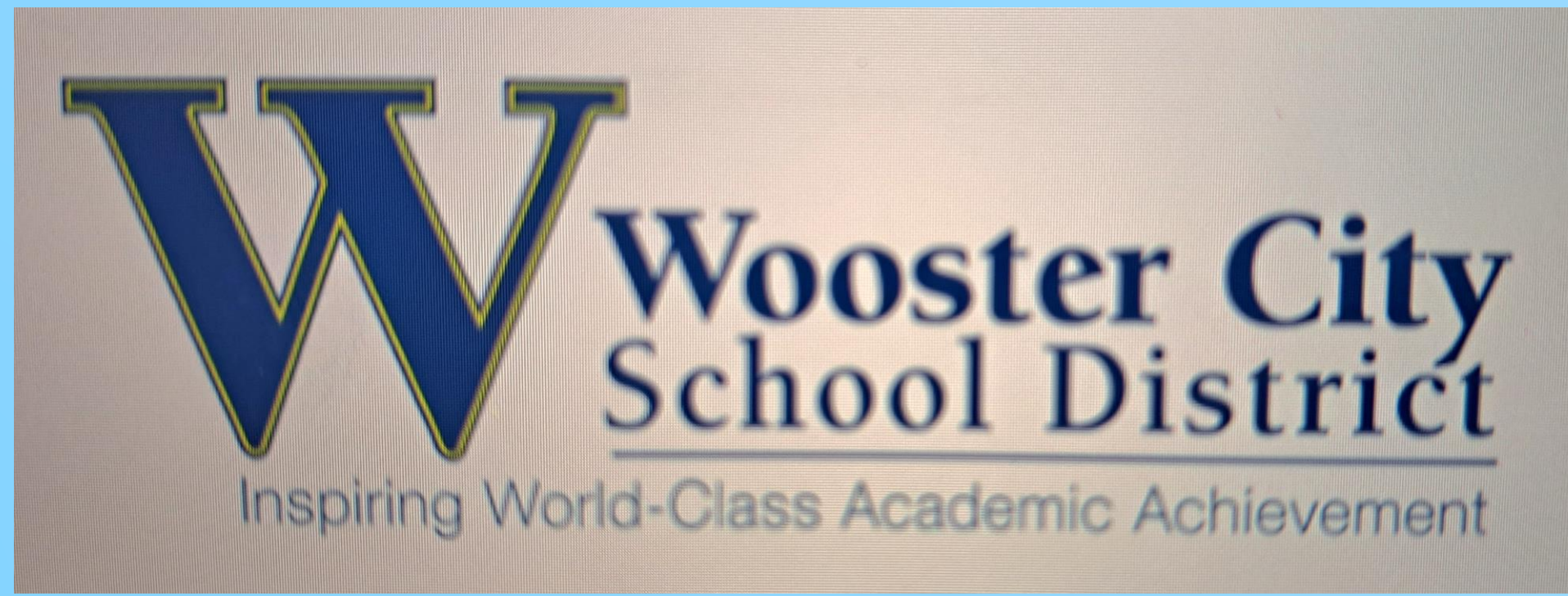


THE JOURNEY OF A DUST PARTICLE



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Abstract

The research question is: When will more dust collect? Two weeks with nobody in the house or two weeks with people in the house? The places tested will be three places in a house that are commonly used: Bathroom, Litter Box, Hallway and three places that are less used: Lizard Cage, Vent, and Piano. This research is important because people can know where to dust their house more often to prevent the spreading of bacteria and dust allergies. Because there is so much dust in many peoples' houses, on a sunny day you may be able to see dust floating around the air you breathe, silhouetted by a ray of sun. When preparing this project, the surfaces of the testing sites were wiped with a disinfecting wipe to ensure there were no dust particles present before testing, and a piece of double-sided tape was stuck there. After two weeks the tapes were removed and placed on a piece of graph paper. Out of all the squares on the graph paper only the boxes with the most visible particles were recorded. The results showed the Hallway had the most dust particles when there was nobody in the house with one hundred and ten particles. When there were people in the house the litter box had one hundred and one particles. Indoor temperature data was compared with outdoor temperature data using www.wunderground.com. In conclusion people should commonly dust s and litter boxes if they have a cat.

Research Question

When will more dust collect? Two weeks with nobody in the house or two weeks with people in the house?

