Properties of Water Demonstrations

After completing your station, clean up the materials and list the properties of water that are being demonstrated – there can be more than one! Prepare a short presentation – include what you did at your station, your observations/results, which property of water it demonstrates, and why that property of water is important for life on earth.

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| Vocabulary  **polarity, hydrogen bonds, surface tension, cohesion, adhesion, capillary action, high specific heat, high heat of vaporization, high heat of fusion, density, pH, universal solvent** | |
| **Station 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   1. *Fill a 250 ml beaker with water and a couple drops of food coloring. Place celery stalk in beaker.* 2. *Time how long it takes for the entire celery stalk to change color.*    * Record your data.    * How is the water able to “defy gravity”? | **Station 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   1. *Use a pipette dropper to drop water onto a penny, one drop at a time.* 2. *Count how many drops you can add before any water spills over the edge.* 3. *Repeat with salt water solution.*    * Record your data (3 trials each for water/salt water). Dry the pennies between each trial.    * Which type of water had more cohesion? |
| **Station 3: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   1. *Put one drop of food coloring in 10 ml of rubbing alcohol. Mix with 50 ml of water.* 2. *Put one drop of food coloring in 10 ml of oil. Mix with 50 ml of water.*   Use graduated cylinders + funnels to measure and 150 ml beakers for each.   1. *Put a pinch of salt in 50 ml of water.* 2. *Record your observations.*  * Record your observations. * Circle the polar substances. Put a box around the nonpolar substances.   Water Oil Rubbing Alcohol Salt | **Station 4: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   1. *Fill 3 150 ml beakers with ~50ml of each liquid – water, oil, rubbing alcohol. Leave 1 beaker empty (air). Turn hot plate on “low.”* 2. *Measure the temperature of each for 3 minutes at 30 second intervals.*    * Record your data.    * What do you notice? |
| **Station 5: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  mage result for paper chromatography   1. *Draw a line using the permanent marker across the bottom of the strip of filter paper (~1.5 cm from the bottom).* 2. *Do the same with a RoseArt marker on a different strip of filter paper, and any additional writing tools of your choice.* 3. *Dip just the bottoms of the filter papers in a beaker of water.*  * What do you observe? * Do you think the permanent marker is polar or nonpolar? Explain. | **Station 6: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   1. *Dip pH paper in each of the beakers.* 2. *Determine the approximate pH of each solution.*  * Record your data and calculate the [H+] of each. * Which beaker do you believe contains water? Explain. * Why does water have a pH of 7? |
| **Station 7: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   1. *Put one drop of water and one drop of rubbing alcohol on a paper towel. Make sure you label which is which.* 2. *Record how long it takes for each drop to evaporate. (You may take the paper towel with you to the next station.)*  * Record your data. * What do you notice? |
| **Station 8: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   1. *Imagine you put 3 ice cubes into a beaker with 250 ml of liquid water.* 2. *Describe what would happen and draw what it would look like.*  * Design an experiment that you could perform to prove that water expands as it freezes. * After completion, watch videos 1 & 2 (links are on the website). | **Station 9: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   1. *Fill a beaker with crushed ice and place on hot plate.* 2. *Record the temperature every 30 seconds. Make sure to continuously stir contents to ensure even heating with a stirring rod.* 3. *Graph your data.*  * If constant heat is being applied, how come the graph isn’t linear? * See website for sample data if needed. |