

## Car Economics

### Introduction

Have you, or someone you know, bought a car recently? What factors were taken into consideration in choosing the car: the make, model, safety, reliability, how 'cool' it looks? For many people, the cost of the vehicle often comes into play, and increasingly, people are also thinking about fuel economy. Fuel economy measures how far a car can travel on a gallon of gas and is usually expressed as "miles per gallon." The more miles per gallon a car can travel has both economic and environmental benefits. Going further on less fuel saves money, and a vehicle with high fuel economy does more to help protect the planet.

Every gallon of gasoline burned releases roughly 20 pounds of carbon dioxide into the atmosphere. So, the less gasoline a vehicle needs to travel a certain distance, the less carbon dioxide it will release during that journey. Different makes and models of cars vary significantly in the miles they get per gallon and the dollar amounts on their price tags! Does considering fuel economy in buying a car make sense environmentally and financially? In this activity, you will try to answer that question by going through the process of comparing vehicle costs, fuel economies, and environmental impacts.

The Environmental Protection Agency (EPA) rates the fuel economy of cars for both in-city and highway driving. These ratings are given in miles per gallon (mpg) and are posted on the windows of new cars.

### Instructions

1. The information for Ford vehicles are provided in rows 1-3 in Table 1.
2. Complete the calculations in Rows 4-5 to estimate how much fuel each vehicle would use each year and the related CO<sub>2</sub> emissions. Assume the vehicles would travel 15,000 miles per year, in combined driving conditions.
5. In Row 6, enter the current price for a gallon of unleaded gas (as of April 16<sup>th</sup> the average US price is \$3.92.)
6. Determine how much it would cost to fuel each vehicle for one year.
7. Assume the vehicle would be owned for ten years and driven in the same conditions for 15,000 miles per year. Calculate the 10-year cost of the vehicle (fuel costs for ten years x the original purchase price).
8. Show your work for all of the calculations!

**TABLE 1: MOST & LEAST FUEL EFFICIENT VEHICLES**

		<b>Least fuel efficient vehicle</b>	<b>Most fuel efficient vehicle</b>
1.	<b>Year, make and model</b>	2012, Ford, F150	2012, Ford, Fusion Hybrid
2.	<b>Purchase price</b>	\$23,300	\$28,775
3.	<b>Miles per gallon:</b> city	17	36
	highway	23	41
	combined	19	39
4.	<b>Gallons used per year</b> (based on 15,000 miles per year, combined driving)		
5.	<b>Pounds of CO<sub>2</sub> produced per year</b> (One gallon of gas burned produces 20 pounds of CO <sub>2</sub> .)		
6.	<b>Price of unleaded gas (per gallon)</b>	\$ _____ /GALLON	
7.	<b>Amount spent on gas for one year (in \$)</b> (price x gallons/year based on 15,000 miles per year)		
8.	<b>10-year cost of the vehicle</b>		

**Questions:**

1. How many pounds of CO<sub>2</sub> would you save over ten years by buying the more efficient vehicle?

2. How many years would it take for a person to “break even” and start saving money by buying the more efficient vehicle over the least efficient vehicle? (Hint: you might create for yourself a year-by-year chart so you can see the pattern.)

3. In Table 2 below, list the types of cars your family owns. Look up their fuel economy at [www.fueleconomy.gov](http://www.fueleconomy.gov) and then calculate the annual CO<sub>2</sub> emissions for each vehicle. If you have your own computer you may use it, or you may use my computer to look up your car information.

**TABLE 2: HOUSEHOLD VEHICLE FUEL ECONOMY & CO<sub>2</sub> EMISSIONS**

Car Make and Model	City mpg	Annual CO <sub>2</sub> emissions (based on 15,000 miles / year)

4. The average U.S. passenger vehicle get 19.5 miles per gallon. How many of your family’s vehicles are better than average?

5. Having compared several vehicles through this activity, what are the main factors that would influence your choice of vehicle?

6. According to the US Bureau of Transportation Statistics for 2009 there are 254,212,610 registered passenger vehicles in the US. Calculate, in pounds, how much CO<sub>2</sub> emissions could be reduced if the average mpg for cars in the US increased from the current average to the Ford Fusion Hybrid combined average. If this occurred, by what portion would the total CO<sub>2</sub> emissions of the US (12,296,865,360,000 pounds) decrease? Is it a significant amount? Do you think this shift would be environmentally and fiscally beneficial to our society? Why?