



# A Walk in the Woods

*A partnership with an arboretum gets preschoolers outside—and into science.*

*By Cynthia Hoisington, Nancy Sableski, and Imelda DeCosta*

**O**n a warm sunny day in July, 40 preschoolers arrive at the Arnold Arboretum, a public “tree museum” that sits on more than 300 acres of parkland in Boston. As they get off the bus, the children, teachers, and family chaperones are quickly organized into small groups and introduced to the docents who will act as their guides. Soon each group is fully engaged in its own investigation of the natural world. The discovery of a rabbit prompts speculation about what animal it is, what other animals live in the woods, and what are “woods” anyway? And “Oh yeah, where are the bears?”

Like many public parks, the arboretum uses a percentage of its funding to provide nature education for adults

and schoolchildren, facilitated by trained volunteer docents. One such effort is the Head Start–Arboretum project. The Education Development Center (EDC), a nonprofit organization that designs and delivers innovative educational materials and training, developed and facilitates the informal science program, which has provided 121 preschoolers with three guided field trips to the arboretum. The project also incorporated life science training for teachers; early childhood training for arboretum docents; field trip agendas, including explorations and discussions; and pre- and postvisit science curriculum ideas for teachers to use in classrooms (see NSTA Connection).

## The Collaboration

Although the arboretum is located in Boston, it remains one of the city’s best-kept secrets. At the outset of the project, many families were unaware that it is a free public park, open daily on a year-round basis. One overarching goal of the project was to have families adopt the arboretum as a resource, providing their children with ongoing experiences known to benefit physical, social, and cognitive development, and support learning in the domain of life science (Louv 2005).

## Figure 1.

### Nature field trip safety tips.

#### Grouping and Identifying Children:

- Have a clear written plan for grouping children and adults before departing the school.
- Ensure at least one adult for each group of four children. Adults should be fully informed of the names and any relevant characteristics of the children in their group (e.g., if a child is afraid of dogs).
- Whenever possible, match languages and temperaments of children and adults.
- Give special consideration to children with behavioral challenges or children who may be frightened of wide open spaces. Any children with medical considerations should be partnered with a teacher.
- Each child should have a clearly secured identifying tag that provides the name, address, and phone number of the school.
- Each teacher should have the daily attendance sheet clearly marked to show who is present on the field trip, signed parent permissions for each child to go, and the emergency contact names and phone numbers for each child.

#### Safety Precautions:

- Review a list of potentially poisonous plants with park staff to ensure that these plants will be avoided during the trip.
- Discuss safety rules with children before departing. They are to check with adults before handling, smelling, or picking any plants. Nothing is to be put in their mouths. No climbing trees.
- Advise parents beforehand to dress children in appropriate clothing—pants and sneakers or walking shoes. Have a plan for inclement weather.
- A first-aid kit carried by a teacher should be available to each group of 20 children. It should contain appropriate medications for individual children with allergies, along with the doctor’s written authorization for administration.
- There should be at least one cell phone for the group and an established protocol for emergencies including program staff to be notified.
- Sunscreen should be applied to children when appropriate.
- Consideration for stopping, resting, and snacking as children require should be incorporated into field trip plans.
- Any items being collected and taken back to classrooms should be checked by park staff.

Specifically, the collaboration aimed to support children’s developing comprehension of science inquiry and basic life science concepts. As children ran their palms along the rough bark of horse chestnut trees or gently cradled a toad, they would have experiences unavailable to them at school, with potential to augment and enrich their classroom science curriculum.

The following four guidelines were foundational to all aspects of project planning:

- Explorations at the arboretum and in classrooms will connect to “big ideas”;
- All activities will include opportunities to engage in authentic inquiry;
- Related life science experiences will connect over time and across settings; and
- Facilitating adults, especially the teachers and docents, will be aware of life science concepts, the inquiry process, and young children’s development.

Follow your school guidelines for outdoor explorations. See our tips for nature study safety in Figure 1.



### Connecting to Big Ideas

The following “big ideas” or concepts set the stage for our explorations:

***Living things have physical characteristics that can be observed and described.*** During their arboretum visits, children made close observations of the plants, animals, and natural materials they discovered. Children’s explorations always began and ended in the same grove of horse-chestnut trees where each small group explored one tree and its surrounding area. Children examined protruding roots; measured trunks using their arms and long pieces of string; collected tree parts; and used magnifiers to look more closely at bark, leaves, flowers, and fruit. Docents, teachers, and assistants encouraged children to notice details of plant parts and to compare and contrast the physical characteristics of leaves of different plants—incorporating the process skill of classification. Once a toad hopped in front of a group and everyone jumped back in unison. This prompted a close (but guarded!) observation of the toad, and the guide asked “Why do you think the toad is so hard to see in the grass?” “It looks the same!” one child said, noticing that the toad and the grass had the same green and gold colors, hinting at the idea of camouflage, an adaptive characteristic.

