Name: _____ Packet Due Date: _____

In-Class Workbook

Expressions and Equations:

Unit 4 – Part 2: Solving Equations and Inequalities

How do we use patterns to understand mathematics and model situations?

Standard	Description
7.EE.A.1	➔ Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.A.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
7.EE.B.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problems, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

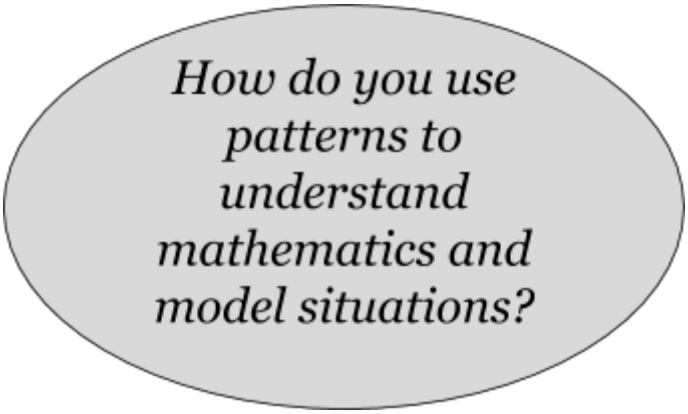
Packet Completion Rubric				
4	**3**	**2**	**1**	**0**
Workbook demonstrates significant effort. Student utilizes notes to help extend their thinking, writing questions, comments or reactions to the content.	Workbook demonstrates some effort. Student takes notes but could further understanding by questioning and interacting with the material.	Workbook shows little effort. Student takes notes sporadically, and could benefit from greater consistency with the material.	Workbook shows little to no effort. Student does not take notes and must demonstrate future interaction with the material to aid understanding.	Workbook is entirely incomplete or not turned in.

Grading Breakdown: 3.5 - 4 = A 3 - 3.4 = B 2.5 - 2.9 = C 2 - 2.4 = D 0 - 1.9 = F

*I am a person who believes in **asking questions**, in not conforming for the sake of conforming. I am deeply dissatisfied - about so many things, about injustice, about the way the world works - and in some ways, my dissatisfaction drives my storytelling.*

Chimamanda Ngozi Adichie

Unit 4 Part 2 Guiding Question:



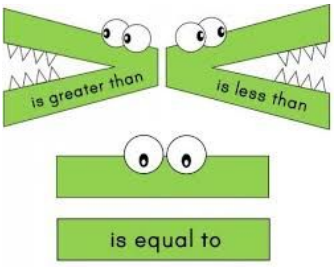
Lesson Objectives	
Lesson After completing a lesson, check the box	**I can…** After completing each lesson, you are on the right track if you can confidently state "I can…"
❑ 4.5	Solve one-step inequalities
❑ 4.6	Solve two-step equations
❑ 4.7	Solve two-step equations
❑ 4.8	Solve two-step inequalities

Lesson

4.5

DO-NOW

1. List four numbers that are **less than** 25.
2. List three numbers that are **greater than** 55.
3. List two numbers that are **less than** -6.
4. List one number that is **greater than** -25.



Homework Reminder

This is where you will shade in the box if you turned in your homework.
There is no homework due today! :)
"Excellence is not an art. It is the habit of practice." - Aristotle

Check-In

How are you doing today?

What do you wonder about algebra?

Equation vs. Inequality

An _____ shows that two expressions **are equal**. *For example:*

Whereas, an _____ shows that two quantities are **not always equal**. *For example:*


This statement is read as "n is less than 5".

Reading Inequalities

_____

This is read as:
"n is less than or equal to 5"
"5 is greater than or equal to n"

_____

This is read as:
"5 is greater than or equal to n"
"n is less than or equal to 5"

INEQUALITY SIGNS		
Sign	**Meaning**	**Example**
>		
≥		
<		
≤		

YOU TRY!	
Inequality	**Word Phrases**
$m < 7$	
$s \geq 8$	
$x + 4 \leq 2$	
$x \neq 7$	

Steps for Solving Inequalities	**Example:**
Three-step process when working with inequalities: 1. Solve 2. **Graph** ⬅ This is NEW! 3. Check with substitution	**$x + 2 > 12$**

STEP 1: Solve	
Solving Inequalities with Addition & Subtraction	*Solving Inequalities with Multiplication & Division*
You can _____ or _____ the same number from both sides of the inequality and the inequality will remain true. ***(Balancing!)***	You can _____ or _____ both sides of an inequality by a positive number and the inequality will remain true.
Examples:	**Example:**

Inequality Sign Rule

When multiplying or dividing by a_____ number, you must flip the inequality symbol.

