



Lincoln Drops

Grades K – 5

Introduction

Push the limit...but don't spill the water! Predict how many drops of water can be placed on the head of a penny before any of the water spills off.

CAUTION! HEALTH & SAFETY

Be careful not to get bubble solution in the mouth! Goggles are required to prevent bubble solution getting in the eyes!

Materials

- pennies
- cup of water
- cup of soapy water
- 2 5mL plastic pipettes (or a dropper of some kind)
- paper towels

Procedure

1. Place a clean, dry penny on a paper towel. Most will have a penny in their pocket! Fill the dropper with water. Carefully place drops of water on the penny, one at a time, keeping track of the number of drops. After you've placed about 10 drops on the penny, look at the penny from the side. What does the water look like on the penny?
2. Continue placing drops of water on the penny, refilling the dropper as necessary. Keep track of the number of drops (including the 10 you've already placed) that you could place before the water spills off the penny.
3. Wipe the penny with a paper towel. See if you can beat your record. You have three more tries.
4. Return the dropper to the cup of water and set aside for others to use.
5. Dry the penny as before and place it on a paper towel. Select a cup of soapy water with its dropper.
6. Begin adding drops of soapy water to the head of the penny. After you've added 10 drops of the soapy water, stop and look at the penny from the side. What does the soapy water look like on the penny?
7. Continue putting drops of soapy water on the penny, refilling the dropper as necessary. Keep track of the total number of drops you could place before the solution spills off the penny. (Don't forget the 10 drops you put on in step 6.)
8. Wipe off the penny with a paper towel. See if you can beat your record. You have three more tries.
9. When you are done, drop your penny in the Used Penny Container.

Where's the Chemistry?

Water has a high surface tension, which means the surface of the water acts like a thin, invisible "skin." This high surface tension creates the dome you see when you look at the penny from the side after placing about 10 drops of water on it. Surface tension results from the strong attraction that water molecules have to each other. We call this attraction "cohesion." Surface tension affects the number of drops of water that fit on the penny. Other factors influence this number as well, such as the height of the dropper above the penny; the placement of the drops; the angle at which the dropper is held; the size of the drops; whether the penny is clean, scratched, or deformed; and whether soap is present. There are much fewer drops of soapy water than drops of plain water that fit on the penny because soap reduces the surface tension of water. Soap is a surfactant, or surface-acting agent, which causes water to spread out (rather than to form a dome, as was the case with plain water).