



Citizen
Science

The Value of Mentors

Family Citizen Science at the Brandwein Nature Learning Preserve

— Writing and photos by Dan Bisaccio —

As it turned out, it was not a foolproof plan. Hiding frogs in my grandfather's suitcase stored under a bed in our rented Maine cabin was naively, but lovingly intended. To my 9-year-old mind many years ago, my hope was to bring my newly discovered friends home to Queens, NY at the end of our Maine adventure. Thankfully, in retrospect, they were soon discovered and set free by my grandfather and uncle.

Although the frogs remained in Maine, I took home something else that was unrealized until later in life. That "something" would persist and grow throughout my life and become a central tenet of my personal and professional world view regarding the natural world. It was my uncle's and grandfather's mentorship cultivating what Aldo Leopold called "progressive citizenship" in developing an environmental ethic.

Mentors are often described as "wisdom keepers" who develop supportive relationships with their mentees. Their wisdom is born from both knowledge and life experience that is willingly

shared but not imposed. Overall, mentors encourage mentee problem-solving skills through reflection as they engage in an experience together.

As an innovative and deep-thinking teacher, scientist, and author, Paul F-Brandwein understood the value of mentors. Long before "differentiated and inquiry-based instruction" found their way into the lexicon of educational pedagogy, Brandwein advocated for all students be given equal access to the opportunity to do original work, including research, with a mentor. He understood that students learn science best by doing science from early on which translates to investigating questions for which there are no known answers. Much of his early work became the educational foundation for BSCS's 2 curriculum series.

In 2008, the Brandwein Institute created a series of nature trails on a section of the Rutgers Creek Wildlife Conservancy (established by Paul Brandwein) to honor the wishes of Paul

and wife, Mary, to engage all with the natural world. That section of trails has become the Brandwein Nature Learning Preserve, located about 25 minutes from downtown Milford, PA; 15 minutes from Port Jervis; 20 minutes from Sussex, NJ, and 25 minutes from Middletown, NY3.

Interpretive hiking trails traverse the 30-acre parcel of the 72-acre Rutgers Creek Wildlife Conservancy. The trails wind through natural communities including an early successional forest, meadow and woods ecotone, mowed meadow, northern riverine forest, northern swamp forest, stream, and upland mixed deciduous forest. The Preserve contains a pavilion, information kiosks, boardwalks, benches, and parking area. The ecological diversity supports a wide array of natural flora and fauna. This past year, the Brandwein Institute, with support from Youth Learning As Citizen Environmental Scientists (YLACES), launched an initiative to develop a family citizen science program.

With Paul Brandwein's lifework illustrating that students become scientifically literate by actively learning science as science is done, the "Family Citizen Science" initiative encourages active scientific research through the development of meaningful mentor-mentee relationships collecting, interpreting, and communicating the scientific data.

The Brandwein Institute Family Citizen Science initiative is facilitated by two of its Directors with extensive experience in field conservation-based science education: Kasey Stankunas, a local environmental science teacher who is GLOBE and AP Environmental Science trained as well as a National Geographic Educator; and Dan Bisaccio, a conservation biologist / educator (Brown University and former high school science teacher). Dan has developed a long-term habitat research study linking national and international teachers (HabitatNet) that was recognized by both the Smithsonian Institution's Monitoring & Assessment of Biodiversity and the United Nations Convention on Biological Diversity.

The pedagogical goals of Family Citizen Science field experiences include the following: (1) continually strive toward mastery of the scientific practices, content, and cross-disciplinary connections as outlined in the Next Generation Science Standards; (2) including "scientific habits of mind" that include: scientific inquiry, methodology, data collection, data analysis being able to effectively communicate the findings; and (3) support mentor-mentee relationships.

Fostering active authentic research – that includes building mentor relationships (intergenerational family ties, teacher-student, scout leader – scouts, 4 H Club mentors, etc.) with

the above-mentioned pedagogical goals to address scientific literacy is how Family Citizen Science at the Preserve is structured. Student content and skill acquisition is developed through the mentor-mentee relationships being fostered between students, teachers, family, and community partners.

Some of the Family Citizen Science projects that we are involved with include: 1. GLOBE's newly announced "Trees Around The GLOBE" (www.globe.gov/web/trees-around-the-globe/overview) protocol that will enable students and their mentors to collect and examine carbon sequestration data, seasonal phenology dates, and assess the general health of a forest; 2. Using iNaturalist (www.inaturalist.org) protocols, mentor-mentee teams will collect and share data on local bird migration and invasive species. We are also exploring partnerships with NY State DEC PRISM programs (www.dec.ny.gov/animals/47433.html) on invasive species as well as projects initiated by local bird clubs; and leading seasonal BioBlitz (www.nationalgeographic.org/projects/bioblitz/) projects at the Preserve.

Training for the protocols occur on mid-season weekends – "Sunday at the Preserve" – dates are posted on the Brandwein Institute's webpage (Brandwein.org) and on the Brandwein Facebook page..

Current research confirms that mentor (family members, teachers, scout and 4-H leaders, community group leaders) relationships increase academic achievement, self-confidence, and social-emotional development (Castro, Eposito-Casas, Lopez-Martin, et al)4.

Family Citizen Science provides opportunity, mentorship and training as well as a support system that nurtures Leopold's concept of progressive citizenship and compliments Paul Brandwein's legacy of fostering scientific and ecological literacy.

We invite you to the Brandwein Nature Learning Preserve in your work to help students, teachers, and families develop an appreciation for the natural world, in order to become informed stewards of the planet! We must build an understanding of nature by gaining scientific knowledge of its wonders.

Of course, any frogs caught must be left in place ... a lesson learned from my mentors years ago.

Author Note: Dan Bisaccio taught high school science for 30 years before joining Brown University as Director of Science Education and Teacher Education. Dan is now "retired" but retains an Associate Professor of Research appointment at Brown and is a Board Director at the Brandwein Institute. Contact – Daniel_Bisaccio@Brown.edu

2 Biological Sciences Curriculum Study (BSCS)

3 Directions to the Brandwein Nature Learning Preserve: Access by program or by appointment.

If your group is interested in visiting the site – please see <https://brandwein.org/preserve/>

Take Interstate 84 to Exit 2 on Mountain Road in New York State. Turn left at County Route 35/Mountain Road 1.0 miles (Cross U.S. Route 6 at blinker light) Turn left at Minisink Turnpike, and another 0.2 mile to the Brandwein Nature Learning Preserve on the right. Pull into the entrance drive and park in the bus parking area.

4 Castro, Eposito-Casa, Lopez-Martin, Lizasoain, and Gairia; Educational Research Review 14:33-46, February 2015

