of perceiving, observing and remembering the descriptive elements belonging to an animal, a plant or insect. They can collect information and draw knowledge from it.

My friend Omar in Cairo, three years old, knows not to treat the wild dogs as pets if only, because they are infested with fleas. My neighbour Maddy learned at two-years-old not to bother the bees in the hive hanging from the apple tree. Jenny, in Moncton New Brunswick, four years old, can identify the leaves of poison ivy in the forest and knows to wear long pants to protect her legs when she goes for walks with her family. Children learn very early on what is dangerous or not, comestible or not, pleasant or disagreeable. They are also capable of attaching symbolic value to things. Children everywhere offer flowers to their mothers and grandmothers to express their feelings or to create a nice event! As you know, they learn using observation, imitation, repetition or as Piaget wrote “perception, assimilation and accommodation”. They also identify with the knowledge of others or the information offered by nature. They encode it just because others use it, or they happened to observe it. They sometimes need information quickly, so they identify with the information others have, to fill the gap until they can adapt or replace it with more personal information. Through a very individualistic process of thought creation they retain or ignore elements of information and knowledge. They set the ones they favour in memory and replay others in thought, all sorts of ways assessing what works or not.

Finding animals, insects, plants or things cute, vulnerable or charming stems from the capability of empathy which is more difficult to use for what is ugly, threatening or disgusting. This notion of finding things cute is a cultural one that is cultivated and exploited by stories, books, animations and movies. Empathy is used to ensure survival among our own and can be transferred to animals, insects and plants. But it also allows sentiments to emerge that can be directed, intentions that can be instructed and behaviours that can be modelled. It is often used because of marketing interests but it can also serve pedagogically to create empathy. “Charlotte, the spider” is a good example!

The question here is do we need to create stories to nurture environmental education with children? Are we trying to sell them nature? Do we need to manipulate them towards environmental education or can we let them acquire a more significant first-hand experience? Should we not have a more functional approach about how everything has a place and time and is part of a balance of all and everything in the universe? Should we not let nature imprint itself on children, so they can sense by themselves their place on earth? Is that not fascinating enough? Let’s take the booties and the bonnets off the turkeys and the mice on these pages to see where this can go! Pink and white mice are mammals of the order of Rodentia and the genus Mus,[1] Wikipedia tells us that they are climbers, jumpers and swimmers and have lots of energy. They use their tail for tripoding so they can observe, listen and feel their environment. They can sense surface and air movements with their whiskers and use pheromones for communication. It is difficult for them to survive away from human settlements and in our houses, they actually become domesticated! They eat plant matter or anything else they can get their paws on. They will even eat their own feces for nutrients produced by intestinal bacteria. They are great at reproducing. They have a 19 to 21 days gestation, have 3 to 14 pups and 5 to 10 litters a year and females are sexually mature at six weeks. Do the math! We like them outside in the fields and not in our houses. Where I live, coyotes can hear and smell them and eagerly feast on them. Small falcons and owls can see them easily and pick them up in a flash. Last summer was very warm and wet. The vegetation exploded as well as the mice population. As I walked in my garden, they would jump up right and left to move away from me.

What can we infer from this information for environmental education? Young children spontaneously sit on their legs, hold up their bent hands and wiggle their noses to imitate mice. By observing mice and comparing their bodies with them, young children can engage in an array of locomotive and motor activities. Experimenting with sensing surfaces and air movements with their skin and their hair they can discover how this gives them information and knowledge. They can explore and sense space with the whole body like the security of a small shelter and the unsettling feeling of wide-open spaces. Discovering smells and odours for two and three-year-olds can be a lot of fun and for older children, linking those to chemical reactions can awake them to science. Seeking the mice out in the fields can be very interesting as they make little tunnels that go everywhere under the snow and through the dried grass. Reflecting with young children over three years old on the mice population in relation to the weather and the consequences this brings is interesting because the phenomenon attracts coyotes near houses which creates a real threat to house pets and small farm animals.

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Wild turkeys...
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Let’s consider wild turkeys or Meleagris Gallopavo. Wikipedia informs us that the females are called hens and the males are known as toms. The males have huge tails they fan out to attract the females and impress the other males. They have up to 6,000 feathers and they can fly for 400 metres. To protect themselves from storms, they can roost up to 16 metres above ground in tall conifers. They gobble and emit a low-pitched drumming sound. If cornered, they can be aggressive towards humans. They are omnivores but prefer nuts, seeds and berries. They will eat amphibians, snakes and reptiles. Their babies are called pouls. The hens lay 10 to 14 eggs and incubate for 28 days and the little ones are ready to go 12 to 24 hours after hatching. They can fall prey to coyotes, grey wolves, lynxes and foxes.

