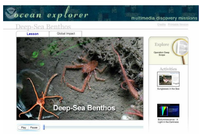
Ocean Exploration and Research

Ocean Exploration Education Highlights

September 2017

Welcome to the NOAA Ocean Explorer Education Highlights newsletter. This monthly newsletter provides you with quick access to ocean exploration-focused, standards-based tips and tools to bring the excitement and science of ocean exploration into your classroom!

What's the Latest from NOAA Ocean Exploration for Your Classroom?



Deep-Sea Benthos-A Multimedia Discovery Mission

Scientists call the open ocean Earth's last frontier-a distant and mysterious realm yet to be fully explored. The ocean covers more than two-thirds of our planet with the deep seafloor making up nearly 60 percent of the planet's surface.

Communities that live on, in, or near the ocean floor, called the benthos, must cope with extreme physical conditions. Although the seafloor is the world's most widespread habitat, it is also one of the least hospitable-cold and dark, nutrient-poor, and bearing the tremendous weight of the ocean.

This Deep-Sea Benthos Multimedia Discovery Mission is an interactive multimedia presentation and learning tool that includes a short video lesson, a second video on global impact, and online student activities.

NOAA OER Educator Professional Development Workshop Participant Joins NOAA's Teacher-at-Sea Program

Meet Terry Maxwell, NOAA Teacher at Sea

As a result of recently attending the educator professional development workshop *Exploring the Deep Ocean with NOAA* at the Shedd Aquarium in Chicago, IL, Terry Maxwell applied for the NOAA Teacher at Sea Program and was fortunate to be selected for the experience. Terry, a physical science teacher at Seneca High School in Seneca, IL, participated in a Sea Scallop/Benthic Survey expedition aboard the R/V *Hugh R. Sharp* in June 2017. His experience included exploring benthic zones and sea scallop populations in the Atlantic Ocean along the New England coast. "What a unique experience to be out only surrounded by the vast Atlantic Ocean for over two weeks. I've seen so many awe inspiring moments" he says of his time out at sea.

Terry Maxwell holding two dramatically different sized sea stars out of the dredge collection. *Image courtesy of Terry Maxwell.*

Click here to see images of Terry's at sea adventures and to read about his work and most memorable moments.

Image of the Month

Sea Star at Lunch

During the Laulima O Ka Moana: Exploring Deep Monument Waters Around Johnston Atoll expedition the exploration team encountered a number of deep-water sea star species thriving in their natural habitat. Participating scientists and the general public had exceptional opportunities to observe the adaptations and natural behaviors of some species never before observed alive!

A sea star, phylum Echinodermata, feeding on a precious coral. *Image courtesy of the NOAA Office of Ocean Exploration and Research, 2017 Laulima O Ka Moana.*

One fascinating anatomical feature of sea stars are pedicellaria. In some species, such as brisingids, the pedicellariae are tiny claw-shaped structures that cover the spines and occur in clusters. Pedicellariae are poorly understood, but are thought to assist in keeping the sea stars body free of debris and in food capture. This image shows a sea star feeding on precious coral; sea stars are one of the most common predators of corals.

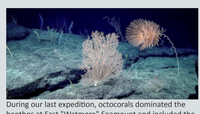
Each brisingid pedicellariae jaw is about 0.4 millimeters (0.02 inches) across. Hundreds of millions of these are present on each spine, forming the "death velcro." *Image courtesy of Bob Ford and Chris Mah.*

Read more about the eating habits of sea stars here, and view this video to see a sea star in action as it is eating its way up a coral.

Watch Sea Star Storytime to learn more about different sea star species observed during this expedition!

Join Us On Our Upcoming Expedition!

From September 6 through 30, 2017, the NOAA Ship *Okeanos Explorer* will conduct remotely operated vehicle (ROV) and mapping operations in the vicinity of Musicians Seamounts north of the Hawaiian archipelago and in close proximity to the recently expanded Papahanaumokuakea Marine National Monument. This will be the last expedition of the Campaign to Address Pacific monument Science, Technology, and Ocean NEeds (CAPSTONE).



During our last expedition, octocorals dominated the benthos at East "Wetmore" Seamount and included the stunning Iridogorgia and bamboo coral in the foreground. *Image courtesy of the NOAA Office of Ocean Exploration and Research, 2017 Laulima O Ka Moana.*

Watch the ROV *Deep Discover's* live video feeds on your computer here, or download our free mobile app (for iOS or Android devices) that will allow you to bring the excitement of ocean discovery directly to your smart phone or tablet. Visit our website to see exciting discoveries we have made thus far this year. An overview of the entire 2017 field season can be found here.

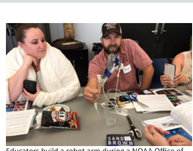
Chief Steward, Mike Sapien, at work in the galley of NOAA Ship Okeanos Explorer. Image courtesy of the NOAA Office of Ocean Exploration and Research, 2017 Laulima O Ka Moana.

A day in the Life of the Chief Steward of NOAA Ship *Okeanos Explorer*

Three cooks aboard the NOAA Ship *Okeanos Explorer* make sure the crew of 49 is well fed and nourished throughout each expedition, which can last up to 30 days. Everyone who has sailed on the *Okeanos Explorer* agrees that the food served is delicious, varied, and offers great vegetarian choices. Dinner is almost always topped with an excellent dessert such as fresh baked cookies, pies or cakes. A nice selection of snacks is available at all times and the ice cream freezer is well stocked throughout the cruise to keep the crew happy. Sunday evenings the cooks put on an ice cream social in the mess, and each expedition features a surf and turf night with king crab and steak.

How do the cooks get the 49 crew to rave about the food they have over the course of their time at sea? Read about a day in the life of the Chief Steward here.

And if you are interested in learning how vegetables and fruit are kept fresh on board over long periods of time while out at sea read this mission log from a previous expedition.



Educators build a robot arm during a NOAA Office of Ocean Exploration and Research professional development workshop at the North Carolina Aquarium in Pine Knoll Shores in May 2017.

Exploring the Deep Ocean with NOAA: Educator Professional Development

NOAA OER's free full-day professional development workshops provide opportunities for educators to engage in learning more about ocean exploration. These workshops are designed to introduce participants to exemplary tools and resources for the classroom to enhance the teaching and learning of ocean science and NOAA endeavors in ocean exploration.

Onsite professional development workshops are offered around the country in cooperation with our Ocean Explorer Education Alliance Partners. If you would like to learn why and how we explore the deep ocean, please attend one of our workshops at an aquarium or science center near you. Upcoming workshops are listed on our website.

Note: *This workshop is a combination of the previously offered Why Do We Explore? and How Do We Explore? workshops.*

We hope that these Exploration Education Highlights will help you focus more of your classroom teaching and learning on the amazing discoveries taking place right here, right now, on our own Planet Ocean! Onward and downward!

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