NATURE JOURNALS

Making the case for taking children outside: the benefits of integrated outdoor learning

Primary students at the Arbor School of Arts & Sciences look for signs of spring in the creek.

A well-crafted lesson plan is a bit like a physical classroom: it has a defined and deliberate structure that acts as an intentional container in which to learn. Teachers put as much time, energy, and love into designing efficient and beautiful classrooms as we do into our lessons. But in being so intentional about designing the perfect learning container, we often forget to turn our attention to the natural spaces that already exist and the surprising integration of academic material that dwells there. When asked what they love about school, "nature" and "the forest" are at the top of my K-1 students' list. So why does most learning take place indoors, requiring us to spend most of our time disconnected from the natural world? In an age where we increasingly come to view our world through the lens of an electronic screen, the lessons of the natural world are fading quickly into the background. Schools are working harder and faster than ever to implement technology to keep up with the times, and this begs the question: how are we also seeking to foster stewardship of the natural world?

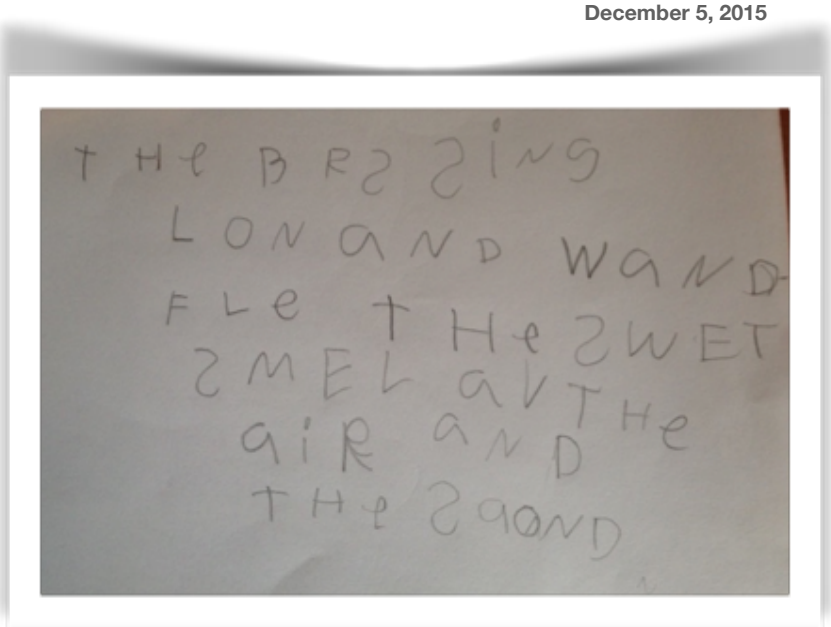
Nature provokes the kind of excitement and wonder that we wish to cultivate within our classroom walls. Each time I ventured with my class into the woods, students would immediately notice their surroundings and generate questions that naturally integrated math, literacy, and scientific learning. And there was always a social or emotional lesson that accompanied the field trip; being out in the world in a new context simply made it so. The outdoors is a broad and beautiful landscape of opportunities for authentic inquiry, if only we take advantage. However, as students' thoughts and behaviors become less restrained, teachers may struggle to take control of the lesson, to put up the familiar and comfortable walls. In doing so, we may be missing the valuable opportunities of surprise objectives that authentic inquiry provides.

So the question becomes: how to break our routine of sticking to the indoor routine? And is doing so worthwhile? In an already crowded curriculum, I've found that outdoor learning is not extraneous. It not only helps us achieve mandated learning targets, but also allows us to take them one critical step further toward the integration of subject matter. This process that brought me to this realization actually started with just the opposite: I began my foray into the world of Nature Journals as a series of separate-subject lessons so I could prove how taking students outside helps us hit academic benchmarks.

How can outdoor learning promote literacy?

One of the first things I learned as a new teacher is that in order to make students want to read, you must provide them with developmentally appropriate texts that interest them; interest is always key. I've heard story after story about kids who just won't read but happen to love soccer; when a teacher gives them well-written books about soccer, that's when they become readers. The same goes for writing: students must write about something they find interesting. Entering an ever-changing outdoor setting, students' thoughts roam freely as they try to make sense of the new stimuli greeting their senses. Asking them to communicate about it through writing provides authentic subject matter that is tangible, real, and exciting.

Drawing upon past field trips to the forest, I was aware that students are most excited about the forest because it's full of brand new stimuli. As the scenery quickly grabbed their attention, I hoped to harness this energy and help them focus on what they were taking in. I wanted to give them the tools of close observation, and use that as fodder for writing. We focused on the senses: what did we hear, see, smell, feel when sitting quietly in our "root spots"? This writing experience also turned into an important lesson in how listening promotes focus. We all learned the powerful lesson that "as we became silent, the forest forgot we were here."



