

RESOURCE LIBRARY
ACTIVITY : 50 MINS

Autopsy of an Albatross

Students dive into ocean plastics with a video about the Midway Island albatrosses. They observe Midway's remote location and hypothesize how plastics could travel there. By comparing hypotheses, students consider what they need to know to understand the problem of plastic pollution. Finally, they are introduced to the unit project of developing their own *National Geographic*-style magazine on the issue of plastic waste.

GRADES

6 - 8

SUBJECTS

Biology, Ecology, Conservation, Earth Science, Oceanography, Geography, Storytelling

CONTENTS

2 PDFs, 1 Image

OVERVIEW

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For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/autopsy-albatross/>

DIRECTIONS

Plastics: From Pollution to Solutions unit driving question: How can humans solve our plastic problem in the ocean?

Plastics, Plastics Everywhere lesson driving question: How do plastics get into and move around the ocean?

1. Ignite students' curiosity about plastic pollution in the ocean.

- Organize students into their publishing teams, which should be formed in advance of this activity (see the Setup section).
- Project a map of Midway Island using *MapMaker Interactive* and zoom in on Kure Atoll, northwest of Hawaii. Then zoom out to see the entire Pacific Ocean. Tell students it is called Midway Island because it is midway between North America and Asia, near the middle of the Pacific Ocean.
- Ask students to close their eyes and imagine being on Midway Island. What would they see, hear, and smell? What would be on the beach?
- Introduce students to the trailer for *ALBATROSS* (3:49), a film by Chris Jordan about the effects of plastic pollution on the albatrosses of Midway Island.
- Before showing the trailer, warn students that the video will contain graphic and upsetting images of dead animals.
- Ask students how the video of Midway Island differs from what they had imagined.

2. Guide students through the process of developing an *Ocean Plastics Movement Model* that shows how plastics can reach Midway Island.

- Remind students that scientific questions are often sparked by surprising observations, like finding plastics in the middle of the ocean. Emphasize that when scientists begin inquiry into a new problem, they often create a model using words, pictures, or a combination of both.
- Distribute one *Ocean Plastics Movement Model* template to each publishing team. Instruct them to begin sketching a model to explain how plastics could reach Midway Island.
 - Point out that this model is a rough draft that will change and grow as they learn more in this unit, so they should use pencils and draw lightly.
 - Jump-start student thinking by asking questions such as:
 - *Where might the plastics be coming from?*
 - *What forces could be making the plastics move?*
 - *What else could be happening to the plastics that we could not directly observe?*
 - *How can you illustrate these concepts on your template?*
- If students are having trouble getting started, display this *Water Cycle Model*. Explain that students' *Ocean Plastics Movement Model* should take a similar approach, but with plastics instead of water as its focus.

- Encourage students to share and discuss their models with their publishing teams or the class. Point out commonalities and differences between the hypotheses presented in the models. For example, different models may emphasize the role of waves, wind, albatross migration, or humans who travel in the vicinity of the island.
- Take care not to correct inaccurate hypotheses at this point; students will be applying what they learn and refining their models as they become more knowledgeable about ocean plastics.
- Ask for examples of evidence that would support a particular model. For example, if a group hypothesizes that waves carry plastics to Midway from Hawaii, an example of evidence to support this hypothesis could be obtained by tracking pieces of plastic, either by boat or with GPS technology, from Hawaii to Midway.

3. Present additional evidence to help students refine their *Ocean Plastics Movement Model*.

- Remind students that scientists often revise their models based on new data, which is why they will now watch a second video. Tell students that although the video is short, it contains a lot of new and important information for their models.
- Introduce the class to a word wall where you will track key vocabulary words throughout the unit (see the Tips section for strategies about setting up an effective word wall).
- Then define and add the following terms to the word wall:
 - *disperse*
 - *concentrated*
 - *ingest*
 - *benign*
- Have students discuss, in small groups or as a class, what new evidence they learned from the video and how they will refine their *Ocean Plastics Movement Model* as a result.

4. Introduce the unit project and create a *Know and Need to Know* chart.

- Ask: *Do you think most people consider the ocean plastic pollution problem in their everyday lives?*
- Conclude the discussion by explaining that in order to solve the problem, people need to be aware of plastic pollution and how to solve it. In this unit, publishing teams will create and publish their own *National Geographic*-style magazine to raise awareness about ocean plastics and help readers take action to address the crisis.
- Introduce and distribute the *Final Project Checklist and Rubric* and answer any questions about it. Also distribute a folder to each publishing team, which they will use as a portfolio to store the various elements of their magazine throughout this unit.

- Ask students to think about and discuss the following questions with a partner:
 - *What do you already know about the problem of ocean plastics?*
 - *What do you need to know about the problem in order to create a magazine that effectively raises readers' awareness?*
- When students are ready to share out, record their answers in a class *Know and Need to Know* chart. Explain to students that they will revisit this chart during the unit to see what they have learned and update their questions.

