**Properties of Water Guided Notes**

**Life depends on hydrogen bonds in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:**

-Water is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ covalent molecule. Polar molecules have slightly charged regions

-Nonpolar molecules do \_\_\_\_\_\_\_\_\_ have charged regions (ex: butter is nonpolar)

Hydrogen bonds form between slightly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ hydrogen atoms and slightly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atoms.

**Properties of Water:**

Hydrogen bonds are responsible for \_\_\_\_\_\_\_\_\_\_\_ important properties of water:

1. Universal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (adhesion)

2. High \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ heat

3. Surface tension (cohesion/polarity)

4. Less \_\_\_\_\_\_\_\_\_\_\_\_\_\_ as a solid

**Universal Solvent**

Universal solvent (adhesion)-the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ among molecules of different substances is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. In other words, water is “ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” to lots of other substances. This means water can dissolve polar substances such as \_\_\_\_\_\_\_\_\_\_\_\_.

**High Specific Heat**

High specific heat-hydrogen bonds give water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ high specific heat. This means water resists changes in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It acts as a coolant in our bodies to keep it from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Water helps maintain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ inside cells by keeping the temperature \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Cohesion**

Cohesion is the attraction among \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a substance. In other words, water is “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” to other water molecules due to hydrogen bonds.

**Movement of Water through Plants**

-Cohesion-tension theory: the driving force of transportion is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, that is, the evaporation of water from the \_\_\_\_\_\_\_\_\_ surfaces. Water molecules \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (stick together) and are pulled up the plant by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or pulling force, exerted by evaporation at the leaf’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Expansion upon Freezing**

Water is \_\_\_\_\_\_\_\_\_\_\_ dense as a solid due to hydrogen \_\_\_\_\_\_\_\_\_\_\_\_. Water expands as it freezes, so it can \_\_\_\_\_\_\_\_\_\_\_ in liquid water.

Many compounds dissolve in water:

-A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is formed when one substance dissolves in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

-A solution is a\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mixture. This means there are the same components in it such as sugar water that contains \_\_\_\_\_\_\_\_\_\_\_\_\_\_ amounts of water and sugar (ex: 1 teaspoon of water with 1 teaspoon of sugar=homogenous)

-Solvents \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ other substances. Water is an example of this as long as a polar substance is placed in it such as sugar or \_\_\_\_\_\_\_\_\_\_.

-Solutes dissolve in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Example: sugar dissolves in water

**“Like dissolves like”**

-Polar solvents dissolve \_\_\_\_\_\_\_\_\_\_\_\_ solutes

-Nonpolar solvents dissolve nonpolar \_\_\_\_\_\_\_\_\_\_\_

-Polar substances and nonpolar substances generally remain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

-Example: water and vegetable oil-they do \_\_\_\_\_\_\_\_ mix because oil is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Some compounds form acids or bases**

-An acid releases a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ion when it dissolves water. This gives a high H+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and a pH less than 7 on the pH \_\_\_\_\_\_\_\_\_\_\_.

-A \_\_\_\_\_\_\_\_\_\_\_\_ removes hydrogen ions from a solution. It gives a lower H+ concentration and a pH \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than 7.

-A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ solution is neither acidic or basic and has a pH of \_\_\_\_\_\_\_\_\_. Example: our blood has a pH range between 7.35-7.45