Name _____

Date _____ Per. _____

Car Emissions

Background

Automobiles are one of the biggest contributors to airborne pollutants. In addition to gaseous primary pollutants like carbon monoxide and carbon dioxide produced by the engines, they also kick up road dust. A car's emissions also contributes to the production of secondary pollutants like volatile organic compounds (VOCs), nitrogen oxides (NO_X), and even trace amounts of carcinogens like formaldehyde.

The pollutant that usually takes the spotlight is, of course, carbon dioxide. Contributions of carbon dioxide in our atmosphere have been increasing since the industrial revolution over a century ago. While some sources of carbon dioxide are natural, the Intergovernmental Panel on Climate Change (IPCC) has, after years of data gathering and analysis, determined that a significant portion of this carbon dioxide is anthropogenic – a direct result of human activity.

The combustion of fossil fuels adds carbon dioxide to the atmosphere very quickly, and in relatively large amounts. Your car's engine, along with every other car on the road, is the most immediate way we add to the increasing carbon dioxide levels. In this internet activity, you will compare various car models and rate their impact on the atmosphere.

Procedure

1. Go to http://www.fueleconomy.gov/feg/findacar.shtml
2. Enter information for an automobile your family owns. Click "GO." You may need to verify the car you selected if multiple versions of the model exist. The average person drives about 12,000 – 15,000 miles per year, so for comparison's sake, an average of 13,500 miles will be used for all vehicles.
3. On the "Fuel Economy" tab, find the number of gallons per 100 miles the car uses and record that information in *Data Table 1*.
4. Click on the "Energy and Environment" tab. Under the "Greenhouse Gas Emissions" section, select "Units: grams per mile" and "Show: Tailpipe CO_2" from the dropdown menus. Multiply the value shown by 0.1 to calculate the kilograms of carbon dioxide produced per 100 miles.
5. Multiply the Annual Mileage by the CO_2 per 100 miles (kg) and divide by 100 to calculate the Annual CO_2 Produced per 100 miles.
6. Repeat steps #2 – 5 for 5 more cars that your family and friends own, and then once more for a seventh "dream" car.
7. In *Data Table 2*, repeat this process again for 3 cars that you believe to have good gas mileage, and therefore low emissions.

Data Table 1

Family & Friend's Cars

Car: Make, Model, Year	Annual Mileage (Estimate)	Gallons per 100 miles	CO_2 per 100 miles (kg)	Annual CO_2 Produced per 100 miles (kg)
1.	13,500			
2.	13,500			
3.	13,500			
4.	13,500			
5.	13,500			
6.	13,500			
7.	13,500			

Data Table 2

Family & Friend's Cars

Car: Make, Model, Year	Annual Mileage (Estimate)	Gallons per 100 miles	CO_2 per 100 miles (kg)	Annual CO_2 Produced per 100 miles
1.	13,500			
2.	13,500			
3.	13,500			

Results & Analysis

On a separate sheet of paper, answer the following questions thoroughly using complete sentences. You may complete your work on the computer. Staple your work, including any graph(s) to the back of this paper.

1. On a piece of graph paper (or the computer), create an appropriate graph to illustrate a comparison between all 10 cars' Annual CO_2 Produced per 100 miles. If you draw your graph, be sure to use a ruler and do so neatly.
2. Which car was the best performer based on carbon dioxide emissions? Which was the worst?
3. Considering what you know about each of the automobile's specifications, are there any trends among cars with a high carbon dioxide output? Describe the trend(s) you notice.
4. Were there any surprising results of your investigation? Explain.