

Water Properties

Introduction:

Water has many different and unique properties from other liquids. Water exists in the three states of matter, solid, liquid and gas. It is the only liquid that when expanded the density decreases and that property makes it possible for organisms living below ice caps to survive, because the colder water is at the top and forms an insulation for animal and plant life below. The properties of water can be divided into two subsections: physical and chemical properties.

PHYSICAL PROPERTIES

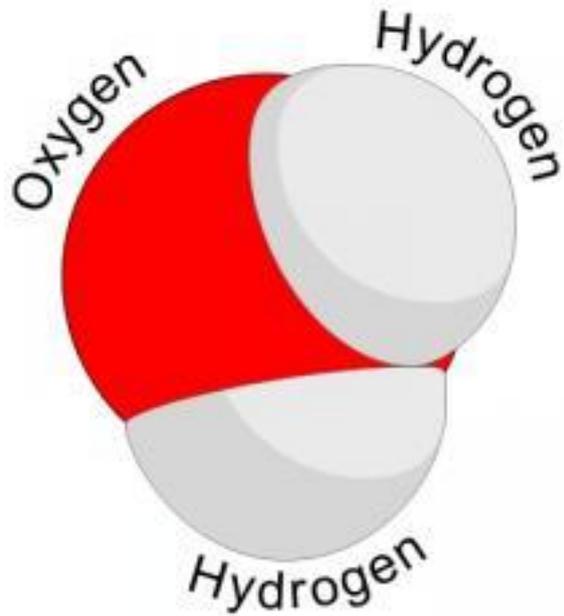
Water is:

- Colourless
- Odourless
- Tasteless

CHEMICAL PROPERTIES

- **Universal Solvent:** many biological processes involve water, that is, many cells' chemical reactions take place in an aqueous environment. It is used by many polar substances to transport ions and sometimes nutrients to other parts of the body or earth.
- **High Heat Capacity:** the specific heat capacity of water is $4200 \text{ J kg}^{-1} \text{ K}^{-1}$. This means that the heat energy needed to raise water 1 Degree Celsius is 4200J per kilogram, hence a large increase in temperature results in a small rise in temperature. This is important because biological processes takes place within specific temperatures and so this enables reactions to take place at a constant rate and not be affected by extremes in temperature.
- **High Surface Tension (Adhesion) and Cohesion:** because of the distribution of charges water molecules are attracted to each other and occupy the smallest area possible that is why when it rains the drops are in balls, this is known as cohesion. This property gives water the ability to be pulled up in a tube (capillarity); this is what happens in the stem of a plant. Adhesion is ability of water to stick to the surface of another liquid or container.

- Latent heat of Vapourization: the evaporation of water from a surface causes it to remove some of the heat with it. This in effect causes the object to be cooled. The heat that is vapourized is called latent heat of vapourization of the water.



A water molecule