

## DEMONSTRATION

1. Your teacher blew through a straw into a bromothymol blue indicator solution until it changed color.

Did the indicator solution become acidic or basic?

2. What chemical from your teacher's breath do you think caused the indicator to change color?



## ACTIVITY

### Question to Investigate

Will carbon dioxide from carbonated water change the pH of an indicator solution?

### Materials for Each Group

- Bromothymol blue indicator solution in a plastic cup
- Water
- Carbonated water in a wide clear plastic cup
- 1 wide, clear, plastic cup
- 2 taller, clear, plastic cups
- Graduated cylinder

### Procedure

1. Measure 30 mL of bromothymol blue indicator solution and divide it evenly into two small clear plastic cups.
2. Add 25 mL of water to a wide plastic cup and 25 mL of carbonated water to another wide cup.
3. Stand the small cups with indicator solution in the liquid in the wider cups as shown.



4. Turn the two tall cups upside down and place them over the two wider cups.
5. While holding the top and bottom cups to keep them together, gently swirl both sets of cups. Watch the color of the indicator in both cups to see if there is any change.
3. **What color is the sample of indicator solution in the water and in the carbonated water?**



4. **What does the color tell you about the pH of each sample of indicator solution? Is it acidic, neutral, or basic?**
5. **The carbonated water and water should not have splashed into the indicator solutions. Why did the indicator solution change color in one set of cups but not the other?**

## **ACTIVITY**

### **Question to Investigate**

Will carbon dioxide gas produced in the baking soda and vinegar reaction change the pH of an indicator solution?

### **Materials for Each Group**

- Bromothymol blue indicator solution in cup
- Water
- Baking soda in small plastic cup
- Vinegar in cup

- 2 small, clear, plastic cups
- 1 wide, clear, plastic cups
- 2 taller, clear, plastic cups
- Graduated cylinder

### Procedure

1. Measure and pour 25ml of vinegar into two wide plastic cups.
2. Pour 15ml of bromothymol blue indicator into two clean small plastic cups.
3. Pour all the baking soda into one of the cups of vinegar. Do not pour anything into the other.
4. Stand the small cups with indicator solution in both the wider cups as shown.
5. Turn the two tall cups upside down and place them over the two wider cups.
6. While holding the top and bottom cups to keep them together, gently swirl both sets of cups. Watch the color of the indicator in both cups to see if there is any change.
7. Compare the color of the indicator in each cup to find out whether the solution is acidic, neutral, or basic.



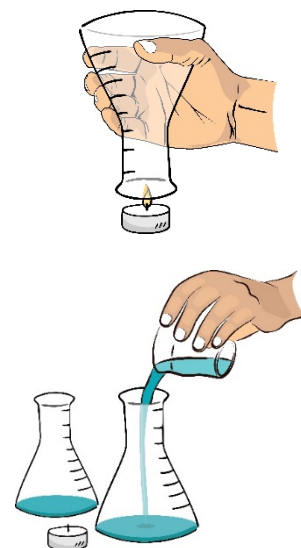
6. What color is the sample of indicator solution in the vinegar and in the vinegar and baking soda?
7. What does the color of the indicator solution tell you about the pH of each solution? Is it acidic, neutral, or basic?

8. What was the purpose of having one set of cups with only vinegar, while the other had vinegar and baking soda?
9. The baking soda and vinegar should not have splashed into their indicator solutions. Why did the indicator solution change color in the set of cups with vinegar and baking soda?

### ***DEMONSTRATION***

10. Your teacher used a flask to collect the gases produced from a candle flame. Your teacher then put bromothymol blue indicator solution into that flask and into another empty flask.

What did you observe?

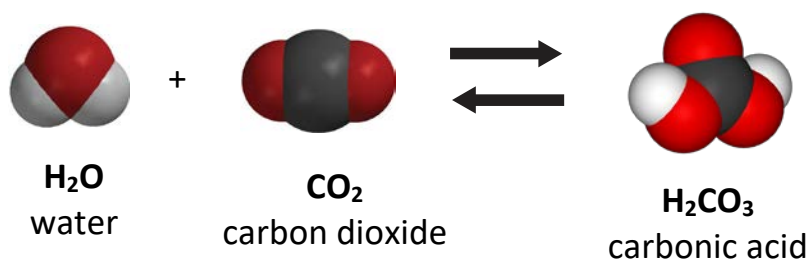


11. What does the color of the indicator tell you about the pH of the solution? Is it acidic, basic, or neutral?

12. What gas from the burning candle caused the solution to become acidic?

***EXPLAIN IT WITH ATOMS & MOLECULES***

13. Water and carbon dioxide gas react to produce carbonic acid. As more carbon dioxide is released into the atmosphere, why is that a problem for our oceans?



14. You saw a video about ocean acidification. It showed that excess carbon dioxide in the atmosphere gets into the ocean and causes ocean water to become more acidic.

According to the video, what might be an effective way to slow down the ocean from becoming more acidic?