

5th Grade - Lesson 3.4
Activity Sheet
Color Change

Name: _____

Date: _____

Safety: Wear safety goggles and be sure to follow all safety instructions given by your teacher. Use a popsicle stick to handle the powdered laundry detergent. Do not touch the solid with your hands. Wash your hands after completing the activity.

DEMONSTRATION

Follow along with the demonstration from your teacher to see how you can make red cabbage indicator solution.

Materials

- Red cabbage leaves
- Water
- Zip-closing plastic bag (storage-grade, quart-size)
- 1 clear plastic cup

Procedure

1. Tear 2 red cabbage leaves into small pieces and place them in a storage grade zip-closing plastic bag.
2. Carefully add about 1 cup of room temperature water to the bag. Get as much air out of the bag as possible and then seal the bag securely.
3. While holding the bag, squeeze it and the mixture of water and cabbage leaves until the water turns a medium to dark blue. It should take about 3–5 minutes.
4. Open a corner of the plastic bag and carefully pour the liquid into an empty clear plastic cup, leaving the cabbage pieces behind in the bag. This blue liquid is your indicator solution.



1. When you squeezed red cabbage leaves with water in the plastic bag, what color did the solution become?

When we squished the red cabbage leaves in water, the solution turned blue.

ACTIVITY

Question to investigate

What can the color of an indicator solution tell you about the substances added to it?

Materials

- Cream of tartar
- Powdered laundry detergent
- 5 Clear plastic cups
- 2 Small cups
- 2 Popsicle sticks
- 1 Tablespoon
- Permanent marker
- White piece of paper

Procedure

Adding an Acid and a Base

1. Label three empty clear plastic cups **Indicator + Detergent**, **Indicator + Cream of tartar**, and **Control**.
2. Carefully pour 2 tablespoons of indicator solution into each cup. Place the three labeled cups on a piece of white paper to make it easier to observe and compare any indicator color changes.
3. Record the color of the indicator solution in the **Control** cup.
4. Use a popsicle stick to scoop up a small amount of cream of tartar. Add the cream of tartar to the **Indicator + Cream of tartar** cup.
5. Gently swirl the cup to mix. Observe the color of the indicator and record any color change(s) in the chart on the activity sheet.



2. When you added cream of tartar, what color did the indicator become?

When we added cream of tartar to the indicator solution, it turned pinkish.

3. Does the color change indicate that cream of tartar is an acid or a base?

The pinkish color means that cream of tartar is an acid.

5. Use a popsicle stick to scoop up a small amount of laundry detergent. Add the detergent to the **Indicator + Detergent** cup.
6. Gently swirl the cup to mix. Observe the color of the indicator and record any color change(s) in the chart.



4. When you added laundry detergent, what color did the indicator turn?

When we added laundry detergent, the indicator turned greenish.

5. Does the color change indicate that laundry detergent is an acid or a base?

The greenish color means that laundry detergent is a base.

Adding a Base to an Acidic Solution

Procedure

1. Use a clean popsicle stick to add a small amount of laundry detergent to the **Indicator + Cream of Tartar** cup and gently swirl the cup to mix. Observe and record any color change(s).
2. If needed, continue adding small amounts of detergent until the solution returns to the original blue color of the indicator in the **Control** cup.



6. What change in color did you observe when you added laundry detergent to the pinkish (acidic) indicator solution?

When we added laundry detergent to the pinkish acidic solution, it turned bluish.

7. If you added too much laundry detergent and the indicator color went past blue and turned green instead, what could you add to try to bring the color back to the blue color of the indicator in the **Control** cup?

If we added too much laundry detergent and the pinkish color went past blue and became greenish, we could add cream of tartar to bring it back to blue again.

Adding an Acid to a Basic Solution

Procedure

3. Use a different clean popsicle stick to add a small amount of cream of tartar to the **Indicator + Laundry Detergent** cup and gently swirl the cup to mix. Observe and record any color changes.
4. If needed, continue adding small amounts of cream of tartar until the solution returns to the original blue color of the indicator in the **Control** cup.



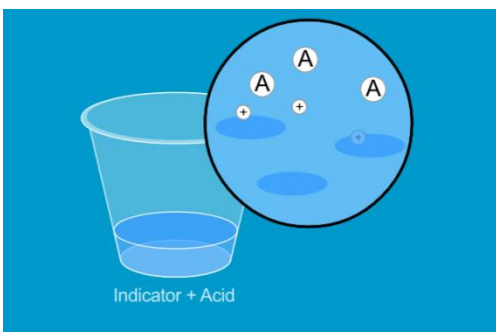
8. What change in color did you observe when you added cream of tartar to the greenish (basic) indicator solution?

When we added cream of tartar to the greenish basic solution, it turned bluish.

9. If you added too much cream of tartar and the indicator color went past blue and turned pink instead, what could you add to try to bring the color back to the blue color of the indicator in the **Control** cup?

If we added too much cream of tartar and the greenish color went past blue and became pinkish, we could add laundry detergent to bring it back to blue again.

EXPLAIN IT WITH ATOMS & MOLECULES



10. You saw an animation of an acid and a base changing the color of an indicator solution. An acid gives a hydrogen ion (H^+ , also called a proton) to the indicator. What does a base do?

A base takes a proton from an indicator.

TAKE IT FURTHER

11. If you tested soil with red cabbage indicator and the color was pink, what could you add to the soil so that it would be more neutral?

A pink color means that there is extra acid. You could add a base to make it more neutral.