



PTMC Moon Walkers Team ID#16286



- **Sept. 13, 2023** - Construction team puts together the greenhouse and sets it up outside near the Sensory Garden. We placed it against the side of the school building to keep it from being blown over by the wind.
- **Sept. 20, 2023** – Through research we learned that the moon soil has a high pH. To learn about pH we conducted experiments testing pH using lemons and baking soda with litmus paper. We researched how farmers lower soil pH by adding Sulfur. We decided to add Sulfur to the moon regolith. We also came up with our hypothesis, variables, controls, and our experimental design. Each student was assigned a job and group to work with. Our Photo/Video team was responsible for planting the control pot, so they would not come into contact with the moon regolith soil and transfer it to the iPad. Other students were randomly assigned a pot to plant. We created teams, so that everyone would have a job to do.



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Safety	Kaidence Futral	Distribute/Collect N95 Masks Distribute/Throw away Disposable Masks Distribute/Dispose of Gloves Teach Proper Glove Removal
Water	River Place/Jack Henderson/ Ana Gunthel	Help Set-up Rain Barrel for Rain Collection Store & Dispense Distilled Water (If No Rain Water) Water ALL Plants w/Distilled or Rain Water Replace ALL Buckets, Jugs, etc to Proper Storage Area Measure Amount of Water for each Plant Record Amount of Water on Data Sheet
Growth (Height)	Elliott Hoffman/Eden Jackson	Know How to Locate & Measure in Centimeters on Tape Measure Measure Height of ALL Plants in Centimeters Record Data for Each Plant
Growth (# foliage)	Cynthis Sanchez-Martinez Ransom Braswell	Accurately Count # of Leaves, Blooms, etc on Each Plant w/out causing w/out causing Damage to the Plant Record Data on Data Sheet
Construction	Colten Hattaway/Hank Cline/ Hunter Cable	Read ALL Directions for Assembly of Greenhouse Build Greenhouse Check Greenhouse Regularly to Ensure Safety of Plants Help Sign Committee Place Sign On Top of Greenhouse Help Sign Team Put Signs in ALL Plants

Photo/Video	Lulah Murdock/Jacie Thompson	Take Pictures & Videos of EACH Team as They are Working Create Video Presentation of PTMC
Signs	Ryder Hoy/Eloide Morton	Create small signs on craft sticks for each plant w/date planted, plant/group #, and species of plant Decorate w/Clipart and Laminate Create a Large sign for top of Greenhouse and Laminate
Soil Changers	Gunnar Banks/Lexi Housworth	Responsible for Changing pH Balance of Soil Measure and Add Sulfur to Soil Test Soil pH Levels Record on Data Chart

Sept 27, 2023: Planting our pots.

Descriptive Name: Will different amounts of sulfur change the pH balance of moon and promote sunflower growth?

Hypothesis: If ½ tsp. of Sulfur is added to moon regolith, then the pH level will be lowered, and sunflowers will grow.

Independent Variable: Amount of Sulfur

Dependent Variable: pH level and plant growth

Measurements: We measured the height in centimeters, and we counted the number of leaves on each plant. We measured once a week (Wednesday) and kept track of the weather. We also measured the pH level at the beginning and end of our experiment.

Control: Dwarf Sunflower seeds grown in 100% potting soil and no sulfur.

Constants: All plants were housed in a greenhouse outside. All plants received 100mL of distilled water weekly and all pots were kept in the same environment and temperature.





PTMC

Moon Walkers

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Control Pot	Pot 1	Pot 2	Pot 3	Pot 4	Pot 5	Pot 6	Pot 7	Pot 8	Pot 9
100% Potting soil	50% Reg 50% PS ½ t. S	50% Reg 50% PS ½ t. S	50% Reg 50% PS ½ t. S	50% Reg 50% PS 1/4 t. S	50% Reg 50% PS 1/4 t. S	50% Reg 50% PS 1/4 t. S	50% Reg 50% PS 1/8 t. S	50% Reg 50% PS 1/8 t. S	50% Reg 50% PS 1/8 t. S
Dwarf Sunflower	Dwarf Sunflower	Dwarf Sunflower	Dwarf Sunflower	Dwarf Sunflower	Dwarf Sunflower	Dwarf Sunflower	Dwarf Sunflower	Dwarf Sunflower	Dwarf Sunflower

**We did the same set-up for our replant. We used plastic cups and punched holes in the bottom for drainage.*

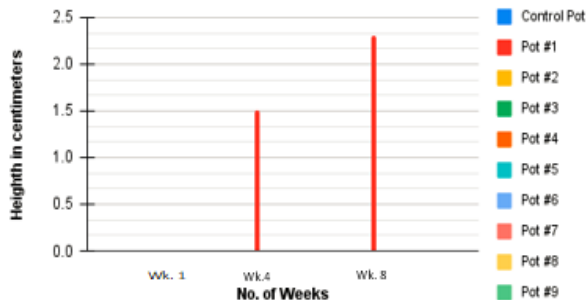
Describe what happened?

