

**“Pollution Affects Us All”**

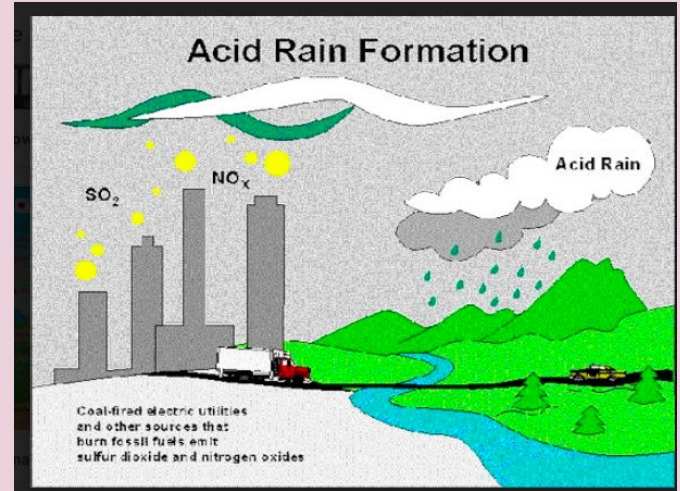
**Q22**

# PURPOSE & HYPOTHESIS

Question: How does acid rain affect plants?

Purpose: The reason I am doing this science project is because pollution is hurting our environment. I wanted to see how air pollution affects our environment by looking at plants.

Hypothesis: I think that the sunflower seeds and the Dusty Miller plants will not grow with the acid water but with the fresh water the Dusty Miller and sunflower seeds will grow.



# RESEARCH

Last year in 4th grade I learned about fossil fuels and how it creates bad air quality in our atmosphere and erratic weather. I learned that greenhouse gasses cause pollution problems that we are having today in our world. This got me to think, “how exactly we can help in fixing the problem in pollution” that is why I am always recycling.

Although, I recycle a lot I still was not too sure how recycling helps in reducing different types of pollution other than preventing more landfills. So I figured out that a good way to learn more about pollution was through seeing how air pollution affects plants. I learned that air pollution comes from fossil fuels and makes acid rain and that rain goes on to plants and hurts the plants growth.

# MATERIALS

1. Sunflower seeds
2. Potting soil
3. One 25 ounce spray bottle labeled fresh water filled with 25 ounce fresh water
4. One 25 ounce spray bottle labeled acid water filled with 5 ounce lemon juice and 20 ounce fresh water
5. Two small planters
6. Two small Dusty Miller plants

Sunflower seeds



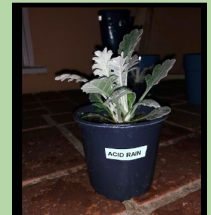
Lemon Juice



Spray Bottles



Dusty Miller Plants



Potting Soil



# EXPERIMENT

1. Squeezed 12 lemons for fresh lemon juice
2. I labeled a spray bottle acid water and filled it with 5 ounces of lemon juice and 20 ounces of fresh water
3. I labeled a spray bottle fresh water and filled it with 25 ounces of fresh water.
4. I added potting soil inside two small planters and planted 6 sunflower seeds in each of the planters
5. I labeled both planters one fresh water and the other acid water
6. I watered the fresh water labeled sunflower seed plant with  $\frac{1}{4}$  cup of fresh water
7. I watered the acid water labeled sunflower seed plant with  $\frac{1}{4}$  cup of acid water
8. I labeled both Dusty Miller plants one fresh water and the other acid water
9. I watered the fresh water labeled Dusty Miller with  $\frac{1}{4}$  cup of fresh water and sprayed it 5 times
10. I watered the acid water labeled Dusty Miller with  $\frac{1}{4}$  cup of acid water and sprayed it 5 times
11. I watered all the plants every other day for two weeks from February 1- 14 and took notes on my observations of all the plants.

# PHOTOS

Day 2 acid rain



Day 3 acid rain



Day 2 fresh water

Day 3 fresh water



**Day 6 acid water**



**Day 8 acid water**



**Day 6 fresh water**



**Day 8 fresh water and first sprout!!**



**Day 10 acid rain**

**Last Day acid rain**



**Day 10 fresh water and more  
new sprouts!**

**Last day fresh water**



# ANALYSIS

[https://docs.google.com/document/d/1yHf2dPXyhb2b82wyGqmyl4I\\_cCAICs6RxjapmiKG31M/edit?usp=sharing](https://docs.google.com/document/d/1yHf2dPXyhb2b82wyGqmyl4I_cCAICs6RxjapmiKG31M/edit?usp=sharing)