***Living things grow, change, and have life cycles.*** Because children visited the same trees during spring, summer, and fall, they were able to observe predictable

changes in the trees that indicated evidence of the life cycle. Large creamy flowers in spring, green spiny fruit in summer, and shiny brown nuts in fall provided lots of evidence for children to collect, examine, draw, and talk about—bringing in representation and communication skills. These observations, along with the conversations that followed, also provided opportunities for children to see patterns (trees change and grow just like other plants do) and make the inference that trees are plants and living things, something that young children often find hard to grasp.

***Living things have needs and they depend on their environments and other living and nonliving things to get these needs met.*** The children soon discovered evidence of animals in and around the trees; a stash of nuts in a trunk hollow, tiny holes eaten in the leaves, and insects crawling on the bark.

As children generated ideas about the creatures that were using the trees for food and shelter, they were introduced to yet another big idea: Living things depend on their environments and on one another for survival. During the second part of each trip, groups moved outward and away from the horse chestnut trees and investigated the minihabitats of grove, meadow, and adjacent woodland. They made predictions about what kinds of creatures they would see, observed the ground and plants closely looking for small creatures, and collected natural items specific to each of these habitats. When one group of children moved a small fallen log in the meadow, they uncovered insects and pill bugs. What did the creatures like about being under the log? Children hypothesized that they were hiding from other animals.

## Authentic Inquiry

Throughout the project, we focused our attention on supporting children's use of three specific fundamental inquiry skills: exploring, representing, and engaging in science talks. We chose these because they could be used and practiced during follow-up activities in the classroom, and drawings that could be taken home would help children share their experiences with families.

We knew that many of the children had never been out in nature to this extent and predicted that they would be either overly nervous or overconfident about exploring. We also knew that observation, the hallmark of exploration in the natural world, would require a measure of self-control that would be difficult for some. But during each trip, we were amazed consistently by the children's willingness to make close observations, talk about them, and generate ideas about what they observed. When one small group discovered some leaves with tiny holes in them, they



Students explore how bark feels.

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looked at the leaves with their magnifying glasses and shared ideas about what had caused the holes. “Something was eating them” said one child. “Maybe a squirrel!” said another. “I think it was spiders!” said a third.

One strategy we used to support exploration was to encourage the children to explore using all of their senses (except taste!) whenever possible. At the beginning of the first trip, docents asked children to lie down on the grass, close their eyes, listen to the sounds they heard, and feel the grass and breeze on their skin. “How does it feel to be rooted to the ground like a tree?” one docent asked the children. “It feels soft,” “It feels hot on my face,” and “It feels so relaxing!” were some of the children's comments. Docents and teachers invited children to hold, touch, and feel the plant parts they collected, and introduced words like *sharp*, *smooth*, and *spiny* as they supported children's descriptions.

During the second half of each trip, children spent time drawing trees and items of special interest they had collected on their excursions. Drawing helped children notice detailed physical characteristics like the different shades of “green, green, and green” on a leaf, the number of legs on a spider, or the shape of a tree when you stand back to look at it. The drawings also acted as prompts for conversations on the trips and back in the classrooms.

Science talks allowed children to express prior knowledge, describe observations, state comparisons, and share ideas. While studying the fruit from a horse chestnut tree in summer, one child said that it looked like a pineapple, which prompted a conversation about similarities and differences: “It's the same shape as a pineapple” and “it's pointy” but “it looks different inside.” Docents and teachers supported children's engagement in science talks by asking open-ended questions that helped children describe their observations. Questions like “What do you see

inside that flower?” (a little green, more yellow, grass); “How did the bird sound?” (cawwww!); and “What do horse chestnuts look like to you?” (a ball, a squash, an egg) also helped children look and listen more closely and compare new items to familiar ones.

Exploring, representing, and participating in science talks continued back in the classroom as children continued to investigate, draw, and discuss their arboretum collections and do related activities. This helped to connect children’s field trip and classroom experiences. For example, for the spring field trip, intentionally sequenced suggestions included making outdoor observations of trees and other plants around the school; observing, describing, and categorizing seeds; planting beans; and observing and documenting plant growth over time. In one classroom, for example, children did a focused investigation of bean seeds and observed them sprout and grow over time to learn more about the needs of living things.

