Teaching with Trees
Celebrating 30 Years of Field Study Programs for Children

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With an inviting, naturalistic landscape and diverse collections of plants collected from around the globe, the Arnold Arboretum is an outdoor classroom for learning. Since 1984, the Field Study Experiences have helped primary school classrooms engage directly with the natural world in the safety and beauty of the Arboretum landscape. Tens of thousands of students have visited to participate in these programs over the years, providing Arboretum educators with valuable data for the development of new and innovative ways to connect kids and science. This fall, we celebrate thirty years of sharing the Arboretum as a unique and enriching outdoor classroom for young learners.

The evolution of school programs at the Arnold Arboretum began in 1982, when Boston Public Schools appealed to local museums and universities to help advance science education in the primary grades. In response, Arboretum educators developed the Field Study Experiences to offer primary school students the experience of being explorers and scientists themselves through fun, hands-on lessons in botany, natural history, and ecology. Activities like observing, measuring, recording, and drawing all contribute to the larger objective of introducing the scientific method, while integrating other skills and disciplines like reading, math, writing, and the arts. Originally targeting students in grades 3-6, the programs were designed around seasonal studies of flowers and seed dispersal, investigations of indigenous peoples and their use of native plants in our area, and tales of the plant explorers who brought novel species from around the world to the Arboretum for study and appreciation.

From the beginning, the Arboretum placed a strong value on making the Field Study Experiences available to students from urban schools. This principle was championed in 1996 when Henry and Edith (Nod) Meyer established an endowment to fund primary school learning at the Arboretum, the Nature Study Fund for Urban Children. Over the past decade, this support has enabled the Arboretum to deepen its engagement with Boston Public Schools, from initiating classroom visits by Arboretum educators at a neighborhood partner school to creating new programs in our landscape for fifth graders to complement their study of ecosystems.

In recent years, the Arboretum has continued to expand its reach by bringing Boston preschool children from Roslindale and Hyde Park to the Arboretum for Field Studies of their own. The partnership with Head Start, now in its tenth year, facilitates spring and summer explorations for preschoolers that focus on the ponds, meadows, and woodland areas of the Arboretum. With the creation of additional programs for primary school students in the first and second grades over the past three years, we now offer a continuum of learning experiences for children from preschool through the fifth grade.
The broad scope and ongoing enhancement of children's education at the Arboretum has been made possible in large part by the contributions and commitment of a dedicated corps of Field Studies volunteers. Coming from a diversity of backgrounds, our volunteer guides absorb many domains of learning through their training and experience in the program—how to leverage the collections and landscape, how to engage and manage groups of children, and how to teach in flexible ways that resonate with all ages and abilities. Their accumulated experiences and valuable insights are essential evaluative tools that have yielded significant improvements to all of the programs.

Three decades and countless impressions later, the Field Study Programs continue to build on the premise that the Arnold Arboretum and its spectacular collections of plants and pastoral landscape provide exceptional opportunities for learning at every age. By encouraging the natural curiosity of children and drawing on their love of the outdoors, the Arboretum provides fertile ground for building scientific interest and scientific literacy among students, their teachers, and the community as a whole. As we look to the future and anticipate more engagement with local schools, it’s clear that a strong foundation exists to continue growing these opportunities in previously unimaginable and exhilarating ways.

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between species. So the genetic piece of my research looks at these plants’ genomes to see which genes are passing over that species boundary, and if we can find evidence of past hybridization and determine how that has affected their evolution. In this case, we know hybridization was detrimental enough that traits evolved to slow or stop this process for these two species. However, we also see examples of Phlox species where hybridization appears to have been a good thing, including some examples in the Midwest where adaptive traits moved across that species barrier and resulted in increased fitness. Much of my future work will be directed at understanding both the good and the bad of hybridization.

Q. Selection of favorable traits plays an important role in horticulture—much of what we’re talking about is applicable to this aspect of the Arnold Arboretum.

A. Yes, horticulture relies heavily on hybridization to create new cultivars with desirable traits, from more abundant flowers or tastier fruits to more expansive hardiness ranges or greater pest tolerance. We depend on hybridization for most of what we eat. Corn for example is a crop that is only available in hybrid form. We count on “hybrid vigor”— the idea that crossing two very distinct organisms can create particularly robust offspring. However, while hybridization can create diversity, it can also hurt diversity, particularly if the offspring produced are sterile so that populations in general dwindle, or if fertile offspring end up out-competing or restricting the ranges of the parent species. This is why we often don’t see closely related species occurring in the same geographic area, because the costs associated with interbreeding are too high to sustain cohabitation. Being at the Arboretum is really exciting because we do see so much hybridization and artificial selection for diversification occurring in horticulture, and it’s interesting to think about all the potential variation that is possible. Why does some of it happen naturally and sometimes not? It’s amazing to see so much diversity in one place. So much of our thinking about diversity is scattered around the globe. Some species don’t grow naturally anywhere near their closest relatives. So with the Arboretum and its diverse collections, we can actually see species that are closely related growing side by side in a common garden. This gives us the opportunity to compare them, to think about their similarities and differences and how and why they evolved that way. I think that’s a really exciting environment to experience every day.

Q. How do you think your research complements the Arboretum’s mission as a public institution?

A. The Arboretum is an oasis for all kinds of biological diversity in the middle of a large city. If you watch in spring as trees leaf out and begin to bloom, the explosion in the numbers and types of birds in our landscape is incredible, especially relative to areas only a few blocks away. That’s something worth thinking about—without the diversity of plants that the Arboretum displays we wouldn’t have these other diverse communities of insects, birds, and other wildlife that depend on them. The diversity of plants and the organisms that pollinate them is critical to maintaining healthy environments, so from an ecological perspective there is so much we can share here to raise awareness about how these things fit together to make a healthy planet. This is particularly important now, as we see more and more plants becoming endangered in their native habitats, as well as threats to pollinators like honeybees and butterflies through pesticides, disease, and compromised habitats.