

INVESTIGATE

7 | Garbage Investigation

GRADE LEVEL

4-8

45-90
minutes

Developmental Modifications: Use the K-3 journal page for this activity. Young children will need close supervision at the beach and should exercise extreme caution with sharp objects. When picking up garbage, always wear gloves. If appropriate, graph the data as a class.

summary

Students analyze beach trash, discuss the problems posed by it and propose solutions to these problems.

subjects

Environmental Science, Ecology, Social Studies, Math

standards

This Great Lakes in My World activity is aligned to the Common Core State Standards and to state learning standards in:

Illinois
Indiana
Michigan
Minnesota
New York
Ohio
Pennsylvania
Wisconsin

This alignment is available on your Great Lakes in My World CD in the "Standards" folder and on-line at <http://www.greatlakes.org/GLiMWstandards>.

objectives

- Discuss the difference between natural and human-made objects.
- Sort, record, graph, compare, and discuss garbage data.
- Problem-solve about garbage issues.

prerequisite

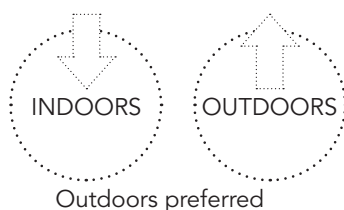
Sound Picture or What's the Environment?, Who Lives In My Community? and Take a Good Look

vocabulary

None

materials

- Pencils
- Journals
- Data sheet
- Graph paper
- Garbage
- Sturdy gloves for each student
- Tarp (if indoors)
- The Ocean Conservancy's data (on cd)

setting

background

Beaches are a place to recreate, exercise, socialize, see wildlife and find solitude. They attract tourists and can be an immense draw for those who live near them. Due to human impact, beaches can suffer from a number of issues, including problems associated with shoreline garbage.

Caution: Students will touch garbage in this activity. Exercise caution when touching garbage! Students should wear gloves. Garbage can be emptied onto a plastic tarp or plastic bag to minimize the mess. If there is a potential for sharp objects, the teacher should sort them out, or responsible, older students can do the sorting. Students should wash their hands when they finish this activity.

Beach litter problems

Cigarette Butts: Cigarette filters are the most numerous item found at Coastal Cleanup. Filters are made of a plastic, cellulose acetate, which can take up to five years to break down and even longer to decompose. Children at play on the beach can put cigarette filters in their mouths. A study has been done showing that the chemicals in cigarettes can be harmful to microorganisms that support other wildlife.

Balloons: Balloons and their ribbons entangle animals and are sometimes ingested when mistaken for food, causing injury or death. Balloons can also be a problem for boaters if their propellers get tangled up in the string.

Food and Food Packaging: Bags can entangle animals or be accidentally ingested by them, causing injury or death. Leftover food may attract additional wildlife to the beach, resulting in increased animal droppings, which can lead to high bacteria levels in the water. High bacteria levels are a reason for beach closings.

Beverage bottles (glass, aluminum, plastic): Broken glass and sharp points on aluminum can injure people as well as wildlife.

Fishing line: Fishing line can cause wildlife to become entangled, potentially leading to injury or death.

Ways to address problems created through beach litter

Service Learning: Service learning integrates community service work into classroom learning and curriculum. Community issues such as dirty beaches or beach closings can be addressed through service learning. When integrated into a curriculum, Adopt-a-Beach™ and Coastal Cleanup are examples of service learning.

Adopt-a-Beach™: Join the Adopt-a-Beach™ program to create positive change for your beach through litter monitoring and water quality testing along the shorelines of the Great Lakes. The Alliance for the Great Lakes provides support and structure for Adopt-a-Beach™ through documentation, an online database and guidance. Adopters make up to five beach visits per year. Participants analyze data and take action to improve their beach. See the Adopt-a-Beach™ activity in this unit or <http://www.greatlakes.org/adoptabeach>.

The International Coastal Cleanup: Coastal Cleanup is an annual, international volunteer event that takes place on the third Saturday of September. In Illinois, Indiana, Michigan and Wisconsin, it is part of the Alliance for the Great Lakes' Adopt-a-Beach™ program (September Adopt-a-Beach™). To get involved in IL, IN, MI or WI, contact the Alliance for the Great Lakes at adoptabeach@greatlakes.org. In other states or countries, contact the Ocean Conservancy to get involved: <http://www.oceanconservancy.org>.