- Our class meets once a week on Wednesdays, so we watered our plants with 100mL of distilled water, measured growth of height in centimeters, and counted leaf growth. Plants were housed in our greenhouse. We decided to check the pH balance again at the end of our growth period.
- During our Fall Break, our teacher watered and measured our plants for us.
- We met on Oct. 18. With only one plant growing, we decided to replant. Our teacher pulled us out of classes on Thursday, Oct. 19 to replant. We chose to keep our original plants to see what would happen. We used the remainder of our moon regolith that was left outside next to our greenhouse. During a heavy rain, water got into the bag. Our replant was much easier due to the moon regolith being wet. We thought this might give us better results on our second set of plants.
- After our replant, we had two pots that grew. Our control pot grew 3 cm with six leaves, and pot #9 with 1/8tsp. of Sulfur grew 2cm with 4 leaves. Both plants died three weeks after the replant.



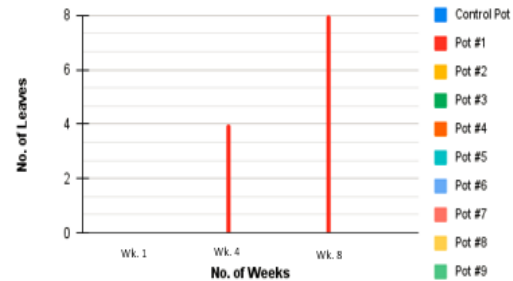
Plant the Moon Challenge

Team: Moon Walkers (1st Planting 9/27/23)



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**** Due to the age of the children and their experience with data charts, we chose to use only the beginning, midpoint, and end stages of growth.**



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What Would We Do Differently?

- Add more sulfur.
- Use something different instead of sulfur.
- Move our greenhouse to the other side of the school where it would receive more sunlight. There wasn't much sunlight on the side where we had it located due to the shadow of the school building.
- Water 2x a week instead of 1x.
- Move our greenhouse indoors. We had some very cold and freezing temperatures.
- Set up a rain barrel to collect rainwater.

What Did We Learn?

- How to plant seeds.
- It will not be easy to grow crops on the moon.
- How to measure with a ruler using centimeters.
- How to measure with a graduated cylinder.
- How to track the weather.
- How to read a multimeter probe.
- How to set-up a graph.

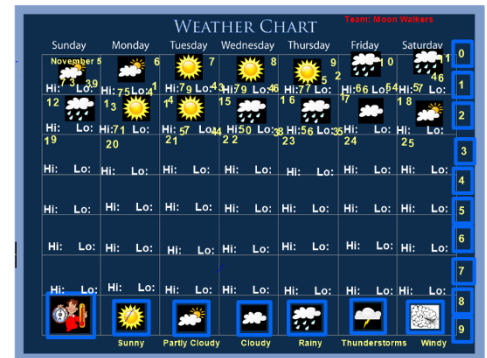
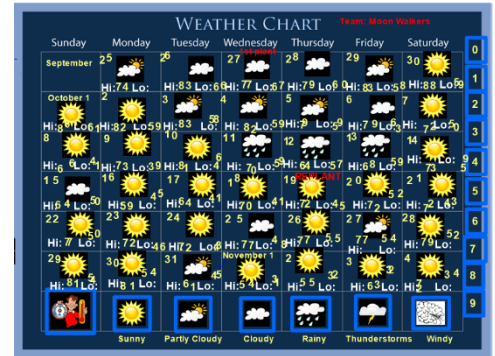
Coollest Thing We Discovered

- We learned about pH levels, acids, and bases.
- We also learned about the surface of the moon and its environment.

What Would You Tell Others About Your Experiment?

- Make sure you put your plants in a sunny spot and check the temperature.
- Give extra water.
- Use safety procedures.
- Mix potting soil and moon regolith together well. We recommend buckets and garden spades.

• Final Grow Set-up





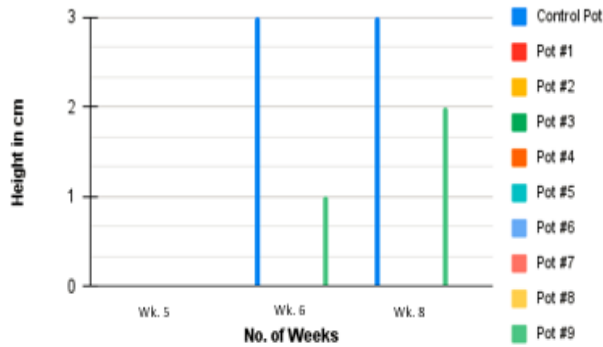
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Final Growth & pH Balance

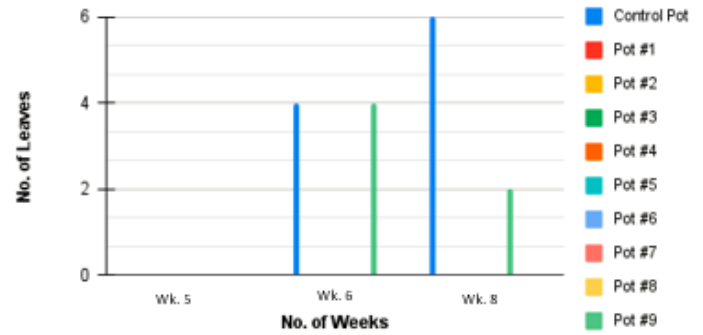
Plant the Moon Challenge

Team: Moon Walkers (Replant 10/19/23)



Plant the Moon Challenge

Team: Moon Walkers (Replant 10/19/23)



*By Week 8, both the Control plant and Pot #9 were dead.

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*Every plant registered a 7.9 pH balance at the beginning and end of both our original plants and our replants.