

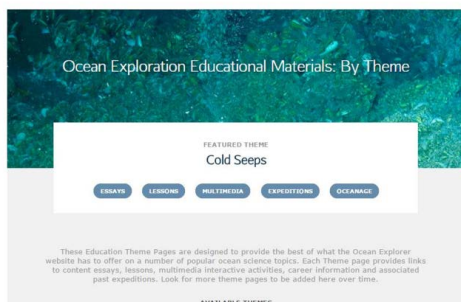


**Ocean Exploration
and Research**

Ocean Exploration Education Highlights September 2016

Welcome to the NOAA Ocean Explorer Education Highlights email. These monthly emails provide 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?



Education Theme Pages are designed to provide the best of what the Ocean Explorer website has to offer on a number of popular ocean science topics.

essays, lessons, videos, images, and links to past expeditions where the feature(s) of the Theme Page were explored. A link to career information about the scientists who make a living exploring these features is also included. Look for Theme Pages on seamounts, deep-sea corals, marine archaeology, vents and volcanoes, and more [here](#).

Need Topic-based Deep Ocean Content for Your Classroom? Look No Further!

As you begin the new school year, you might continue to look for ways to adapt to new science standards and/or refresh some of your units or lesson plans. Our Ocean Explorer Theme Pages provide collections of some of the best of our website content on specific topics. Each Theme Page includes

Standards-based Lesson

[The Multi-Talented Underwater Robot](#)

(Grades 9-12)

NGSS: HS-ETS1-2

In this lesson, students explore how complex missions for Autonomous Underwater Vehicles (AUVs) are planned and how engineers approach complex real-world problems by breaking them down into smaller, more manageable problems. Through team assignments, students will review the capabilities of the AUV *Sentry*, imagine that their team has been designated as the Expedition Leader for one of three different *Sentry* mission scenarios, identify which of *Sentry's* capabilities will be needed to achieve the mission's objectives, and what special circumstances need to be considered when planning this mission.



Focus
Autonomous Underwater Vehicle (AUV) *Sentry*

Grade Level
9-12 (Engineering Design)

Focus Question
How do ocean explorers plan complex missions for autonomous underwater robots?



Learning Objectives
• Students will understand how engineers approach complex real-world problems by breaking them down into smaller, more manageable problems.

Materials

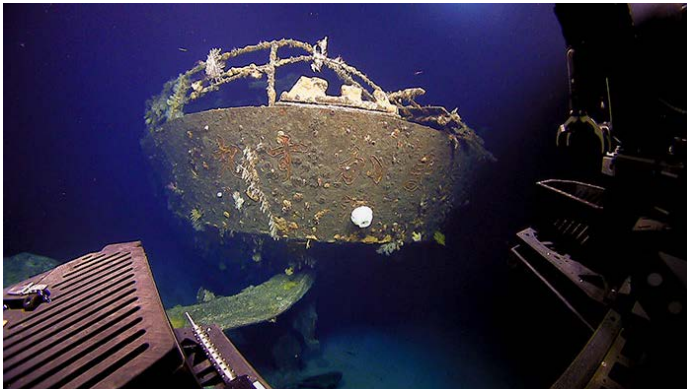
- Copies of:**
- *NDSF Sentry Fact Sheet** linked from <https://www.whoi.edu/main/sentry>;
 - *A Scientists Guide to AUV Sentry Cruise Planning and Proposal Writing** linked from <https://www.whoi.edu/main/sentry>; (* The links can be found by scrolling down the page to "Additional Resources")
 - *AUV Sentry Mission Scenarios* (page 15); one copy for each student or access to these files via student computers or interactive whiteboards.



This lesson was written for the [Exploring Carolina Canyons 2016 Expedition](#).

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

Image of the Month



The stern of the Amakasu Maru No. 1, with her name still visible 73 years after she was sunk. Image courtesy of the NOAA Office of Ocean Exploration and Research, *Deepwater Wonders of Wake*.

Amakasu Maru World War II Shipwreck

On August 11th, the NOAA Ship *Okeanos Explorer* set out to explore a potential shipwreck that had been mapped during a previous cruise. Scientists believed that the wreck might be the Japanese Imperial Naval Destroyer, *Hayate*, which was sunk during the Battle of Wake.

The remotely operated vehicles landed close to the target and quickly came upon the bow of a ship. After exploration to determine the ship's identity, it became apparent that the wreck was not that of the *Hayate*. Once the vehicles made their way to the stern of the vessel, scientists were surprised to see lettering still visible on the hull! One of the participating biologists was able to translate the name of the ship. It was determined that the ship was the *Amakasu Maru No. 1*, which was a Japanese water tanker sunk by a U.S. submarine in 1942.

Watch the [Highlight Video](#) and read the [Daily Update](#) on this extraordinary find!



Amanda Demopoulos, Research Benthic Ecologist, then and now. *Image courtesy of Amanda Demopoulos.*

[Before They Were Scientists: Mission Logs](#)

During the [Exploring Carolina Canyons 2016 Expedition](#), we posted some intriguing background on various members of the science team and what inspired them toward careers in marine science.

Find out who's encouragement and special gift started [Amanda Demopoulos](#) on her journey to become a benthic ecologist; discover what book was influential in leading [Carl Kaiser](#) to become an engineer and Autonomous Underwater Vehicle Program Manager; or [read Liz Shea's advice](#) on how getting to know "interesting people doing interesting work in interesting places" can lead to very interesting employment opportunities.

Try using these essays to inform students of various career paths.



Teachers participate in a NOAA OER professional development workshop hosted by the Tauese P.F. Sunia Ocean Center, National Marine Sanctuaries in Pago Pago, American Samoa. *Image courtesy of NOAA.*

[Upcoming Education Professional Development](#)

Our Fall 2016 [professional development opportunities](#), *Exploring the Deep Ocean with NOAA*, are now listed 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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