

**Lab: Investigating Buffers**

Name:

Block:

For Students:	For Teacher:
Lab performed:	Pre-lab completion: <input type="checkbox"/> Yes <input type="checkbox"/> No
Lab due:	Lab Submitted: <input type="checkbox"/> On Time <input type="checkbox"/> Late

If this buffer system was absent from our blood, the eating acidic or basic foods would cause the pH would swing too high (alkalosis) or too low (acidosis), and the result could be deadly.

This lab will demonstrate the buffering solution found in your blood. Our blood cannot tolerate a drastic shift in pH. It's a good thing, then, that human blood contains a buffer of carbonic acid,  $\text{H}_2\text{CO}_3$ , and sodium bicarbonate,  $\text{NaHCO}_3$  (Remember that  $\text{Na}^+$  is a spectator ion). This buffer regulates drastic shifts in the pH of our blood.

**Carbonic Acid Buffer Equation:****Pre-Lab Questions**

1. What is the purpose of a buffer system?
2. Compare the following systems. In system A, after adding **3 drops** of  $\text{HNO}_3$ , the pH changes from 8 to 2. In system B, after adding **30 drops** of  $\text{HNO}_3$ , the pH changes from 9 to 4.
  - a. Which system has the buffer? How do you know?
  - b. What is the independent variable in the experiment? (The variable that is changed.)
  - c. What is the dependent variable in the experiment? (The variable being tested and measured.)

**Procedure**

**Beaker #1: Unbuffered Solution**

**Beaker #2: Buffered System**

**Data Table**

**Beaker #1**

<u>Initial pH:</u>	<u>(Approx) number of drops of HCl:</u>	<u>Final pH:</u>

Total change in pH (Final - Initial): \_\_\_\_\_

Total number of drops of HCl added: \_\_\_\_\_

**Beaker #2**

<u>Initial pH:</u>	<u>(Approx) number of drops of HCl:</u>	<u>pH:</u>	<u>(Approx) number of additional drops of HCl:</u>	<u>Final pH:</u>

Total change in pH (Final - Initial): \_\_\_\_\_

Total number of drops of HCl added: \_\_\_\_\_

### Post-Lab Questions

1. Did the buffer system work? Give evidence.
2. Exhaled breath contains  $\text{CO}_2$ . This carbon dioxide reacted with the water in the beaker to form carbonic acid,  $\text{H}_2\text{CO}_3$ . Write the chemical reaction.
3. What is the buffer system? (the equation...)
  - a) When  $\text{HCl}$  ( $\text{H}^+$ ) is added, which direction does the reaction shift?
  - b) When  $\text{NaOH}$  ( $\text{OH}^-$ ) is added, which direction does the reaction shift?
4. What happened to the sodium ion in sodium bicarbonate?