

Yellow Ducks Overboard! A Lesson in Geography and World Citizenship

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“Who was responsible for this mess?” Twenty-two voices cried out. “We want to know!” Plastic bottles, lids, bags, and containers were entwined among fishing line along with old shoes and tires. This flotsam of discarded waste was topped off with little yellow rubber ducks and strange “sea creatures” polluting our classroom space! This was the sight that greeted Mrs. B’s first grade class as they entered the room. “What had happened? Dr. Nagel, have you been in our room again?” As the class struggled to settle down in and around this entangled heap of debris, I worked with their teacher, Ms. B, to connect their immediate “polluted” environment with the more abstract concept of the pollution found in our world’s oceans. Our lesson was inspired by the book, *10 Little Rubber Ducks* by Eric Carle, which discusses ocean pollution.¹

It can be a challenge to help first graders understand how pollution in their own immediate space is connected to the pollution in the larger space that we call our world. Developmentally, many are not able to grasp the more abstract aspects of this idea. If we begin by presenting concrete and visual examples of pollution, then children can literally see pollution’s impact, which motivates them to seek solutions to the problem. This introductory experience moves them closer to the ultimate goal of developing a global awareness and sense of responsibility to our local and world communities.

In September, I volunteered to read a story to Mrs. B’s class each month during the school year. Many social studies issues were raised in the books we read, including the five themes of geography: location, place, human-environment interaction, movement and region, and the world.² The five themes of geography intersected nicely with the students’ study of oceans and provided an opportunity to raise the issue of ocean pollution.

Pacific Ocean Garbage Patches

In 1985, a group of researchers in Alaska sampled a concentration of plastic flotsam in the ocean. A few years later, the National Oceanic and Atmospheric Administration (NOAA) predicted the growth of a “Great Pacific Garbage Patch,” a large area of



All photos Donna Beauboeuf

floating debris that includes bits of plastic bottles, bags, lids and other objects.³ Today, oceanographers study (and worry about) how sea life is being affected by the Eastern Pacific and Western Pacific Garbage Patches, which shift in location and continue to grow in size. The Eastern Pacific garbage patch is located an area midway between Hawai’i and California. The Western Pacific garbage patch (which rotates “clockwise” and is often referred to as the “garbage gyre”) can be found off the coast of Japan.

The name “garbage patch” is a misnomer. It’s not an island of trash forming in the middle of the ocean, or a blanket of trash that can be seen with satellite or aerial photographs. This is likely because much of the debris consists of small bits of floating plastic not easily noticed, even from a boat. Like a cloud in the sky, the garbage patch shifts in shape and size as ocean currents move it about.

Shipping Container Spills

Some of the plastic in the garbage patches comes from litter that people drop on the street, which gets carried by rainwater runoff into storm drains, and then to creeks, rivers, bays, and finally to the ocean. Some of the plastic pollution comes from



recreational boaters dumping trash. A lot of it originates from ships dumping trash or accidentally spilling cargo.

According to NOAA, 6,000 to 8,000 shipping containers are lost at sea each year. Ships roll during a storm, cables may loosen or break, and containers slip into the sea. Many of these containers are 40 X 8 X 8 feet, or about the size of a railroad boxcar. The containers often sink, but many break open and spill their contents. Debris from shipping containers can often be found along the shores of places far from where the containers sunk. For example, after a container of Nike shoes was lost at sea, shoes were found months later along the west coast of North America, from Alaska to California.

Rubber Ducks as Data Points

As a class, we brainstormed some of the ways the oceans can become polluted. We then read *10 Little Rubber Ducks*, which was inspired by an incident in 1992: A shipping container tumbled into the North Pacific Ocean, broke open, and 28,800 little rubber ducks (and other plastic bath toys) were lost at sea.⁴ The ducks were manufactured in China, and they were on their way to being sold in U.S. stores.⁵

This accident was an example of plastic pollution, but it also provided scientists with an opportunity to study the speed and direction of ocean waters traveling over the Earth.⁶ The ducks washed up shores of North America and Asia over the next decade, and were even carried by Arctic currents to the Atlantic ocean, winding up on British shores 15 years after the spill.⁷

The story of the rubber ducks enabled us to provide students with concrete examples of one of the ways the ocean can become polluted, to introduce a map of the world to these first graders, and to make connections between children's immediate surroundings and the larger world around them. In *10 Little Rubber Ducks*, the rubber duck castaways drift in many different directions, encountering living animals that must survive in ocean or coastal habitats — a dolphin, a seal, and a polar bear.