Hypothesis

There will be more dust when people are in the house compared to when there are no people in the house.

Introduction

The purpose for this project is to find out how much dust settles over a two-week period of time. This is important because dust can be very abundant and influences bad air quality. The areas tested were three spots in my house which are commonly used every day (Vent, Litter Box, and Bathroom) and three spots that are not used very much (Lizard Cage, Hallway, and Piano). There were two different time periods tested, which were two weeks of being home and two weeks of not being home.

Research Methods

1. Wipe clean the places where the tape would be placed
2. Place down the tape
3. Wait two weeks
4. Collect samples
5. Place tape on graph paper and label location
6. Count number of dust particles per square
7. Record data

Materials

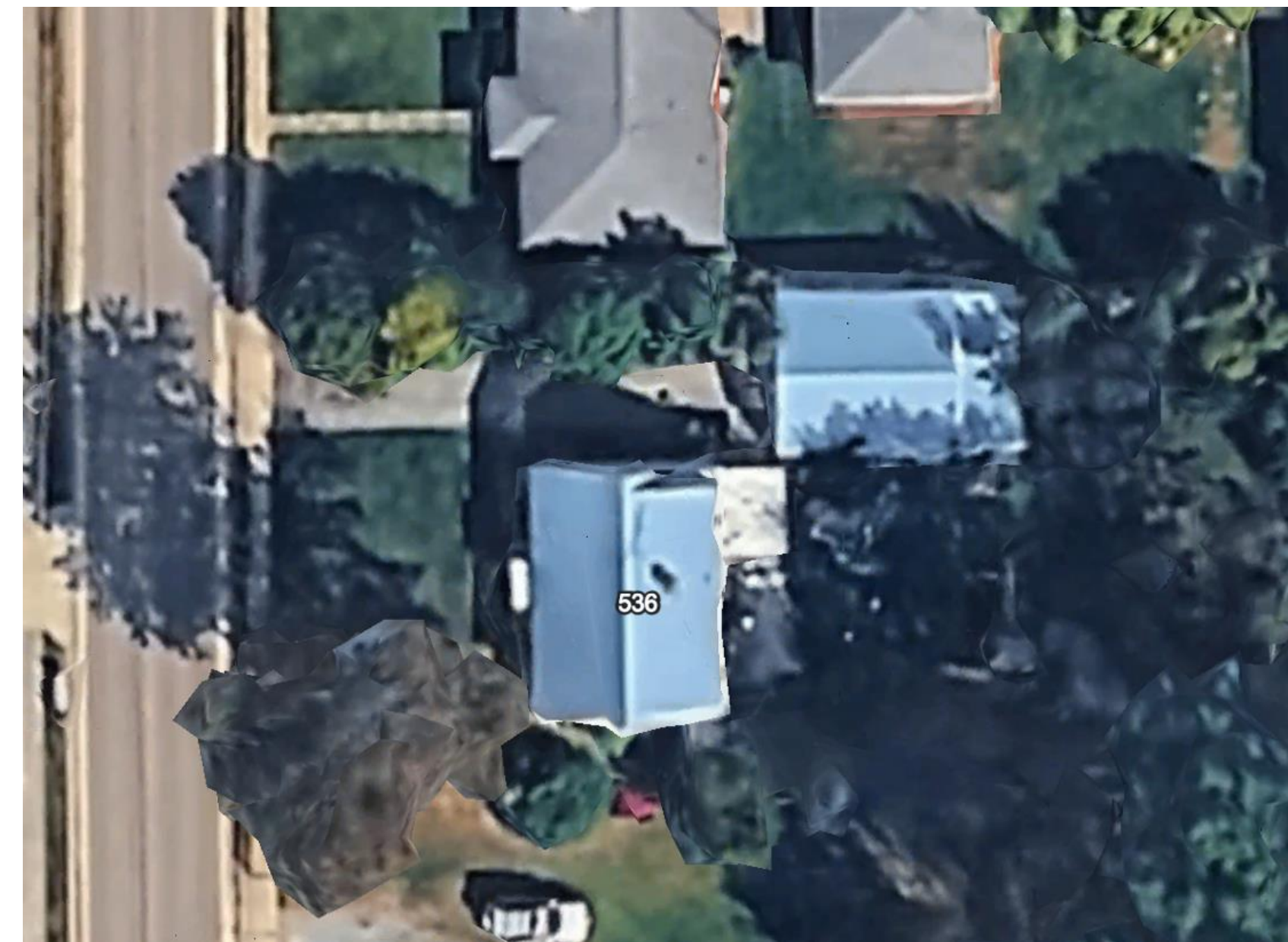
- Double sided tape
- Box cutter
- Scissors
- Graph Paper
- Plastic Baggies
- Magnifier