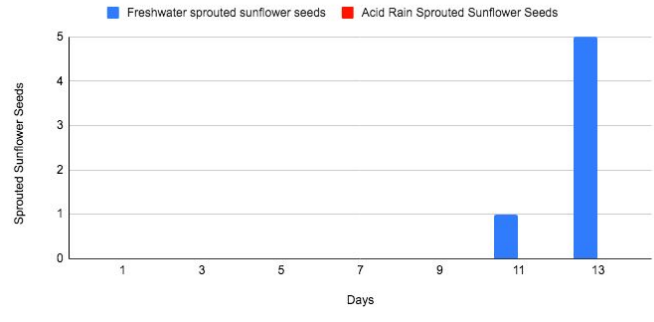
Date	Temperature/Time	Measurements of Acid and Fresh H <sub>2</sub> O	Acid Water Plant Observation	Fresh Water Plant Observation
2-1	72° 5pm	¼ cup of fresh water and ¼ cup of acid water. 5 spray pumps of fresh water and acid water	* 3 in. height, 19 leaves, 6 seeds	* 4 in. height, 20 leaves, 6 seeds
2-2	72° 4:50 pm	no watering		
2-3	72° 4:51 pm *sunny day	¼ cup of fresh water and ¼ cup of acid water. 5 spray pumps of fresh water and acid water	*acid water longer to absorb in seed planter *maybe it is the pulp from lemon that makes it more difficult for the water to be absorbed	*fresh water absorbed quickly in seed planter *leaves look the same
2-4	70° 4:50 pm *sunny day	no watering/broken arm		
2-5	81° 4:51 pm *sunny day	¼ cup of fresh water and ¼ cup of acid water. 5 spray pumps of fresh water and acid water	*drained pulp from acid water to see if water would absorb quicker, no change still took longer to absorb	*fresh water absorbed quickly in seed planter *leaves look the same
2-6	72°	no watering		
2-7	72° 4:50 pm	¼ cup of fresh water and ¼ cup of acid water. 5 spray pumps of fresh water and acid water	* 1 dried leaf * 3 in. height * no growth observed * dry soil before watering * acid water absorb long (30 sec)	* leaves green, no dry leaves * 30 leaves * 4 in. height * no growth * soil moist before and after watering (2 sec)
2-8	64°	no watering		
2-9	72°	¼ cup of fresh water and ¼ cup of acid water. 5 spray pumps of fresh water and acid water	* soil dry both plants * takes 30 sec to absorb both plants * leaves look the same color	* the soil moist * absorb 1or 2 sec
2-10	61°	no watering		
2-11	66°	¼ cup of fresh water and ¼ cup of acid water. 5 spray pumps of fresh water and acid water	* 5 leaves fell of plant * soil dry on both plants * pulp on top turned white on both plants * 3 1/8th in in height	* the plant has grown * one seed has grown * soil wet * 4 1/4th inches in height
2-12	68°	no watering		
2-13	64°	¼ cup of fresh water and ¼ cup of acid water. 5 spray pumps of fresh water and acid water	* no sprouted seeds * dry soil before watering both plants * 30 sec to absorb acid water both plants * pulp build up both plants * 4 brown specks on leaves * plant leaves look droopy * 3 1/8th inches in height * leaves mostly white	* fresh water sunflower seeds sprouted 5 leaves * moist soil before watering both plants * green leaves * plant height 4 1/4th inches in height (plant is straight up)



Fresh water sunflower seed sprouts

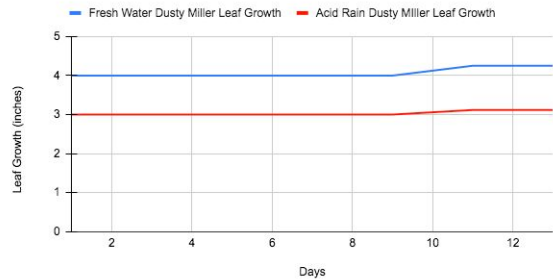
Dusty Miller plants

Acid Rain vs Freshwater Sunflower Seed Sprouts



Acid rain sunflower seeds

Acid Rain Dusty Miller Growth vs Freshwater Dusty Miller Growth



My biggest surprise out of this experiment is with acid rain water and how it affects seeds and soil. The acid rain affected the soil with it being really dry and the way the acid rain took a long time to absorb in the soil.



I decided to look at the acid rain sunflower seed soil to look at the seed. I thought it would be dead but it was sprouting deep inside the soil!



# CONCLUSION

My experiment did not work out. At first I thought I was able to prove my hypothesis that “acid rain affects plants’ growth”, but on the last day I decided to dig in the soil to look at the seeds to see if they were dead. When I dug in the acid rain soil there were 3 sprouts deep inside and the soil was moist. I guess acid rain just slows down plant growth. I also think acid rain inside of plants change the nutrients of the plant. Also the “Dusty Miller” which was also watered with acid rain water started to wilt and got brown specks. I also was able to see how fresh water is so important in plant growth because the sunflower seed with fresh water started growing after 5 days and the fresh water “Dusty Miller” plant continued to look tall and healthy. Finally, what really shocked me was how every time that I watered the plant with acid rain it took about 30 seconds for the soil to absorb and the soil was always dry.

# REAL WORLD CONNECTION

Pollution affects living organisms in horrible ways. On Earth there are different types of pollution and they are water, air, land and noise pollution. I know that water pollution affects marine life and also humans if water is polluted. Air pollution causes health problems to people and creates acid rain and green house gasses which also effects all living thing and weather. Land pollution also affects soil and communities which cause health problems.



All these pollutions need to end because we will not have a clean home and Global Warming will destroy Earth. A study 2017 by the Lancet Commission on pollution and health found that there are globally nine million deaths a year caused by toxic air, water, soils and work places. Finally, I keep thinking about Polar bears and how the ice caps are melting because of Global Warming which is caused by air pollution. (“Pollution Facts for Kids” kiddle.com)

This expereriment has made me understand to really think about what I do with things like can I recycle, can I reuse things, do I need to buy certain things that I really don't need like toys. I am now looking at things differently and saying to myself “Do I really need it or do I just want it/”

# WORKS CITED

“Acid Rain” [education.com](http://education.com)

“Acid Rain” [konnecthq.com](http://konnecthq.com)

“Create Acid Rain in Your Own Kitchen” [kidsecologycorps.org](http://kidsecologycorps.org)

“Pollution Facts for Kids” [kiddle.com](http://kiddle.com)

My mom and sister:

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