

**Title:**

Preparing teachers and students for outdoor science learning

**Summary:**

The EPA Partnering for the Future project established a partnership between Oxbow Farm & Conservation Center and Frank Wagner Elementary School centered on increasing access to outdoor learning for kindergarten students. The project grew out of an interest, expressed by Frank Wagner’s kindergarten teachers, to collaborate with Oxbow to provide students with repeated outdoor learning opportunities throughout the academic year, and improve teachers’ ability to confidently lead outdoor lessons themselves. The project was accomplished by co-developing a plan for monthly exposure with hands-on environmental education for students, both at Oxbow and at the school. Located in an agricultural area 20 minutes from Oxbow, Frank Wagner serves an ethnically diverse community and over 60% of the students qualify for free & reduced priced lunches. The teachers noticed that many of their students spend minimal time exploring nature; before a school renovation the school campus had very little outdoor greenspace and the children were largely confined to indoor learning. Teachers expressed concerns about student behavior outdoors and felt apprehensive about having the appropriate skills to manage students and/or the materials needed for effective lessons. The Best Practices presented here are proven strategies intended to prepare students for outdoor science learning and provide teachers with the tools and skills to feel confident teaching in the outdoors.

Two professional development workshops were held for the project team on the subject of Next Generation Science Standards (NGSS), identifying appropriate science subjects and practices for outdoor science learning; an additional workshop focused on place-based education further addressed the teacher’s challenges. Workshop participants included Oxbow Educators and all four Kindergarten teachers. Often, we were joined by Monroe School District staff and additional project partners that were supporting the project.

Working in collaboration with the Oxbow team, the school is planning an outdoor classroom to be installed in spring of 2019. This project was funded by an EPA Environmental Education grant #01J26201.

**Introduction**

During initial interviews conducted in the fall of 2016, teachers shared the following challenges with teaching in the outdoors:

“...it has a lot to do with behavior in an outdoor setting. There’s no four walls, there’s no boundaries. So I was really worried, to be honest, going to the farm, because it’s very open...sometimes when we do go outside it’s a big responsibility and you have traffic and you have to be safe. And when we’ve gone on our little adventures, I always have a para, a helper, with us.”

“The weather here. And then just having the material for them to write outside, and then coming back in, not losing [it] ...I think once we teach them how to do it outside, and then

how we don't run around, it's not recess time. I think that's what they think: every time we go outside, they think it's recess. But I think if we do more outside activities, they'll think, 'oh, it's not always recess when we go outside, we can learn outside too'."

Additionally, teachers were aware that students would benefit greatly from more time to learn (and play) in the outdoors, specifically including hands-on engagement, full bodied learning, opportunities to explore, and getting dirty.

One teacher said, "We need to keep in mind that a lot of these kids have not had a lot of structure in their life. So, as much structure as possible when we're out there, even though it's this wonderful opportunity for them to be free and to explore, there really needs to be...limits and very clear expectations for them."

The problems our best practices address are twofold: first, pinpointing appropriate tools and techniques needed to create a successful outdoor learning experience; and second, understanding how to instill, from an early age, that the outdoors can be a place for learning and that outdoor learning time comes with important expectations.

The practices identified through this brief will provide a roadmap for formal educators to prepare students for outdoor learning.

### **Project Implementation**

(The following activities were carried out to address the identified challenges)

To address these challenges, three workshops were held on the subject of Next Generation Science Standards (NGSS) and place-based education, identifying appropriate science subjects and practices for effective outdoor science learning. Workshops were developed and delivered in collaboration with [EduCulture](#), a local edible education organization that works to bridge local farms, gardens, classrooms, and lunchrooms and provides support to professional learning communities working together on place-based education programs. EduCulture's founding director and EPA project partner, Jon Garfunkel planned and hosted the workshops, thoughtfully addressing the needs of the project team. During the second workshop, two contributors were invited to present their tips and tools for preparing both teachers and students for outdoor science learning. The contributors were selected due to their well-aligned experience, credibility, and relevance to the project. Both contributors, Barb Bolles and Peggy Koivu of EduCulture, were formerly kindergarten teachers themselves and shared their story of embarking on a school garden project together, with very little experience in garden education. Frank Wagner teachers heard their stories and noticed parallels to their own experiences and collaborated with the contributors to brainstorm challenges and opportunities for outdoor learning at Frank Wagner. Workshop contributors then began to give specific recommendations for addressing the challenges.

