

**Activity Title:** Deep-water Coral—*Lophelia pertusa*

**Subject (Focus/Topic):** Marine Invertebrates—Coral

**Grade Level:** Grade 5 (can be used for grades 3-4 as well. I used vertebrates for other grades.)

**Average Learning Time:** 12 class periods (2 hours each--research, project planning, teaching skills)

**Lesson Summary (Overview/Purpose):** The purpose of this lesson is to introduce students to the diversity of life in the ocean

**Overall Concept (Big Idea/Essential Question):** How is the diversity of the ocean dependent upon balance?

**Specific Concepts (Key Concepts):** The ocean is interconnected. Our actions directly and indirectly affect the ocean. The ocean floor is the largest habitat on Earth and is largely unexplored.

**Focus Questions (Specific Questions):** Why do systems need balance?

In what ways do humans use/need the ocean?

Why should we respect life in the ocean?

**Objectives/Learning Goals:** Students should understand the essential understandings of:

Systems need balance to work well.

Diversity of life needs to be respected.

The Earth has one big, many-featured ocean which interconnects with humans.

**Background Information:** From May 30-June 14, 2011, I travelled aboard the NOAA ship, Pisces, studying deep-water corals and their habitat with scientists. My blog contains information about NOAA, the ship, the science involved, the coral and other animals, and reflections of my time aboard. Read my blog at <http://teacheratsea.wordpress.com/category/teachers/sue-zupko/> to better understand our work and what we found. If you click on May 2011 you will start at the beginning. The entries are numbered from 1-17 with news stories included. You should understand that corals are Cnidarians, marine invertebrates with nematocysts and tentacles. Other animals in this phylum include sea pens, anemones, hydroids, and jellyfish.

**Common Misconceptions/Preconceptions:** Corals (and other marine invertebrates) are plants; plants produce the majority of our oxygen; most ocean pollution is caused from littering by boaters and beach-goers; the majority of life in the ocean is fish.

**Materials:**

sticky notes paper

bulletin board or butcher paper and means to post on wall during unit for KWL

Plastic zip-style bags

Candies (minis): Hersheys Milk Chocolate, Twizzlers, Kit Kat, Jolly Rancher, Jolly Rancher Stix (all found in a Party Mix), Tootsie Rolls, Red & White Peppermint Candy clear-wrapped, Green & White Spearmint Candy clear-wrapped, Dum Dum suckers.

Copy of Kandy Kritter Key

Large sheets of paper for KWL which can stay posted.

Coral polyp project supplies:

- white paper (construction paper is a bit thick, but it will work. I used a drawing paper)
- bleeding tissue paper ([such as this](#))
- small buckets of water
- newspaper (to protect table and sop up water)
- paint brushes (1" works well)
- toilet paper tubes
- ruler and pencil
- scissors
- glue

**Technical Requirements**

Computers with Internet access for student research on marine animals

Google Ocean: <http://earth.google.com/ocean/ocean>

Microsoft Power Point

**Teacher Preparation**

Create a coral polyp using the materials above to estimate time, resource use, and classroom management.

Place a sample of each candy in a baggie for each table group.

Make copies of the Kandy Kritter Key for each student.

Review "*Lophelia pertusa*" slideshow to learn basics about this cold-water coral.

Read about corals, and print/laminate photos of marine animals from the NOAA photo library:  
<http://www.photolib.noaa.gov/reef/>

Visit [www.lophelia.org](http://www.lophelia.org) to learn more about cold-water corals.

**Keywords:** coral, habitat, invertebrates, plankton, polyp

## **Pre-assessment Strategy/Anticipatory Set (Optional)**

Show students a conch or other large sea shell and ask what it is. Ask if it is alive or dead. What lived in it? Tell them they will learn about life in the ocean, especially invertebrates living on the bottom.

Ask students to brainstorm and list what they know (or think they know) about the ocean. List these on a chart which can be reviewed throughout the unit. Next, ask the students to list on their paper what they want to know about the ocean. Students write their questions on sticky notes and put on the bulletin board or chart paper. These questions can be restated by the teacher later and written in large letters so they are easier to review.

