



An Innovative Curriculum

Guided by the National Science Education Standards, the program curriculum was created specifically for use with Global Heartbeat. It encompasses science, math, health, social studies, and creative writing, all with a focus on oceans and health. Specific topics include:

- Marine Organisms as Indicators of Ocean Health
- Effects of Stress on Humans and Marine Life
- Invasive Species
- Harmful Algal Blooms
- Public Health and Water Quality Monitoring
- Medicines from the Sea
- Physiology of Crabs and Mussels

What is Global Heartbeat?

Global Heartbeat is a hands-on environmental science and education program for middle and high school students, which promotes awareness of ocean health, coastal environmental issues, and human health implications.

- **Global Heartbeat uses non-invasive scientific technology to assess how well marine animals adapt to stress in the aquatic environment.** An organism's health is related to the health of its habitat, and by monitoring a crab's or mussel's heartbeat, we can begin to evaluate the condition of its ecosystem. In this way, Global Heartbeat may potentially serve as an early warning system of possible ecological degradation and negative impacts on marine biological diversity.

"It teaches kids to use real data and to solve real problems...teaching them to ask questions."

-- Sea Grant Administrator

- **Global Heartbeat engages students, educators, and scientists in cooperative research.** This approach encourages students to experience real scientific inquiry in their learning, and helps them realize that they are contributing to a coastal pollution monitoring network that will be used by people around the world.
- **Global Heartbeat reaches much farther than the participants' own communities.** The program focuses on bringing together different groups such as informal and formal education institutions, universities, schools, and marine education centers. By contributing to a global database and interacting online, students are able to share and compare their findings with Global Heartbeat partners around the world.

One unusual aspect of the program is that it establishes a personal connection between students and living organisms. For students, the realization of this interconnectedness with the environment inspires them to take an interest in their surroundings, and promotes environmental stewardship.

"It ties in the fact that all living species are alike in many ways."
-- Student Participant

Educational Activities

- Collecting organisms in the field
- Hands-on monitoring of organisms' heartbeats in the lab
- Researching the water quality of local waters
- Sharing results online with students and scientists worldwide
- Using new curriculum materials specially created for this program

Program Objectives

- To build awareness of coastal seas and their effect on the health of living organisms, including people
- To increase understanding of how marine organisms serve as early indicators of pollution
- To help students use authentic research tasks and make real contributions to scientific knowledge
- To establish an interactive global Web-based network for information dissemination, data posting from the monitoring research, and dialogue among participants
- To build science-school partnerships

Partners

The program began in 2001 and has had three years of funding from NOAA's USC Sea Grant office. Other partners include University of Maryland Biotechnology Institute and MD Sea Grant, University of Plymouth, Bermuda Biological Station for Research.

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