procedure

Part One

1. Give the students one minute to think about an experience they have had on a beach or near the shore. In pairs, have students share their experience with each other for one or two minutes.
2. Ask students, if they have been to the beach, what they like about it. Take a few answers. Ask students what problems they have seen at the beach. *The list of answers might include: too crowded, no lifeguards, garbage, dirty, too cold, big waves, too hot.* Acknowledge all of these answers as possible. Focus on the garbage issue. Ask students: *What do we mean when we say the beach is dirty? This can mean garbage in the water and on the shoreline. How does garbage get to the beach? Human hands are behind garbage on the beach. People can leave trash at a beach or it can be left elsewhere, then be blown or washed onto the shore.*
3. Investigation: What do students think is found at beaches? Tell students they are going to investigate what is really found at beaches. Depending on classroom scheduling, here are two options:
 - a. Bring in a bag of garbage found on a Great Lakes beach.
 - b. During a class field trip to the beach, have students pick up garbage and bring the bag to class.
4. Have students collect data on the garbage they find. Garbage can be sorted as a class, or divided up and sorted by small groups of students. Use the sorting chart provided. To add interest, add a few natural objects that might be found at the beach (feathers, rocks, driftwood...) into the mix of garbage for later discussion.

procedure continued

5. Complete and discuss the questions on journal pages.

Also, discuss the following: Is this all considered garbage? Some items you find can be recycled. Discuss the benefits of recycling and/or reusing an object (such as a toy that is found at the beach). If you have put natural objects in with the garbage, discuss the fact that natural objects belong in the ecosystem.

How are natural objects different from those produced by people? When natural objects decompose or break down in the ecosystem, they give back to the area in the form of nutrients for decomposers, insects and scavengers. They belong along the shoreline.

What problems could garbage create on the beach?

Web Option: This question can be answered on the Alliance for the Great Lakes's web site: www.greatlakes.org or the class can brainstorm ideas. Information is included in Background. Garbage items can cause problems for humans and wildlife. Trash on beaches can: cause people to care less about beaches or feel unhappy about their community, transform a beach into an eyesore, cause health issues, and entangle animals or be accidentally eaten by them, which can cause sickness or death for the animals.

6. What can we do to help solve the problem of garbage on the beach? Carry out what you carry in to beaches, picking up extra garbage at the beach, and educate others about beach litter issues.

Solution List: Based on the class discussion, have students make a list of possible solutions. Students create a list of three items they can do to help reduce garbage on the beach. Students share this list to compile a class solution list.

Suggested Solutions:

- A. *Take responsibility:* Always pick up your garbage, even the small pieces and food waste. Garbage can cause problems for humans and wildlife.
- B. *Join the Alliance for the Great Lakes's Adopt-a-Beach™ Program.* Schools and community groups are invited to adopt. The program includes a commitment of five visits per year for litter cleanup and monitoring. As a program participant, you can also monitor water quality.
- C. *Volunteer at Coastal Cleanup,* an international event that takes place the third Saturday of every September. It is coordinated by the Alliance for the Great Lakes in Michigan, Illinois, Wisconsin, and Indiana, and internationally by the Ocean Conservancy. For a list of state coordinators, see the Ocean Conservancy's web site: <http://www.oceanconservancy.org>
- D. *Pick up extra garbage.* Bring an extra garbage bag with you when you go to the beach and spend some time making the area cleaner than when you arrived. This sets a great example for others at the beach.
- E. *Talk to local and state officials:* Encourage your local and state officials to enforce litter laws and support them with proper disposal containers and adequate staff.
- F. *Educate others.* Explain the problems associated with shoreline trash to other people. Help them see how important it is for us each to take responsibility for our actions.

Part Two

1. Graph the data that you have collected while sorting garbage.
2. Graph the Coastal Cleanup data provided.
3. Compare the graphs. Your beach visit data and the data collected in Coastal Cleanup 2004. Choose a single site or use data for a state. Remember that you are comparing your site to one that is likely different in size and volunteer numbers.

4. Discuss as a class:

- What is similar about what was found?
- What is different about what was found?
- What might account for any differences?
- Discuss what makes graphing a useful tool. *Graphing is a useful tool for comparison because it allows people to see a visual representation of data.*
- What conclusions can you draw from these sets of data?

wrap-up

1. Schools, classrooms, families and individuals can take action about the problem of beach garbage by participating in Adopt-a-Beach™. Your school can integrate the idea of "service learning" into the curriculum by addressing the beach issues in this activity. To get involved: Contact the Alliance for the Great Lakes about Adopt-a-Beach™.

extension

Explore what happens to the garbage in your school or community. Where does it go? Is some of it recycled? Landfilled? Investigate some of the problems associated with solid waste management. What are ways that these problems can be addressed within your school or community?

assessment

Rubric on page 310

7 | Garbage Investigation

FIRST NAME																				
LAST NAME																				

[2] What did you find the most of? Where did it come from?

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[3] What did you find the least of?

