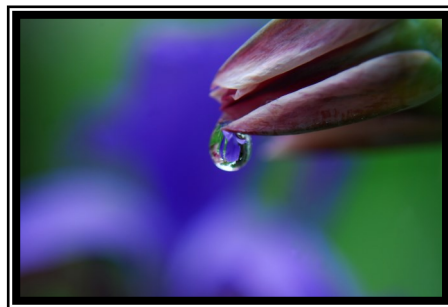


Wonderful Water, the Substance of Life...

Earth is often called the 'blue planet'. It is no wonder since about 75% of its surface is covered with water. The salt water in the oceans represent about 97% of this water while the remainder is fresh water (no salt). Of this fresh water, 2% is locked up in glaciers and rock and only the 1% that is left is available to all living things on a daily basis. So despite its abundance it is a limited resource.



Fortunately, the water cycle cleans and renews the water making it fresh for re-use by the earth's living organisms. Water's unique properties make the water cycle possible. Few substances are quite like water. It can exist in three states; liquid, solid and a gas and in nature is constantly in motion altering its state when conditions are favorable.

It is a clear, colorless, odorless and tasteless in its liquid state, it can be invisible in a gaseous state and as a solid is lighter than its liquid form and can float. Water's properties begin with its molecular status. A water molecule has polarity meaning that the bonds that make up the molecule have slightly positive and negative ends. This polarity give it special properties. It is...

- **Cohesive:** It is attracted to other water molecules. This gives it the ability to flow.
- **Adhesive:** It is attracted to other substances.
- **Capillary Action:** Due to its adhesive and cohesive properties it will flow up in narrow spaces making it possible for water to travel up (resisting gravity) in a tree, a flower stem or even in our bodies bringing water to the cells of every living organism.
- **Universal Solvent:** Water's polarity allows it to dissolve more substances than any other substance. This along with adhesion makes it ideal for washing hands and clothes clean.
- **Surface Tension:** Water's cohesive properties give it a 'film or mesh' at its surface. For this reason water droplets appear to sit in a dome shape and some insects appear to walk on water.
- **Specific Heat and Evaporation Temperatures:** Water has a high heat capacity allowing it to absorb more heat energy before the temperature of the water is altered. This energy absorption is constant and helps to regulate the air temperature of the earth. This makes seasonal changes more gradual.

As water travels the earth in the water cycle, its properties bring life to all living things. A water droplet may be picked up as a gaseous vapor, through evaporation, in Iowa then condense and fall as a water droplet in Ohio. As a droplet, it joins other droplets, it hits the earth and travels as a river or stream in a watershed. A watershed describes an area of land that contains a common set of streams and rivers that all drain into a single larger body of water, such as a larger river, a lake or an ocean. For example, the Mississippi River watershed is an enormous watershed. Or it may be absorbed into the soil and picked up by a plant or become part of an aquifer. An aquifer is an underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand, or silt). Groundwater can be extracted using a water well to be used as a source of community water.

No matter what state or where the water is, it is the source of life on earth and is one of our most precious resources. As a limited resource we need to conserve its use and keep our water sources clean and free of contamination. Let's explore some of these water properties.

- **The Water Cycle:** Watch the water cycle in the closed system of a terrarium.
- **Water Wonders:** A series of experiments to explore the properties of water.
- **Water Power:** A series of experiments that will show how powerful moving water can be.
- **Water Life on a Window Sill:** Watch a pond/stream sample come to life on a window sill.