

RESOURCE LIBRARY
ACTIVITY : 50 MINS

Bioluminescence: Living Light

Students learn about bioluminescence and conduct an experiment to learn how ocean animals use bioluminescence for camouflage.

GRADES

3 - 5

SUBJECTS

Biology, Geography, Physical Geography

CONTENTS

2 Links, 3 Images

OVERVIEW

Students learn about bioluminescence and conduct an experiment to learn how ocean animals use bioluminescence for camouflage.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/bioluminescence-living-light/>

DIRECTIONS

1. Introduce the concept of bioluminescence and show students a photo gallery.

Discuss with students the problems that might confront creatures of the deep sea. Ask: *What are the conditions like in the deep sea? Are there fewer sources of food available? Is the water that deep colder than the water closer to the surface? Why?* Ask students to think about how animals that live in the deep sea might have adapted to these conditions. Then invite a volunteer to read aloud the NG Education encyclopedic entry for bioluminescence. Check students' comprehension. Ask:

- *What is bioluminescence?* (an animal's ability to emit its own light)
- *What causes bioluminescence?* (chemical reactions in an animal's body)
- *What do animals use bioluminescence for?* (to confuse or blind attackers; to communicate)

Show students the photo gallery of bioluminescent fish and animals and answer any questions they may have.

2. Have students build a model of an underwater habitat.

Divide the class into small groups. Explain to students that they will build a model to see how bioluminescence can provide camouflage. Ask each group to poke holes in one end of the box and cut a viewing hole in the other. Then have them paint the inside of a shoe box black. Ask students to set the box aside to allow the paint to dry.

3. Have students build bioluminescent fish for the model.

Next, ask students to cut two fish shapes from black construction paper; poke numerous holes in one and leave the other complete. Ask each group to hang the complete fish shape from the shoe box lid, then return the lid to the box. Have each student hold the box to a light and look through the viewing hole. Do they see a silhouette of a fish? Have students repeat the exercise with the fish with holes.

4. Have a whole-class discussion about students' observations.

Ask the groups to comment on the difference in appearances of the two fish. Elicit from students that the complete fish shape is silhouetted when seen against scattered light, while the fish with holes blends into the background and is difficult to spot.

TipEnglish Language Learners (ELL)

If possible, preteach the vocabulary in activities and lessons. This will help English language learners identify words, place them in context, and remember them.

Extending the Learning

Have students use the provided Monterey Bay Aquarium Animal Guide to research one of the following bioluminescent fish—Hatchetfish, Northern lampfish, Fanfin anglerfish, Deep sea anglerfish, or Shining tubeshoulder—and write about it. Students' writing should include:

- a physical description of the creature
- sketches or illustrations
- information about its habitat

- information about how it obtains food

When students have finished writing, invite volunteers to read aloud one paper for each of the four types of fish. Ask: *What else do these fish have in common?* (small; have adapted to scarcity of food and cold temperatures at great depths)

OBJECTIVES

Subjects & Disciplines

Biology

Geography

- Physical Geography

Learning Objectives

Students will:

- describe how organisms use bioluminescence
- conduct an experiment to learn how animals use bioluminescence for camouflage
- describe the habitat and characteristics of at least one bioluminescent organism

Teaching Approach

- Learning-for-use

Teaching Methods

- Discussions
- Hands-on learning

Skills Summary

This activity targets the following skills:

- Critical Thinking Skills

- Analyzing
- Understanding
- Geographic Skills
 - Acquiring Geographic Information
 - Analyzing Geographic Information

National Standards, Principles, and Practices

NATIONAL GEOGRAPHY STANDARDS

• Standard 8:

The characteristics and spatial distribution of ecosystems and biomes on Earth's surface

NATIONAL SCIENCE EDUCATION STANDARDS

• (K-4) Standard C-1:

The characteristics of organisms

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Black construction paper
- Black paint
- Paintbrushes
- Pencils
- Pens
- Scissors
- Shoe boxes with lids
- Transparent tape
- Writing paper

REQUIRED TECHNOLOGY

- Internet Access: Required

- Tech Setup: 1 computer per classroom, Projector
- Plug-Ins: Flash

PHYSICAL SPACE

- Classroom

GROUPING

- Small-group instruction

BACKGROUND & VOCABULARY

Background Information

Below 1,000 meters (3,300 feet), the waters of the ocean are dark and cold. No sunlight penetrates these depths, and 90 percent of the creatures here produce their own light in a chemical process called bioluminescence.

Prior Knowledge

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Recommended Prior Activities

- None

Vocabulary

| Term | Part of Speech | Definition |
|-----------------|----------------|--|
| bioluminescence | noun | light emitted by living things through chemical reactions in their bodies. |

FUNDER



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Atmospheric Administration (NOAA) National Marine Sanctuary Program.



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