Biological importance of water

Water can be argued to be the substance which brings life to a planet, however it's only use is not just as a hydration method for a dehydrated person. It has many uses and properties, just a few include being a solven t, cooling mechanism, sweating and surface tension, these are just a few which will be looked into more depth.

Water seems to be a very simple molecule consisting of just two hydrogen atoms and one oxygen atom, both of the hydrogen atoms are attached to the oxygen atom, therefore making it one of the simplest molecules known. However its uses out numbers the majority of other molecules greatly. Water is a V-shaped molecule with the molecular formula H_2O. in liquid state 80% of the electrons are involve d with the covalent bonding, the three atoms do not stay together as the hydrogen atoms are constantly switching between water molecules, acids and bases act as a catalyst in this reaction and the reaction is at its slowest at pH 7 that's why we call pH 7 neutral and is the safest to drink it at. However water is still considered a permanent structure as the reactions happen in less than a millisecond.

Water is a very good solvent nevertheless not all things dissolve in it, it is the structure of it wh ich makes it a good solvent, the electrons are not evenly distributed in H_2O as in many other molecules, as more electrons are grouped at one end, it makes one end slightly more negatively charged ands the other slightly more positively charged, so water is said to be called polar so it attracts other polar substances. This explains its high melting and boiling points, high surface tension, and why it expands when frozen. Many non-polar substances are made soluble in water by use of detergents and soaps, b oth of which are large molecules with a polar end and a non - polar end. The polar end is attracted to the polar water molecule, and the non-polar part to the non-polar greasy dirt.

It is the cohesive forces between liquid including water that are respo nsible for surface tension, the molecules on the surface do not have as many other molecules surrounding them so they have to cling to the molecules underneath them stronger than ordinary molecules, this forms a film across the suface which makes it more difficult to move an object through the surface than to move it when it is completely submersed. Surface tension is usually measured in measured in dynes/cm. Water at 20°C has a surface tension of 72.8 dynes/cm. Surface tension is important in places such a s capillaries, bubbles fluid droplets and alveoli.

Capillary action is caused by adhesion and surface tension. Adhesion of water to the walls of a vessel will cause an upward force on the liquid at the edges and result in a meniscus which turns upward . The surface tension acts to hold the surface intact, so instead of just the edges moving upward, the whole liquid surface is dragged upward.

The human body is two thirds water, so obviously water is essential in a healthy body. Water is involved in every function of the body. It helps transport nutrients and waste products in and out of cells. It is necessary for all digestive, absorption, circulatory, and excretory functions, it also helps in functiuon of water soluble vitamins and maintaining a st eady body temperature.

As water can be a fluid it exerts a static fluid pressure, The pressure exerted by a static fluid depends only upon the depth of the fluid, the density of the fluid, and the acceleration of gravity.

If two solutions of diffe rent concentration are separated by a semi - permeable membrane which is permeable to to the smaller solvent molecules but not to the larger solute molecules, then the solvent will tend to diffuse across the membrane from the less concentrated to the more concentrated solution. This process is called osmosis. Osmosis is of great importance in biological processes where the solvent is water. The transport of water and other molecules across biological membranes is essential to many processes in living organisms. The energy, which drives the process, is usually discussed in terms of osmotic pressure.