Throughout the workshop, teachers and participants worked together to create the following guide for preparing students and teachers for outdoor science learning

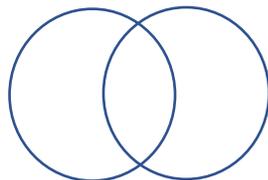
### Best Practices for Outdoor Learning

#### Setting the stage for learning outdoors

- **Establish a set of rules/expectations** for students that will stay consistent and be reviewed each time students go outside for learning
  1. Wait to be invited before harvesting plants or food
  2. Respect plants/handle with care
  3. Be careful where your feet are (feet and plants don't go in the same place)
  4. A coyote howl means it's time to gather together
  5. Walk unless you're invited to run (or fly...)
    - (Add lesson specific rules as needed)Practice setting the expectations in the recess yard and when walking between school buildings. Remind students of the rules often.

- **Challenge the idea that a classroom or learning space only exists indoors.** Establish an agreement before going outdoors and get students involved in pinpointing details of the agreement and appropriate behaviors using a Venn diagram. Students will share ideas of what behaviors are appropriate or not appropriate for the indoor and outdoor classroom (act them out, make it fun).

- Venn Diagram of behaviors:



Behaviors to review:

Running, reading, learning, having fun, climbing, etc.

- Once students agree that the behaviors are in the right places, have them sign it or add their name as a contract
- **Behaviors and approaches**
  - Crossing the threshold of the learning space meaning you are “inside” a place of learning
  - Have a visible distinction between play and learning spaces
  - Have a common gathering point so students know where to go

The first lesson of the Monthly EE Program developed through this partnership was called Inside, Outside, In-Between and was developed for this purpose. This lesson was the students' first encounter with the Oxbow educators and set the stage for learning and having fun together throughout the school year.

#### Tips for planning the outdoor learning experience

- Keep the lesson semi-structured, have a game plan but allow for adjustment
- Have your end goal in mind; the path may change but you will arrive at the same end goal
- Follow student curiosity- they have to have buy-in to learn

- Have an outdoor “kit” with ready-to-go materials for outdoor learning. See our recommendations for an [Outdoor Science Toolbox](#)
- Have a couple “back pocket” activities that can be implemented without preparation. Example: use egg cartons to collect and sort items by color, texture, sounds, size, etc.
- Have students “turn and share” to a neighbor to facilitate communication and sharing of observations
- Use science journals with prompted entries for students to document their experience

### **Structure of an outdoor learning experience**

- Take care of the physical needs of students before learning can happen (proper footwear and clothing for the weather, access to restrooms, and drinking water as needed)
- Establish boundaries, point out the visible boundaries and have a student repeat them back
- Break into small groups and have a team name or “gathering signal” within the small group
- Establish a meeting spot and use a call or signal to gather students together. Giving a 3-5 minute warning is helpful with transitions
- Use the same attention grabbers as you would in the classroom for consistency

### **Results of the Project – Outputs and Outcomes**

Students participated in nine total lessons in their Monthly EE program, four of which were hosted outdoors at Oxbow’s Kids’ Farm. The remaining lessons were hosted at the school. Students were engaged and excited, even during rainy days due to proper footwear and clothing sponsored through the grant. The concept of habitat (plant and animal needs) was used as a connecting theme through the lessons, which supported the pinpointed NGSS Performance Expectation prioritized by the project. (*K-LS1-1. Use observations to describe patterns of what plants and animals [including humans] need to survive*). Behavioral and safety concerns during the lessons were minimal and chaperones and teachers gave students the support they needed for success.

With the goal of increasing teacher self-efficacy for delivering outdoor EE, we assessed the teacher outcomes through teacher interviews collected at Baseline, Midline, and Endline of the project.

After the first two workshops, teachers shared the following quotes when asked if they had implemented any new strategies since the workshops.