"The birds sing long and wonderful, the sweet smell of the air and the sound..." excerpt from the Nature Journal of 1st grader Madison.

Assigning a writing prompt helps give emergent writers a solid launchpad, but it's equally important to give them the freedom of choice in how they write. In the classroom, we rarely give students a writing prompt that doesn't include explicit instructions for format. Outside, I wanted students to be able to write in a way that felt natural, the point being to observe and record. For Nature Journals, students were allowed to write sentences, lists, poems, or simply collections of words; on occasion, they could choose a close observational drawing instead. This gave me some great insight into the kinds of writers my students naturally are, and some genuinely surprised me. Jacob, an adept but unsure first grader, was typically quick to ask for help with his independent writing. Like many emergent writers, he expressed anxiety over having accurate conventional spelling, and was reluctant to "guess and go." In contrast from the classroom, in which students get up from their work spots as needed to request help, our Nature Journals practice requires that students remain "rooted" in their chosen spots- their own private, quiet space in the woods. In accordance with the importance of listening well, the main rule is "no talking," and this includes getting teacher help. In a way, this freed Jacob and other anxious students from the paralyzing worry caused by incorrect spelling. I was amazed to watch Jacob not only start right in on his writing, but then produce something unique to the rest of the class that went above and beyond the directions given: a poem about what he'd observed that day.

"The creek is filled with water.
The noise is like little whispers from dwarves.
I tried to float a leaf, but it sinked."

-Moses Laws

Giving students the freedom to express what's in their hearts and minds gives them the power to surprise you. This wasn't a lesson about poetry, and we hadn't begun to even scratch the surface of simile, but there it was, springing up naturally in Jacob's internal dialogue. Over the next few weeks, we continued practicing this loop of observation followed by writing. I found that I could make

the objective as specific or as broad as needed to match the day's particular energy. Some days, we wrote broadly about what we did in the woods; other times, we carefully observed a natural specimen and recorded those thoughts. The best inspiration for the next week's lesson came directly from what we had observed the prior week and what questions followed. More often than not, I wound up scrapping the projected next lesson and creating a new one based on our new thoughts and questions.

The benefits of play-based inquiry, both in writing and in character development:

Teacher Tip: Leading students from observation to inquiry

- Start by explicitly teaching how to look and listen. These are the two most powerful tools in an outdoor classroom. Commit your first two lessons to modeling these behaviors and enforce them with reminders in following lessons.
- Plan assignments that give direct instruction on how to observe a specimen. Model how to do a close observational drawing and then integrate text by adding labels. Students will begin to do this on their own when instructed to "observe and write."
- Integrate observation into both math and literacy lessons. Ask students to observe qualitative and quantitative features of an area of land or of a particular specimen. Example: Count the features of a leaf (veins, holes, spots, etc) and then describe it in detailed writing.
- Use natural observations to fuel inquiry. Begin with an exercise in observation that they are already familiar with (like counting leaf features). Then ask them to pose questions based on what they notice. Model first by posing genuine questions inspired by their observations. Recording their questions is a perfect "next step" writing exercise to familiarize them with authentic inquiry.

I was curious to see what my students would choose to write about if shaped by their natural interests. It was obvious that their favorite part of being outside was the occasional "forest free play" session that popped up as time allowed after a lesson. Just as recess can be the most fertile ground for building social skills and habits of character, free time to roam the forest led the students to quickly learn lessons in courage and teamwork. Students naturally sorted themselves into groups based on common interest, and the sense of cooperation and camaraderie that followed was incredible. A group of four or five boys worked diligently at constructing a log bridge to cross the stream, shouting instructions to each other and collaborating to gather and haul materials. Warning each other about "booby traps" of ivy, small groups of students bravely pushed through the undergrowth to explore new terrain. Kids stopped to help each other up or down a particularly steep hill. It was just the kind of character building we hope to design in our classrooms, but here it was simply unfolding before my eyes.

So how to integrate this natural learning with the writing curriculum? After a few weeks of assigning specific writing prompts focused

on a chosen subject, I decided to take a cue from their natural excitement and the lessons they were naturally experiencing. I instructed them simply to play for ten minutes within the designated boundaries, and then settle into a spot to write about it in their journals, with no restrictions on how they should write.

