

Improving Ocean Literacy by Engaging Informal Science Education Facilities with COSEE SE Partnerships



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Abstract

The Center for Ocean Sciences Education Excellence – SouthEast (COSEE SE) develops strategies for engaging scientists and educators for increased ocean literacy. COSEE SE employs innovative methods at the pivotal junction of science and education to: 1) extend scientific research to the public 2) teach educators about the nature of science and 3) connect informal science education (ISE) facilities with research and formal education communities. The Ocean Sciences Education Leadership Institute (Institute), is a 6-day residential summer professional development opportunity that serves North Carolina, South Carolina and Georgia, and brings together regional scientists and educators. Since 2003, three major themes have been explored: southeastern climate change, undersea research/ocean observing technologies, and coastal/estuarine ecosystems. After the Institute, the educators transfer science concepts to 1) students through teacher designed lessons and 2) local peers through a 6-hour professional development event, Ocean Awareness Day (OAD). The OAD links COSEE SE, Institute scientists and educators with regional ISE facilities. Each OAD is coordinated by Institute educators and hosted at an ISE facility and serves as a multiplier of the Institute impact. Thus, the partnership between COSEE SE and the individual ISE facility extends ocean literacy to a regional audience.

National COSEE Network 12 Thematic and Regional Centers

COSEE Network Mission

- Promote partnerships between research scientists and educators,
- Disseminate best practices in ocean sciences education, and
- Promote ocean education as a vehicle for creating a scientifically literate workforce.

COSEE SE Goals and Objectives

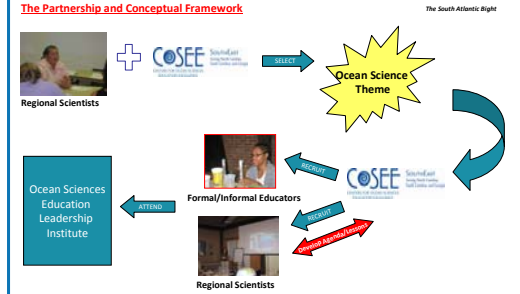
- Engage scientists and educators in mutually beneficial and catalytic programs,
- Facilitate integration of research into high quality educational materials,
- Increase access to ocean sciences for underrepresented populations,
- Develop and support local, regional and national networks to attain a sustainable communication system among ocean scientists and educational institutions, and
- Provide expertise in evaluation design instruments and strategies.

Ocean Sciences Education Leadership Institute

Framework

- 6-8 day residential summer professional development opportunity
- 24 informal and formal educators from NC, SC and GA
- Themes reflective of relevant and regional research priorities
- The South Atlantic Bight serves a geographic and scientific context
- Engagement with regional session plans through lectures, field and lab exercises.
- Follow-up requirements: lesson plan and Ocean Awareness Day hosted at an Informal Science Education facility.

The South Atlantic Bight



During the Institute week, both educators and scientists exchange information through multiple Formats: lecture, field based activities, classroom and lab exercises. The sharing of information is Mutual: Scientists share information pertaining to ocean science research and educators share insight and strategies to communicating this information to their students and the general public.



Institute Ocean Science Themes

Coastal Habitats

Science Topics

- Watersheds
- Water Quality Parameters
- Invasive Species
- Phytoplankton
- Fecal coliform
- Estuary/Wetland Ecosystems
- Barrier Island Ecology

Ocean Literacy Principles

- The Earth Has One Big Ocean With Many Features
- The Ocean and Life in the Ocean Shape the Features of the Earth
- The Ocean Supports a Great Diversity of Life and Ecosystems
- The Ocean and Humans are Inextricably Connected

Undersea Technology and Ocean Observing

Science Topics

- Water Quality Parameters
- Instrumentation
- Undersea Technologies
- Deep water Corals
- Physical Oceanography

Ocean Literacy Principles

- The Earth Has One Big Ocean With Many Features
- The Ocean and Life in the Ocean Shape the Features of the Earth
- The Ocean Supports a Great Diversity of Life and Ecosystems
- The Ocean and Humans are Inextricably Connected
- The Ocean is Largely Unexplored

Southeastern Climate Change

Science Topics

- Carbon Cycle
- Currents/Tides
- Ocean Chemistry
- Climate and Weather
- Sea Level Change
- Greenhouse Effect

Ocean Literacy Principles

- The Earth Has One Big Ocean With Many Features
- The Ocean and Life in the Ocean Shape the Features of the Earth
- The Ocean is a Major Influence on Weather and Climate
- The Ocean Supports a Great Diversity of Life and Ecosystems
- The Ocean and Humans are Inextricably Connected

All of the Institute themes are built upon strong science foundations that enable the development of innovative educational strategies designed to increase ocean literacy. The quality of the science presented during the Institute is reflective of the strength of partnership that COSEE SE maintains with regional research universities and government agencies.

