

POLYMER PUTTY

INGREDIENTS

White multi-purpose glue (non-washable)
Water
Food coloring
Borax (laundry aid)
3 - 16 ounce plastic cups
4 - 3 ounce plastic cups
Craft sticks
Plastic teaspoons

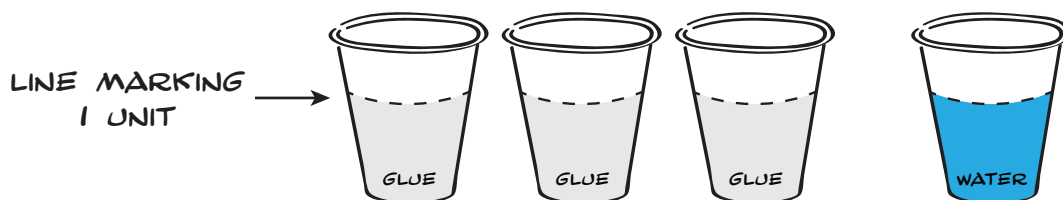
This activity does not require exact measurements. Older students can use measurements to vary the glue-water ratio, in order to observe changes in the putty's properties.

BASIC DIRECTIONS

- 1) In a 16 oz. cup, mix a ratio of 3 units of glue for every 1 unit of water. Add food coloring if desired.
- 2) In a second 16 oz. cup, mix 2 teaspoons of borax with 1 cup of water.
- 3) In a third 16 oz. cup, combine 3 units of glue mixture (cup #1) with 1 unit of borax mixture (cup #2).
- 4) Stir this new mixture with a craft stick (this will create the polymer material).
- 5) Now you can remove the putty from the cup and knead it, bounce it, stretch it, and more!

DETAILED DIRECTIONS

Create a glue solution in a 16 oz. cup by mixing a 3:1 ratio of glue to water. An easy way to do this is to mark two 3 oz. cups with a line at the same height and use one to measure glue and one to measure water (see below). You can also add food coloring to the glue solution at this point if desired.



Create a borax solution in a 16 oz. cup by mixing 2 teaspoons of borax with 1 cup of water. It is ok for some of the borax to settle out of the solution (at slightly under a 4% solution, the solution becomes saturated).

Create the polymer putty in a 16 oz. cup by mixing a 3:1 ratio of glue solution to borax solution. You can create two more simple "measuring cups" (see above) to measure out your glue and borax solutions. Stir the new mixture with a craft stick to create a putty-like polymer material. If your polymer is too slimy or liquid, add more glue solution. If your polymer is too sticky, then add more borax solution. Remove your polymer putty from the cup and observe what happens as you knead it, bounce it, stretch it, etc.

Exploration: Try using different ratios of glue and water to create the glue solution in step 1. Can you make a stiffer polymer? Can you make a polymer that "flows" more smoothly when you hold it?

NOTE: Polymer putty can be stored in a plastic bag, however throw it away if mold begins to grow. Borax can cause skin irritations for some people. If skin irritation occurs, wash with soap and water. Be careful with glue around carpets and other household objects. This material should NOT be given to small children.

Visit the **AGPA K-12 website** for even more exciting polymer experiments: agpa.uakron.edu