# Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Teacher \_\_\_\_\_\_\_\_\_\_\_\_

**Topic (Title)** : The Penny Experiment: Cohesion and Surface Tension

1. **Problem:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Hypothesis:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. **Manipulated or Independent Variable:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Dependent Variable (Outcome):** ­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Controls:** (May or may not use all lines)

A. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ E. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ F. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ G. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ H. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. **Materials:** (May or may not use all lines)

 A. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ F. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 B. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ G. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 C. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ H. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 D. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ I. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 E. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ J. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Procedure:**

# \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. **Observations: Chart, diagram or graph:**

Clean Penny without soap

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Trial 1 | Trial 2 | Trial 3 | Trial 4 | Average |
|  |  |  |  |  |

Penny coated with soap

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Trial 1 | Trial 2 | Trial 3 | Trial 4 | Average |
|  |  |  |  |  |

1. Write several sentences that clearly state what you see.

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1. **Conclusion:**

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1. **Suggestions for changing or improving this study or a variation of this experiment:**

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The Penny Experiment

Cohesion: Water molecules are attracted to other water molecules. Each water molecule is made up of 2 parts hydrogen and 1 part oxygen. So, the chemical symbol for water is H 2 O. The oxygen end of water has a negative charge and the hydrogen has a positive charge. The hydrogens of one water molecule are attracted to the oxygen from the 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.

After doing the experiment and reading about cohesion and surface tension, answer the following questions in complete form.

1. Explain your results from both parts of the experiment in terms of cohesion and surface tension.

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1. How do your results compare to the other groups in your class? Provide at least 2 possible reasons for any similarities and differences you identified.

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