



Exploring pH using natural cabbage juice indicator



Investigate!

What happens to the pH when carbon dioxide infiltrates into the ocean? Does the mixing of water and carbon dioxide result in a new substance? Find out using a natural pH indicator - **purple cabbage juice!**

What is pH?

The pH scale is used to describe how acidic or basic a substance is. An acid adds hydrogen ions (H+) to a liquid and a base adds hydroxides (OH-). Water is neutral (7) and seawater is slightly basic (8).



To make purple cabbage juice, finely chop 1/8 head of red cabbage. An adult may need to help you depending on your age. Heat 2 cups of water until hot in the microwave or on the stove. Place chopped cabbage into the hot water, stir, and cover until cool. To obtain the cabbage juice, pour contents through a fine mesh sieve or simply use the pot lid to hold back the cabbage as you pour the purple juice into a container.

Activity: Human Smokestack

NOTE! →

Since the Industrial Revolution, the burning of fossil fuels (i.e. gas, oil) has increased the amount of carbon dioxide in the atmosphere. Approximately 25% of this carbon dioxide is absorbed into the world's oceans. What happens when carbon dioxide mixes with water?

Cabbage juice indicator changes color depending on the pH of the solution.

Acidic: pink, red
Neutral: purple
Basic: blue, green

1. Gather 2 clear cups and label #1 and #2. Into each cup, add 1 cup of water, ¼ cup of purple cabbage juice, and ¼ tsp. of salt. Stir. Each cup should look the same. Cup #1 is your Control. You will not do anything further with this cup.
2. Predict: What do you think will happen if you add carbon dioxide to Cup #2? Do you think the water will change color? _____
3. Add carbon dioxide to Cup #2. How? The easiest way is to use your breath! What gas do humans breath out? That's right, carbon dioxide! Blow into Cup #2 for 1-minute using a straw. A lidded cup will minimize face splattering!
4. What change do you observe? _____



When carbon dioxide is added to water, a chemical reaction forms carbonic acid. When an acid dissolves in water, it releases hydrogen ions (H+) which lower the pH and turn our cabbage juice indicator purplish-pink.



Does mixing CO₂ and H₂O result in the formation of a new substance? _____

Yes! Carbonic acid.

How do you know? _____

The solution turned purplish-pink (more acidic).