

Lose the Blues with CO₂!

Carbon dioxide (CO₂) is essential for life on Earth. Scientists have ways of testing the amount of CO₂ in the atmosphere. In the activity below, you can do your own test for CO₂!

Materials:

- Red cabbage leaves
- Zip-closing plastic bag
- Water
- White piece of paper
- 2 clear plastic cups
- Baking soda
- Vinegar
- Teaspoon
- Tablespoon
- Disposable plastic juice bottle (with wide mouth about ½ liter)

Procedures:

1. Tear up two leaves of red cabbage and place the pieces in a zip-closing plastic bag. Add about ¾ cup water. Get as much air out of the bag as you can and close the bag securely.
2. While holding the bag, use your other hand to squish the leaves in the water until the water turns a medium to dark blue. This is your indicator solution. It will change color when certain substances are added to it.
3. Place 2 clear plastic cups on a white piece of paper. Pour about 2 tablespoons of the blue indicator solution into each cup.



4. Place about 3 teaspoons of baking soda in the bottle. Add about 1 tablespoon of vinegar. Hold your hand gently over the top of the bottle and swirl to mix the vinegar and baking soda which should produce bubbles of carbon dioxide (CO₂) gas.
5. Very carefully tilt the bottle over one cup so that only the CO₂ pours out of the bottle and into the indicator. Be sure that none of the liquid pours into the cup. The CO₂ is invisible, but since it is heavier than air, it should pour out of the bottle and into the cup of indicator.
6. Use a straw to stir the indicator solution in both cups. What did you notice? What must have caused the change you observed?

Think about this ...

If the indicator solution changes color when CO₂ is mixed in with it, what do you think would happen if you used a straw to bubble your own breath into some fresh red cabbage indicator solution? Try it and see!

Where's the Chemistry?

When the carbon dioxide mixes with the water in the red cabbage indicator, it creates a very weak acid called carbonic acid. This acid reacts with the red cabbage indicator and changes its color.



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The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at www.acs.org/kids.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

Never experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines".

