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H₂omegrown: Plants Reaction to Different Types of Liquids

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Abstract

Today we will be examining the different types of reactions plants have to different types of waters. The question we will be exploring is, do plants grow better with different types of liquids. We will be going through a step by step process on the different types of observations and inferences my group and I made. My group and I have decided that there is a relationship between the plants and the different types of water that is given to them. The test subjects we tested on were 30 lima beans. During the experiment we made qualitative and quantitative observations. The manipulative variable in this experiment was the different types of liquids given to the lima bean seeds. The responding variable I this experiment was the amount of seeds germinated during the experiment. The way my group and I organized our data was through graphs. We also organized our data into four kinds of tables.

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Introduction

This is a five sentence paragraph sentence describing my knowledge about water quality and the effects it has on its surroundings. You may be asking why water quality is so important. Water quality is a big essential on living things and on the environment. Many people contract diseases, and sicknesses from water quality. Water quality is the main cause for thousands of people’s deaths because they don’t have clean water. What inspired my group and I to explore this topic is we wanted to see the effects water quality has on its surroundings. My colleagues and I formed a hypothesis before we began running tests and conducting the experiment. If we grow plants with the water from Lennox, Hawthorne, and from Inglewood I feel that the plants will grow much faster from the water from Lennox then the other locations because the water from Lennox is much clearer than the waters from Inglewood and Hawthorne.

In light of our research my colleagues and I decided to examine whether if plants grew faster with the waters from Lennox than the waters from Hawthorne and Inglewood. During our experiment we created observations, and we made inferences. Observations means to gather information from an object by the action of observing. To make an inference is to reach a conclusion by evidence or reasoning. The way we used observations to make inferences was we first observed our subject over a time period and once we gathered enough information we made inferences. Well what we noticed was that for the first two days none of the seeds germinated.

Materials

* (30) lima bean seeds

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* (3) paper towels
* (3) Ziploc bags
* (3) 5cm of tape
* H₂O from at least 3 different sources (enough to run 3 trials)
* Graduated cylinder

Methods

Step one place 1 set of 10 lima beans in paper towel. Step two wrap the set of 10 lima beans in paper towel. Step three place paper towel with the 10 lima beans folded into the Ziploc bags. Step four pour 15ml of one water source, from one of the water bottle, into the Ziploc bag. Step five seal the Ziploc bag ¾ so the lima bean seeds can get carbon dioxide. Step six cut five centimeters of tape and apply to the bag. Step seven tape the bag to a sunlit window. Step eight label the Ziploc bag as the type of group it is/test 1. Step nine repeat the steps for the other 2 sets of 10 lima beans.

Results

Lima bean seeds grow differently with the different types of water and the quality of the water. Before the experiment the lima bean seeds were really hard and smooth. During the experiment the lima bean seeds started to become soggy and began to give off an awful stench. Also during the experiment some of the lima bean seeds began to crack open and some didn’t sprout. In conclusion the lima bean seeds grow at different rates/time to the different types of water given to them.

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At the beginning of the trial (day one) no seeds germinated and we observed that the water from Inglewood was clear and looked clean. On day two none of the seeds germinated

and the observations we made were that the seeds looked wrinkly and were squishy. On day three only four seeds germinated, the measurements for plant 1 was 1cm, plant 2 was 1cm, plant 3 1cm, and plant 6 was 0.5cm, the observations we made was that the seeds were squishy and they looked wrinkly. On days 4 and 5 there was no data taken. For Hawthorne on day 1 none of the seeds germinated and the observations we made was that the water looked clear and it looked like if it came from a faucet. On day two no seeds germinated and the observations we made was that the seeds looked mushy and were soft and squishy. On day 3 only one seed germinated, the measurement for plant 2 was 1cm, the observations we made was that the seeds were split in half and that they had wrinkles and were squishy and they were soft. On days four and five there was no data taken. For the control group on day 1 no seeds germinated and the type of water source that was given to them was distilled water, the observations we made was that the water was steam filtered it was bottled very clear the seeds were hard and soft. On day two only 3 seeds germinated the measurements for the seeds were, plant 3 was 1cm, plant 5 was 1cm, and plant 10 was 1cm. the observations I made was that the seeds looked soft and looked squishy. On day 3 only 3 seeds germinated the measurements for the seeds were, plant 3 was 3cm, plant 5 was 1.5cm, and plant 10 was 1.5cm. For days 4 and 5 no data was taken. The last water source we used was water from Lennox. On day one no seeds germinated and the observations that were made were that the water was clear and the seeds

