Name _____ Date _____ Period _____

**Inquiry: Designing your Own Experiment with Mustard Seed Germination**

**Background:**

In the previous lab you experimented with whether or not mustard seeds would germinate (sprout) with just water. Now you and your lab group will be given certain materials to design your own experiment to determine how a particular **independent variable** (of your choosing) affects the germination of mustard seeds (**dependent variable**). A variety of factors can seriously affect the rate and degree of seed germination.

Below are examples of conditions that you can test against a control group. Using the materials provided to the class, you will develop an experiment that will have only **one independent variable and one dependent variable**. You will write down your purpose, hypothesis, independent variable, dependent variable, constants and control similar to the previous experiment. Get your design approved by your teacher before beginning the Pre-Lab.

**Independent Variables (Choose One):**

Amount of Light (Light vs. Dark)

Temperature (Room Temperature vs. Warm or Cold)

Germination on a Substrate (With or Without Paper Towel)

Tap Water vs. Another Type of Solution

- Fruit Juice
- Bottled Water
- Vinegar
- Soda
- Salt Water
- Ammonia

Others????? (Check with your instructor first)

**Pre-Lab**

1. **Title:** _____

2. **Purpose:** _____

_____

**Independent variable:** _____

**Dependent variable:** _____

**Constants:** _____

_____

**Control set-up (the most "normal" set-up for mustard seeds):**

_____

3. **Hypothesis:**

_____

_____

_____

**Teacher's approval** _____

Once your experiment is approved, proceed with setting up your experiment. Make some notes in the space below so that you will have the needed information for your formal lab.

4. **Materials *your group* used:**

_____

_____

5. **Procedure:** (this should include all steps to replicate your experiment…amount of water, number of seeds, etc)

_____

_____

_____

_____

_____

_____

_____

6. **Data:** After several days, collect **both qualitative and quantitative data**. As a part of the Pre-Lab, you will construct a table, with titles, for you to record your data to include in your formal lab.
7. **Results:** Create a graph similar to the previous lab that compares the amount of mustard seed germination between your control group and manipulated variable.
8. **Conclusion:** As a part of your formal lab you will write a conclusion that summarizes what you learned through your experiment. As a group, come up with a few responses to the areas below so that you can include them in your discussion at the end of the lab.

**Errors made:**

_____

_____

_____

**Hidden variables:**

_____

_____

9. **Post-Lab Questions:**
    1. Why is it important to have only one independent variable in an experiment?
    2. We measured how well seeds performed by just looking at the number of seeds that germinated. What other kinds of quantitative data could we observe in order to determine how well the seeds are doing?
    3. Why is it so important to note any possible errors in our experiment?
    4. Writing a lab report is one way we can share our results with the scientific community? Why is it important to share the finding of our experiments with others?