**Distance Learning Programs in Marine Science (for MAST)**

**Alaska SeaLife Center:**

"The Scoop on Poop"
Alaska SeaLife Center researchers need your help. Why is the Steller Sea Lion population declining? Environment? Pollution? Diet? How do scientists learn what animals eat without watching them eat? They get the "Scoop on Poop". Students will use the scientific method to begin to answer some of these questions. Through the dissection of Steller Sea Lion scat students will discover how animal scat can be used for clues about diet and foraging behavior. Students will see what species, weight, and size of fish the sea lion has been feasting on. We will make use of actual satellite data on the distribution and movement of Steller Sea Lions and track their behavior on remote rookeries. Designed for grades 6 - 12.

"Customized Programs"
Do your students show exceptional enthusiasm for a particular lesson plan or subject? With advance notice we will modify existing programs or create specialized programs to accommodate specific lesson goals, age or understanding levels or expertise.

**Cosi – Columbus:**

"Exploring the Ocean Floor"
October 18, '05 @ 9:00 AM ET – ONLY ONE DATE!
$130

Applicable subjects: Oceanography, Geology, general science, Physics

Dr. Kathryn Sullivan, President and CEO of COSI and the first American woman to walk in space, will talk with students and answer questions about deep ocean exploration. As part of the program, Dr. Sullivan will challenge the students to plan an ocean exploration as if they were in the shoes of Dr. Robert Ballard as he prepared to search for the Titanic. She has her own unique connection to the area as well, having completed the original detailed seafloor mapping in and around the Titanic wreck site as part of her PhD research. Dr. Sullivan is a Captain in the U.S. Naval Reserve, specializing in oceanography and environmental forecasting. She served as Chief Scientist for NOAA, the National Oceanic and Atmospheric Administration, where she oversaw research and technology programs in several areas, including climate and global change, marine biodiversity and satellite...
Distance Learning Programs in Marine Science (for MAST)

instrumentation. Students should prepare questions in advance, based on the information sent to the teachers. Test connection is on October 14 at 2:30 PM.

Great Barrier Reef Marine Park Authority HQ, (Townsville, Australia):
Note: due to time difference (they are 15 hours ahead of us), programs would have to be scheduled as a special late afternoon/early evening activity (5pm or later for a start time of 8am or later in Australia)

“Reef Videoconferencing”
What is Videoconferencing? Wherever you are in the world, experience the Reef with Reef Videoconferencing. During this underwater fact-finding mission, your classroom will be transported to the Coral Reef and Predator exhibits at Reef HQ in Townsville, Australia. State-of-the-art technology unlocks unique teaching and learning experiences, including information delivered live by a scuba diver. Reef Videoconferences are supported by comprehensive teaching materials, and educate students about a range of marine issues.

Supported by a team of qualified educators, you and your students will:
- observe more than 5000 live sea creatures;
- experience the habitats, ecosystems and behaviour of reef creatures;
- analyse the interactions that exist between reef creatures;
- appreciate the requirements for a healthy ecosystem;
- discover the latest in reef research; and
- take actions that will protect the future of the Great Barrier Reef.

The Reef Videoconferencing program is very flexible. Therefore if there are any specific topics that you want covered during the session please let us know. Reef HQ has multi point capabilities so schools can split the cost if they wish to undertake a Reef Videoconference together.

Marine Education Center & Aquarium, University of Georgia:

“No Wetlands, No Seafood!” (Gr. 8-12)

DESCRIPTION: What do things like tides and salt marshes have to do with ordering blackened redfish at your favorite seafood restaurant? Join Marine Resource Specialist Paul Christian to discover the intricacies of life in a Georgia estuary.

Melbourne Zoo (Australia):
"Something Fishy"
Find out more about our Australian Fur Seals and our programs about Marine Entanglement, "Diving through Debris" and "Seal Pool Chemistry".
Distance Learning Programs in Marine Science (for MAST)

Mote Marine Laboratory:  All New

"Coral Reefs"
Grades 8-12, 50 minutes.

Why are coral reefs important? Discover the value of coral reefs to wildlife and how important they are to people too.
The SeaTrek companion curriculum for Coral Reefs is downloadable from the Mote Marine website. (See curriculum appendix for alignment to National Standards).
Topics include:
Coral Reefs are Animal, Vegetable AND Mineral. (~5 min.)
Why are Coral Reefs Important? (~5 min.)
What is Threatening Them? (~10-20 min.)
What is Mote's Research on Coral Reefs? (~5 min.)
What can Students Do to Help Coral Reefs? (~10 min.)
Questions and Answers. (~5-15 min.)

"Secret Life of Dolphins"
Grades 4-12, 50 minutes.

