Name: _____ Date: _____ Period: _____

# Penny Lab

**Introduction:** Surface tension refers to water's ability to "stick to itself". Due to the polar nature of water, water molecules will form ionic bonds to attach themselves to another water molecule. We can measure the surface tension of water by dropping water (drop by drop) onto a penny and counting the amount of drops. How many drops do you think can fit on a penny? Do you think water pollution will affect water's ability to retain surface tension? Let's use the scientific method to find out!

**Step 1: Make Observations**

The first step of the scientific method is to make observations. What do we want to observe? We want to learn about the surface tension of water. We will do this by dropping drops of water onto a penny.

**Materials:** Paper towel, penny, beaker of clean water, transfer pipette

**Procedure:**

1. Count the number of drops of water that land on your penny before the water runs over the edge.
2. Record the number of drops that stay on.
3. Dry off the penny and repeat the experiment three more times, recording the number of drops each time.

| Trial | Number of Drops |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |

**Step 2: State a Problem or Purpose**

Look back to the introduction. We wondered if surface tension of water would be affected by pollution. How can we test this? Look at the group of variables listed. Choose something you would like to work with. Then state a problem. (What do I want to know? What would happen if……?)

**Variables**: White vinegar, Light corn syrup, Hydrogen peroxide, Corn oil, Iodized salt, Baking powder, Baking soda, Food coloring

**Problem:** _____

_____

**Step 3: Form a Hypothesis**

Remember, your hypothesis needs to contain two pieces of information. Answer your problem above in order to form your hypothesis.

**Hypothesis:** _____

_____

**Let's think**: Pollution means the introduction of a (harmful) substance into an environment. So, if we wanted to test how pollution would affect water surface tension, how would we introduce pollution into the experiment?

**Step 4: Set-up (Design) a Controlled Experiment**

Okay, in a controlled experiment, you have to have one independent variable, a dependent variable that you are measuring, control variables, a control group and an experimental group.

| Independent Variable: | Dependent Variable: |
|---|---|
| Control Variables:<br>1.<br>2.<br>3.<br>4. | Control Group:<br><br>Experimental Group: |

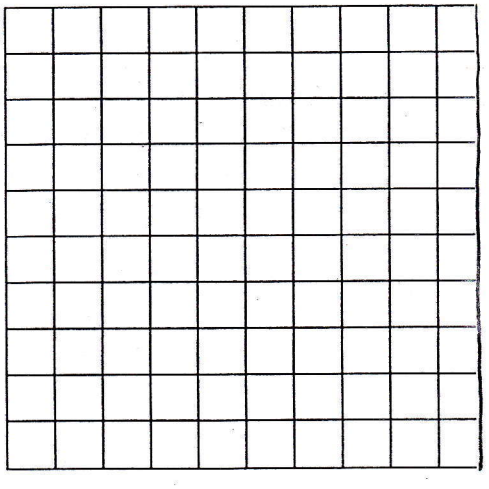
**Procedure:**

1. Count the number of drops of **polluted** water that land on your penny before the water runs over the edge.
2. Record the number of drops that stay on.
3. Dry off the penny and repeat the experiment three more times, recording the number of drops each time.

| Trial | Number of Drops |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |

**Step 5: Record Your Data and Analyze Your Results**

| Trial | Number of Drops Clean Water | Number of Drops Polluted Water |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| Avg. | | |



Record the information from both parts of the experiment into the data table. Then, graph your results onto the grid at the right. Do not forget to label both your axes and title your graph!

**Step 6: Draw Conclusions**

So, what happened? What did you learn about water surface tension and pollution? Please state your conclusion below. Was your hypothesis supported (right) or rejected (wrong)? Explain.

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