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## Abstract

In his book “Last Child Left in the Woods,” Richard Louv coined the term “Nature Deficit Disorder,” which he thinks of as “... not a formal diagnosis, but a way to describe the psychological, physical and cognitive costs of human alienation from nature, particularly for children in their vulnerable developing years.”(Louv, 2008) In the years that followed the publication of Louv’s first book, schools began to think more deeply about how to give children authentic outdoor learning experiences. In 2010, our 3<sup>rd</sup> through 5<sup>th</sup> grade school, Cottage Lane Elementary in Blauvelt, New York, began an outdoor education event where we take our entire school to a local state park for a day. Once there, each class rotates from learning center to learning center to work with scientists, outdoor educators, local environmental groups and other volunteers to learn more about and experience the environment around them. What follows is a brief summary of what we have learned in the 10 years that we have been doing this work. We hope that it may serve as a model which other schools could replicate in their own way. Please visit this site <http://jacobtanenbaum.com/outdoored.html> for learning center activities that can be replicated if you want to try your hand at implementing a day of your own.

## Where We Go

Tallman Mountain State Park in Sparkill, New York offers much that one should look for when selecting a location for an outdoor education event. To put it simply, there is a lot to talk about, do and study. A variety of habitats are present in the park. It is located along the western shore of the Hudson River estuary near the widest section of the River. Deciduous forest makes up much of the 700-acre park. The forest includes several freshwater ponds and streams that flow into the Hudson just below the park. The Piermont Marsh is a 1017-acre wetland that forms the eastern park boundary. ([www.dec.ny.gov/lands/92365.html](http://www.dec.ny.gov/lands/92365.html)) It is one of the five remaining brackish tidal marshes in the Hudson River estuary (New York, 2018). The Piermont Marsh is part of the Hudson River National Estuarine Research Reserve and so it has been well studied over the years. The park provides a home to a variety of animals, birds and plants as well as aquatic life. Bald eagle and

osprey are frequently seen in the area. We make use of the several miles of roads and hiking trails as well as restrooms and picnic areas in the park. The roads and trails roughly parallel one another allowing us to have some flexibility when we have individuals in our community with mobility issues.

The park also has some interesting geology. It is located along the Palisades cliffs. These basalt cliffs formed in the late Triassic when an intrusion of magma into an earlier layer of sandstone solidified below the ground, forming a sill. Erosion of the softer layers around the cliffs caused them to be exposed and they are a defining part of the Hudson river landscape in this region. (<https://njpalisades.org/nature.html>) Ice sheets scraped along the exposed rock during the ice ages, leaving striation marks which can still be seen today in some places.

When searching for a location to work outdoors with children, having access to a park which offers so much gives us the flexibility to have a wider range of learning centers placed strategically around the area so that children can directly interact with the subject that is being taught.

Finally, the park is just a 10-minute drive from our school. Less time on the bus means the students spend more time in the park. It also means the buses can make two trips each, cutting the largest expense of the day in half.

## Volunteers and Centers

Examples of learning centers include: Forest Ecology, Mud Core Sampling, Bee Keeping, Plankton, Salt Marsh Ecology, Geology, Art in Nature, Hiking, Recycling, Macro-invertebrates, Local Turtle Protection, American Eels, Native plants vs. Invasive plants, Composting, Plankton Study, Meditation in Nature, Yoga in Nature, Geocaching and many more.

Outside volunteers or school staff with unique expertise run all of the learning centers. Volunteers have included different local environmental groups, local scientists, environmental educators, our local water and electric companies and several community members; for example, a local bee-keeper created a center for us. Over the ten years we have been running this program, the group of volunteers has increased dramatically. Many come through my work with NOAA's Planet Stewards program, NOAA's Teacher on the Estuary program as well as through networks of outdoor educators around the community. We are fortunate to have many universities and scientific institutions in our area. Lamont Doherty Earth Observatory, a research arm of Columbia University is just minutes from the park, and the participation of many of their scientists and staff has been invaluable. Local environmental groups, such as Keep Rockland Beautiful



**Figure 1.** The Piermont Marsh with Tallman Mountain in the Background

Photo credit: Jacob Tanenbaum

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### DESIGN/LAYOUT

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**Figure 2.** Earth Day 2019 – Creating Plankton Nets

Photo credit: Courtesy of South Orangetown Central School District

have also donated time as has the Rockland County Soil and Water Conservation District.