On this particular day, Alice, a notably shy Kindergarten student, had a breakthrough. After weeks of lingering by the teachers as other students leaped across logs and slid down the creek bed, she decided to venture into Kid Land, an area of the forest deemed "off-limits" to grown-ups. Teachers supervise from afar, but students play and romp under the illusion of complete freedom, a rare reprieve in a world of hover-parents and ever-present teachers. After shakily crossing the bridge with some teacher assistance, Alice reached the other side and began to explore this novel wilderness. Minutes later, she bounced back up the path elated, beaming and excitedly talking about what she had seen. Alice had a story to tell, and this time, she wasted no time in getting it down on paper. Her general trepidation usually shows in her writing; she is a reluctant independent writer, and it often takes a great deal of coaxing to get her to start. This time, however, Alice eagerly attempted text to communicate her story in writing, though I had even given the option of using illustration.

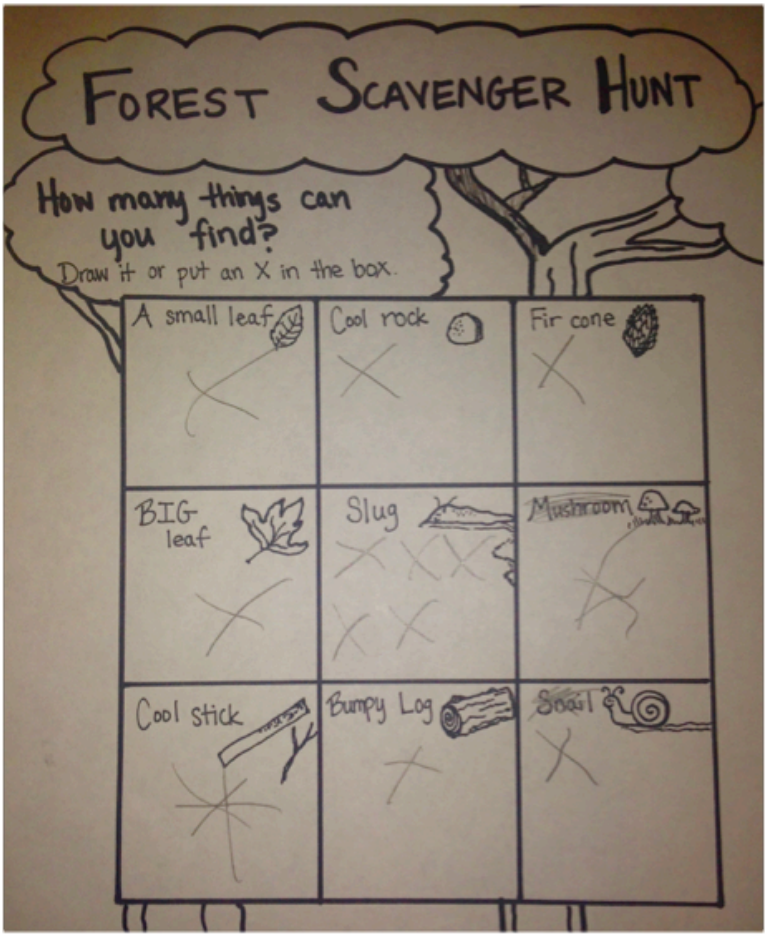
"It was my first time in Kid Land.
I was kind of scared!"

-Alice B.,
Kindergarten

At the New York State College of Human Ecology at Cornell, research professors Nancy Wells and Gary Evans undertook a study on the link between mental health of a sampling of elementary school students and the degree of nature surrounding their homes. They found that children exposed to more nature tested lower for behavioral conduct disorders, anxiety, and depression, and higher on a global measure of self-worth. They also concluded that "more [nature] appears to be better when it comes to bolstering children's resilience against stress or adversity." (Louv, 51).

The confidence children gain through surpassing physical challenges in uncharted territory is hugely transferable to in-class lessons too. Confidence builds on itself, and what we are most trying to build is resilient people who aren't afraid to try, fall down, and pick themselves back up and carry on. This is what we're constantly trying to impart on our children as we try to pull their attention back to the reading, writing, or math page in front of them, convincing them that it's okay to try. In the outdoor classroom, the environment is wild and free; kids are encouraged to climb, run, play and take risks. As Alice's case demonstrates, they learn that although the territory may seem unfamiliar and dangerous, they can experiment, make mistakes, gain courage from their attempts, and have the room they need to grow.

How can you use the natural environment to make math exciting, engaging, and applicable?



An introduction into observation and quantifying the world around them. Students can use "X"s or tally marks to record specimen they find.

