Penny Lab: Exploring Scientific Method

Title

- *Examination of changes in surface tension of a liquid between water and water with soap added*

- *The effects of soap on the surface tension of water*

- *How soap affects the number of drops of water that can fit on a penny*

Purpose/Question

- Does adding soap to a penny reduce the surface tension of the water being added?

- How does adding soap to a penny affect how many drops can fit on it?

Hypothesis

- ***If** soap is added to a penny, **then** I think more drops of water will fit on the penny*
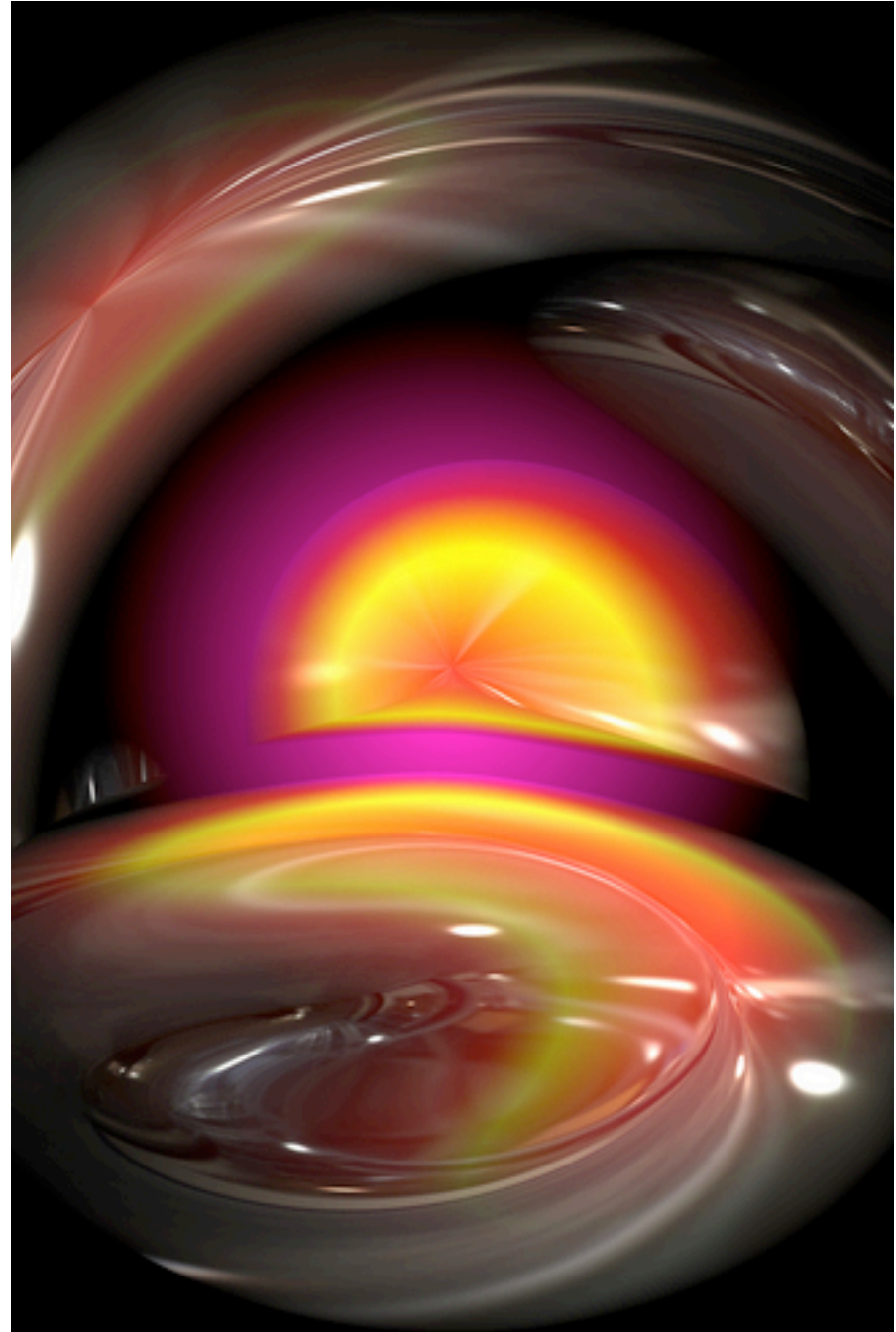
Variables

- **Independent** – *the addition of the soap (what is added, or the "treatment"!)*

- **Dependent** - *number of drops of water that are able to be added (what is in the data table!)*

