

**Group Names** \_\_\_\_\_ **Date** \_\_\_\_\_

## **Final Experimental Design/Plant the Moon**

Team Name: Sachsonvile Scientists

Team # 11100

Middle School Division

### **Experimental Parameters**

Hurricane Ian caused our growth period to be a week late. The growth period ended a week early.

### **Independent Variable(s)**

The type of seeds is the independent variable.

- Kale
- Radish
- Broccoli
- Mung bean
- Dandelion

### **Dependant Variable(s)**

The dependent variable is the weight and grams at harvest.

### **Controls**

- The amount of light
- The soil mixture
- The tray size
- The amount of water
- Blackout period
- The weighting of each tray during blackout

### **Project Hypothesis or Aim**

Would microgreens grow in the regolith soil mix?

## **Experimental Design and Procedures**

### **Grow Period #1**

1. Mix 50% of regolith, 25% of expand and grow, and 25% potting soil.
2. Separate the regolith mix into 7 trays.
3. Soak the seeds overnight.
4. Spread the 5 different seeds on top of the 5 different trays.
5. Spray the seeds with water
6. Put the seeds in a weighted blackout for three days
7. Take the seeds out of blackout
8. Turn on grow lights
9. Water everyday
10. Measure and record pH weekly
11. Harvest after 2 weeks
12. Weigh the harvested microgreens in grams

### **Grow Period #2**

1. Since there was time left during the grow period, the experiment could be repeated
2. The regolith root mix was either flipped or remixed
3. Repeat steps 3-12 in Grow Period #1



## Grow Pot Setup

### Pot






**1 Control Soil:** Soil mix of 25% Expand and Grow & 25% Kellogg Organic Potting Soil and 50% Lunar regolith (soil mix)

**Amendments:** None

**Crop:** Radish, Kale, Dandelion, Mung Bean, Broccoli

<u>Week 1</u>	<u>Week 2</u>	<u>Week 3</u>	<u>Week 4</u>	<u>Week 5</u>	<u>Week 6</u>
7pH	8pH	8pH	8pH	N/A	N/A
		N/A	N/A	N/A	N/A

### 2 Broccoli

<u>Week 1</u>	<u>Week 2</u>	<u>Week 3</u>	<u>Week 4</u>	<u>Week 5</u>	<u>Week 6</u>
7pH	7pH	7pH	8pH	8pH	7pH
			N/A		

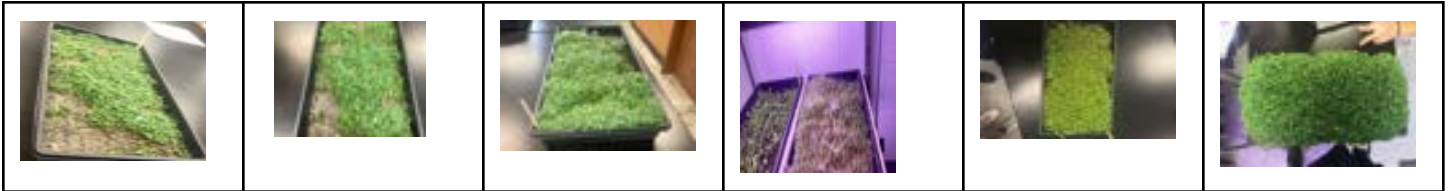
**Results statement from Grow Period #1** The seeds were placed evenly and watered every day. The seeds eventually grew, but after harvest turned into a muddy substance.

**Results statement from Grow Period #2** The regolith mixture was ground up and replanted, then watered daily. The broccoli eventually grew, and harvested with no difficulties.

**Comments:** Technical difficulties arose due to the camera not working, leading to a missing a picture for week 4

### 3 Kale

<u>Week 1</u>	<u>Week 2</u>	<u>Week 3</u>	<u>Week 4</u>	<u>Week 5</u>	<u>Week 6</u>
7 pH	7 pH	9pH	8pH	8pH	9pH








**Results statement from Grow Period #1:** In the first growing period, there were some spots that did not grow as good as others. This was because some seeds were mixed underneath the regolith when the seeds were placed on top.

