A STEM in the Park Take Home Activity

STEM in the PARK™

Science, Technology, Engineering, and Mathematics

How Much Water Can Fit on a Penny?

What You Need

- 1 Penny
- 1 Pipette
- Water

What To Do

1. Rinse a penny in tap water. Dry it completely with a paper towel.
2. Examine the penny and consider how many water drops you think will fit on the penny. Write down your guess.
3. Place the penny on a flat surface that can get wet, such as a kitchen counter.
4. Fill a small glass or bowl with water.
5. Use a pipette to draw water and carefully put individual drops of water onto the penny. Make sure not to touch the tip of the pipette to the penny.
6. Count the water drops as you add them, one at a time, until water runs over the edge of the penny. Did your guess match with the number of drops you could fit? The number of drops that fit may surprise you.

Continued on back

What To Do cont.

Repeat the experiment as many times as you want, or take it further by testing another liquid like vegetable oil, salt water… whatever you want! Use a table similar to the one below to keep track of your trials and liquids.

Liquid	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Water					
Other					

Learn

How did so many drops of water fit on one tiny penny?

The answer is that there are two properties of water at work: cohesion and surface tension.

Cohesion

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

Surface Tension

Surface tension is the name we give to the cohesion of water molecules at the surface of a body of water. The cohesion of water molecules forms a surface "film" or "skin." Some substances, such as soap, may reduce the cohesive force of water, which will reduce the strength of the surface "skin" of the water.

Observations and results

You should find that plain tap water produces a much larger, stable drop of water on top of the penny than the soapy water does. This is because plain tap water has higher surface tension, so the surface is "stronger" and can hold together a larger drop. Adding soap lowers the water's surface tension so the drop becomes weaker and breaks apart sooner. Making water molecules stick together less is what helps soaps clean dishes and clothes more easily.

This activity is brought to you by the Science and Mathematics Education in ACTION program at BGSU.

Science & Math Education in ACTION
research.teach.impact.