What Is The Scientific Method?

Penny Drops

Background:

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 hydrogens of one water molecule are attracted to the oxygen 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 may reduce the cohesive force of water, which will reduce the strength of the surface “skin” of the water.

PROBLEM: How does soap added to the water affect the amount of drops you can fit on a penny?

HYPOTHESIS: Make a prediction as to what you think will happen to the amount of drops that fit on a penny depending on the amount of soap in the liquid.

EXPERIMENT:

MATERIALS:

Pennies	tweezers
paper towel	water
liquid dish soap (varying ratios)	

PROCEDURE:

Part A: Perform a CONTROL test for comparison with later results.

Step 1: Start with a “clean” penny. Rinse a penny in tap water and dry completely. Be sure to remove as much residue as possible - without using soap!

Step 2: Hold the penny with the tweezers provided, then dip it into the CONTROL LIQUID (water only). Allow extra liquid to drip off the penny into the container before proceeding to the next step.

Step 3: Place the penny on paper towel. Place drops of WATER on the penny (one at a time) until ANY amount of water runs over the edge of the penny runs over the edge of the penny.

Step 4: Record the number of drops for that trial in the table.

Part B: Perform tests with the TESTING LIQUID.

Step 1: Start with a “clean” penny. Rinse the penny in tap water and dry completely. Be sure to remove as much residue as possible - without using soap!

Step 2: Hold the penny with the tweezers provided, then dip it into the TESTING LIQUID. Allow extra liquid to drip off the penny into the container before proceeding to the next step.

Step 3: Place penny on dry spot on a paper towel. 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 your observations and the number of drops for that trial in the table. Repeat Steps 1 - 4 three more times before calculating the average.

OBSERVATIONS:

Make a data table to record your observations for each of the ratios of water to soap.

(What are your dependent and independent variables?)

CONCLUSION: