

Formation of a precipitate

What happens when soap is added to hard water?

In certain parts of the country, minerals like calcium, iron, or magnesium are naturally dissolved in the water. Water that has minerals dissolved in it is called *hard water*. These minerals can combine with soap to create *soap scum*. In this activity, you are going to make hard water and see how it reacts with soap.

Procedure

Prepare the cups

1. Label 3 plastic cups **soap**, **water**, and **hard water**.
2. Place 3 tablespoons of water in the *soap* cup and 2 tablespoons of water into each of the *water* and *hard water* cups
3. Hold a piece of Ivory soap on a piece of paper. Use a popsicle stick or plastic spoon to scrape soap flakes onto the paper.
4. Add 1 tablespoon of soap flakes to the water in the *soap* cup, and stir until the water is white.
5. Make “hard water” by adding 2 teaspoons of Epsom salt to the water in the *hard water* cup, and mix until no more Epsom salt will dissolve.



Add soap to water and to hard water

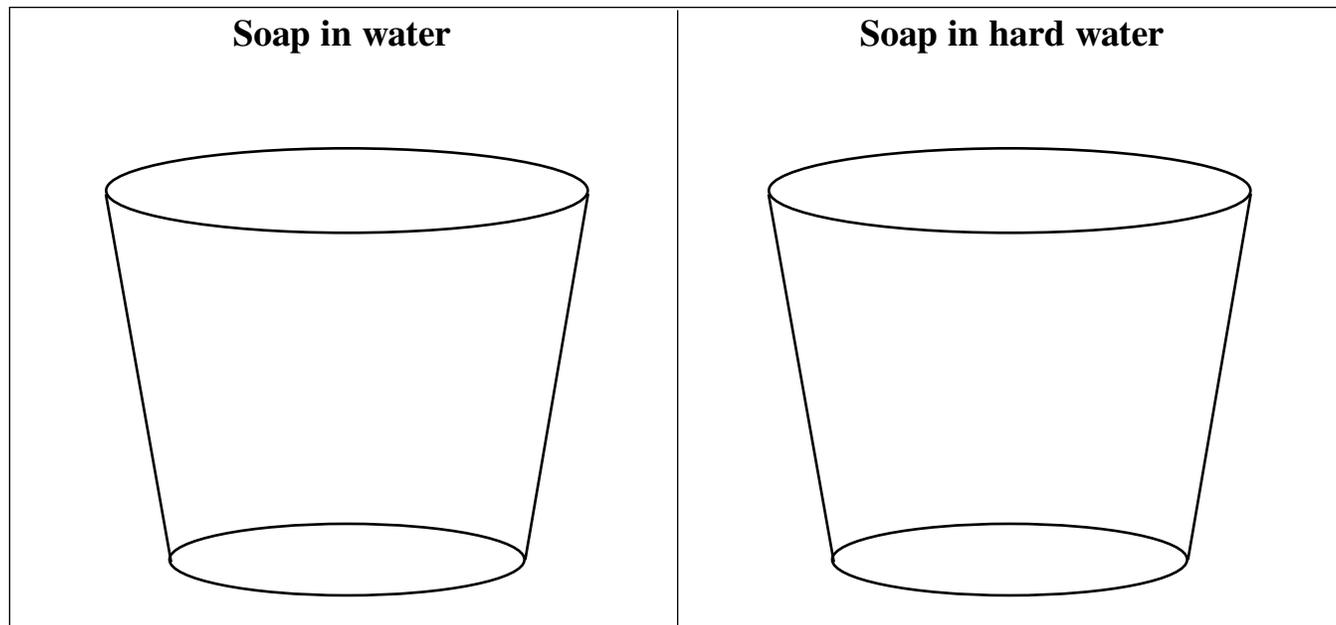


6. Use a dropper to pick up soap solution from the *soap* cup. Carefully squirt several droppers-full of the soap solution into a teaspoon until it is full.
7. Pour this teaspoon of soap solution into the *water* cup. Use the dropper to collect another teaspoon of soap solution, and also add it to the *water* cup.
8. Using the same method described in Steps 1 and 2, add 2 teaspoons of soap solution to the *hard water* cup.
9. Look at the cups from the top and the side. Record your observations at the top of the following page.

Activity 5.10

Formation of a precipitate (*continued*)

Use words and drawings to describe what you see in each cup.

**How do you know that soap scum is different from soap?***Procedure***Prepare the cups**

1. Label one cup **soap** and the other **soap scum**.
2. Add 2 tablespoons of water to each of the labeled cups. These cups will be used after the soap scum is collected.