The adults are around four feet tall and the big males can weigh some 37 pounds. I observe them regularly around my house. Hens flock together with the young ones, 12 or 14 together as they walk around the fields and woods. When they cross the road, one leads on and at least one or two stay behind to gather everyone. They are very attentive, looking right and left and right again. One might even stand guard in the middle of the street to make sure everyone has crossed. I am told they made a comeback in recent years as they had disappeared because of over hunting. At night in the summer, when there is a storm, we can hear them gobble after each clap of thunder.

What can we infer from this information for environmental education? It’s a magnificent bird when it struts around displaying its beautiful black tail, but I reckon a young child would be impressed even afraid if it came face to face with a tom or a hen on the street or in the back yard. It certainly offers the opportunity to acquire new vocabulary with the wattle or snood hanging from its beak, the caruncles pending from its neck, its hairless head crown and beard or beards on a single bird, the spurs on the back of its legs and the three long toes on its feet. Two and three- year-olds would delight in knowing by heart the body parts of the wild turkey and comparing it with the ones of a chicken. Young children would also be impressed to measure themselves against the life-size drawing of a male turkey. Three and four-year-olds could explore what low-pitch drumming sounds are and could discuss why the turkeys gobble after the clap of thunder and even do a little research. As an educator, I would not miss the chance to make a parallel between the turkeys looking right and left and right again before crossing the street and children attempting to do the same but unable to fly away from danger! Finally, with older children it would be interesting to place the mice, the turkeys and the coyotes in their environment and talk about the relation between them.

Nature provides real and fascinating animations all by herself and children can appreciate the reality of animals, insects and plants. All sorts of elements can create the desire for observation and exploration. Exploration calls on focus which brings attention to details which creates in turn the need for manipulation. Manipulation and/or representation will lead to curiosity for functions which is knowledge. Knowledge for young children establishes the feeling of competence. Competence cultivates initiatives and permits the experience of trials and successes. In turn, the need and the pleasure for demonstration can take place, then patience to practice, to persist and develop skills becomes a reality. Later, mastering will open the cognitive door to metaknowledge.

Observation, exploration, focus, manipulation, representation, curiosity, knowledge, competence, initiative, demonstration, patience, mastering, metaknowledge, is a pedagogical sequence that young children can start experiencing when they are just a few months old.

Suzanne Major is an anthropologist and early childhood educator. She received her Ph. D. in 2015, with mention of excellence, in Anthropology of Early Childhood Education from the University of Montreal, Quebec, Canada. She also has a master’s degree in Child Studies which was obtained in 2004 at Concordia University, in Montreal, Canada. She has worked 12 years as Director for the Early Childhood Studies Program of the University of Montreal’s Faculty of Permanent Education.
**E.E. Resource Guide**

*A selection of environmental education materials, resources and opportunities that you should know about*

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### Reaching Out to Latino Audiences

Educators are working to find ways to reach youth and adults in the U.S. from diverse backgrounds. Check out this program from Environment for the Americas, using an Outreach Toolkit and multilingual activities for teaching about birds.

[www.birdday.org/connectingcultures/connecting-cultures-study](http://www.birdday.org/connectingcultures/connecting-cultures-study)

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### Project Learning Tree Updated Curriculum

Since 1976, Project Learning Tree (PLT) has existed to use trees and forests to increase students’ understanding of the environment and actions they can take to conserve it. On their website, find links to how to become a GreenSchool and strategies to better teach STEM. Find free lessons and shop for curriculum guides. Three new curriculum guides are available: Grades K-2: Treemendous Science!, Grades 3-5: Energy in Ecosystems (a Learning ® Magazine 2019 Teachers’ ChoiceSM Award for the Classroom winner), and Grades 6-8: Carbon & Climate.

[www.plt.org](http://www.plt.org)

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### ShareOregon

People can discover Oregon locals’ favorite natural places to explore here as well as upcoming community events and activities. Individuals are invited to share and post opportunities here, too. Fly fishing classes, landscape design trainings, great places to kayak and volunteer opportunities are some other resources shared on this website.

