



DAY 11

pH Levels

Experiment 1: Create your own PH indicator

You will need

- Red cabbage
- Water
- A small pan
- Strainer

Here's how

First, have an adult help you make some red cabbage juice.

1. Add 1/4 cup of grated red cabbage to 2 cups of water in a small pan.
2. Heat the water to a boil until the water turns purple.
3. Remove the pan from the heat and strain out any pieces of cabbage.
4. Allow the cabbage juice to cool.

You just made a pH indicator from red cabbage and water. A pH indicator is something that will change from its original color based on whether it is introduced to an acid or a base.

Cabbage juice contains a special molecule called anthocyanin, which gives the cabbage its deep red-purple color. It also gives other red, blue, and purple plants their unique colors — it makes blueberries blue, cherries red, eggplant purple, and so on.

Experiment 2: What household items are acids, and which are bases?

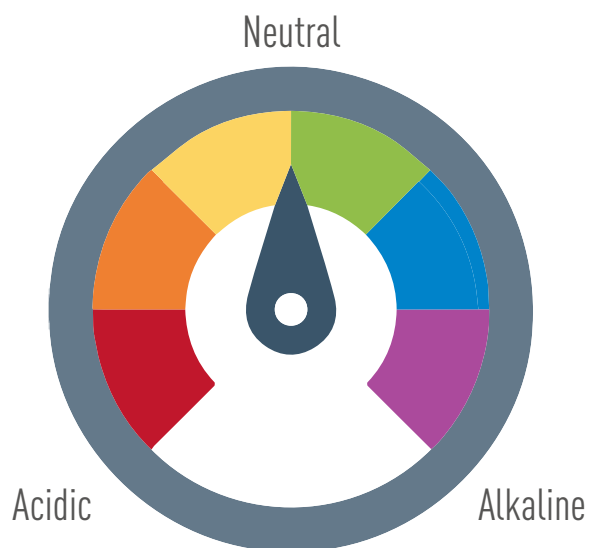
You will need

- Cabbage juice indicator
- Three empty yogurt cups
- Pipette (from day 3)
- Lemon juice
- Baking soda
- Water
- Vinegar

Here's how

1. Use the pipette to add some lemon juice into one cup. Now, pour in some of the cabbage juice. What happens? (Make sure to rinse the pipette with water after using it.)
2. Put a small amount of baking soda in the other cup and add water, little by little as you stir, until the baking soda dissolves. Pour in some of the cabbage juice. What do you observe?

!! Dear Parents and Supervising Adults
This part of the experiment requires use of a stove, so an adult should always be present. You should devote special care to handling hot water safely and assist your child when help is needed. Make sure there is no fire risk when heating water on the kitchen stove.



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- Use the pipette to add some vinegar into the third cup. Before adding the cabbage juice, try to guess what color it will turn. Now, pour in some of the cabbage juice. Was your hypothesis correct? (Make sure to rinse the pipette with water after using it.)

Experiment 3: Acids and bases cancel each other out

You will need

- Cabbage juice indicator
- Three yogurt pots
- Pipette
- Lemon juice
- Baking soda
- A teaspoon

Here's how

- Put a small amount of baking soda in one of the yogurt cups. Add water, little by little as you stir, until the baking soda dissolves.
- Fill the other two cups halfway with the cabbage juice.
- Use the pipette to add 20 drops of the baking soda solution into one of the cups with cabbage juice. Rinse the pipette and 20 drops of lemon juice into the other cup. What do you observe?
- Next, add 20 drops of lemon juice into the cup with the baking soda and red cabbage mixture. What is happening?
- You can also rinse the pipette and add 20 drops of the baking soda solution into the other cup with the lemon juice and red cabbage mixture. Is the reaction the same?



When dissolved in water, acids produce hydronium (H_3O^+) ions, and bases produce hydroxide (OH^-) ions. When anthocyanin comes into contact with hydronium ions, it turns pink. When it comes into contact with the hydroxide ions, it turns blue or green. That means the lemon juice and the vinegar are acids and the baking soda and water solution is a base.

Disposal:

After experimenting, dispose of all mixed liquids down the drain and rinse all of the materials used.