Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Environmental pH

**Purpose**

The purpose of this exercise is to determine the pH of various substances and how these substances can affect the environment. [[1]](#endnote-1)

**Background**

A liquid may be an acid, base, or neutral. The degree of acidity or the strength of a base can be measured by using the pH scale. The scale is divided into three areas: Acid (readings below 7), neutral (reading of 7), and basic (readings above 7). Each division either increases or decreases the pH of a substance 10 times. The pH of 5 is ten times more acidic than a pH of 6. Water has a pH of 7 but when it mixes with air the suspended materials will either raise or lower its pH. Acid Rain is an example of this type of reaction.

1 2 3 4 5 6 **7** 8 9 10 11 12 13 10 11

 **More Acidic Neutral More Basic**

**Procedure:**

 **Materials**

1. pH paper and chart 8. Ammonia 15. Additional Samples (3)
2. Forceps/tweezers 9. Detergent
3. Masking tape 10. Pond Water
4. Paper towels 11. Distilled Water
5. Depression slides (10) 12. Salt Water
6. Lemon juice 13. Tap Water
7. Cola 14. Baking Soda

**Sequence of Steps**

1. Label a paper towel from A through N. Leave space between each label so that you may place a glass slide above the label.
2. Put a drop of liquid on each slide as listed below: **Caution do not allow any of the materials to come in contact with your skin. If contact is made wash it off under running water and notify the instructor immediately**.

|  |  |  |  |
| --- | --- | --- | --- |
| A – Lemon Juice | B – Distilled Water | C – Pond Water | D –Tap Water |
| E – Salt Water | F – Ammonia | G – Baking Soda | H – Cola |
| I – Detergent | J -  | K -  | L -  |

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3. Hypothesize whether the liquid would be acid or base and record in “observations”.

4. Pick up a piece of pH paper with the forceps.

![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()5. Touch the pH paper to the liquid in slide A and remove it. Compare the color of the paper with that on the pH chart. Record your observation on Table 1.

6. Repeat the procedure with the rest of the slides.

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**Observations**

 Table. 1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Slide** | **Hypothesis**  | **pH**  | **Acidic**  | **Basic**  | **pNeutral**  |
| A  |    | d  |   |   |   |
| B  |   |   |   |   |   |
| C  |   |   |   |   |   |
| D  |   |    |    |    |    |
| E  |   |    |    |    |    |
| F  |    |    |    |    |    |
| G  |    |    |    |    |    |
| H  |    |    |    |    |    |
| I |  |  |  |  |  |
| J |  |  |  |  |  |
| K |  |  |  |  |  |
| L |  |  |  |  |  |

**Analysis:**

1. Which of the liquids had the lowest pH?

 Is it acidic, basic or neutral? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Which of the liquids had the highest pH?

 Is it acidic, basic or neutral? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Which of the liquids were closest to being neutral?

4. If the pH of a sample was 3 how many times more acidic is it than a solution with a pH of 6?

5. Agriculture Application: The ideal soil pH for several vegetables is listed below. Use the table to

answer the following questions.

|  |  |
| --- | --- |
| **Vegetables:** | **Ideal pH** |
|  Artichoke | 6.5 - 7.5 |
| Asparagus | 6.0 - 8.0 |
| Broccoli | 6.0 - 7.0 |
| Corn | 5.5 - 7.0 |
| Cucumber | 5.5 - 7.5 |
| Lettuce | 6.0 - 7.0 |
| Peanut | 5.0 - 6.5 |
| Pepper | 5.5 - 7.0 |
| Potato | 4.5 - 6.0 |
| Watermelon | 5.5 - 6.5 |

a) Which vegetable can handle the most acidic soil?

b) Which vegetable can handle the most basic soil?

c) What is one generalization you can make about the pH that all of these vegetables need?

1. Galan, Daniel (2008).Environmental pH Lab. *Calexico High School Ag Department*. [↑](#endnote-ref-1)