

The **Least-Squares Regression** simulation encourages students to explore data on two quantitative variables, interpret the correlation coefficient, fit a linear function to various data sets, understand how to achieve a best-fit line, and determine whether a linear fit is appropriate.

The screenshot shows the PhET Least-Squares Regression simulation interface. It features a central scatter plot with a best-fit line and a menu of data sets on the right. Callout boxes provide instructions on how to interact with the simulation.

OBSERVE the change in the sum of the squared residuals as a point is added or moved.

WATCH r update with each new data point.

DRAG points to create a custom data set.

EXPLORE a data set from the menu.

FIT a line to the data set.

Simulation details shown in the screenshot:

- Best-Fit Line:** $y = 0.76x + 3.77$
- Correlation Coefficient:** $r = +0.80$
- My Line:** $y = 0.69x + 4.81$
- Equation Form:** $y = ax + b$
- Menu Items:** Custom, Height vs. Shoe Size, Spending vs. Salaries, Manatee Mortality vs. Time, Minimum Wage vs. Time, Internet Users vs. Time, US Gasoline Price vs. Time, Life Expectancy vs. TVs, Orbital Speed vs. Distance from Sun, Temperature (°F) vs. Cricket Chirps, Temperature (°F) vs. Longitude, Temperature (°C) vs. Cricket Chirps, Temperature (°C) vs. Longitude, Temperature (°C) vs. Latitude.

Suggestions for Use

Sample Challenge Prompts

- Create a custom data set with...
 - a correlation coefficient that is *positive*.
 - a correlation coefficient that is *negative*.
 - a correlation coefficient of *zero*.
- Create a custom data set with a linear association. Try to fit a line to it using the My Line controls, explain how you decided on your final line, then show the Best-Fit Line to see how close you were.
- Create a custom data set and show the best-fit line. Choose a point to drag and observe how it influences the best-fit line.
- For each data set in the menu, determine if a linear fit is appropriate, and justify your answer.
- Why do we call this type of regression “least-squares”?

See all published activities for Least-Squares Regression [here](#).

For more tips on using PhET sims with your students, see [Tips for Using PhET](#).