Basilisk Lizard
(The Jesus Christ Lizard)

This does not leave the room!

FACTS:

- Species - Basiliscus basiliscus.
- Family - Iguanidae.
- Location - Central and South American rainforests. Near rivers and streams.
- Size - 2 & 1/2 feet long including the tail.
- Diet - Insects, small invertebrates, flowers, and small vertebrates (like snakes, birds, and fish).
- Enemies - Large birds of prey, snakes, fish, other large reptiles, and mammals.
- This animal is not endangered.

INFORMATION:

- They are part of the Iguana Family.
- They have the nickname "Jesus Christ Lizard" because when fleeing from a predator, they are very fast and can even run on top of the water.
- Basilisks actually have large hind feet with flaps of skin between each toe. The fact that they move quickly across the water, aided by their web-like feet, gives them the appearance of "walking on water".
- Smaller basilisks can run about 10-20 meters on the water without sinking. Young basilisks can usually run farther than older ones.
- Like most reptiles, basilisks are active during the day.
- They have long toes and sharp claws.
- Most are under a foot in length, but some may grow up to two feet.
- Basilisks usually weigh between 200-600 grams.
- I don't know for sure, but their maximum lifespan is probably around 7-8 years. In the wild, most die much sooner.
- Females lay about 2-18 eggs, five to eight times a year.
- Eggs hatch after about three months and the babies weigh about 2 grams.
- Their outstanding camouflage allows them to remain motionless and very hard to detect.

HOW CAN SPIDERS WALK ON WATER?

Why can spiders walk on water and we can't? To answer this question, you have to understand a few major ideas.

Surface Tension

Surface tension is the tendency for the surface of a liquid to act like a stretched membrane or piece of rubber. The cohesive forces work to bring the molecules on the interior of the liquid to the exterior surface. If you want to get scientific, surface tension is numerically equal to the force acting at right angles to a line of unit length that is lying on the surface and is called Constant of Capillarity and is represented by the symbol T. Capillarity is the interaction between contacting surfaces of a liquid and a solid that distorts the liquid surface from a planar, flat or two-dimensional, shape to concave or convex.

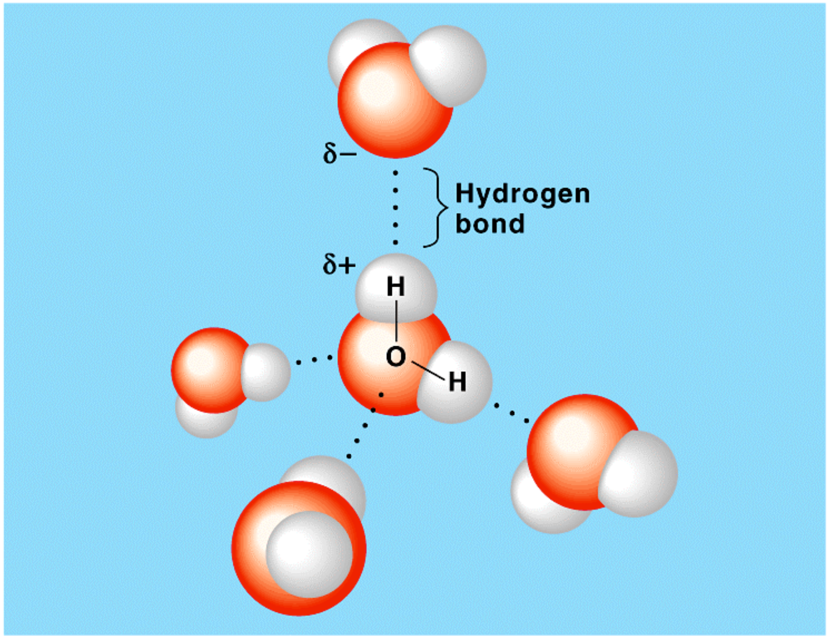
Cohesion

Cohesion is the attraction of molecules by which the elements of the body are held together. Water has the highest cohesive force of any liquid except that of mercury. At the air-water interface, the water molecules are H-bonded to one another and to the molecules below the surface. This makes the water behave as though it were coated with an invisible film.

