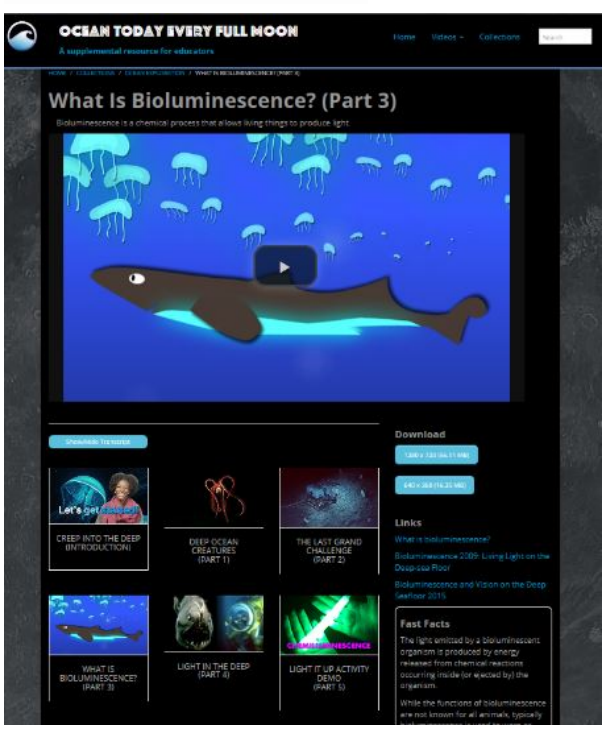
Ocean Exploration and Research

Ocean Exploration Education Highlights
December 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!

Ocean Today - Every Full Moon:
Bioluminescence Supplemental Resources for Educators



NOAA's Ocean Today website offers exciting multimedia resources for educators on all aspects of the ocean realm -- exploration and discoveries, marine life and ocean science. A six part video resource was recently created on bioluminescence.

Bioluminescence is the production and emission of light by a living organism. The light emitted by a bioluminescent organism is produced by energy released from chemical reactions occurring inside (or ejected by) the organism. If you've ever seen a firefly, you have encountered a bioluminescent organism. In the ocean, bioluminescence is not as rare as you might think. In fact, most types of animals, from bacteria to sharks, include some bioluminescent members. While the functions of bioluminescence are not known for all animals, typically bioluminescence is used to warn or evade predators), to lure or detect prey, and for communication between members of the same species.

Click here to creep into the deep and learn how animals have evolved bioluminescent capabilities to breed, feed and survive.

For more information explore our Bioluminescence Theme Page complete with standards-based lessons, content essays, photos and videos.

NOAA Ship *Okeanos Explorer* Moves Back to the Atlantic Ocean - Join Us for Upcoming Expeditions!

From October 2017 to September 2018, the NOAA Ship *Okeanos Explorer* will return to the Atlantic Ocean and conduct a series of expeditions to continue exploration of the deep waters of the U.S. Gulf of Mexico and North Atlantic. A multidisciplinary team of scientists, technicians, and engineers - both on board the ship and on shore - will investigate the Gulf of Mexico, Mid- and South Atlantic Bight, Northeast U.S./Canada transboundary area, and a priority mapping area in international waters south of Bermuda. Explorers will conduct undersea mapping and remotely operated vehicle (ROV) explorations of the geological, biological, archaeological, and chemical features of these vast areas. An overview of the 2018 exploration season can be found here.


NOAA Ship *Okeanos Explorer* exploring the deep seas. *Image courtesy of NOAA OER.*

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.

Image of the Month

Seirios: A Remotely Operated Vehicle Sparkling Where No Light Has Been Before

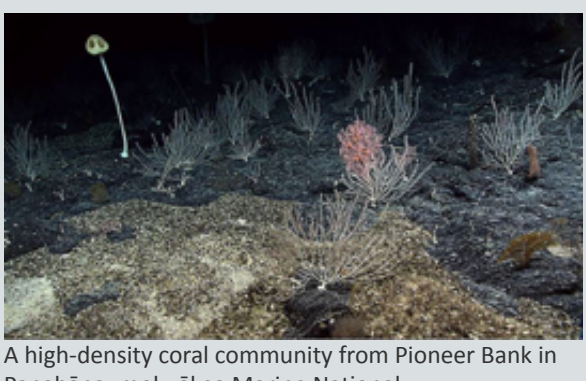
Seirios (a.k.a. Sirius) is a name known to many as the brightest star in the night sky. It also happens to be the name of one of the remotely operated vehicles (ROVs) aboard NOAA Ship *Okeanos Explorer*, supporting ocean exploration efforts around the world.


Remotely Operated Vehicle (ROV) *Seirios* is lowered into the ocean. *Image courtesy of NOAA OER.*

Much like its namesake, *Seirios* acts as a brilliant source of light in the "night sky" of the deep ocean, providing illumination and a wide-angle view from above for its counterpart ROV, the *Deep Discoverer* (D2).

Referred to in the industry as a 'camera sled,' *Seirios* is directly tethered to the *Okeanos Explorer* by a five mile-long steel cable. D2 is connected to *Seirios* via a 30 meter-long tether which provides D2 with a "spherical" workspace around *Seirios*. This configuration also allows *Seirios* to absorb the heave from the ship while keeping D2 stable as it explores the ocean floor. It is this tandem robot configuration that allows stunning imagery to be captured for an undisturbed look at the seafloor.

Read this mission log to take a closer look at *Seirios*, and read here to learn about how the technology was developed.


A high-density coral community from Pioneer Bank in Papahānaumokuākea Marine National Monument. *Image courtesy of Hawaii Undersea Research Laboratory.*

How Did They Get There? Biogeography of Pacific Islands and Seamounts

Since the early days of ocean exploration, scientists have been fascinated with understanding the pattern of species distribution throughout the marine environment. This area of scientific study is known as marine biogeography.

Marine biogeographers examine the historical, geological, ecological, and environmental factors that influence the distribution of life in the ocean. This research helps to explain why species are found where they are and how populations are connected and spread from one location to another.

The deep sea is the largest habitat on the planet; yet, it is comparatively less explored than the surface of the moon. Read here to find out how species come to colonize different locations on the seafloor.


Educators build a methane hydrate model at the Georgia Aquarium in Atlanta, GA during the professional development workshop in November 2017. Image courtesy of NOAA OER.

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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