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[4] What category was the most popular for items that you found? (Check one)

- ☛ Recreational Activities (evidence of people having fun at the beach)
- ☛ Fishing/Boating (trash from commercial fishing or boat/vessel activities)
- ☛ Smoking-related (cigarette filters, lighters, packaging)
- ☛ Dumping (old appliances, batteries, car parts, tires)
- ☛ Eating (food wrappers, food packaging, napkins, utensils)

[5] What surprised you about what you found?

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[6] What problems might be created by shoreline trash? List two to four problems.

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[7] What three solutions do you think will help solve the problem of beach litter?

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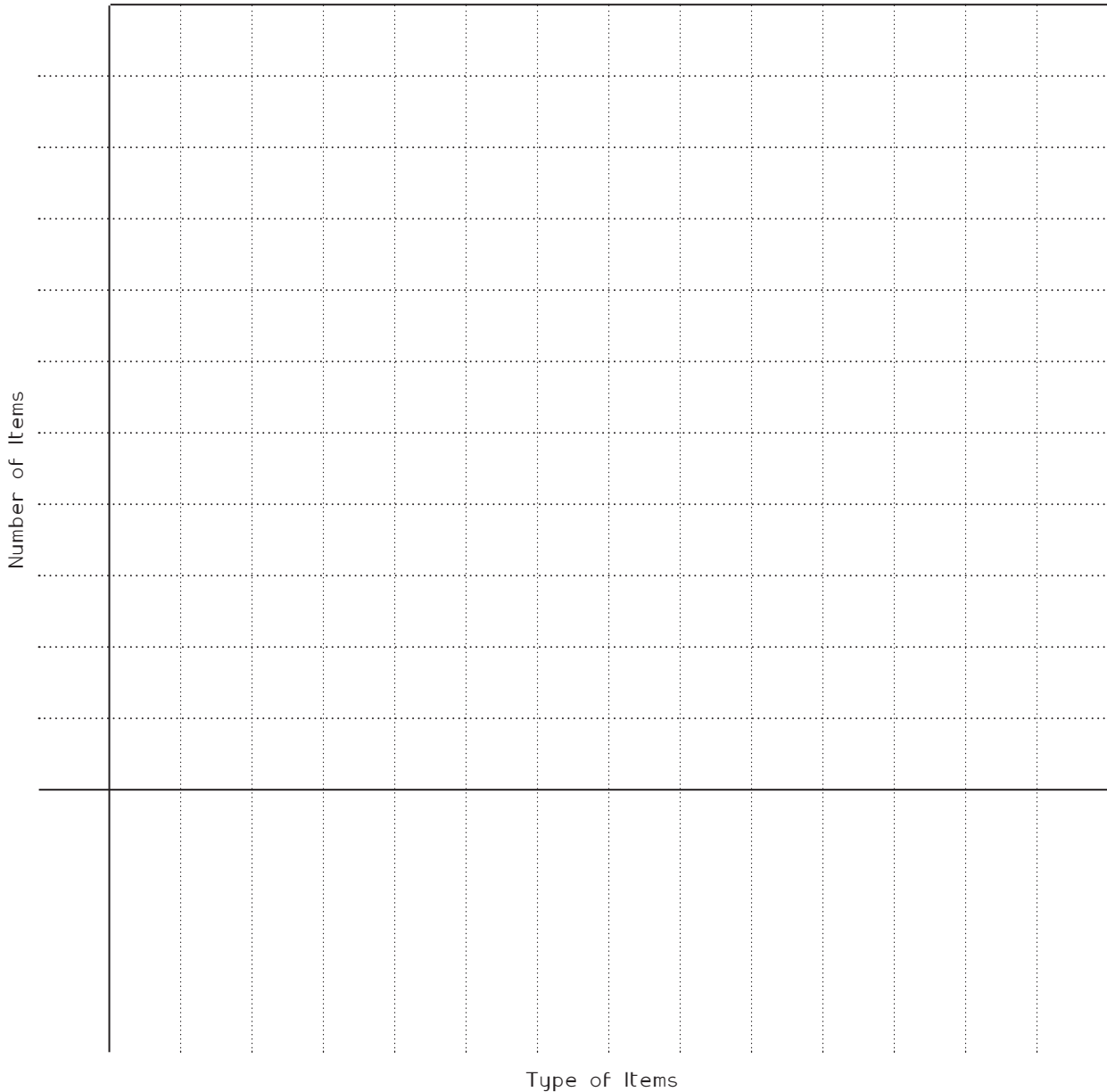
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FIRST NAME																				
LAST NAME																				

[8] Make a bar graph of the data you collected:



If you have many items, you may want to group them in the following categories:

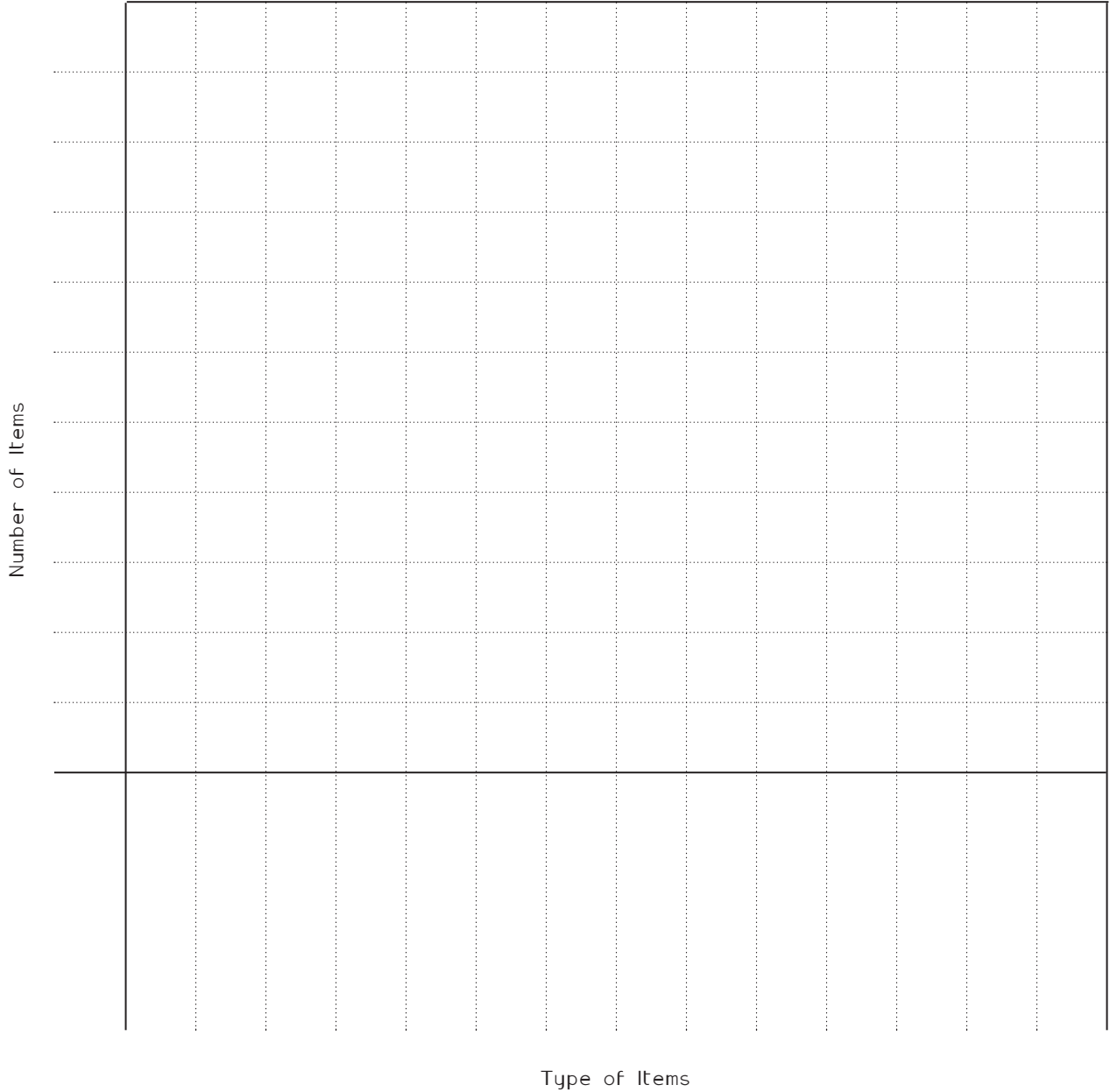
- Recreational Activities
- Food-related
- Fishing/Boating
- Smoking-related

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FIRST NAME																				
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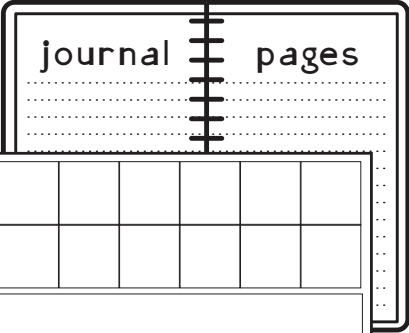
[9] Make a bar graph of The Ocean Conservancy data:



If you have many items, you may want to group them in the following categories:

- Recreational Activities
- Food-related
- Fishing/Boating
- Smoking-related

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GRADE LEVEL
K-3

7 | Garbage Investigation

FIRST NAME																				
LAST NAME																				

[1] Draw the object you found most often.

[2] How many did you find?

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[3] Draw the most unusual object you found. Label it.

[4] Draw a clean beach. Include any animals and plants you think might live there.

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