Example:

Rule Explained! Video notes:

Direction of Inequality Sign

Does Not Change Direction	Changes the Direction
• Add / Subtract a number from both sides • Multiply/Divide both sides by a positive number • Simplify a side *Example: $3x < 7 + 3$* *$3x < 10$*	• Multiple/Divide both sides by a negative number *Example: $-2x < 12$* *$x > -6$* • Swapping left and right hand sides *Example: $2y + 7 < 12$* *$12 > 2y + 7$*

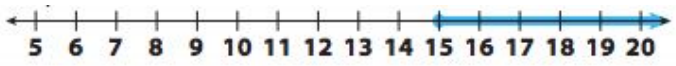
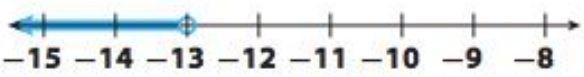
STEP 2: Graph

After we solve an inequality, we graph the possible solutions on the number line.

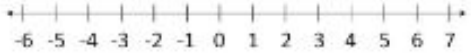
When plotting the initial point:

Use ° when graphing > or < .

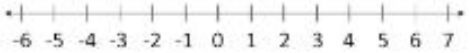
Use • when graphing ≥ or ≤ .

Graphing Examples:	
1. **n ≥ 15** (circle filled in indicated that 15 is included in the solutions)  	**2.** **n < -13** (blank circle indicated that 13 is NOT included in the solutions) 

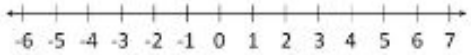
x > 4



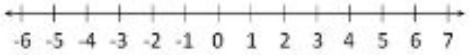
x < -3



x ≥ -5



x ≤ 2



Let's Chat!	
What are these graphs and dots telling us about our answer?	*Thoughts:*
How can you remember when to fill in the dot?	*Thoughts:*

STEP 3: CHECK			
After you have **solved** and **graphed** possible solutions, you can **check** the inequality by plugging in one of the solutions.			
x + 5 < 14	5x > -15	x + 5 ≤ 6	$\frac{x}{-3} \geq 11$

Guided Practice

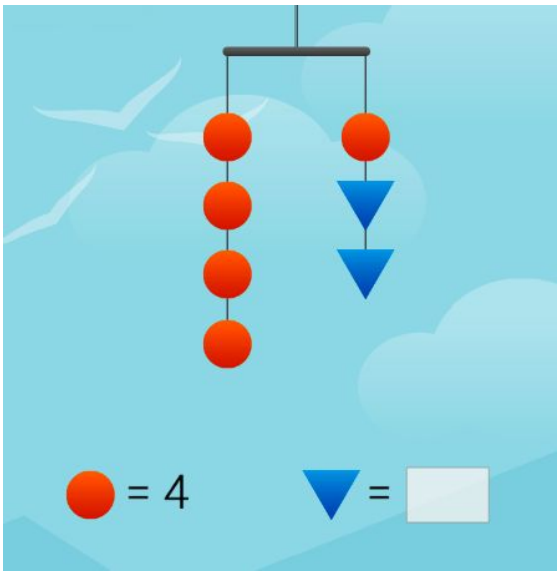
Directions: Solve & graph the inequality. Check your answer with your groupmates.

1.	2.
3.	4.
5.	6.
7.	8.
9.	10.

Lesson

4.6

DO-NOW



Find the value of the shape in the puzzle:

Blue triangle: _____

Explain! What is the first step you took to solving? Second step?

_____

_____

_____

_____

_____

_____

Homework Reminder

Shade in the box if you turned in your homework.

"Excellence is not an art. It is the habit of practice." - Aristotle

Check-In

How are you doing today?

What do you wonder about algebra?

