How Many Drops of Water Can Fit on a Penny?

Materials:

- 2 eyedroppers
- 2 pennies
- Cup—labeled WATER
- Cup —labeled SOAPY WATER
- Water
- Soapy water *(Add a tablespoon of dish soap to a cup of water. GENTLY stir the mixture—don't make too many bubbles.)*

Take a Guess: How many drops of water can fit on one side of a penny? _____

Perform a CONTROL test for comparison with later results.
Step 1: Rinse a penny in tap water and dry completely.
Step 2: Place the penny on paper towel.
Step 3: Use an eye dropper to place drops of WATER on the penny (one at a time) until ANY amount of water runs over the edge of the penny.
Step 4: Record the number of drops for that trial in the table.

Repeat steps 1 - 4 three more times (for the other trials) before calculating your average.

Substance	Trial 1	Trial 2	Trial 3	Trial 4	Average
CONTROL					

Perform tests with the TESTING LIQUID.
Step 1: Rinse a penny in tap water and dry completely.
Step 2: Place the penny on a paper towel.
Step 3: Use the second eye dropper to place drops of SOAPY WATER on the penny (one at a time) until ANY amount of water runs over the edge of the penny.
Step 4: Record your observations and the number of drops for that trial in the table.

Repeat steps 1 - 4 three more times before calculating the average.

Substance	Trial 1	Trial 2	Trial 3	Trial 4	Average
Penny covered in soap					

What's Happening?

You just saw three important forces tugging on the water: gravity, cohesion, and adhesion. Gravity flattens the droplets, cohesion holds the droplets together, and adhesion holds the drops on the surface of the coin.

The cohesive force is the pull of the water molecules on themselves. Each successive drop sticks to the water that's already on the coin. We often call this cohesive force "surface tension". It's what makes water drops look like they're wrapped in invisible skins. Soap reduces the cohesive force, and breaks the surface tension. Soapy water makes smaller drops than plain water. Since soapy drops are smaller, more soap drops will fit on a penny than plain water drops.

Answer each question related to the experiment.

1. Explain your results in terms of cohesion and surface tension. Did the penny hold as many drops as you first thought?

2. Compare your results with other groups. Did they have the same results? Why or why not? Give at least one reason.

3. How could this be applied to your daily life? Why is this information important to know?

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