**Results statement from Grow Period #2:** Growing was faster than growth period 1, and the results we got back were outstanding. The weight was higher and there were not as many spots that didn't grow as well.

**Comments:** For the second growing period, we mixed up 1/2 of the regolith mixture, and flipped the other half. Both sides were just as equal. The side that was flipped, was cut in rows vertically and horizontally with a plastic knife to facilitate growth.

#### **4 Dandelion**







<b><u>Week 1</u></b>	<b><u>Week 2</u></b>	<b><u>Week 3</u></b>	<b><u>Week 4</u></b>	<b><u>Week 5</u></b>	<b><u>Week 6</u></b>
7pH	7pH	8pH	8pH	8pH	8pH
					

**Results statement from Grow Period #1:** The dandelion's did not grow very much throughout the first growth period. The dandelions then started to develop white fungi across the dirt and on their stems.

**Results statement from Grow Period #2:** There was no period 2 as the dandelions did not produce enough growth to harvest after the first growing period. So they just continued to grow in the first growth period.

**Comments** The week 6 pictures were unavailable

#### **5: Mung Bean**





<b><u>Week 1:</u></b>	<b><u>Week 2:</u></b>	<b><u>Week 3:</u></b>	<b><u>Week 4:</u></b>	<b><u>Week 5:</u></b>	<b><u>Week 6:</u></b>
8 pH	8 pH	7 pH	8 pH	8 pH	10 pH
					

**Results statement from Grow Period #1:** Using a regolith/expand-and-grow mixture, the group planted the microgreens in a container with drainage holes, and the beans were in a blackout period and weighed them down using a book. The beans were watered daily, the pH measured weekly. The group harvested ¼ of the plants. The group harvested a second time as well.

**Results statement from Grow Period #2:** After the group harvested the beans from grow period #1, the remaining soil was flipped, turned over, and holes were poked in the soil. The group spread the microgreens over the newly flipped soil, and put the beans in a blackout period, using a book to weigh the microgreens down. Again, the plants were watered daily, and the group tested the pH of the beans weekly. On week 7, the group harvested.

**Comments:** Because the group harvested week 7, there is no available photo for week 7.

**6 Radish**

<u>Week 1</u>	<u>Week 2</u>	<u>Week 3</u>	<u>Week 4</u>	<u>Week 5</u>	<u>Week 6</u>
7pH	8pH	7pH	8pH	8pH	7pH
					

**Results statement from Grow Period #1:** In growth period 1 It weighed 196.9 grams. The Radish grew relatively tall but in some spots in the back of the tray it grew a bit shorter but overall it grew relatively well.

**Results statement from Grow Period #2:** In grow period 2 we flipped half and mixed half of the soil and they were about the same exact height except the back was a bit short again. It weighed 236 grams.

**Comments:** Both of the grow periods were amazing but the second grow period was better and grew faster then grow period one. Both of the grow periods where watered and had the same lighting but for grow period 2 we flipped and mixed the soil.

	Harvest 10/12/22	Harvest 10/19/22	Harvest 11/09/22
Control		285.1g	
Radish		196.9g	236 g
Control		90.66g	
Kale		117.19	188.24

Control			
Dandelion			24.26g
Control	130.8g		
Beans	98.2g	218.96	92.8g
Control	77.9g	66.75g	
Broccoli	51.7g	52.1g	185.65g

**Final Results and Conclusions**

The hypothesis was correct, and all plants grew successfully within 2 weeks. (Except for dandelions)

The astronauts would have food within that time of 2 weeks. The regolith mix can be reused immediately after harvesting to grow the microgreens again. In fact, the second growth may have been more successful than the first. Radish and Mung Bean seemed to have the best growth.