

Absolute Value – Grade 6, Level 2

Lesson Overview

In this lesson, students will connect a discussion about opposites and distances to be able to define and determine absolute value.

Alignment

Standard/Indicator Addressed

Math (6.NS.7d) Understand and apply the concepts of comparing, ordering, and finding absolute value to rational numbers.

- d. Understand that absolute value represents a number's distance from zero on the number line and use the absolute value of a rational number to represent real world situations

Standards for Mathematical Practice

- 2. Reason both contextually and abstractly.
 - a. Make sense of quantities and their relationships in mathematical and real-world situations.
- 4. Connect mathematical ideas and real-world situations through modeling.
 - a. Identify relevant quantities and develop a model to describe their relationships.
 - b. Interpret mathematical models in the context of the situation.
 - c. Make assumptions and estimates to simplify complicated situations.
 - d. Evaluate the reasonableness of a model and refine if necessary.

Connections

Disciplinary Literacy Strategies (for Purposeful Reading, Meaningful Writing, and Productive Dialogue)

Pairs Squared

Chum Check (Students turn to their elbow partner to check their understanding of the content.)

Lesson Plan

Time Required – (One 45 Minute Class Period)

Disciplinary Vocabulary – absolute value, absolute value notation, integer, number line, opposite

Materials Needed:

- Counters for the number line

- Number lines drawn on a sentence strip, sheet of paper, etc. for repeated use – students may draw these or they may be provided
- Index cards

Formative Assessment Strategies: Student dialogue

Misconceptions:

- Students often have the misconception that distance can be a negative number when determining absolute value of a positive number, confusing the *concept* with opposite/additive inverse. The absolute value bars do not simply change the sign of the number inside the bars.
- Students may mistakenly use parentheses or brackets for the absolute value thinking that it won't matter; but these symbols do not mean the same thing as the absolute value bars.

Engage

- Use the following questions to engage students in discussion:
- What do you know about distance? How do we express distance?
- If Brad leaves home and travels 4 blocks east, then 2 blocks south, then 3 blocks west, how many blocks has he traveled?
- If Anna leaves home and travels to a friend's house 6 blocks north, then travels to another friend's house by going 7 blocks south, how many blocks has she walked in all?
- Do we talk about distance as positive or negative?
- Using a number line, place a marker on -7 and 7. How far is each marker from 0? They are both 7 units away from zero.
- Tell students this is the absolute value of a number. Write the following on the board: "The absolute value of an integer is its relative distance from zero".
- Show and explain the notation for absolute value. Asking what the absolute value is of an integer is the same as asking how far the integer is from zero on a number line.

Explore

- Use markers and a number line to represent and solve the following:
 - $|9| = \underline{\hspace{2cm}}$
 - $|-5| = \underline{\hspace{2cm}}$
 - $|-8| = \underline{\hspace{2cm}}$

- $|1| = \underline{\hspace{2cm}}$
- $|0| = \underline{\hspace{2cm}}$
- Discuss with students: “Remember the opposite of a positive number is negative (example: the opposite of 6 is -6). The opposite of a negative number is positive (example: the opposite of -10 is 10; which can also be written as $-(-10) = 10$)”.
- Use what you know about absolute value and opposites to solve the following:
 - $| -(-9) | = \underline{\hspace{2cm}}$
 - $| -(-(-4)) | = \underline{\hspace{2cm}}$
 - (Have students use ‘Chum Check’ to compare responses.)
http://www.s2temsc.org/uploads/1/8/8/7/18873120/motivating_and_engaging_strategies.pdf
- What sign is the opposite of any absolute value? Create 4 absolute value sentences with a partner – label them A,B,C, and D. Represent the absolute values on a number line, with points labeled A,B,C, and D. Mark the opposite of each absolute value on the number line, labeled A1,B1,C1 and D1.
 - What do you notice about the opposite of each absolute value?
 - How would you represent the opposite of an absolute value in a number sentence?
 - $-|-9| = -9$ OR $-|8| = -8$ for example

Explain

- Discuss responses to the question: “What is the difference between taking the opposite of an integer and finding its absolute value?”
 - First, have students think individually and write their response on an index card.
 - Have them pair up with another student and come to consensus on one statement which summarizes their thinking.
 - Use the Pairs Squared strategy to form quads and both pairs come to consensus on one statement which summarizes their thinking.
 - All statements should be shared with the whole class for discussion.
- Discuss the following statement: “Why is absolute value more than just removing the negative sign from an integer, if there is one?”
 - First, have students think individually and write their response on an index card.

- Have them pair up with another student and come to consensus on one statement which summarizes their thinking.
- Use the Pairs Squared strategy to form quads and both pairs come to consensus on one statement which summarizes their thinking.
http://www.s2temsc.org/uploads/1/8/8/7/18873120/exit_slips_or_exit_tickets_strategy.pdf
- All statements should be shared with the whole class for discussion.

Other information on this indicator(s) can be found in the support documents/resources on the SC State Department website.

www.ed.sc.gov (Instruction → Standards and Learning → Mathematics or Science → Support Documents and Resources)

Content Area (Disciplinary) Literacy strategies and descriptions can be found on the S2TEM Centers SC website:

s2temsc.org (Resources → Disciplinary Literacy Virtual Library → Strategy Warehouse)

Computational Thinking Reference:

<https://csta.acm.org/Curriculum/sub/CurrFiles/CompThinkingFlyer.pdf>

<https://csta.acm.org/Curriculum/sub/CompThinking.html>

Additional Information

Level 1 lessons contain a realignment to the 2014 Science and/or the 2015 Mathematics Standards.

Level 2 lessons contain Level 1 information and Content Area Literacy and Disciplinary Literacy Strategies.

Level 3 lessons contain Level 1 and 2 information and Computational Thinking Connections.

Level 4 lessons contain Level 1, 2, and 3 and integration of at least 2 content areas.