

Poke, But Don't Soak

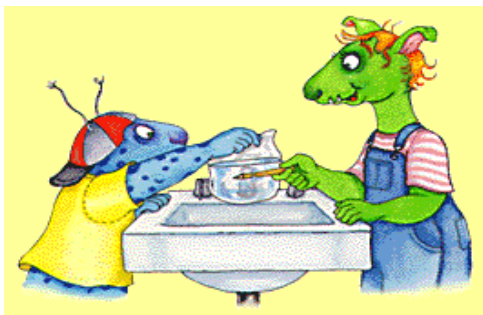
Try to poke a pencil all the way through a plastic bag of water without causing leaks. The flexible power of polymers makes it possible!

Materials:

- Zip-closing plastic bag
- Sharpened pencil
- Water

Procedures:

1. Fill the plastic bag about $\frac{1}{2}$ full of water. Seal the bag. Hold the bag over a sink or bucket or over the ground outside.
2. While you hold the bag, your partner should slowly push the point of the pencil through the side of the plastic bag and into the water. Did any water spill? Don't take the pencil out.



3. Why do you think very little or no water spills? Look closely at the plastic bag surrounding the pencil. How would you describe the way the plastic bag fits around the pencil?
4. Do you think the pencil can go all the way through the water and out the other side of the bag with no water spilling? Ask your partner to slowly push the pencil all the way through the other side of the bag. What happened?

Think about this ...

Try to poke a wooden skewer through a balloon without popping it. This takes some practice! Rub a little vegetable oil along the length of the skewer. Carefully poke it through the thick, unexpanded material near the knot of the balloon. Then twist the skewer as you move it through the balloon. Poke the skewer out through the thickest part at the other end of the balloon. How is this like the activity Poke But Don't Soak? Is there anything about long thin polymer strands that might help explain why the pencil can do this?

Where's the Chemistry?

The polymers in the plastic bag and the balloon are very flexible. Some of the long thin polymer strands shift over so that the pencil or skewer can push through. Notice how the polymer material in both cases molds itself around the poking object. This flexibility creates somewhat of a seal so that the water or air does not spill out much.



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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.

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 and click on "Safety Guidelines".

