

Growing Brains (Slurper Balls)

CONTEXT Growing Brains were originally developed by Lynn Higgins for her general chemistry students to experience one method of shaping an elastomeric material [compression molding]. Students were intrigued when the brains, soaked in water, “grew” in size.

POLYMER AMBASSADOR Mary Harris focused this “growing” interest to create an activity that has students observe, keep organized data tables, prepare line graphs, and use inquiry-based science for their assessment. Read Mary’s Jan 2002 Science Scope article (p22-27) for lesson plans.

Students begin by mixing liquid latex and dampened sodium polyacrylate powder. The resulting sticky mass is squeezed into a brain shape by hand. After students determine the mass of “their” brain, they are placed in water.

The proportions of latex, SPAP and water need not be exact. Have students experiment. I’ve used 10mL latex, 2- 4g SPAP, and 4-8 mL of water. Quantities are easily doubled.

Sodium polyacrylate SPA has many industrial uses, but is most familiar as “diaper crystals” in superabsorbent disposable diapers. It’s claimed to absorb up to 400 times its mass of distilled water. The elastomer matrix keeps the absorber contained as water enters the brain and the powder swells to a gel, thereby ‘growing’ the brain into a lumpy mass. A typical brain will double its size overnight.

SAFETY CONCERNS: GOGGLES MUST BE WORN!

LATEX (www.flinnsci.com) is not considered hazardous, but students with latex allergies should not do this laboratory. This is a synthetic product and does not have the allergens that natural latex does.

Liquid latex is packaged in AMMONIA which acts as a preservative. The ammonia has irritating fumes.

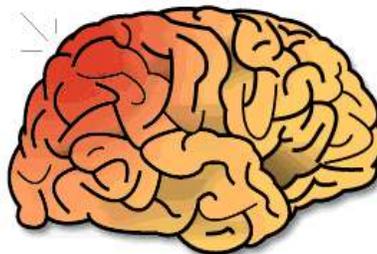
SODIUM POLYACRYLATE is non-toxic. However, breathing the dust can be irritating to the eyes and nasal passages. Order it from a chemical supply company. DO NOT shake it out of diapers.

CHEMMATTERS TEACHERS GUIDE to “The Thirsty Polymer” Oct 1999
http://www.chemistry.org/portal/resources/ACS/ACSContent/education/curriculum/chemmatters/tg/99_O_tg.pdf

GROW YOUR OWN “BRAIN”

WEAR GOGGLES!

600 mL beaker / cup / jar
25 mL graduated cylinder
small disposable cup
paper towels stir stick
10 mL liquid latex
(www.flinnsci.com)
2 grams of sodium polyacrylate
powder (www.teachersource.com)
6 mL water



1. To calibrate the cup, pour 10 mL of water into the cup from a graduated cylinder and mark the side of the cup at the 10 mL level. Pour out the water. Pour in liquid latex to the mark on the plastic cup.
 2. Mix sodium polyacrylate powder with about 6 mL water and stir with the stir stick. It should become evenly damp.
- NOTE: Read Steps 3 and 4 NOW. Once the powder is added to the latex, you must work quickly.***
3. Dump the wet powder INTO the latex. Mix **firmly** as much as possible. It will be fairly stiff.
 4. Pull the glob out of the cup with your fingers. Mold, roll, and press it into a “brainy” shape. Don’t fret: It’s not possible to make it look “good” or neat.
 5. Record the mass of your brain.
 6. Fill a large beaker or jar with tap water. Place your brain in the water. Notice its density relative to water. Does it float or sink?
 7. Notice how your brain “grows” over the next days. ; ^)

Cool brain picture at;

<http://www.brainmuseum.org/specimens/primates/human/qtvrbrains.htm>

Have fun!

