Chemistry in your Classroom

This simple experiment will allow you to explore three different chemistry concepts with your students in one experiment:

1. An increase in the amount of gas, will raise gas pressure and inflate a balloon
2. Endothermic reactions take in energy, making them cold
3. Carbon Dioxide is heavier than air

Supplies:

Empty plastic bottle: a disposable water bottle or a 2 liter soda bottle are perfect
A box of baking soda
A container of white vinegar
Two funnels
Two balloons

Procedure

1. Place the first funnel in the plastic bottle. Have one student hold the plastic bottle while another student pours approximately a half cup of vinegar into the bottle. Amounts don't have to be exact. Remove the funnel from the bottle.
2. Have one student hold the balloon upside down and place the second funnel in it. Have the second student slowly pour baking soda into the balloon. They should fill the balloon approximately halfway with baking soda. Remove the funnel.
3. Have one student hold the plastic bottle. The second student will hold the balloon upside down while carefully stretching the opening over the opening of the plastic bottle, taking care not to dump the baking soda yet.
4. Once the balloon is securely attached to the bottle, turn the balloon right side up and dump the baking soda into the vinegar
5. Observe the balloon as the carbon dioxide released by the chemical reaction fills the balloon (*if the balloon does not fill, you need to increase vinegar and baking soda amounts*)
6. Have the students feel the plastic bottle and see that the reactants feel cold to the touch, indicating an endothermic reaction
7. **This part may require teacher assistance.** Carefully pinch the balloon to keep the carbon dioxide from escaping, remove it from the plastic bottle, and tie off the end of the balloon.
8. Blow up the second balloon with air to approximately the same size as the carbon dioxide balloon and tie off the end
9. Have the student hold both balloons above their head as high as they can and release them at the same time. Observe if the balloons fall at the same or different rate.
10. Explain to the students that carbon dioxide is heavier than air because air is made mostly of nitrogen and oxygen, with only a little bit of carbon dioxide.