Unit 4: Inequalities 12 Days (Instruction and Assessment)

Content Standards: A coherent set of standards that not only stress conceptual understanding of key ideas, but also continually return to organizing principles such as the properties of operations to structure those ideas.

- **7.EE.4b** -Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

Practice Standards: The mathematical practices represent a picture of what it looks like for students to understand and do mathematics in the classroom and should be integrated into every mathematics lesson for all students.

Students will have opportunities to:

- **SMP1** - Make sense of problems and persevere in solving them
- **SMP2** - Reason abstractly and quantitatively
- **SMP3** - Construct viable arguments and critique the reasoning of others
- **SMP4** - Model with Mathematics
- **SMP5** - Use appropriate tools strategically
- **SMP6** - Attend to precision
- **SMP7** - Look for and make use of structure
- **SMP8** - Look for and express regularity in reasoning

Concepts from Previous Units	Big Ideas, Concepts, & Strategies for Current Unit	Connections to Upcoming Concepts
Fifth Grade ● Use and interpret simple equations **Sixth Grade** ● Determine whether a value is a solution of an inequality ● Represent constraints with inequalities and recognize that they can have infinitely many solutions ● Solve one-step equations and inequalities	**Seventh Grade** ● Solve one-step inequalities involving integers and rational numbers ● Solve two-step inequalities	**Eighth Grade** ● Solve two-step equations ● Solve equations with variables on both sides ● Graph equations in two-variables

Vocab.	**Greater than (>), Less than (<), Inequality, Properties of Operations (additive property of equality, multiplication property of equality), Distributive Property, Solution, Coefficient, Negative Numbers, Positive Numbers** Perimeter, Base, Height

			A Day - First Day of Lesson Vocabulary, Tasks to Support Learning for ALL, Guiding Questions & Supplements to Extend Learning:			**B Day- Second Day of Lesson** Opportunities forNumber Sense, Additional Task, Practice and Tiered Supports, or to Analyze Student Work	
Lesson	**Learning Objectives**	**Student Objectives**	**Vocabulary and Tools**	**Implement Task for ALL Students** from Big Ideas Curricular Resource	**Supplemental Task** As another option, for extra practice, as a day 2 task, or for students who need an extension	**Implement Number Sense Routine**	**Select Practice Opportunity:** Distributed Practice
4.1 **(2 Days)**	**Preparing for 7.EE.4b** 1. Write and graph inequalities 2. Use substitution to check whether a number is a solution of an inequality	**4.1 Writing and Graphing Inequalities** **Essential Question:** *How can you use a number line to represent solutions of an inequality?*	**Vocabulary in the Launch** Reminder of the meaning of < and > signs **Tools:** Open number line **Vocabulary in the Summarize:** Inequality	**Task A:** ***Activities 1 and 2: Understanding Inequality Statements and Symbols*** ***Guiding Questions:*** *Think carefully about the phrase/term (at least, less than, no more than, etc).* *What does it mean when we say this?* *Do the numbers you circled represent that meaning?* *How do you know when you would include the number or not?* *How many numbers do you think could make the statement true?* *What are some of the numbers that make the statement true?* **Summarize** *What decisions did you have to make when thinking about which numbers represented the statement?* *How did you know when to include the number and when not to include the number?* *Can you think of a time when you used/heard an inequality used?* Appropriate now to explain how we	**Task B:** ***Selected Exercises: #26 Modeling*** ***Guiding Questions:*** *Do you think it's always a good idea to buy a monthly pass?* *When is it better not to buy a monthly pass?* *How many times would you need to ride for it to be better to buy the monthly pass?* *How could you write that as an inequality?* ***Summarize:*** *How did you decide on the number of times you need to ride for the monthly pass to be a better deal?* *How do you write that as an inequality?. . .* *How do you graph that on a number line?* *What does it represent to be to the left of the line?. . . the right?* Appropriate now to explain how we	**Number Sense Routine Samples:** **Always, Sometimes, Never** **For each statement, decide if it is always true, sometimes true, or never true** **Possible Examples:** A negative number is smaller than any other number If you multiply by a negative, you will get a negative.	**PJ:** Practice 4.1 **EX:** #7, 8, 11, 14, 17, 18, 21 **FGR** #29-32

