



Graphing Marine Debris

Objectives:

Students will understand how marine debris has changed over time and how the invention and increasing use of plastic products has magnified and changed issues surrounding marine debris. They will be able to explain recent trends in 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
- ⊙ Markers
- ⊙ Notecards
- ⊙ Masking tape
- ⊙ Handout: CoastWalk 2012 Data
- ⊙ Handout: ICC Data

Preparation:

Create a line with masking tape on the floor to form the x-axis of your human-size graph.

At the beginning of this line, place a perpendicular line of tape on the floor to form the y-axis.

Make small dash marks along the y-axis to represent every 5 students (or an appropriate scale for your group size.)

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?

Procedures & Activities:

Split the debris items into the four source categories (land-based/personal use; marine industries & recreation; container ship spills; and natural disasters) or into other categories defined by the students.

Reveal the x- and y-axis on the floor.

For each category, place a notecard label below the x-axis. Go through the categories one by one and instruct students to come forward if they have seen an item of marine debris from this category on the coast or ocean.





Graphing Marine Debris *Continued*

Line the students up perpendicular to the x-axis and mark how far along the y-axis the line reaches on the floor with a piece of masking tape.

Have students return to their seats, and then move on to the other categories, following the same procedures.

When all categories have been completed, have students gather round to look at the graph they have created.

Instruct students to recreate the bar graph in their science notebooks, with # of students who have seen the item on the y-axis and category of marine debris on the x-axis.

Explain that marine debris clean ups take place throughout Alaska and the world, and that data from these clean ups is recorded, so that it is possible to identify the most common debris items found in Alaska and worldwide.

Have students write the following in their science notebooks:

- A hypothesis (educated guess) about the 3 most common marine debris items collected during international clean ups
- Reasoning to support that hypothesis

- A hypothesis about the 3 most common items collected during Alaskan clean ups
- Reasoning to support that hypothesis

Remind students that they are transitioning from broad categories of items to more specific categories like “ropes and nets” or “plastic beverage bottles.”

Then students should share their hypotheses and reasoning with a partner and agree on their top

3 for international clean ups and their top 3 for Alaskan clean ups.

Write student hypotheses on the board.

Wrap-Up:

Then pass out data from ICC and Alaskan clean-ups that identify most common debris items. Discuss the data. Were any hypotheses supported? Was the data surprising? Ask students to reflect in their science notebooks on the following questions:

- Why might these be the most common items?
- Where do they come from?
- What can I do to decrease the amount of these common debris types?

Extensions & Lesson Connections:

You may extend the graphing activity to deal with data from your class’s marine debris clean ups. See the "Data Entry and Analysis" Lesson for more information on accessing and analyzing the data.

This activity pairs nicely with "Marine Debris Source Sorting" and "Designing Debris Solutions."

Evaluation:

Review student science notebook entries, including: list of debris they have seen, hypotheses and reasoning for common debris types, graph of debris types, and reflection on why these types are most common and what could be done to minimize the amount of this debris. Evaluate these entries for completeness, effort, and understanding of the concepts.