

Properties of Water Lab

Water is essential component of life. It is one of the simplest yet most important molecules in the natural world. Our bodies are made up of about 60 % water. As you complete this lab you will be investigating the unique properties of water.

Define the following terms:

Adhesion:

Cohesion:

Polar molecule:

Nonpolar molecule:

Hydrogen bond:

Surface tension:

Before starting the lab, you need to make sure that you have made all your predictions pertaining to the investigations. Make sure that you have gotten the teacher's approval that all your predications have been completed before you start your investigations.

Teacher's initials: _____

Station 1: At this station, you will be investigating how many drops of water can fit onto a penny. Place a penny flat onto a paper towel then count the drops of water as you add them to the penny. Stop counting and adding drops of water to the penny as soon as the water overflows off the penny. Repeat this for a total of three trials.

1. Make a prediction as to how many drops of water will fit onto the penny. _____
2. Fill in the data table below after each trial, and then find the average after all three trials.

Trial #1 # of drops	Trial #2 # of drops	Trial #3 # of drops	Average # of drops

3. From what you have learned from the notes taken in class, explain what properties of water are being demonstrated here that allows the water to build up on the penny without rolling off.

Name: _____ Date: _____ Period: _____

Station 2: At this station, you will be investigating the behavior drops of water on a piece of wax paper. Using a pipette, drop several drops of water in different places around the wax paper. Then using the toothpick placing it in the middle of one of the drops, move the drop of water around the wax paper bumping into the other drops on the paper.

1. Make a prediction as to the behavior that the drops of water on the piece of wax paper will exhibit.
2. Once you have finished the investigation, explain the properties of water that are being demonstrated here, try using the terms adhesion, cohesion, surface tension, polar, non-polar, and hydrogen bonding.

Use the same procedure as above, except this time use oil instead of water.

3. Make a prediction on how the oil will behave on the wax paper.
4. Evaluate the differences in the properties of oil compared to the properties of water that accounted for the differences that you saw.

Station 3: At this station, you will compare what happens when ice is added to a beaker of water and to a beaker of isopropyl alcohol, and answer the following questions.

CAUTION: Isopropyl alcohol is HIGHLY POISONOUS, DO NOT drink! ALSO, ethanol is flammable, an eye irritant, and has fumes.

1. First predict what is going to happen when ice is placed in a beaker of water and a separate beaker of isopropyl alcohol.
2. Describe what property of water allows ice to float in water? Why did the ice behave the way it did in the isopropyl alcohol?
3. Explain why this property of water is important to the life of aquatic organisms.

Name: _____ Date: _____ Period: _____

Station 4: Using a clean beaker that has been thoroughly rinsed out. Fill the beaker with clean water about a centimeter from the top of the beaker. Take a paper clip and gently release the paper clip onto the top of the water until it floats.

1. The density of a paper clip is greater than the density of water, so it should not float based on this idea alone. Explain what properties of water allow the paperclip to float?
2. Make a prediction as to what will happen to the paperclip if you add liquid soap to the water
3. After you have made your prediction, add some liquid soap to the water and watch what happens. Then try to explain what happened to the properties of water when the liquid soap was added.

Station 5: At this station you will need a Petri dish with only a little colored water in the bottom of the dish. Then you will take a capillary tube and place it in the water and watch what happens.

1. Predict what will happen and why you think that is going to happen based on the properties of water.
2. Describe the properties of water you observed at this station.
3. Explain (you may reference your textbook) how this same property allows water to travel from the roots of a tree to top branches of the tree.

Name: _____ Date: _____ Period: _____

Station 6: For this station, follow the procedure carefully.

1. Number your test tubes (TT) 1-4.
2. Pour 10 mL of water into the TT marked 1 & 2.
3. Pour 10 mL of isopropyl alcohol into TT marked 3 & 4.
4. Place two small pinches of sugar in TT 1 & 3.
5. Place two small pinches of salt in TT 2 & 4.
6. Cover each TT with your thumb and shake for about a minute over the sink.
7. Record your observations in the data table.
8. When you are done, clean all the tubes thoroughly.

CAUTION: Isopropyl alcohol is HIGHLY POISONOUS, DO NOT drink! ALSO, ethanol is flammable, an eye irritant, and has fumes

1. From what you know about the properties of water, predict which solvent will dissolve which solute.
2. Fill in the data table to record your observations.

Substance	Water	Isopropyl Alcohol
Sugar		
Salt		

3. Which solvent dissolved the best?
4. What property gives water the ability to dissolve things?

Post-lab Questions

Explain at least three things that you learned about the properties of water that you didn't know before doing this lab.