Direct Instruction

<u>Video 1 Notes:</u> What does it mean to solve a two step equation?

1. _____
2. _____
3. _____

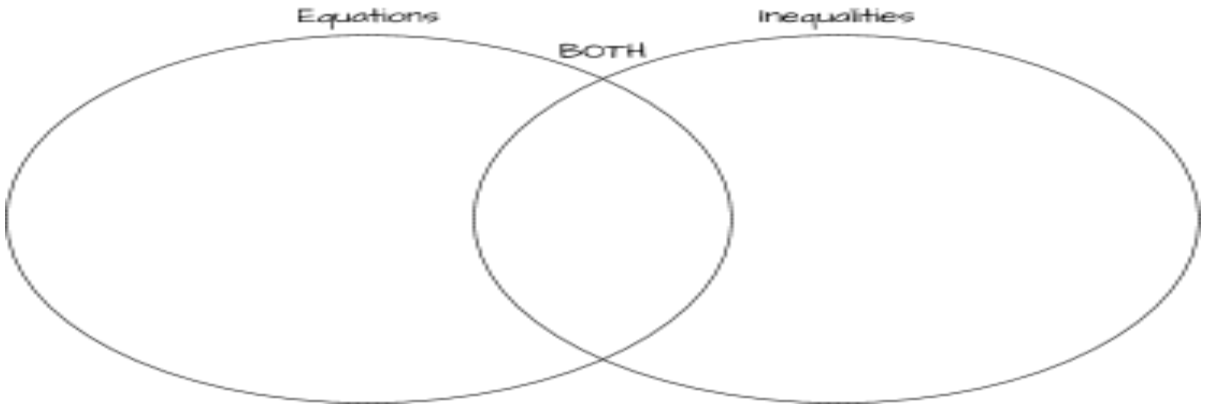
<u>Video 2:</u> Example - Solving a two step equation

$$-16 = \frac{x}{4} + 2$$

SOLVING TWO-STEP EQUATIONS	
STEP 1: Get the entire variable term by itself **STEP 2:** Get the variable by itself	
STEPS	**PROBLEM**
STEP 1: Get the entire variable term by itself **STEP 2:** Get the variable by itself	$5x + 10 = 20$ Does it check? _____
STEP 1: Get the entire variable term by itself **STEP 2:** Get the variable by itself	$-\frac{z}{4} = 10$ Does it check? _____
STEP 1: Get the entire variable term by itself **STEP 2:** Get the variable by itself	$8y + 10 = 98$ Does it check? _____

Math Chat!

How are inequalities different from equations? How are they the same?

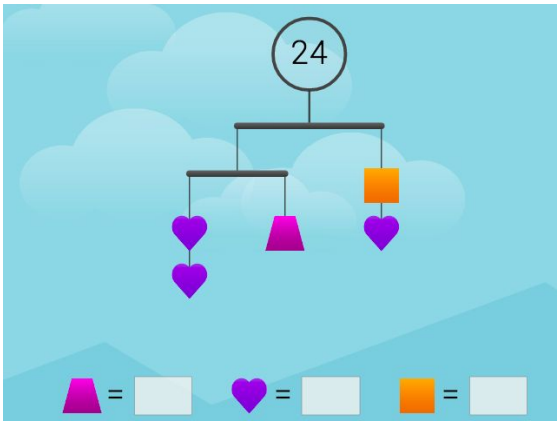


Guided Practice- Complete the task card. Show ALL your work. Check your answer!	
Task Card: _____	Task Card: _____
Task Card: _____	Task Card: _____
Task Card: _____	Task Card: _____
Task Card: _____	Task Card: _____
Task Card: _____	Task Card: _____

Lesson

4.7

DO-NOW



Find the value of the shapes in the puzzle:

Pink trapezoid: _____
Purple heart: _____
Orange square: _____

Explain the steps you took in order!

_____

_____

_____

_____

Homework Reminder

Shade in the box if you turned in your homework.
"Excellence is not an art. It is the habit of practice." - Aristotle

Check-In

How are you doing today?

What do you wonder about algebra?

Video notes: *Solve with MathAntics!*

$2x + 2 = 8$	$\frac{x}{2} - 1 = 4$
$2(x + 2) = 8$	$\frac{x - 1}{2} = 4$

Helpful tip:
THINK OF REVERSE PEMDAS!

