

36.4: Procedures

You will observe indicators of chemical change.

1. Draw a table in which to record your data. **Do not fill in data until you have read the instructions for obtaining that data.**

Table 36.4.1

Reaction	T_i	T_f	ΔT	Spontaneous (yes or no)	Indicator(s)
Red Water (bleach)					
Red Water (vinegar)					
Baking Ingredients					
Inflating Balloon (vinegar)					
Inflating Balloon (water)					
Dr. Foamy					
Prof. Flame (matches)	N/A	N/A	N/A		
Prof. Flame (lighter)	N/A	N/A	N/A		

2. Obtain two 250 mL beakers and measure 100 mL of water in each beaker. Add 25 mL of bleach to one beaker and 25 mL of white vinegar to the 2nd beaker; use the grease pencil to label your beakers. Add 2 drops of red food coloring to each beaker. Stir the contents of each beaker until mixed. Measure and record the initial temperature (T_i) of the contents in each beaker.
3. Occasionally check the contents of the beakers containing red food coloring, for any indication that there has been a chemical change; this may take **30-60 minutes**. If a chemical change occurs, record the temperature of the contents after the change has occurred, and the final temperature (T_f). Calculate and record any change in temperature (ΔT) that was measured. Record whether the reaction is a spontaneous reaction (yes or no), and list any indicator(s) that a chemical change has occurred.

Baking Ingredients

4. Obtain two 250 mL beakers and measure 50 mL of water into each beaker.
5. Add 1 plastic spoonful of baking soda to one beaker and 1 plastic spoonful cream of tartar to the second beaker; be careful that your measurements are equal in amounts. Use the grease pencil to label your beakers. Stir each beaker until the solids are dissolved, or for 2 minutes, whichever comes first. Measure and record the initial temperature (T_i) of the contents in each beaker, listing the baking soda substance in the upper box and the cream of tartar substance in the lower box.
6. Add the baking soda water to the cream of tartar water. Record the temperature of the combined baking soda water and cream of tartar water as the final temperature (T_f) for both. Calculate and record any change in temperature (ΔT) that was measured. Record whether the reaction is a spontaneous reaction (yes or no), and list any indicator(s) that a chemical change has occurred.

Inflating Balloon

8. Use the funnel and a plastic spoon to add 4 spoonful's of baking soda into the balloon. This should be done over a paper towel to minimize the mess.
9. Use the graduated cylinder to measure 40 mL of vinegar into the empty water bottle. Return to your lab table with the water bottle and balloon. Measure and record the initial temperature (T_i) of the vinegar from the outside of the bottle.
10. Carefully, seal the water bottle by stretching the opening of the balloon over the opening of the bottle; make sure it is well sealed and be careful not to allow any baking soda into the bottle yet.



Figure 36.4.1: Water Bottle Balloon

11. Place the bottle with the balloon onto some paper towels. Tip the balloon up and empty the contents of the balloon into the bottle. Measure the temperature (T_f) outside of the bottle after the vinegar and baking soda have been combined. Calculate and record any temperature change (ΔT) that was measured. Record whether the reaction is a spontaneous reaction (yes or no), and list any indicator(s) that a chemical change has occurred.

Dr. Foamy

12. Add 200 mL of hydrogen peroxide to a 250 mL beaker. Add a "squirt" of dish soap to the hydrogen peroxide and gently stir until mixed. Measure and record the initial temperature (T_i) of the contents in the beaker.
13. Set the large (400-500 mL) beaker in a sink. Pour one packet of active dry yeast into the large beaker. Add enough water to dissolve the yeast. Then add the 200 mL of hydrogen peroxide/soap mixture to the large beaker in the sink, and gently stir to mix. Observe the substance in the large beaker for a few seconds. Measure and record the final temperature (T_f) for the combined contents in the large beaker after the few seconds of observation. Calculate and record any temperature change (ΔT) that was measured. Record whether the reaction is a spontaneous reaction (yes or no), and list any indicator(s) that a chemical change has occurred.

Professor Flame

14. Obtain a box of matches, return to your lab table, and strike a match. Record whether the reaction is a spontaneous reaction (yes or no), and list any indicator(s) that a chemical change has occurred.
15. Make the fireplace/BBQ lighter light. Record whether the reaction is a spontaneous reaction (yes or no), and list any indicator(s) that a chemical change has occurred.

Clean-up

- Dispose of bleach, vinegar and hydrogen peroxide substances as directed by your instructor
- Wash, rinse, and completely dry, beakers, spoons, and thermometers
- Wash graduated cylinder and water bottle by shaking with soapy water inside, thoroughly rinse them, and place them on a drying rack
- Rinse the match and discard it
- Discard the balloon in trash
- Thoroughly clean the surface of your lab table

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