Water Is Essential To Life Essay, Research Paper

Water is Essential for Life

Water is the most important substance in our evolution and our daily lives. Without water, life as we know it would not have been possible. It’s important to understand and examine the water molecule in order to ascertain how it brought about Earth’s thriving ecosystem and how important it is for us today.

Water is a strong solvent, it’s a very unique molecule that can breaks and reforms constantly. Each water molecule consists of one oxygen atom and two hydrogen atoms. The oxygen atom also called the “apex of the water molecule” bears a slight electronegative charge while hydrogen possesses a more positive one (Kirk 225). Because of the opposite charges attract, the water molecules are drawn together. When an oxygen atom is linked to a molecule’s hydrogen atom, a bond called a hydrogen bond is formed (Kirk 256).

There are several types of water molecule such as liquid water, ice and water vapor. These are all as important as we need in our daily lives. In a liquid form of water it has no such spaces because hydrogen bonds constantly breaks and reforms. Thus ice is stable hydrogen bonds that bonded together, it’s less dense and will float on liquid water. If it’s not this reason, the great bodies of water would freeze from the bottom up without the insulation of a top layer of ice, and all life in the water would all die (Bio; notes)

Water is a very small molecule that has its own unique properties therefore it behaves like a larger one. The bonds between water molecules are the covalent bonds; these bonds are so strong that water resists changes in its state. For example, solid, liquid and gas. Thus water has a higher melting point and a higher boiling point than any other molecule of similar size (Kirk 256).

When heat is applied to solid water, some hydrogen bonds get so much kinetic energy that they break and the ice melts. Whereas liquid water does not necessarily have all four hydrogen bonds present at all times but it must somehow retain some of them so if any object penetrates water, it must be able to break the hydrogen bonds on the surface of the water. These bonds normally resist breaking but forming a “skin” that allows small insects to walk on the surface of the water, and without this cohesiveness of water, those insects would not have survived (Science 309).

All plant life on Earth benefits from the ability of water to make a hydrogen bond with another substance of similar electronegative charge. Cellulose, is the substance that makes up cell walls and paper products, it is a hydrophilic substance also known as the “water-loving”. This substance interacts with water but it will not dissolve in it, unlike other hydrophilic substances. Cellulose can also form strong hydrogen bonds with water molecules. This explains why a paper towel will “wick” water upwards when it comes in contact with it. Each water molecule will make a hydrogen bond with cellulose and pull another water molecule up from down below and so on (Kirk 259). Without this feature plants would find it more difficult to transport water up their stems to the leaves in order to make food through photosynthesis. These transpiration leaves creates tension that pulls on the water column (Bio; notes).

Water has a very high heat capacity. Most of the heat introduced to water is used not to set water molecules in motion (giving them kinetic energy and causing their temperature to rise), but to move hydrogen atoms around between neighboring oxygen atoms (Science 308&309). In order for us to make water to evaporate from the surface of liquid water, a certain amount of energy must be expended to break its hydrogen bonds. Because these hydrogen bonds are so strong, water requires a lot of heat to boil. When water vaporizes, it takes along all of the heat energy required to break its bonds thus having a powerful cooling effect on the original body of water. It takes very little water loss to cool water substantially. If humans had no way of perspiring, our body temperatures would rise about 70?C in one single day (Kirk 257-259).

Water is very essential for life because it is as close as we can get to a “universal solvent.” It is apparent that water is the most important substance ever to have been created because it is so vital to our race. Its unique properties help all the living things to survive in the scheme of nature on our planet Earth.

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