



# Fleet Manager

**STEM Sims**

## Lesson 4: The Fleet

The price of gasoline is one of the main factors that determine the operating costs of a vehicle. For a company with a large fleet of vehicles, a small rise in the price of fuel can translate into much higher operating costs for the company and much lower profits. Business owners are often faced with the difficult decision of whether to spend more money in the short run in order to save money over the long term. Major purchases, like buying a new vehicle for a business, take large amounts of money out of the owner’s pockets. But in a time when fuel costs are very high, large expenditures now might save serious dollars later. Can you help the owner of a fleet of vehicles decide which to keep and which to replace?

### Doing the Science

#### Part I. The Gasoline Fleet

1. Start the Fleet Manager Simulation.
2. Select one of the vehicles in the fleet.
3. Select the “Use” button, then the “Drive” button. When the vehicle completes the route, select the “Status” button.
4. Record in Table 1 below the Vehicle name, Total Distance Driven, and Fuel Used.

**Table 1. Current Fleet Vehicles**

Vehicle	Total Distance Driven (miles)	Fuel Used (gallons)	Miles per Gallon (mpg)

5. Calculate and record in Table 1 the Miles per Gallon rating of the vehicle.
6. Close the box by selecting the “X” in the upper right-hand corner, and then select the “Fleet” button.
7. Select a different vehicle and repeat steps 3-6. Test a total of five different vehicles.

#### Part II. The Decision

8. Select the “Fleet Status” button. Note and record in Table 2 on the next page the total operating cost per mile of the 10-vehicle fleet.
9. Close the box by selecting the “X” in the upper right-hand corner, and then select one of the vehicles in the fleet.

- Select the “Use” button, then the “Drive” button. When the vehicle completes the route, select the “Status” button.

**Table 2. New Purchased Vehicles**

Vehicle	Color	Total Distance Driven (miles)	Fuel Used (gallons)	Miles per Gallon (mpg)	Operating Costs (\$/mile)
<b>Total Current Fleet</b>	-----				
<b>Total New Fleet</b>	-----				

- Record in Table 2 the Vehicle name, Vehicle Color, Total Distance Driven, Fuel Used, and Operating Costs for the vehicle.
- Close the box by selecting the “X” in the upper right-hand corner, and then select the “Fleet” button.
- Select a different vehicle and repeat steps 9 - 12. Test a total of three different vehicles.
- Select the vehicle that you previously tested with the highest operating cost (use the vehicle’s color if you can’t remember the names of the vehicles) and select the “Trade-In” button at the bottom of the screen.
- Shop for a new vehicle by selecting one of the five available models. Once you have completed your selection, select the “Purchase” button. Make sure to record in Table 2 the information about the new vehicle (type and color).
- Repeat steps 9 – 12 to test drive your new vehicle.
- Select the “Fleet Status” button. Note and record in Table 2 the total operating cost per mile of the 10-vehicle fleet.

**What Do You Understand?**

- Which vehicle that you tested in Part I was the most fuel efficient? Explain why you chose this vehicle.

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2. Some vehicle insurance companies charge a higher premium for vehicles of certain colors. For instance, red sports cars are generally charged a higher rate than white sports cars. Construct an explanation on why some insurance companies charge a higher rate for certain colors.

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3. Find out the current average price of gasoline per gallon in your area. Based on this value, determine how much the fuel would have cost to complete the trip for the most fuel-efficient vehicle. Show the work for your calculation.

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4. The United States is one of the very few countries in the world that reports gas mileage in the units of measure called “miles per gallons.” Kilometers per liter is the world’s most common unit of measure of gas mileage. Given: One mile = 1.61 kilometers and one gallon = 3.79 liters. If the price of gasoline was \$2.75 per gallon, what would the price of gasoline be in units of liters?

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5. If a vehicle traveled 28.8 miles, how far did this vehicle travel in units of kilometers?

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6. Convert the units of mileage measure for one of the vehicles in Part I of this investigation from miles per gallon to kilometers per liter.

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7. What happened to the total operating costs of the fleet when you purchased a new vehicle in Part II of this investigation?

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8. Construct an explanation of the tradeoffs a company would make when deciding on whether or not to purchase a new vehicle to replace an existing vehicle in their fleet.

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