Name: _____ Date: _____ Period: _____

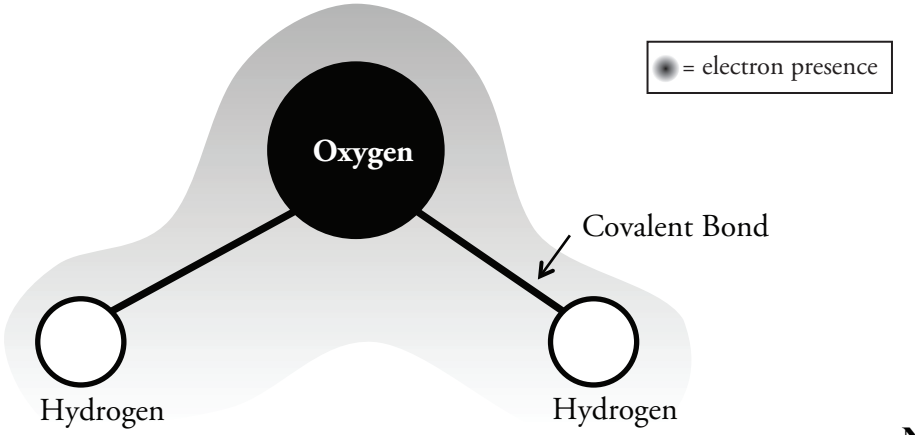
Properties of Water

What Makes Water So Special?

Why?

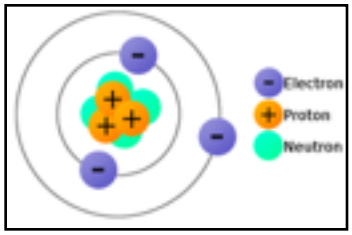
When you hear that NASA's space probes are looking for "evidence of life" on other planets, do you know what that means? They are looking for evidence of liquid water. Water is fundamental for all life; without it every living thing would die. Water covers about 70% of Earth's surface and it makes up 65–75% of our bodies (82% of our blood is water). Even if water might seem boring to you—no color, taste, or smell—it has amazing properties that make it necessary for supporting life.

Model 1 – The Molecular Structure of Water



Electron density model of H_2O

Need to Know



1. How many hydrogen atoms are in a molecule of water?

2. How many oxygen atoms are in a molecule of water?

3. What holds the hydrogen to the oxygen atom?

4. The shading around the molecule represents the density, or amount, of electrons shared by the atoms. What does this indicate about the density of electrons around the oxygen atom compared to the density of electrons around the hydrogen atoms?

5. If electrons have a negative charge, where is the majority of negative charge on the water molecule?

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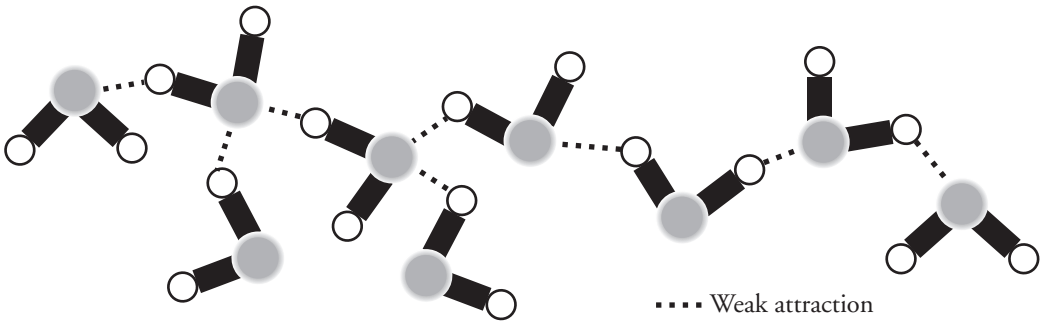
Model 2 – Attraction of Water Molecules



6. Looking at your answers to Questions 1 and 2 from Model 1, identify which atoms are represented by:

   a. The small, unshaded circles in Model 2._____

   b. The larger gray shaded circles in Model 2._____

7. What do the thick solid lines between the small and large circles represent?

8. According to Model 2, what is represented by the dotted lines?

9. Remember that electrons in a water molecule are more dense around the oxygen and less dense around the hydrogen atoms.

   a. What kind of charge would the oxygen atom have compared to the hydrogen atoms? Label the oxygen atoms with this charge.

   b. What kind of charge would the hydrogen atoms have compared to the oxygen atoms? Label the hydrogen atoms with this charge.

10. Describe the arrangement of water molecules in Model 2 with one another. (Hint: Think about which type of atoms are near each other.)

11. Describe the cause of attractions between molecules of water.