

Water essay essay sample



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Water is an odorless, colorless, tasteless chemical compound that makes up well more than half of the human body. In addition to being prominent in the make-up of the human body, it also covers all but approximately 30% of the Earth's surface, and can be found naturally in all three states of matter: liquid, solid and gas. Water is a covalent bond known most commonly by its empirical form; H₂O. It can also be identified by the Lewis Dot Structural form shown in the figure in the upper right corner of this page. To better understand what it means to say that H₂O has a " covalent bond", let's look at the definition of a covalent bond: A covalent bond is a chemical bond that involves the sharing of electron pairs between atoms.

The stable balance of attractive and repulsive forces between atoms when they share electrons is known as covalent bonding. For many molecules, the sharing of electrons allows each atom to attain the equivalent of a full outer shell, corresponding to a stable electronic configuration. (Source: http://en.wikipedia.org/wiki/Covalent_bond). With respect to that definition, one can ascertain that the covalent bond of water occurs when two hydrogen atoms each share their one electron with one of six electrons in the outer shell of one oxygen atom. In addition to having a covalent bond, water is also a polar bond. This means that there are different charges on opposite bent ends of the molecule.

Now that we know the chemical make up of water, the physical states in which it can appear, and just how prevalent it is in our lives, let's look further into how exactly it affects our lives. In a very rudimentary breakdown - water provides life for vegetation to grow, animals eat the vegetation and humans eat the animals & plants. But it goes even further than that. Every known

organism on planet Earth needs water to survive. For humans specifically, we need water to dissolve nutrients and deliver them throughout our bodies. It keeps us hydrated, and also helps flush our bodies of toxins and waste as well as work to balance our metabolism. Water doesn't just help our bodies internally, though. Water in the atmosphere falls as rain that waters crops. We can travel via boat through water ways. Even some factories & steam engine trains are powered by water. Water is vital to our every day existence.

The density of water is approximately one gram per cubic centimeter. It is dependent on its temperature, but the relation is not linear and is unimodal. Unimodal means it possesses a single unique mode. When hot water is cooled to room temperature it becomes increasingly more dense and reaches its maximum density at 39 °F. When water is cooler than that, it becomes less dense. In fact, when water freezes and becomes ice, it is less dense and actually will float when submerged in another liquid, which is unlike most substances when solidified, which become more dense and sink. Due to its powerful hydrogen bonding water has a very specific high heat capacity as well as a very high heat of vaporization. Because of these characteristics, water is able to help stabilize the Earth's climate because it can act as a buffer to drastic changes in temperatures. For example the ocean absorbs approximately 80% of the heat the Earth experiences due to Global Warming!

As a result of the very strong hydrogen bonding in water molecules, this causes water to be very cohesive; that is, the water molecules stick together. Because of the strong cohesive nature of water, water has a very high surface tension when in liquid form. This means water placed on a nonporous,

non absorbant surface will accumulate in droplets. Additionally water has a high adhesive property as well because of the polar bonding. For example, when water is placed on an extremely smooth glass surface, the water may form a thin film because the molecular forces between glass and water molecules (adhesive forces) are stronger than the cohesive forces.

As a result of the interactive energies between adhesive forces and surface tension, water is able to rise in a narrow tube against the force of gravity. This spectacle is known as capillary action. As water adheres to the sides of the tubes the surface tensions cause the water to spread out and “climb” the walls. The relationship of surface tension and capillary action is a crucial phenomenon in biology. For example, when water is carried through xylem up stems in plants, the strong intermolecular attractions (cohesion) hold the water column together and adhesive properties maintain the water attachment to the xylem and prevent tension rupture caused by transpiration pull.

Water makes a very good solvent (something that can accept another substance, a solute, by dissolving) because of its polarity. The likelihood of a substance being able to dissolve in water is dependent upon the ability of the solute to equal or improve the dipole-dipole interactive forces water molecules produce and share between other water molecules. As previously mentioned, water is a vital solvent for the human body as it helps break down vitamins and minerals and distribute them to the parts of the body where they are needed.

Water affects every aspect of our lives, internally and externally. We as humans - as organisms living on planet Earth need water to survive - it is as simple as that.