## **Lesson Procedure**

1. After completing the KWL and viewing the slideshow, *Lophelia pertusa*, students will create a coral polyp and add it to the class's coral mound using tape and glue.

Procedure: Students working in pairs are given newspaper, scrap pieces of bleeding tissue paper, and a sheet of drawing paper. Students cover the drawing paper, lying on a thick bed of newspaper, with scraps of different colors of the bleeding tissue paper. The papers will overlap a bit. They fill the water bucket half-full of water. With generous amounts of water added to the paint brush, students press their tissue paper firmly down onto the drawing paper with water. The paper is then allowed to dry (do first thing in morning and it is dry for after lunch) and the tissue is removed. Each team gets two empty toilet paper tubes, glue, a ruler, pencil, and scissors. They measure the length of the tube and measure this onto their drawing paper, twice. Explain this clearly so they don't cut it in the wrong direction. If they do, they can just color paper with pencil or marker. Each team member then gets the correct size to cover their tube correctly. Put glue on the back of the entire piece of drawing paper and wrap around the tube. While the glue dries, students each get two squares of bleeding tissue paper and a pair of scissors. Fold both papers together in half hamburger-bun style. Round off the end and cut "tentacles" on the unfolded side about half way down. A pile of coral rubble (unused empty toilet paper tubes) are attached to look like they have fallen off of live corals. The created corals are then attached to these "dead" ones (see photo). The mound can be displayed in the library or in a showcase with information about corals. It is a good idea to attach the mound to a sturdy piece of foamboard.

2. Students should be given an opportunity to search for marine invertebrate species on-line and in books. Some suggested web sites are listed at the end of this paper with some suggestions for students to read about coral reefs and cnidarians (invertebrates closely related to corals). Search engines are a wonderful way to look as well with the key words, marine invertebrate.

3. Conduct activities found in *Only One Ocean* and *Ocean Currents* so students understand how the oceans are interconnected. Activities include the KWL, tossing an inflated globe within a circle of students 100 times to see what percent of the Earth is covered in ocean, problem solving the loss of fish within fisheries, etc.

## **Student research**

1. Allow students to choose a marine invertebrate they would like to research. I have them list all the ones they know already and when they are choosing, have them select something they know nothing about and become an expert on it. Students will create a technology-based lesson to present to other students in the

building. Products could include books, videos, multimedia, etc., based on the time and technology available. Slide shows and books made using Power Point are easy for the students to create and easy for the teacher to teach skills to a large group.

2. Students must include in their final product the categories listed on the Marine Animal Worksheet.

3. Do several activities with dichotomous keys, such as the Kandy Kritter key, to explain how scientists classify animals.

### **Assessment and Evaluation**

Students will be assessed on their KWL charts, research, dichotomous keys, and their presentation. KWL charts can be evaluated based on writing a list of thoughts for all three categories, including at least 10 lessons learned.

### **Extensions**

Using laminated photos of marine invertebrates the students are studying, have teams create a dichotomous key to narrow down the genus and species of each animal. The back of each picture should include hard body/soft body, method of eating, method of reproduction, physical features, etc. to help students in the creation of a key. When creating a key, students must have a yes/no question where all animals can be divided into two groups. You prepare them for this activity with the students themselves and use their attributes. Divide first by boy or girl or hair/eye color. Keep asking questions until each child's specific attribute is addressed and they are named. Avoid weight. Height, finger length, earrings or not, glasses, shoe color or type, etc.

Activities in Janice VanCleave's *Oceans for Every Kid: Easy Activities that Make Learning Science Fun* are an excellent resource to reinforce principles in this unit.

### **Standards**

#### **National Science Education Standard(s) Addressed for Grade 5:**

NSES A: Unifying Concepts and Processes

○ Sub-categories 1-5

NSES B: Earth and Space

○ Sub-category 2,3

NSES C: Life Science

○ Sub-categories 1-5

NSES E: History of Nature and Science

○ Sub-categories 1 and 2

NSES F: Personal and Social Perspectives

- Sub-categories 1-5

### **Ocean Literacy Principles Addressed:**

- Principle 1: a, b, c, e, f, g: The Earth has one big ocean with many features.
- Principle 4: a, b: The ocean makes Earth habitable.
- Principle 5: a-i: The ocean supports a great diversity of life and ecosystems.
- Principle 6: a-e, g: Interconnectedness.
- Principle 7: a-f: The ocean is largely unexplored.

