CABBAGE CHEMISTRY

Aim: In this experiment, you will hypothesize what color the cabbage juice will turn when mixed with common household items to determine how acidic or basic the item is.

Red cabbage contains an **indicator pigment** molecule called Flavin. This water-soluble pigment is also found in apple skin, red onion, plums, poppies, blueberries, cornflowers, and grapes. Very acidic solutions will turn the indicator a red color. Neutral solutions result in a purplish color. Basic solutions make a greenish-yellow or yellow color.

WHAT YOU WILL NEED:

- Gloves and goggles
- Small red cabbage
- Pot of boiling water
- Strainer
- Small white cups or plates
- Medicine dropper or pipette
- Large bowls (2)
- Worksheets
- Series of house hold items to test pH (fruit juice, vinegar, baking soda, etc.)

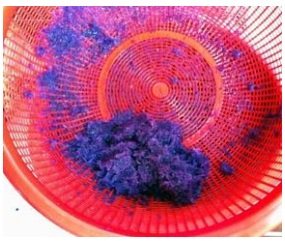
Process:

1. Grate a small red cabbage and place the pieces into a large bowl.

2. Pour boiling water (parent supervision please!) into the bowl to cover the cabbage. USE CAUTION.

3. Leave the cabbage mixture steeping, stirring occasionally, until the liquid is room temperature. This may take a half hour or more. The liquid should be reddish purple or deep purple in color.

3. Place strainer over a second larger bowl and pour the mixture through the strainer to remove the cabbage pulp. Press down on the pulp to squeeze more liquid out of the pulp.



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- Series of house hold items to test pH
  - Fruit juice
  - Vinegar
  - Baking soda
  - Salt
  - Sugar
  - Clear dish soap

5. In the bowl, you should now have a clear liquid that will be purple or blue in color. This is your indicator solution.

6. The color of the liquid will change depending upon the pH. Set aside your indicator solution. You will use it as your “stock” solution for your experiment.

pH	Color
2	Red
4	Purple
6	Violet
8	Blue
10	Blue-green
12	Greenish-yellow

7. Test various household items with your indicator. Use a separate Dixie cup or white plate for each solution you wish to test. Add your indicator solution to the sample until you see a change in color. We tested vinegar and baking soda.

We also tested a number of other household products that will post on our Facebook page. Check out the videos and share yours!!

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WHAT YOU WILL NEED:

- **More household items to test!**

How do you tell if something is an acid or a base? An acid will provide protons (H^+) and a base will take a proton out of the system. So how does one measure this? You use a chemical called an **indicator**, which is a molecule or mixture of molecules, that changes in color depending on whether a solution has a high pH or low pH. The pH of a solution is a numerical measure of how basic or acidic it is. A solution with a pH or ~7 is neutral, >7 is a base, <7 an acid. Specifically, an indicator works by responding to the levels of hydrogen ions (H^+, protons) in a solution. There are many different types of indicators, some are liquids and some are concentrated on little strips of "litmus" paper. Indicators can be extracted from many different sources, including the pigment of many plants.

This picture shows some of the different colors that red cabbage juice can become. From left to right, the solutions shown range from very acidic (red) to very basic (yellow).

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