

Testing the Air Quality of Walker Memorial

Academy

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Abstract

A test of air particulant matter was conducted at Walker Memorial Academy. It was done to see if our air quality at school was that good. Because we are located in a rural area that is not heavily industrialized, we hypothesized that our air quality is ace. To prove it, we conducted an experiment using Vaseline, the lid and bottom of a Petri dish, tape, and string. A thin layer, measured of Vaseline was applied to the bottom of a Petri dish. The dish is then weighed and photographed. A piece of string is taped to the Petri dish, then the lid is placed back on before taking it outside. Next, we hung up the dishes and took off the lids. After hung for a few days, put the lid back on and take down and Data was collected again. After this second test, we came back with good results and a hypothesis confirmed.

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I. Research Question: How does particulate count affect our air quality?

II. Hypothesis: We believe our air quality, at Walker Memorial Academy, is good because we are not surrounded by so much buildings and are located in a rural area.

III. Materials:

- A. Petri dish
- B. Vaseline
- C. Tape
- D. String

IV. Procedures:

1. Place a thin coat Vaseline upon one petri dish BOTTOM
2. Mark on the back a 2.54cm square with marker
3. Take a photo of the dish before the experiment
4. Weigh Petri dishes. Record weights.
5. Place dishes underneath dissecting scope. Take a photo of each through scope
6. Tape string to Petri dish
7. Place Petri dish TOP onto dish BOTTOM
8. Choose one different location for each dish
9. ****DO NOT remove dish TOP from dish BOTTOM until you have hung it up****
10. Davis will take a photo (with an app) of chosen area
11. Davis will airdrop photo (photo will include latitude and longitude of chosen area)
12. On apple maps, each student will pin point the give latitude and longitude
13. Hang up a dish at a chosen area

14. Remove petri dish top
15. On the fifth day take a photo of the dish
16. Cover the Petri dish BOTTOM with the dish TOP and take it down
17. Re-Weigh Petri dishes. Record
18. Place dishes underneath dissecting scope.
19. Take a photo of it through scope
20. Count number of particulates within the 2.54cm square
21. Place photos into a graph, the before photos and after photos separate
22. See if there is a difference between weights.
23. Observe under dissecting scope.

