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Sea Grant
University of Southern California

SEA GRANT PROGRAM
UNIVERSITY OF SOUTHERN CALIFORNIA

Los Angeles, CA 90089-0373
Phone: 213-740-1961 Fax: 213-740-5936
E-mail: seagrant@usc.edu

TEACHING MARINE EDUCATION IN URBAN SETTINGS

Island Explorers

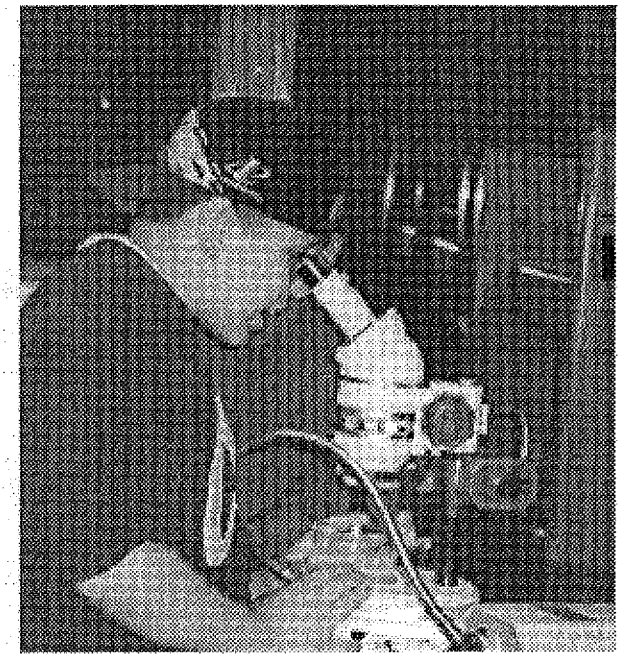
The Island Explorers program is a student-centered science curriculum for elementary and middle school, which is characterized by hands-on, real-life marine science activities that directly correlate with the California Science Framework. It uniquely focuses on Southern California and Catalina Island coastal environs. Island Explorers offers stimulating learning in a cohesive and exciting, well-planned curriculum. The curriculum is multidisciplinary and multifaceted, introducing students not only to marine biology, but to geography and geology, physics, chemistry, and ecology. Telepresence enhancements make the program truly groundbreaking, and introduce students to 21st Century technology. The curriculum is available on Sea Grant's website.

The **goals** of the Island Explorers curriculum are to promote science literacy and to encourage interest and lifelong learning of the marine sciences, especially for minority students. Students develop interpersonal skills through group projects and field trip experiences, and build an awareness of environmental problems, science careers and community involvement.

As part of the Island Explorers program, students may participate on field trips to local beaches and aquaria, an Adopt-a-Beach cleanup, and travel on a research vessel to the USC Wrigley Institute for Environmental Studies marine laboratory on Santa Catalina Island. A "Science Symposium" offers a culminating project to reinforce and synthesize science principles and enhance communications skills.

The Catalina Island Field Trip is an added component to Island Explorers (contingent upon funding). The field trip consists of an overnight trip to the USC Wrigley Marine Science Center on Catalina Island (WMSC). Students travel on a research vessel and participate in onboard science experiments and activities. At WMSC students participate in waterfront studies, laboratory experiments, and island biogeography excursions. They collect data for individual and group research projects for which they have prepared during classroom time.

"This trip has given me lots of experiences, and I believe it will change my life. Now I know more than what I knew before. ...Once you see a beautiful place, you feel that you have to see everything there is."



Distance learning components enrich classroom exercises, and familiarize students with the use of the internet for study and research. Island Explorers curriculum and online activities are available on the Sea Grant website. Video cameras and websites containing scientific data (i.e., current and temperature readings, wind direction, wave height), and interactive online conferences enable students to "virtually" participate in field trips and laboratory experiments and to interact with other students and with scientists.

Teacher Support

Supporting teachers in the use of new curricula such as Island Explorers is an important part of the Sea Grant education program. Teacher workshops familiarize teachers with Island Explorers lesson plans, enhance their teaching skills, and improve their grasp of scientific concepts. Workshops may be designed specifically for certain programs, such as the Parent Child Education Program, or held at WMSC to familiarize teachers with field trip destinations.