One of the main goals of teaching math to children is that we want them to develop number sense. By this, I mean the ability to think about and manipulate numbers without losing their meaning. Our numerical system, much like our alphabet, is an abstract representation, a means for communicating about the world. Unfortunately, we often start with teaching children how to use this system before they understand what it means. Asking students to work with something without understanding its nature seems unfair and nonsensical, and it's a reason that so many students believe they just "can't do math." As much as we need them to practice math skills with pencil and paper, we also need them to internalize the practice of viewing and understanding the world quantitatively. It is this piece that is often missing, and this piece that gives meaning to the daily practice we require of them. I was curious to see if it could be found in the natural world.

I'll admit that the first time I intentionally went to craft a math lesson that centered on the forest, I was apprehensive. Nature has always been a personal source of inspiration for writing, poetry, and illustration; so when I sought to include a math focus in this Nature Journal experiment, I was on unsure ground. I decided to start with what I know best: a nature walk. But this time, I set my mind to thinking about math as I observed the familiar territory around me.

How many points are on a big maple leaf? Do they all have the same number of points? What about symmetry...do all sword fern fronds have the same amount of spores? If so, what is the evolutionary purpose behind it? What is the distance from one bridge to the next? What is the rate at which the creek water is flowing during this time of the year?

On just one short, winding trail, I was able to rattle off a long list of questions that had me seeing through a quantitative lens, which was just what I was hoping to foster in my students. I realized that intentional thinking is everything. This gave me hope for the potential of my forest-focused math unit, and I began brainstorming actual lessons. Tallying plant and animal species, counting the features of certain leaves, measuring the distance from the classroom to the woods, looking for geometric shapes and symmetry in the landscape: the mathematical territory was boundless. It was economist Thorstein Veblen who famously stated that "the outcome of any serious research can only be to make two questions grow where only one grew before." This truth was especially apparent in our math lessons. The more we noticed about a subject, the more questions sprung up, and the lessons we stumbled upon were deeper and richer than I had imagined.

When math meets scientific inquiry:

On a chilly October day, I ventured into the forest with a small group of students; the day's objective was a continuation of a previous math lesson in which students used tally marks to count and record species of plants and animals.

"Aw, not this again!" cried Joey, an accelerated and humorous student who truly enjoys his work, but also strives to act like older students, quick to complain about schoolwork.

This moment made me clench my fists; I had been so excited about this lesson and hated the thought that it might bore any of my students (I also worried that Joey's dismay would spread to the rest of the class). But I explained exactly why we were doing this again; this time, I sensed the need to put a different spin on it. We were going to do just what real research scientists do: observe a natural setting over a period of time and record our observations while looking for changes and patterns in our data.

I had planned this lesson as a way to bring mathematical learning into the forest: I wanted students to see that they can view and understand their world quantitatively as well as qualitatively. I wanted to bring meaning to the numbers we're learning about in class. And yes, I wanted them to practice the art of tallying and careful counting and recording. But I didn't communicate this to the class; what I communicated was that I wanted them to be like real research scientists (because, let's face it, that's a much more engaging purpose). So I shouldn't have been so surprised when that was exactly what happened! Suddenly, a redundant math lesson morphed into a situation that called for real science. Kids at any age love an activity that puts them in a genuine, useful role; they were no longer just students practicing the art of counting with tally marks. They were scientists on an important expedition to understand and record the world around them! The math had come alive in a way it simply couldn't in an abstract word problem. After working in assigned boy-girl pairs to conduct their research, I called the class together again to report back. Most pairs had decided to count sword ferns and found more than they had predicted- almost too many to count!

"Hey look, there are some way over there too!" I heard Maddie exclaim, pointing across the bridge. "How are there so many sword ferns?"

Here it was: the moment of authentic inquiry, inspired by observation. It was a moment I couldn't have planned for when the target was just to practice counting, recording, and thinking quantitatively. But stepping back and remembering the big picture,

Teacher Tip: Flexibility is key in being prepared

- Be flexible! It can be tempting to stick to our structured lesson plans when we've put such careful energy into them. The danger here is that we miss out on taking the natural path of inquiry, missing the surprising objectives that line that path. Don't be afraid to change tack in the moment if a great observation or question steers you in a different direction; trust your instincts!
- Use observation and inquiry to inform future lessons. If a question gives you pause, make a note to come back to it. When the lesson is over, you can do some research and develop your thinking. This will help you determine if the question is worth a deeper look as a whole class or if you want to follow up with a particular individual.
- Students are usually more fidgety and distracted in the woods. Rather than enforcing discipline for this natural inquisitive behavior, plan accordingly. Keep instructions succinct and use repetition. Wandering eyes and feet do not inherently mean students aren't paying attention. Sometimes the students I thought were too distracted to listen in the woods wound up following instructions beautifully on the assignment.
- Time can slip away more quickly than usual on an excursion. There will always be delays. Protect your students' writing time by building in extra time for getting to and from your nature spot. Explicitly practice getting there quickly and quietly.
- Have a plan for minor emergencies like getting students quickly to a restroom and carry a first-aid kit and cell-phone/walkie-talkie.

what we really want our students to achieve is to build an arsenal of tools (like counting and recording) that will allow them to think critically about the world. Of course, it is crucial to teach them the skills first, but thinking critically requires integrating skills, content, and burning questions.

