The **Number Line: Distance** simulation encourages students to explore subtraction in multiple contexts, discover patterns, and generalize how to interpret subtraction as distance.

Explore Screen

In the Explore screen, students can investigate subtraction using two objects and discover that when they are subtracted, the distance between them is also calculated.

SWITCH between absolute value and simple difference

INTERPRET the variables; **SWITCH** their locations

HIDE information if needed

INTERPRET distance statement as subtraction

EXPLORE distance in different contexts

Generic Screen

The Generic screen provides the flexibility to think about subtraction in any context, or with no context, and generalize the concept of subtraction as distance between two integers on a number line.

INTERPRET subtraction statement as distance

DRAG handles to change the values

CHOOSE horizontal or vertical representation

McGarry, August 2021

Insights into Student Use

• Students may notice a connection between the horizontal and vertical number lines and a cartesian plane if they have plotted cartesian coordinates before.

Suggestions for Use

• Allow students to play with the sim before guiding them with challenge prompts.
• Encourage students to share their discoveries and observations with the class to build confidence and sense-making.

Sample Challenge Prompts

• On the Explore screen, compare the same subtraction problem in all three contexts. Think of another context where the distance between two points could be represented with subtraction.
• With Directed Distance on,
   • Find three different ways to make a distance of 10 and record the distance statements.
   • Find three different ways to make a distance of -10 and record the distance statements.
      • Compare your statements with your partner. What patterns do you notice?
• When does Directed Distance produce a distance that is different from Absolute Value?

○ Absolute Value
◉ Directed Distance

See all published activities for Number Line: Distance here.
For more tips on using PhET sims with your students, see Tips for Using PhET.