Each year we work closely with new center providers to create an activity that is age appropriate, hands on and that will fit in to the time constraints. This is critical, since many of our volunteers are not accustomed to working with third through fifth graders. Once developed, activities can be refined and repeated from year to year. Those new to outdoor education may need help with some of its unique features. One of the most important aspects of working with a group of volunteers is giving lots of advanced notice. We typically begin reaching out to volunteers in January for an event that takes place in June.

Examples of centers that you can use are found at <http://jacobtanenbaum.com/outdoored.html> and include:

- Composting by Janet Fenton
- Eel Game by Brianna Rosamilia and Nicole Laible
- Piermont Marsh by Margie Turrin and Laurel Zaima
- Plankton Nets by Carol Knudson

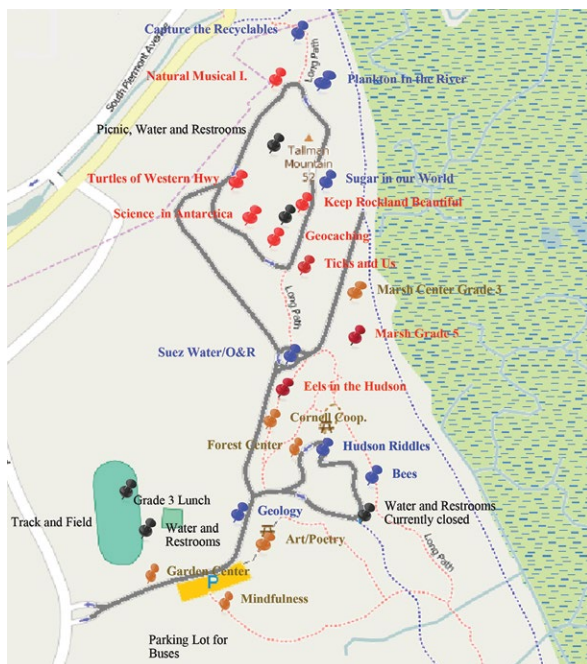
## Logistics

An important part of keeping a program like this going is having well-thought-out simple logistics. Each classroom teacher and each center provider are given a map of the park with the centers clearly indicated. The map includes roads and trails as well as the location of picnic areas for lunch, water and restrooms. One of the critical parts of creating the map is paying attention to the amount of time it takes students and staff to walk between centers. We kept travel times to 10 minutes by clustering grades around the park. Centers are geared for one grade only. This way they can be repeated from year to year with no chance that students visited the center in previous years.

The day is divided into five 35-minute periods. We allow 20 minutes for center activities, 5 minutes for questions and 10 minutes for transition. Each group of students visits four centers and eats lunch during one of the five 35-minute periods. (See schedule below)

## Addressing Teacher Concerns

For most teachers, their responsibilities for the day consist of guiding the students from center to center. Some teachers create learning centers



Grade 3 Schedule	9:20	10:00	10:35	11:10	11:45	12:20	12:55
Class 1	BUS	Art and Poetry	Walking Center	Lunch	Garden Center	Grade 3 Marsh Center	Return to Bus - Depart 1:10
Class 2	BUS	Garden Center	Grade 3 Marsh Center	Lunch	Mindfulness	Forest Center	Return to Bus - Depart 1:10
Class 3	BUS	Cornell	Garden Center	Lunch	Forest Center	Mindfulness	Return to Bus - Depart 1:10
Class 4	BUS	Mindfulness	Art and Poetry	Garden Center	Grade 3 Marsh	Lunch	Return to Bus - Depart 1:10
Class 5	BUS	Grade 3 Marsh	Forest Center	Art and Poetry	Cornell	Lunch	Return to Bus - Depart 1:10
Class 6	BUS	BUS	Mindfulness	Forest Center	Art and Poetry	Lunch	Cornell
Class 7	BUS	BUS	Cornell	Mindfulness	Lunch	Garden Center	Forest Center
Class 8	BUS	BUS	Walking Center	Cornell	Lunch	Art and Poetry	Garden Center
Class 9	BUS	BUS	Walking Center	Grade 3 Marsh Center	Lunch	Cornell	Mindfulness

and staff them for the day. Although we initially had to address many concerns, this event is now a favorite tradition for many teachers.