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were hard and soft. On day 2 no seeds germinated and the observations that were made were that the seeds were soft, wrinkly, and were squishy. On day 3 no seeds germinated and the

Observations that were made were that the seeds were squishy and soft. On days 4 and 5 no data was taken.

Table 1: Seed Germination of Plants in \_\_\_\_\_\_\_Inglewood\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ H20

|  |  |  |
| --- | --- | --- |
| **DAY 1 DATA**  **Date: \_\_\_\_9/4/13\_\_\_\_\_\_\_\_\_\_** | **DAY \_\_2\_\_\_ DATA**  **Date: \_\_\_\_\_9/5/13\_\_\_\_\_\_\_\_\_** | **DAY \_\_3\_\_\_ DATA**  **Date: \_\_\_\_\_\_9/6/13\_\_\_\_\_\_\_\_** |
| **Number of seeds germinated:**  0 | **Number of seeds germinated:**  0 | **Number of seeds germinated:**  4 |
| **Plant heights (cm):**  Plant 1: \_\_\_0\_\_\_ Plant 2: \_\_0\_\_\_\_  Plant 3: \_\_0\_\_\_\_ Plant 4: \_\_0\_\_\_\_  Plant 5: \_\_0\_\_\_\_ Plant 6: \_\_0\_\_\_\_  Plant 7: \_\_0\_\_\_\_ Plant 8: \_\_0\_\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_\_0\_\_\_ | **Plant heights (cm):**  Plant 1: \_\_0\_\_\_\_ Plant 2: \_\_0\_\_\_\_  Plant 3: \_\_0\_\_\_\_ Plant 4: \_\_0\_\_\_\_  Plant 5: \_\_0\_\_\_\_ Plant 6: \_\_0\_\_\_\_  Plant 7: \_\_0\_\_\_\_ Plant 8: \_\_0\_\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_\_0\_\_\_ | **Plant heights (cm):**  Plant 1: \_\_1cm\_\_\_\_ Plant 2: \_\_1cm\_\_\_\_  Plant 3: \_\_1cm\_\_\_\_ Plant 4: \_\_0\_\_\_\_  Plant 5: \_\_0\_\_\_\_ Plant 6: \_\_0.5cm\_\_\_\_  Plant 7: \_\_0\_\_\_\_ Plant 8: \_\_0\_\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_\_0\_\_\_ |
| **Observations:**  **The water was clear the seeds felt hard**  **The seeds had a hard shell** | **Observations:**  The seeds felt soft  The seeds were squishy  The seeds had a soft shell | **Observations:**  The seeds felt squishy  The seeds had wrinkly shell  The seeds felt soft |

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Table 2: Seed Germination of Plants in \_\_\_\_\_\_\_Lennox\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ H20

