Lab Report: Idle Free Schools, A study of Eagle Peak Carbon Emissions by the Week-Day
(Experiment: Using the Scientific Method)

--------------------1. Guiding Question:------------------------

How does **the day of the week** affect the **amount of carbon emissions EPMS idling vehicles release?**
(independent variable)   (dependent variable)
Testing   ~Measuring

----------2. Introduction (Research/Background Knowledge, and Sources):----

What is the **Problem**? Some problems facing our society is... global warming is accelerated by cars releasing CO_2 when they burn gasoline. This air pollution can cause asthma, heart conditions and cancer to be agrivated.

This problem is **caused** by not turning off the car, and letting it run while you sit still. This is called idling.

One possible **solution** to the problem might be shutting off your engine if you idle for more than 10 second.

Facts about Carbon Emissions at Schools:
- Carbon emissions can cause cancer
- Carbon emissions can damage children's brain cells
- Carbon emissions from idling wastes gasoline, which wastes money.
- About 1/3 of a gallon of gas is wasted by 1 hour idling.

Source:

1. Green Driving America web site. Schools Are not Drive Thrus! green driving america.org/sant. html. NOV 28, 2022

----------------------3. Variables:----------------------

Independent Variable (factor that I am testing/changing between each trial):

The Day of the week

Dependent Variable (responding factor that I'm measuring):

Amount of Carbon Emissions EPMS idling vehicles releases

Control Variables (factors that I have to keep constant [same] so that it will be a fair test):

_____

-------------------4. Hypothesis:----------------------

If _I measure & calculate carbo emissions at EP for each day of_

(I make these changes to the **independent variable**) the week

then _Monday? will have the highest carbon emissions_

(the **dependent variable** will respond in this way)

because: _there will be more people refreshed from the_

weekend coming to school than on other days.

(what research said that makes me think that this is how the dependent variable will respond)

----------------------5. Materials:----------------------

Each Researcher should have:
- Clipboards
- Pens
- Watches or Cell Phones that tell time
- 20 Observers to collect data each day

----------------------6. Procedures:----------------------

1. The following steps will be done for several days in a row, right after school, during pick-up time (2:35-3:00pm)
2. Groups of students take data sheets watches and clipboards out to "drop-off/pick-up" zones of school campus 10-15 minutes before drop-off
3. Students record **data** about vehicles in the zones, including: Type of Vehicle (V=car, T=Truck/SUV), Vehicle Description, Arrival Time, Is Vehicle Idling?, Depart Time and # Minutes Idling (if idling). One group of 10 students will be in the Bus Area and one group of 10 students will be in the Front Circle Area. Students will work in groups of 4.

-------------------7. Data Collection:------------------

(*Raw Data and Calculations are located on separate Data Collection and Observation Forms)

Data collection dates: _12-5_ , _12-6_ , _12-7_ , _____ , and _12-2_

Average Temperature Across Data Collection Days: _(49+52+54+47)÷4=_(50.5°F)_

Weekday	Total Idling Fuel Consumed on this weekday (gal of gas)	Total Idling Carbon Emissions on this weekday (lbs) round to whole #
Monday	1.51	30. ~~~~
Tuesday	0.97	19. ~~~~
Wednesday	1.20	24
Thursday	___	___
Friday	2.06	41 ~~~~

$(30 + 19 + 24 + 41) \div 4 = 114 \div 4 =$

Average for All 5 Days:

(Average = Total each column, then divide by # of days: $\cancel{5}$) 4	Average Idling Fuel Consumed on a weekday (gal of gas)	Average Idling Carbon Emissions on an average weekday (lbs)
Averages ------→	$(1.51 + 0.97 + 1.20 + 2.06)$ $\div 4 =$ __1.44__ Gals of Gas 🚗	__28.5__ lbs of ~~Carbon Dioxide~~ 🚗

