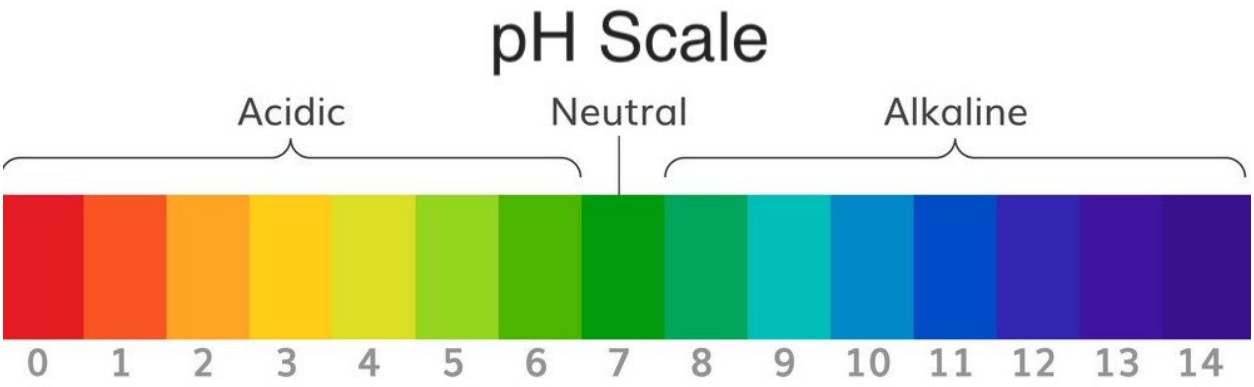
BIO 117 LAB 3 Chemistry of Life: pH of Matter

Pre-Lab

Acids, Bases, and pH Name: _Daneshia Wooten _____

The degree to which a solution is acidic or basic is represented by a quantity known as pH. The pH of a solution can be measured by using pH meter, pH paper or color indicators. The color indicators commonly used in biology labs are **Bromothymol blue and Phenolphthalein.**

Bromothymol blue is a chemical indicator that is **blue** in basic solutions, turns **green** in neutral, and turns **yellow** in acidic solutions**. Phenolphthalein** is a chemical indicator that is **pink** in basic solutions, and does not react with neutral and acidic solutions to exhibit a color change.



Use the above information answer the following questions:

1. Which of the following values indicates the greater concentration of acid?

pH 5 or pH 2? ____**pH2**_____

2. Which of the following values indicates the greater concentration of base?

pH 14 or pH 9? _____**pH9**_____

3. What does a pH of 7 indicate? _____***Neutral***_____

4. A student mixes strawberry koolaid and water. A pH meter is used to measure pH of 5.4. What kind of solution is strawberry koolaid?

A. **Acidic** B. Basic C. Neutral

5. Bromothymol blue is a chemical indicator that is **blue** in basic solutions, turns **green** in neutral, and turns **yellow** in acidic solutions.

A. What color you think bromothymol blue would be in water directly out of tap (pH 7.2)?
_____***Green***_____

B. What color you think bromothymol blue would be in water in which exhaled air is blown through a straw for 5 min and the pH is 5.1? _____***Yellow***_____

C. What color you think bromothymol blue would be in water after a snail has lived in it for three days (pH 5.8)? _____***Yellow***_____
D. What color you think bromothymol blue would be in water after 2mL of bleach has been added to it and the pH is 9.4 ? ___***Blue***_____
E. What color you think bromothymol blue would be in water with instant coffee added to it (pH 5.0)? _____***Yellow***_____

Procedure I

Use the simulation lab to: pH Lab

1. Test and record the pH of coffee, blood, water, soap, milk, and soda pop.
2. Determine whether each is acidic, basic, or neutral.
3. Investigate whether changing the volume by adding 500ml of the substance being tested to the original volume affects the pH. Note the pH of the final volume of substances.
4. Investigate whether diluting each sample with 500ml of water affects the pH.

Please Note: All recordings must be done in the **table 1** below.

TABLE 1

Sample	pH of Sample alone	Nature Acidic/basic/neutral	pH after Added sample	pH of Diluted sample after adding water
Coffee	5.00	Acidic	5.00	5.32
Blood	7.40	Neutral	7.40	7.23
Water	7.00	Neutral	7.00	7.00
Soap	10.00	Basic	10.00	9.71
Milk	6.50	Acidic	6.50	6.69
Soda Pop	2.50	Acidic	2.50	2.80

Analysis of Data

Use the information from the **Table 1** to answer the following questions:

1. Which is the most acidic substance? ___***Soda pop***_____

2. Which is the most basic substance? ___***Soap***_____

3. Name the neutral substance. ___***Water***_____

4. What changes in pH occur when blood is diluted with water?

It would decrease by .15

5. Is there any change in pH when the volume of blood is increased? ***There is no change in the pH change***

Conclusion

Please note: You may try out the simulation with different samples to answer the next two questions.

6. What is the effect of volume on pH of substances? (Explain pH changes that might occur by increasing or decreasing the volume of the samples) For ***an acidic solution, the pH will increase, whereas for a basic solution, the pH will decrease.***

7. What is the effect of concentration on pH of substances? (Explain pH changes that might occur by increasing or decreasing the concentration of the samples) ***the pH of an acid solution will be lower as the solution is more concentrated. For bases, the pH will be higher with more highly concentrated solutions.***

Procedure 2: Copy down the pH of all samples in the appropriate column in Table 2. Predict the color change after adding the color indicators

TABLE 2

Sample	pH of Sample alone	Color After Adding Bromothymol blue	Color After Adding Phenolphthalein
Coffee	5.00	yellow	green
Blood	7.40	green	green
Water	7.00	green	green
Soap	10.00	blue	pink
Milk	6.50	yellow	green
Soda Pop	2.50	yellow	orange

ANALYSIS & CONCLUSION

Use the information from the above Table 2 to answer the following questions.

1. Bromthymol blue changes color when mixed with an acid. What color should it become?

2. ___***Yellow***_____
3. What color should Bromthymol blue be when in a base? ___***Blue***_____

4. What color would you expect Bromthymol blue to be if it were in a neutral solution? ____***green***_____
5. Phenolphthalein changes to ____***pink***_____ in the presence of ____***basic***_____.
6. What is the advantage of using pH meter rather than Bromthymol blue or Phenolphthalein? _____***The pH meter is more accurate to a pH strip.***_____ _
7. Which reagent (Bromthymol blue or Phenolphthalein) could be considered as an acid indicator? _____***Bromthymol blue***_____