[www.shareoregon.com](http://www.shareoregon.com)

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### BEETLES: Emerging Leaders 2019 Leadership Institute

The BEETLES Project at the Lawrence Hall of Science is now accepting applications to an Emerging Leaders cohort at the August 2019 Leadership Institute, seeking leaders who represent communities historically marginalized in environmental-related fields and who face systemic barriers to access the outdoors. Emerging Leaders will attend a BEETLES Leadership Institute alongside current organization leaders from EE and outdoor science organizations nationwide, all working to build individual and organizational capacity to increase diversity in leadership roles in the field of environmental education. BEETLES will offer Emerging Leaders a transportation stipend to attend the Institute and room and board during the Institute. BEETLES will also pay an honorarium to any Emerging Leaders who are not currently salaried at the time of the Institute.

[Learn more and apply: beetlesproject.org/emerging-leaders-program/](http://beetlesproject.org/emerging-leaders-program/)

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### Honoring Our Rivers Student Anthology

An ongoing project of Willamette Partnership, Honoring Our Rivers is an Oregon-based anthology of student writing and artwork that is uniquely focused on watersheds and works at the intersection of the arts, education, and the environment.

The 2018 Anthology is now available and can be downloaded from the website at www.honoringourrivers.org. This year’s Anthology includes a special tribute to Native American tribes of the Pacific Northwest.

[www.honoringourrivers.org](http://www.honoringourrivers.org)

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### Drawdown

Project Drawdown is a comprehensive plan to reverse global warming. Developed by a diverse group of researchers from around the world, it consists of 100 of the most substantive, existing solutions to address climate change. “Drawdown” is the point in time when the concentration of greenhouse gases in the Earth’s atmosphere begins to decline on a year-to-year basis. On the website, you can see a summary of the solutions (e.g., #1 Refrigerant Management, #2 Onshore Wind Turbines, etc.), order the book, and find current events disseminating the solutions. You can watch a quick 17 min. overview TED talk about Drawdown.

[www.drawdown.org](http://www.drawdown.org)

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### Living in Celilo

Living in Celilo is a curriculum mandated by the State of Washington and part of the state’s Since Time Immemorial curriculum. It aims to use the students’ imagination and creativity to facilitate personal investment in the history of Celilo Falls. It is a project-based curriculum with an integrated humanities curriculum including memoir and journal writing, art making, and reading historical first person narratives, historical essays and articles that illustrate different points of view.

Download the curriculum and learn more at [www.confluenceproject.org](http://www.confluenceproject.org).
Green Ninja

Green Ninja is a NGSS middle school science provider and is centered around a climate action superhero. Free videos are appropriate for students in grades 3-8. In one, “Dr. Burrito” explains the difference between weather and climate using the spiciness of burritos. In another video, Green Ninja, saves the “night” by helping a man shrink his carbon footprint.

In Green Ninja curriculum, each unit of instruction includes phenomena, hands-on activities and projects that allow students to use science and engineering to create their own environmental solutions.

The River Mile Network: Crayfish Study

The River Mile and partners are leading a crayfish study that will be taking place throughout the Pacific Northwest starting May 1. Crayfish are an important part of freshwater food webs, but invasive crayfish have become a problem. There is new and free curriculum as well as workshops coming up for educators.

The River Mile is managed by the National Park Service, Lake Roosevelt National Recreation Area’s Education Program and is a network of educators, students, resource managers, scientists and informal educators in the Columbia River Watershed sharing what they know and learn about the Columbia River Watershed.

therivermile.org

Blue Sky Funders Forum

The Blue Sky Funders Forum is a national hub that helps members learn, connect, and grow philanthropy that supports the many benefits of environmental literacy and a stronger connection to nature. The website includes a list of members and profiles. It also features case studies exploring innovative and effective collaborations between funders and the field. Research briefs are available too. Academic literature is summarized around environmental literacy and impacts on everything from youth development to education to health and wellness.

blueskyfundersforum.org

National Science Teachers Association (NSTA): Best STEM Books 2019

Every year NSTA appoints a judging panel that selects two annual lists of Best STEM Books. The list is chosen by volunteer educators, identified in cooperation with the Children’s Book Council. The books are intended to explore problems and possible solutions in the scientific world, and where applicable, in the lives of protagonists.

