Bringing Science to Disadvantaged Children

We watched the deer gracefully pick its way through the forest as Neal explained the function of the deer's white tail in signaling danger. We had already explored life under rocks in the forest, discussed the role of fallen trees in the forest ecosystem, and learned how to identify poison ivy and why to stay away from it. The children were asking thoughtful questions, and were eager to figure out the answers to the questions Neal posed to them. We picked wild raspberries, noticed the groove left on the bark of a tree by a twisting vine, and found a May apple patch trampled down by deer that had come to feed. Later, in the park's nature center, we watched a corn snake (so named because its markings resemble Indian corn) strangle and eat a mouse. The children who had been hardest to control as we were setting out were the ones who were the most excited and inquisitive about our finds. It was hard to believe that these were disadvantaged children with a lot of uncertainty in their lives.

The children were residents of transitional housing in Arlington, Virginia. The house is run by the Arlington-Alexandria Coalition for the Homeless, and provides temporary housing for homeless families before they move into long-term independent living situations. In addition to housing, adult residents receive instruction in job-hunting, managing personal finances, and parenting. They also are required to obtain and hold a job if they do not already have one. Many of the adults are single mothers who are struggling to stabilize their lives, and they have difficulty providing sufficient attention and support to their children. Volunteers at the shelter give the children extra attention by helping with homework, reading with them, organizing activities, and simply providing a caring adult presence. *Science Can be Fun!* was designed to supplement these activities by exposing the children to science in a way that stimulates the children's curiosity and generates positive associations with learning.

The program targets disadvantaged children, aiming to catch elementary school children before they have learned that "science is hard." I was particularly interested in working with children who have suffered the dislocation of being homeless because the lack of a long-term residence can make learning fragmented and I wanted to help the children use learning to break the cycle of poverty.

In setting up the program, I felt very limited by my lack of experience in teaching science to children. How could I hold their attention for more than five minutes? What could I say that would excite them? I felt further hampered by a lack of access to materials for exciting displays since I no longer work in a laboratory. It seemed best to start by consulting a scientist who was already doing such projects with children, but finding an appropriate mentor was difficult. So, I decided to set up a series of sessions led by scientists who were invited based on their areas of expertise and skill with children. I chose hands-on activities that would teach the children but would not feel like school. Because the group included a broad age range (about 6 through 10), all activities had to be interesting and accessible to students with various backgrounds.

The first event was an astronomy viewing night, inspired by the memory of my excitement the first time I saw the moon in the telescope. Members of the Northern Virginia Astronomy Club (NOVAC) generously agreed to set up their telescopes in a local park one night and show the children how to find interesting objects in the skies. We chose a night with a first-quarter moon so that the shadows on the lunar craters would be dramatic. Due to light pollution in the Washington, DC area, we were limited to looking at the moon and Jupiter. Yet that was sufficient for some basic lessons. The children noticed that the objects that started out in the center of the viewing area moved to the side within several minutes, leading to a discussion about the Earth's rotation. We were also able to identify the four Galilean moons of Jupiter. Several of the telescopes, made by the club members, were sturdy enough for the children to aim and focus by themselves. Being able to point the telescopes was as much of a hit as looking through the eyepiece!

For both the nature walk and the astronomy night we had a high adult-to-child ratio so that each child could get as much individual attention as possible. It was surprisingly easy to find people who wanted to take a few hours to share their expertise with the children. The local park authority was also very cooperative in granting permission for us to stay beyond the dusk closing time of the park for the astronomy night. The observation night provided an additional benefit to the NOVAC club members. NOVAC is a nonprofit corporation whose primary purpose is to provide enjoyment and education to the public through astronomical observations. Its activities include regular observation nights for members and friends and also more general observations with schools and the public. Yet several of the members remarked that they felt an extra pleasure in being able to share their hobby with this group of children.

Holding hands with Sherrie as we walked through the woods, or showing the children how to look at slides through the microscope, I could see that time spent with attentive, caring adults was at least as important for children as the science they learned. In addition, since children only stay at the shelter for about three months, they are frequently coming and going, and it is difficult to build up a sense of continuity between programs. Yet I hope that the science trips will stand out as good times during a difficult period in the children's lives so that science is associated in their minds with excitement and fun.

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The Education Exchange highlights the experiences of scientists and engineers with local schools, along with helpful hints and resources. If you would like to share your own involvement in science education, contact: Finley Shapiro, Department of Electrical and Computer Engineering, Drexel University, Philadelphia, PA 19104, U.S.A. Phone (215) 895-6749; fax (215) 895-1695; e-mail: shapiro@ece.drexel.edu

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