Think you know everything about dolphins? Stay tuned as we expose the reality of these misunderstood marine mammals. The students will be introduced to dolphin reality; dolphin anatomy and adaptations; dolphin society; dolphin behavior; dolphin research; and dolphin conservation. Students will also learn the popular misconceptions about dolphins and why they are often misunderstood. The SeaTrek companion curriculum for this program is downloadable from the Mote Marine website. (See curriculum appendix for alignment to National Standards).
Topics include:
Basic mammalian and specific dolphin anatomy and physiology.
The resident dolphins of Brookfield Zoo and their life histories.
Double Dolphin game featuring dolphin diets, behavior and communication.
Wild dolphin research featuring the work of Dr. Randy Wells.
Question and Answer featuring live video from our Dolphin and Whale Hospital.

"Ocean Fisheries"
Grades 8-12, 50 minutes.

Why are ocean fisheries important?
The material provides a basic understanding of fish biology, oceanic food webs, fisheries ecology, recreational and commercial fisheries, issues facing sustainable fisheries, technologies and methods used in fisheries, and highlights particular issues of concern as well as research to explore these issues being done by Mote Marine Laboratory's Center for Fisheries Enhancement.

9/8/2005 page 3
**Distance Learning Programs in Marine Science (for MAST)**

The SeaTrek companion curriculum for this program is downloadable from the Mote Marine website. (See curriculum appendix for alignment to National Standards).

**"FIN TV: Marine Careers"**  
Grades K-12, 50 minutes.

Dive into exciting careers and speak live with Mote's experts! SeaTrek offers opportunities to interact with experts from a variety of career paths, such as a marine scientist, an aquarist, an educator, a manatee trainer and more! These events will be organized by SeaTrek staff, and offered “first come - first serve,” on particular dates which will be posted periodically on SeaTrek's website starting in September.

Objective: The students will learn about marine science and aquarium careers and what it takes to work in these fascinating fields.

**New Jersey State Aquarium:**

"How Do They Do That?"

The world is full of a diversity of habitats, each requiring special adaptations for survival. From the sticky tube feet of the sea star, to the terrific tail of the horseshoe crab, join us in discovering some amazing adaptations of the animal world! Designed for grades K - 8.

**Skidaway Institute of Oceanography:**

Research faculty from the Skidaway Institute of Oceanography (our campus neighbors) are also available for presentations on several facets of biological, chemical, geological, and physical oceanography. The professors listed below are available for presentations on their areas of study. **Arrangements for these programs must be made well in advance (several weeks), to accommodate ongoing research and travel.**

**Dr. Clark Alexander, coastal geological processes:**

- Research Interests and Projects: Rates and processes of sediment accumulation and strata formation in estuarine, coastal, shelf, and slope environments using radiochemical techniques and tracers. Sediment dynamics and coastal erosion. Historical records of anthropogenic impacts on the coastal zone.

**Dr. Marc Frischer, marine microbial ecology:**

- Research Interests: Research in my laboratory focuses on the role of microbial diversity in marine environments and the use of molecular methods to investigate microbial diversity. A large emphasis is placed on the development and evaluation of new methods, particularly those that can be used in situ. In addition, a focus of my laboratory is the adaptation of genetic probes to a wide variety of uses in applied marine sciences, biotechnology, and bioremediation. Current projects include investigations of new methods to determine the in situ activity of single cells, molecular methods to study the utilization of inorganic nitrogen by marine bacteria, bioremediation of saltmarshes contaminated with PCBs and mercury, and the use of molecular genetic probes to evaluate the efficacy of stock enhancement in marine fisheries.
Distance Learning Programs in Marine Science (for MAST)

Dr. Rick Jahnke, chemical oceanography:
- The study of sediment chemical, biological and physical processes that control the chemistry of benthic and marine systems. Specific examples of recent research interests and projects include:
  1) development of ocean observatory infrastructure via the ORION Program and coastal observatory research via the CoOP Program
  3) continental shelf biogeochemistry including benthic primary production (Jahnke et al. (2000) CSR 20:109-127)
  4) denitrification pathways in sediments (in collaboration with graduate student Alex Rao)
  5) the metabolic and chemical processes controlling the dissolution and preservation of calcium carbonate on the deep sea floor (Jahnke and Jahnke (2004) GCA 68:47-59)
  6) the magnitude and distribution of the global flux of organic carbon to the deep ocean and sediments (Jahnke (1996) GBC 10:71-88)

In all of these projects, particular emphasis is placed on designing, constructing or adapting new instrumentation that permits novel sampling and observation. Specific recent examples include autonomous benthic flux chamber instruments for the deep ocean; paired light and dark chambers for continental shelf benthic primary production measurements; a simple adaptation to a spade box corer and acrylic core barrel to collect sandy sediments with intact porewaters; and a deep sea corer that recovers sediments without decompression or warming.