V. Data

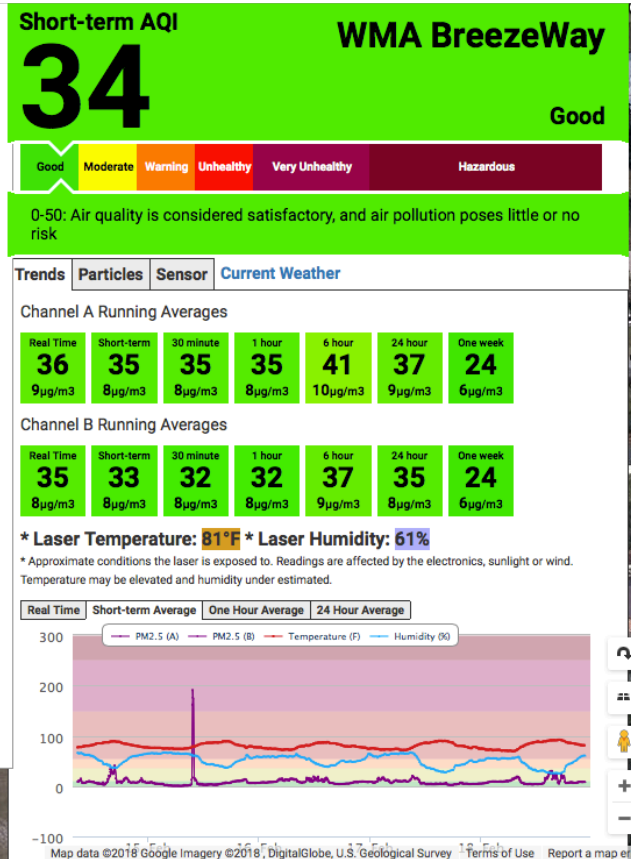
Air Quality

Students	Date (start to finish)	Location	Before Photo	Before Photo (scope)	After Photo	After Photo (scope)	Before Weight	After Weight	Weight Difference	Particulates Count	Metadata
Abel	Jan 17, 2018 – Jan 22, 2018	(27.627640, -81.523455)					9.1g	9.4g	0.3	91	N/A
Ifiok	Jan 16, 2018 – Jan 22, 2018	(27.627772, -81.523728)					9g	9.1g	.1g	191	N/A
Ashley	Jan 17, 2018 – Jan 22, 2018	(27.627631, -81.523440)					4.85g	6.3g	1.45	117	N/A
Levi	Jan 17, 2018 – Jan 22, 2018	(27.628012, -81.523084)					13.8g	13.9g	.1g	246	N/A
Isaac	Jan 17, 2018 – Jan 22, 2018	(27.6271820, -81.5241397)					8.3g	8.4g	.1g	364	N/A
Zarlinn	Jan 17, 2018 – Jan 25, 2018	N/A					7.5g	7.6	0.1g	103	Did not ask for location.
Richard	Jan 17, 2018 – Jan 22, 2018	(27.6276625, -81.5235754)					10g	10g	0g	207	N/A
Misty	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rory	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Data collected of our Petri dishes before and after exposed to air.



Aerial view of campus with location of each student's Petri dish marked.



VI. Analysis/Results:

As you could see from the collected data, due to the amount of particulates counted, weights of some Petri dishes increased. We successfully collected particulates that were present in the air. Also, some might have more than others depending on where they have placed their dish. The only metadata collected is that I did not get my location.

VII. Conclusion:

On my second test for air quality, it was a mostly a success. I say mostly because I did not ask my professor to get my location for me. Other than that, I followed through with all the steps. Looking at the data and referring back to the question, we can conclude that we do have good air quality. Since we have no results from our previous attempt, we cannot compare the two tests. But when we compare our data and our initial beliefs, we found our beliefs to be true.

VIII. Discussion:**A. What is Particulate Matter (PM)?**

1. The total amount of solid and liquid particles present in the air. Most are harmful to health. PM includes pollen, smoke, soot, dust, and droplets of liquid.

B. How does Particulate Matter affect human health?

1. The longer we are exposed to particulate matter, the more detrimental affects it has on both children and adults. Breathing in particulate matter for a long time can result in shorter life expectancy of a few months, especially for people who are already dealing with diseases of the heart or lungs.

C. How are we exposed to Particulate Matter?

1. We are always exposed to particulate matter, especially in areas where many motor vehicles are present. Long-term exposure are more likely to affect people who live by busy roads. Not only particulate matter can affect us when outside, it can also affect us when we are inside, such as smoking or other sources of exposure at work.

D. Should current PM guidelines be reconsidered?

1. Absolutely, because recommended guidelines for long-term and short-term exposure to particulate matter will ease the affects to health. Reductions of PM concentrations have been shown to have positive affects on the public's health. Before, there were no specific guidelines on exposure, but due to the research in recent years of its affect on health, guidelines are to be reconsidered.

E. Are certain population groups particularly vulnerable?

1. Certain population groups are particularly vulnerable. This includes those who are regularly exposed to large amounts of pollutants in the air, people of old age, people with certain diseases. This also includes individuals that are naturally more sensitive to pollutants in the air, such as young or unborn children, and people who have a genetic disposition.

F. Improvements with design?

1. The only improvement is to follow through with the procedures.

G. Impact beyond classroom?

1. Knowing how much particulate matter is in the air can tell us just how good our air quality really is. It can tell us if we need to improve the quality and extent to how we can strive to improve the quality.

H. Compare?

1. Looking at the different amounts of Particulate Count, my Petri dish had one of the least amounts. The amount was dependent on where I had placed it. Mine was placed at the gazebo, in the courtyard, beside the pond. The courtyard is in the middle of the school, a bit far from the parking lot and road, and has a good amount of vegetation. All of this contributed to the good air quality of the area I put my dish in, therefore resulting in me having one of the lowest amounts of particulate matter.
2. When looking at everyone else's amount of particulate count, theirs are either higher or lower than mine, depending on where they placed their Petri dishes. Let's look at the maximum and minimum. Abel had the least amount. When you see where his was placed you will find that his dish was, too, placed in the courtyard, by the pond, but this time in a tree. But when you see the highest amounts, which is Isaac and Levi, their location can explain why such a big number. Isaac is far out from any trees and is near by the U where the cars drive through to get in the school. Although Levi's Petri dish was hung from a tree, it was near the road, therefore making it collect more particulate matter.

I. PurpleAir

1. PurpleAir is a new device that is being used to find our actual AQI (Air Quality Index). It has an accurate count of PM, and can tell us how good or how polluted the area it is in is. It helps tell us where it is dangerous or safe for us to breathe. The more we learn about the quality of the air we breathe, the more we can improve it.

References

Facts, Green. (15, August 2005). *Air pollution particulate matter*. Retrieved from <https://www.greenfacts.org/en/particulate-matter-pm/index.htm#1>