				write and graph inequalities or check solutions.	write and graph inequalities or check solutions.		
4.2 (2 Days)	**Learning 7.EE.4b** 1. Solve inequalities using addition or subtraction 2. Solve real-life problems	**4.2 Solving Inequalities** **Essential Question:** *How can you solve an inequality that involves addition or subtraction?*	**Vocabulary in the Launch** Perimeter Base Height **Tools:** Open number line **Vocabulary in the Summarize:** Inequality	**Task A:** ***Selected Exercises: #20 and #26*** ***Guiding Questions:*** *What do you know about the number of passengers?* *How could you write that as a number sentence/inequality?* *Does that match the situation. . . how do you know?* *What would it look like on a number line?* **Summarize** *What were the number sentences/inequalities you wrote for each of these situations?* *Why did you write them as addition/subtraction statements?* *What about the situation lent itself to those operations?* *Did you ever include multiplication. . . why?*	**Task B:** ***Selected Exercises: #21-23*** ***Guiding Questions:*** *What do you know about how to find perimeter?* *How can you describe the relationship in your own words?* *How can you represent that relationship with an inequality?* *Once you solve, does that make sense in the figure?* ***Summarize:*** *What did you do to figure out each of the inequalities?* *How were you able to check your work?* *What are the range of lengths that could be accurate for each figure?* *How could you show that on a number line?*		**PJ:** *Activity 1 and 2: Writing an Inequality* **PJ:** *Activity 4: Temperature of Continents* **EX:** #7, 9, 11, 13, 15, 17, 19, 25, 28 **FGR:** #29-33
4.1-4.2 Quiz							
	Learning 7.EE.4b 1. Solve inequalities using	**4.3 Solving Inequalities** **Essential Question:** *How can you solve an*	**Vocabulary in the Launch** Coefficients	**Task A:** ***Modified Activity 1: Inequalities Involving Multiplication or Division***	**Task B:** *May need extended time to complete Task A*		**EX:** #2, 10, 12, 14, 17, 18, 24, 37, 39, 40 **FGR:** #48-52 **PJ:** Practice 4.3

4.3 **3 Days**	multiplication or division 2. Solve real-life problems	*inequality that involves multiplication or division?*	**Tools:** Open number line **Vocabulary in the Summarize:** Inequality	***Guiding Questions:*** *What do you notice happening when you multiply by 2. . . by -3?* *Why do you think that happens?* *Could you test your idea?* *What do you think this means when we have inequalities with negative coefficients?* *What did you predict?* *Which number line matched your chart?* *Was your prediction accurate?* *Why do you think so?* **Summarize** *What did you notice in the tables when you multiplied by positive numbers? . . . negative numbers?* *Were you able to predict what would happen?* *Did you try it using other positive or negative numbers?* *It's okay to change our prediction. . . what do you think we should conclude about multiplying or dividing by positive and negative numbers?*	**Task C (Generalizing)** ***Activity 4: Writing Rules*** Before students fill out the table, work together to predict the solutions, then use the table to check. *Let's look at our solutions we predicted and test it again the chart.* *Were our predictions correct?* *What rules can we write about solving inequalities with negative coefficients?* *Did those rules hold true in the chart?*		
4.4 **(2 Days)**	**Learning 7.EE.4b** 1. Solve multi-step inequalities 2. Solve real-life problems	**4.4 Solving Inequalities** **Essential Question:** *How can you solve an inequality that involves multiple steps?*	**Vocabulary in the Launch** **Tools:** Open number line	**Task A:** ***Selected Exercises: #22 and #23*** ***Guiding Questions:*** *Describe the situation in your own words.* *How could you write that as an*			**EX:** #7-17 odd, 18, 19, 24 **FGR:** #25-27

			Vocabulary in the Summarize: Inequality Properties (additive, subtractive, multiplication of equality) Distributive Property	*inequality? How can you represent the different amounts and rates to match the situation?* *Can you find the answer with the inequality and without the inequality and see if they match?* **Summarize** *What were the different inequalities you wrote for the three situations?* *How did you solve these inequalities?* *Did your solutions match what you would get if you solved without an inequality?* *What did you have to be careful of when solving?* *What did you have to remember from solving other equations in the past?*			
	End of Unit Assessment:						
Vocab:	**Greater than (>), Less than (<), Inequality, Properties of Operations (additive property of equality, multiplication property of equality), Distributive Property, Solution, Coefficient, Negative Numbers, Positive Numbers** Perimeter, Base, Height						

Sentence Stems for Secondary Mathematics:		
Domains	**Language Objective(s):**	**Sentence Stem(s):**

Speaking	1. I can orally describe the steps I took to solve the problem. 2. I can orally describe my reasoning. 3. I can defend my strategy. 4. I can restate someone else's thinking in my own words. 5. I can compare strategies.	• I need more time to think please. • I would like to add _____. • I think what you said is _____. • This is my strategy _____. • I agree/disagree with _____ because _____. • I would _____ instead. • This makes me think _____. • The evidence I have is _____. • What if_____? • How can that be _____? • Could you have _____? • How did you _____? • Why did you _____?
Reading	1. I can find important information in a word problem. 2. I can summarize the purpose of the word problem.	• The problem is asking me to find _____. • The purpose of the problem is _____.
Writing	1. I can write to explain my reasoning. 2. I can explain why my strategy works. 3. I can record drawings and equations to show my work.	• The problem is asking me to find _____. First I, _____Next, _____. Finally I found out that _____. My strategy works because _____. • The problem is asking me to find _____. In the beginning _____. But then, _____. At the end, _____. My strategy works because _____. • These are the steps I took to find _____. First, _____. Second, _____. Third, _____. I got _____ as my solution. I solved the problem this way because _____. • The problem is asking me to determine _____. I used the _____ strategy. To solve this problem first I _____. Then, I _____. Next, _____. After that, I _____. Finally I found out that _____. I noticed _____. My strategy works because _____.