Self-Inflating Balloons

AS-800

To use:

Look at one of the transparent balloons and locate the packet of liquid. You can find this packet in the opaque balloons by feeling around for it. Carefully squeeze the packet (or press it against a hard surface like a table) until it bursts. That's all there is to it! In a few moments, the balloon will inflate completely. You need take no further action. The balloon should stay inflated for quite a while—for several days or more likely a week or more.

How does it work?

These balloons contain a small packet of a liquid, and a solid material. One of these is acidic, and the other basic. When the packet of liquid is squeezed hard enough to burst it, the two components mix. This triggers an acid-base reaction (see below) which in this case generates carbon dioxide gas, filling the balloon. Both components involved in the reaction are non-toxic.

Do it yourself!

You can create a similar reaction with materials around your own house. All you will need is:

- White vinegar (other kinds will work too)
- Baking soda
- A tall glass or similar container

Put about one tablespoon of baking soda into the glass, and rapidly pour in about ½ cup of vinegar. Instantly it will bubble up. Most likely, the bubbles will fill the entire container and, depending on the size of the container you are using, the vinegar solution may overflow. That's why it's wise to do this experiment in a sink, on a plate, or on an edged cookie sheet.

So what exactly happens when you mix vinegar and baking soda? Since vinegar is an acid and baking soda is a base, they undergo an acid-base reaction. Generally when an acid and a base are mixed together, the acid and base neutralize each other and form water and a small amount of a salt.

In the case of vinegar and baking soda, the acetic acid (that's the vinegar) and sodium hydrogen carbonate (the baking soda) combine to form water, carbon dioxide gas (which is responsible for all the bubbles), and sodium acetate (which is a salt).

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Microscale Vacuum Apparatus (VAC-10)

Students can now safely produce a vacuum in a small bell jar right at their lab stations. By reducing the pressure in the microscale bell jar, they can expand a balloon, boil warm water, and even transfer liquids from one pipet to another. They can watch a marshmallow or shaving cream increase in volume as the pressure is reduced and learn about how extremely low pressure affects the world around them. Instead of passively observing a demonstration, students can actively experiment on their own and observe the results right before their eyes.

Milk Bottle & Egg Demo (BOT-800)

Use this sturdy glass milk bottle for an egg-cellent demonstration of air pressure. All you need is a hardboiled egg and a little bit of fire. If you drop some lit paper inside the milk bottle and then place the egg on top, the fire goes out and the egg is mysteriously pushed into the bottle, intact! Warm air expands, cool air contracts—it's the cooling of the heated air inside the bottle that allows the atmosphere to 'push' the egg inside.

Gas Solubility Demo ("The Baby Bottle Experiment") (BOT-815)

An unopened can of soda feels very solid because more than three volumes of dissolved carbon dioxide gas create a pressure of about 55 PSI above the liquid. This is about four times atmospheric pressure. Fill a baby bottle with soda, secure with a rubber nipple without a hole, and shake. Watch the nipple expand as the gas comes out of solution. Amazing to see! Great for teaching Henry's Law of Partial Pressures.