Cabbage pHun

Key Words:
Acid
Base Neutral pH

Materials:
Red cabbage
Knife
Boiling water
Filter paper (coffee filters work well)
One large glass container
Small glass containers
Household ammonia
Baking soda
Washing soda
Lemon juice
Vinegar

Instructions:
1. Chop the cabbage into small pieces until you have about 2 cups of chopped cabbage. Place
   the cabbage in a large glass container and add boiling water to cover the cabbage. Allow at
   least ten minutes for the color to leach out of the cabbage.
2. Filter out the plant material to obtain a red-purple-bluish colored liquid. This liquid is at about pH 7.
3. Pour about 50 - 100 mL of your red cabbage indicator into each small glass container. Use
   separate containers for each chemical. Add the chemicals to the indicator until a color change
   occurs.
What’s Going On:
Red cabbage contains a pigment molecule called flavin. This is a water-soluble pigment that is also found in some fruits and flowers. Very acidic solutions will turn the solution a red color. Neutral solutions result in a purplish color. Basic solutions appear in greenish-yellow. Different types of indicators will have different pH color scales.

The color of the juice changes in response to changes in its hydrogen ion concentration. pH is the -log[H+]. Acids will donate hydrogen ions in an aqueous solution and have a low pH (pH < 7). Bases accept hydrogen ions and have a high pH (pH > 7).

A neutralization experiment could be performed using cabbage juice indicator. First add an acidic solution such as vinegar or lemon juice until a reddish color is seen. Then add washing soda or vinegar until the solution neutralizes turning a bluish color.

Chemicals used in this demo may be safely washed down the drain with water.
You can also make pH test strips by soaking filter papers in a very concentrated red cabbage juice and then hanging the papers to dry. The color change that you see is a physical change but the loss or addition of Hydrogen ions is a chemical change.