

Plant the Moon: Mars Edition

Will Indoor or outdoor lighting conditions prevail?

Third graders quest to find the answers...

Planning:

We filled out multiple Google [forms](#) to decide the process and independent variable of this project. Crop choice came down to lettuce or spinach due to the cold weather varieties we had on hand. We ultimately chose lettuce because of the shortened growing period at ~35 days which made sense to fit within the 8 week grow period. We decided to use differences in lighting as the independent variable. Students chose to use different types of light over different watering schedules, and amount of light. Students were adamant about having an outdoor crop and indoor crop to vary the lighting from the sun to a sun lamp. Students chose this, understanding that we live in MN and the weather was getting cooler every day.

Hypothesis:

The indoor plants will grow larger and faster than the outdoor plants because the lighting and environment indoors is more consistent and controlled than the outdoor environment and lighting.

Responsibilities:

Each student applied for up to three jobs they were interested in doing for this project. This is the final job board, indicating the job for each student.

PLANT THE MOON

Indoor	Outdoor
Measurer: Nellie	Measurer: Beau
Measurer (control): Piper	
Soil Scientist: Charlie	Soil Scientist: Jack
Rain Team: Noah	Rain Team: Deniel
Recorder: Olivia	Recorder: Benton
Manager: Tarek	Manager: Tanner
Planter: Callie	Planter: Connor
Connor: Rain Team (Control)	
Indoor & Outdoor	
Photographer: Bryn Spokesperson: Thatcher Scheduler: Odie	

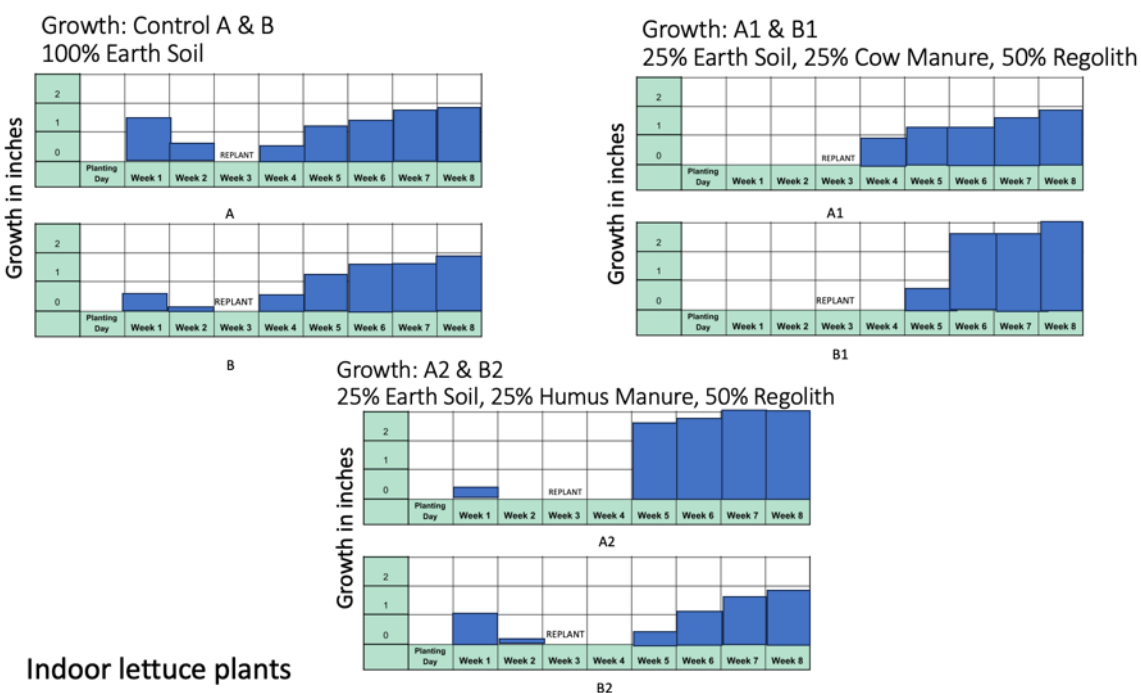
Growing Period Indoor:

Start date: October 10th, 2024

On planting day, we watered all indoor plants with 1.5 oz of water. We watered regularly between 1-2 oz. every other day, and by October 22nd, we found that none of the seeds had grown. We replanted all indoor plants on the 22nd.