Books on the 2019 list include “The Brilliant Deep: Rebuilding the World’s Coral Reefs” about the innovative efforts of Ned Nedimyer and his environmental conservation and coral reef restoration project. “The Girl with a Mind for Math” examines sexism and racial inequality as it follows the story of Raye Montague, who decides to become an engineer and changes the way ships are designed. There are many other thought-provoking books listed.

static.nsta.org/pdfs/2019BestSTEMBooks.pdf

Increasing Inclusion in School Gardens

The garden education team at the School Garden Project of Lane County (Eugene, OR) set out on a mission to increase inclusion in school garden settings. With the financial support from the Coeta and Donald Barker Foundation, they met with local special education teachers, received training in inclusion practices and Universal Design, and worked collaboratively to re-think and revise teaching practices, curriculum, materials, and garden designs to help push the edges of school garden education. The resource packet is a compilation of the information learned through this 12-month project. This is a free resource and you are invited to read, download and share it within your community.

North American Association for Environmental Education (NAAEE): eeResearch

This database is a collaboration between NAAEE and the Children & Nature Network with support from the Pisces Foundation and ee360. It combines research for the field of environmental education and the movement to connect children and nature. There are multiple ways to search for articles, syntheses, and research summaries. One of the search options aligns with the same five broad search categories (education, conservation, health, social justice, human development) used by the funding community.

Research includes preschooler’s knowledge about environmental impact of various modes of transportation, cognitive restoration in children after exposure to nature, school green space’s impact on student academic performance and much more.

naaee.org/eepro/research/library

FREE DOWNLOAD:

Climate Choices EIF in the Classroom Middle School Teacher Guide

Environmental Issues Forums (EIF) is an NAAEE initiative designed to promote meaningful, productive deliberation about difficult issues that affect the environment and communities. This middle school level teacher’s guide provides an introduction to the EIF issue guide Climate Choices: How Should We Meet the Challenges of a Warming Planet? Using Climate Choices offers an opportunity for teachers and students to use a deliberative process to consider our climate choices. This resource provides background information on deliberation, how to use Climate Choices in the classroom, and material to help teachers moderate a forum with students. It also includes resources on teaching about climate change issues.

Marine Debris STEAMSS Curriculum

The Oregon Marine Debris STEAMSS curriculum was created by Oregon Coast STEM Hub partners in 2014 with funding support from the NOAA Marine Debris Program. Marine Debris is a complex, real-world problem which integrates the subject areas of Science, Technology, Engineering, Art, Math, and Social Studies (STEAMSS). The issue of marine debris is especially relevant to students living in coastal areas, and the topic offers opportunities for student data collection and stewardship actions at local field sites.

Visit the Marine Debris STEAMSS page at https://oregoncoaststem.oregonstate.edu/marine-debris-steamss

The Oregon Marine Debris STEAMSS curriculum is only one of several STEM lessons and activities shared by the Oregon Coast STEM Hub.

Educational Exploring Climate Science w/ VR

10 high school teachers from WA schools that are in comprehensive or multiple target schools, including 3 alternative school setting teachers, worked and learned for 3 days with 3 Climate Scientists and 2 Virtual Reality Scientists/Engineers to learn about what climate is, what causes changes in climate and then to begin the co-design process for a virtual reality climate simulation for use on Oculus Go devices.

Environmental Education Research Bulletin (EERB) Issue 10

The Environmental Education Research Bulletin is a collaborative project between Dr. Nicole Ardoin at Stanford University, ChangeScale, and the North American Association for Environmental Education (NAAEE). The research bulletins synthesize and summarize recently reported research from journals focused on issues pertaining to environmental educators. The bulletins include articles related to environmental education evaluation, sense of place, environmental behavior, teaching practices, and professional development, among other relevant topics.
EE Resources

Oregon State University
Extension Service

OSU Extension, 4-H Youth Development: Outdoor Science, Education, and Recreation

On this website, there are some 4-H Natural Science materials (Backyards & Beyond Neighborhood Nature Clubs Community Organizational Guide and Tool Kit) that give young scientists a place to record their observations about wildlife, soils, forests, habitats, marine/tidal areas, water, etc. There are also examples of outdoor school science curriculum and planning resources here developed by Outdoor School of Oregon. Modules include “The Carbon Cycle,” “A Web of Life,” “The Rock Cycle and the “Nitrogen Cycle,” and “The Water Cycle.”
https://extension.oregonstate.edu/4h/outdoor-science-education-recreation

Citizen Climate Lesson Plan: Grades 9-12

This thoughtful and thought-provoking curriculum provides a vast array of information, teaching activities, and resources for learning about and understanding the issues related to climate disruption.