Direct Instruction - *Let's try this one together!*

$$17t + 22(4-t) = 70$$

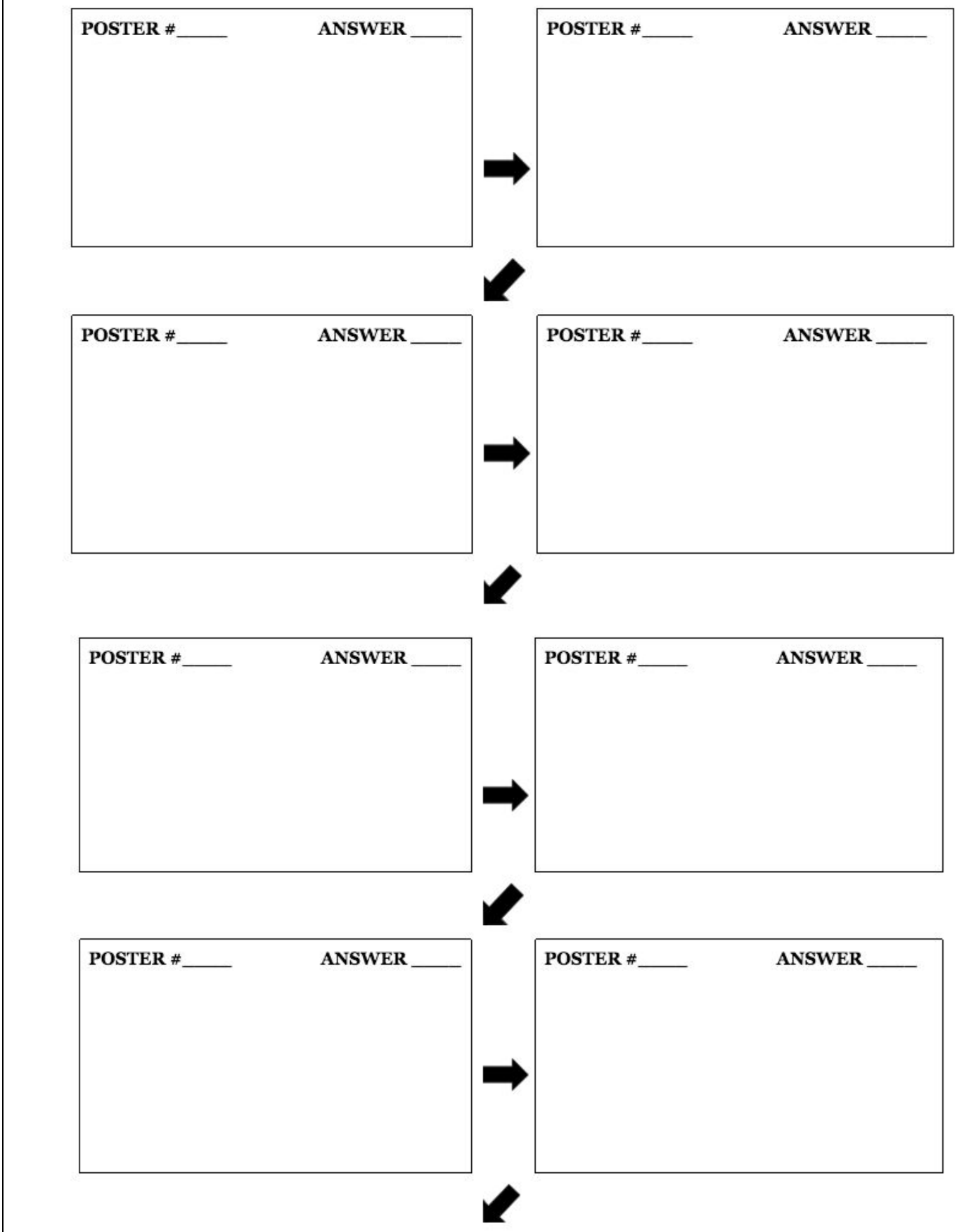
$$15(1-\frac{N}{5}) = 20$$

$$X - (33-x) = 2$$

CHECK IN!