To understand more fully the global nature of the problem of pollution, the students explored where these ducks were manufactured, how they were transported and to where they

were being shipped. As a class, we discussed briefly that the rubber ducks were manufactured in China, and were on their way to stores in the U.S. when the spill occurred. We looked at a map of the world (Pacific-Ocean centered) to identify the various locations of the ducks' vast journeys.⁸

Stuck with a Problem

As I read the story, students sat surrounded by the plastic bottles and other debris that polluted the classroom. We challenged students to find the rubber ducks among the trash. A chorus of voices could be heard saying, "I found a shoe!" "I found a fishing net!" "I found a bucket!" "I found a rubber duck!" Entrapped within flotsam were realistic plastic replicas of tropical fish and other sea creatures. Students began shouting, "I found a fish, but it is stuck in plastic!" "There is a fish under the shopping cart." With these discoveries, we challenged the students to think, "How can we help the fish stuck in the plastic or under the shopping cart?"

As the students moved carefully amid the flotsam in their classroom, some of them got caught in the netting. Dalton yelled out "I'm stuck," followed by Olivia wailing, "I can't get up." Mrs. B's first graders were experiencing first hand what the fish and animals in the ocean encounter when caught up in discarded fishing line and nets. We helped the first graders out of the debris, cutting twisted and tangled fishing line from their small legs and feet. The marine debris lesson had created an immediate concrete reaction among the students. They were hooked on the lesson (no pun intended); they cared about ocean pollution, and were motivated to try to propose solutions to it.

Getting Active about Pollution

The first graders were given a blank map of the Pacific Ocean and shown how to draw the ocean currents for the Pacific Ocean. Students put an 'X' on the spot where the 28,800 rubber ducks were lost at sea and drew some lines to indicate the ducks' various journeys to distant shores. This activity reinforced the concept of movement, as students could see concretely how the ducks travelled across the Pacific Ocean.

Then we showed students a short video produced by NOAA Marine Debris Program, which showed how fishing nets can harm reefs, fish, and seals.⁹ The video also provided examples of people picking up trash, divers cutting the fishing nets off reefs, and fishermen collecting the old nets. Following the video, we challenged the students to write down on the back of their map of the Pacific Ocean three things they could do to prevent pollution. Student responses included "Put your McDonalds cup in the trash," "Pick up trash," and "Throw away old fishing line at home."

An example of the students' understanding of the concept would be Whit's response: "My name is Whit and let me tell you about ocean pollution. Did you know that fish and birds eat trash in the water because they think it is food? It makes them sick and they die. Seals and dolphins eat plastic bottles

Ducks in the Flow: Resources about Surface Ocean Currents for the Upper Elementary Classroom

For grades 3-5, educators at Eastern Michigan University have produced a unit of study that includes a storybook and three classroom activities. In the storybook, three kids work collaboratively to explore and investigate surface currents found in the ocean and the Great Lakes while following the journey of a seafaring plastic duck. Three hands-on activities for the classroom further explore the science content and provide instruction in basic science process skills. There's also a teaching guide. It's all at www.windows2universe.org/teacher_resources/ocean_education/currents_main.html.

Making links between the story of the drifting ducks and your elementary social studies curriculum is not hard. Visit www.education.noaa.gov, and then teach your student what the acronym NOAA stands for, what this agency of the federal government does, and how the Clean Water Act of 1972 came about. Make connections with the themes 6 POWER, AUTHORITY, AND GOVERNANCE, 7 PRODUCTION, DISTRIBUTION, AND CONSUMPTION, 8 SCIENCE, TECHNOLOGY, AND SOCIETY, and 9 GLOBAL CONNECTIONS — and borrow from related lesson examples in National Council for the Social Studies, *National Curriculum Standards for Social Studies: A Framework for Teaching, Learning, and Assessment* (Silver Spring, MD: NCSS, 2010). Finally, contact a local organization through the Clean Water Network (www.cleanwaternetnetwork.org/about) and work with them to develop appropriate service learning activities for your students.

as food. Do not throw trash on the ground because it will get into the ocean and make the animals sick.”

