How Far From Zero?

Teacher		**Class**	Grade 6
Subject	Math	**Topic**	Absolute value
Date		**Room**	
Lesson length	60 minutes	**Country**	United States

Students learn absolute value as distance from 0. They model integers and rational numbers and explain debt size.

Curriculum links

- identify a number, its opposite, and its absolute value [1]
- locate, compare, and order integers and rational numbers using a number line [1]

Learning objectives

- Students will find absolute value of rational numbers as distance from zero.
- Students will interpret absolute value as magnitude of positive or negative quantities.

Success criteria

- I can write |x| by counting jumps from x to 0.
- I can explain |-30| = 30 as a $30 debt size.
- I can compare magnitudes of decimals and fractions.

What students already know

Ask: Where are -3 and 3? Which is greater? Who is farther from 0? Listen for both are 3 away.

Key words

absolute value	how far a number is from zero on a line [3]
distance	count of jumps between two spots on a scale [3]
opposite	spot just as far from zero but on the other side [1]
magnitude	how big an amount is, ignoring plus or minus [4]
rational number	a whole, fraction, or decimal, positive, negative, or zero [1]
number line	a straight row with marks in order to show amounts [3]

Materials

- tape number line on floor from -10 to 10
- sticky notes with integers and rationals
- markers
- projector and Slides 2-11
- devices to play Video clip 1 and Video clip 2
- paper, pencils, rulers, mini-whiteboards
- printed copies of Worksheet Task D

Before the lesson

- Tape floor line from -10 to 10, clear desks and backpacks for safe walking space
- Write sticky notes: -4, 4, -2, 0, -3.5, -2, -1/2, 1.5, 2.75, 4, -2 1/2, 2 1/2
- Test Slides 2-11 and Video clip 1 (0:00-3:40) and Video clip 2 (0:00-1:41)
- Print Worksheet Task D for pairs and paper number-line strips -5 to 5

Lesson outline

0–5 min **Starter** 5 min · Whole class

Hook interest and surface ideas about direction versus distance from zero.

YOU DO

1. Welcome class at floor line and say the hook question about -4 and 4.
2. Place sticky notes for -4 and 4 on floor line and ask who is farther from zero.
3. Show Slide 4 vote and take a quick hand vote on when size matters more.
4. State today we measure distance from 0 and use it for real amounts.

STUDENTS DO

1. Listen, predict, and vote by show of hands.
2. Watch -4 and 4 placement and count steps to 0 aloud.
3. Share one idea when debt or cold size matters.

Say: If you stand on -4 and I stand on 4, who is farther from zero? You might both be surprised. Vote with me when size matters more than plus or minus, then we will test it by counting steps.

Ask: Which is greater, -4 or 4? (4 is greater; -4 is less.) · Who is farther from zero, -4 or 4? (Neither; both are 4 jumps from 0.)

Check understanding: Ask all to hold up fingers for distance of -4 from 0; if mixed, count 4 steps back to 0 together before moving on.

Support: Point to 0, count grid lines aloud 1, 2, 3, 4 with a partner. **Stretch:** Ask what distance -4.5 would be and how to count the half step.

Use: Slides 4

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5–15 min **Teaching** 10 min · Whole class

Explain absolute value as distance from 0 and model notation with integers.

YOU DO

1. Show Slide 2 and define the absolute value of a number as distance between that number and 0 [3].
2. Model |2| = 2 and |-2| = 2 by counting 2 jumps to 0 on the floor line [4].
3. Model |-30| = 30 as $30 debt size, sign shows below zero, bars show size.
4. Play Video clip 1 and stress result is always 0 or positive because distance is always positive [11].

STUDENTS DO

1. Watch, count jumps aloud, and copy |2| = 2 and |-2| = 2.
2. Repeat distance chant: how far, not which way.
3. Note why answer stays positive or zero.

Say: Absolute value tells how far a number is from zero, not which side it is on. Both 2 and -2 are 2 jumps away, so |2| = 2 and |-2| = 2. You can never get a negative answer because distance cannot be negative.

Worked example: Find |-30|. Step 1: locate -30, 30 left of 0. Step 2: count distance to 0, which is 30 units [3]. Step 3: write |-30| = 30, so the debt size is $30.

Ask: What is |-4| and how do you know? (4, because -4 is 4 units from 0.) · Why does |-2| equal |2|? (Both are 2 units from 0, in different directions [4].) · Can absolute value be -3? (No, it is never negative because distance is always positive [18].)

Check understanding: Mini-whiteboards: write |-6|; scan; if many write -6, recount 6 jumps to 0 and restate distance rule.

Support: Give a number line marked 0 to 5 only and start with positive numbers, then add matching negatives.
Stretch: Ask students to predict |-2 1/2| before counting half-steps.

Use: Slides 2, 5; Video clip 1 (0:00–3:40)

15–35 min **Main activity** 20 min · Groups

Practice finding absolute value of integers and rational numbers by counting to 0.

YOU DO

1. Send groups to floor line with sticky notes for -4, 4, -2, and 0.
2. Demo placing -4, counting 4 steps back to 0, recording |-4| = 4 and |4| = 4.
3. Direct Slide 8 paper work: draw 0-centered line -5 to 5 and mark -3.5, -2, -1/2, 1.5, 2.75, 4.
4. Circulate, ask for both landing spots and shared distance, check equations.

STUDENTS DO

1. Place sticky notes on floor line, count steps to 0, record | | equations.
2. Hold up note, call out distance, write two sentences like |-4| = 4 and |4| = 4.
3. Draw line -5 to 5, plot 6 rationals, write | | = ?, star biggest magnitude.

Say: Place your note, walk slowly and count jumps back to zero, then write the bars equation. On paper do the same for fractions and decimals. Star the biggest magnitude and be ready to explain why it wins.