Teaching in the outdoors is often more reactive than proactive. This is hard for teachers trained in traditional techniques who like a more predictable set of circumstances. We try to show staff how to take joy in what is unpredictable. Many traditionally trained teachers are uncomfortable with questions they do not know the answer to. Naturalists and outdoor educators are accustomed to using guide books and apps because they often see things they can't identify right away. We try to model taking joy in not knowing as well as the process of using dichotomous keys and other tools to identify something we have not seen before.

Teachers may struggle with a lack of experience on trails. The first year we did this, we got together with a group of staff members on a Saturday before the event and we hiked around the park to help alleviate some of their concerns.

Students or staff may have mobility or medical issues that impact their experience and comfort levels. Having the choice to walk on roads as well as trails alleviates some concerns since the roads may be easier to manage than a rough trail. Staff may have fears about animals, ticks, weather or poison ivy. Each year we send out a guide to help staff recognize poison ivy in its many forms and remind students and staff how to dress appropriately for the forest to minimize issues from weather, ticks and insects. Concerns regarding those issues have faded over time.

Hands on nature-based activities can often be tailored to address specific Next Generation Science Standards (NGSS) Disciplinary Core Ideas (DCI) applicable to a particular grade. For example, the unique geology of our area is well suited for teaching the DCI's in the fourth grade related to earth systems, which talk about patterns in rock formations that help us recognize changes over time.

Days like this are also an opportunity to go into some depth on NGSS Crosscutting Concepts related to patterns, scale, proportion, and quantity, structure and function as well as stability and change. All of those important goals are naturally addressed in a high-interest setting that cannot be duplicated in the classroom. The same is true of NGSS Scientific Practices such as asking questions, defining problems, analyzing and interpreting data, constructing explanations, engaging in argument from evidence and obtaining, evaluating and communicating information.

That said, it is important to note that we are committed to doing hands-on nature-based activities even if they do not connect directly to the standards, simply because they are worth doing.

## Costs to the District

Keeping costs down is essential in public education. For this activity, all centers are staffed by volunteers. There are some minor material costs. The district also pays for an extra nurse to be on duty in the park for the day. We ask the local ambulance corps to keep their rigs in the park when they are not in use. They kindly do this at no cost to us. The major expense is busing the children. We minimize this by busing half the school to the park and then having the buses return for the second group of classes. This cuts the cost in half. All in all, this is one of the least expensive field trip activities that we run during the year.



**Figure 3.** Learning along the Hudson River

Photo credit: Jacob Tanenbaum

## A Note on 2020

During the COVID-19 pandemic, we created a virtual Earth Day event in June of 2020. We did this by scheduling a volunteer to meet with each class via video-conference for 20 minutes with time at the end for questions. There are some outdoor educational activities that lend themselves well to video conferencing. For example, we had a local bee-keeper connect using a cell phone and show the children the bee-hives close at hand. In general, though, we are all happy to return to hands-on outdoor education for 2021, though it will be in our schoolyard, since we cannot travel by bus to the park. Nature-based hands-on activities cannot be duplicated on a screen.

## Conclusions

Outdoor education does not need to be expensive and often does not require long-distance travel. For 10 years running we have managed to bring 650 children to the outdoors for a day of learning from experts – though we were forced to do this virtually in 2020 due to the pandemic. For many students, it is their first time in Tallman Mountain Park even though it is just a few minutes from their homes. In the last few years, we have introduced more diverse and eclectic activities, such as yoga, meditation, poetry and art. Those have gone well and will be continued and expanded in the years to come. Future plans include adding a center devoted to the music of the natural world around them. After all, how can we teach about the Hudson River without singing a little Pete Seeger?