Collect the soap scum

3. Place a coffee filter on the top of a plastic cup as shown. Hold the filter in place as you pour the hard water and soap scum into the filter.
4. Allow some of the water to drain through. Then carefully remove the filter and gently squeeze the remaining water into the cup.
5. Carefully lay the coffee filter on a paper towel as shown. Use a popsicle stick to scrape the filter to collect the soap scum.

**Compare the amount of bubbling in each cup**

6. Look at the amount of soap scum you have. Then place a similar amount of soap flakes into the cup labeled *soap* and stir gently.
7. Add the soap scum to its labeled cup and stir gently.
8. Place a straw into both cups. Gently blow through each straw and compare the amount of bubbling.

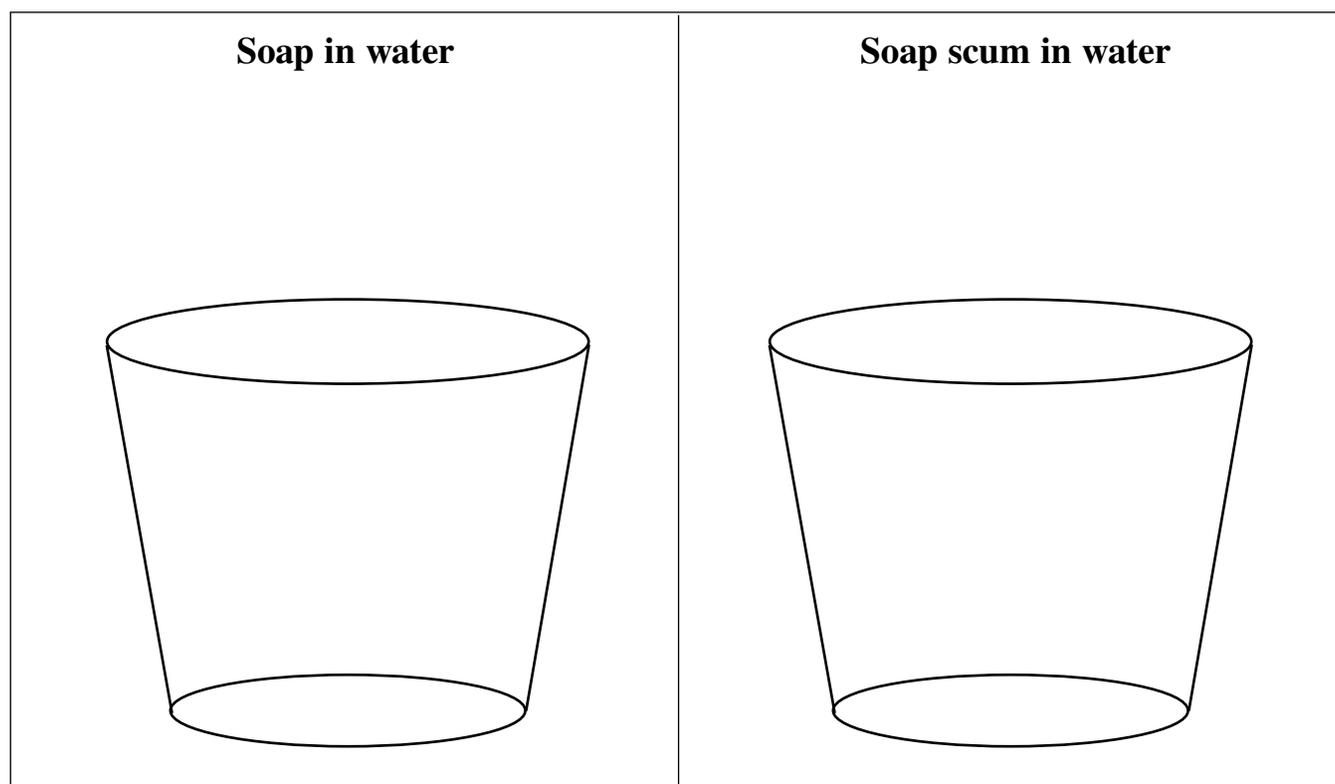


Activity 5.9

Formation of a precipitate *(continued)*

1. Does soap scum dissolve in water as well as soap? _____
2. Does soap scum bubble in water as well as soap? _____

Draw the amount of bubbling you saw in each cup.



3. Do you think a chemical reaction occurs when soap is added to hard water? _____

Think about the definition of “chemical reaction” and what you observed in your experiment to explain your answer.
