"Absolute Value" Classroom Activities

Short description: Learn about absolute value, demonstrated on the number line and through a real-life example, in this animated Math Shorts video.

Long description: This animated Math Shorts video explains absolute value, as demonstrated on the number line and through a real-life example. In the accompanying classroom activity, students watch the video and then play a game in which they move a penny along a number line in positive and negative directions. As they play, they use absolute value to track the total distance that the penny moves. To get the most from the lesson, students should be comfortable determining distance between positive and negative numbers on a number line.

Activity Text

Learning Outcomes
Students will be able to
- use absolute value to calculate the total distance moved in positive and negative directions on a number line
- define the mathematical terms below

Common Core State Standards: 6.NS.C.7.c

Vocabulary: Absolute value, number line, negative numbers, absolute value notation

Materials: Per pair: pencils, paper, a red die and a blue die, a penny; 10 Steps Game handout, Number Line handout

Procedure
1. Introduction and Video (5–10 minutes, whole group)
Prompt to find out what students know about *absolute value*, listening for connections to the *number line*, *negative numbers*, and *absolute value notation*.

If needed, give a brief introduction in preparation for the video.

Show students the video, pausing as follows:

At 1:02, ask students, How many blocks did Lucy walk forward? How many did she walk back? How do you know? Give students a moment to talk with a partner before resuming the video to reveal the answer.

2. 10 Steps Game (15 minutes, pairs)

Distribute the materials and review the game instructions. Talk through the sample game as students use the penny to "act out" the game on their boards. When the game is over, ask students:

● Where did the penny end up?
● Which player, blue or red, moved the penny more? How do you know?

If students do not bring it up, point out that one approach is to add the moves each player made. Another is to note that the penny ends up on a negative number, so red must have moved more.

As students play a few games, circulate to check that they are distinguishing between total distance traveled and distance traveled in a particular direction.

Pose the following to students ready for a greater challenge: Suppose two people play the 10 Steps Game. Blue and red each roll three times. The penny ends up on 0 at the end of the game. Make up three possible rolls for each player.

3. Conclusion (5 minutes, whole group)

Engage students in reflecting on absolute value as the total distance moved by comparing it with displacement from the origin—that is, where the penny ends up. Begin by asking them about the games they played:

● Did anyone play a game in which each player moved the penny the same amount?
● Where did the penny end up?

Then, ask about a hypothetical situation:

● I played a game in which the penny moved 12 steps. Can you tell whether red or blue rolled more? Can you tell if the penny ended up on a positive or negative number? Why or why not?
● Suppose I moved 12 steps and the penny ended up at 2. Now can you tell whether blue or red moved more? Why or why not?

Activity Extension: Play a life-sized game of 10 Steps, with students taking turns standing in for the penny. Play outdoors with the number line marked in chalk or in the gym or classroom with the number line marked with tape on the floor.

This activity is based on work developed at TERC.