The Impact of Air Pollution on Global Warming

Purpose

The purpose of my science project is to raise awareness about air pollution and how it contributes to global warming. I also wanted to measure and compare the levels of air pollution in different locations. Greenhouse gases, such as carbon dioxide, methane, nitrous oxide, and black carbon, trap heat in the Earth's atmosphere, leading to global warming. Air pollution also creates aerosols, like dust and soot, which can absorb sunlight and affect the climate. According to the Environmental Protection Agency, these pollutants play a significant role in climate change. I am interested in studying air pollution because it is one of the main contributors to global warming. By understanding and reducing air pollution, we can take important steps toward slowing climate change

Hypothesis

My hypothesis is that air pollution levels will be higher outdoors than indoors because cars, dust, smoke from fires, and other sources of pollution are more common outside. Therefore, I predict that there will be less air pollution found inside compared to outside locations.

Materials

Petroleum Jelly
Index Cards
Tape
Bread ties
Phone/Camera

Experiment

- First, I selected different indoor and outdoor locations to test the air quality.
- collected air pollution samples by spreading petroleum jelly evenly on index cards.
- I placed the index cards in four different locations: inside my house, outside my house, inside a car, and on the school fence.
- I taped the inside and outside cards securely in place and used bread ties to attach the card to the school fence.
- I also included one “traveling” card that moved between locations (inside, outside, and in the car). I changed its location every Sunday for three weeks.
- All cards remained in place for three weeks.
- I took pictures of each card every Sunday to document the amount of air pollution collected over time.
- Variables I could not control included weather conditions such as rain and wind, possible interference from people, and natural differences in pollution levels at each location.

Results

- Over the three-week testing period, the cards placed outdoors collected the most visible air pollution particles. The card that was lying flat outside collected more particles than the card attached vertically to the fence. This suggests that the position of the card affected how much pollution it was able to collect.
- The indoor card collected less pollution compared to the outdoor cards. The traveling card showed different amounts of pollution depending on where it was placed that week. Overall, the data showed that outdoor locations had higher levels of visible air pollution than indoor locations.
- The graph provides a visual estimate of the amount of pollution collected on each card during each weekly observation. My hypothesis was supported because the outdoor locations showed more air pollution than the indoor location.

Graph/Chart

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Particals:	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100+	
2	Location:												
3	wk 1-travel	x											
4	wk1- Inside	x											
5	wk1- Car	x											
6	wk1- Fence	x	x										
7	wk1- outside	x	x	x									
8	wk2 - Travel	x	x										
9	wk2 - inside	x											
10	wk2 - Car	x											
11	wk2 - Fence	x	x										
12	wk2-outside	x	x	x	x	x	x						
13	wk3 - travel	x	x	x	x								
14	wk3 - Inside	x	x										
15	Wk3 - Car	x											
16	Wk 3- Fence	x	x	x	x	x							
17	wk3 - Outside	x	x	x	x	x	x	x	x	x	x	x	
18													
19													

Conclusion

- This project is important because air pollution plays a major role in climate change and affects the health of people, animals, and the environment. My results showed that more air pollution was found outdoors than indoors, likely because outdoor areas are directly exposed to vehicles, dust, and other pollution sources.
- Understanding where pollution is most concentrated can help us make better decisions to reduce it. Reducing the use of gasoline-powered cars, supporting cleaner energy sources, and making environmentally responsible choices can help lower air pollution. Lower air pollution can reduce greenhouse gases, which contribute to global warming.

What Did I Learn?

- By studying air pollution, we can take small but meaningful steps toward protecting the Earth and improving air quality for all living things.
- Air pollution can be collected and observed using simple materials like petroleum jelly and index cards.
- Outdoor areas had more visible air pollution than indoor areas.
- The position of the card (flat vs. vertical) affected how much pollution was collected.
- Environmental factors such as wind and rain can influence results.
- Testing over several weeks helps provide more reliable data.
- Air pollution is connected to larger environmental issues like climate change.

Background and Research

- Environmental Protection Agency (EPA). Climate Change Impacts on Air Quality. August 11, 2025. http://epa.gov/climate-change-impacts-air-quality
- Compassion in world farming. Compassion Submits a Petition Urging a Global Reduction in Meat and Dairy to Help Reduce Greenhouse Gases. May 5, 2022. https://www.ciwf.com

Future Research/What Can Be Done Next

- Test more locations (near busy roads, parks, parking lots, classrooms, etc.) to compare pollution levels in different environments.
- Leave the cards out for a longer period of time to see if results change over months instead of weeks.
- Measure pollution during different seasons to see if weather affects air quality.
- Use a digital air quality monitor to collect numerical data and compare it with the petroleum jelly method.
- Test how weather conditions like rain, wind, or temperature impact how much pollution is collected.
- Investigate specific sources of pollution (for example, comparing high-traffic areas to low-traffic areas).

Week 3 - Travel -Car
Week 3 - Inside

Week 3 - Inside
Week 3 - Car

Week 3 - Car

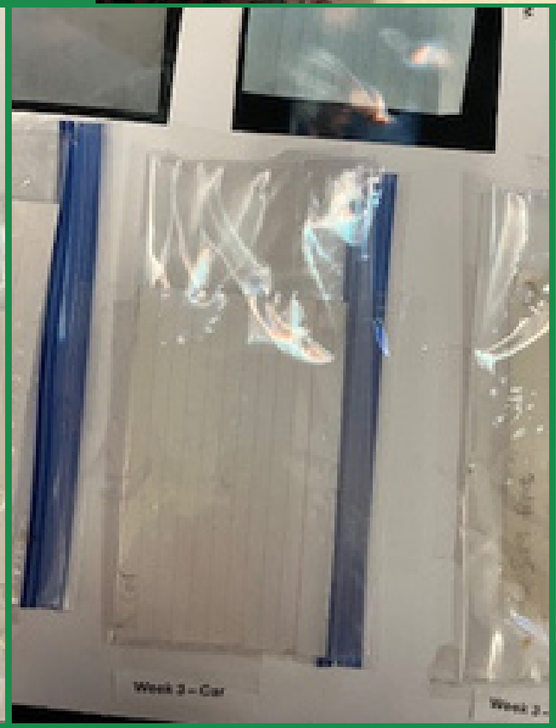
Week 3 - Fence

Week 3 - Outside

Week 3 - Outside

Week 3 - Travel -Car
Week 3 - Inside

Week 3 - Travel -Car
Week 3 - Inside


Week 3 - Car

Week 3 - Inside

Week 1 - Fence
Week 1 - Outside
Week 2 - Fence
Week 2 - Outside

Week 1 - Outside
Week 2 - Outside

Week 1 - Outside
Week 2 - Outside

Week 2 - Fence
Week 2 - Outside

Week 2 - Inside
Week 2 - Car

Week 2 - Inside
Week 2 - Car

Week 2 - Car
Week 2 - Fence

Week 2 - Inside