



Marine Debris Source Sorting Relay

Objectives:

Students will be able to recognize four major sources of marine debris and connect their own consumer and community choices to the four sources of marine debris.

Concept:

Marine debris has existed for thousands of years, since people have been creating and disposing of tools and clothing. Until the invention of synthetic plastics, most marine debris was biodegradable. Plastics are a unique and relatively recent technology, and have vastly magnified the problems caused by marine debris. There are four main sources of marine debris: land-based/personal use, marine industries & recreation, container ship spills, and natural disasters. Individuals have great power to change their own consumption and disposal habits; influence others to minimize plastic waste; and prepare for, rebuild, and clean up after large- and small-scale natural disasters.

Materials:

- ⊙ Science notebooks
- ⊙ Pencils
- ⊙ Whiteboard, Flipchart, or SmartBoard with appropriate tool to write on it
- ⊙ Large Bins (2-4)
- ⊙ A variety of marine debris
- ⊙ Notecards
- ⊙ Markers

Preparation:

Fill bins with different types of clean marine debris collected from beaches or borrowed from the Center for Alaskan Coastal Studies (www.ak-coastalstudies.org). Make sure each bin contains at least 10 items, and that those items represent

all of the 4 major source categories for marine debris.

Write one of the four source categories (land-based/personal use; marine industries & recreation; container ship spills; natural disasters) on notecards so that you have 4 complete sets. If you are planning to use student-defined categories, do not write on the cards until the categories have been defined.

Introduction:

Ask students to think back to a time they were on the coast or ocean. What kinds of litter and marine debris did they see?

Divide students into groups of 2-4. Give groups 2 minutes to make a list in their science notebooks of debris they have seen personally.

After the time is up, have groups share their debris items.

Write them on the board and discuss the items as you do. Where did they see these debris items? Was there a lot of them, or just one? Where might they have come from?

Activities and Procedures:

Have students return to their groups and work to divide the common types of debris they have seen into 3-5 broad source categories.

The categories used later in this lesson are Land-Based/Personal Use, Marine Industries & Recreation, Container Ship Spills, and Natural Disasters. However, do not tell students these categories before they create their own.





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The goal is to get them thinking about the broader sources of marine debris and how they would categorize items.

Have groups share their categories.

Discuss what types of debris might be missing from these categories. Students are likely to be familiar with land-based/personal use type debris and debris from marine industries and recreation, although they might use other category labels. However, many students will not be familiar with debris from container spills and natural disasters.

If debris items from these categories have not been considered, introduce the concepts to the class by asking about items like basketballs that fell off a shipping container or foam from buildings and docks.

Then, explain that marine debris comes from many sources and these sources can be organized into many different categories. Explain that categories that are sometimes used are: Land-Based/Personal Use, Marine Industries & Recreation, Container Ship Spills, and Natural Disasters.

Divide students into 2-4 teams for a relay race.

Arrange bins filled with clean marine debris at the front of the classroom – one bin for each team.

Place notecards with labels for marine debris source categories (land-based/personal use; marine industry & recreation; container-ship spills; natural disasters OR student-defined categories) about ten steps away from each relay team.

Make sure each team has their own set of labels.

Explain that the first member of each team should run or speedwalk to a piece of marine debris, place it with the correct (or most plausible) vector label, and return to tag their next teammate.

The game continues until all of the marine debris has been sorted.

Instruct students that if they are unsure of where a piece of debris belongs, they can consult their teammates.

Begin the race! When the first team finishes, stop the race and sort through the piles as a class.

The group with the most marine debris correctly placed in the categories wins.

Wrap-up:

Discuss any debris that was difficult to place within a category. Look at debris items to see if any could be from natural disasters, either local or across the ocean. Spend some time discussing how natural disasters can be linked to debris. Since the 2011 Tohoku Earthquake and Tsunami in Japan, marine debris clean ups along the Gulf of Alaska, Prince William Sound, and Southeast Alaska have collected significantly higher amounts of polystyrene and polyurethane foam that are likely linked to aquaculture buoys that were ripped away during the tsunami and insulation from homes that were destroyed. Take a moment to recognize the immediate tragedy of the disaster, and the long-term effects this marine debris might have. Explain that smaller scale weather events can create marine debris too. Briefly discuss ways that people living in



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coastal areas can prepare for extreme weather to protect themselves and their property, and prevent debris from entering the ocean.

Extensions & Lesson Connections:

This lesson pairs well with Designing Debris Solutions and Graphing Marine Debris Trends.

If you would like, extend the relay race into round two. Replace the source labels with likely effects on marine and coastal organisms (entanglement, ingestion, smothering, toxins, etc.) and mix the marine debris back up for a second relay. This links well to the Effects of Marine Debris on Ecosystems, Marine Debris Masks, Gyre Dangles, and Top of the Ocean lessons.

Evaluation:

The successful sorting of debris can be used as a measure of cooperation and student understanding.

