Bio 137: Lab 2: Scientific Method   Name: Milalicia Joe _____

Mr. Orchid, a horticulturist (plant scientists) wanted to lodge complains to the city that a nearby residence is ruining his flowers because of the detergent being used to wash their cars. The soap runs into a stream that goes near his flowerbeds. Before complaining, Mr. Orchid decided to find out whether soap can affect flower growth. He inspected the flower beds near the stream and noted that there were two kinds of kinds of plants - **marigold** and **chamomile**.

Help Mr. Orchid design a controlled experiment.

Materials available are as follows: Marigold seedlings, Chamomile seedlings, Plastic pots Terracotta pots, Hyponex soil, Miracle-Grow soil, Fleet wash, city water, natural sunlight.

1. Write a hypothesis (should be in a complete sentence and describe what exactly is being tested and measured).
   - The group of flowers that is not exposed to detergent will grow more than the group of flowers that is exposed to the detergent.

2. Describe (fill in the chart) the control group and the experimental group with regards to what variables were used in each (type of flower, type of pot, type of soil, etc.).

	Control Group	**Experimental Group**
Flower Type	Marigold	Chamomile
Pot Type	Plastic pots	Terracotta pots
Soil Type	Hyponex	Miracle-Grow
Add Detergent (Yes or No)	Yes	No
Independent Variable	detergent	No detergent
Dependent Variable	growth	growth
Exposure to Sun Light (Same or Different)	Same	Same
Water (Same or Different)	Same	Different
One Control Variable	Exposure to sun Light	Exposure to sun light

3. Six seedlings of the same size were used for each group. The experiment was run for **Three** months. A ruler was used to make accurate and consistent measurements every two days. A data table to show the results was created. This table included an average for the experimental and control group.

Calculate the average height in each experimental group.

	Plant #1	Plant #2	Plant #3	Plant #4	Plant #5	Plant #6	Average
Control Group	5.50 cm	5.20 cm	5.60 cm	5.25 cm	5.80 cm	5.55 cm	5.48
Experimental Group	5.25 cm	4.80 cm	5.00 cm	4.75 cm	4.85 cm	4.25 cm	4.82

Results:

Average Height of Plants in Control Group: _____5.48_____

Average Height of Plants in Experimental Group: _____4.82_____

Did you support or disprove the hypothesis? _____No _____

Conclusion: Write a paragraph summarizing what you have learned about scientific investigation from doing this simulation.

 I have learned that detergent from the nearby residence helped Mr. Orchid's flowers grow. The experimental group growth was low because of multiple things such as it had no detergent added and less amount of water. Control group with the plastic pots helped played a bigger part. While the dependent stayed the same for both groups. The exposure of the sunlight helped with the growth but without the same amount of water it didn't help the growth.

End of Lab Questions:

4. Explain why you need a control group.

-You need a control group because we need something to use as a comparison after we tested our hypothesis.

5. Why is it necessary to include an average in the data table?

- It is necessary to include an average in the data table because it provides the data, and results so you can see if your hypothesis was supported.

6. Why is it necessary to take deliberate action to keep all conditions the same except the independent variable?

- Because the independent variable can stand on its own, dependent variable that change in response to the independent variable.

7. If you made **one additional change** in in the experimental group, (e.g. keep the plants in the dark) would the results be comparable? Explain.

- Yes, because the results would change horribly, the growth of the pants would be worse than experimental group.

8. What is the last step of the scientific method?

- Conclusion and communication

9. What action should Mr. Orchid take after analyzing the experimental data?

- The action Mr. Orchid should take is withdraw his report and let all his flower be closer to the residence .