5. Encourage students to explore *National Geographic* magazines to generate ideas for their projects.

- Guide students' explorations by asking them to note observations and ideas for their own magazines.
- Distribute a selection of *National Geographic* magazines to students.
- Conclude the activity with the following two questions on an exit ticket:
 - *What information about plastic pollution concerns you the most right now?*
 - *What do you most want to learn about this problem?*

TipTeacher Tip

- **Step 1:** You can add an ocean currents layer to MapMaker Interactive. Go to the Layers tab on the right side, click Add Layer, select Water, select Ocean Surface Currents, and click Done.
- **Step 2:** Read more about facilitating development of initial models in science from [*Ambitious Science Teaching*](#).
- **Step 3:** There are many strategies that teachers use to set up word walls in their classrooms. To learn more about some of these options, read these resources:
 - [*Interactive Word Walls Enliven Vocab Learning*](#) for an in-depth view of one teacher's use of word walls with English Language Learners
 - [*The Science Toolkit*](#) for visual examples of a wide variety of science word walls
- **Step 4:** To read more about supporting ongoing changes in student thinking, visit this resource from [*Ambitious Science Teaching*](#).
- **Step 5:** To learn more about facilitating a *Know and Need to Know* chart in project-based learning, [*this PBL Works blog*](#) provides an explanation and examples

Modification

Depending on your classroom's access to and experience with online resources, you may elect to have publishing teams create digital magazines instead of printed magazines. Online production has the advantages of supporting collaborative work, and teams can more easily share their final projects with a wider audience. The resources in this unit can all be easily modified for online work.

Informal Assessment

The initial model, revised model, and *Know and Need to Know* chart provide insights into students' current understanding and ideas about ocean plastics and their movement around the globe.

Extending the Learning

An albatross bolus is similar to an owl pellet. National Geographic has a [Laysan Albatross Virtual Bolus Dissection](#) available online, including a student worksheet PDF.

It may be possible to obtain real albatross boluses (or boli). The nonprofit [Oikonos](#) provides free boli from Hawaii, subject to availability. Albatross boli are also available from the [U.S. Fish and Wildlife Service, Pacific Islands External Affairs Team](#).

OBJECTIVES

Subjects & Disciplines

Biology

- [Ecology](#)
- Conservation

Earth Science

- [Oceanography](#)

Geography

Storytelling

Learning Objectives

Students will:

- Develop and revise an initial model to hypothesize how plastics reach Midway Island.

- Question how plastic pollution can be transported vast distances across the ocean to distant ecosystems.
- Generate ideas for their unit project by examining issues of National Geographic magazine.

Teaching Approach

- Project-based learning

Teaching Methods

- Brainstorming
- Discussions
- Visual instruction

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Information, Media, and Technology Skills
 - Media Literacy
- 21st Century Themes
 - Global Awareness
- Geographic Skills
 - Asking Geographic Questions
- Science and Engineering Practices
 - Developing and using models

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

NEXT GENERATION SCIENCE STANDARDS

- **Crosscutting Concept 4:**

Systems and system models

- **Science and Engineering Practice 1:**

Asking questions and defining problems

- **Science and Engineering Practice 2:**

Developing and using models

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Copies of *National Geographic* magazines for students to explore
- Portfolio folders for publishing teams to store their *Ocean Plastics Movement Model, Final Project Checklist and Rubric*, and other materials over the course of the unit. Three-hole prong folders are suggested, because when the magazines are complete, they can be assembled and bound without the use of plastics.

REQUIRED TECHNOLOGY

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

PHYSICAL SPACE

- Classroom

SETUP

Prior to starting this unit, divide your students into publishing teams consisting of four students each and arrange desks in groups of four. Use any process you are comfortable with to select these publishing teams. For the majority of the activities in this unit, students will be expected to work within their publishing teams, although there are several jigsaw activities in which students form other group arrangements. *Scholastic* provides this [list of eight different ways to group students](#).

Designate a place in your classroom where publishing teams will keep their folders, which contain all of their work-in-progress for the final project. You may also wish to designate a place in your classroom where students can peruse copies of *National Geographic* magazines as they look for inspiration to design their own magazines.

Finally, choose a place in your classroom that can be used as an interactive word wall, with space to post up to 50 clearly visible vocabulary words over the course of the unit.

GROUPING

- Large-group instruction
- Small-group work

ACCESSIBILITY NOTES

Closed captioning should be turned on during video clips for English Language Learners and other students with auditory processing issues.

OTHER NOTES

This unit can be emotionally disturbing for students and teachers. It's important to remember that humans created this crisis, and humans have the power to stop it. Managing emotional responses is important, while also reminding students that there are real ways for individuals, communities, companies, and governments to address the problem. The activities in the third lesson, *Pollution Solutions*, will address which solutions to the plastic problem are the most promising, and the final project invites students to rally the public to act.

BACKGROUND & VOCABULARY

Background Information

Scientists estimate that there are over five trillion pieces of plastic floating in the ocean, with a dump truck's worth of plastics entering the oceans every minute.

Students (and adults) often forget that throwing something away just means moving it somewhere else. In places with well-developed waste management systems, this can mean burying plastics in a landfill, recycling them, or incinerating them—each of which has its own issues. In places with less-developed waste management systems, plastics are often simply

dumped. Estimates vary widely depending on environmental factors and the type of plastics involved, but studies have shown that many types of plastics can persist in the environment for hundreds of years or more. Because of its longevity, plastics disperse around the globe, carried by wind, water, animals, and—of course—human activity.

Prior Knowledge

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Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
benign	adjective	not harmful
concentrated	adjective	items gathered closely together in one place.
disperse	verb	to scatter or spread out widely.
hypothesis	noun	statement or suggestion that explains certain questions about certain facts. A hypothesis is tested to determine if it is accurate.
ingest	verb	to take material, such as food or medicine, into a body.

For Further Exploration

Websites

- [Smithsonian: Laysan Albatrosses' Plastic Problem](#)
- [U.S. Fish and Wildlife Service: Birds of Midway](#)