GLOBE Data Used

I decided to base my project around the GLOBE Program Air Temperature and Clouds Protocol (all GLOBE dust observation data come through Clouds Protocol).

Dust Collection Location:



Dust Collection



Results

Two weeks with four people in the house

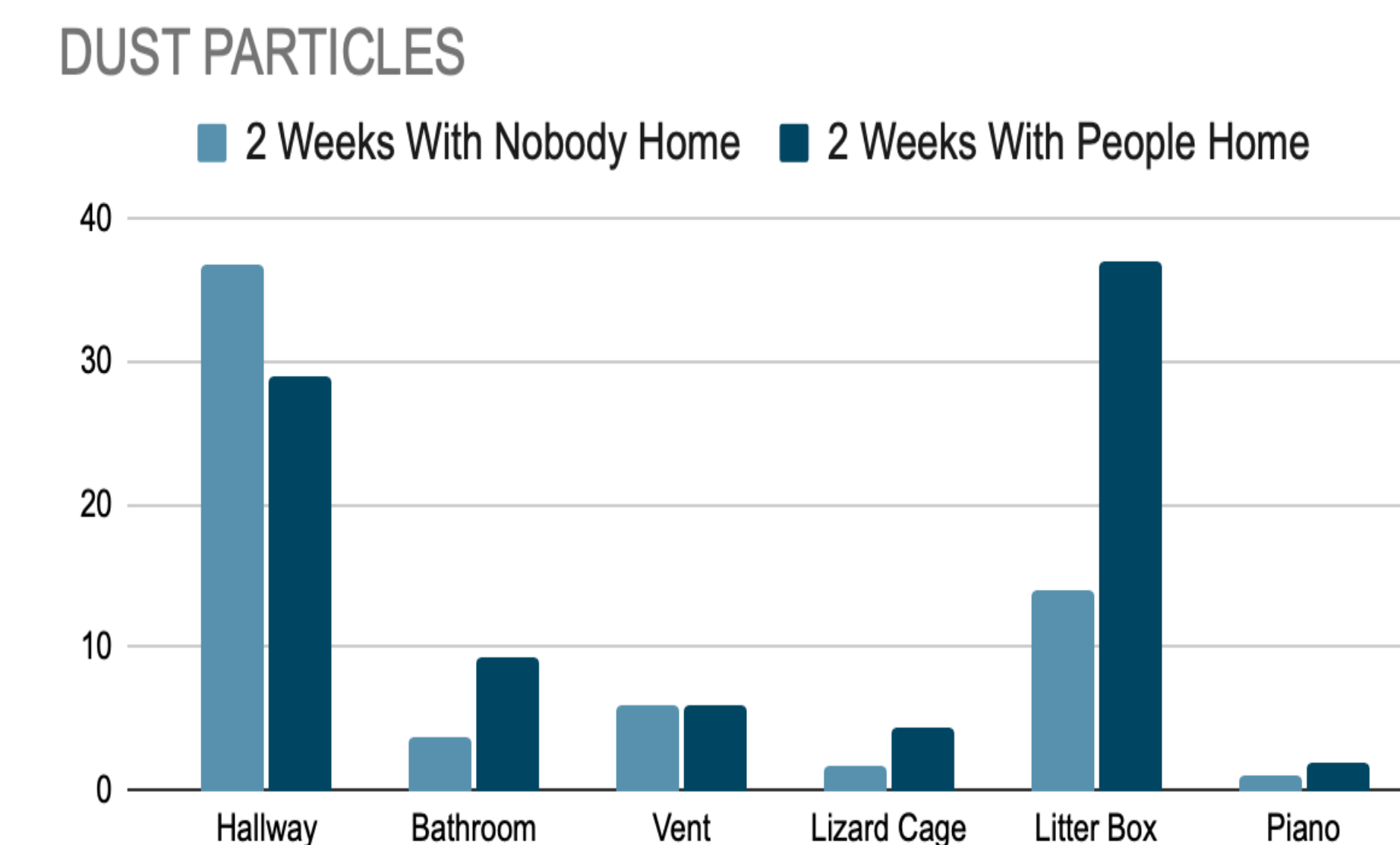
Example: Graph Box / Number of Particles