"How do you think sword ferns spread their seeds so they can grow everywhere?" I prompted.

Here, the lesson took another turn that I hadn't expected: another student jumped in to explain. Allison excitedly ran over to a fern, enthusiastically explaining how the spores on the underside of the fronds rub off onto the backs of animals passing underneath, which causes the animals to unwittingly deposit the spores around the forest. The rest of the group hung on to her every word, bounding after her to get a closer look at the spores. Without intentionally planning for it, my students were engaged in scientific discourse with each other. Moreover, they were beginning to learn that their natural questions and observations hold weight worth exploring. It would have been a much flatter lesson had they simply followed the directions and looked to me for answers. This discourse is the point of authentic inquiry and serves the larger purpose of training our students how to be curious, inquisitive, lifelong learners who participate in a learning community.

Primary students observe signs of the season's change in the Arbor forest.

The whole is greater than the sum of its parts: Integration of subjects is the heart of outdoor learning, the heart of education.

Environmental educator David Orr addresses the segregation of subject matter in schools and the resulting consequences in his article *What Is Education For?* "We labor under a confusion of ends and means, thinking that the goal of education is to stuff all kinds of facts, techniques, methods, and information into the student's mind, regardless of how and with what effect it will be used." If we are aiming for deep understanding of subject matter, the world, and their own

personhood, it is crucial that students develop the ability to weave together separate skills and subjects to create a rich understanding of the world in which they live. At the Arbor School of Arts & Sciences, the curriculum is based around theme work for this very reason. Students and teachers explore different themed units each year, ranging from migratory animals to the Ancient Greeks to the human body. The purpose of theme work is to let the subject matter provide a juicy, interesting, and authentic context through which to practice reading and writing, math and science. This model of learning more closely matches how adults seek to understand their world and continue the learning process; it's less scripted and far more applicable to "real life" than teaching subjects in fragments.

During my time at Arbor, I sought to make use of the sprawling acreage, a forested piece of land full of cedar trees and towering Doug Firs, as both an extra classroom and as a coteacher. I created individual Nature Journals for each student and meticulously crafted separate math, writing, and science lessons designed to bring us outside. My goal was to prove that you can use the outdoors as a vehicle for teaching each of these subjects. However, what I learned when we actually went out into the natural world was much richer than the individual day's objectives. Just as the ivy, trees, soil, and creek are ever present and linked in ecological cycles necessary to the life of the forest, so too were the math, reading, writing, scientific, and emotional lessons that I was trying to teach. They did not actually exist as separate subjects in nature, though they usually do in schools, each with its own block in the daily schedule. Rather, they're all part of the whole realm of knowledge we are trying so desperately to impart on our students, and they appeared in the forest as naturally as you might expect, every single time.

Integrating subjects through outdoor learning opens a window into a world in which our carefully thought-out lesson plans can turn into something else entirely, and something that is completely pertinent to the real world around our students. In a school system in which kids are so often asking why they have to learn a task or subject, taking kids into nature allows them to see firsthand one real life application of what they are learning about. It is a world in which a math lesson can turn into a case of true scientific discovery that they can actually see and touch, not just read about. It is a world in which a Kindergartner can remember the lesson she learned from the story we read about courage and actually translate it to her life when she needs to cross a log to reach a promising new territory. It's a world in which students can let their bodies run, jump, play, fall, and get back up again; in the getting back up, they learn lessons of perseverance and resilience that are so lacking from our curriculum. In the process, their minds are allowed to run free and unfettered as well.

It is inevitable that throughout this journey, they will stumble upon questions that pop up like bumps on a log, to be considered and navigated as they traverse the landscape. They will learn that the math, reading, and writing we have learned in the classroom have useful places in

outside contexts and can help them communicate their thinking about real, tangible things. They will learn from the environment around them one of the most important lessons we want them to know in this world: they are part of the whole, they are part of something bigger, and there are myriad ways to think about and understand that world, and thus come to better understand themselves.