Prediction

We think when the radishes are exposed to less soil it will take longer for it to sprout and it would look different and be a different size then the typical radish would.

Research question

Does the amount of soil affect how quickly a plant, starting at a seed, can grow? We came up with this question because we know soil is necessary for plants to grow, so we wanted to see if how much soil affects how quickly a plant can grow.

Experimental design

We would like to experiment what would happen when we decreased the regulated amount of soil by half and then that by half. We would like to perform this with three of each soil amount. So, we will be putting six seeds in each pot. This will help to support our claim more strongly with more evidence. We are conducting our experiment on radishes. We think that this will be the best possible plant because radishes have to grow in the ground and we are excited to see what will happen with less soil. We would give it 16ml of water measured from a granulated cylinder and give it the same amount of sunlight just with less soil. We are planning to conduct our experiment over 5-6 weeks. We are hoping that doing this will help us see if the growing process can be sped up and if plants can truly sprout and grow with less soil. We are planning on using six seeds per pot. We will water the pots every week.

3/4/24

Today we start the planting process which includes putting six seeds in each of our pots. We will need 54 seeds because we are using nine pots. Every five days we will water the seeds with one inch of water or more specific, 16 milliliters. We have three different samples. One sample was ⅛ cup of soil, another ¼ cup of soil, and the last one was ½ cup of soil. In each sample there are three pots. Before we water the seeds we wet the soil so that the soil can be moist. Then we took a picture of the seeds the first day.

The order of things we did today:

1. Got three separate containers and put three pots in each container.
2. Put ½ cups of soil in one of the samples and ¼ and ⅛ cups of soil in the other two samples.
3. We wet the soil so that it was ready to put the seeds in.
4. We then put 6 seeds in each of the pots.
5. Finally we put 16 milliliters of water in each of the pots and took a picture of it all.

3/7/24

So, today in class we checked up on our seeds (no plants yet) and we found no growth but did notice that the soil was fairly dry so instead of watering our plants/seeds every five days we decided that it would be a better experiment result if we water our plants/seeds every day so they don't dry out and die. After we figured out that the soil was way too dry we watered each of the pots with six-teen millililiters of water and then let them be. Then we updated our experimental design on Planting science to watering the plants/seeds everyday with six-teen millililiters of water.

New Experimental Design:

We would like to experiment what would happen when we decreased the regulated amount of soil by half and then that by half. We would like to perform this with three of each soil amount. So, we will be putting six seeds in each pot. This will help to support our claim more strongly with more evidence. We are conducting our experiment on radishes. We think that this will be the best possible plant because radishes have to grow in the ground and we are excited to see what will happen with less soil. We would give our plants 16ml of water measured from a granulated cylinder five days a week and give it the same amount of sunlight just with less soil. We are planning to conduct our experiment over 5-6 weeks. We are hoping that doing this will help us see if the growing process can be sped up and if plants can truly sprout and grow with less soil. We are planning on using six seeds per pot.

3/8/24

Today we checked up on the plants/seeds and we found some version of growth in each of the different samples. The pots with ⅛ cups of soil have the seeds that are growing because if you examine the seeds closely you can see that they opened up a little bit but aren't entirely sprouting yet. In the ¼ cup samples are kindove sprouting with very little small sprouts at the surface of the soil. And then finally, in the ½ cup sample we found the sprouts were much bigger and there was one very big sprout in one of the pots of the ½ cup sample. We also decided that we would change our experiment again and realized that watering the plants/seeds every day would be too much water because it would most likely drown our experiment. Our new plan is to water the plants/seeds every other day not counting the weekends.

New Experimental Design:

We would like to experiment what would happen when we decreased the regulated amount of soil by half and then that by half. We would like to perform this with three of each soil amount. So, we will be putting six seeds in each pot. This will help to support our claim more

strongly with more evidence. We are conducting our experiment on radishes. We think that this will be the best possible plant because radishes have to grow in the ground and we are excited to see what will happen with less soil. We would give our plants 16 ml of water measured from a granulated cylinder every other day of the week and give it the same amount of sunlight just with less soil. We are planning to conduct our experiment over 5-6 weeks. We are hoping that doing this will help us see if the growing process can be sped up and if plants can truly sprout and grow with less soil. We are planning on using six seeds per pot.

3/11/24

Today we came into class and examined our plants. We found a substantial amount of growth from the ½ cup of soil compared to the last time we checked the plants. In the ¼ cup of soil sample I looked closely at the plants/seeds and didn't see any big growth yet but the seeds are sprouting the tiniest bit. In the ⅛ cup sample there was a similar outcome with the ¼ cup of soil sample. You couldn't see any obvious sprouting but the seeds had a little tiny crack in them where there was a small sprout peeking out. After examining all the different pots and samples we then watered each and every pot with six-teen millimeters of water. I also noticed before we watered the plants/seeds the soil was extremely dry because we hadn't been at school to give them water. There were no height inclines for the samples of the ¼ cup and the ⅛ cups of soil samples but we did have enough growth to masseur the plants in the three pots of the ½ cup of soil sample.

<u>½ cup Sample:</u>

1. 6.04 cm tall
2. 6.375 cm tall
3. 4.8 cm tall

3/13/24

Today we did pretty much the same as Monday. We examined our plants that were left at school over Tuesday and found that there was some more growth in the ½ cup of soil sample. The other ¼ cup of soil and the ⅛ cup of soil samples did not seem to have any growth from the last time that we checked on the seeds/plants. So the ¼ and the ⅛ cups of soil are still at zero centimeters growth. But on the bright side the ¼ cups of soil and the ⅛ cups of soil sample are kind of sprouting because you can see the seed shell kind of cracking around the surface indicating that a sprout might be coming out soon

<u>½ cup Sample:</u>

1. 7.1 cm tall
2. 6.875 cm tall
3. 5.4 cm tall

3/15/24

Today in science class we again checked up on our plants/seeds. We also watered each pot in every sample with six-teen millimeters of water. After we watered all the pots with water we then measured the height and growth of each plant. Here are the measurements of the plants/seeds in the ½ cup sample because the ¼ cup and the ⅛ cup of soil samples are not growing enough to become measurable.