Lizard Cage	Vent	Litter Box
1/7	1/10	1/40
2/3	2/5	2/39
3/3	3/3	3/32
Average: 4.33	Average: 6	Average: 37
Hallway	Bathroom	Piano
1/38	1/10	1/4
2/25	2/10	2/1
3/24	3/8	3/1
Average: 29	Average: 9.33	Average: 2

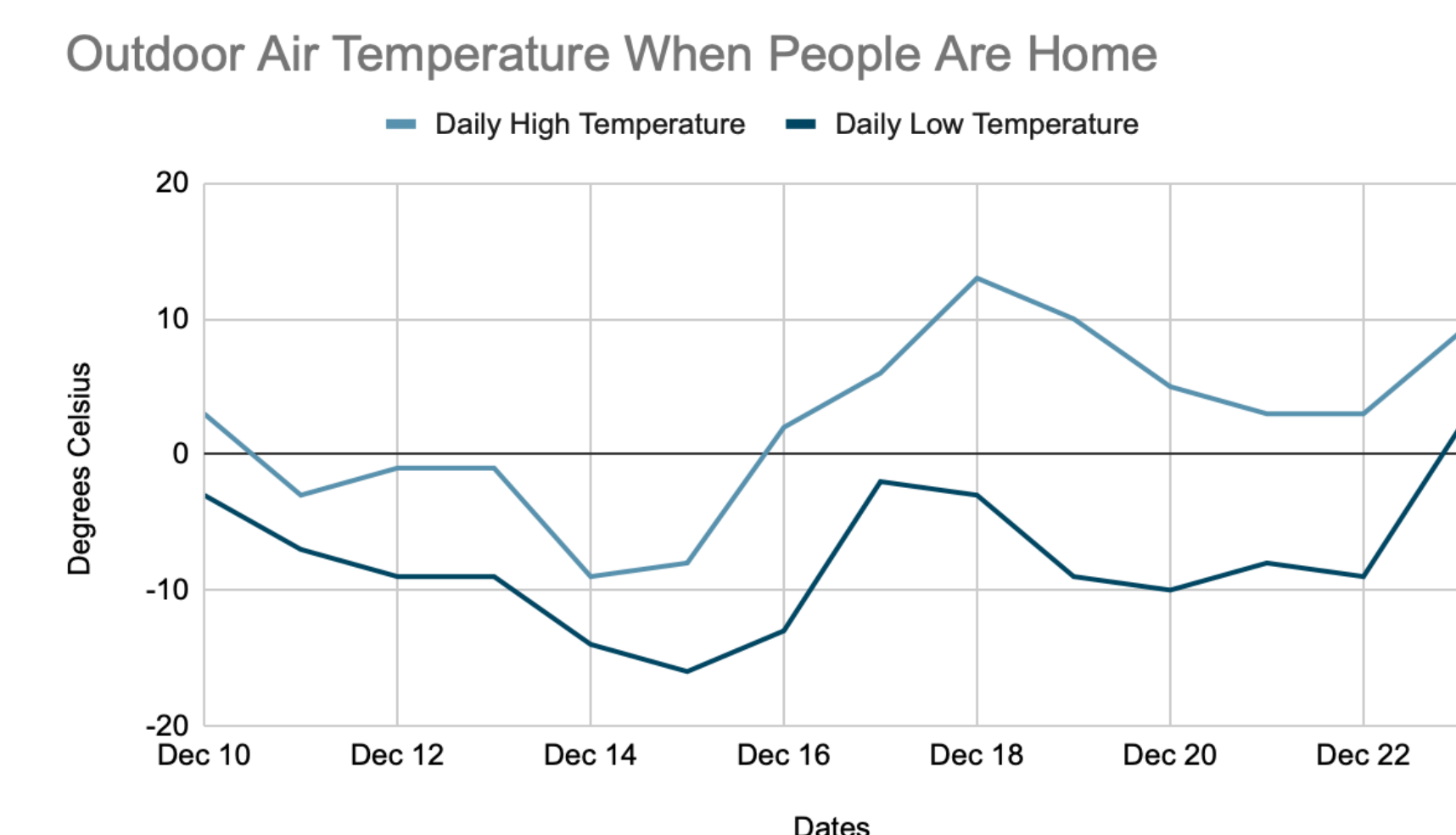
Two weeks with nobody in the house

