

Name: _____

Date: _____

Period: _____

The Matthews Family- Part II

Week # _____

Directions: Read the story and complete the Cornell Notes.

Narrator- Sarah Matthews was enjoying a long afternoon run and was only a few blocks away from home when she was surprised by the ringtone of her phone.

Paul Matthews- Mom, it's Paul! Get home quick! I was on the computer downstairs, so I didn't hear Molly fall down in the bathroom- even though she's only 3, she must have managed to climb onto the toilet seat, then the sink, and reach up to the medicine cabinet. I think she started eating a whole bunch of aspirin tablets before she fell! She just threw up. Oh, no! She just threw up again, this time on me!

Narrator- Sarah immediately called 911 for an ambulance. The Matthews family arrived at the ER while Molly immediately underwent a physical exam and lab samples were obtained for analysis. By this time, she was unresponsive, and was breathing rapidly and deeply.

Sarah Matthews- How does this happen because of aspirin?

Dr. Martinez- Well, aspirin is acidic. That means at high levels it can lower the pH of your blood from its normal value of about 7.4. Once your blood pH drops below 7, it becomes very dangerous. As you can see, the nurse is starting to administer activated charcoal through a stomach tube to absorb any excess aspirin in Molly's stomach and prevent its entry into the bloodstream.

Sarah Matthews- Oh. Our son Paul was trying to explain pH to my husband and me last night- but what do you mean by dangerous, and what can you do to get it back up again?

Narrator- They were interrupted by another nurse who came in with the lab results. Dr. Martinez frowned as he looked over the results. They revealed a pH of 6.8. He hadn't seen a pH that low for some time. It certainly explained Molly's rapid and deep respiration.

Dr. Martinez- I need a treatment of IV bicarbonate to correct the acidosis.

Sarah Matthews- I'm afraid I don't follow. How is this treatment going to help Molly?

Dr. Martinez- We use bicarbonate as a buffer, that is, a substance that can combine with the acid she ingested to reduce acidity and raise pH.

Paul Matthews- Actually, according to my science lesson today, the function of a buffer is to minimize the change in pH when acid or base is added to the solution. Buffers are extremely important to living organisms, like my sister Molly, because most of the body's processes occur only when the pH remains within a fairly narrow range. A pH that is too high or too low can interfere with the structure and activity of many biomolecules, especially proteins. Therefore, buffers are commonly used in living organisms to help maintain a relatively stable pH.

Dr. Martinez- Wow, you have one smart kid on your hands!

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Question	Description, definition, or example
What are Molly's initial symptoms?	1. 2. 3.
What do high levels of aspirin do to the blood?	
What were the two treatments given to Molly and why were they given?	1. 2.
How does bicarbonate treat Molly's symptoms?	
What is the function of a buffer?	
Why are buffers important in living organisms?	

1. (IOD 401) What is the pH of Solution B when two drops of HCl are added?

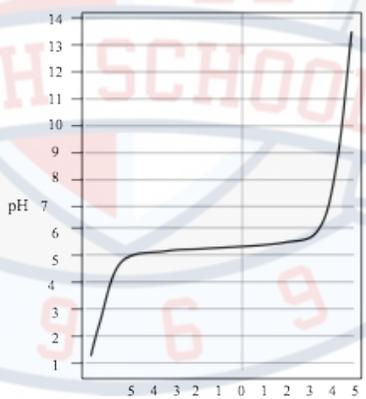
2. (IOD 502) What is the buffering range of solution A?

3. (IOD 502) How many drops of HCl can be added to Solution A before a significant change in pH occurs?

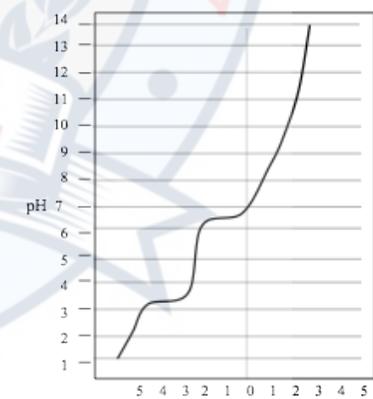
4. (IOD 502) How many drops of NaOH can be added to Solution A before a significant change in pH occurs?

5. (IOD 502) Explain the buffering capacity of Solution B when NaOH is added.

6. (EMI 501) Which solution has a greater buffering capacity? Explain.



Solution A



Solution B