## References

Louv, Richard (2008). *Last Child in the Woods*. Algonquin Books, Old Chapel Hill.

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## About the Authors

**Jacob Tanenbaum** teaches science and computer technology in the South Orangetown schools located in Rockland County, just north of New York City. Mr. Tanenbaum has been an educator for over 30 years. In addition to schools in the New York area, Mr. Tanenbaum has taught in Tucson, Arizona; Buffalo, New York; Alabama; Georgia, Guatemala City; Guayaquil, Ecuador and Bogotá, Colombia. More information, as well as a list of his awards, grants, talks and publications appears on his website, [www.jacobtannenbaum.com](http://www.jacobtannenbaum.com)

**Janet Fenton** is a Master Gardener Volunteer through Cornell Cooperative Extension: Rockland, New York since 2010. She has conducted several presentations on gardening, especially composting and vermicomposting to children and adults. Additionally, she oversees the management of the Garden of Faith at Marydell Faith and Life Center which has produced thousands of pounds of fresh produce which is distributed through the St. Ann's Food Cupboard. She also serves as a volunteer garden educator at the Children's Garden at Marydell during the summer. She retired in 2014 after teaching for over 27 years.

**Carol Knudson** is a Research Assistant at the Lamont-Doherty Earth Observatory of Columbia University. Since 2008 she has been working on the Hudson River Water Quality Project with

Riverkeeper. She is an alumna of Tappan Zee High School (class of 1981) and through her children, has been involved in South Orangetown Central School District activities since 2005.

**Nicole V. Laible** currently works as the Environmental Programs Manager for the Rockland County Division of Environmental Resources in New York. As Environmental Programs Manager, she leads four environmental boards and manages several professional water resources research projects. She also works with colleagues to host Conservation Field Day's and other environmental education programming for K-adult audiences. Nicole is on the leadership team for the Minisceongo Creek Watershed Alliance and Rockland Environmental Educators Working Group. She received the "Environmental Educator" award from Keep Rockland Beautiful in 2017 and the "Next Generation Leadership Award" from Strawtown Studio in 2018. She also serves as a board member on the Hudson River Watershed Alliance, working on the Finance and Governance committees. Nicole has a Master's in Public Administration and Policy from American University and a B.Sc. from SUNY Stony Brook University where she double majored in Marine Sciences and Coastal Environmental Studies.

**Brianna Rosamilia** is the Conservation District Technician at the Rockland County Soil and Water Conservation District in New York. In her current role she leads education programs focused on water quality and trains volunteers to collect scientific data for community science programs. She earned a bachelor's of science in environmental science from Marist College and a master's of science in environmental interpretation from the SUNY College of Environmental Science and Forestry. She started working in the environmental education field as a seasonal environmental educator with the Student Conservation Association. Since then, she has educated thousands of youth and adults in nonformal education settings on topics relating the Hudson River Estuary, its tributaries, and the Hudson Valley. In her free time, she likes to paint, look for birds, and take long walks.

**Margie Turrin** is Director of Educational Field Programs at Lamont-Doherty Earth Observatory of Columbia University where she has researched, developed, implemented and published on field-based educational work for students, teachers and faculty for over 20 years. She has been part of bringing thousands of students and educators to the Hudson to collect and analyze their own data, using the estuary as a classroom. She is an advocate of using data to pose and answer questions, focusing on incorporating authentic data into stories and activities that provide key insights about the environment. Her work spans from local to global with projects in both the Arctic and Antarctic that focus on climate change and sea level impacts.

**Laurel Zaima** is the Education and Outreach Coordinator at Lamont-Doherty Earth Observatory of Columbia University. Laurel has substantial experience working with youth, teaching students through informal education about the natural environment through hands-on experiences since 2015. At Lamont, she works on education initiatives that communicate science research to the general public, K-12 and undergraduate school groups, and New York and New Jersey teachers. Her primary educational focus is on connecting people to the Hudson River and their local waterways by using a place-based instructional approach with an emphasis on field explorations. She also teaches about sustainability, climate change, and sea level rise with a strong emphasis on the changes occurring in the polar regions.