½ cup Sample:

1. 8.5 cm tall
2. 10.17 cm tall
3. 7.6 cm tall

3/18/24

Today in science class we went to check up on our sprouts/plants/seeds and we got greeted with good news! Both the ⅛ cups of soil sample and the ¼ cups of soil sample started to actually sprout. After closely examining all of the pots, you can also see that almost all of the seeds have either sprouted or the sprout is almost completely out of the seeds shell, which is very good news. We hope that this growth keeps up and it seems that we are doing good. Then we did what we would normally do and we watered each pot with six-teen milliliters of water. After we watered the pots, we measured the plants and finally got some measurements for the other pot samples besides the ½ cups of soil sample. As for the ½ cup of soil sample the plants are doing good and growing even more everytime we measure the plants. Here are the measurements for all the different samples.

½ cup Sample:

1. 9.4 cm tall
2. 10.6 cm tall
3. 7.8 cm tall

¼ cup Sample:

1. 4 cm tall
2. 0 cm tall
3. 0 cm tall

⅛ cup Sample:

1. 0.875 cm tall
2. 1 cm tall
3. 0 cm tall

3/19/24

Today in class we checked up on our plants to find that some of the plants in one of the pots looked like it may have died because it dried out and we tested the soil to see that all of the soil in the pots are very dry and have no sign of moisture so trying to avoid that having the other plants dry out, we watered the plants with instead of six-teen millimeters we watered each plant with twenty milliliters of water. It isn't too obvious but it does seem that besides the pot that had dried out the other plants/seeds/sprouts are growing more and more everyday. As for the pot that had gotten too dried out (probably from the sun) we hope to revive it over the time of the experiment. After watering our pots we began to measure all the plants and sprouts and we also changed the experimental design after. We hope that the plant can be revived and that we will be able to see more growth in our plants/seeds/sprouts. But when we did measure our plants we didn't see any changes so all the measurements are the same.

<u>New Experimental Design</u>:

We would like to experiment what would happen when we decreased the regulated amount of soil by half and then that by half. We would like to perform this with three of each soil amount. So, we will be putting six seeds in each pot. This will help to support our claim more strongly with more evidence. We are conducting our experiment on radishes. We think that this will be the best possible plant because radishes have to grow in the ground and we are excited to see what will happen with less soil. We would give our plants 20 ml of water measured from a granulated cylinder every other day of the week and give it the same amount of sunlight just with less soil. We are planning to conduct our experiment over 5-6 weeks. We are hoping that doing this will help us see if the growing process can be sped up and if plants can truly sprout and grow with less soil. We are planning on using six seeds per pot.

3/23/24

Today we went into class and checked up on our plants. Yesterday we had a science quiz so we didn't have the time to check up on them but we did water them with twenty milliliters. Today since we will be going away for the weekend, and we will be putting our plants in the sun, we watered each pot with about 5-10 milliliters of water so the plants don't dry out. Then after we watered the plants we took the stakes we had put in before out because it seemed that they were not helping the plants so we decided the plants would be better off without them. After that we took a picture of it all. When we were done taking the pictures, we measured all of our plants and put the data in our data table. Overall we found that all our plants had shrunk except about two pots that grew in the slightest.

3/25/24

Today in class, we checked up on our plants to find most of them dry. Some of them were fine but most of them were dry. We didn't measure our plants but we did in fact water our plants with the normal twenty milliliters of water. We then took pictures of our plants and did other things in science class.

4/2/24

Last week we were only in class on Monday because of other heating problems in the school, so we were not able to water or check up on our plants at all during the timespan of six days. To add on to that we also hadn't placed our plants in the sun part of the room and I think you can guess how that went. When we checked up on our plants today we found that almost everything was bone dry and our plants were almost entirely dried out. We did water them with twenty milliliters still, but I don't think there is too much hope for our experiment. We then measured our plants and the results were that either something shrunk, or there was no growth or even plant to measure. Here are some of the data that changed.

1/2 cup Average Height:
- 2.67 cm tall

1/4 cup Average Height:
- 0 cm tall

1/8 cup Average Height:
- 0 cm tall

4/3/24

Today there is nothing much to say about anything, and I think we officially ended our experiment. We checked up on the plants today and they were entirely dead, but we did get enough information about what happens when there is more or less soil for a plant to grow.

Conclusion:

The control plants (the plants that had the correct amount of soil) grew the strongest, fastest, and healthiest. The first possible explanation of our results is that the more soil a plant has, the more water it can hold. Therefore, the plants don't get dried up as easily. The second possible explanation is that due to being out of school for multiple periods of time, we were unable to water and care for our plants. So, the plants started to shrink and dry out. Sadly, because of this, none of the plants survived. However, our data still supports our claim. Our original prediction was that the pots with less soil would take longer to grow, be smaller, and be weaker than the pots with more soil. The data collected supports our original

prediction by showing that the plants with more soil grew faster, taller, and stronger than the plants with less soil. Some future experiments that could be done to expand on the results of this experiment consist of seeing if doing this experiment long term would affect the outcome and what would happen if we had a better routine for caring for the plants. The fastest, strongest, and healthiest plants were the plants with the largest amount of soil (or the control plants).