

How Do We Explore? An Online Professional Development Workshop

Presented by NOAA's Office of Ocean Exploration and Research (NOAA OER), and the College of Exploration (COE)

Course Dates: January 24 – February 11, 2011
(Extension credit coursework will be due by February 13, 2011)

Instructor for Grad Credit Portion: Melissa Ryan (NOAA OER)

Workshop Facilitators:

Dr. William Bragg (COE)
Peter Tuddenham (COE)
Dr. Tina Bishop (COE)
Susan Haynes (NOAA OER)
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Location: The College of Exploration's online campus at www.coexploration.org

Cost: Free to participants
Optional: One graduate extension credit through California State University Fullerton is available for \$100. **It is the participant's responsibility to ensure that their education institution will accept extension credit.**

Workshop Description

This three-week online professional development offering titled *How Do We Explore?* is the third in a series focused on NOAA's new ship and America's Ship for Ocean Exploration, the *Okeanos Explorer*. This course will focus on the different technologies used in ocean exploration. It will include inquiry-based lessons for all grade-levels and facilitated online reflective conversations about how we approach the study of our largely unexplored ocean. The course will also feature keynote scientist presenters who are experts in their respective fields and who have made significant contributions to our knowledge of the ocean.

Participants will learn about the innovative techniques, cutting edge tools and scientific processes the scientists and crew of *Okeanos Explorer* will be using in this new era of ocean exploration. Methods for exploration that will be discussed are:

- searching for anomalies
- selecting sites for exploration
- communication tools
- telepresence technology
- mapping techniques
- water column study
- operating remotely operated vehicles

Participants will be formal and informal educators, as well as interested members of the public. An unlimited number of people will be able to participate. Workshop components will include online spaces for Educator Professional Development, a collection of resources, discussion rooms for keynoters to interact with participants, and discussion rooms for educators of different grade levels. Leader's Guides for educators and new lesson plans relating to the keynote topics will be introduced.

Professional Development Offering Outline

Week One – January 24 - 29, 2011

Topics:

- Keynote Addresses: Ocean Exploration and Telepresence
- *Okeanos Explorer* Strategy for Exploration
- The Importance of Scale and the Fractal Geometry of Nature
- Telepresence

Objectives:

- Describe requirements for explorations of unknown areas on Earth
- Compare and contrast ways in which exploration requirements were met by the Lewis and Clark Expedition with ways in which these requirements are met by *Okeanos Explorer* expeditions
- Describe how fractal geometry models natural systems, and how scale influences exploration strategy and results
- Describe selected physical principles that make telepresence possible

Week Two – January 30 – February 5, 2011

Topics:

- Keynote Addresses: Multibeam Sonar; Conductivity, Temperature, and Depth (CTD)
- Multibeam Bathymetric Mapping
- Water Column Investigations

Objectives:

- Compare and contrast bathymetric maps produced by multibeam technology with two-dimensional topographic maps
- Analyze multibeam map images to obtain information about deep ocean topography
- Discuss how deep-sea ecosystems may produce physical and chemical anomalies in the water column that can be detected by exploration instruments
- Analyze physical and chemical water column data for anomalies that may indicate the presence of deep-sea ecosystems and geologic processes

Week Three – February 6 - 11, 2011

Topics:

- Keynote Address: Underwater Robots
- Remotely Operated Vehicles and Video Imagery

Objectives:

- Discuss the concept of biological diversity, and how video imagery may be used to estimate biodiversity in deep-sea ecosystems
- Explain the process of engineering design, and apply this process to solve problems related to underwater exploration with robots

Graduate Credit Requirements

1. Read and Participate in all online sessions. Join and read each of the keynote presentations.

- Listen to/read presentations, ask questions
- Review and explore lessons, resources, and standards (all related to the particular presentation/topic)

Total ~ 9 hours

2. Participate in breakout session(s).

- Dialogue with other educators/break out sessions (discussion rooms, Lounge, etc.)
- Explore other provided resources (web links, books, and other shared resources and lesson plans)

Total ~ 6 hours

3. Answer the “question for the week” in the graduate credit room. The question will relate to the Keynote topics.

4. Demonstrate intended or actual classroom applications by choosing **one** of the options below:

A. Choose two of the lessons presented in this course and describe how you would incorporate them into your curriculum. Include your target audience, Web site links, and additional resources.

B. Create an annotated bibliography of at least eight new resources beyond those presented in this course related to the session that would be useful for others as a reference. These may include Web links, articles, books, and other recommended resources. A description of each resource, as well as suggested grade level(s), possible use in the classroom, and assessment of its value should be included.

5. Complete the workshop Survey. The survey will be posted online and will include questions about the participants' individual learning as well as the workshop format, structure, and content.

COURSE ASSESSMENT:

Participants will have until February 13, 2011 to complete the requirements for graduate extension credit.

Instructors to ascertain that all requirements have been met as stated above.

Note: Attendance related stats will be verified using a manager's monitoring feature of our Caucus software.