Scientific Method Lab:
How is the Surface Tension of Water Affected by Soap?

Introduction: Surface tension refers to water's ability to "stick to itself". Surface tension can be measured and observed by dropping water (drop by drop) onto a penny. The number of water drops that can fit on a penny will surprise you.

Objective: to observe how the surface tension of water is affected by the addition of soap

Materials: penny, water, soapy water, droppers

I. Initial Observation of Surface Tension: Using the dropper from the bottle labeled “tap water” squeeze one drop of water at a time onto the surface of a penny. Have your partner count the number of drops that can fit on the surface of the penny. Record this number in the space below.

Number of Drops of Water _____

II. Problem: How does soap affect the water's surface tension?

a. Develop a hypothesis that answers the experimental problem.

_____
_____
_____

III. Procedure: Test your hypothesis by comparing the number of drops of tap water that can fit on a penny to the number of drops of soapy water that can fit on a penny. Because water drops may vary depending on how well you drop the water, it is best to run many trials and take an average of your trials for each condition. Record your data in the table below

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average
Tap Water						
Soapy Water						

IV. Analyze the Data and Draw Conclusions: Examine the data you obtained from your experimental trials. Discuss your findings with your group members. Then write a **paragraph**, making sure that you include the following key points: (**paragraph** should be on separate paper with an appropriate heading)

- Does your data support or refute your hypothesis?
- Explain your answer using your data as evidence.
- From your observations, how does soap affect the surface tension of water, citing data from your experiment to back up your conclusion(s).

- Describe how you could improve your experiment to obtain more accurate and reliable results.

V. Post-Lab Analysis: Please answer the following questions in full sentences. Please answer these questions on separate paper.

1. Explain what surface tension is.

2. Why were 5 trials of each condition taken and then averaged?

3. Why was a control group necessary in this experiment?

4. Which group was the control group?

5. Identify the independent variable in the experiment.

6. Identify the dependent variable in the experiment.

7. What if the experimental question was "How does sugar affect the surface tension of water?" Describe how you would answer this question using the scientific method. (give a brief summary of the procedure your would follow).