

Teacher Guide for the Lesson on **inequality**

Standard:
7.11(A)

Content Objective:

We can model and solve an **inequality** and explain how operations, including multiplying or dividing by a negative, affect the solution.

Language Objective: Answer the following question in complete sentences using the sentence stem and the key vocabulary of the lesson:

Why do you think multiplying or dividing by a negative changes the direction of the **inequality**?

*I think multiplying or dividing by a negative changes the direction of the **inequality** because...*

Other key vocabulary: [equation](#)

inequality

INEQUALITIES	ADDING/SUBTRACTING	MULTIPLYING BY A NEGATIVE
$>$ $<$ $\leq$ $\geq$	① $x + 8 > 32$ ② $x + \frac{8}{-8} > \frac{32}{-8}$ ③ $x > \frac{32}{-8}$ $\frac{24}{-8}$ ④ $x > 24$ ✓ ① $x - 6 \leq 54$ ② $x - \frac{6}{+6} \leq \frac{54}{+6}$ ③ $x \leq \frac{54}{+6}$ $\frac{60}{+6}$ ④ $x \leq 60$ ✓	① $-2x > 14$ ② $\frac{-2x}{-2} > \frac{14}{-2}$ ③ $x > \frac{14}{-2}$ $\frac{-2}{-2}$ ④ $x < -7$ ✓
MULTIPLYING/DIVIDING BY A POSITIVE	DIVIDING BY A NEGATIVE	
① $6x < 24$ ② $\frac{6x}{6} < \frac{24}{6}$ ③ $x < \frac{24}{6}$ ④ $x < 4$ ✓	① $\frac{x}{3} \geq 5$ ② $(\frac{x}{3}) \cdot 3 \geq 5 \cdot (3)$ ③ $x \geq 5 \cdot (3)$ ④ $x \geq 15$ ✓	① $-\frac{x}{8} \leq 12$ ② $(-\frac{x}{8}) \cdot 8 \leq 12 \cdot (-8)$ ③ $x \leq 12 \cdot (-8)$ (the signs!) ④ $x \geq -96$ ✓

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By studying this visual, students might:

Notice	Wonder
The symbols show relationships like less than or greater than	Why does multiplying or dividing by a negative change the direction?
The direction of an inequality can change depending on what you do to both sides	Does the inequality always flip with negatives?
Multiplying or dividing by a negative flips the inequality symbol	What happens if you do more than one step?
The same number is being compared on both sides in different ways	How is this different from solving an equation?

• The visual shows patterns between steps and how inequalities behave	• Can an inequality have more than one solution?
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EXTENDING THE DISCUSSION

- After randomly calling on students, if there is anything from this list that was not mentioned, then ask the class, "Did anyone notice...?"
- After students have shared what they notice, ask the class, "Did anyone wonder...?" using the suggestions above or anything else you might think is interesting or relevant to the lesson.

Structured Conversation Prompts

OBSERVATIONAL	RELATIONAL	INFERENTIAL
What is an inequality? An inequality is...	How is an inequality different from an equation ? An inequality is different from an equation because...	Why do you think multiplying or dividing by a negative changes the direction of the inequality? I think multiplying or dividing by a negative changes the direction of the inequality because...

Example Student Responses to the Observational Question

Low-Level	High-Level
An inequality is when numbers are compared using symbols like .	An inequality is a comparison between two values or expressions using symbols like less than, more than, less than or equal to, or greater than or equal to to show they are not equal.

RESPONDING TO RESPONSES

Emphasize and celebrate each student's use of the key vocabulary to support a culture of "no wrong answers."

STRUCTURING STUDENT CONVERSATIONS

Have students list observations from the visual as a warm-up, then use the Q-SSS-A process to guide small-group conversations. In the slide decks, brackets can be moved to prepare the structured conversation. In the example to the right, students will be instructed: [Q-SSS-A](#).

- To put a thumb up, then lower their hand when they are ready to answer the question
- To share with their elbow/shoulder partner, and that the student with the darkest shoe will share first
- That they will be randomly called on after the conversation



[Here is an example](#) of structuring a conversation with Q-SSS-A.

Note: the inferential question is the same as the language objective. It is recommended that students answer the inferential question in a small-group discussion before answering it individually as the closure or exit ticket of the lesson.

Structured Reading

READING PURPOSE	PAT LIST	POST-READING DISCUSSION
The purpose for reading is to understand how an inequality represents a real world situation and shows what must be true about a value.	• Where an inequality is used to represent a situation • What the inequality shows must be true about a value • How the situation connects to the inequality expression • What changes or stays the same in the inequality	How does the inequality $x - 15 \geq 40$ represent Jalen's situation in the final example? <i>The inequality $x - 15 \geq 40$ represents Jalen's situation because...</i>

STRUCTURING THE READING

Communicate the purpose of reading to the students and instruct them to make a note every time they see something on the PAT ("Pay Attention To") list. How you have students note items on the PAT list is up to you. This could include:

- Putting an asterisk in the margin
- Underlining text that supports the PAT list
- Putting a comment in the margin

Follow the reading with the post-reading discussion. Structure this discussion using the Q-SSS-A process just like the structured conversations in this lesson.

Note: you might find the relational question is better discussed before or after the reading. This depends on whether the relational question is directly related to the reading or might make connections across units.

DIFFERENTIATING THE READING

You will notice that three different reading passages are provided with this lesson. Look at the shapes in the top-left of each passage to determine the grade level.

BELOW GRADE LEVEL	ON GRADE LEVEL	ABOVE GRADE LEVEL
 <i>Triangle is bottom-left</i>	 <i>Square is bottom-left</i>	 <i>Circle is bottom-left</i>

In a class with students at diverse reading level proficiencies, you can give the appropriate reading passage to different students, while having all students follow the same PAT list and post-reading discussion.