

Chemistry Color Changers!

Most people use cabbage for cooking but it can also be really great for your at-home chemistry experiments. Check out the cool chemistry stuff you can do with a red cabbage!

What you'll need

- Goggles
- Red cabbage
- Quart-size zip-closing plastic bag
- 3 clear plastic cups
- Droppers
- Popsicle stick
- Water
- Lemon juice (from a real lemon or from bottled lemon juice)
- Powdered laundry detergent



Be Safe

Always work with an adult to supervise and guide you. You and your adult partner should wear properly fitting safety goggles. Do not taste or eat any food or household substances that you are testing.

Here's what to do

1. Label a piece of paper **Acid**, **Base**, and **Control**.
2. Break off a few leaves of the cabbage. Then the leaves up and put them into a zip-closing plastic bag.
3. Add about 1 cup of water, get as much air out as you can and then zip the bag closed. Be sure it is securely closed.
4. Hold the bag at the top with one hand and squish the leaves in the water with the other hand for a couple of minutes until the water turns a dark blue. This blue liquid is your indicator solution for the chemistry experiment.
5. Next, pour about 1 tablespoon of the indicator into each of three clean clear plastic cups.

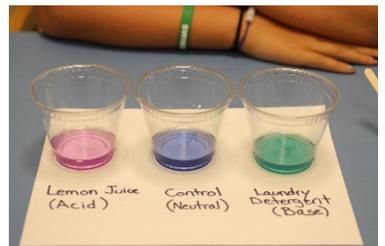
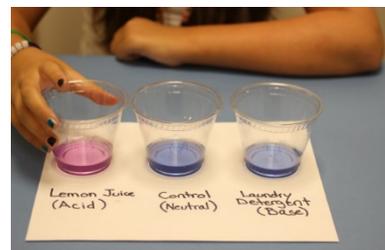
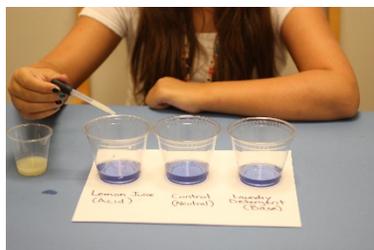


6. Add 1 drop of lemon juice to the cup labeled Acid and gently swirl to mix.

What to expect

The liquid turns a cranberry red color. This color change tells you that lemon juice has an acid in it.

7. Now, use the tip of a popsicle stick to add a very small amount of laundry detergent to the cup labeled Base and gently swirl to mix.



What to expect

The liquid turns a greenish-blue color. This color change tells you that the detergent contains a type of chemical called a base.

What's happening in there?

The indicator solution contains molecules called pigment molecules that give it its color. In plain water, these pigment molecules give the water a blue color. But when acid in the lemon juice gets in the water a reaction makes the indicator molecule change so the color looks pink.

When the detergent is added to the indicator solution, a different reaction happens which changes the indicator molecule and makes the color look greenish.

What else could you try?

The acid and base are like chemical opposites. What do you think will happen if you put a drop of lemon juice in the cup that already has the detergent in it? Let's try it and find out.

Be safe

Be sure to review the safety instructions on page 1 before proceeding.

Here's what to do

1. Place 1 drop of lemon juice in the cup that has detergent in it. Carefully swirl the liquid and see if there is any color change.

What to expect

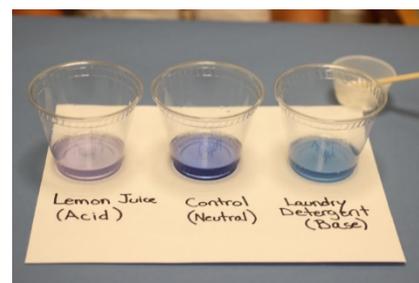
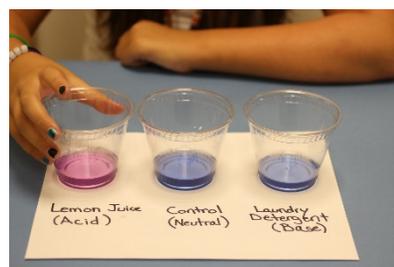
The liquid should change from a greenish-blue to a more bluish color. It should look like it is becoming closer to the color of the control. Since the ammonia made the indicator change color in one direction, the vinegar is making it change color back to the way it was.

How about if you put a little bit of laundry detergent in the cup that already has the vinegar?

2. Place a small amount of laundry detergent in the cup that has vinegar in it. Carefully swirl the liquid and see if there is any color change.

What to expect

The liquid should change from a cranberry color to a more bluish color. It should look like it is becoming closer to the color of the control.



What else could you try?

You can use your red cabbage and the laundry detergent to make secret writing. Here's how:

What you'll need

- Red cabbage
- Water
- Laundry detergent
- Cotton swab
- Plastic cup
- White paper

Be safe

Please review the safety instructions on page 1 before proceeding.

Here's what to do

1. Make a detergent solution by adding $\frac{1}{2}$ teaspoon of laundry detergent to 1 Tablespoon of water. Swirl to mix.
2. Dip a cotton swab in the detergent solution. Touch the swab to the side of the cup to remove some excess liquid.
3. Use the solution to print your name or make a design on the paper.
4. Wave the card to help the solution dry. It may take 5-10 minutes
5. Take a cabbage leaf and fold it a couple of times so it is a few layers thick.
6. Rub it on the card and see if your invisible secret writing becomes visible!



What to expect

The paper should become purple but the area with the writing should be green so you can see it! "Hi there"