### **Additional Resources**

**Movie:** Discovery Channel movie-*Blue Planet: Seas of Life*

### **Websites:**

<http://www.lophelia.org>

<http://www.mbgnet.net/salt/coral/animals/cnidar.htm>

<http://www.usc.edu/org/cosee-west/FebMar07Resources/19ResourcesCoral.pdf>--

Comprehensive list of coral reef resources (videos, websites, podcasts, and much more)

<http://www.coris.noaa.gov/about/> – Information about coral reefs from NOAA’s Coral Reef Information System

<http://coralreef.noaa.gov/> – Things You Can Do to Protect Coral Reefs at NOAA’s Coral Reef Conservation Program

[http://www.nature.org/greenliving/gogreen/coralreeftips/?sitelink=reefs\\_facts&gclid=CNHt77awu6sCFZAs7AodFhZshg](http://www.nature.org/greenliving/gogreen/coralreeftips/?sitelink=reefs_facts&gclid=CNHt77awu6sCFZAs7AodFhZshg) – Nature Conservancy List of what you can do to help coral reefs

<http://coralreef.noaa.gov/deepseacorals/threats/>– NOAA Coral Reef Conservation Program, Education and Outreach

[http://oceanservice.noaa.gov/education/tutorial\\_corals/welcome.html](http://oceanservice.noaa.gov/education/tutorial_corals/welcome.html) – Coral information from NOAA’s National Ocean Service

<http://www.coris.noaa.gov/glossary/> - Glossary of terms

<http://www.iyor.org/reefs/coldwater.asp> - International Year of the Reef website

### **Books:**

LHS GEMS: Ocean Currents: Marine Science Activities for Grades 5-8 found at [www.lhsgems.org](http://www.lhsgems.org)

LHS GEMS: Only One Ocean: Marine Science Activities for Grades 5-8 found at [www.lhsgems.org](http://www.lhsgems.org)

Stanitski, Diane and John J. Adler. *Teacher at Sea: Mr. Tanenbaum Explores Fisheries on the NOAA Ship Henry B. Bigelow*.

VanCleave, Janice. *Oceans for Every Kid*.

**Author:** Sue Zupko

**Creation date:** September 14, 2011

# Marine Animal Investigation

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Student name

Animal common name

Scientific Classification: <http://www.factmonster.com/ipka/A0776195.html> What do the animals have in common in each of these?

Kingdom: Animal (all animals)

Phylum

Class

Order

Family

Genus

Species

Vertebrate or invertebrate?

Life Cycle:(draw)

Habitat and distribution (where found in world)

Predators (What eats it?)

Prey/Food (What does it eat?)

Physical Description

Pictures/video

Threats (habitat problems, toxins, trawls, etc)

What would happen if this animal's numbers dramatically declined?

Interesting facts about this animal:

List your sources (book title and author, web site url, interview, etc)

## Contract for Marine Animal Investigation

Activity	Date approved
Animal for investigation approved by	
Tessellation completed and hung outside our classroom (should be related to your animal in some way)	
Animal Investigation worksheet complete (research done)	
Project plan approved (due by)	
Make-and-take approved (students should learn about your animal from this activity)	
Project complete and presented to our class (this works out the bugs)	
Project presentation date set with classroom teacher and technology checked ahead of time to make sure it works in that classroom)	
Project presented in regular classroom by	

You will be provided ample time during class to complete the work. You are welcome to do some work at home as long as all materials are in the building during school hours (sometimes we find extra time when class work is complete). Feel free to visit the public library and find resources on-line. Good internet resources include NOAA Fisheries (<http://www.nmfs.noaa.gov/>), MARlin (<http://www.marlin.ac.uk/species.php>), <http://www.kidport.com/reflib/science/animals/Animals.htm>, and Enchanted Learning.

Rubric: Creativity of presentation (interesting to kids?), accuracy, presentation, "Make and take" relevance to project and planning.

I understand the above requirements and will do my best on this project.

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Student signature

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Parent signature





