Educator Maria Montessori once remarked that freeing a child’s potential can have a transformative effect on his or her relationship with the world. Since the 1980s, the Arboretum has offered field study experiences in the Arboretum landscape to elementary school students in Boston and surrounding communities to promote meaningful interactions between children and the world of nature. Through the generosity of a longtime supporter of these efforts, the Arboretum expanded children’s programs in 2009 by sending educators into Boston Public School classrooms to enhance science education opportunities for neighborhood students. When a three-year collaboration with the Louis Agassiz Elementary School ended in 2011 with the school’s closing, the Arboretum began a new partnership with the Boston Teachers Union School (BTU School) to coordinate science lessons for the school’s Kindergarten, first grade, and second grade students.

Ana Maria Caballero, an early childhood education specialist and teacher with more than 20 years of experience at Brookline Public Schools, was hired by the Arboretum in 2010 to join Manager of Children’s Education Nancy Sableski in teaching students at the partnering school. In the following interview, Nancy and Ana Maria discuss how the program nurtures a broad understanding of general science through a rigorous curriculum, sparking curiosity through thought-provoking activities that promote observation, reasoning, and language skills.

Q: Science can be neglected as a subject of study in primary education, where the emphasis is often placed on a core of reading, writing, and math. How does the Arboretum’s collaboration with the BTU School address this disparity?

Nancy: A driving force in this new partnership is the Arboretum’s commitment to teach all areas of science to the students, and not just the life sciences, to provide continuity of instruction through the entire year and to include more of the curricula that the school system recommends. An important part of this is linking the science material in the classroom with activities that can engage the students outside. When we taught about air and weather, the kids made kites that they took out to the playground to experiment with the ideas of wind and atmosphere. One of the outdoor activities we led in the fall was planting a bulb garden, which we’ll use in the spring to observe how plants grow and then learn about plant morphology.

Ana Maria: Part of what I try to do in every lesson is to build connections with teachers that demonstrate how science can be integrated into the core literacy and math lessons that they are already teaching their students. Science should not be seen as supplementary material or something that’s taking away time from other lessons. By enhancing science literacy, we have an opportunity to work on their reading, writing, and math skills at the same time.

Q: Are there key things about science that you are hoping to impress on kids at this age?

Ana Maria: We talked a great deal about what our ideal vision of science in the classroom would be as we planned the program, and because we teach from pre-Kindergarten to second grade we were able to think about building science literacy as a continuum. For the youngest students, we place a great emphasis on building observation skills, using language and vocabulary to describe their observations, and learning how to draw whatever is being observed. These skills

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THE SCIENCE OF LEARNING

A conversation with Nancy Sableski, Manager of Children’s Education, and Ana Maria Caballero, Arboretum Science Education Specialist

With Jon Hetman, Communications and Stewardship Officer
continue to be important for our lessons with first grade students, but with the additional element of writing as a part of the journaling process. We create word banks, and the kids describe what they are looking at in terms of color, shape, size, and texture. Concepts such as comparing and contrasting individual organisms come into play as well.

In second grade, we strive to continue progress in all of these areas, but add opportunities for kids to think and work independently as well as to work together to encourage listening and cooperation. These experiences prepare kids for greater autonomy as they move into higher grades, when they can begin to plan and conduct investigations of their own design. You can’t get there, though, unless they’ve received a solid foundation in making observations and describing what they see in words and pictures.

Q: What is the role of the BTU School teachers in terms of how science lessons are prepared and presented?

Ana Maria: It’s been wonderful to collaborate with the teachers on lessons, and I have enjoyed opportunities to co-teach the units with the teachers or to identify ways that teachers can continue to include elements of science instruction on their own. They take full part in our planning and assist in instruction, particularly when the lessons break into small groups to take a closer look at organisms or to note observations. With the special education teachers, it’s particularly important to tap into their insight to shape how we can most effectively present the content to their students. Also, with an enthusiastic group of kids, the teachers play a very important role in maintaining proper behavior and respect as we go through the material. Looking to the future, we’d like to bring more teachers to the Arboretum to share the strategies we’ve developed here for using outdoor spaces to teach science. It would be another great way to contribute to how science is taught in Boston.

Q: Are there unique challenges in teaching the students served by the program?

Ana Maria: Conventional wisdom tells us that there are tremendous challenges in engaging inner-city students, but I’ve been astounded by how little they actually differ from children with greater advantages in terms of their aptitude, their curiosity, and their capacity for growth. While it may be true that some challenges exist, the students we serve ask the right questions, make perceptive observations, and create drawings that demonstrate just how engaged they are in the material. This speaks to the core of the program in seeking to provide an exceptional experience that helps kids reach their potential.

Q: How are you tracking individual student development as the year progresses?

Ana Maria: The science journals that the students maintain to record their observations provide an integral part of how we gauge the development of their skills. As the year progresses, we can really see how students’ competencies develop, from writing and drawing to following directions. We’ve seen a lot of growth already this year, from improved listening skills and increased participation in discussions to enhanced direction-taking and independent thinking.

Q: There appear to be tremendous benefits for the students and the school in continuing this partnership. How do you think the program benefits the mission of the Arboretum?

Nancy: Our director is a scholar who enthusiastically promotes the idea of lifelong learning, and we’re working at the local level to implement that vision through primary science instruction. The partnership provides a platform for the Arboretum to become more responsive to the learning needs of our public at every age.

Ana Maria: I think we benefit also by teaching kids to appreciate and respect nature and to become good stewards of the land. If we can instill these concepts in kids at the beginning of their educational development, this regard will translate into other areas of their lives. We’re already seeing kids who understand the importance of things like recycling, and how to do your part to help the world. It’s another piece of encouraging young people to understand their role as citizens, and to be thoughtful regarding how we interact with nature. While it’s our goal to make science interesting and exciting to all the kids we teach, it’s also extremely gratifying to see those students who really take off through the experience. I think it’s one way that future scientists take wing.