

Michael  
Crazy Coconuts

\*Make sure you date every entry. Explain in detail what your group did. Record qualitative (physical descriptions/ adjectives) and quantitative (# of plants, heights, - things that can be counted) observations.

Talk to your mentors to see if you should record individual plant growth (how will you tell which plant is which?) or if it is acceptable to measure all of them and record average plant growth. I've set up a sample data table below for you to enter data into.

3/27/2017

After more than a week we have been able gather all of our materials. After the go ahead from our mentor Steven we have planted today. We are planting two radish seeds in each of our twelve cups. The cups have been divided equally into three tubs, the warm temperature tub, the cold temperature tub, and the normal conditions tub. The warm tub is being heated like a greenhouse by two bright lights above it, however the cold tub has been set aside and is is being cooled down by snow and ice packs, and insulated by t-shirts. At the moment there is nothing to observe about our radishes being planted today, but there will be hopefully in the coming days.

3/29/17

Today we had to change the positioning of our light source for the warm bin. Now, instead of shining light from above the light will now be coming from below. Still none of the plants have sprouted, so there is no growth. The cold bin has been better insulated, and we are renewing the snow in it everyday. We have come to the conclusion that we will water all of our plants with 35 milliliters of water daily. At the moment there is nothing to observe. Hopefully the plants sprout soon.

3/30/17

Today we went about our daily activities watering and tending to the plants habitats. However, we finally got sprouts! There are sprouts in all of the warm condition cups, three of the controlled cups, and sadly none so far in the cold cups. Right now our average temperature in the warm soil is about 92 degrees fahrenheit. In the cold soil the temperature is about 50 degrees fahrenheit, and the controlled temperature is about 70 degrees fahrenheit. Furthermore the average height of the controlled soil is 1.4 centimeters. The cold bin has no height, and the warm soil average height is 3.8 centimeters .More results should come soon.

3/31/17

Today the last seed in our controlled tub sprouted. Still none have sprouted in our cold tub, and no more have sprouted in our warm tub. I think that our cold tub will end up staying that way for the rest of our experiment, but they could sprout. The plants that have sprouted are growing over one centimeter per day. They will have to stay unwatered and without sunlight during the weekend sadly. Hopefully on Monday the cold tub plants will have sprouted.

4/3/17

Over the weekend our plants absorbed a lot of moisture from the bins. Due to this they were being drowned in water by the time we had watered them. To fix the problem we drained a lot of the plants so that they will not drown. We finally have one sprout in the cold bin, and still eight in the normal, and seven in the warm. The temperature in the cold bin was higher today because the ice packs melted over the weekend. The normal and hot stayed relatively the same.

4/4/17

Our radish plants are growing extremely tall. We are still having watering issues, because the plants keep on getting flooded. Due to this we have decided to water our plants with 30 milliliters of water every other day. Our temperatures have come back to normal after the weekend. We have come back to using ice packs instead of snow to cool our cold bin. Finally, our group has begun to lose all hope for the cold bin. There is still only one sprout out of eight, while seven have sprouted in the warm, and all eight have sprouted in the controlled bin.

4/5/17

Today we ran into the overwatering problem again. Due to this we have decided to water our plants every other day with 25 milliliters of water. We also have poked holes in in all of our cups in order to drain water. The plants are still growing to humongous heights which is not normal for radishes. We have been having trouble keeping our cold bin temperature steady. Todays temperatures were 33 degrees celsius for warm, 17.2 for cold, and 21.4 for the controlled bin. Hopefully thing work out.

Data Table

4/6/17

Today we did not run into any watering problems. The soil is moist just how it should be. Now that things are under control we came to the decision that we will only water our plants when it is necessary. The plants are still growing even taller. The warm plants have just hit ten centimeters, the controlled plants are almost at eleven, and the cold plant is five centimeters steadily growing about one centimeter per day. We had to replace the light heating our warm bin because it wet out. This caused our soil temperatures to be very close today. Hopefully no problems arise during the coming weekend.

4/7/17

Today, we decided that watering our plants is not a good idea. Last weekend the plants took in a lot of water through condensation, making them mucky. Our experiments seem to be creating differences in our plants. The warm lants have been growing fast and tall ever since they sprouted. The controlled plants have done just about the same thing however they are a little bit taller. Sadly, our cold bin has only had one sprout, meaning that the other seven seeds planted there did not sprout. The good thing about the cold bin is that the plant in there is growing well. Even though it is growing slowly it is very healthy. On the other hand the controlled and warm bin plants have white stems, and are sagging over. There is no sign of unhealthiness on their leaves though. Hopefully on Monday there will be no issues.

4/10/17

I hoped that there would not be any problems, but it turns out that the cold bin plants are bathing in over one centimeter of water. We had to drain the cups as soon as possible. This issue only happened in the cold bin. As the plants continue to grow taller a select few of the plants have broken their stems. Oddly enough the most

healthy plant is the cold bin plant, that has been bathing in water for two days. All of the other plants have white unhealthy looking stems, but huge leaves. It came to me in my research that the extreme growth, and unhealthiness is more than likely caused by our nitrogen rich soil. Nitrogen rich soil can make plants more vulnerable to disease, and grow abnormally. We have also noticed that very few plants still stand upright. All but one of ur warm bin plants droop over the side of the cup, the same goes for the controlled bin, however, the cold bin plant still stands upright.