Produced by the Will Steger Foundation, the curriculum is available for free download from http://www.gei.org.uk/Documents/Steger_Foundation.pdf

Phenology Walk and Trail Guide

The Phenology Walk and Trail Guide, developed by the USA National Phenology Network provides you with a step-by-step guide to creating a long-term Nature's Notebook Citizen and Professional Science Project, and resources for engaging your community in observing the seasonal and long term changes in plant and animal life cycle events. This resource include instructions on how to set up a monitoring location and how to partner with other organizations in your community working on similar programs. It also includes program planning resources and evaluation recommendations. As a supplement, the USA National Phenology Network offers a 10-week, 50 hour, online Local Phenology Leader Certification Program.

Climate Literacy and Energy Awareness Network (CLEAN)

A collection of 700+ free, ready-to-use learning resources rigorously reviewed by educators and scientists suitable for secondary through higher education classrooms.

Launched in 2010, CLEAN is led by science education experts at the Cooperative Institute for Research in Environmental Science (CIRES) at University of Colorado Boulder and the Science Education Resource Center (SERC) at Carleton College.

It includes high-quality, digital resources including learning activities, visualizations, videos and short demonstrations/experiments. It’s geared towards educators of students in secondary through undergraduate levels. It also has web pages designed to help educators be equipped to teach the big ideas in climate and energy science. There is space for a community of professionals committed to improve climate literacy as well.
cleanet.org/index.html

Knowing Home: Braiding Indigenous Science with Western Science

Knowing Home attempts to describe the creative vision of Indigenous scientific knowledge and technology that is derived from an ecology of a home place. The traditional wisdom component of Indigenous Science—the values and ways of decision-making—assists humans in their relationship with each other, the land and water, and all of creation. Knowing Home weaves Indigenous perspectives, worldviews, and wisdom practices into the science curriculum. It provides a window into the scientific knowledge and technological innovations of the Indigenous peoples of Northwestern North America, providing numerous examples and cases for developing science lessons and curricula. Knowing Home shows how Indigenous perspectives have the potential to give insight and guidance as we attempt to solve the complex environmental problems of the 21st century.

Knowing Home is available online or you can order a hard copy through the UVic Bookstore.

PDF versions are available at: https://dspace.library.uvic.ca:8443/handle/1828/7821

Honoring Tribal Legacies

The National Park Service and University of Oregon funded a diverse team of educators to design Honoring Tribal Legacies, seven model curricula available to educators so they can integrate Native American Tribal perspectives into curricula at all grade levels and in multiple subject areas. While not marine environmental education, the materials can serve as a design model for cross-curricular materials.

https://blogs.uoregon.edu/honoringtriballegacies/
EE Resource Review

Natural Curiosity 2nd Ed.: The Importance of Indigenous Perspectives in Children’s Environmental Inquiry

Review by Lyndsey McLellan

After immersing myself into outdoor-experiential learning for the last eight years, it was a pleasure to come across such a relevant and timely resource guide. Natural Curiosity 2nd Edition - A Resource Guide for Educators: The Importance of Indigenous Perspectives in Children’s Environmental Inquiry (Doug Anderson, Julie Comay, and Lorraine Chiarotto) provides educators with a pedagogical framework supported by lived examples from schools across Ontario. The Laboratory School, Dr. Eric Jackman Institute of Child Study, at University of Toronto has done an exceptional job embedding principles directly linked to practical examples. The branches that make up this resource focus on: Inquiry and Engagement, Experiential Learning, Integrated Learning, and Moving Toward Sustainability. Together they provide the stability for allowing the Indigenous perspectives to flow through the branches like sap flows through a tree. This sap is comprised of three main ingredients: Lighting the Fire: The Spirit of Learning, The Flow of Knowledge: Everything is Related, and Applied Learning through Reciprocity. By mixing these fundamental components within the branches, the guide addresses theoretical underpinnings alongside practical examples while maintaining a consistent Indigenous lens. It is exciting to see how my life’s work is aligning with a movement whereby educators are encouraged to consider the natural world and Indigenous perspectives within their practices.

