Baking Soda & Vinegar Balloons

Materials:
- Vinegar
- Baking Soda
- Food Coloring
- Empty Soda or Water Bottle
- Measuring Cups and Spoons
- Balloons
- Funnel
- Paper Towels
- Safety Goggles

Directions:
1. Safety first! Put on your safety goggles!
2. Place your empty soda bottle on a table. You may want to put a tray or disposable tablecloth down as this experiment can be messy!
3. Use the funnel and spoon to add baking soda to your balloon. You can add just 1 spoonful or completely fill up the balloon- it is up to you!
4. Add ¼ cup of vinegar to the soda bottle.
5. Add a few drops of food coloring of your choice to the vinegar.
6. Carefully stretch the open end of the balloon over the top of the open bottle.
7. Hold the bottle with one hand and carefully stand the balloon upright.
8. Gently shake the balloon so the baking soda falls into the soda bottle to mix with the vinegar. Keep the bottle still on the table.
9. Observe what happens when the baking soda and vinegar mix. Notice the temperature change that happens in the bottle as the reaction happens!
10. When the reaction is complete, you can remove the balloon to release the carbon dioxide gas and dispose of the bottle.

The Science Behind the Experiment:
This is a great example of an acid-base reaction, a physical and chemical change, an endothermic reaction, and an experiment with the different states of matter! Baking soda is a base and vinegar is an acid. When they are mixed together they create carbon dioxide gas! A physical change is when you change the way something looks but don't actually change what it is. A chemical change is when you make something new and cannot go back to the original substance. In this experiment, the physical change occurs when you dye the vinegar and the chemical change occurs when the baking soda and vinegar mix and form carbon dioxide gas! You also work with the three states of matter: solid (baking soda), liquid (vinegar) and gas (carbon dioxide). Finally, the experiment is endothermic. This means it absorbs heat as the reaction happens and gets colder, which you can feel on the outside of the bottle.

Make it Awesome:
Make it bigger! Instead of using a 16 oz. bottle, try using a 2-liter bottle. Or go even bigger! You can use a giant balloon and 5-gallon water jug! This means you can use more vinegar and more baking soda to create an even BIGGER reaction!

Extensions:
1. What happens when you change the amount of baking soda or vinegar?
2. What happens if you use a smaller or larger bottle?
3. What happens if you dilute the vinegar with water?
4. What other changes can you come up with for this experiment?

Check back on our website [theIMAG.org](http://theIMAG.org) for more science demos.