Name: _____ Date: _____ Class: _____

The Charges of Water **Answer Key**

1) The diagram to the right shows the charges on a water molecule. Water is known to undergo **cohesive forces**, meaning it is attracted to other water molecules. Based on the diagram, why do water molecules become attracted to one another?

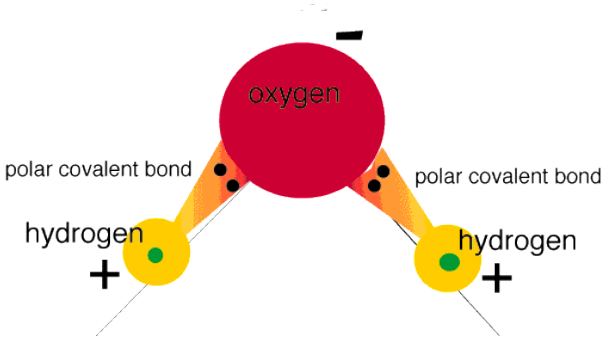

Figure 1:
http://academic.brooklyn.cuny.edu/biology/bio4fv/page/image15.gif

Water is a polar molecule, mostly due to its asymmetric shape. The positive charges on one side of the molecule tend to attract the negative charges on the opposite side of a neighboring molecule.

2) An **adhesive force** is when two dissimilar molecules are attracted to each-other. Discuss which glass treatment has the strongest adhesive force, and what this tells you about the polarity of the molecules in that glass treatment.

The hydrophilic Anti-Fog has strong adhesive forces, causing the water to stick to the glass. This means the hydrophilic coating is a strongly polar coating that attracts the charges of the water molecules.

3) Below is the molecule Polydimethylsiloxane (PDMS): the primary ingredient in Rain-X. PDMS likes to form long polymer chains (right). How do you think the shape and structure of the PDMS molecule helps it to repel water?

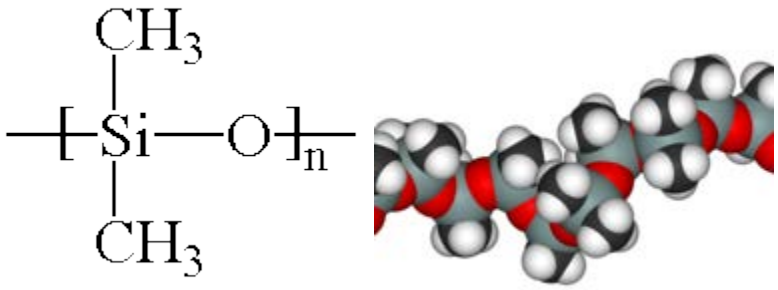

Figure 2: http://chemsrv1.uwsp.edu/macrogcss/silicone.html, http://soft-matter.seas.harvard.edu/index.php/Polymer_molecules

The PDMS has a symmetric structure that helps it to be non-polar. This means the cohesive forces between water molecules dominate and cause it to bead, or attract to itself.