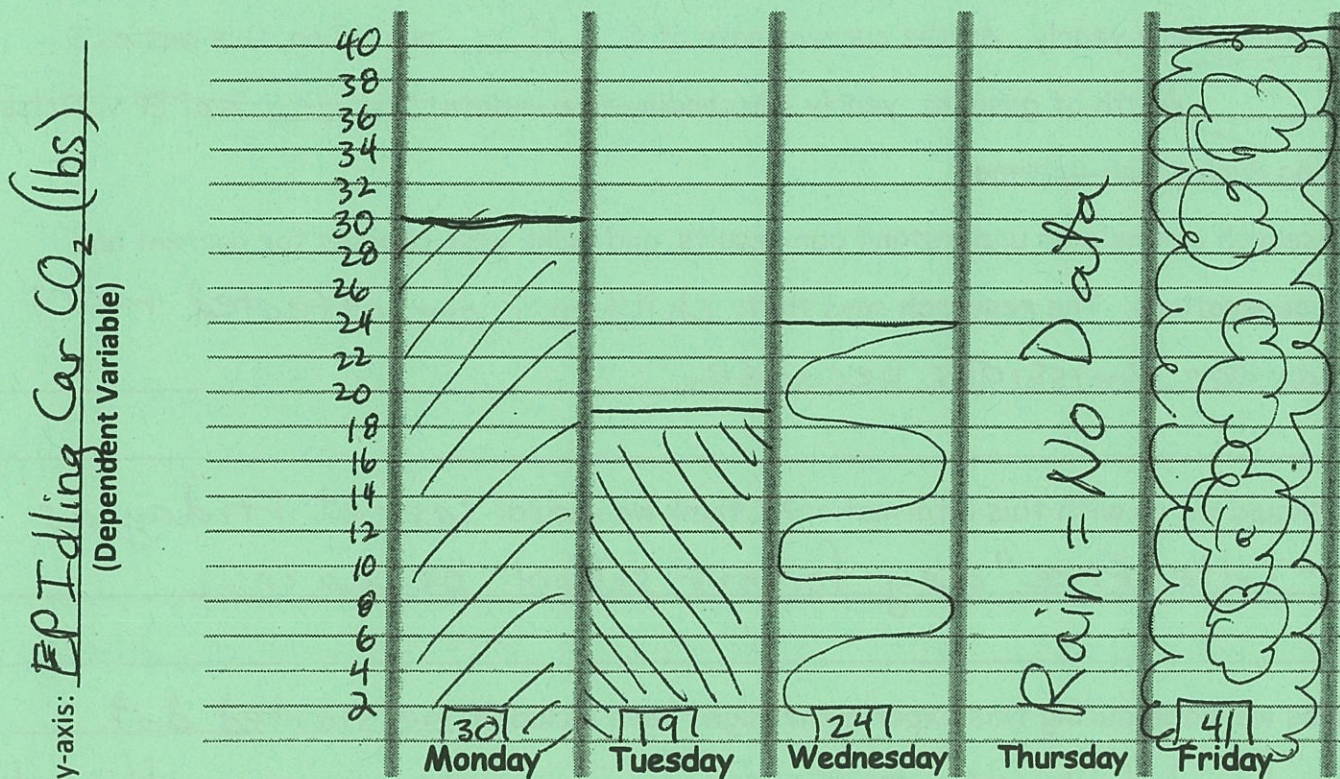## Extrapolation of Data: Annual Calculations

(Average) Gasoline Consumed Yearly:	(Average) Amount of Carbon Emissions Yearly:
(# Gals of Gas x 175 days=) $1.44 \times 175 =$ __252 gals.__	(# lbs of Carbon Dioxide x 175 days=) 28.5×175 $= 4,987.5$ lbs

------------------ 8. Observations:------------------

(*See Data Collection and Observation Forms)

9. Graph: Amount of Carbon Dioxide Released into Atmosphere by Idling EP Cars:

y-axis: EP Idling Car CO_2 (lbs) (Dependent Variable)

| 40, 38, 36, 34, 32, 30, 28, 26, 24, 22, 20, 18, 16, 14, 12, 10, 8, 6, 4, 2 |

|30| Monday |19| Tuesday |24| Wednesday Rain = No Data Thursday |41| Friday

x-axis: __Day of the Week__

(Independent Variable)

------------------10. Results (Data Analysis)------------------

The **data table** shows: _the amount of gasoline consumed by idling_
A **trend** I noticed on the graph is: _cars, and the amount of carbon emissions_
for each day.

This means that: _there ~~was~~ less idling and carbon emissions in_
the middle of the week

Mondays & Fridays contribute most to carbon
--------------------11. Conclusion:-- _emissions_ ----

Was my hypothesis correct? I **conclude** that my **hypothesis** was: ___not correct.___

The data can be used as **evidence** (proof) to prove my conclusion. The **data** we collected

supports my conclusion in the following way: _there was approximately_
41 lbs of carbon emissions released on Friday
& 30 lbs of carbon emissions released on Monday.

According to **the Extrapolation of the Data**, Eagle Peak idling cars consume ___252___

gallons of gas yearly, which contributes (adds) ___4,988 lbs.___ of carbon emissions to the

school atmosphere yearly. At the current rate of $ ___4___ per gallon, this wastes $

_____ worth of gasoline, yearly. ~~According to our data,~~ _____ % of EP vehicles

~~are idling during pick-up time.~~

The research can help us understand our results, and make wise choices for current and

future generations. The **research** says that: _children are affected more_
by carbon emissions because...

_____

What should we do with this information? I think we should: _target Friday as_
an "Idle-Free" day for our school because...

_____

Mistakes we made during this experiment might have included: _we started dat_
collection late in the season when more people are idling to
enough
Keep heaters on. We did not have data collection after
the bell rang. Often, the end-time was not recorded.