|  |  |  |
| --- | --- | --- |
| **DAY 1 DATA**  **Date: \_\_\_\_9/4/13\_\_\_\_\_\_\_\_\_\_** | **DAY \_\_2\_\_\_ DATA**  **Date: \_\_\_\_\_9/5/13\_\_\_\_\_\_\_\_\_** | **DAY \_\_3\_\_\_ DATA**  **Date: \_\_\_\_9/5/13\_\_\_\_\_\_\_\_\_\_** |
| **Number of seeds germinated:**  0 | **Number of seeds germinated:**  0 | **Number of seeds germinated:**  0 |
| **Plant heights (cm):**  Plant 1: \_\_0\_\_\_\_ Plant 2: \_0\_\_\_\_\_  Plant 3: \_\_0\_\_\_\_ Plant 4: \_\_0\_\_\_\_  Plant 5: \_\_0\_\_\_\_ Plant 6: \_\_0\_\_\_\_  Plant 7: \_\_0\_\_\_\_ Plant 8: \_\_0\_\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_\_0\_\_\_ | **Plant heights (cm):**  Plant 1: \_\_0\_\_\_\_ Plant 2: \_\_0\_\_\_\_  Plant 3: \_\_0\_\_\_\_ Plant 4: \_\_0\_\_\_\_  Plant 5: \_\_0\_\_\_\_ Plant 6: \_\_0\_\_\_\_  Plant 7: \_\_0\_\_\_\_ Plant 8: \_\_0\_\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_\_0\_\_\_ | **Plant heights (cm):**  Plant 1: \_\_0\_\_\_\_ Plant 2: \_\_0\_\_\_\_  Plant 3: \_\_0\_\_\_\_ Plant 4: \_\_0\_\_\_\_  Plant 5: \_\_0\_\_\_\_ Plant 6: \_\_0\_\_\_\_  Plant 7: \_\_0\_\_\_\_ Plant 8: \_\_0\_\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_\_0\_\_\_ |
| **Observations:**  **The seeds were hard**  **The water was clear**  **The water looked clean** | **Observations:**  The seeds felt soft  The seeds felt squishy | **Observations:**  The seeds were squishy  The seeds had wrinkles on the shell. |

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Table 3: Seed Germination of Plants in \_\_\_\_\_\_\_\_\_\_Hawthorne\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ H20

|  |  |  |
| --- | --- | --- |
| **DAY 1 DATA**  **Date: \_\_\_\_\_9/4/13\_\_\_\_\_\_\_\_\_** | **DAY \_\_2\_\_\_ DATA**  **Date: \_\_\_\_\_\_\_9/5/13\_\_\_\_\_\_\_** | **DAY \_\_3\_\_\_ DATA**  **Date: \_\_\_\_\_\_9/6/13\_\_\_\_\_\_\_\_** |
| **Number of seeds germinated:**  0 | **Number of seeds germinated:**  0 | **Number of seeds germinated:**  1 |
| **Plant heights (cm):**  Plant 1: \_\_\_0\_\_\_ Plant 2: \_\_0\_\_\_\_  Plant 3: \_\_0\_\_\_ Plant 4: \_\_\_0\_\_\_  Plant 5: \_\_0\_\_\_ Plant 6: \_\_0\_\_\_  Plant 7: \_\_\_ 0\_\_ Plant 8: \_\_\_0\_\_\_  Plant 9: \_\_\_0\_\_\_ Plant 10: \_\_0\_\_\_ | **Plant heights (cm):**  Plant 1: \_\_\_0\_\_\_ Plant 2: \_\_0\_\_\_\_  Plant 3: \_\_\_0\_\_\_ Plant 4: \_\_0\_\_\_\_  Plant 5: \_\_0\_\_\_\_ Plant 6: \_\_0\_\_\_\_  Plant 7: \_\_0\_\_\_\_ Plant 8: \_\_\_0\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_\_0\_\_\_ | **Plant heights (cm):**  Plant 1: \_\_0\_\_\_\_ Plant 2: \_\_1cm\_\_\_\_  Plant 3: \_\_0\_\_\_\_ Plant 4: \_0\_\_\_\_\_  Plant 5: \_\_0\_\_\_\_ Plant 6: \_\_0\_\_\_\_  Plant 7: \_\_0\_\_\_\_ Plant 8: \_\_0\_\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_\_0\_\_\_ |
| **Observations:**  **Water looked clear**  **The seeds felt soft and hard.** | **Observations:**  The beans were soft  And they were wrinkly | **Observations:**  One of the seeds was broken down the middle. |