Yourself:	***Partner:***

Guided Practice: Scavenger Hunt


POSTER #_____ ANSWER _____
POSTER #_____ ANSWER _____
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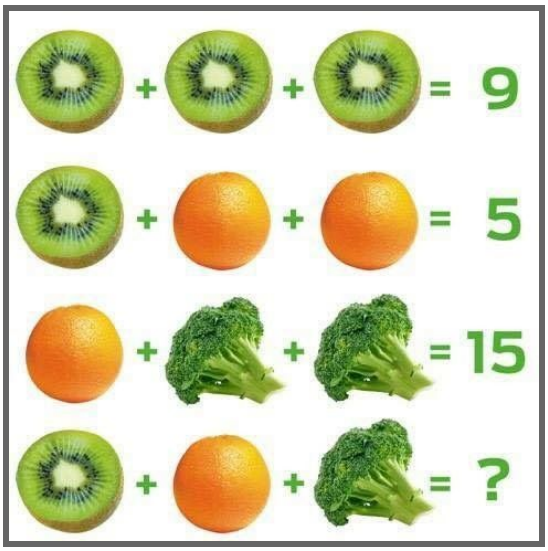
POSTER #_____ ANSWER _____
POSTER #_____ ANSWER _____
POSTER #_____ ANSWER _____
POSTER #_____ ANSWER _____
POSTER #_____ ANSWER _____

POSTER #_____ ANSWER _____

Check yourself: *Teacher Initials* _____

Unit 4 Solving Equations & Inequalities	**Lesson 4.8**

Lesson **4.8** **DO-NOW**		***Solve for each of the unknown values.*** Kiwi = _____ Orange = _____ Broccoli = _____
Homework Reminder	Shade in the box if you turned in your homework. ***"Excellence is not an art. It is the habit of practice." - Aristotle***	
Check-In	How are you doing today? What do you wonder about algebra?	

Review of Solving Two-Step Equations

The method of solving two-step inequalities is similar to solving _____.

Consider the equation: 2x +2 = 8

As mentioned in yesterday's video, the "x" in this equation is involved in TWO different operations: addition and multiplication. To get "x" alone, you need to use TWO inverse operations (subtraction and division):

Solving Two-Step Inequalities

Consider if this equation was turned into an inequality:

$2x + 2 < 8$

Just like with two-step equations, you would use inverse operations (in this case, subtraction and division) to get the x alone:

We used _____ to solve this inequality.

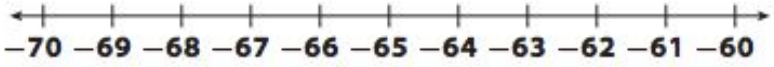
Inequality Sign Rule

When multiplying or dividing by a negative number, you must flip the inequality symbol.

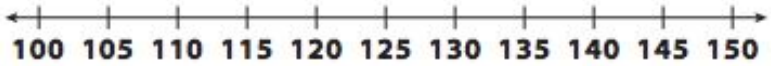
You Try!

