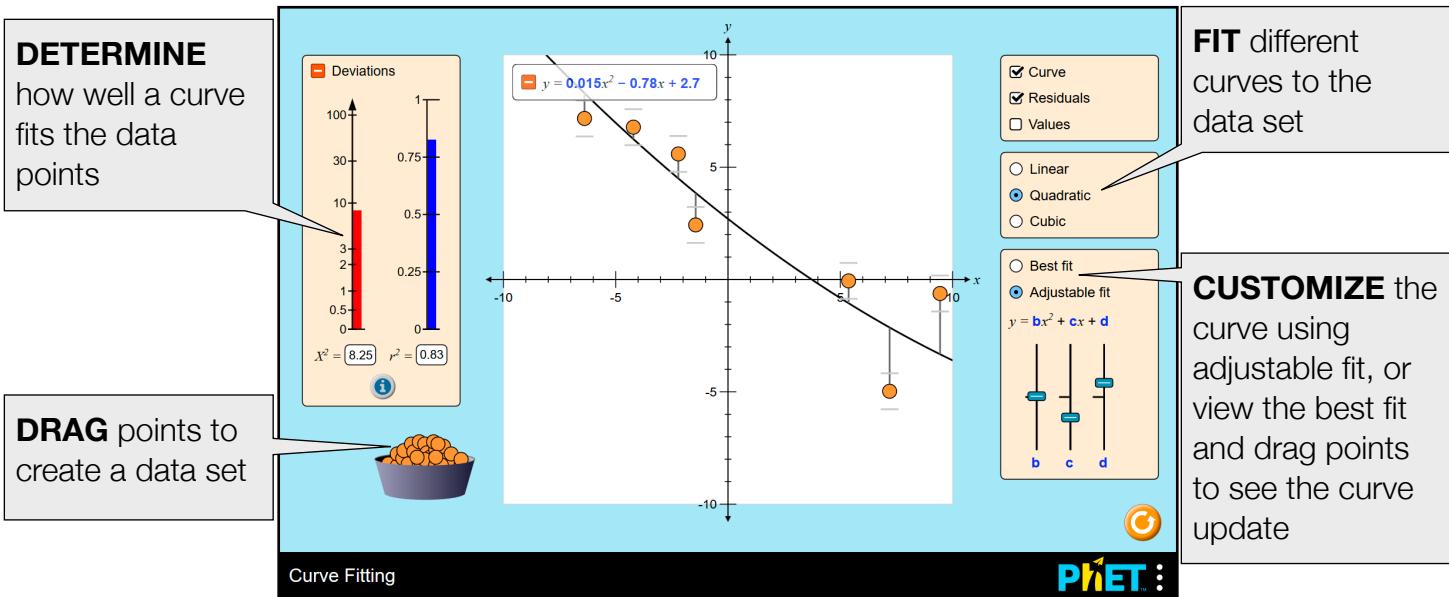The **Curve Fitting** simulation allows students to explore how the number of data points and uncertainty around them can affect chi squared and r squared.

DETERMINE how well a curve fits the data points

FIT different curves to the data set

DRAG points to create a data set

CUSTOMIZE the curve using adjustable fit, or view the best fit and drag points to see the curve update

Customization Options

Query parameters allow for customization of the simulation, and can be added by appending a '?' to the sim URL, and separating each query parameter with a '&'. The general URL pattern is:

`…html?queryParameter1&queryParameter2&queryParameter3`

For example, in Curve Fitting, if you want to run the sim in Spanish `(locale=es)` and disable external links `(allowLinks=false)` use:

https://phet.colorado.edu/sims/html/curve-fitting/latest/curve-fitting_all.html?locale=es&allowLinks=false

Query Parameter and Description	Example Links
`locale` - specify the language of the simulation using ISO 639-1 codes. Available locales can be found on the simulation page on the Translations tab. Note: this only works if the simulation URL ends in "_all.html".	`locale=es` (Spanish) `locale=fr` (French)
`allowLinks` - when `false`, disables links that take students to an external URL. Default is `true`.	`allowLinks=false`

Important Notes

- Δ_y and σ represent the same idea, but conventions for graphical display and equations are not the same. The term "error bar" is commonly used to refer to the uncertainty of a data point on a graph. Technically, the half-length of the error bar is equal to one standard deviation. The symbol σ_i is conventionally used to refer to the uncertainty of data point (x_i, y_i) in equations.
- Students may have experience with correlation coefficient, r^2, from using graphing calculators and Excel (or another spreadsheet program). They may not observe the residuals if their data points all are on the curve. Make sure that as they explore the sim that they use many points and with some deviation.

Suggestions for Use

- This sim could be used as an exploration into statistics without students trying to learn how χ^2 is calculated. For an example, see: Curve Fitting Activity.

Sample Challenge Prompts
- Build a data set and decide which curve fits your data the best. How do you know?
- What effect does changing the error bars have on χ^2 and r^2?

See all published activities for Curve Fitting here.
For more tips on using PhET sims with your students, see Tips for Using PhET.