Table 4: Seed Germination of Plants in Control Group H20 (bottled H20)

|  |  |  |
| --- | --- | --- |
| **DAY 1 DATA**  **Date: \_\_\_\_\_9/4/13\_\_\_\_\_\_\_\_\_** | **DAY \_\_2\_\_\_ DATA**  **Date: \_\_\_\_9/5/13\_\_\_\_\_\_\_\_\_\_** | **DAY \_\_3\_\_\_ DATA**  **Date: \_\_\_\_9/6/13\_\_\_\_\_\_\_\_\_\_** |
| **Number of seeds germinated:**  0 | **Number of seeds germinated:**  3 | **Number of seeds germinated:**  3 |
| **Plant heights (cm):**  Plant 1: \_\_0\_\_\_\_ Plant 2: \_0\_\_\_\_\_  Plant 3: \_\_0\_\_\_\_ Plant 4: \_\_0\_\_\_\_  Plant 5: \_\_0\_\_\_\_ Plant 6: \_\_0\_\_\_\_  Plant 7: \_\_0\_\_\_\_ Plant 8: \_\_0\_\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_0\_\_\_\_ | **Plant heights (cm):**  Plant 1: \_\_0\_\_\_\_ Plant 2: \_\_0\_\_\_\_  Plant 3: \_\_1cm\_\_\_\_ Plant 4: \_\_0\_\_\_\_  Plant 5: \_\_1cm\_\_\_\_ Plant 6: \_\_0\_\_\_\_  Plant 7: \_\_\_0\_\_\_ Plant 8: \_\_0\_\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_\_1cm\_\_\_ | **Plant heights (cm):**  Plant 1: \_\_0\_\_\_\_ Plant 2: \_\_0\_\_\_\_  Plant 3: \_\_3cm\_\_\_\_ Plant 4: \_\_0\_\_\_\_  Plant 5: \_\_1.5cm\_\_\_\_ Plant 6: \_\_0\_\_\_\_  Plant 7: \_\_0\_\_\_\_ Plant 8: \_\_0\_\_\_\_  Plant 9: \_\_0\_\_\_\_ Plant 10: \_1.5cm\_\_\_\_ |
| **Observations:**  **The water was steam filtered**  **The water looked clear the seeds were hard** | **Observations:**  The seeds were soft and they were squishy | **Observations:**  The seeds were soft  The skin was wrinkly  The plants sprouted but werent tall. |

Analysis & Discussion

This is a five sentence that will summarize my findings. The problem that was studied was plants reaction to different types of water. I predicted that the water from Lennox was going to help the seeds germinate into plants faster than the other water sources because the water from Lennox was clear and looked clean. An inference that I made was that the seeds

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would grow and sprout quicker with the water from Lennox because it was clean and clear. I believe my hypothesis was incorrect because the seeds took longer to germinate than the other seeds.

This study is important because we learned how to graph our results. We also knew what type of graph to use. We also knew how to separate and organize our data into tables. This study is also important because we got to find out how important water quality is. We also learned how the water quality can affect its surroundings, environment, and living organisms. We also got to see how water from different locations can affect the growth of plants. As you can see in the tables of Lennox over the experiment none of the seeds germinated.

This is another five sentence paragraph that analyzes the experimental design and directions for future study. The possible sources of error could have been the amount of sunlight given to the seeds. It is important that the seeds got enough sunlight or not, none of

the seeds would get enough sunlight and some would and some seeds wouldn’t grow. Another possible source of error is that the seeds didn’t receive the same amount of water. This is

important because some of the seeds might of have gotten more water than the others and some would take longer to grow and some would grow/sprout. One way to fix this experiment would be to place half of the seeds in different Ziploc bags. Also another way to improve my experimental design would be to place the seeds in a place where they get enough sunlight and oxygen like outdoors.

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References

*Definition for observations* (n.d) Retrieved from

<https://www.google.com/#q=define%20observation>

*Definition for inference* (n.d) Retrieved from

<https://www.google.com/#q=define%20inference>