Meg A. Mole's Bouncing Ball

from Celebrating Chemistry

Balls have been around for thousands of years. The earliest balls were made out of stone and wood. They were used to play games that involved kicking and carrying. The discovery of natural rubber changed what people could do with a ball. They could bounce it! These days, not all bouncing balls are made out of rubber. They can also be made out of leather or plastic and be hollow or solid. Think about the last ball that you bounced. What materials were used to make it? In this activity, you will make a bouncy ball from glue, borax, and cornstarch.

SAFETY! Be sure to follow Milli's Safety Tips and do this activity with an adult!
Do not eat or drink any of the materials used in this activity.

Materials

- Marking pen
- 2 small plastic cups (4 oz.)
- Measuring spoons
- Warm water
- Borax
- Wooden craft stick
- White craft glue
- Cornstarch
- Watch with second hand
- Metric ruler
- Zip-closing bag

Procedure

1. Using a marking pen, label one of the cups "Borax Solution". Ask your adult partner to help you pour 2 tablespoons of warm water into the plastic cup. Measure 1/2 teaspoon of borax powder and place it in the same cup. Gently stir with a wooden craft stick until the powder is completely dissolved in the water.
2. Use a marking pen to label the second cup, "Ball Mix". Pour one tablespoon of glue into this plastic cup.
3. Add 1/2 teaspoon of the borax solution to the cup labeled, "Ball Mix". Do not stir the mix yet!
4. Add 1 tablespoon of cornstarch and wait about 10–15 seconds before you mix it all together with a wooden craft stick.
5. Stir everything together until you can no longer stir the mix with the wooden stick.
6. Take the mixture out of the cup and place it in your hands. The mixture will be sticky and messy!
7. Knead the mix to form a ball. (The more you knead, the less sticky it will become.)
8. Once the mix has been shaped into a ball, bounce it and play with it!
9. Measure the width of your ball and write it down in the "What Did You Observe?" section. Describe what the mix felt like before and after you shaped it.
10. Store your bouncy ball in a zip-closing plastic bag once you are finished playing with it.
11. Thoroughly clean the work area and wash your hands.

What Did You Observe?

How did the mix feel as you started to shape it?

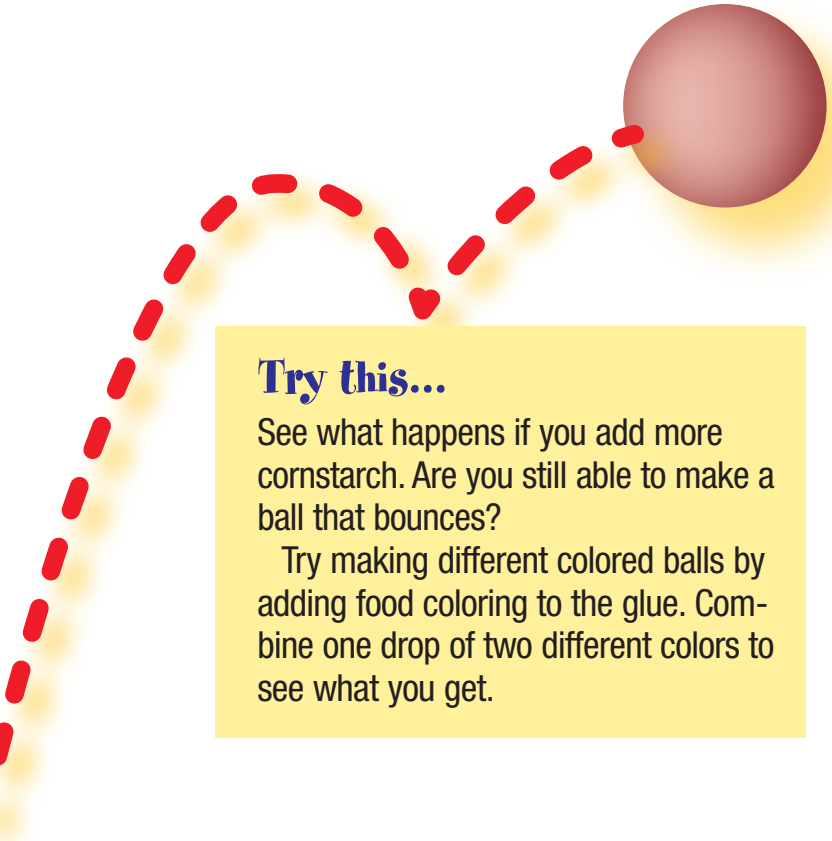
_____

How did it feel after you shaped it?

_____

Width of your ball: _____cm

How high did it bounce? _____cm



Try this...

See what happens if you add more cornstarch. Are you still able to make a ball that bounces?

Try making different colored balls by adding food coloring to the glue. Combine one drop of two different colors to see what you get.

Where's the Chemistry?

Glue contains a polymer called polyvinyl acetate (PVA). When you add borax solution to polymers like PVA, it cross-links or connects the two polymers together like a net or a spider's web. Depending on how much of each ingredient that you mix together, you can make something that is "goopy", slimy, or stretchy. For instance if you add more cornstarch, you will be able to bend and stretch the mix. Add less borax and you will get a "goopy" mixture. To make a slimy substance, add more glue.

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 anactivity.
- Wash your hands well after every activity.

Never:

- ***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"