



## Try This at Home Science: Red Cabbage pH Indicator

### Activity Overview:

Make an acid/base indicator solution from red cabbage to test the pH of different household solutions.

### Materials:

- Red Cabbage (3 cups)
- Knife or blender
- Boiling Water (3 cups)
- Strainer
- Stir Stick or spoon
- 7 100-mL beakers or clean containers
- 2 large containers
- Safety glasses
- Tablespoon measurer

### Liquids to test:

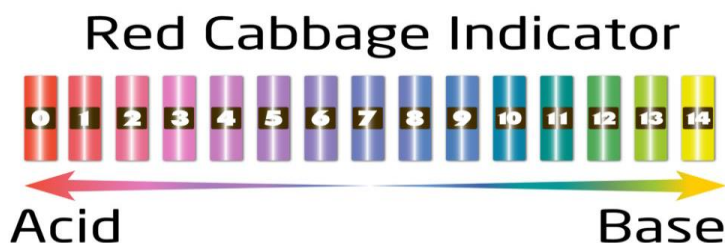
- Windex
- Lemon/Lime water or soda
- Apple juice
- Clear washing detergent
- Water
- Baking soda and water
- White vinegar

### Try this!

1. Roughly chop your red cabbage and place it into a large container.
2. Bring your water to a boil and pour it into the container full of cabbage. Use Caution.
3. Stir until water changes color and strain out the liquid into another large container.
4. Wait until liquid is cooled to room temperature.
5. Alternatively, you can use a blender to blend the red cabbage and water until smooth. Still strain out cabbage pieces to keep just the liquid solution.
6. While waiting, set up your 7 clear containers for each testing liquid.
7. Once cabbage indicator solution has cooled, fill up each clear container halfway with the solution.
8. Next, add 1-2 tablespoons of the test liquid to each container of indicator.
9. Gently stir and observe what happens. The color should change based upon the pH of the substance added to the indicator.
10. Analyze the results and try to organize the 7 containers from most acidic to most basic using the chart provided below.

### What's happening?

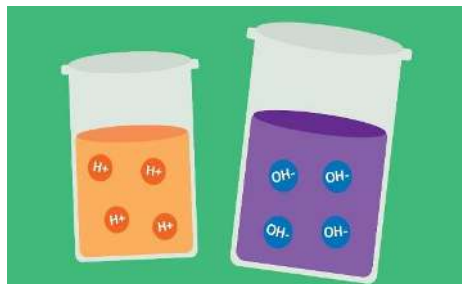
Red cabbage is a natural pH indicator because the blue/purple juice of the cabbage changes color when it mixes with an acid or a base (alkali). This is due to a specific pigment molecule in red cabbage called *anthocyanin*.



When you are measuring the pH, you are measuring the concentration of hydrogen ions in a solution. The more acidic solutions will have a high pH, or more hydrogen ions, and turn a more red or pinkish color. The basic solutions have a low pH, or less hydrogen ions and more hydroxide ions, and will turn a more green or yellow color. The neutral solutions will be somewhere in the middle of the scale (pH of ~7) and stay the original purple color.

### How does this relate to everyday life?

Every day substances are classified as basic, acidic, or neutral (like water)! Acids and bases can be found in the food that we eat, things that we drink, and all types of cleaning products.



They are also important throughout our own body systems! There are strong acids in our stomachs to help digest the food we eat.

Acids usually taste sour, like lemons or vinegar. Bases, or alkaline substances feel slippery, like Epsom salts or soaps! This is why they make such good household cleaners.

### Now try...

- Experiment with other natural pH indicators: apples, red onions, blackberries and blueberries for example.
- Experiment with other household solutions and determine the pH level of each!
- Buy pH strips and compare the pH results with the red cabbage indicators (or others!) of the various household solutions. Do they match up?

For more “Try This at Home Science” activities, visit [www.mi-sci.org](http://www.mi-sci.org).