

ADVANCED ECOLOGY & APPLIED RESEARCH TECHNIQUES

A Marine Resources Development Foundation Teacher Workshop

CONTACT HOURS: 40

GENERAL OBJECTIVE:

This course is geared towards science teachers who are looking to increase their knowledge and understanding of marine ecosystems. This particular course is also geared towards teachers who are interested in participating in data collection for local and international research agencies and organizations. Participants will spend six days at a marine education center in Key Largo, Florida, equipped with classroom, wet labs and the necessary research tools. Ecology discussions, laboratory activities, and demonstrations of common applied research techniques in the evening will be followed by field trips to various ecological communities in the Key Largo coastal marine environment. Participants will snorkel each environment and use the discussed research methods to explore the community diversity and abiotic parameters which define each habitat. Data collection involves water quality measurements, reef fish identification, coral bleaching recognition and soil analysis. Data collected and methods applied will depend on habitat being surveyed. Data collected will be submitted to the appropriate organization.

SPECIFIC OBJECTIVES:

Upon completion of this component, participants will:

1. Derive a definition for the term "ecology."
2. Identify and explain the climactic transition influencing the Keys' ecosystems.
3. Describe four edges or ecotones found in the Florida Keys and the mutual influences among these neighboring habitats.
4. Understand the concept of "abiotic factor" and
 - a. estimate realistic values for five marine aquatic parameters
 - b. define, explain the abiotic prerequisites for three different habitats
5. Understand the geography and geology of the Florida Keys.
6. Describe the life cycle of a marine organism and identify culturing techniques which are crucial to the successful completion of this cycle in an artificial environment.
7. Illustrate the concept of metamorphosis with five examples from the marine environment.
8. Identify six representative autotrophs and six representative heterotrophs characteristic of each of six different coastal communities.
9. Understand the concepts of diversity and abundance of population and predict their response to stress vs. stability.
10. Explain six benefits to the human population of the Keys that are contributed by healthy coastal habitats.
11. Participate in a plankton tow and identify phytoplankton, zooplankton, meroplankton and holoplankton with the aid of a dissecting microscope.
12. Differentiate and cite two examples each of meroplankton and holoplankton.
13. Demonstrate an understanding of limiting factors that affect populations in coastal habitats.

14. List characteristics which define each of the six major invertebrate phyla.
15. Understand the techniques used for evaluating water quality and demonstrate the operation of instruments for these measurements.
16. Explain, and rank order by effectiveness, characteristics utilized for the field identification of coral reef fishes.
17. Make a firsthand exploration of five different coastal habitats in the Florida Keys.
18. Explain the mutualistic relationship that allows corals to develop in an oligotrophic environment.
19. List five relationships between two organisms that are characteristic of the Florida Keys coastal environment.
20. Learn and use research techniques and methods used to study Keys habitats including water quality testing, seagrass quadrats, diversity indexing, coral bleaching and disease monitoring, mangrove soil analysis, and fish identification.
21. Collect scientific data: coral disease/bleaching for Mote Marine Lab, water quality data for GLOBE and Florida International University's Water Quality Monitoring Network, and fish count data for the Reef Environmental Education Foundation.

DESCRIPTION/ACTIVITIES

Participants will complete the following activities:

1. Participate in laboratory activities and biological field studies
2. Attend lectures/discussions

EVALUATION

Participants will have successfully earned continuing education credits upon showing significant improvements in scores on a pre- and post-test, and participating fully in all aspects of the program.