

RAFT IDEAS

Topics: Chemical
Reactions

Materials List

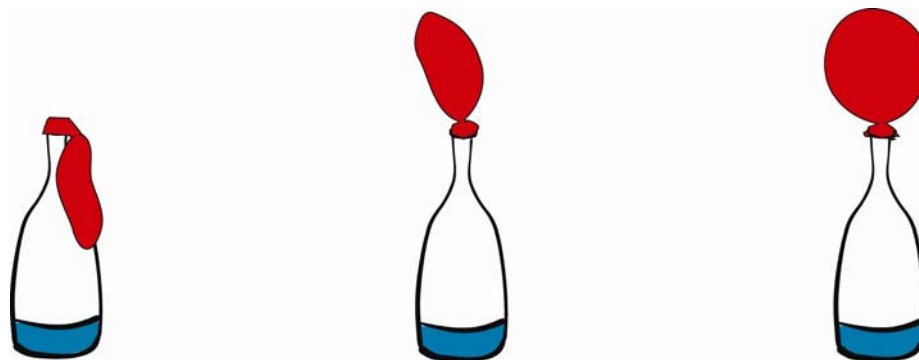
- ✓ Bottle
- ✓ Vinegar
- ✓ Baking Soda
- ✓ Balloon

This activity can be used
to teach:

- Chemical Reactions
(CA Science
Standards: Grade 5,
1.a, 1.g; Grade 8, 5.a)

Balloon Blow Up

For a Surprising Reaction



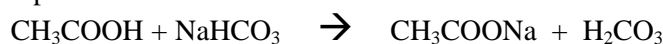
Combine two common household ingredients to cause an exciting, safe, chemical reaction.

To Do and Notice

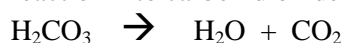
1. Pour about 60 ml ($\frac{1}{4}$ cup) of vinegar into the bottle.
2. Place 30 ml (2 tablespoons) of baking soda into the balloon.
3. Being careful not to let the baking soda fall into the bottle, stretch the open end of the balloon over the neck of the bottle. Make sure the balloon is on tightly. Let the balloon dangle to one side of the bottle.
4. Hold onto the balloon at the bottleneck to maintain a tight seal, and lift the rest of the balloon so that all of the baking soda falls into the vinegar at the bottom of the bottle at the same time.
5. Observe what happens to the vinegar and baking soda when they come into contact with each other.
6. Notice what happens to the balloon over time.

The Science Behind the Activity

In a chemical reaction two substances or more (reactants) combine to form one or more new substances (products). These new substances do not easily reform the original reagents. Vinegar contains acetic acid, CH_3COOH , and baking soda is sodium bicarbonate, NaHCO_3 . When combined they undergo an acid-base double replacement reaction to form sodium acetate and carbonic acid.



Carbonic acid, H_2CO_3 , is unstable, and immediately undergoes a decomposition reaction into carbon dioxide and water.



The bubbles you see from the reaction are formed by carbon dioxide gas that fills the balloon. The liquid left in the bottle is a dilute solution of sodium acetate in water.

Taking it Further

- Create a small rocket or car powered by the vinegar and baking soda reaction.
- Use litmus paper or a pH indicator solution (see RAFT Idea Sheet *Cabbage Patch Indicator* for instructions on how to make an inexpensive solution) to observe the pH of the reactants and products as the reaction take place.

Web Resources - Visit www.raft.net/more for how-to videos and more ideas!