Solve Two-Step Inequalities

45-minute instructional plan | Minnesota 2007 standards: 7.2.2.4; 7.2.4.1 (supporting algebraic manipulation)

Learning objectives

• Model a real-world constraint with a two-step inequality.

• Undo addition/subtraction before multiplication/division.

• Reverse the inequality correctly when dividing by a negative coefficient.

• Graph and interpret the resulting solution set.

Suggested 45-minute sequence

0–5 min	Review and quick check
5–8 min	Why the lesson matters / real-life launch
8–11 min	Read the learning objectives
11–18 min	Explore model and vocabulary
18–30 min	Guided examples and error analysis
30–38 min	Independent practice
38–43 min	Group reasoning
43–45 min	Independent exit ticket

Core concept

Undo the fixed amount first; undo multiplication next; check the coefficient sign.

$$-2x - 7 > 9 \quad \Rightarrow \quad x < -8$$

Teaching prompts

• Ask students to name the unknown and units before manipulating the equation or inequality.

• Ask: Which steps preserve the solution set, and why?

• Distinguish open/closed circles, the direction of the number line, and discrete contextual solutions when relevant.

Common misconception / correction

A student solves –4x + 2 ≤ 10 and concludes x ≤ –2. Explain the sign error.

$$-4x + 2 \leq 10 \Rightarrow -4x \leq 8 \Rightarrow x \geq -2$$

Divide by a negative number and reverse ≤ to ≥.

Differentiation and assessment

Support: pre-label the variable, highlight fixed versus repeated quantities, and provide an annotated example. Extension: require a second representation or a reasoned equivalence argument.

Assessment: a correct exit response with justified steps suggests readiness for the next lesson; otherwise use an additional model and one follow-up problem.

Worked answer key

1. Solve 2x + 7 > 19.

$$x > 6$$

2. Solve –3y + 4 ≤ 16.

$$y \geq -4$$

3. Solve x/5 – 2 ≥ 1.

$$\frac{x}{5} - 2 \geq 1 \Rightarrow x \geq 15$$

4. Solve 1.5p + 6 < 18.

$$p < 8$$

5. Solve –2.5t – 1 ≥ 9.

$$t \leq -4$$

Group challenge

A workshop needs to collect at least $28. It already has an $8 donation and receives $4 for each attendee. How many attendees are needed?

$$8 + 4n \geq 28 \Rightarrow n \geq 5$$

Additional practice — if time allows

Solve (1/2)x – 1 < 3, then show the graph.

$$\frac{1}{2}x - 1 < 3 \Rightarrow x < 8$$

Exit ticket

Solve –4x + 7 < –9 and graph.

$$-4x + 7 < -9 \Rightarrow x > 4$$

Teaching note

Ask students to justify their methods. Use incorrect answers to identify the next instructional step.