Lizard Cage	Vent	Litter Box
1/2	1/8	1/16
2/2	2/5	2/14
3/1	3/5	3/12
Average: 1.67	Average: 6	Average: 14
Hallway	Bathroom	Piano
1/42	1/5	1/1
2/38	2/3	2/1
3/30	3/3	3/1
Average: 36.67	Average: 3.67	Average: 1

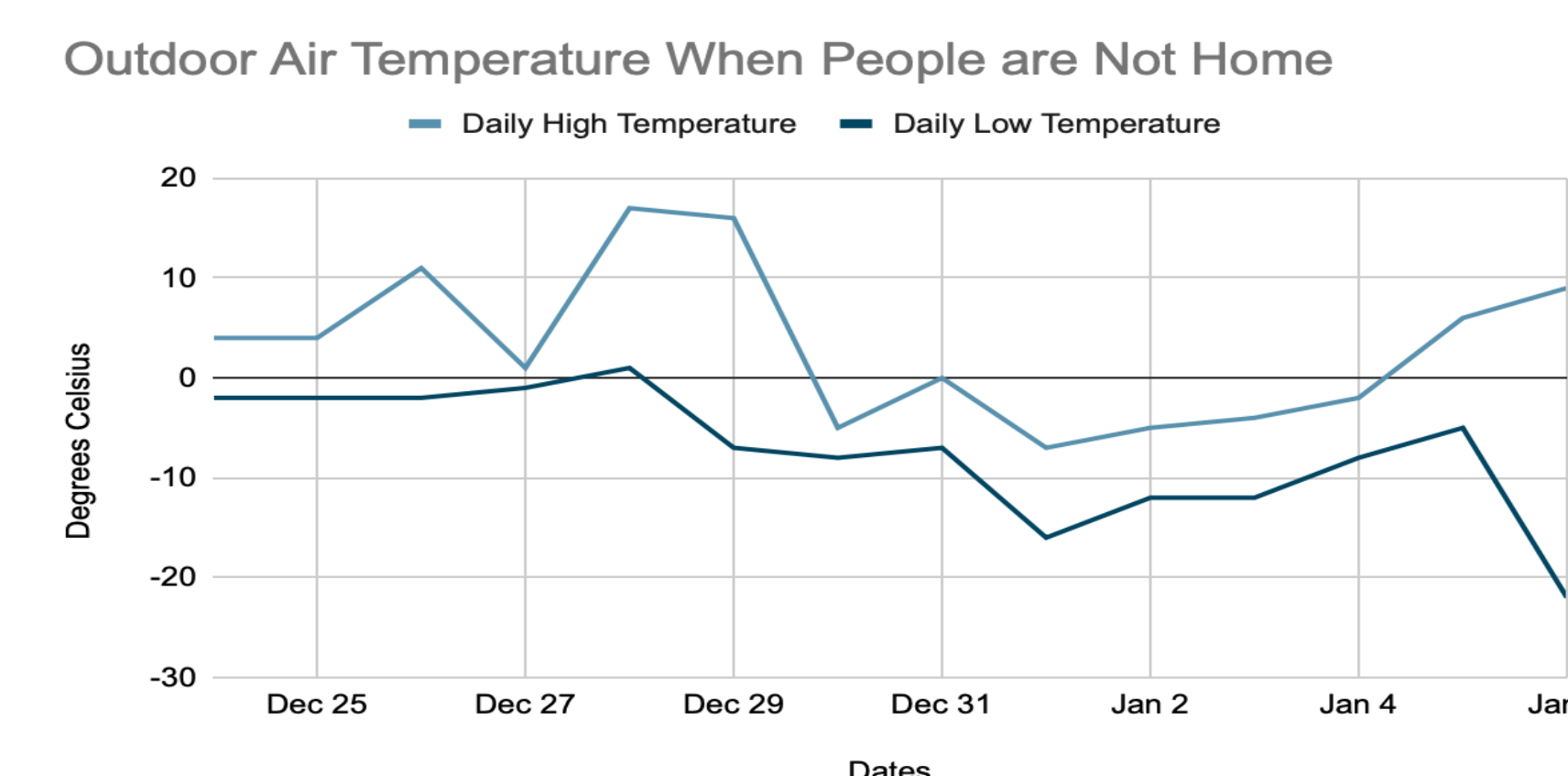
Graph 1:



