

In **Number Line: Integers**, students can explore multiple contexts that lend themselves to integer comparisons on a number line. After students explore altitude, bank accounts, and temperature, they can generalize about comparing integers and define absolute value.

Explore Screen

In the Explore screen, students can compare integers in multiple contexts.

The screenshot shows the 'Explore' screen of the 'Number Line: Integers' simulation. A vertical number line on the left ranges from -80 m to 100 m, with 0 m at sea level. A red dot is at 24 m, labeled '24 m above sea level' with a person skydiving. A blue dot is at -24 m, labeled '24 m below sea level' with a submarine. A comparison box at the top shows $-24 < 24$. On the right, a panel allows toggling 'Number Line', 'Labels', and 'Absolute Value'. A bottom panel shows icons for a bird, a fish, and a thermometer.

OBSERVE the values change as the objects move

DEFINE absolute value in multiple ways

DRAG objects to the scene

SHOW/HIDE number line, value labels, or absolute value

DEFINE absolute value in context

The screenshot shows the 'Explore' screen of the 'Number Line: Integers' simulation with a bank account context. A horizontal number line for 'Balance' ranges from -\$100 to \$100, with 0 at the center. A red piggy bank at -\$40 is labeled 'debt of \$40'. A green piggy bank at \$60 is labeled 'balance of \$60'. A comparison box at the top shows $-40 < 60$. On the right, a panel allows toggling 'Number Line', 'Labels', and 'Absolute Value'. A bottom panel shows icons for a piggy bank, a bird, a fish, and a thermometer.

COMPARE two different bank account balances

DEFINE absolute value in context

VIEW one or two accounts

ADD/REMOVE money to create a balance or debt

COMPARE temperatures of different locations

SWITCH the order of the comparison

CHOOSE month of real data to view

Temperature: $^{\circ}\text{F}$ / $^{\circ}\text{C}$

108° F, 93° F (A), 75° F (B), 0° F, -83° F

93 > 75

April

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Generic Screen

In the Generic screen, students can compare integers generally, on different scales, and begin to define absolute value more generally.

COMPARE values at different locations on the number line

VIEW the opposite value

CHANGE number line range

DEFINE absolute value in a general context

-7 < -2

Labels, Tick Marks, Opposite, Absolute Value

-10 to 10

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Suggestions for Use

- Use the Explore screen as an introduction to negative numbers, and later the Generic screen to reinforce the idea of opposites.
- Use both screens as an introduction to absolute value. Challenge students to come up with their definition of what they think “absolute value” means after playing with the simulation. Combine student ideas to come up with a classroom definition.

Customization Options

`?defaultCelsius` - starts the simulation with celsius as the default selection for temperature units.

See all published activities for Number Line: Integers [here](#).

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