The Magic of Water Lab

Name:_____
Period:_____

Background: Water is essential for all life on Earth. In fact, most life forms are made up of mostly water. Water is the basis for cell structure, transportation of cellular materials, and metabolic processes. There are certain qualities about water that make it important for living things.

Questions: How does the physical structure of water affect how water interacts with other substances? How does this make it essential to life?

Pre-Lab: Complete the following task

a. Draw, in color, a space filling model of a water molecule.

b. Draw in color and label 3 large water molecules (using a space filling model) united by hydrogen bonds. Label the charges on the atoms.

c. Why is oxygen slightly negative? (pg. 40)

_____

_____

d. What is the term for a molecule that has the two ends with a slightly different charge?

_____

Station 1:

1. Using a pipette, place 3 or 4 drops of water onto a sheet of wax paper.
2. Pick up the paper and tilt it so the drops slide into one another.
   a. What do you notice?

   _____

   _____

   b. What happens when the drops contact each other?

   _____

   _____

   c. Sketch in color the water droplet from the side.

   Wax Paper→
3. Dry off the wax paper.
4. What property of water is demonstrated by this station? How do you know?

   _____

   _____
5. Does wax paper attract water molecules? Give evidence to support your answer.

   _____

   _____
6. Was the wax paper polar? Why or why not?

   _____

   _____

Station 2:

1. Place 2 drops of water on a glass microscope slide.
2. Place another microscope slide on top of the first creating a glass-water-glass sandwich.
3. **CAREFULLY** try to separate the glass pieces without sliding them. You break it, you bought it.
4. Draw a color diagram showing your glass slides.
5. What property of water is demonstrated by this station? How do you know?

   _____

   _____

6. Does the glass attract water molecules? Give evidence to support your answer.

   _____

   _____

7. Was the glass polar? Why or why not?

   _____

   _____

8. Slide the glass slides apart and dry off.

Station 3:

1. **VERY CAREFULLY** hold a capillary tube at a 45-degree angle. You break it, you bought it.
2. Place a few drops of the colored water on the wax paper.
3. Place the end of the capillary tube so that it just touches the water drop in the wax paper.
4. Wait 5-10 seconds.
5. Describe what you saw occur.

_____

_____

6. Draw a color diagram of what happened.

7. What property of water is demonstrated by this station? How do you know?

_____

_____

8. Dry off the wax paper.

Station 4:

1. There is a small dish with water.
2. Using the forceps try to place the pin on the surface of the water.
3. If it falls, try again. Only try 3 times before moving on.
4. Hypothetically, if you had been successful, why would the pin have stayed on the surface of the water?

   _____

   _____

5. What property of water are you attempting to demonstrate this station? How do you know?

   _____

   _____

Station 5:

1. At this station there is a wool sock and a plastic ruler.
2. Using the wool sock to rub the plastic ruler vigorously **IN ONE DIRECTION** 20 times.
3. Turn the lab sink on a slow, steady stream of water.
4. **WITHOUT GETTING THE RULER WET** slowly move the ruler close to the stream of water.
5. What happens when you bring the ruler close to the stream of water?

   _____

   _____

6. What property of water is demonstrated by this station? How do you know?

   _____

   _____

7. Plastic itself is non-polar. How was this possible if plastic is non-polar?

   _____

   _____

8. Was the wax paper polar? Why or why not?

   _____

   _____

Station 6:

1. Fill one beaker with water until it is about ¾ full.
2. Place an empty beaker on the table.
3. Cut a string about a foot long.
4. Hold the full beaker about a foot above the first.
5. Use one finger to lightly hold one end of the string in place **ON THE POUR SPOUT** of the full beaker, and one finger to lightly hold the other end **IN** the empty beaker.
6. Slowly pour water down the string into the empty beaker **WITHOUT SPILLING**.
7. Submerge your string in water until it is thoroughly wet.
8. Try again.
9. Why did wet string work, but dry string did not?

   _____

   _____

10. How was water able to travel down the string without spilling?

    _____

    _____

11. What property of water is demonstrated by this station? How do you know?

    _____

    _____

Station 7:

1. Fill a 250 mL beaker with 50 mL of water.
2. Place a cork in the beaker, wait, and observe where the cork moves. **GET YOUR EYES DOWN LEVEL WITH THE CUP AND OBSERVE THE SURFACE.**
3. Draw where the cork ends up.

4. Fill a plastic cup up **AS MUCH AS YOU CAN WITHOUT SPILLING.**
5. Place a small piece of cork in the cup, wait, observe where the cork moves. **GET YOUR EYES DOWN LEVEL WITH THE CUP AND OBSERVE THE SURFACE.**
6. Draw where the cork ends up.

7. Remember that cork is less dense than water and will float to the highest point it can reach.
8. What happened to the cork in the beaker?

   _____

9. Why did the cork do this?

   _____

   _____

10. What happened to the cork in the plastic cup?

    _____

11. Why did the cork do this?

    _____

    _____

12. What property of water is demonstrated by this station? How do you know?

    _____

    _____

Station 8:

1. Cut an index card to make a "boat".
2. Empty a tub, rinse it well, and pour fresh water into it until the bottom is covered.
3. Let the water settle.
4. Place the boat in at one end of the tub, with the point toward the middle of the tub.
5. Paper is a polar substance.
6. Does the boat move?

   _____

7. Get a toothpick.
8. Dip the toothpick in dishwashing soap.
9. Touch the soap to the water inside the hole in the boat.
10. Does the boat move?

    _____

11. Why did the boat behave as it did in the tub without soap?

    _____

    _____

12. Why did the boat behave as it did in the tub with soap?

    _____

    _____

13. What property of water is demonstrated by this station? How do you know?

    _____

    _____