

The **Equality Explorer: Two Variables** simulation allows students to explore the conditions that result in equality and inequality when there are two variables present. Students can build a system of equations and develop a meaningful understanding of a system of equations.

OBSERVE the statement reflecting what is on the balance

LOCK the balance so that an operation occurs on both sides

CONTROL the variable value

RELOAD a snapshot

RESET the sim

The simulation interface shows a balance scale with weights. The left pan has a pink 'y' weight and two white '-1' weights. The right pan has a blue 'x' weight and three white '1' weights. Above the scale, the equation $y - 2 = -x + 3$ is displayed. To the right, there are input fields for $x = 2$ and $y = 3$, and a 'Snapshots' list containing the same equation and values. At the bottom, there are buttons for adding weights (x, -x, y, -y, 1, -1) and a lock icon.

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 Equality Explorer: Two Variables, if you want to run the sim in Spanish (`locale=es`) and disable external links (`allowLinks=false`) use:

https://phet.colorado.edu/sims/html/equality-explorer-two-variables/latest/equality-explorer-two-variables_all.html?locale=es&allowLinks=false

⚙ Indicates this customization can be accessed from the Preferences menu within the simulation.

Query Parameter and Description	Example Links
⚙ <code>locale</code> - 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”.	<code>locale=es</code> (Spanish) <code>locale=fr</code> (French)

Query Parameter and Description	Example Links
⚙️ <code>audio</code> - if muted, audio is muted by default. If disabled, all audio is permanently turned off.	<code>audio=muted</code> <code>audio=disabled</code>
<code>allowLinks</code> - when <code>false</code> , disables links that take students to an external URL. Default is <code>true</code> .	<code>allowLinks=false</code>
<code>supportsPanAndZoom</code> - when <code>true</code> , enables panning and zooming of the simulation using pinch-to-zoom or browser zoom controls.	<code>supportsPanAndZoom=false</code>

Insights into Student Use

- Students naturally want to find balanced situations. Encourage them to find as many as possible.

Suggestions for Use

Sample Challenge Prompts

- Build a balanced situation using both x and y . Hide the variable values and trade computers with a partner. Can you determine the values of x and y ?
- Create an equation using both x 's and y 's and take a snapshot. Keeping the variable values the same, build a *different* equation and take a snapshot. What do you notice about *both* snapshots? What happens when you substitute the x and y values into both equations?

See all published activities for Equality Explorer: Two Variables [here](#).

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