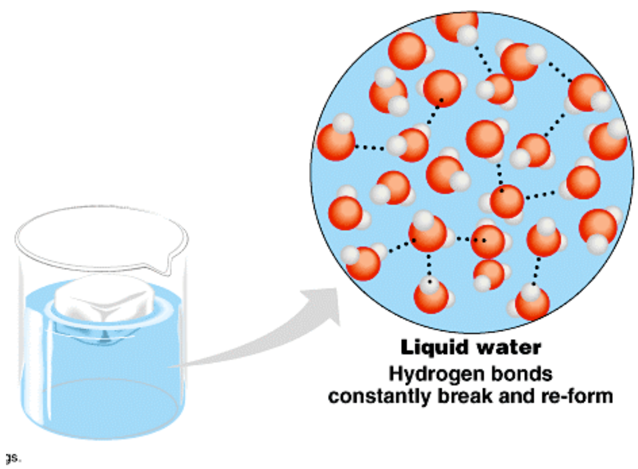
Walking on Water

The main reason why certain creatures can "walk" on water and we can't is because their bodies have tiny, little hairs on the bottom of their legs and feet. Their body weight is so minute that it only creates a dimple in the water's surface which allows the insect to literally "walk on water." Our body weight is too much for the cohesive forces of the water and we break through the invisible film that the tension creates.

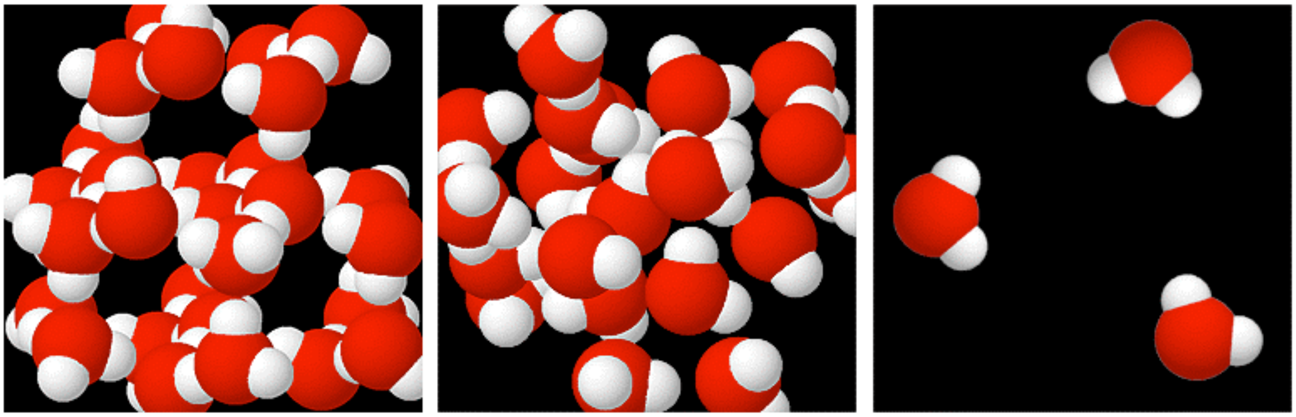
Structure of Water Pictures



Five Water molecules hydrogen bonded to each other



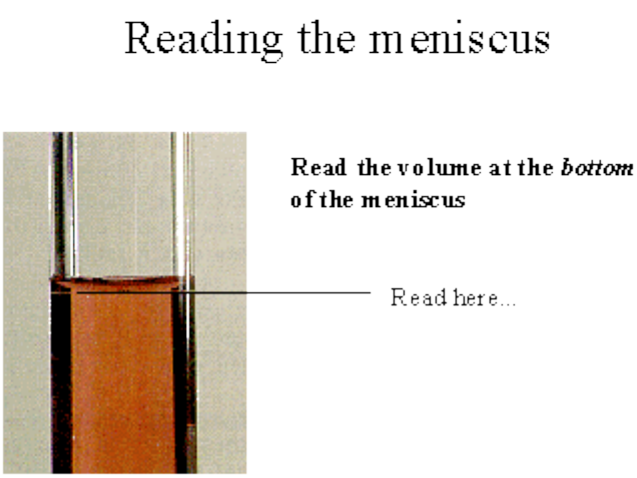
Surface Tension of water is strong because of the hydrogen bonds



