



## Air Today, Oceans Tomorrow

*What happens when CO<sub>2</sub> in the air dissolves in the oceans?*

### Key Concept

All the extra carbon dioxide going into the oceans is making them slightly more acidic.

### What You Should Know

- When carbon dioxide interacts with water, some of it dissolves. A small fraction of the dissolved carbon dioxide interacts with the water to become carbonic acid, H<sub>2</sub>CO<sub>3</sub>. Like other acids, this weak acid produces hydrogen ions which make the water more acidic:  
$$\text{CO}_2 + \text{H}_2\text{O} \longrightarrow \text{H}_2\text{CO}_3 \longrightarrow \text{H}^+ + \text{HCO}_3^-$$
- The oceans have absorbed about half of all the extra carbon dioxide people have put into the air over the last 150 years

### Materials (per student or group of students)

- Tall clear cup
- Tap water
- Drinking straw
- 2 pH strips

### The Prediction

When we blow into water, what happens to its pH? Why?

### Investigation

- 1) Fill the cup halfway with water.
- 2) Measure the pH of the water and record.
- 3) Take a breath, inhaling and exhaling. Remember that humans take in oxygen and release CO<sub>2</sub>.
- 4) Blow through the straw into the water for 2-3 minutes.
- 5) Re-measure the pH of the water and record.

## **Discussion**

- 1) What's your conclusion?
- 2) How do we know that bubbling carbon dioxide through water makes the water more acidic?
- 3) What is happening to our oceans as the concentration of CO<sub>2</sub> increases in our atmosphere?

## **What's Happening?**

After blowing into the water, the pH reading is less than the baseline reading prior to blowing into the straw. If the baseline pH for the water is 7.0 (neutral), you would expect that the pH value after bubbling would be a value less than 7.0, which is in the acidic range.



## Air Today, Oceans Tomorrow Data Sheet

### Prediction

What will happen to the pH of the water after blowing into it for a few minutes?

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### Record the pH of the water

pH of water	
Before blowing into water	
After blowing into water for 2 minutes	
After blowing into water for 3 minutes	

### Explanation of pH scale

The pH scale is used to indicate the acidity of a solution. The pH may range from 0 to 14, where 0 is the most acid, 14 the most basic and 7 is neutral. pH is really a measurement of the concentration of hydrogen ions ( $H^+$ ). The more hydrogen ions in a solution, the more acidic it is and therefore the lower its pH.