For example, during the 2009 Institute on Southeastern Climate Change, 14 scientists from 10 universities participated in lectures, panel discussions, field trips and classroom/lab activities.

Strategy to Extend Ocean Literacy to ISE: Lesson Plan Development and Implementation

As one of the requirements of the Institute, formal and informal educators submit an outline for a lesson plan that reflects the science and activities presented. This is due at the end of the Institute.

During the following school year, educators are required to implement their lesson plans, based on the outline submitted during the summer. Educators then submit an implementation report that documents: changes to the original lesson plan outline, strategies/activities used, assessment tools, reflection piece.

This strategy extends the Institute science information and ocean literacy to both classrooms (formal) and to programs offered at Informal Science Education facilities.

Strategy to Extend Ocean Literacy: Engaging ISE Facilities in Ocean Awareness Days

One of the most innovative strategies for ocean literacy extension requires the Institute educators to coordinate and host an Ocean Awareness Day during the following school year at an ISE Facility. This includes organizations such as museums, aquariums and environmental education centers.

The OAD is a 3-hour professional development day that brings together a tri-fold partnership of Institute formal and informal educators, ISE facilities and staff and regional scientists. The OAD extends information presented during the Institute to local teachers and school districts. The OAD is supported by COSEE SE and is mutually beneficial to Institute educators, ISE facilities, and participating scientists. The Institute educator demonstrates leadership in assimilating new science information and science concepts presented along with established ISE exhibits and programs in more than 80% of events. The ISE staff benefit by receiving new science information and resources. Partnerships with the scientists are nurtured by their involvement in the agenda as speakers and facilitators in activities.

Scientists and Formal Educators work closely together in the development of the OAD to determine which science concepts from the Institute are the most relevant to present. This partnership enables the networking that occurred during the Institute to be nurtured and extended beyond the scope of the Institute. Often scientists will deliver a presentation during the OAD and remain for the duration to assist with educational activities and lessons. Formal educators encourage the networking and collaboration between the scientists and their peers.

Scientists and Informal Educators/ISE facilities work closely together in the development of the OAD to determine which science concepts from the Institute are the most relevant to present as well as which science concepts align with ISE exhibits and existing programs. The ISE serves as the hosting site for the OAD and often serves as the main channel for promotional efforts.

Informal Educators/ISE facilities and Formal Educators work closely together in the development of the OAD to determine what elements from the Institute would be the most relevant to present to their peers. The ISE facility staff provide the hosting site and promotional efforts while the formal educators assist with obtaining resources, developing the agenda and leading activities during the OAD. ISE facilities have the opportunity to showcase their exhibits and programs during the OAD.

Conclusion

The COSEE SE ISE Network: The Multiplier Effect

Network of ISE facilities that support COSEE SE professional development)

The network of ISE facilities that has been established since the Institute began in 2003 totals more than 35 aquariums, museums and environmental education centers in GA, SC and NC. Their participation as an extension of the information presented during the Institute serves to:

- Nurture partnerships between both formal and informal educators in designing an OAD. Formal educators also have a first-hand experience in what types of programs and exhibits are available for use by their schools and classes.
- ISE facilities have the opportunity to serve as a multiplier of Institute and ocean literacy concepts as the information, lessons and activities are infused into existing programs and exhibits.

As an overall estimate: Each year twenty Institute educators reach up to 500 people during the OAD that is hosted at an ISE facility to their peers, who in turn reach up to 5000 students/year. In addition, ISE facilities reach hundreds of members of the general public each year.

Resources

- www.cosee.org (SEPORT map)
- www.cosee.org (COSEE Network Map)
- www.cosee.org (South Atlantic Bight graphic)