

Issue 16, Winter 2001

NASA's High Performance
Computing and
Communications Program

NASA / Winter 2001
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Ospreys photo by Judy Voight Englund



Teachers, students use NASA web resources for discovery

by Louis Varricchio

Armed with an eight-foot-tall display board dotted with weather and oceanographic charts, photographs of birds and colorful satellite images, a group of bashful sixth- and seventh-grade students awkwardly greeted several NASA scientists visiting the Ann Street School in Newark, N.J., recently. Within a few minutes, the students set up their poster display to help explain what they had been working on for the past few months.

These inner-city students began their presentation by explaining to the scientists how certain birds such as the eagle, osprey and sandhill crane migrate along seasonal flyways during the spring. The young students used NASA satellite data, which are available on the Internet, to track and record the birds' migratory behavior. They also presented their findings about vegetation in areas where the birds live and the weather conditions during spring migration. The students impressed the visitors by displaying observational details that made their amateur scientific investigations shine.

The boys and girls of Ann Street School are part of an expanding group of student scientists who are

rediscovering the wonders of the Earth and sky, thanks to a ground-breaking NASA-funded effort called *Leading Educators to Applications, Research and NASA-related Educational Resources in Science* (LEARNERS). Spearheaded by the Learning Technologies (LT) Project, part of NASA's High Performance Computing and Communications (HPCC) Program, LEARNERS participants aim to enhance K-12 science, mathematics, technology and geography education in formal classrooms and informal learning environments across the United States.

Photos by Louis Varricchio



New York-area high school students from left Ryan Wright, Monjia Belizaire and Kevin Fields, Jr. delighted in NASA's satellite data. Wright's Signals of Spring research project won first prize at last year's Brooklyn College Science Research Today fair. The ospreys are one species being tracked by students

LEARNERS programs focus on using Internet-based tools to deliver content from various NASA missions. It is a unique cooperative undertaking that links teachers and students with NASA experts and resources. Seven programs, in various stages of development at six U.S. universities and one independent research laboratory, will demonstrate a wide variety of web-based educational technologies delivering content

related to NASA's mission.

"As a government agency whose output adds new information to the pool of human knowledge, NASA hopes the inspiration and intellectual excitement inherent in the aeronautics and space program will enrich many fields," says Mark León, manager of NASA's LT Project.

Fields of study that stand to benefit from the space program include social science, life science, physical science, mathematics and technology, León stresses. "So the cooperative agreements we have signed with LEARNERS participants are a two-way street," he adds. "NASA also benefits through new blood and new ideas by everyone involved with LEARNERS."

Signals of Spring

The students of Ann Street School are part of a dynamic LEARNERS activity called *Signals of Spring*. Created and coordinated by Glen Schuster, a scientist with U.S. Satellite Laboratory located in Tarrytown, N.Y., Signals of Spring provides teachers and students with instruction on using geography, meteorology, oceanography and seasonal data to track and record the migratory behavior of birds and sea mammals.

Schuster explains that the Signals of Spring curriculum first instructs teachers how to use NASA satellite information to explain the migration of animals to their students. Next, it requires one week of classroom instruction, followed by research and analysis components. Students go on to become species, geography

Photo by Louis Varricchio



Glen Schuster loves the challenge of distributing Signals of Spring, which brings science education to inner-city and rural schools, among other areas.

and weather experts.

"The students at Ann Street School have worked like real research scientists to produce excellent work," Schuster says.

"I am very excited about the educational potential of these and other students we're working with. I think this and other LEARNERS programs will make a positive impact on the nation's K-12 science and math curricula."



Using NASA satellite data, students at Canarsie High School in Brooklyn, N.Y., involved with the Signals of Spring learning program tracked four ospreys during their migration from South America to North America in spring 2000. [94k size.](#)

Arlene Richards, who teaches science at Canarsie High School in New York City's bustling Brooklyn borough, sees concrete results from her students' involvement with the Signals of Spring program. "There are so many good things about NASA LEARNERS and the Signals of Spring program," Richards says. "Students really get involved with it and look forward to it. You can see how well students respond because they like to look up information on their own! They also like working on computers, so the interactive aspect of using the web is a definite strength."

Richards is especially proud of Ryan Wright, a Canarsie student whose Signals of Spring research project won first prize at last year's Brooklyn College Science Research Today fair. The college established the exhibition to showcase science projects created by New York-area high school students. Wright's study called "How Does Weather Affect the Migration of Bald Eagles?" used satellite data to track bald eagles during their East Coast migrations.

"Ryan wants to become a medical doctor," Richards notes, "and the Signals of Spring project is helping him venture into the world of science. As a result, he is going to present his work at other competitions this year. We're

very proud of him."

Glen Schuster, an enthusiastic spokesman for both Signals of Spring and for bringing interactive science education into inner-city and rural schools, sees NASA's support of LEARNERS activities as a real investment in America's schools.

"Signals of Spring is welcome in minority communities," says Schuster. "It's a switch because most of the time inner-city schools are the last to get this kind of thing."

After getting a start in the New York City metropolitan area, Schuster's program has now expanded to include schools in Houston, Texas, and the District of Columbia. During the coming spring, thousands of students in these schools will be pouring over satellite data, interpreting the signs and signals of migrating animals heading north.

America's Farm

Meanwhile, in the American Midwest, another NASA LEARNERS activity is getting underway. Similar to Signals of Spring, this effort involves teachers and students using data collected remotely via satellite or



Teacher Arlene Richards thoroughly tested NASA's Signal of Spring in her classroom at Carnasie High School in New York city's Brooklyn borough.