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|--|
| <input type="checkbox"/> Focused attention |
| <input type="checkbox"/> Carefully follow procedures |
| <input type="checkbox"/> Work only within lab groups |
| <input type="checkbox"/> Hushed voices |
| <input type="checkbox"/> Safe procedures |

Name: _____
Period: _____

Serial Dilution and Indicator Lab

II. Purpose: To perform a serial dilution, standardize an indicator, and study the one of the processes which leads to the formation of acid rain.

Discussion:

One factor leading to acid rain is the reaction of excess CO₂ in the atmosphere with water.

When this occurs, the following reaction takes place:



In lab, you will reproduce this reaction, in the presence of a pH indicator solution and determine the acidity of the solution you create by standardizing the indicator.

III. Procedure

Serial Dilution

1. Fill a clean 50mL beaker ½ full with distilled water
2. Get 2 microtip droppers
3. Rinse a microwell tray and place it against a white background
4. Place 9 drops of distilled water in wells D1 through D7 and E1 through E6 (not E7)
5. Fill well B1 ½ full with 1.0 M HCl (an acid)
6. Fill well G1 ½ full with 1.0 M NaOH (a base)

Acid

7. Using the empty microtip dropper you used with the water, add 1 drop of 1.0M HCl to well D1, returning the unused HCl to well B1. Flush dropper with distilled water 3 times, discarding rinse water in the sink
8. With your flushed dropper, draw up the contents of well D1
9. Place 1 drop of well D1 into well D2, return the remaining solution to D1
10. Draw up the contents of well D2
11. Place 1 drop of well D2 into well D3, return the remaining solution to D2.
12. Continue this process through well D6

Base

13. Using a new microtip dropper, add 10 drop of 1.0M NaOH to well E7, returning the unused NaOH to well G1. Flush dropper with distilled water 3 times, discarding rinse water in the sink
14. With your flushed dropper, draw up the contents of well E7
15. Place 1 drop of well E7 into well E6, return the remaining solution to E7
16. Draw up the contents of well E6
17. Place 1 drop of well E6 into well E5, return the remaining solution to E6.
18. Continue this process through well E1

Standardization of Indicator

1. Place one drop of universal indicator to each well
2. Record the color of the wells
3. Save for future reference

Acid Rain

1. Fill the 50ml beaker $\frac{3}{4}$ full with distilled water
2. Place 3 drops universal indicator
3. Record color
4. With a straw, blow CO_2 through the solution until a noticeable color change is observed
5. Record new color

IV. Data

	1	2	3	4	5	6	7
D	pH= 1 <u>color</u>	pH= 2 <u>color</u>	pH= 3 <u>color</u>	pH= 4 <u>color</u>	pH= 5 <u>color</u>	pH= 6 <u>color</u>	pH= 7 <u>color</u>
E	pH= 8 <u>color</u>	pH= 9 <u>color</u>	pH= 10 <u>color</u>	pH= 11 <u>color</u>	pH= 12 <u>color</u>	pH= 13 <u>color</u>	pH= 14 <u>color</u>

	<u>Color</u>	<u>pH</u>
Before Reaction		
After Reaction		

VI. Conclusions

a) What does the pH scale measure?

b) What is a logarithmic scale? Why is it significant that pH is a logarithmic scale?