## Assessment

Children’s life science learning and their ability to engage in inquiry were primarily assessed through observation of their behavior during field trips, review of their observational drawings, and their participation in science talks. Assessment was primarily used to uncover children’s current ideas about living things so that teachers could intentionally plan direct experiences and conversations that would move children forward in their thinking about living things. Some typical ideas of preschoolers include that trees are not living things; that insects are not animals; and that seeds will all grow into flowers, no matter where they come from. Children’s tree drawings made during and after the first field trip indicated confusion about roots and root structure. Four of the drawings show that children were not thinking about the roots of a tree at all. Two of them show some roots but the structure is stunted. Another shows a child’s theory that birds enter, live, and fly inside the trunk of a tree. By uncovering these early understandings, teachers have opportunities to plan direct experiences and meaning-making conversations that help children question and further explore these ideas and generate new theories, based on the evidence they observe. For example, teachers may support children’s learning about tree roots by pulling up a small tree (like the guide did on the first field trip) and inviting children to investigate, measure, and draw the roots.

## Adult Participation

In this project the three critical groups of adults were the teachers, the docents, and the families. By having docents paired with teachers and teacher assistants on field

trips, we hoped to take advantage of their complementary skills and strengths. We also hoped that they would learn from one another how to best facilitate children’s nature explorations and model this for family chaperones.

The arboretum docents are volunteers and include men and women with a broad range of personal and professional experiences in the life sciences, education, and related fields. What they share is a deep understanding of life science concepts, familiarity with the arboretum and its plant and animal life, and an enthusiasm to share their knowledge with children.

The teachers brought with them knowledge of developmentally appropriate practice, teaching strategies that are effective with young children, and an intimate familiarity with each of the children. As indicated by a pretraining survey, however, many teachers also came with some discomfort about nature and were nervous about leading children’s life science explorations outdoors. EDC provided training for docents and teachers adapted from *Discovering Nature With Young Children*



Examining a tree up close.

(Chalufour and Worth 2003) and *Worms, Shadows, and Whirlpools* (Worth and Grollman 2004). These resources describe a developmentally appropriate yet cognitively challenging approach to facilitating young children's science investigations. Training for the teachers focused primarily on preparing them to lead children's investigations by engaging them in their own inquiry-based investigations at the arboretum. The arboretum coordinator facilitated a teacher investigation of the horse-chestnut trees that children would explore, thereby modeling the inquiry approach we wanted teachers to use with children. Teachers made observational drawings, shared ideas, and raised questions about the physical characteristics and needs of the plants and animals they observed. The coordinator shared photographs with teachers showing how the trees would change over the course of the seasonal field trips and described the life cycle of the trees. Teachers who lack this type of expert guidance may enrich their own explorations of trees and other plants with resources such as regionally specific field guides and the D.K. Eyewitness Books, *Tree* and *Plant*, which are useful as reference books in the preschool classroom (Burnie 2005a and 2005b).

In the posttraining survey teachers indicated that their outdoor experiences gave them heightened confidence about being in nature and supporting children's explorations.

Families in the program included a broad range of cultures, ethnicities, languages, and nature experiences. From the beginning of the project, teachers promoted family involvement directly by inviting family members to be chaperones on each trip. Midway through the project, EDC and the arboretum coordinator hosted a short presentation of the project at a parent meeting, showing photographs of children exploring the arboretum during the first field trip. These photographs, along with personal invitations to each family written in their native languages and decorated by the children, generated excitement about a family day event planned in conjunction with the final field trip for children. This event was held on a Saturday to boost participation of working families, included multiple family activities led by the docents, and was supported by Head Start staff who attended with their own families. Staff and program families walked in the woods, read children's nature books, examined natural items with magnifiers, and were invited to pose for portraits in the park using film donated by the program.

## Deeply Engaged

It was clear that children paid close attention to the environment, observed minute details closely, and stayed deeply engaged in the facilitated experiences. A collec-

tion of children's drawings revealed a gradual increase in their abilities to represent what they observed. Teacher feedback completed at the end of the project reported that the children learned new vocabulary words, including tree names, and observed similarities and differences among trees. Teachers also noted children's appropriate use of the magnifier and their increased ability to recall their experiences back in the classroom.

The Head Start–Arboretum project provided children with authentic experiences with nature that gave context to their school life science activities. All of us that participated gained respect for the importance of these experiences in the lives of all young children. ■

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## NSTA Connection

Find a letter for chaperones, pre- and post-field trip activities and discussion ideas, and assessment questions at [www.nsta.org/SC1010](http://www.nsta.org/SC1010).



## Connecting to the Standards

This article relates to the following *National Science Education Standards* (NRC 1996):

### Content Standards

#### Grades K–4

#### Standard C: Life Science

- Characteristics of organisms
- Life cycles of organisms
- Organisms and their environments

National Research Council (NRC). 1996. *National science education standards*. Washington, DC: National Academies Press.