Graph 2:



Graph 3:



Analysis and Discussion

The results for when there was nobody home were only three particles around the piano, which were the least. Second to least were the lizard cage with only five particles, then the bathroom with only eleven. The vent had eighteen particles, and the litter box (did not count chunks of litter) had forty-two. Finally, the most particles were found in the hallway with one hundred and ten.

The results for when there were people at home were the least from the piano, then the lizard cage with thirteen, and the vent with eighteen. The most were the bathroom with twenty-eight, then the hallway with eighty-seven. Finally, the most dust was found near the litter box (did not count chunks of litter) with one hundred and one.

Our furnace turns on when the indoor temperature drops below our setting of 19 degrees Celsius. Because the outdoor temperature was always below 19 degrees Celsius, our furnace ran often, causing much air movement within our house. The furnace would impact dust collection indoors, because there will be more air moving when the furnace is running.

Conclusions

In conclusion the data did support my hypothesis for there were a total of two hundred and forty-eight dust particles when there were people home and only one hundred and eighty-nine dust particles when there was nobody home. The big surprise about this project was there were more dust particles in the hallway when there was nobody home compared to when there were people walking around. Outliers like this go against the norm. Why was there more dust in the hallway when nobody was home? It is very hard to tell; there was nobody there!

This experiment, however, does tell me dust can settle anywhere even if there are people walking around or not. Perhaps not as much, but dust is accumulating whether or not anyone is present or not. The dust particles could also have been kicked up while there were people walking around, not giving them a chance to settle, and again, without anyone there, it is very hard to tell.

NEXT STEPS

If I were to do this project again I would most likely choose to test out different places in my house like close to a door or inside of a vent. This data could help people where to put air filters and when to replace air filters in their houses.

If I were able to get permission, I would be curious to see how much dust accumulates at school, a factory, nursing home, or woodworking shop. Big factories and woodworking shops can accumulate large amounts of dust. Hospitals and nursing homes can also gather heaps of dust. If there is this much dust in a house with only four people and a cat one can only imagine how much dust could settle inside of a facility with many people. Also, I would collect outdoor dust and maybe even outdoor temperature readings. Looking further I did eventually look at outdoor temperature and found out that the outdoor temperature did have an impact with dust readings inside the house, causing the furnace to run more frequently the colder it got outside.

Bibliography

- Butte, W. "Pollutants in house dust as indicators of indoor contamination." *Europe PMC*, <https://europepmc.org/article/med/12206053>. Accessed 11 November 2025.
- Cowie, Claire. "What is Dust? Understanding the Tiny Particles to Better Industrial Dust Control." *WeatherSolve Structures*, 19 December 2024. <https://www.weathersolve.com/industrial-dust-control/>. Accessed 10 November 2025.
- "Dust Particle." *Science Direct*, <https://www.sciencedirect.com/topics/materials-science/dust-particle>. Accessed 10 November 2025.
- GLOBE Program. www.globe.gov. Accessed 10 November 2025
- "UNDERSTANDING DUST PARTICLE SIZE." *RabbitAir*, https://www.rabbitair.com/blogs/air-purifier/understanding-dust-particle-size?srsltid=AfmBOoqf5pVDxJl_qQsa-o232fmB8csUkLAhVJTJsrvcKr9OEc5byfkJ. Accessed 10 January 2026.
- Weather Underground. <https://www.wunderground.com/calendar/us/oh/smithville/KBJJ>. Accessed 28 January 2026.
- "What is Dust Made of? Dust Particle Sizes & Composition." *MOLEKULE*, 07 4 2022, https://moekule.com/blogs/all/what-is-dust-made-of-dust-particle-sizes-composition?srsltid=AfmBOorjD_zlnFJBjUW73ybfp3Pbyu8yffUlpODRzPyZekZ0YxeSd. Accessed 10 January 2026.