



**W**ater is a very important chemical! It covers about three-fourths of the Earth's surface and makes up about two-thirds of your body's weight. Every living thing needs water to survive. One of the special things about water is that it tends to stick to itself. This property is called cohesion. When water sticks to something else, it is called adhesion. Because water sticks so strongly to itself, it tends to bead up on slick surfaces like a car's hood or windshield. Water also forms a "skin" on its outer surface. This "skin" is strong enough to support a water bug, and it is flexible enough to bend around the edge of a water drop.

## Materials

- 2 Paper towels
- Penny
- Small disposable paper cup (3 oz.)
- Water
- Dropper
- Liquid dish detergent
- Food coloring (optional)

### ADAPTATION

**ADAPTATION:** To see the water's surface more

clearly, you can add a drop of food coloring to the water. You may also want to use a magnifying glass and a flashlight.

### SAFETY!

**SAFETY:** Be sure to follow Milli's Safety Tips and do this

activity with an adult! Do not drink any of the water samples in this activity.

- Use the dropper to carefully place water onto the surface of the penny one drop at a time, counting the drops and watching from the side as they are added. Add the drops close to the center of the penny and hold the tip of the dropper just above the penny.

How many drops of water fit onto the penny before the water runs over the edge and onto the paper towel? Write down your answer and draw a picture of what you saw.

- Dry the penny completely with the other paper towel and then place it onto a dry spot on your first paper towel.
- Add five drops of liquid dish detergent to the cup containing the water and mix it slowly with the dropper.
- Try dropping soapy water onto the top surface of the penny as before.

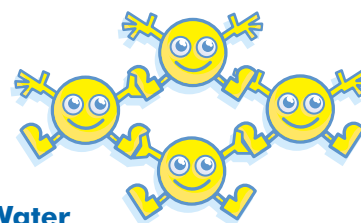
How many drops can you add before the water runs over the edge onto the paper towel? Write down your answer and draw a picture of what you saw.

- Thoroughly clean the work area and wash your hands.

## Where's the Chemistry?

Because water sticks to itself so well, it will easily form very large drops. In a drop, all the water molecules are close together, and they can touch several other molecules at the same time. Each of the water molecules is surrounded on the top, bottom, left, and right by other water molecules.

When detergent is added to the water, the drop falls apart. The detergent molecules stick to the water molecules, and they block the water molecules from sticking to each other. As more detergent is added to the water, the water molecules have a harder time sticking to one another. Since the water molecules cannot stick to each other as well, they cannot form large drops, so soapy water forms small drops, and very soapy water will not form drops at all.



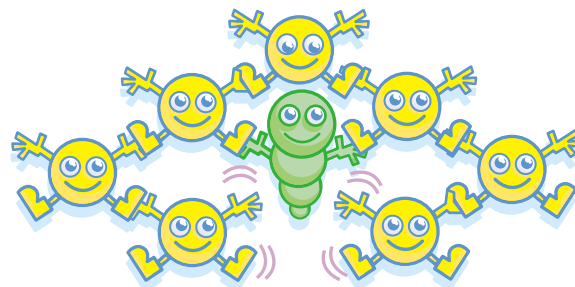
Water



Water Molecule



Detergent Molecule



Water + Detergent

## Procedure

- Place a clean, dry penny flat on one of the paper towels.
- Fill the cup about halfway with water.



## What did you observe?


Number of Drops of **Water** on a Penny

Number of Drops of **Soapy Water**  
on a Penny

Draw a Picture of Water on a Penny



Draw a Picture of Soapy Water on a Penny



The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at [www.acs.org/kids](http://www.acs.org/kids).

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## Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

### Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

**Never** eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

**Never** experiment on your own!

**For more detailed information on safety go to [www.acs.org/education](http://www.acs.org/education) and click on "Safety Guidelines".**

