

Second Wedge Exercise from Improving Cars' Fuel Efficiency, Name _____
(passed out Feb 26, due Feb 28)

Definitions and Assumptions:

One "Wedge" is defined as eliminating 1 GTC of carbon emissions per year by the year 2050

One GTC is 1 billion metric tons of C (a billion is 1,000 million)

One metric ton is 1,000 kilograms (kg)

1 kg of C is the same as 3.67 kg of CO₂

Assume that burning a gallon of gasoline releases

8.8 kg of CO₂

Assume that "overhead emissions" for producing gasoline add:

25%

So the total emissions associated with on gallon of gasoline is:

11 kg of CO₂

Question #1. How much CO₂ emissions must be eliminated by the year 2050 to get one wedge?

_____ billion kilograms/year

Question #2 Suppose there will be 1,500 million vehicles in use in 2050 and their average use is 12,000 miles per years. What is the total, annual travel by all vehicles in 2050? (be sure to give your answer with the units shown next to the space for your numerical answer).

_____ billion miles/year

Question #3: Suppose the vehicles' average fuel efficiency is **25 mpg**. How much gasoline would be consumed in 2050?

_____ billion gallons/year

Question #4. How much CO₂ emissions would be associated with this gasoline use?

_____ billions of kilograms/year

Question #5: What is the CO₂ emissions in the year 2050 if there were one wedge of improvement?

_____ billion kilograms/year

Question #6: What much gasoline would be consumed in 2050 if there were "One Wedge" improvement?

_____ billions of gallons/year

Question #7. What is the average fuel efficiency of the vehicles in 2050 if there were "One Wedge" improvement?

_____ miles per gallon