This framework makes it a breeze to comprehend in a practical fashion with Part 2 focusing on the stories of educators as they find their own ways to connect to the natural world, while being informed by Indigenous perspectives throughout the process. Clarity is provided when acknowledging that “Indigenous perspectives cannot be deeply reflected in a written document or outside of their cultural context.” (P. 5) Yet what can be are “indications of how such perspectives can inform environmental inquiry.” (P. 5) For someone who has chosen to follow a career path in outdoor experiential learning, it is interesting to gain perspectives from educators who are in the traditional classroom setting. My educating philosophy has been grounded in sense of place and people directly linked to the natural world as the fundamental setting for this learning. It was interesting to learn about environmental inquiry that happens in ‘unnatural outdoor spaces’ alongside other experiences that immersed, or introduced, students into their natural world and communities. It was refreshing to read this resource and to note many of the practices that are outlined as being relevant to what we do at Shaw Woods Outdoor Education Centre.

These various avenues of environmental inquiry are supported through Indigenous perspectives in part when valued in accordance with ‘sense of place’, “this deepens as children visit and revisit places and experiences that have meaning in their everyday lives.” (P. 75) This concept is supported by Reggio Emilio educators who “take seriously the idea of the physical environment as a ‘third teacher’. (P. 26) It happens more often than not that teachers who explore inquiry-based learning find themselves visiting our outdoor education centre. Our next steps are to go back to the schools and to the educators that have been supporting us for the last seven years, and ask the participants what ‘impact’ their experiences at the Centre have had on them. This is important for me to evaluate when noting educators who say they need an entire year in order to have the child benefit from the inquiry-based process. This example is given when discussing the benefits of Knowledge Building Forums, when Robin Shaw, Lab School teacher notes “We are looking for things that grow over time. It takes a whole unit, or year, to form a profile for a particular child.” (P.38) So it is through the relationships between the educators, children, caregivers, community groups, partners, and outdoor education centre that help form a lived experiential, inquiry-based approach to learning. Considering the web that weaves through existence and purposefully threads experiences and lessons together, it is encouraging to think our children will stick to the path that is being created as we begin to, and continue to, implement these practices.

It is exciting to think that the experiences at the Centre, which have been tied to the curriculum since the inception of the family-based program studies, support sense of place alongside the fundamental learning and experiences that happen inside the classrooms and communities. These program families consist of four main arteries: aquatics, wildlife, forestry, and soils which are then accompanied by wilderness skills, specialized programs, and maple syrup production. Our partnerships with local Indigenous peoples, like-minded organizations, municipalities, county advisors, volunteers and our main school boards, offer the opportunity to co-create models that are based on landscape and wildlife, and supporting cultural practices that acknowledge our living world. As it is so eloquently...
said, “An Indigenous perspective conceives of place as a process, because it refers to what is happening in a place rather than the mere contents and location of a place. Place is a web of dependent interrelationships with everything in Creation, and it includes human responsibilities to care for those relationships, to maintain balance within the universe so we can survive, and to participate in the sacred processes of Creation.” (P. 85) I learn how to navigate this process by recognizing our success has been based on honouring and respecting individual needs; whether it be the child, educator, volunteer, or caregiver, this is possible when encouraging our differences and recognizing our common sustainable needs.

When we find joy and purpose in our life work as educators, we begin to recognize our unique abilities to create space that continuously nurtures our connection to place and peoples; this can be respectfully and authentically done by acknowledging all Indigenous communities and cultural practices that are intrinsically connected to each other in their respective place. This is critically important as we choose whether we are “raising nations of people who can work together and define how technology and resources are applied for common and deeply ethical purposes? Or, are we preparing our children to become increasingly atomistic, isolated, and defined by technology, anxiety, and money” (pg. 9) When reflecting on this question it is encouraging to note “The World Commission on Environment and Development, the United Nations Declaration on the Rights of Indigenous Peoples, and the Convention on Biological Diversity all recognize the significance of Indigenous knowledge to all peoples (McGregor, 2014) (pg. 6) This responsibility to protect biodiversity alongside cultural diversity in relation to place, requires the consideration of seven generations ahead and to respect those yet unborn by protecting what is required for them to live full lives in balance with nature. In order to respect this diversity in an ever-changing world, we must develop a culture of “Reciprocity and mutual respect [to] help sustain our survival. It is this kind of healing and survival that is needed in moving forward from the residential school experience.” Honouring the Truth, Reconciling for the Future: Summary of the Final Report of the Truth and Reconciliation Commission of Canada (pg. 9) It was a pleasure and honour to be chosen as one of the ten educators across the province to review this guide. I am humbled in my ignorance and encouraged in my focus after delving into this resource by uncovering the many stories of educators who continue to make this learning process a natural pathway within their pedagogical practices.

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