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?
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| **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?
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| **Station 5: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**mage result for paper chromatography1. *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?
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| **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?
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| **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.
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