CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
J1118

Project Title
The Costs of Idling

Abstract

Objectives/Goals
I estimated the amount of fuel used by idling cars in my school#s pick-up line, then calculated the amount of CO2 emitted and the cost of the fuel wasted. I compared the CO2 and money wasted before and after hanging signs in the parking lot.

Methods/Materials
I recorded the following information for every car that arrived in the pickup line on 3 days: car number, arrival time, make/model, car type, idling or off, and departure time. I estimated the fuel wasted/hour of idling for different types of cars by idling in my neighbors# cars. I determined the amount of fuel wasted by idlers, the amount of CO2 produced (0.607kg CO2 per gallon of fuel) and the amount of money spent ($4.00/gallon fuel).

I posted signs in the pick-up line describing the costs of idling and recorded the number of idling cars on 2 days as described above. I calculated the change in CO2 emitted and money wasted before and after the signs.

Results
Before hanging the signs, 63/142 cars idled for an average of 10min. 52sec. All the cars used an average of 1.18gallons/day of fuel. This would produce 0.72kg of CO2/day. This costs $4.56/day for all the cars in the pick-up line. Assuming these results are consistent throughout the year, 128.88kg/year of CO2 would be emitted wasting $820.80/year.

After putting up the signs, there was an 8.8% decrease in the number of idlers. The average time idling for each car went down 2min. 5sec. that reduced the total idling time by 51min. 55sec. Only 0.89gallons/day of fuel were wasted. All the cars in the pick-up line produce 0.54kg of CO2/day and cost a total of $3.56/day. This produces 97.41kg of CO2/year and costs $641.34/year.

Conclusions/Discussion
Every idling car in the pick-up line releases approx. 9.5kg of CO2/year - the amount that a Redwood absorbs while photosynthesizing/year. Since there was an average of 21 cars idling in the parking lot/day, it would take 21 Redwoods to consume the CO2 produced by idlers. If there are about 2,000 middle and junior high schools in the USA and each one has 21 idlers per day, then we would need 42,000 Redwoods to absorb the CO2.

Summary Statement
The costs of idling cars in the middle school pickup line in terms of fuel wasted and CO2 produced.

Help Received
Dad helped glue papers on board and drove neighbor's vehicles to determine amount of fuel wasted while idling.