Online workshops allow teachers to interact with scientific experts and other educators to explore topics such as El Nino, Marine Sanctuaries, Harmful Algal Blooms, and Coral Reefs. This training enhances knowledge of science content while helping teachers to develop

technological expertise and to familiarize themselves with classroom exercises and distance learning techniques. A partnership with the Sustainable Seas/National Geographic program has involved teachers from all over the world, who may gain graduate credit for participating and developing curriculum components. A recent workshop linked ocean concepts with national geography standards. Future workshops will link ocean content with existing science standards.

"This is an exciting way to learn...to have access to this level of expertise in one course is beyond anything I have experienced before."

Innovations

The Parent-Child Education Program makes basic science concepts approachable for parents and students working together, and helps to develop a sense of environmental stewardship, independent thinking and creative expression. Parents and their students are introduced to basic marine science concepts to enhance science literacy. Life and learning skills are taught by the USC Department of Occupational Science and Occupational Therapy. The 7-week course focuses on environmental issues, social responsibility, communication skills and self-esteem building and includes a field trip and a culminating project. In addition, families explore career opportunities in the marine, health or social science arenas. Many participants have never been to the beach or seen the ocean and have no understanding of how their actions can impact the marine environment. The program fosters a lifelong interest in science and a sense of stewardship and concern for their communities.

Summer Science Programs for Young Women invite middle school and high school girls to the Wrigley Marine Science Center on Catalina Island to participate in snorkeling, kayaking, labs, field trips, and science activities. The program schedule includes field data collection, snorkeling, kayaking, a hyberbaric chamber tour, marine arts and crafts, and hands-on lab and field activities. The program theme of "fun and learning" is housed in the larger context of "Women in Science." Female research scientists, graduate students, and teachers interact with students, who are given the opportunity to see women in a variety of marine related careers in environmental policy, research science, education, and diving safety. Catalina Island is a perfect teaching 'lab' for introducing science topics, and a beautiful place to have fun, too!

"I hope you keep doing this for many young women in the years to come...you taught us a great deal about the ocean and the life in it."

The "Global Heartbeat Project" brings together young people and scientists through a partnering of research institutions, schools and marine aquariums. "Global Heartbeat," a hands-on environmental science and educational program, uses an ecotoxicological research method developed at the University of Plymouth, England, to monitor a crab or mussel's heartbeat in response to environmental stimuli. An infrared sensor is harmlessly glued to the shell of a crab or mussel, and the signal transmitted to a computer which records changes in the organism's heartbeat in response to environmental stimulus. Monitoring crabs' heartbeats helps demonstrate the relationships between ocean health and the health of living organisms, and offers a new approach to the study of marine biology, coastal ecology and environmental science. A two-year pilot project is developing a research curriculum for high school students. Instructional assistance for using the system in a classroom setting will help train educators to utilize it in their own classrooms. The long-term goal of Global Heartbeat is to bring together students, research scientists, and colleagues at marine aquariums in a pollution monitoring network. A website will include data summaries, curricula, and discussion forums where scientists and students can interact.

"I could feel their heartbeat with my finger and we could see their reactions to salinity and temperature changes." "It was really neat to do our own experiments and see how the heart rates rapidly changed."

Making a Difference for Southern California Students

Sea Grant's Island Explorers marine science program has been taught in many elementary and middle schools in Southern California, particularly in minority and underserved schools near downtown Los Angeles. Hundreds of students have been exposed to marine science and other science disciplines through classrooom use of Island Explorers. Marine science provides an effective "hook" to engage students and teachers in science education, and to foster interest in science and environmental careers. As an interdisciplinary pursuit, marine science fosters learning not only in traditional science but also in mathematics, reading and a general interest in educational advancement.

For more information please visit our website: http://www.usc.edu/go/seagrant

USC Sea Grant Staff:
Linda E. Duguay, Director
Phyllis Grifman, Associate Director
Judy D. Lemus, Marine Advisory Leader
Lynn Whitley, Education Coordinator