Space filling models of water as a solid, liquid and gas

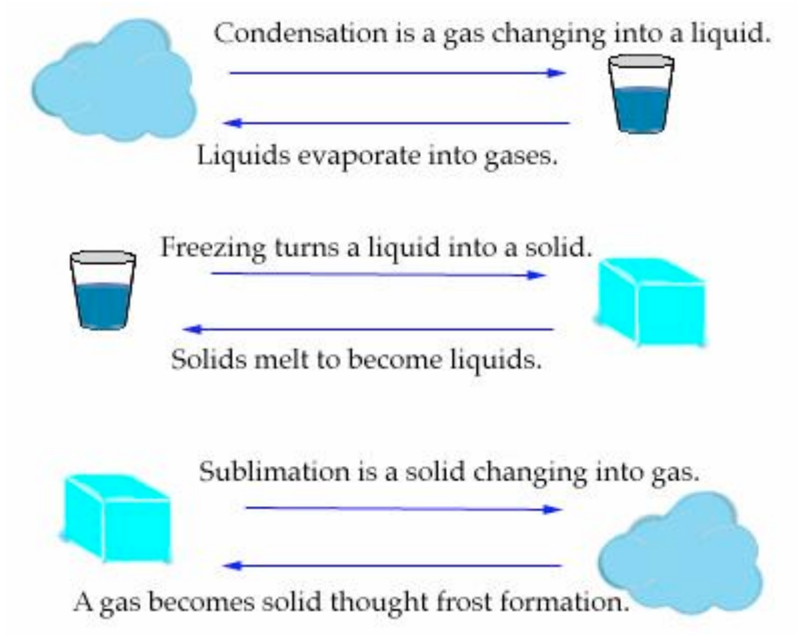
What is a meniscus???

A meniscus is the curved surface at the top of a column of liquid. In a science class, this liquid is usually water or some sort of aqueous solution, and the column is usually a graduated cylinder or a pipet. As you may have noticed, when water is in such a thin glass tube, it does not have a flat surface at the top. Instead, the top is curved inward, making it a little difficult to decide exactly where to read the volume. As pictured below, the volume should be read from the bottom of the meniscus.

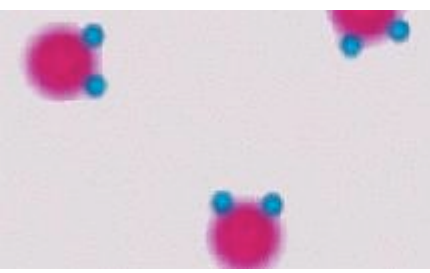


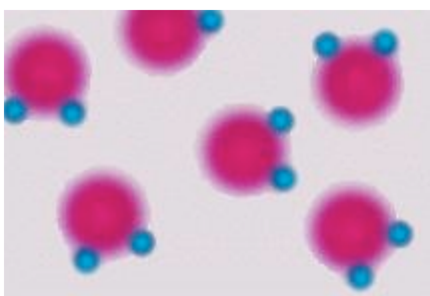
Why doesn't water lie flat? Well, it has to do with the nature of the water molecules and glass molecules themselves. Water is made up of polar molecules, which have positively and negatively charged ends. Since opposites attract, the positive sides attract the negative sides, and all of the molecules stick to one another. This is why water droplets can form. Glass molecules also happen to be polar. Again, since polar molecules like to stick together, the water in a glass tube will actually tend to stick to the sides of the tube! You can see this at the top of the graduated cylinder, where the water will slightly creep up the sides and form a curve, which is the meniscus.