- **Control:** *adding water to the penny without soap*

Procedure

- **Step by step instructions**

"I think you should be more explicit here in step two."
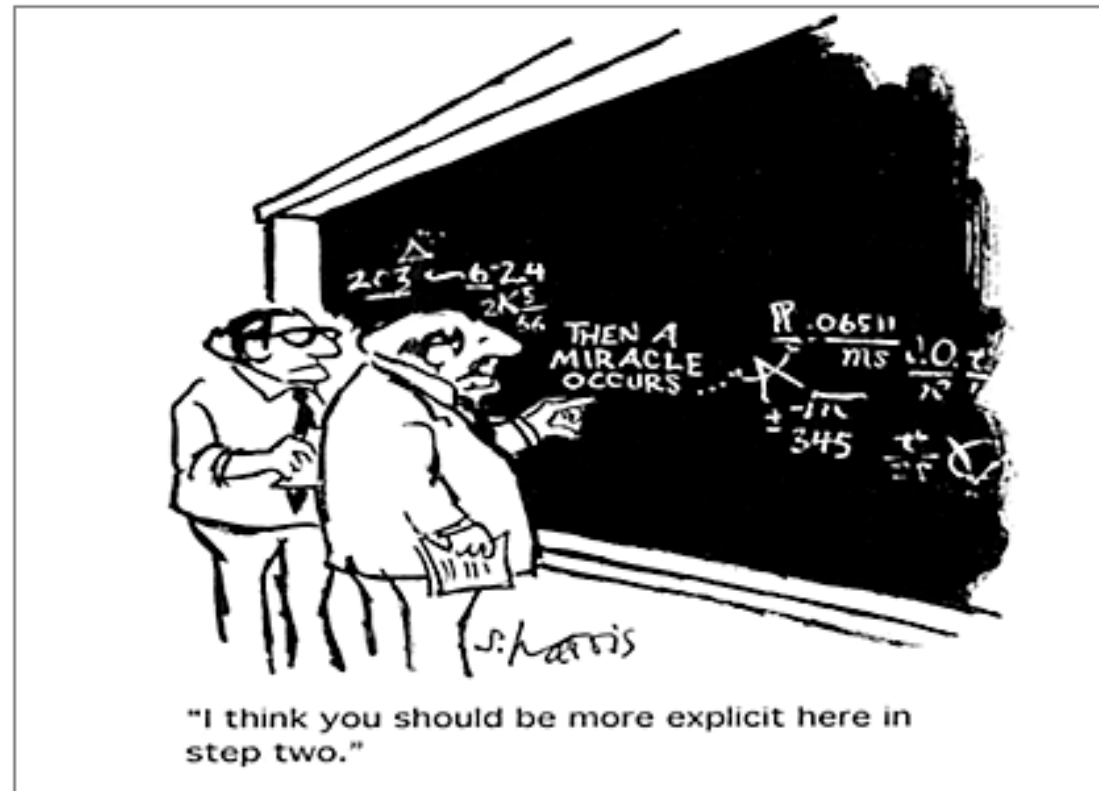
Materials

- *penny, soap, water, 1 ml pipette, forceps*

No soap added	Trial 1	Trial 2	Trial 3	Trial 4	Average
# of drops	37	45	39	42	40.8

Soap added	Trial 1	Trial 2	Trial 3	Trial 4	Average
# of drops	23	28	32	22	26.3

Effects of Adding Soap to a Penny

# of drops of water

45

40

35

30

25

NO SOAP (average)
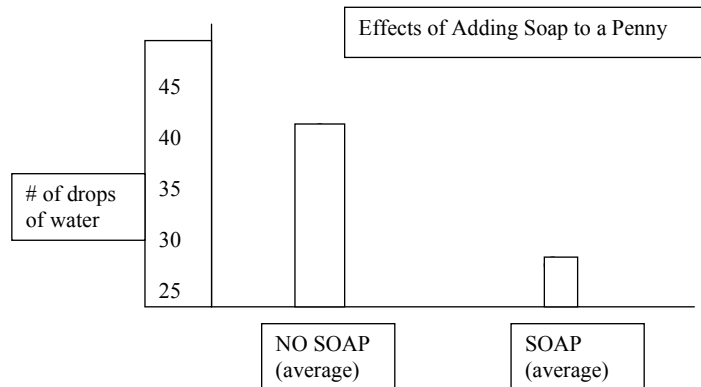
SOAP (average)

Data & Graph

CEE (Claim, Evidence, Explanation)

Claim

With soap on penny, fewer drops of water can be added!

Evidence

Average for no soap on penny is 40.8 drops of water

Average with soap on penny is 26.3 drops of water

Explanation

Because soap reduces cohesion of water, surface tension decreases and water molecules break apart and can't stay on the penny

Vocabulary

surface tension
cohesion
variables

Hypothesis Refuted or Supported?

My hypothesis was supported. Soap did decrease the number of drops of water that could be added

Errors

I believe that we added too much soap to the penny

Further Investigations

In the future, I will examine if other items reduce the surface tension of water

Analysis
CEE

Average for no soap on penny is 40.8 drops of water

Average with soap on penny is 26.3 drops of water

Because soap reduces cohesion of water, surface tension decreases and water molecules break apart and can't stay on the penny

With soap on penny, fewer drops of water can be added

In the future, it would make sense to see if other items reduce the surface tension of water

surface tension cohesion variables

I believe that too much soap was added to penny

My hypothesis was supported. Soap did decrease the number of drops water that could be added