

The **Equality Explorer: Basics** simulation allows students to explore the conditions that result in equality and inequality and play with the concept of a variable.

Basics Screen

In the Basics screen, students can discover equality relationships and create functional definitions of equality and inequality.

OBSERVE the statement reflecting what is on the balance

ORGANIZE objects on the balance

BUILD an equality by dragging objects on and off the balance

SAVE snapshots of the balance

RELOAD a snapshot

EXPLORE different sets of objects

Equality Explorer: Basics

Lab Screen

In the Lab screen, students can change the values of the objects and build unique equations.

HIDE the object values

CLEAR the balance

CONTROL the object values

SHOW/HIDE the object values for each snapshot

RESET the sim to its original state

Equality Explorer: Basics

Insights into Student Use

- Students naturally want to find balanced situations. Encourage them to find as many as possible.
- Students enjoy making extremely unbalanced situations. Challenge them to find the “most unbalanced” scenario. What were the values of the objects?

Suggestions for Use

- Explore proportional relationships on the Basics screen.
- Build equations with different values for each shape.

Sample Challenge Prompts

- Find as many equations as possible using the objects on the Basics screen.
- Build an equation on the lab screen. What makes this an equation?
- Identify the values for the square and circle. What could these values represent about the square and circle?
- If a dog equals 1, what does a cat equal?
- Using the Lab screen, balance 2 squares with 3 triangles. What values for the square and triangle make this work? Compare with the class.

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

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

VIEW original equation

VIEW current equation

APPLY operations to isolate x .

The screenshot shows the 'Equality Explorer' software interface. At the top, it says 'Level 3 Multi-step equations with fractions' and has a star icon with the number '1'. Below this, there are two input fields for equations: the first contains $\frac{7}{2}x - 2 = -\frac{179}{2}$ and the second contains $x = -25$. Below the equations is a calculator interface with buttons for '+', '-', 'x', '+', a display showing '7', and a yellow arrow button. A 'Next' button is also present. In the center, a balance scale is shown with a blue box labeled 'x' on the left pan and a white circle labeled '-25' on the right pan. To the right, a 'Snapshots' panel shows a list of equations: $\frac{7}{2}x - 2 = -\frac{179}{2}$, $7x - 4 = -179$, and $7x = -175$, with camera icons for taking snapshots. At the bottom, there is a navigation bar with icons for 'Equality Explorer', 'Basics', 'Numbers', 'Variables', 'Operations', and 'Solve It!', along with the 'PhET' logo.

COLLECT stars for each completed challenge

SAVE snapshots of each step to show progress