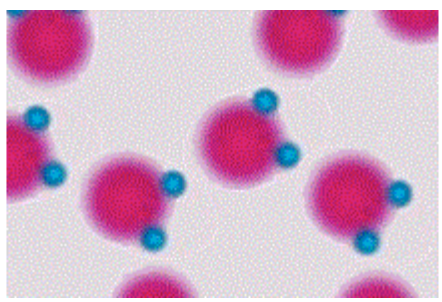
The States of Water



Water has three states. Below freezing water is a solid (ice or snowflakes), between freezing and boiling water is a liquid, and above its boiling point water is a gas. There are words scientists use to describe water changing from one state to another. Water changing from solid to liquid is said to be *melting*. When it changes from liquid to gas it is *evaporating*. Water changing from gas to liquid is called *condensation* (An example is the 'dew' that forms on the outside of a glass of cold soda). *Frost formation* is when water changes from gas directly to solid form. When water changes directly from solid to gas the process is called *sublimation*.


Gas

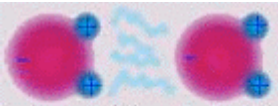

Liquid


Solid

Most liquids *contract* (get smaller) when they get colder. Water is different. Water contracts until it reaches 4 C, then it expands until it is solid. Solid water is less *dense* that liquid water because of this. If water worked like other liquids, then there would be no such thing as an ice berg, the ice in your soft drink would sink to the bottom of the glass, and ponds would freeze from the bottom up!

Adhesion and Cohesion

Water is attracted to other water. This is called *cohesion*. Water can also be attracted to other materials. This is called *adhesion*.



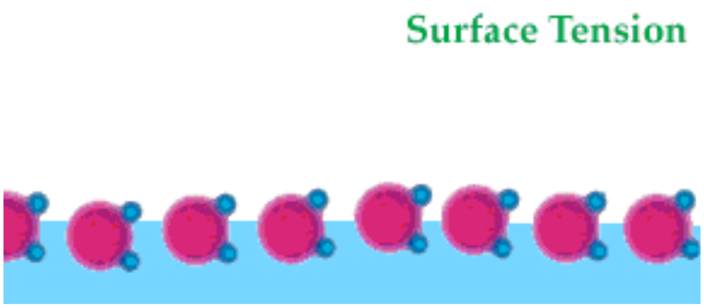
The oxygen end of water has a negative charge and the hydrogen end has a positive charge. The hydrogens of one water molecule are attracted to the oxygen from other water molecules. This attractive force is what gives water its cohesive and adhesive properties.

Surface Tension

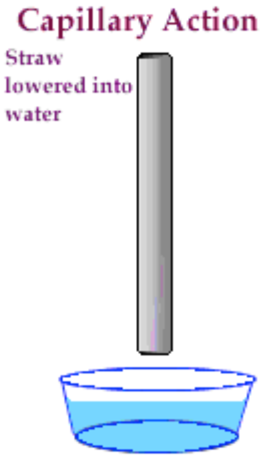
Surface tension is the name we give to the cohesion of water molecules at the surface of a body of water. **Try this at home**: place a drop of water onto a piece of wax paper. Look closely at the drop. What shape is it? Why do you think it is this shape?

What is happening? Water is not attracted to wax paper (there is no adhesion between the drop and the wax paper). Each molecule in the water drop is attracted to the other water molecules in the drop. This causes the water to pull itself into a shape with the smallest amount of surface area, a bead (sphere). All the water molecules on the surface of the bead are 'holding' each other together or creating surface tension.

Surface tension allows water striders to 'skate' across the top of a pond. You can experiment with surface tension. Try floating a pin or a paperclip on the top if a glass of water. A metal pin or paper clip is heavier than water, but because of the surface tension the water is able to hold up the metal.



Capillary Action



Surface tension is related to the cohesive properties of water. *Capillary action* however, is related to the adhesive properties of water. You can see capillary action 'in action' by placing a straw into a glass of water. The water 'climbs' up the straw. What is happening is that the water molecules are attracted to the straw molecules. When one water molecule moves closer to a the straw molecules the other water molecules (which are cohesively attracted to that water molecule) also move up into the straw. Capillary action is limited by gravity and the size of the straw. The thinner the straw or tube the higher up capillary action will pull the water (Can you make up an experiment to test this?).

Plants take advantage of capillary action to pull water from the soil into themselves. From the roots water is drawn through the plant by another force, *transpiration*.