While the students continued to work, I slipped away to the flotsam and collected all the fish and sea creatures that were entangled in the debris. We then called the first graders back to the flotsam and instructed them to find a spot to sit, at which point someone exclaimed, “What happened to the animals?” Quickly, the students discovered that all the animals were gone. “What happened to the fish and animals?” I repeated. A murmur, “They died,” echoed throughout the classroom.

Thinking Positively

As students began to realize what happened to the sea animals, I read aloud *I Can Save The Ocean!* by Alison Inches, which explores solutions to ocean pollution.¹⁰ In the book, Max, a Little Green Monster, loves the ocean and the beach, but doesn't like

people leaving their trash behind. Through Max's experiences, young readers learn how plastic bags, old tires, or a broken toy sometimes look like food to a fish or a turtle. This information led students to discuss how discarded trash in our immediate environment can end up in street drains and, ultimately, in the bigger ocean environment.

At the end of the story, Max decides, “I'll pick up the trash.” Max had created his own solution to the problem. We asked the students, “What can we do about the trash in the classroom so that it does not pollute our oceans?” “I know,” Whit volunteered, “Let's pick up the trash,” to which Addison added, “I saw a recycling bin outside; we can put the bottles and cans there!” “Great idea,” said Mrs. B, and she had the students pick up as many bottles and cans as they could. Together we sorted what could be put in a trash bag and what could be recycled. Mrs. B then took the first graders out to the recycling bin to properly dispose of the bottles and cans that were on their reading rug.

Spying paper and plastic bottles left on the playground on their way back to the classroom, students asked, “Mrs. B., can we pick up that trash?” One good answer to that question: “Yes you can, but first let's get a bucket and put on our safety gloves!”¹¹

The concepts of caring for our Earth, and developing a sense of global responsibility and community, were taking shape. The concrete experience of the flotsam had been transferred to another venue, and our first graders were able to recognize their power as citizens of a global community. 🌍

Notes

1. Eric Carle, *10 Little Rubber Ducks* (New York, NY: HarperCollins, 2005).
2. Association of American Geographers, *Guidelines for Geographic Education* (Washington DC: AAG, 1984).
3. “Marine Debris: De-mystifying the ‘Great Pacific Garbage Patch’” (National Oceanic and Atmospheric Administration), <http://marinedebris.noaa.gov/info/patch.html>.
4. “Moby-Duck: When 28,800 Bath Toys Are Lost At Sea,” www.npr.org/2011/03/29/134923863/moby-duck-when-28-800-bath-toys-are-lost-at-sea.
5. For a delightful adult account of the yellow ducks, check out Donovan Hohn's *Moby-Duck: The True Story of 28,800 Bath Toys Lost at Sea and of the Beachcombers, Oceanographers, Environmentalists, and Fools, Including the Author, Who Went in Search of Them* (New York: Penguin Books, 2012).
6. Curtis Ebbesmeyer, “Beachcombing Science from Bath Toys,” beachcombersalert.org/RubberDuckies.html.
7. Ben Clerkin, “Thousands of Rubber Ducks to Land on British Shores after 15 Year Journey,” *Mail Online* (June 2007), www.dailymail.co.uk/news.
8. See the themes “3. People, Places and Environments” and “7. Production, Distribution, and Consumption” in *National Council for the Social Studies, National Curriculum Standards for Social Studies: A Framework for Teaching, Learning, and Assessment* (Silver Spring, MD: NCSS, 2010).
9. National Oceanic and Atmospheric Administration. “What is Marine Debris?” (Video), <http://marinedebris.noaa.gov/outreach/video.html>
10. Alison Inches, *I Can Save The Ocean!* (New York, NY: Little Simon, 2010).
11. “Organizing a River Cleanup,” www.americanrivers.org/assets/pdfs/national-river-cleanup/diy-nrc-toolkit.pdf.

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