Remember: Solve-Graph-Check

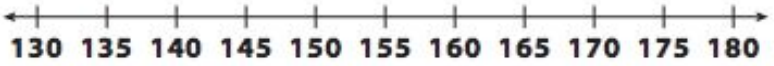
$\frac{a}{-8} + 15 > 23$ _____



$\frac{f}{2} - 22 < 48$ _____



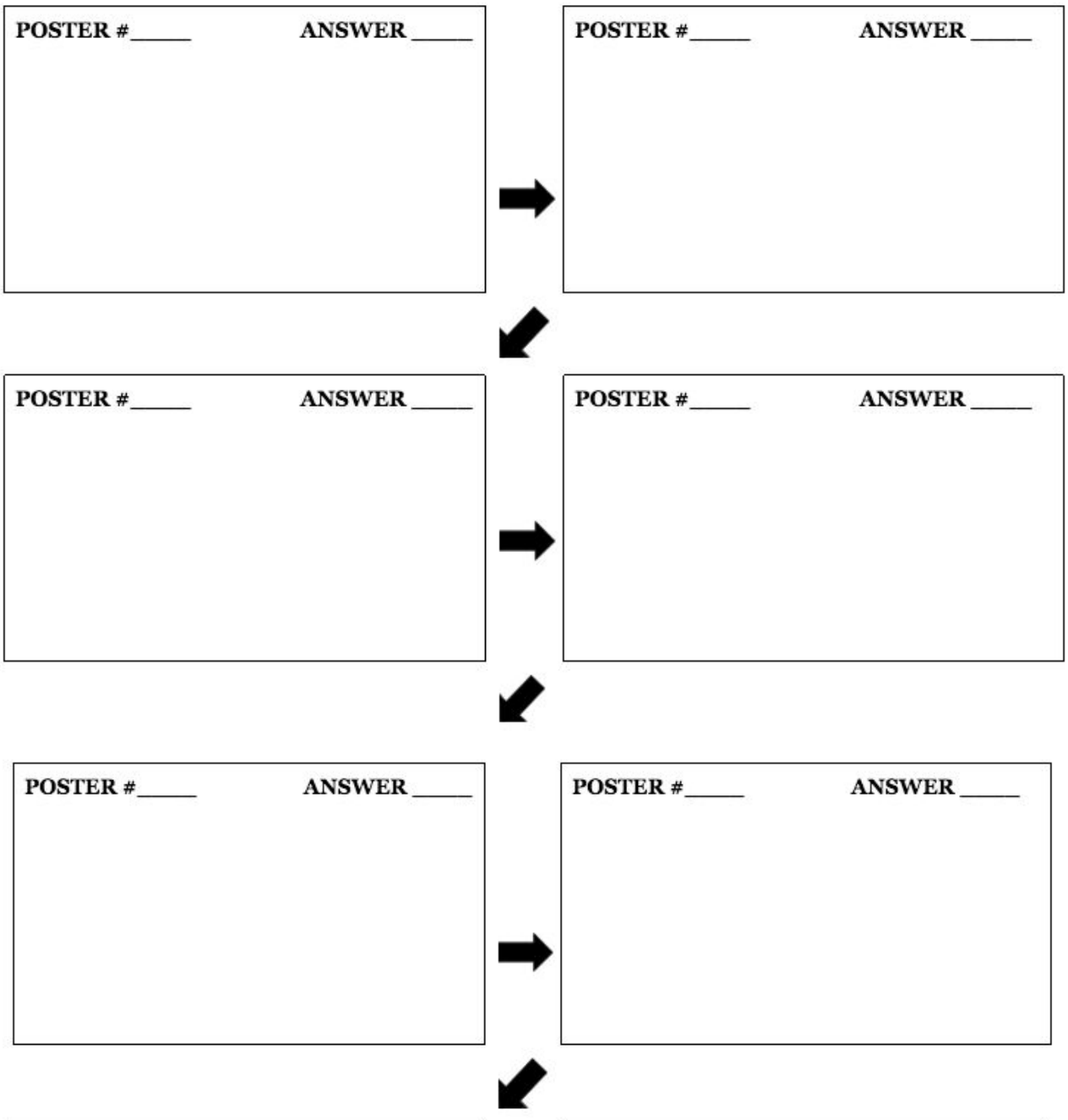
$-25 + \frac{t}{2} \geq 50$ _____

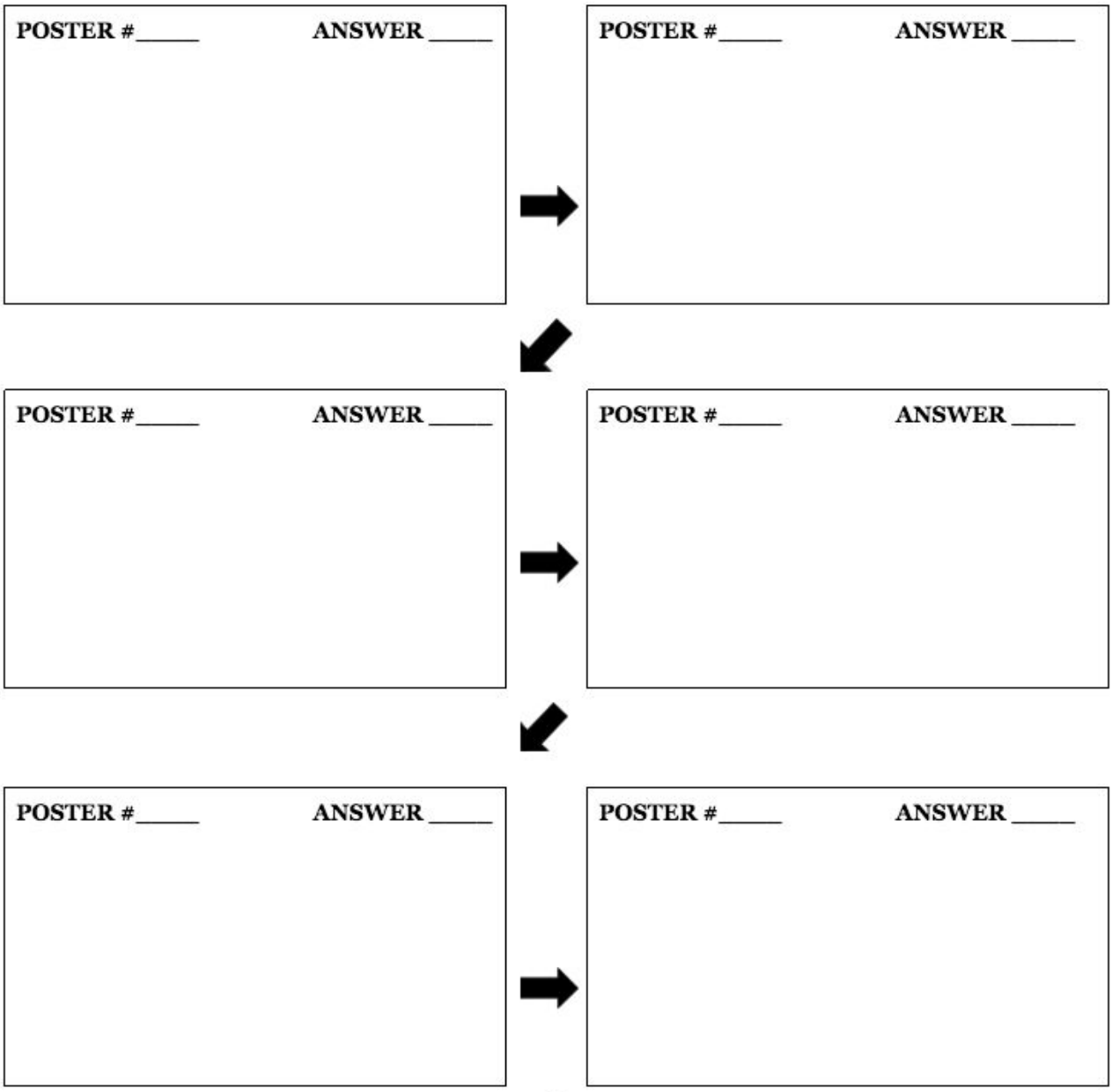


Solving Two Step Inequalities Video Notes

Solve the following problem: $\frac{2}{3} > -4y - 8\frac{1}{3}$

Guided Practice: Scavenger Hunt





Check yourself: *Teacher Initials* _____

Math Talks

4.5 What does a solution set to an inequality mean? For example: $y > 8$	4.6 What does it mean to "isolate the variable term"? Is that the final step to solving two-step equations?
4.7 What is a good strategy to use when solving two-step equations and inequalities?	4.8 What are the major differences between solving equations and solving inequalities? Name at least 3!

Workbook Reflection

Answer the question as completely as possible, using evidence from what we have learned this unit. Justify your response with examples and evidence from throughout the packet.

How can we solve two-step equations and inequalities?

Choose one of the following concepts and describe it. Include visuals to support your answer.

- *Difference between Equations and Inequalities*
- *Meaning of solutions to inequalities*
- *Tips to solve two-step equations and inequalities*

What lesson most challenged your thinking?

What would you have done differently?

Flip through your packet, and look to see if you shaded the box every day for turning in your homework. How many days did you shade it in?

Lesson 5	Lesson 6	Lesson 7	Lesson 8

If you didn't finish it each night, consider why →

Would you like to come in during lunch or recess for support?