

Learning Objective: Students investigate relationships between the quantities involve in driving to the mountains.

The Rocky Mountain Vacation Trip Problem

William was driving with his father, Mr. Pitts, into the Rocky Mountains. The distance to the camp site is 180 miles one way. Their car has a trip computer that gives information during the trip. William read the car’s manual to help him interpret what the different gauges were showing.

Understanding the Features of Your Trip Computer	
Outside Temp: The temperature outside the car – degrees Fahrenheit.	Height: Altitude or height above sea level- in feet.
Average Fuel Economy: The number of miles driven divided by the number of gallons used – miles per gallon (mpg). Trip start 00.0.	Distance to Empty: An estimate of the amount of miles you can drive with the fuel in the tank, taking into account the present rate of fuel consumption-in miles.
Fuel: Fuel in tank-in gallons	Trip Odometer: Distance driven on this trip- in miles.

Start of the Trip:

TRIP COMPUTER		
Outside Temp 60°	Height 1,000 feet	Fuel 17 GAL
AVG. Fuel Economy 00.0 MPG	Distance to Empty 425 miles	Trip Odometer 000

After 20 minutes:

TRIP COMPUTER		
Outside Temp 58°	Height 1,275 feet	Fuel 16 GAL
Avg. Fuel Economy 15.0	Distance to Empty 240 miles	Trip Odometer 015 miles

1. What changed during the first 20 minutes? Explain the changes.
2. Explain how the distance to empty has dropped from 425 miles to 240 miles in just 20 minutes of driving time.
3. Predict how the display may look after another 20 minutes.

Temperature

From the computer display, you can see that William and his father started their trip at 1000 feet above sea level, with the outside temperature of 60°F. William’s father used a simple “rule of thumb” to get a feeling for the temperature up on the mountain.

“For every 3000 feet you gain in altitude, the temperature drops 20°F.”

4. Twenty minutes into the trip, did the display agree with Mr. Pitts’ “rule of thumb?”
5. William and his dad plan to camp at 8000 feet. What should the temperature be at that altitude? Illustrate the relationship
6. Complete the table.

Height(ft)	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
Air Temp(°F)											

7. Is the relationship a proportional relationship? Explain
8. What should the temperature be when they are at 6500 feet?
9. At what altitude will the temperature be at freezing (32°F)?

Fuel Consumption

From the car’s manual, William knows that at 55 mph on a level road, the car gets 25mpg. The car’s gas tank holds 17 gallons. Furthermore, William knows that the one-way distance to the camp site is 180 miles, and that there are no gas stations on the trip.

10. William says, “Dad, we have plenty of fuel to make the return trip.”
Do you agree? Do you understand his reasoning?

Georgia Department of Education

Common Core Georgia Performance Standards Framework Teacher Edition

Sixth Grade Mathematics • Unit 2

- 11.** When driving on the mountain road, the average fuel economy (mpg) goes down dramatically. Dad says, “When going uphill in the mountains, the car will get about 15 miles per gallon.”

Explain why the display labeled “Distance to Empty” indicated 75 miles when Dwayne and his dad reached the camp site, 180 miles after starting.

- 12.** Explain why it was still possible to make the return trip with so little fuel left.
- 13.** Copy and complete this table showing the fuel used on the uphill trip.

Journey (distance in miles)	0	15	30	60	120	135	150	180
Fuel Used (gallons)	0							
Fuel in Tank (gallons)	17							

- 14.** Make a similar table showing the fuel used on the downhill trip, assuming the car got 45 mpg.
- 15.** Will the car complete the round trip on one tank of gasoline, running at 15 mpg uphill and 45 mpg downhill? Justify your answer.