Revealing the Wonders of Nursing Science

It was a science classroom full of eager seventh graders, that much was plain to see. A high decibel buzz of conversation punctuated by an occasional "All right!" or "Cool!" filled the room. Lithe bodies maneuvered expertly through the obstacle course of tables, chairs and fellow students to get a better look at each science experiment in progress. They stood on their toes, peered over their classmates shoulders, and handled as many objects and instruments as they could lay their hands on. When an experiment was complete and the expected results achieved, they shouted the findings to their friends; it didn't matter whether their friends were across the room or standing right next to them.

Pure delight filled their youthful faces. Their genuine curiosity and unguarded enthusiasm deceived the first time onlooker. Only after a few minutes of close observation did the unaccustomed observer realize that he was actually standing among seasoned public school teachers instead of a classroom full of seventh graders. Utterly engaged in the classroom activities, none of the teachers seemed to give much thought to the fact that they themselves were part of a scientific study.

The study in question, the Peabody Teachers Program, is funded by a Science Education Partnership Award from the National Institutes of Health. A science literacy initiative in New Haven elementary and middle schools, the program aims to educate and excite teachers and students to experience the diversity of the natural world with a positive attitude towards scientific inquiry, and to promote the incorporation of science and scientific inquiry methods in the classroom. "The program provides participants with access to the educational resources of the Peabody Museum to enhance the learning experience in their classrooms" explained principal investigator Michael J. Donoghue, Director of the Peabody Museum and G. Evelyn Hutchinson Professor of Ecology and Evolutionary Biology. "It helps educators to develop new and exciting ways to

YSN's Esther Seibold (center) participated in the Summer Biodiversity Institute with other Yale graduate students and teachers from Greater New Haven.

teach children to view their environment, to strengthen students' observational and investigative skills, and instill a respect for biodiversity."

The program works closely with selected teachers to develop science curriculum units aligned with state and national science standards. Although participants are officially welcomed into the program at a reception in the spring, their year truly begins with the summer Biodiversity Institute. Often described as "summer camp for teachers," this weeklong professional development course takes place each summer at the Peabody Museum. The institute includes a number of laboratory and field activities. During a jam-packed week in June of 2003, teachers examined a series of Petri dishes, looking at the impact of spices such as garlic, hot chili peppers and cinnamon on various types of bacteria. Another group looked at the parts of a flower and identified the functions of each. To gain a better understanding of a flower's structure, the group dissected one and drew diagrams based on their observations. Another experiment involved DNA extraction; the group was

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able to end up with strands of wheat germ DNA in a test tube and to examine those strands. Classroom discussions reinforced knowledge gained in the lab. Didactic activities included lectures on group process, as well as on issues in biodiversity.

The program also included field trips. One group visited an Asian oriental grocery market where they were introduced to a multitude of exotic foods. "We looked at distinctive Asian fruits, vegetables and herbs; products most teachers normally wouldn't come in contact with regularly," said Esther Seibold, a doctoral student at YSN. "This and other hands-on activities helped program participants gain an appreciation for the wide variety of resources in our community that can be used to help children develop a better understanding of natural science."

Throught he Museum's NSF Graduate Teaching Fellows in K–12 Education Programs, Esther is working closely with Peabody Teachers to develop lessons that introduce scientific inquiry methods into their schools' curriculum. According to Esther, the partnership between nursing science and public school education makes perfect sense. "My own research focuses on the relationship between public schools and health services," she explained. "With a better understanding of each other's roles, teachers and nursing professionals can be very effective collaborators."

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Laura Fawcett, program director of the Peabody's NSF grant, agreed. "The GK–12 Fellows Program brings together a diverse community of scholars and educators who develop strategies to encourage, support and sustain interest in the sciences. We are very pleased to have Esther share her unique expertise with the other program participants."

In the hope of recruiting Yale doctoral students into the program, Ms. Fawcett sought assistance from Dr. Ruth McCorkle, Esther's academic advisor. Dr. McCorkle recognized at once that Esther was a great choice for a GK–12 Fellowship. "I was aware of Esther's long standing interest in school health issues," said Dr. McCorkle. "It was clear that her background and experience were perfectly suited for the program." She encouraged Esther to apply, and in May of 2003 Esther was awarded a fellowship, along with four other Yale graduate students in the sciences.

That spring, Esther took part in a series of instructional seminars that introduced her to the numerous collections in the Peabody Museum. She also met with the museum curators, collection managers and other members of the Yale scientific community. This orientation process proved extremely useful to the GK–12 Fellows, according to Esther. "It helped us to identify university resources we would have access to in our work with teachers and students in the program," she said. She also participated in the daily activities of the Biodiversity Institute, helping to guide teachers through each laboratory experiment, and discussing with them strategies to incorporate what they have learned into their classroom instruction. "The institute served as a springboard for us in developing curriculum topics in science to be delivered in the classroom in the coming year," she said.

By the end of the week-long summer institute, teachers had identified their

topics and were provided with an informational packet to aid them in developing lesson plans. Among chosen topics were a study of nutrition and how it impacts health, an examination of the impact of garbage and waste on the environment, and a study of local bodies of water and their place in the ecosystem. The next step was to develop a plan to introduce these issues to students in a classroom setting.

In the fall of 2003, the GK–12 Fellows received classroom teaching instruction. To enable them to become more comfortable in the classroom, each Fellow was assigned a mentor; a middle school teacher who had been a past participant in the Peabody Teachers Program. Fellows then delivered three practice lessons in their mentors' classroom. Esther was paired with Karlen Meinsen, a 5th grade teacher at Conte West Hills Magnet School in New Haven. Her class consisted of over 20 students with varying degrees of interest in and knowledge of science. "That was challenging, but also a lot of fun," recalled Esther. "You have to be extremely flexible and quick on your feet in order to keep students' attention and stimulate their interest. My mentor's help was invaluable in improving my teaching skills with this age group."

Having honed their classroom teaching skills, GK–12 Fellows will provide science teaching and technical assistance to Peabody Teachers as they implement lessons in their classrooms. Fellows will mentor teachers in inquiry-based science techniques, and will also serve as dynamic, young scientist role models for students. Esther has been assigned to Wintergreen Interdistrict Magnet School—serving New Haven, Hamden and Woodbridge—for a period of several weeks in the spring of 2004. Additional work will be required to modify the curriculum for different ages and grade levels of the students, according to Esther. "How one presents the information and keeps the interest level high will vary considerably from third to fifth grade," she said, "but I am looking forward to that challenge."

The fellowship has enabled Esther to gain a better understanding of the rewards and challenges of the teaching profession from the educator's point of view. Due to receive her doctoral degree in May of 2005, Esther says that she is committed to improving nursing education and plans to build on her current research following graduation. "Whether by expanding my current research focus or developing implementation projects, I intend to continue to look for ways teachers and health care providers can minimize barriers to collaboration," she said.

Esther sums up her experience by pointing out that the program impacted her professionally and personally. "If one is interested in creating a better dialog between educators and health care providers, it is essential to first understand school dynamics from the teacher's point of view," she said. "This fellowship has provided a great way for me to expand upon my own understanding of educational systems and has informed my research." She adds, "I have also gained much respect and appreciation for the remarkable individuals who pursue the teaching profession. Their encouragement and collegiality have made this experience very special to me."

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