RUSTY'S Round the World Adventure

Plastics & the Ocean

Objective

This lesson will reinforce the importance of disposing of and sorting our waste properly. Students will perform a few simple experiments to examine whether trash can float, blow around, or wash away, drawing conclusions about how waste--primarily plastic--ends up in the ocean. Extension activities elaborate on the harmful impact marine debris has on wildlife.

Teacher Background

The influx of plastic products and packaging over the last 70 years has been extraordinary. The world now produces close to 300 million tons of plastic every year, half of which is designed for single-use. More than 8 million tons of plastic is dumped into our oceans each year. Scientists predict there will be more plastic than fish in the oceans by 2050.

Oceans are fundamental to the health of our planet -- the very lifeblood of Earth's ecosystem. To survive and prosper, humankind needs a harmonious relationship with our planet's oceans. This includes a reevaluation of our disposable lifestyle as well as increasing our participation in efforts to reduce, reuse, and recycle as much as possible.

Materials Needed

Letter from Rusty
Rustygram Slideshow
Fish Friend/Fish Foe worksheet
How did it get there? Station Guides
A 2-3-gallon bucket filled with water
2 15-inch round table fans (or similar)
1 large, shallow container (such as a large dishpan)
A watering can
A towel or two
*Package from Rusty, full of items that could be collected from the beach, such as:

- Marine debris i.e. sea shells, sand, seaweed, etc.
- Bottle caps and other hard plastics
- Torn plastic bags, straws and other soft plastics
- Aluminum foil or soda can tab
- Miscellaneous items i.e. balloons, ribbon, fishing wire, etc.
- Styrofoam pieces

*Generate student excitement by creating a package from Rusty in a recycled container- a shoe box, large envelope, etc. with little trays or baggies full of curious items for each group.

Procedure

Where Is Rusty? (10 minutes)

1. Students watch the Rusty Travels the World video (1 min).

2. Students receive a postcard from Rusty while he's on his travels, either provided as a Handout or displayed on the SmartBoard/projector.

3. Read Rusty's postcard aloud while playing the Rustygram slideshow of accompanying photos to learn more about his trip. Where does Rusty go?

4. Have a brief class discussion about the ocean. Record answers on the SmartBoard/poster paper.

Ask:
Have you been to the ocean?
Do you know someone who has?
What do you/they love about it?
What is important about the oceans?
What would you save if it was at risk?
Show Rusty's Big Questions:
Where did this stuff come from?
How did it get to the oceans?
What must we do about it?

What Did Rusty Find? (5 minutes)

1. Arrange the class into groups of 4-5 students. Explain to the students that each group will receive a Package from Rusty that they will need to open carefully. Introduce the Fish Friend/Fish Foe worksheet to help them categorize the items that they find inside. Allow the students a few minutes to complete the worksheet, reminding them that:

Fish Friend: items that come from the ocean and belong there
Fish Foe: items that don't come from the ocean and do not belong there

2. Encourage the students to share out some of the things they put into each category and why. Write their responses on the board. Identify common items and materials. Explain that they will now be gathering information to find out about how their Fish Foes ended up in the ocean. Instruct students to return their Fish Friends back into the package and to flip their worksheet over. Each student should select 1-2 Fish Foes from Rusty's Package for further investigation.

How Did It Get There? Research (15 minutes)

1. On the back of the Fish Friend/Fish Foe worksheet, instruct teams to fill in the "Item Description" column on the Trash Traits handout for each of their Fish Foes that they've selected. Introduce the three stations. Each station will have a short experiment to complete and several images that depict real world examples of the phenomena being tested. State that each group will have 3 minutes to do the experimental portion and 3 minutes to analyze the photos and complete the corresponding column on the Trash Traits worksheet at each station.

Station 1: **Can it be blown around on land?** Set up the fan at one end of a table. (If no fan is available, blow on the item or use a piece of paper.) Students will place Foes in front of the fan one by one and record their observations for each Foe.

Station 2: Does it float? Can it be blown around on water? Fill a portable container with water and set it on a table. Have students place one Foe at a time in the water and record their observations. If the item floats, have students repeat the wind test from the first station.

Station 3: Can it be moved by sprinkling water? Elevate one end of foil pan or a similar shallow container. Place the Foes one at a time on the sloped area and sprinkle water on them using a watering can. Have students record their observations.

2. Students return to their groups with completed Trash Traits worksheet. Facilitate discussion of Trash Traits, one material or object at a time. Use the following questions to guide the conversation:

Ask:
What will happen to floating items when they get into the ocean?
What could some of the problems be with floating trash?
What will happen to items that don't float when they get into the ocean? What could some of the problems be with trash that sinks? Do you see any patterns with the floating and sinking trash?
Do you see any patterns in the trash that can be blown around?
What does the sprinkling water station represent?
Do you see any patterns in the trash that moves by sprinkling water?
Each group works out how an assigned trash item could make its way to the ocean.

Check for Understanding (10 minutes)

1. Instruct students to complete their own Postcard to Rusty by answering the original questions: Where did this stuff come from? How did it get to the oceans? What must we do about it?

2. Talk through a few examples of Fish Foes that were studied and where they could end up. Have students get up one by one and sort those items into the correct bin (blue bin or trash bin).

3. Conclude with a brief Reduce, Reuse, Recycle message. Avoid plastic! But if you have it, make sure it gets recycled, reused or trashed.

Extension Activity

1. Using Trash Traits observations, instruct students to draw and or to explain how one of the below phenomena could occur:

Plastic Bag → Confused for jellyfish
Soda Rings → Entangled turtle
Plastic Bottle Cap → Confused for food
Plastic Bottles → Used as hermit crab's shell
Cleanser Microbeads→ Fish food