

# Sink or Swim?



## IDENTIFY THE DIFFERENT PLASTICS IN A MYSTERY BAG.

Plastics are everywhere: from car parts to drinking bottles to sports equipment. Each plastic is chemically unique and has distinct properties that make it suitable for certain products. Plastics are classified #1 through #7. To find out what type of plastic a product is made from, check the bottom of the object and locate the number inside the recycle symbol. Even though some recycling centers only accept certain numbers, all plastics with this symbol are recyclable. Markets just don't exist for all recycled products.



## You'll Need:

For the mystery bag:

- ◆ #1 plastic (clear bottle, e.g., soda, water, mouthwash, or salad dressing bottle)
- ◆ #2 plastic (opaque bottle, e.g., milk, orange juice, shampoo, or lotion bottle)
- ◆ #4 plastic (lightweight bag, e.g., bread, sandwich, and some grocery bags)
- ◆ #5 plastic (tub, e.g., yogurt, cottage cheese, or margarine container)
- ◆ #6 plastic (e.g., Styrofoam products, disposable plates and cups, plastic utensils)
- ◆ scissors
- ◆ sandwich or paper lunch bag (1 per small group)



For each small group:

- ◆ plastic containers girls bring from home
- ◆ transparent cup or container
- ◆ water
- ◆ paper and pencils
- ◆ scissors
- ◆ permanent marker

**SMART START:** The day before, you will need to do two things:

- ★ Prepare "mystery bags" for each small group. Find samples of #1, #2, #4, #5, and #6 plastics and cut them into small pieces (about 1 to 2 in.). If the plastics are not easily distinguishable by sight, cut them into different shapes. For example, cut a #1 plastic into squares, a #2 into triangles.

Make a key that identifies each plastic by its number. Then place a mixture of all types into a bag for each group.

- ★ Ask girls to try and find one example of each type of plastic container at home. <sup>2</sup> Then, clean and bring in examples to share. Plastics with #3 (e.g., PVC pipe) and #7 (e.g., computer cases or sport water bottles) can be hard to find. Explain that this activity focuses on plastics #1, #2, #4, #5, and #6.





# Sink or Swim? continued

Here's how:

- 1. Introduce plastics.** Ask girls to name as many things as they can that are made of plastic. Are all plastics the same? How are they different?
- 2. Collect data.** Ask girls to brainstorm different physical properties of materials (color, appearance, texture). Then, ask girls to break into small groups <sup>1</sup> and sort the plastic bottles and containers they brought in according to their numbers. Have them examine each pile and list different physical properties that are characteristic of each type of plastic. They should create a table that will later be used to classify the plastic pieces in the mystery bag. Here are some examples:
  - ★ **Transparency** Is the plastic clear or opaque? Or in-between?
  - ★ **Luster** Is the plastic dull or shiny?
  - ★ **Brittleness** Does the plastic break when bent?
  - ★ **Rigidity** Is the plastic flexible or tough?
- 3. Test density.** Recycling centers use density (another physical property) to separate certain plastics. Have each group cut out a small sample from each type of plastic and use a permanent marker to label it with its recycling number. Give each

group a small clear cup (or equivalent) filled with water. Using a pencil, push each sample down into the water and wait to see if it floats. Record results. (Plastics #2, #4, and #5 float, while #1 and #6 sink.)

- 4. Identify mystery plastics.** Put the bottles and containers away. Hand a mystery bag to each group and present the **SciGirls Challenge**: Identify the different plastics in your mystery bag by their physical properties. Can they assign a number to each sample?
- 5. Share.** Bring the girls back into a large group and discuss how they knew which plastic was which. <sup>6</sup> Why might a company choose one type of plastic over another? (durability, contact with food, ability to stack for shipping) How might recycling centers use these properties to sort plastics? Suggest girls research what products each type of plastic can be recycled into!

To see what SciGirls learned when they visited a recycling center, watch the *SciGirls Go Green* DVD. (Select Going Green: Research.)



To learn more about the numbers found in the recycle symbol, watch the *SciGirls Go Green* DVD. (Select Going Green: Mentor Moment.) <sup>7</sup>



## Mentor Moment

Alexis Clark is a chemical engineer who works for General Mills. She designs food packaging for products like yogurt and thinks about design considerations such as: weight, durability, stacking, and consumer appeal. She has always been interested in the food industry and likes that she has an effect on how consumers view the products we buy on store shelves.

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