

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 and 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.

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



Be sure to follow Milli's Safety Tips and do this activity with an adult!

Do not eat or drink any of the materials in this activity.

To read
Milli's Safety Tips
click here!



Procedure

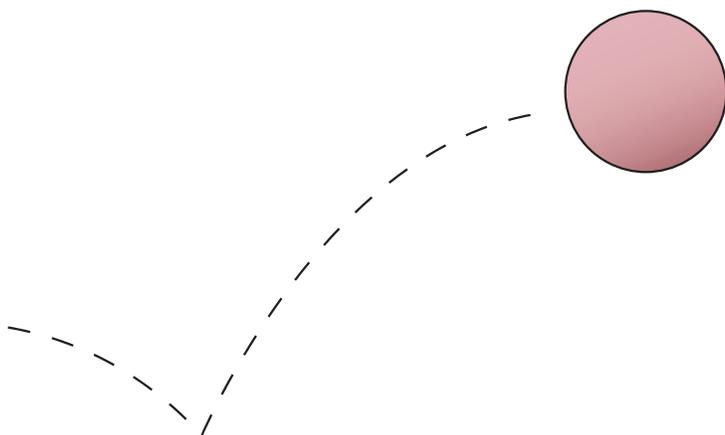
1. Using a marking pen, label one of the cups "Borax Solution". Ask your adult partner to help you pour 2 tablespoons of warm water into the plastic cup. Measure $\frac{1}{2}$ teaspoon of borax powder and place it in the same cup. Gently stir with a wooden craft stick until the powder is complete dissolved 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 $\frac{1}{2}$ 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.



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Where's the Chemistry?

A polymer is a very long chemical made up of repeating little chemical units all hooked together in a very long chain. 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.



What Did You Observe?

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



Width of your ball: _____ cm

How high did it bounce? _____ cm