Worked example: Find |-3.5|. Step 1: mark -3.5 halfway between -4 and -3. Step 2: count distance to 0, which is 3.5 jumps [3]. Step 3: write |-3.5| = 3.5.

Ask: What is |-2 1/2|? (2 1/2, two and a half steps from 0.) · Which has greater magnitude, -3.5 or 2.75, and why? (-3.5, because 3.5 is farther from 0 than 2.75.) · What is |0|? (0, zero is zero jumps from itself.)

Check understanding: Trade papers: check each pair has two opposite spots but one shared distance number; if off, fold paper at 0 so -4 lands on 4 to see equal distance [11].

Support: Give a number line marked 0 to 5 only and start with positive numbers, then add the matching negatives. **Stretch:** Students add halves like -2 1/2 and 2 1/2 and count half-steps to 0.

Use: Slides 8

35–50 min **Real-World Magnitude** 15 min · Pairs

Interpret absolute value as size of debt, temperature, and other signed quantities.

YOU DO

1. Show Slide 3 morning -5 degrees Fahrenheit case and Slide 6 map of ideas.
2. Play Video clip 2 and listen for debt |-30| = 30 dollars and the word magnitude.
3. Lead Slide 10 think, pair, share: account shows -$30, is debt $30 or -$30?
4. Hand out Worksheet Task D and coach pairs to write signed number plus | | size sentence.

STUDENTS DO

1. Discuss in pairs what sign means and what size means for balance and temperature in degrees Fahrenheit.
2. Plot balances on number lines and circle distance to 0.
3. Solve Worksheet Task D problems and write one | | sentence per case.

Say: The sign tells direction. Below zero means you owe. The bars tell size. An account at -30 is $30 below zero, but |-30| = 30 means the debt size is $30. Plot it if you need to and circle the distance to 0.

Worked example: Account balance -30 dollars. Signed value -30 means $30 below zero. Distance from 0 is 30, so |-30| = 30, which describes the size of the debt in dollars.

Ask: Account shows -$30. Is the debt $30 or -$30? How does | | show it? (Balance is -$30; debt size is $30, shown by |-30| = 30.) · What does |-5| = 5 mean for -5 degrees Fahrenheit? (It is 5 degrees from 0 degrees Fahrenheit; cold size is 5 [4].) · Which is colder, -3 degrees or -7 degrees, and which has greater absolute value? (-7 is colder and |-7| = 7 is greater than |-3| = 3.)

Check understanding: Cold-call pairs to read sign sentence and size sentence; listen for magnitude without regard to sign; re-plot to 0 if sign and size are mixed.

Support: Let students first plot each balance on a number line and circle the distance to 0. **Stretch:** Students make their own pair where balances differ but debts are same size, like -$18 and $18.

Use: Slides 3, 6-7, 10; Video clip 2 (0:00–1:41); Worksheet Task D

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50–60 min **Plenary** 10 min · Whole class

Consolidate value versus absolute value and check all success criteria.

YOU DO

1. Revisit objectives: distance from 0 and size of real quantities.
2. Show Slide 9 reminders and Slide 11 true-or-false statements for vote.
3. Fix |3.5| = -3.5 as false because absolute value is never negative.
4. Give exit ticket and preview homework Task B.

STUDENTS DO

1. Vote true or false, explain with distance from 0.
2. Correct false statement to |3.5| = 3.5.
3. Complete 3-question exit ticket on their own.

Say: Value tells where you are, plus or minus. Absolute value tells how far from zero. It stays zero or positive. Opposites like -4 and 4 share the same bars number because they are the same distance away.

Ask: Why is |-4| = 4 true but |3.5| = -3.5 false? (Distance is 4 and 3.5; result must be positive or zero, never negative [18].) · Do opposites share the same absolute value? (Yes, they are the same distance from 0 in different directions [24].)

Check understanding: Exit tickets plus thumbs up 1-5; if unsure, refold paper at 0 and recount one rational example together.

Support: Provide sentence frame: The sign means ___, the size means |__| = ___. plus pre-drawn line.
Stretch: Write a tricky question where greater number has smaller absolute value, like -2 versus 5.

Use: Slides 9, 11

Common mistakes

Mistake	How to spot it	How to fix it
Thinking bars make everything inside positive, like |2-5| becomes 2+5 = 7	Student writes 7 for |2-5| or |3-8|	Simplify inside first to -3, then distance to 0 is 3, so |2-5| = 3, not 7 [4].
Writing a negative absolute value, like |3.5| = -3.5	Negative answer after bars or minus sign moved inside	Restate distance is always positive or zero, so |3.5| = 3.5 and |-3.5| = 3.5 [11].
Saying debt is -$30 dollars instead of $30 size	Student answers debt = -30 when asked for size	Separate sign and size: balance -30 means below zero; |-30| = 30 describes size of debt in dollars.

Support

- Use 0-to-5 line first with positives, then add matching negatives; circle distance to 0.
- Fold paper at 0 to match -4 onto 4 and decimals onto mates to feel equal distance.

Stretch

- Add halves and quarters like -2 1/2, -3/4, 2.25 and order three cards by absolute value.
- Create debt pairs like -$18 and $18 and temperature pairs with same | | but different signs.

For the LSE or teaching assistant

Stay with floor-line groups first, count jumps aloud and check sticky-note equations; in pairs, prompt plotting balances and circling distance to 0 before writing | | sentences.

Check for understanding

Question	Answer
Find |-4|.	4
Find |-3/4|.	3/4
Account balance is -$30. Write | | to show debt size.	|-30| = 30; debt size is $30.

Homework

Do Worksheet Task B and write one sentence explaining |-18| = 18 for an $18 debt.

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