Name: _____   Period: _____   Date: _____

Water Lab #1

PRE-LAB: *Write down and sketch your observations for the two liquids. Explain the differences you see in the two liquids and why you believe these differences occur.*

	Sketch	Description/Explanation	What was it?
Liquid #1			
Liquid #2			

BACKGROUND: We observe and use water every day. It makes life on Earth possible. Water covers nearly three fourths of Earth's surface and affects almost all living and nonliving things. Because it is so abundant, it may not seem unusual, but water is unique when compared to other substances in the universe. In fact, its properties are quite different from those of other substances even here on Earth. For instance, it is the only substance on Earth that occurs naturally in all three states—solid (e.g., an iceberg), liquid (e.g., ocean water), and gas (e.g., steam or vapor in a cloud).
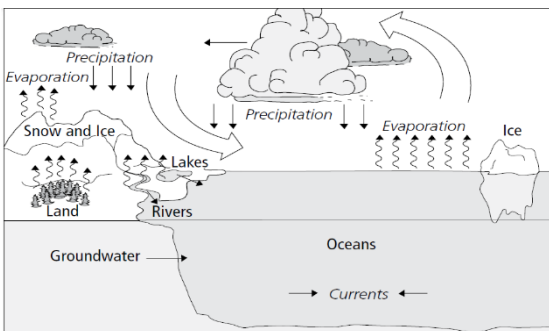
Most substances (water, air, dirt, etc.) are made up of **atoms**. Atoms are arranged in a specific way, often forming a **molecule**. The makeup of a water molecule—or any molecule— is called **molecular structure**. A substance's molecular structure is responsible for its properties and governs how it interacts with other things on Earth. This Activity introduces and explores one specific property of liquid water.

Activity #1: A Pile of Water

PROCEDURES:

A. Place a penny on a paper towel.

B. Estimate the number of water drops you can pile on the penny before the water runs over its edge.

C. Record your estimate in the data table.

D. Place water on the penny drop by drop. Working with the other members of your group, develop a technique that allows you to put the most drops on your penny. You may want to put the drops on in different areas of the penny or from different heights. Count each drop until the water spills over.

E. Record your results in the table on the data table

F. Make a sketch of the water on the surface of the penny just before the water spilled over.

G. Based on what you observed with the penny, make a prediction comparing the number of drops you could pile on a nickel, dime, or quarter. Remember that the area of the different-size coins is important to your predictions. **Repeat Steps 4-6 with the different coins.**

Sketch the water and coin in the space below:

Data Table: Predicted and Observed Results		
Item	Number of Drops	
	Prediction	Observation
Penny		
Nickel		
Dime		
Quarter		

1) Describe the way water "sits" on the penny.

2) Why do some pennies hold more water droplets than others?

3) Why do you think water piles up on the penny, rather than spilling over the edges immediately?

Activity #2: On Top of Water

PROCEDURES:
A. Fill up the bottom of a plastic cup with water.
B. Gently place the paper clip on the top of the water so that it sits on top. Sketch an observation in the data table.
C. Use the eyedropper to add a few drops of soap. Describe what happens.
D. Attempt to float the paper clip again.

Paper clip and water	Paper clip and soap
Sketch:	Sketch:
Description:	Description:

4) Describe the differences in density between the paper clip and water.

5) Explain what changed when the soap was added.

OVERVIEW: Water molecules "stick," or are attracted to one another, because water has an uneven distribution of electrical charge. (It is a "**polar molecule**.") Each molecule has a positive end, or "pole," and a negative pole. The positive end of one molecule and the negative end of another molecule attract each other. This attraction, called **hydrogen bonding**, is strong enough to hold water molecules together. The force of hydrogen bonds causes water to fall in drops and to dome up on flat surfaces or containers full of water. When placed on coins, the molecules of water form flexible piles that stay together because of hydrogen bonding. This phenomenon—of water "piling up"—is due to **surface tension** and **cohesion**. Liquid water has an extremely high surface tension because of its molecular structure and the hydrogen bonding between molecules.

6) What two properties of water were observed during these lab activities?

7) What is the main cause of these properties?