

RESOURCE LIBRARY
ACTIVITY : 2 HRS

Marine Debris: A Legacy of Litter

Students learn about the sources and impacts of marine debris. They participate in a school site cleanup and then compare their findings to international coastal cleanup data.

GRADES

9 - 12+

SUBJECTS

Biology, Ecology, Earth Science, Oceanography, Geography, Human Geography, Physical Geography

CONTENTS

4 PDFs, 2 Videos, 1 Link

OVERVIEW

Students learn about the sources and impacts of marine debris. They participate in a school site cleanup and then compare their findings to international coastal cleanup data.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/marine-debris-a-legacy-of-litter/>

DIRECTIONS

1. Activate students' prior knowledge.

Have students brainstorm different types of litter or debris. Make a list on the board. Ask:

- *What happens to litter? Where does it go?*
- *How could litter end up in the ocean?*

Elicit from students that garbage that does not make it to a landfill can become litter found along the sides of roads or in waterways, eventually ending up in the ocean. Emphasize that no matter where litter comes from, wind, streams, and ocean currents carry litter throughout the globe, including to the ocean and coasts where it becomes marine debris.

2. Have students watch the video “Marine Debris.”

Give each student a Marine Debris Video worksheet. Show students the NOAA “Marine Debris” video (3 minutes, 30 seconds) and have them answer the questions as they watch. Then use the provided answer key to discuss the questions. Ask:

- *What is marine debris?* (any manufactured solid material that enters into the marine environment)
- *What are examples of marine debris?* (lost fishing nets and gear, plastic, paper, cigarette butts)
- *Why is marine debris so dangerous to marine animals?* (Animals can mistake it for food and it can fill them up so that they starve to death; toxins in the plastics and bacteria in the debris can accumulate in organisms and in the food chain; fishing line and rope can entangle organisms; lost fishing gear can trap animals until they die.)
- *How do people, even those who don’t live by the ocean, contribute to the accumulation of marine debris?* (Marine debris comes from all over and is connected to the ocean by streams, rivers, and ocean currents.)

3. Have students list sources and impacts of land-based and ocean/waterway-based marine debris.

Divide students into small groups and provide each group with a NOAA Marine Debris Facts handout. Have half of the groups read about and summarize sources of land-based and ocean/waterway-based marine debris. Have the other half of the groups read about and summarize the effects of marine debris on ocean ecosystems, marine wildlife, and people. As a class, have the groups take turns presenting what they learned about the sources and impacts of marine debris. Emphasize the fact that the sources and impacts of marine debris are highly varied and involve all people, no matter where they live.

4. Have students watch the video “It’s Time to Stop Trashing Our Beaches.”

While watching the video (1 minute, 30 seconds), tell students to think about how their actions could contribute to or help solve the marine debris pollution problem. Explain to students that they will be conducting a school-site cleanup and collecting debris data. In their small groups, have students brainstorm types of debris/litter they expect to find around their

school grounds. Give each group a copy of the worksheet School Site Cleanup Data Table. Explain that the data sheet they will be using is designed to record the same information that is recorded during coastal clean-up events. Explain the proper data collection procedures to the groups. As needed, refer to the Ocean Conservancy's 2010 Report: Trash Travels (pages 26-32) to show students how to identify and classify different debris items.

5. Conduct the school site cleanup and compare data.

Using the School Site Cleanup Data Table, have students conduct their own cleanup on their school site. Remind students to use gloves and avoid any materials that could be considered hazardous waste. After groups have collected their data, they will count the total number of debris items found by category for the entire class and then calculate the percentage of the total comprised by each category. Have students compare their data and debris type percentages to the Top Ten Marine Debris Items Worldwide results from the Ocean Conservancy's 2010 Report: Trash Travels (page 11). Have students record their results in the School Site Cleanup Data Table.

