

Ocean Exploration Education Highlights
March 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?

The [Ocean Explorer Multimedia Discovery Missions](#) are a series of 13 interactive multimedia presentations and learning activities that address a wide range of ocean topics.

The [Chemosynthesis and Hydrothermal Vent Life Multimedia Discovery Mission](#) includes a short video lesson, a second video on global impact, and three online interactive student activities.

Chemosynthesis and
Hydrothermal Vent Life

Scientists first discovered hydrothermal vents in 1977 while exploring an oceanic spreading ridge near the Galapagos Islands. To their amazement, the scientists also found that the hydrothermal vents were surrounded by large numbers of organisms that had never been seen before. They discovered that hydrothermal vents in the deep ocean present a unique ecosystem that evolved in the absence of sunlight, and its source of energy is completely different and obtained through chemosynthesis. Chemosynthesis is the process by which certain microbes create energy by mediating chemical reactions. The animals that live around hydrothermal vents make their living from the chemicals coming out of the seafloor in the vent fluids.

Standards-based Lesson

The Tell Tale Plume
(Grades 9-12)

NGSS:
Performance Expectation HS-LS-2-3
Disciplinary Core Idea LS.1.C, LS.4.C

Hydrothermal vents are formed when the movement of tectonic plates causes deep cracks to form in the ocean floor. Seawater flows into these cracks, is heated by magma, and then rises back to the surface of the seafloor.

In this [lesson](#), students learn about hydrothermal vents, identify changes to the physical and chemical properties of seawater that are caused by hydrothermal vents, and use oceanographic data to recognize a probable plume from hydrothermal activity.



Note: All lessons are written to support the [NGSS](#) and the [Ocean Literacy Essential Principles and Fundamental Concepts](#).

Image of the Month

Hydrothermal Vent

Hydrothermal vents are the result of seawater percolating down through fissures in ocean crust in the vicinity of spreading centers or subduction zones (places on Earth where two tectonic plates move away or towards one another). The cold seawater is heated by hot magma, re-emerges and ultimately forms the vents. Seawater in hydrothermal vents may reach temperatures of over 371° Celsius (700° Fahrenheit). Hot seawater in hydrothermal vents does not boil because of the extreme pressure at the depths where the vents are formed.



Hydrothermal vent chimney. In the center of the photo, you can see the vent fluid which looks like dark smoke due to the high levels of minerals and sulfides contained in the fluid. Look closely, and you will also see the chimney is crawling with *Chorocaris* shrimp and *Austinochorda williamsi* crabs. *Image courtesy of the NOAA Office of Ocean Exploration and Research, 2016 Deepwater Exploration of the Marianas.*

To this day, hydrothermal vents continue to fascinate the science community. "Exploring hydrothermal vents is so exciting because it teaches us about the limits of life - organisms living there have to deal with mind-boggling extremes of temperature and chemistry!" say scientists and ocean explorers Diva Ammon and Deb Glickson. Read more about their discoveries [here](#).

Click [here](#) to watch video footage of a stunning hydrothermal vent encountered during the [2016 Deepwater Exploration of the Marianas](#).

Tune in to *Okeanos Explorer* Live Video from Your
Computer or Mobile Device!

The 2017 field season is well underway! Visit our [website](#) to see exciting discoveries from the last cruise that started on February 16 in Pago Pago, American Samoa and ended on March 2 in Apia, Samoa.

Our next cruise will run from March 7 through March 29 and will focus on regions around Howland, Baker and Phoenix Islands. The crew of the NOAA ship *Okeanos Explorer* will employ remotely operated vehicles (ROVs) to explore the never-seen-before seafloor and water column and all the known and unknown creatures living at depth in this area of the Central Pacific. The ROV dive sites will include deep-sea coral and sponge habitats, bottom fish habitats, hydrothermal vents, and seamounts.

You can watch the *Okeanos Explorer* live video feeds on your computer [here](#). You can also 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. Join scientists from around the world as they explore the deepest, darkest reaches of our planet's last unknown frontier, and hear them discuss their findings and watch as true discoveries unfold!

An overview of the entire 2017 field season can be found [here](#).



Meredith Tanguay in her dive gear. Meredith is a professional diver, dive instructor and Dive Safety Officer, with a strong passion for ocean exploration. *Image courtesy of Meredith Tanguay.*

A Day in the Life of a Dive
Safety Officer

Meredith Tanguay is a Dive Safety Officer volunteering for the Global Underwater Explorers (GUE), an America-based international non-profit scuba diving organization.

Meredith is an avid ocean explorer who shares the excitement of new discoveries with her team members: "Being a volunteer Dive Safety Officer means a lot of long hours and weeks away from home, but it is all worth it to be a part of a great team. Some days I get to dive to document new species while other days I support "putting someone on the moon" - delivering divers to a never-before-seen wreck like the USS *YP-389* (a WWII yard patrol boat). Together we share in the joy of new discoveries unlocked from the depths of our sea", she says.

Last summer, Meredith participated in the Battle of the Atlantic: Archaeology of an Underwater WWII Battlefield expedition, a joint project of NOAA's Office of Ocean Exploration and Research, NOAA's *Monitor* Marine National Sanctuary, the Project Baseline Initiative, and GUE. The focus of this mission was to characterize the remains of this underwater WWII battlefield.

You can read Meredith's compelling essay about her work during this expedition [here](#).



During a professional development workshop in Maryland educators create a three-dimensional map to simulate multi-beam sonar technology used to map the ocean floor. *Image courtesy of NOAA OER.*

Upcoming Education
Professional Development

If you want to learn about why and how we explore the deep ocean and get more exploration-focused, standards-based tips and tools to bring the excitement and science of ocean exploration into your classroom, please attend one of our free educator professional development workshops.

Our Spring 2017 [professional development schedule](#) for *Exploring the Deep Ocean with NOAA* is posted on our website. Sign up for a full-day onsite professional development at an aquarium or science center near you!

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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