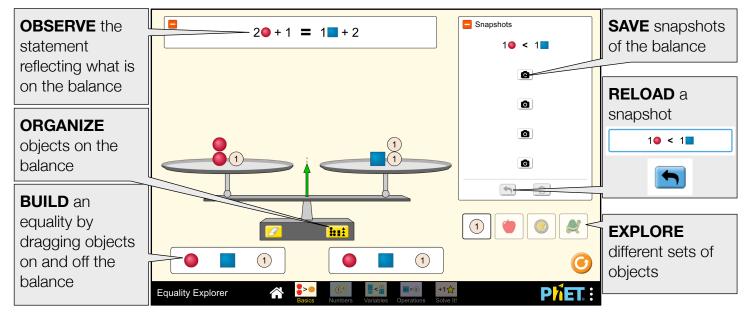


The *Equality Explorer* simulation allows students to explore the conditions that result in equality and inequality, the effect of applying operations to an equality or inequality, and solve simple equations.

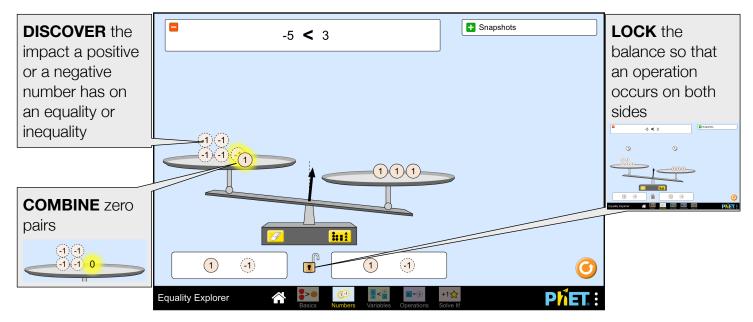
# **Basics Screen**

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



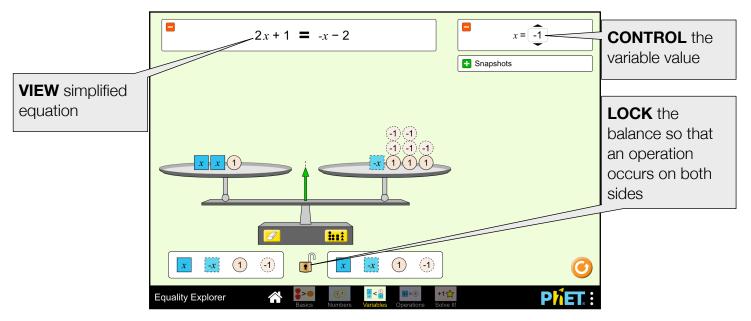
#### **Numbers Screen**

In the Numbers screen, students can turn on the lock to perform the same operation to both sides of the balance and explore what happens to the state of equality.



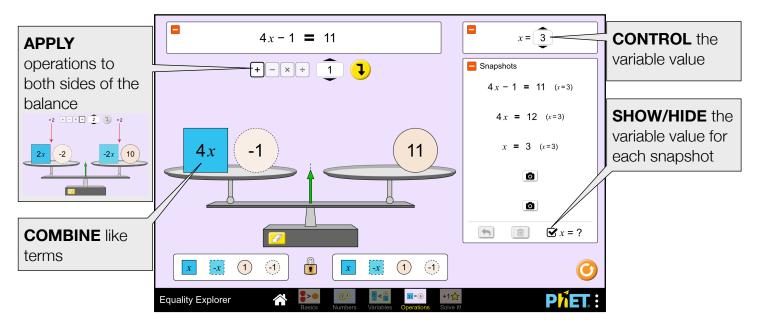
## Variables Screen

In the Variables screen, students explore how different values for a variable impact the state of equality.



### **Operations Screen**

In the Operations screen, students can build an inequality or equation and apply universal operations to explore what happens to each term, and discover how to undo an operation.



## **Insights into Student Use**

- Students naturally want to find balanced situations. Encourage them to find as many as possible.
- Students enjoy applying operations to create the largest or smallest numbers.
- Students might realize that an operation is "unproductive" or doesn't do exactly what they want. Challenge them to find the operation that will "undo" their last one.

## Solve It! Screen

In the Game, students solve equations using the universal operation control to isolate the variable.

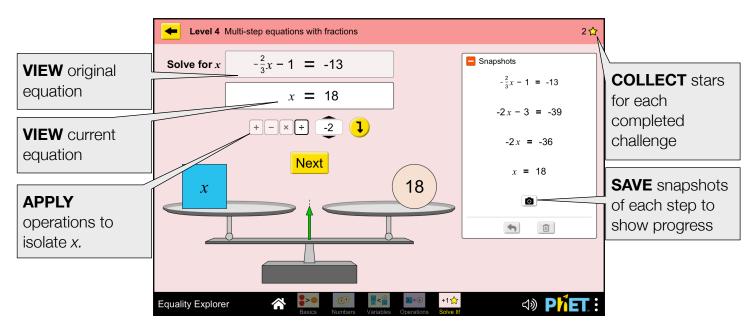
Level 1: one-step equations

Level 2: one-step equations with negative coefficients

Level 3: two-step equations

Level 4: multi-step equations with fractions

Level 5: multi-step equations with variables on both sides of the equation



## **Suggestions for Use**

- Explore proportional relationships on the Basics screen.
- Using the Variables screen, set up a balanced equation and minimize the variable value. Trade computers with a partner and figure out the value of x.

Sample Challenge Prompts

- Find as many equations as possible using the objects on the Basics screen.
- What happens to an equation or inequality if you add 1 to both sides with the lock on? What happens if you add -1 to both sides with the lock on?
- Explain what happens to an equation if you try to remove 1 from both sides (with the lock on) and you don't have a 1 available. Why does this happen?

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