6. Have students reflect on what they have learned.

Start a class discussion by asking students to summarize the effect marine debris accumulation is having on ocean ecosystems and wildlife. Then ask:

- *Are you surprised by the amount or type of debris you found? Explain.*
- *What are some similarities and differences in the two data sets (school site and world 2010 report)?*
- *What could be the reasons for these differences?*
- *What is the relationship between the debris data collected at the school site and the data collected at a coastal site?*
- *What did you learn about the role you play in marine debris accumulation?*
- *What are you willing to do to address the problem of marine debris?*

Modification

Create a blank class data table using a transparency or the whiteboard so it is easier for each group to share its data with the rest of the class.

Informal Assessment

Assess students' worksheets and data sheets for completeness and accuracy.

Extending the Learning

Have students complete the Marine Protected Areas activity [Laysan Albatross Virtual Bolus Dissection](#) and then compare their school site cleanup data to the debris found in the albatross bolus.

OBJECTIVES

Subjects & Disciplines

Biology

- [Ecology](#)

Earth Science

- [Oceanography](#)

Geography

- [Human Geography](#)
- [Physical Geography](#)

Learning Objectives

Students will:

- identify sources of marine debris
- describe ways that marine debris negatively impacts marine ecosystems and organisms
- collect and analyze debris data based on a school site cleanup
- explain how humans contribute to and help solve problems associated with marine debris

Teaching Approach

- Learning-for-use

Teaching Methods

- Discussions
- Experiential learning
- Information organization

- Multimedia instruction
- Reading

Skills Summary

This activity targets the following skills:

- 21st Century Themes
 - Global Awareness
- Critical Thinking Skills
 - Analyzing
 - Understanding
- Geographic Skills
 - Acquiring Geographic Information

National Standards, Principles, and Practices

NATIONAL GEOGRAPHY STANDARDS

- **Standard 1:**

How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

- **Standard 14:**

How human actions modify the physical environment

- **Standard 8:**

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

NATIONAL SCIENCE EDUCATION STANDARDS

- **(9-12) Standard C-4:**

Interdependence of organisms

- **(9-12) Standard F-4:**

Environmental quality

- **(9-12) Standard F-5:**

Natural and human-induced hazards

OCEAN LITERACY ESSENTIAL PRINCIPLES AND FUNDAMENTAL CONCEPTS

- **Principle 6d:**

Much of the world's population lives in coastal areas.

- **Principle 6e:**

Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out and put into the ocean. Human development and activity leads to pollution (such as point source, non-point source, and noise pollution) and physical modifications (such as changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.

- **Principle 6f:**

Coastal regions are susceptible to natural hazards (such as tsunamis, hurricanes, cyclones, sea level change, and storm surges).

- **Principle 6g:**

Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Garbage bags
- Latex gloves
- Pencils
- Recycling container

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per classroom, Projector, Speakers
- Plug-Ins: Flash

PHYSICAL SPACE

- Classroom

- Outdoor recreation space
- Parking lot

GROUPING

- Large-group instruction

OTHER NOTES

Before starting the activity, download and queue up the videos.

BACKGROUND & VOCABULARY

Background Information

Marine debris is any manufactured solid material that enters the marine environment, either intentionally or unintentionally. Marine debris has become one of the most pervasive pollution problems facing the world's oceans and waterways. A wide variety of marine debris can be found in large quantities throughout the ocean and can cause severe problems for marine organisms including birds, mammals, fish, and other creatures that get caught in it or consume it.

Prior Knowledge

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Recommended Prior Activities

- [Laysan Albatross Virtual Bolus Dissection](#)

Vocabulary

Term	Part of Speech	Definition
marine debris	<i>noun</i>	garbage, refuse, or other objects that enter the coastal or ocean environment.

For Further Exploration

Audio & Video

- [SCRIPPS: Inside the Plastic Vortex Video Podcast](#)

Websites

- [EPA: Factsheet—Marine Debris](#)
- [NOAA: Marine Debris Program—De-mystifying the "Great Pacific Garbage Patch"](#)
- [NOAA: Marine Debris](#)
- [National Geographic Photo Gallery: Polluted Oceans](#)
- [National Geographic Education: National Teacher Leadership Academy \(NTLA\)](#)

FUNDER

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