“...That we could go outside, that’s the best way to learn science, now that I’m equipped, like what the presenter said, you know it’s easy you could go outside anytime. I was teaching about plants and worms and then I said let’s go outside ... I had that already set up we didn’t have to prep it, I’m already prepped, so “let’s go see worms outside” ....”

“...You can see my little egg cartons up there, and the paint chips. We just went around and found different colored things, I’ve done that with my class. ... I never thought to pull out paint chips and have the kids match it to things in the natural environment... Oh my gosh they loved it. ...they just ran off screaming and came back with hula hoops, flowers, and different bark chips to make sure it was the right brown. So it was just those little tricks of the trade...”

“...There are two ladies that came and we used the egg carton [activity] and I feel like they had really down-to-earth ideas, I mean obviously they’ve actually implemented the ideas. So we’ve done the egg carton idea, we’ve done the [activity] with the paint chip, you know you go out and you find something that’s green in nature, you know those little ideas are fun for the kids to do - it’s exploring, they’re outdoors.”

## Lessons Learned

The workshops themselves employed the following strategies

- Start with a story, even reading a storybook, to awaken and inspire the workshop participants right away. The second workshop contributors shared the book “If you plant a seed” by Kadir Nelson. After the book, we were ready to talk about the goals of the day.
- Draw from experience and stories of relevant professionals, those in a position to help bridge the gap of indoor and outdoor education, have them share their story and build rapport with teachers prior to giving recommendations.
- Hear from the group about specific opportunities and challenges for them, prior to giving recommendations.
- Provide concrete activity examples for workshop participants to actually do. In the case of the NGSS workshops, teachers participated in two outdoor EE activities: a paint chip color search, and an egg carton scavenger hunt. Teachers later reported using both activities with their students.
- Build relationships with the workshop contributors and the project team. In the case of all three outdoor EE workshops (two on NGSS, and one on Place-based education), participants connected with the workshop contributors and formed relationships. The workshop contributors also took the time to hear from the participants about their goals and challenges which influenced the workshop content.
- Get outdoors! During the third workshop (on place-based education), we took the time to go outdoors at the school and create an asset map. This proved highly useful as we identified a safe outdoor space and accessible route for students and teachers to use regularly.

## Conclusion

The series of professional development workshops were initially intended to address the topic of NGSS and did so, particularly the first workshop which included meeting with the Monroe School District Science Curriculum Director(s). The workshop involved an effort to connect teachers to existing resources. The District had resources (informational binders) and significant experience with NGSS and the contributors from the District were willing and open to hosting the workshop for this audience. Through this first workshop, we pinpointed the NGSS performance expectation to target with our year-long monthly EE unit for the kindergarteners (*K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive*). The workshop provided guidance as we developed lesson plans and served to demystify NGSS by breaking it down

into practices and concepts that teachers felt better able to address. Teachers reported feeling more prepared to tackle NGSS after the workshop.

While NGSS was the main focus for the workshop series, teacher feedback and partner meetings indicated that there were additional barriers for teachers taking students outside for learning. Their concerns prompted the second workshop, which involved applying the new knowledge learned through the NGSS workshop as curricular building blocks for the lessons, and also focused intentionally on addressing barriers with practical examples of back-pocket outdoor education activities and helping teachers make connections between hands-on science, NGSS, and outdoor education.

A lesson learned that could be applied to similar partnerships: it was clear that each of the concepts and techniques (especially with regard to addressing barriers to outdoor EE) should be explored not just individually, but in relationship to one another. In other words, we needed to look at the big picture and see how each of the topics fit together as pieces of larger puzzle.

### **Further Reading**

Resources for outdoor EE best practices that influenced this document include:

Growing Gardens; Youth Grow Garden Lessons Manual:

<https://www.growing-gardens.org/wp-content/uploads/2013/03/Growing-Gardens-Youth-Grow-Lesson-Plan-Manual-Jan-2016.pdf>

Next Generation Science Standards in the Garden:

<https://www.lifelab.org/content-standards/> (requires a free username login) Webinars from Lifelab:

<https://www.lifelab.org/2014/10/outdoor-classroom-management-webinar/>