Exploring Polarity

Purpose: *To explore how the structure of a molecule contributes to how it functions.*

Pre-lab questions:

1. What causes some molecules to be polar?

2. Draw a the Lewis dot structure for a water molecule.

3. Which of the atoms in this molecule are more positively charged? How would this affect the shape of the water molecule? Redraw your molecule to show the correct shape in the space below.

4. If a molecule is polar, do you think it would be more or less attracted to itself? Why?

Part 1: Drops on a penny. You will do this by measuring how many drops of a liquid you can place on a penny before it runs over

Note: Use different pennies for each liquid and dry the penny between **each trial!** Use **different droppers** for the different liquids**!**

	Trial #1	**Trial #2**	**Trial #3**	**Average**
Water				
Ethanol				
Oil				

5. Sketch the penny (side view) just before it over flowed. What force is pulling the water apart? What force is holding the water together? Draw and label arrows to show these.

6. Based on your results from the penny activity, what do you conclude about the relative strength of the forces interacting between the molecules.

Part 2: Capillary Action

Capillary action depends on the polarity of the molecules of the liquid and the polarity of the material they are touching. An attraction between a liquid and some material it contacts will cause a liquid to "climb" upwards. As one molecule moves upwards due to, it attracts neighboring molecules in the liquid, which in turn attract their neighbors. An example of this can be found in plants, which must move water from their roots upward.

Procedure:

1. Obtain **6 strips of coffee filter and a beaker of each liquid**.
2. Mark each strip with a line **5 mm** from the bottom.
3. Holding the papers upright, dip them into the separate liquids, just up to the line you drew (5 mm of paper should be in liquid).
4. Continue holding them upright in the liquid for **30 seconds**, then remove them. Measure how high each liquid climbed in millimeters. Record the data.
5. Repeat.

Liquid	Height cm (trial 1)	Height cm (trial 2)	Height cm (trial 3)	Average
Water				
Ethanol				
Oil				

7. Why is water able to move up the filter? Draw what you think is happening at a molecular level.

8. Based on your results from the capillary activity, what do you conclude about the relative polarity of different molecules tested? Explain in a complete sentence.