California State University of Bakersfield, Department of Chemistry

VB Rocket

Standards:

K.PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

K.PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

Introduction:

Baking soda and vinegar are two common household items. Did you know that when they are combined they will create a forceful reaction? Baking soda and vinegar react with each other because of an acid-base reaction. Baking soda is a bicarbonate ($NaHCO_3$) and vinegar is an acetic acid (CH_3COOH). One of the products this reaction creates is carbon dioxide.

Materials:

- Film canister
- Rubber stopper/cork
- Baking soda
- Vinegar
- Scotch tape or masking tape
- Empty 2-liter soda bottle
- Construction paper (various colors)
- Scissors
- Paper towels

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Safety:

- Always have an adult with you to help you during your experiment.
- Always wear eye protection and gloves when doing chemistry experiments.
- Always perform this experiment outdoors in an open area.
- Always be cautious reaction can happen quickly.

Procedure:

1. Build rockets using film canisters and construction paper (we added wings and a nose to our canister to create a rocket).
2. Pour about 2 cups of vinegar into the empty 2-liter bottle.
3. Pour about ¼ cup of baking soda on to a paper towel and roll it tightly so no baking soda falls out. We used ½ of a full size paper towel. (The paper towel w/ baking soda needs to fit through the top of the 2-liter bottle)
4. Quickly put the paper towel w/ baking soda through the top of the 2-liter bottle.
5. **Firmly** place the cork/rubber stopper inside the top of the 2-liter bottle.
6. Place the rocket on top of stopper/cork.
7. Step back and watch the reaction. (It may take a few moments for it to react)

Data and Observations:

1. Record your observations in this space.

Questions:

2. What makes the rocket soot off?

References:

1. http://www.stevespanglerscience.com/lab/experiments/acid-base-rocket (Date Accessed; August 4, 2014).

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