Properties of Water
Developed by Jacqueline Nguyen, Katie Thomas, Nimerta Sandhu, and Dorothy Kong. Spring 2012. Done with 1st graders.

-Water is really important on earth! All living things need water, and it’s involved in the weather too! (Maybe talk briefly about the water cycle here, of remind the kids about it if they’ve already learned about it.)

-Before we break into small groups... we are going to see what happens if we place celery/flower in food coloring. We’ll back to this at the end of our visit today!

-Have you ever been in a car and watched the droplets of water roll down the side of the window, joining up with other droplets along the way? Have you ever wondered why water comes out of a leaking faucet as small drops? Let’s break up into small group so we can learn the properties of water and hopefully find out why these things happen!!

(Break into small groups here.)

Adhesion

Basic Facts
- property that makes different types of particles stick together

Activity
-Water is highly adhesive, which means that water molecules tend to stick to other kinds of molecules

Demo
-Capillary action demo to show how water molecules are attracted to the molecules in paper--dip a piece of paper towel in a glass of water and observe how the water moves up the paper. (Maybe add food coloring to the water to make it easier to see.)
Explain briefly that adhesion is an important property of water because it lets water travel up plant roots and stems from the soil, by sticking to the molecules that make up the roots and stems! This is how plants get water!!

-Show water droplets hanging off a leaf (resisting gravity by sticking to an object)

Cohesion

Basic Facts
-property that makes the same type of particles stick together
-Water is highly cohesive, meaning that water molecules tend to stick to each other.

Demo
-How many drops of water can you fit on a penny? More than you might expect, since water tends to stick to itself and form a droplet, rather than spreading out.

Surface Tension

Basic Facts
-Property that allows liquid to resist a force (It is the Superpower of liquids!!)
-Show that you can make some things float on the water's surface due to surface tension if you place them carefully on the surface, even though they are “heavy” (dense) enough to sink if you just drop them in. Paperclips seemed to work well. Fill a cup with water so that you can see the water bulging over the top of the glass (surface tension makes it do that!). Drop a paperclip into the glass of water—it should sink. Then carefully slide a dry paperclip onto the surface of the water, starting at the edge of the cup. You should be able to get it to float, although it takes a little practice. Test this ahead of time!

-What is this caused by??
  ans. the property we just learned about! cohesion!
-causes water drops to form

(Come back together in big group.)

**Review of Key Ideas:**

Adhesion – water molecules stick to *other types of molecules*. revisit celery/flower, show that colored water has traveled up the stem, just like in the capillary action demo we did. What causes this? Adhesion!

Cohesion – Water molecules stick to *each other*.

Surface tension – property that allows a liquid surface to resist a force. Caused by cohesion!

**Big exciting finish!!!** Bring in a water strider (you can catch them in Strawberry Creek) and show the kids how it can walk on water. What lets it do this? Surface tension! Pretty cool, huh?
Materials:
- Poster of adhesion vs. cohesion
- Food coloring
- Celery
- Clear Cups
- Paper towels
- Pennies
- Droppers
- Paper clips
- Water (can get from sink in classroom)
- Water Strider (+ container of water for it to walk around in)

NOTES:
When we did this module (Spring ’12) with 1st graders, they didn’t really understand the concept of surface tension at all. In future, I might omit the term “surface tension” entirely, and focus on the fact that cohesion causes water molecules to stick to each other and form droplets, or to resist a force trying to separate the water molecules (like the leg of a water strider pushing down on the water’s surface). This is the concept of surface tension, and I think they...
understood that well enough—the term “surface tension” itself just confused them. I don’t think they understood why it was different from cohesion (honestly they are basically the same thing...).