Focused attention
Carefully follow procedures
Work only within lab groups
Hushed voices
Safe procedures

Name:

Period:

Serial Dilution and Indicator Lab

II. Purpose: To preform 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  $CO_2$  in the atmosphere with water. When this occurs, the following reaction takes place:

 $CO_2 + H_2O \rightleftharpoons H_2CO_3$  (carbonic acid)

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  $\frac{1}{2}$  full with 1.0 M NaOH (a base)

# <u>Acid</u>

- 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

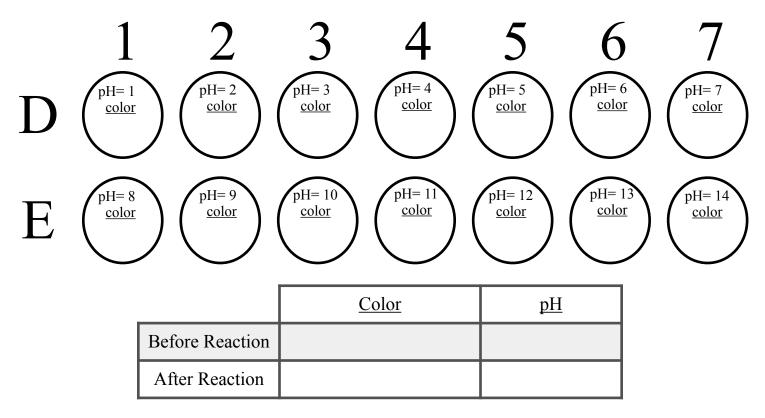
### Standardization of Indicator

- 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 <sup>3</sup>/<sub>4</sub> full with distilled water
- 2. Place 3 drops universal indicator
- 3. Record color
- 4. With a straw, blow CO<sub>2</sub> through the solution until a noticeable color change is observed
- 5. Record new color

IV. Data



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