

Lesson Summary

- When constructing a scatter plot, the variable that you want to predict (i.e., the dependent or response variable) goes on the vertical axis. The independent variable (i.e., the variable not related to other variables) goes on the horizontal axis.
- When the pattern in a scatter plot is approximately linear, a line can be used to describe the linear relationship.
- A line that describes the relationship between a dependent variable and an independent variable can be used to make predictions of the value of the dependent variable given a value of the independent variable.
- When informally fitting a line, you want to find a line for which the points in the scatter plot tend to be closest.

Problem Set

1. The table below shows the mean temperature in July and the mean amount of rainfall per year for 14 cities in the Midwest.

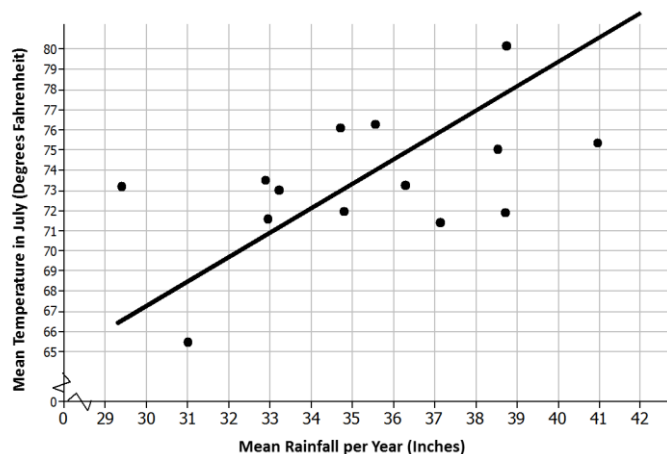
City	Mean Temperature in July (degrees Fahrenheit)	Mean Rainfall per Year (inches)
Chicago, IL	73.3	36.27
Cleveland, OH	71.9	38.71
Columbus, OH	75.1	38.52
Des Moines, IA	76.1	34.72
Detroit, MI	73.5	32.89
Duluth, MN	65.5	31.00
Grand Rapids, MI	71.4	37.13
Indianapolis, IN	75.4	40.95
Marquette, MI	71.6	32.95
Milwaukee, WI	72.0	34.81
Minneapolis–St. Paul, MN	73.2	29.41
Springfield, MO	76.3	35.56
St. Louis, MO	80.2	38.75
Rapid City, SD	73.0	33.21

Data Source: <http://countrystudies.us/united-states/weather/>

- a. What do you observe from looking at the data in the table?

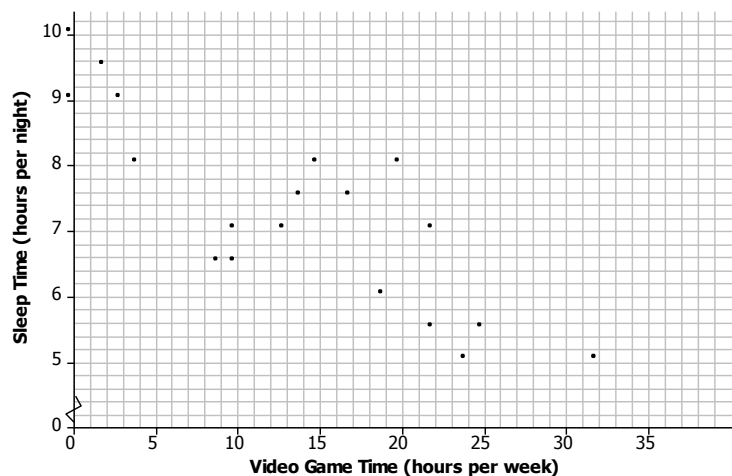
- b. Look at the scatter plot below. A line is drawn to fit the data. The plot in the Exit Ticket had the mean July temperatures for the cities on the horizontal axis. How is this plot different, and what does it mean for the way you think about the relationship between the two variables—temperature and rain?

July Rainfall and Temperatures in Selected Midwestern Cities



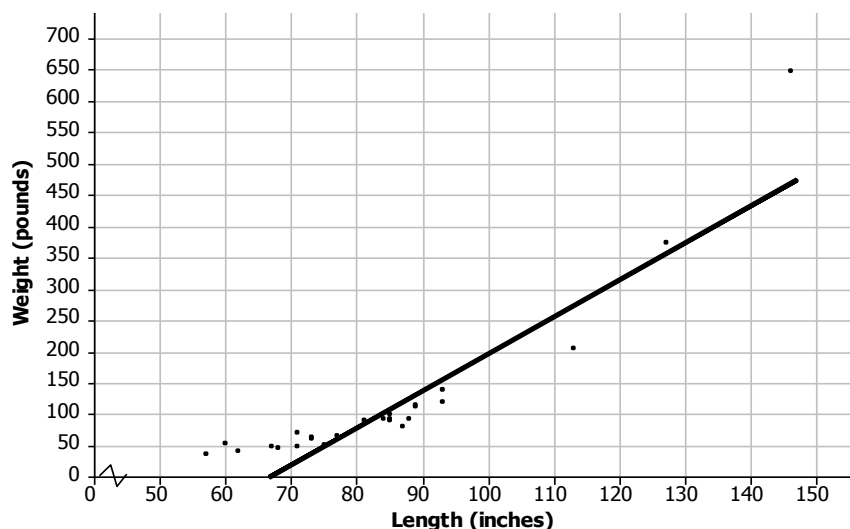
- c. The line has been drawn to model the relationship between the amount of rain and the temperature in those midwestern cities. Use the line to predict the mean July temperature for a midwestern city that has a mean of 32 inches of rain per year.
- d. For which of the cities in the sample does the line do the worst job of predicting the mean temperature? The best? Explain your reasoning with as much detail as possible.
2. The scatter plot below shows the results of a survey of eighth-grade students who were asked to report the number of hours per week they spend playing video games and the typical number of hours they sleep each night.

Mean Hours Sleep per Night Versus Mean Hours Playing Video Games per Week



- What trend do you observe in the data?
 - What was the fewest number of hours per week that students who were surveyed spent playing video games? The most?
 - What was the fewest number of hours per night that students who were surveyed typically slept? The most?
 - Draw a line that seems to fit the trend in the data, and find its equation. Use the line to predict the number of hours of sleep for a student who spends about 15 hours per week playing video games.
3. Scientists can take very good pictures of alligators from airplanes or helicopters. Scientists in Florida are interested in studying the relationship between the length and the weight of alligators in the waters around Florida.
- Would it be easier to collect data on length or weight? Explain your thinking.
 - Use your answer to decide which variable you would want to put on the horizontal axis and which variable you might want to predict.
4. Scientists captured a small sample of alligators and measured both their length (in inches) and weight (in pounds). Torre used their data to create the following scatter plot and drew a line to capture the trend in the data. She and Steve then had a discussion about the way the line fit the data. What do you think they were discussing, and why?

Alligator Length (inches) and Weight (pounds)



Data Source: James Landwehr and Ann Watkins, *Exploring Data*, Quantitative Literacy Series (Dale Seymour, 1987).