4/12/17

Today is a sad day. Our warm bin and controlled bin have lost a plant. The plants that had died had not been looking very good lately. They had darker more shriveled leaves, and white stems. Most of our plants now have drooped over on their side because of growing so tall. We do not think that they are drooping due to unhealthiness. Other than the two dead plants most of our plants are doing okay. Some have white stems, or still have only one leaf, but one plant in the warm bin got itself a third leaf. This plant shows great health and promise, beside the fact that it is drooping due to 15cm height. Hopefully no more plants die soon or never.

4/13/17

One way to put it that most of our plants are not looking very good. Most if not all have white stems now and medium sized leaves. Our best plants are in our warm bin. The have large leaves, green stems, and are on the road to becoming a radish. However, our controlled bin plants have small leaves, white stems, and do not look like star radishes. We will do what we must to keep the plants alive.

4/14/17

Next Friday our experiments will be completely over. Next week we will begin to write our conclusions, and pack everything up. Our plants condition could be described exactly how I had described them yesterday. Warm is good with big leaves, but controlled is drooping with small leaves, and white stems. The cold plant has no issues, and is growing with no droop at all. Although it is small it is extremely healthy. At the end we will, measure plant roots, radish circumference (If any radishes at all) and write conclusions about how the effects of soil temperature could come in useful for a farmer.

4/17/17

Our plants in the controlled bin are looking very bad. Two of them are alive through only half of their stem, and the rest are drooping and wilting. All plants in the controlled bin have white bent stems, and all the plants have unhealthy looking leaves. Sadly, one died in that bin as well. On the other hand, the plants in the warm bin are giant, have great stems, multiple leaves that are not shriveled or wilting, and are on their way to plant stardom. Finally, the lone survivor of the cold bin. That plant is the only plant i all three bins whose stem has not bent over. It has healthy leaves and a green stem. The only downside is that it has been growing slowly.

Date	Temp. Warm Soil	Temp. Cold Soil	Temp. Controlled Soil	Height
3/27/17	21.9 degrees Celsius	21.1 degrees Celsius	21.9 degrees Celsius	Warm: 0cm Cold:0cm Controlled:0cm

3/29/17	24.7 degrees Celsius	8.6 degrees Celsius	21.3 degrees Celsius	Warm: 0cm Cold:0cm Controlled:0cm
3/30/17	33.6 degrees Celsius	9.9 degrees Celsius	21.3 degrees Celsius	Warm: 3.8cm Cold:0cm Controlled:1.4cm
3/31/17	30.six degrees Celcius	16.2 degrees Celsius	22.2 degrees Celsius	Warm:4.5cm Cold:0cm Controlled:3.3cm
4/3/17	32.4 degrees Celsius	20.8 degrees Celsius	20.8 degrees Celsius	Warm:8.1cm Cold:1.7cm Controlled:8cm
4/4/17	31.3 degrees celsius	14.4 degrees Celsius	21.1 degrees Celsius	Warm:8.7cm Cold: 2cm Controlled:8.5
4/5/17	33 degrees Celsius	17.2 degrees Celsius	21.4 degrees Celsius	Warm:9.3cm Cold:4 Controlled:10.3cm
4/6/17	23.3 Degrees Celsius	12.3 Degrees Celsius	20.6 Degrees Celsius	Warm:10cm Cold:5cm Controlled:10.6cm
4/7/17	30.1 degrees Celsius	19.2 degrees Celsius	22.2 degrees Celsius	Warm:10.1cm Cold:7cm Controlled:10.5cm
4/10/17	29.2 Degrees Celsius	22.1 Degrees Celsius	22.5 Degrees Celsius	Warm:11cm Cold:8.5cm Controlled:11.25cm
4/12/17	30.9 Degrees Celsius	23.3 Degrees Celsius	26.1 Degrees Celsius	Warm:13.9cm Cold:8.5cm Controlled:11.6cm
4/13/17	N.A.	N.A.	N.A.	Warm: 12cm Cold:9cm Controlled:11.7cm
4/14/17	29 Degrees celsius	10.1 Degrees celsius	23.1 Degrees celsius	Warm:12.3cm Cold:10cm Controlled: 11.7cm
4/17/17	Degrees Celsius	Degrees Celsius	Degrees Celsius	Warm:12.8cm Cold:9cm Controlled:10cm

## Conclusions:

At the end of our experiments we came to the conclusion that the warm bin plants grew healthier and taller than both the controlled plants and cold plants. One explanation for this is that the moisture, and humidity inside of the worm bin gave the plants the best environment to live in. A possible cause for the cold bin plants growing short but healthy is that the cold environment provided by the ice packs slowed down the plants systems therefore slowing its growth. We think that our studies can help farmers growing radishes because most radishes are planted in the early spring, but our studies could prove that planting radishes in the summer can improve growth. Hopefully, if growth improves because of our studies other issues can be partially fixed like hunger.

### Effects of Temperature on Plant Height

