

# Illuminations Unit Plan

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## Student Learning Guide Automobile Mileage Age vs. Mileage

1. Go to the graphing utility at <http://www.illuminations.nctm.org/imath/912/LinearRelationships/student/index.html#first>
2. Set the scale for the applet at  $x \text{ min} = 0$ ;  $x \text{ max} = 15$ ;  $y \text{ min} = 0$ ;  $y \text{ max} = 160$ .
3. Calculate the age of each automobile in the table and enter your answers in the center column.
4. Plot the **age and mileage** on the applet.

Year	Age (in years)	Mileage (thousands of miles)
1991		92
1992		132
1992		151
1993		150
1995		91
1995		114
1995		68
1995		56
1996		65
1996		76
1997		88
1998		79
1999		31
1999		21
2000		31
2000		45
2000		34
2001		8
2001		14
2001		3

5. Click on the Show Line to see the least squares regression line for the data? What is the equation for this line?
6. What is the value of the correlation coefficient?

## Illuminations Unit Plan

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7. What does this tell you about the how well the line fits the data?
  
  
  
  
  
  
  
  
  
  
8. What does the correlation coefficient tell you about the slope of the line?
  
  
  
  
  
  
  
  
  
  
9. What is the slope of the least squares regression line? What does it mean in terms of the data that was plotted? Does this make sense? Why or why not?
  
  
  
  
  
  
  
  
  
  
10. What is the  $y$ -intercept of the line? What is its meaning in terms of the data? Does this make sense? Why or why not?
  
  
  
  
  
  
  
  
  
  
11. Based on your equation, how many miles would you expect a car that was produced in 1970 to have on the odometer? Does this make sense? Why or why not?

## Illuminations Unit Plan

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12. Based on your equation, if you had a car with 101,000 miles on the odometer, how many years after 1990 would be the year in which the car was manufactured? Does this make sense? Why or why not?

13. Based on your equation, how many miles would you expect to be on the odometer of an automobile that is 14 years old? How does this compare to the actual data in the table? Why aren't these values the same?