

Name \_\_\_\_\_ Date \_\_\_\_\_ Per \_\_\_\_\_  
preAP Biology

## Properties of Water

Write everything you know about water this box.

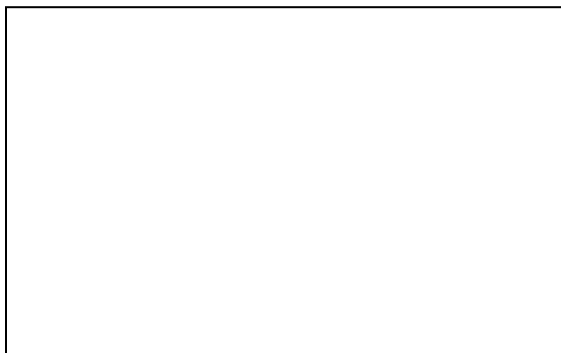
### **STATION 1 – Water is a polar molecule and has a very unique structure.**

Answer the following questions from the reading provided.

1. What is a polar molecule?
2. Name the elements that make up water.
3. What charge does the hydrogen atoms have in a molecule of water?
4. What charge does the oxygen atom have in a molecule of water?
5. The \_\_\_\_\_ atom of one water molecule will bond with \_\_\_\_\_ atoms of other water molecules.
6. What are the bonds called between two hydrogen atoms?

Answer the following questions after completing the activity.

1. Draw one molecule of water and label the hydrogen and oxygen atom. Label the positive (+) region of the molecule and the negative (-) region of the molecule.



2. Draw 5 molecules of water bonded together with hydrogen bonds. Label one hydrogen bond, oxygen atom, and hydrogen atom.



### **Analysis Questions**

Explain why it is important for hydrogen bonds to be weak bonds instead of strong bonds.

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### **STATION 2 – Water is the universal solvent.**

**Answer the following questions from the reading provided.**

1. Define mixture.
2. What are the two types of mixtures?
3. Define solute.
4. Define solvent.
5. Why is water considered the greatest solvent on Earth?

**Answer the following questions after completing the activity.**

1. Describe the appearance of the test tube with oil and salt. (Use complete sentences and be detailed)

- Describe the appearance of the test tube with water and salt. (Use complete sentences and be detailed)

**Analysis Questions**

Up to 60% of our body is made up of water. Describe the significance of water being a universal solvent in our bodies.

**STATION 3 – Water has the properties of adhesion and cohesion.**

Answer the following questions from the reading provided.



- How many hydrogen bonds can a single water molecule have?
- Define cohesion.
- Define adhesion.

Answer the following questions after completing the activity.

How many drops can fit on a penny?

	Water	Rubbing Alcohol
Number of Drops that Fit on a Penny		

What does the solution look like on the penny?

Water	Rubbing Alcohol
	

- Explain why more water drops could fit on a penny when compared to rubbing alcohol.

2. What property of water allows the water to stick to the penny?
3. What property of water allows the water to form a dome-like structure on top of the penny?

### **Analysis Questions**

Describe an example of cohesion and adhesion that you might observe during your daily life.

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## **STATION 4 – Water is less dense as a solid than a liquid.**

**Answer the following questions from the reading provided.**

1. Why can solid ice float on liquid water?
2. When a lake freezes, how does the density of water prevent all of the living organisms in the lake from freezing as well?

**Answer the following questions after completing the activity.**

1. Describe why the polymer ball is at the bottom of the vegetable oil.
2. Describe why the ice floats on the water.

### **Analysis Questions**

Imagine a world where ice was more dense than liquid water. What would this world be like? What would the consequences be for life in your local freshwater streams and lakes.

**STATION 5 – Water is important for capillary action.**

**Answer the following questions from the reading provided.**

1. What two properties of water contribute to capillary action?
2. How does water move up the thin walls of a tube? Specifically, what is it sticking to?

**Answer the following questions after completing the activity.**

	<b>Distance the Water Moved (centimeters)</b>
<b>1cm Paper Towel</b>	
<b>2cm Paper Towel</b>	
<b>3cm Paper Towel</b>	

**Analysis Questions**

Explain why the vessels that transport water in trees must be very small in diameter.

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**STATION 6 – Water has a strong surface tension.**

**Answer the following questions from the reading provided.**

1. How does water hold up materials that is heavier than itself?
2. What property of water gives it a high surface tension?

**Answer the following questions after completing the activity.**

	Plain Water	Soapy Water
Number of Paperclips that floated		

1. What property of water allows the paper clips to be attracted to the plain water?
2. How did the soap affect the paper clip's ability to float?

**Analysis Questions**

Explain why this property of water is essential for organisms like water bugs.

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**STATION 7 – Water has a high heat of vaporization**

**Answer the following questions from the reading provided.**

1. Define heat of vaporization.
2. What causes water to have a high heat of vaporization?
3. What happens to the surface when water evaporates?

