**Water We Use Laboratory**

**Introduction**

Water quality is priority to civilizations. It is examined and analyzed by environmentalists, government agencies, aquarium owners, gardeners and businesses. This experiment can show what you might expect from your tap water or pool water in terms of chemical and biological content. In this activity students will test water samples from different sources. Students make predictions based on their observations. Then they will filter the water and compare the results to their predictions. Students will measure the pH level of the sample using the litmus test.

**Learning Goals**

* Determine how the water we use in our everyday lives is clean
* What is a good pH level range? Difference between hard and soft water
* How to filter water (acidic and basic) compare acidic, neutral, and basic pH levels.
* Carrying out scientific investigations.
* Asking and answering scientific question.
* Interpreting data and making connections to our everyday lives.

**Materials:**

Water analysis kit

Litmus paper

Water samples (4-5)

Test tubes

Plastic Flasks

Pipettes

Sharpies

Gloves

Cotton

Coffee Filters

**Experimental Procedure**

* **Part 1**: Assemble analysis kit by placing each tier on top of eachother with corresponding filter. Choose filter material and record each tier with corresponding filter material in notebook (for example, gravel, cotton, coffee filter, sand, etc)

1. Make prediction of what to expect (e.g. does water get clear? cloudy?)
2. Assemble the filtration tower (from the bottom up):
   1. **First tier**: fold coffee filter paper (cut if you need to) and place in the bottom tier
   2. **Second tier**: place a thin piece of cotton and then add packet of sand
   3. **Third tier**: place a thin piece of cotton and then add half packet of charcoal
   4. **Fourth tier**: place a thin piece of cotton and then add packet of small rocks (pebbles)
3. Stack the tiers on top of each other (first tier on bottom, then sand, then charcoal, then pebbles on top)
4. Use a pipette to transfer water into a test tube (about ¾ full)
5. Record observations of your water sample (color, particles, etc)
6. Pour water sample into your filtration tower and observe how the water travels through the filtration process.
7. Record and observe water after filtration
8. Dispose of water

* **Part 2**: Measuring the pH of Water Samples
  1. Label your 5 test tubes 1-5 corresponding with the water samples.
  2. After labeling tube, using your pipet, take a portion water **from** each sample and fill **your** test tubes halfway.
  3. Grab 5 pieces of litmus paper from your instructor. **(Keep litmus dry and clear until ready to use)**
  4. Dip 1 piece of litmus paper into sample, enough so that you are able to see a change. **(DO NOT drop paper into tube)**
  5. Record the pH level (and color) shown on the litmus paper in notebook.
  6. Repeat steps d-e for the remaining water samples.
  7. Record observations.

**Data Table for Parts 1 and 2**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Water Sample | | Before Filtration | | After Filtration | | pH Level (1.0-14.0) | Hardness |
| Does it contain debris? / Observations | Color | Does it contain debris? / Observations | Color |
| 1 | Tap Water |  |  |  |  |  |  |
| 2 | Filtered Water Fountain |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |
| 4 | Freshwater Creek |  |  |  |  |  |  |
| 5 | Rain Water |  |  |  |  |  |  |

**Questions**

1. What is the purpose of the carbon, sand, and filter paper? What does each do?
2. Once water is filtered, would water be safe to drink/use?
3. What causes a solution to be acidic, neutral, or basic?

**Summary of experiment**

* Write 5-7 sentences of discussing the objective, procedure used, and results of your experiment.