

## Students Get SMART on Science at UNH Summer Institute

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DURHAM, N.H. -- From crayfish and cloning to acid rain and the human genome, high school students attending a summer institute at the University of New Hampshire are learning there's more to science than what they read in their textbooks.

Forty high school students from New England have given up four weeks of their summer vacation to go back to school. The students, who have interests in mathematics and science, are participating in UNH's Project SMART (Science and Mathematics Achievement through Research Training), a program which aims to educate and challenge them beyond their high school curriculum, while acquainting them with the environment and resources of the university as a place for higher education and research.

"Project SMART is a unique opportunity for learning in an environment very different from the high school classroom," says director Subhash Minocha, UNH professor of plant biology. "The institute is an intensive, hands-on experience where students learn not only what the current trends in various sciences are, but also gain historical and philosophical perspectives for understanding social and ethical issues raised by recent scientific developments."

In Minocha's biotechnology program, for example, participants gain experience in the techniques of cell culture, cloning, DNA isolation and gene manipulation. Recent controversies such as those concerning stem cell research, in vitro fertilization and human cloning are also discussed.

Other activities of the institute include environmental assessment activities on Mount Washington, research

on the "invader" Asian Shore Crab, and examination of global warming issues.

"It's different than anything else I've done," said Kris Cui of Barrington, on a recent field trip to the New Hampshire coast. "The teachers don't just give you an assignment to follow. They allow us freedom to discover, to come up with our own questions and learn how to find the answers."

Project SMART is a collaborative effort of several UNH departments and faculty members, undergraduate and graduate students. Participants this year chose between three areas of study: biotechnology, headed by Minocha; environmental science, headed by Barrett Rock, professor of natural resources in UNH's Institute for the Study of Earth, Oceans, and Space and recent graduate student Steve Hale; and marine and freshwater biology, headed by Alan Baker, associate professor of plant biology, and James Haney, professor of zoology.

The Institute is co-sponsored by UNH and the N.H. Space Grant Consortium. Additional support is provided by UNH's College of Life Sciences and Agriculture, College of Engineering and Physical Science, and Sea Grant Program. Numerous biotechnology companies provided donations of chemicals and equipment.

According to Minocha, it is hoped that, given the opportunity to explore careers in science and mathematics, many of these students will continue their education in these disciplines at the pre-college and college levels.

Most importantly, however, the Project SMART instructors hope the institute will help students to become scientifically literate citizens.

"When the ozone layer is being destroyed, when the water systems are polluted or new drugs and technologies are developed to diagnosis and treat new and old diseases, it is not scientists alone who are involved; it is the public at large that must support such adventures," Minocha says.

"To participate in decision making, we must understand the concepts and techniques of science."

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