Dr. Richard Lee, bioremediation:
- Research Interests and Projects:
  - DNA Damage and Embryo Developments in Grass Shrimp Exposed to Contaminants
    We use a rapid and sensitive assay for DNA damage, the Comet assay, to assess the presence of genotoxic agents at several contaminated estuarine sites. The presence of these genotoxic agents, e.g., mercury, toxaphene, and chromium at these sites are linked to both DNA damage and embryo development effects. Laboratory studies, where suspect contaminants are added to food, water, or sediment, are used to verify field results. The presence of genotoxic agents in sediment are determined by adding female grass shrimp to contaminated sediments, allowing reproduction to occur, followed by DNA strand damage assays and embryo development bioassays of the embryos produced by the females.
Prevalence and Intensity of a Blue Crab Disease in Coastal Georgia

The blue crab, *Callinectes sapidus*, supports an important fishery along the Atlantic and Gulf coasts of the U.S. This fishery has suffered a significant decline in recent years with Georgia blue crab catches decreasing from 9.3 million pounds in 1995 to 1.8 million pounds in 2002. The cause of this sudden and dramatic crash is the subject of intense investigation. The decrease in crab population has been coincident with an increase in the prevalence and intensity of a disease in blue crabs caused by a parasitic infection of a dinoflagellate, *Hematodinium* sp. A focus of our work has been on development and use of molecular gene based diagnostic test for *Hematodinium* sp. that is very sensitive and can be used to detect *Hematodinium* sp. in the water as well as in crab hosts. A combination of field and laboratory studies are being used to study the transmission and life history of *Hematodinium* sp.

View a photomicrograph of muscle sections of a *Hematodinium* infected blue crab (photo taken by A. Walker at Mercer University Medical School).

Mariculture of Black Sea Bass for the Sushi Market

Our group has been developing a greenhouse based recirculating system to grow larval sea bass to 2 pound adults in one year. Instead of pellets, the black sea bass are fed live tilapia juveniles. Tilapia are reared in separate heated tanks with reproduction taking place every two weeks so there is a constant supply of tilapia fry and juveniles for the black sea bass. For further details, please see our mariculture webpage and video link.

Dr. Peter Verity, marine plankton:
- Research Projects:
  - Feeding ecology of marine zooplankton
  - Shelf and estuarine food webs
  - Eutrophication
  - Physiological state of marine suspended bacteria
  - Detritus
  - Larval transport
  - Nitrogen cycles
  - Physiological ecology of *Phaeocystis*
  - Pelagic structure and relationship to vertical export
  - North Norwegian plankton ecology

Smithsonian Environmental Research Center:

"Aquatic Ecosystems: Put the Parts Together"

Examine some living and non-living components in various aquatic ecosystems, with particular attention on the effects of a salinity gradient. Students are encouraged to build aquatic ecosystems in the classroom and share observations with SERC staff during a
Distance Learning Programs in Marine Science (for MAST)

videoconference. Comparisons will be made to the Chesapeake Bay ecosystem, with examples of its specific living and non-living components.

"Blue Crab Biology"
Examine the fascinating life and role of the blue crab, an important link in the Chesapeake Bay food web. The video conference will focus on blue crab research conducted in the Bay, and what this research tells us about the state of the Bay and its watershed. Designed for grades 4 - 12.

"The Chesapeake Bay"
An introduction to and overview of the Chesapeake Bay, its watershed, and the Smithsonian Environmental Research Center (SERC). Explore the unique characteristics of the nation's largest estuary and learn about some of its inhabitants. This videoconference is a great first introduction to estuaries and Chesapeake Bay ecology. Designed for grades 2 - 12.

"Watershed Connections"
During this videoconference, students will examine the natural, inseparable connections between land and water. To do this, SERC will present a series of videoconferences, each focusing on a particular organism or habitat of the Chesapeake Bay. In the first of this series, Tales of the Blue Crab, examine the fascinating life and role of the blue crab. SERC staff will describe the blue crab research conducted in the Bay, and what this research tells us about the state of the watershed.

Ocean Institute:

“Safari into the Intertidal Zone Videoconference”
Grades 1-12• 50 Minutes • One Class •
Join us for an “Intertidal Safari”! During this videoconference, students take a “virtual walk” through the tidepools and use their observation skills to define this unique and rugged ocean ecosystem. Younger students discover what makes a tidepool and learn about the animals that inhabit them. Older students define the abiotic and biotic components of a tidepool, use a field guide to identify animals, hypothesize about their survival strategies, and carry out a population survey of the intertidal zone.

“Mysterious Whales Videoconference”
Grades 1-12• 50 Minutes • One Class •
There are few animals in the ocean that fascinate humans more than whales. From graceful humpbacks to awe-inspiring blue whales, students experience how field biologists study these mysterious creatures. Younger students observe the differences between whales and fish as well as identify different types of whales. After identifying different species of whales, older students record whale behaviors and study vocal patterns just as if they were aboard a research vessel.