By November 15th, the tallest indoor plant was the control group, at 1.5" and by November 12th, they were all falling down and wilting. We weren't sure if they were doing this because of the soil, the watering on top of the plants, or the lighting being too strong. We decided to poke a "watering hole" in the corner of each indoor pot. This is where the water was administered for the remaining days of the growth cycle.

Overall, the indoor plants with earth, humus and regolith were the tallest and grew 3" tall.



Growth Cycle Indoor Photos:



Growing Period Outdoor:

Start date October 10th 2024

On planting day, we watered all outdoor plants with 1.5 oz of water. We watered regularly between 1-2oz. every other day, and if it rained, we did not water. On November 18th, it rained so much that the plants were “drowning”. We poured off the excess water and continued with the experiment.

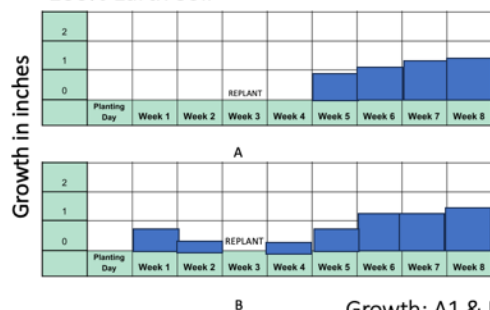
On the final day of the experiment, it was 32 degrees outside, and the rain had frozen on the plants. We moved them indoors in order to get final measurements. Outdoor plants with soil containing earth, cow manure and regolith grew 1.5” total height. This was the tallest of all outdoor plants.

Outdoor Weather Conditions

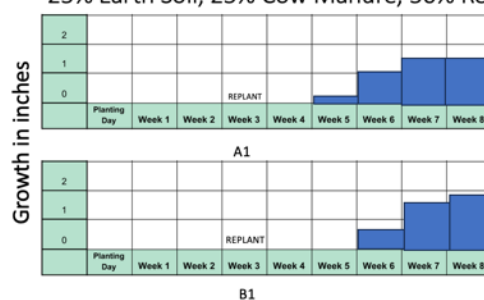


Source: <https://weather.com/weather/monthly/l/0ace8d72c9c2badf5aa881aee28567d41a94890e007abe160e72b34c96acaf0d>

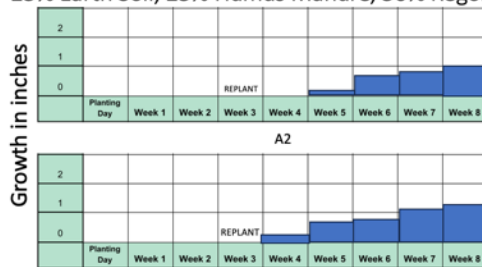
Growth: Control A & B
100% Earth Soil



Growth: A1 & B1
25% Earth Soil, 25% Cow Manure, 50% Regolith



Growth: A1 & B2
25% Earth Soil, 25% Humus Manure, 50% Regolith



Outdoor lettuce plants

Growth Cycle Outdoor Photos:



Final Conclusions:

Did the experiment support our hypothesis?

Yes. We found that the indoor plants grew larger and faster indoors using a grow light, and all other conditions constant.

What changes or improvements would we consider if we repeated the experiment?

1. We would use only one light instead of two because it seemed that the lighting may have been the cause of the sprouts wilting when they got larger than 2" tall.
2. We would think about reducing the ratio of regolith to earth soil. In this experiment, it seemed that 50% regolith was very dense and heavy which was our other thought as to why the sprouts wilted when they started to grow tall.
3. We would keep both sets of plants indoors and not challenge the weather outside.
4. We would explore more hearty seed varieties that have a higher chance at growth.

What did we learn?

1. "You can grow lettuce in October."
2. "The Mars soil was much harder (denser) than regular soil so the roots would stop when they tried to grow through the Regolith."
3. "Plants take a long time to grow."
4. "I think that we all did really well, and I'm glad the plants were able to sprout."
5. "It was frustrating that our plants didn't grow as large as we expected, but we didn't give up."
6. "The challenge is what made it fun."

Team Photo



Back row from left: Olivia, Connor, Mrs. Totin, Piper, Tarek, Deniel, Jack and Callie

Front row from left: Charlotte (Charlie), Tanner, Eleanor (Nellie), Bryn, Odie, Beau, Noah, Benton and Thatcher