Pollution Percentages

Objective

Given a sample of marine debris, the student will be able to sort the debris into four groups. The student will be able to gather and interpret data from the debris and solve real-life problems involving percentages.

Given examples of trash, the student will be able to predict and test how it would degrade in the ocean and discuss its impact on the marine ecosystem. After demonstrating how some materials degrade in water, better than others, the student will be able to predict the impact of various human activities on the marine ecosystem.

Materials

- ❏ debris gathered from a beach, streambed, or roadside
- ❏ scale
- ❏ pencils and paper
- ❏ calculator (optional)
- ❏ a tub large enough to completely submerge trash
- ❏ water

Background

Some sea turtles die when they ingest trash. Leatherbacks are especially susceptible to ingesting plastic bags, plastic pellets, and balloons—mistaking them for jellyfish prey. Plastic debris can block a sea turtle's intestines and reduce its ability to eat. Sea turtles can also become entangled in ropes, plastic bags, plastic six-pack holders, plastic tarps, and even beach chairs. Debris enters the ocean from ships and from shore—blowing into the ocean from beaches and washing down waterways during storms. You can help sea turtles by making sure your trash is either recycled or disposed of properly in trash receptacles. Also, whenever possible, choose reusable shopping bags.

Action

PART ONE:

1. Take a field trip to a local beach, stream, or roadside and collect debris you find there.

2. Separate the debris into four groups: plastic, wood products (including paper), metal, and glass.

3. By weighing each group, find its percentage of total weight.
   - What type of debris is most prevalent by weight?
   - What type of debris is most prevalent by number of pieces?

4. Discuss the possible origins of the debris you recovered. Next, discuss what happens when trash accidentally reaches the ocean. Use these questions to help prompt discussion:

   • How does trash end up in the ocean?

   • What kinds of trash have you seen in the ocean (or lake, stream, or other body of water?) If the trash is listed or pictured on the board, circle it.

   • What eventually happens to the trash? Where does it go?

   • How can students work together to design an experiment to see what happens to trash that is in salt water?

PART TWO:

5. Assign students to work in cooperative learning groups. Each student group selects one item of trash from each of the four categories. Ask them to predict which items will degrade fastest and slowest when submerged in water.

Beach clean-up volunteers sort trash. Such efforts do more than just keep beaches clean: they also help prevent marine animals from ingesting or becoming entangled in trash.

6. Have students submerge their items in a large tub of water.

7. Once a week, have each group remove and examine each piece of their "trash" and record changes in its appearance.

8. At the end of the semester, have students chart which items degraded fastest and which degraded slowest.

   • Which kinds of trash appear to be degrading? Which kinds do not?

   • What other changes do you observe?

9. Discuss the potential impact each type of trash might have on the marine ecosystem. Brainstorm ways to decrease the percentage of waste, being sure to discuss consumer choices, recycling, legislation, and habitat clean-ups.

Deeper Depths

Have students research bioplastics (i.e. biodegradable knives, forks, dishes, and cups) online. Students can then discuss whether or not bioplastics are a good solution to decreasing the amount of plastics in landfills. What are some other options for decreasing the great percentage of plastics in landfills?