Capillary Action:

Have you ever wondered how trees transport water from their roots to their leaves? Well, the answer has to do with a special property of liquids called capillary action. Capillary action is the movement of a liquid along a solid surface due to charges on the liquid and the surface. Plants use capillary action to bring water from the roots up through the stems all the way to the leaves.

There are two main forces that result in capillary action. **Adhesion** is the force that causes one substance to "stick" to a different substance. In plants, adhesion causes water to stick to the tissues of plants. **Cohesion** keeps molecules of the same substance together- cohesion is the force that keeps water molecules together in plant tissues.

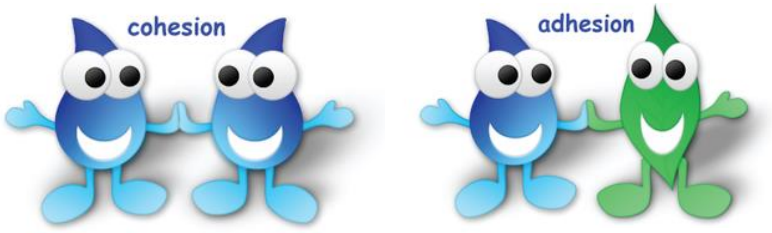

Image Credit: USGS

Capillary action occurs when adhesion is stronger than cohesion- which is when water is *more* attracted to the plant tissues than the water is attracted to itself. Capillary action is a very important property of water, and is responsible for plant life as we know it- without the ability to move water upwards against gravity, plants would not be able to transport water and nutrients from the soil throughout the plant.

Materials:

- 1 full glass of water (any size)
- 1 empty glass of water (any size)
- 1-2 paper towel sheets

Instructions:

1. Place your glasses, one full and one empty, next to each other on a table or counter.
2. Take a paper towel sheet and hold it vertically and fold in half twice so you have a long, skinny piece.
3. Twist this piece to form a “rope” of paper towel.
4. Place one end of the paper towel in the full glass of water, with the opposite end in the empty glass of water.
5. Leave the paper towel rope between the two glasses for 20 minutes.

What to look for:

Have you noticed any changes?

The water molecules will be more attracted to the molecules of the paper towel than they are to themselves- causing them to travel across the towel. As the end of the paper towel becomes too saturated with water to hold it, water drops off the towel and into the empty glass. As time goes on, the glass becomes fuller as adhesion continues to pull water molecules across the paper towel, into the glass with less water.

Leave your experiment overnight, noting which glass has more water. When you check on it after several hours, which glass has more water? At what point does the water **stop** traveling from one glass to another, and why do you think that is?

Capillary action materials:

Completed experiment setup: