**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_**

**pH of Common Household Substances**

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**Background Information:**

The concentration of hydrogen ions in a solution is very important for living things. This is because, since the hydrogen ions are positively charged they alter the charge environment of other molecules in solution. The concentration of hydrogen ions is commonly expressed in terms of the pH scale. Low pH corresponds to high hydrogen ion concentration and vice versa. A substance that when added to water increases the concentration of hydrogen ions(lowers the pH) is called an acid. A substance that reduces the concentration of hydrogen ions(raises the pH) is called a base.

In this lab you will be testing the pH of certain common chemicals with litmus paper, pH paper, and a pH meter to determine if a substance is an acid, base, or neutral.

**Materials:**

* Well plate
* pH paper
* red litmus paper
* blue litmus paper
* salt water
* milk
* tap water
* baking soda water
* hand sanitizer
* lemon juice
* hydrogen peroxide
* shampoo (diluted with water)
* soda
* Listerine
* Windex
* Vinegar

**Pre-Lab Questions:**

1. What is the purpose of this lab?
2. What is the pH range of acids?
3. What is the pH range of bases?
4. What color will acids turn red litmus paper? Blue litmus paper?
5. What color will bases turn red litmus paper? Blue litmus paper?
6. What pH does something have to be to be neutral?

**Procedure:**

1. **Predict the pH of each solution in the table below.**
2. **Place a small amount of each solution in your well plate. (You should put each solution in a different well plate)**
3. **Test each solution’s acidity or basicity with red litmus paper. Record color results in chart below.**
4. **Test each solution’s acidity or basicity with blue litmus paper. Record color results in chart below.**
5. **Test each solution’s pH with pH paper. USE ONLY A SMALL (fingernail length) OF pH PAPER FOR EACH SOLUTION. Use the chart on the pH paper box to record the pH of each solution.**
6. **Throw away all used pH paper and litmus paper in the trash.**
7. **Wash and dry out well plate.**

**DATA TABLE:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Substance** | **Predicted pH** | **Red litmus paper** | **Blue litmus paper** | **pH paper** | **Acid, Base, or Neutral?** |
| **Salt water** |  |  |  |  |  |
| **Milk** |  |  |  |  |  |
| **Tap water** |  |  |  |  |  |
| **Baking soda water** |  |  |  |  |  |
| **Hand sanitizer** |  |  |  |  |  |
| **Lemon juice** |  |  |  |  |  |
| **Hydrogen peroxide** |  |  |  |  |  |
| **Shampoo** |  |  |  |  |  |
| **Soda** |  |  |  |  |  |
| **Listerine** |  |  |  |  |  |
| **Windex** |  |  |  |  |  |
| **Vinegar** |  |  |  |  |  |
| **UNKNOWN A** |  |  |  |  |  |
| **UNKNOWN B** |  |  |  |  |  |

**Questions:**

1. **Ms. Price will give you the actual pH readings as measured by a pH meter in class. Write these numbers for each solution below and compare to your results. What seems to be the difference between the two techniques of measure pH?**
2. **Were there any predictions that you were correct about? Wrong about?**
3. **List and explain your reasoning as to how you determined what substance each unknown is.**
   1. **Unknown A**
   2. **Unknown B**
4. **Analyze the substances that tested basic. What connection do you see with regard to their use in the household?**
5. **Analyze the substances that tested acid. What connection do you see with regard to their uses?**
6. **Suppose in your younger days before you knew better, you choose to say something that your parent didn’t approve of. Why might “washing your mouth out with soap” have been a measure to prevent you from doing this again? What pH range is involved with this scenario?**
7. **One household remedy for bee stings is to make and apply a baking soda paste. From your data on baking soda water, what type of substance must bee venom be if it is neutralized by baking soda?**