

Lesson Plan by Aaron Cripe

Lesson: Inequalities 7.3

Grade Intended: 8th grade Pre-Algebra

Length: 50 minutes

Academic Standard:

Standard 3 — Algebra and Functions

Algebra is a language of patterns, rules, and symbols. Students at this level write and solve linear equations and inequalities, including solving pairs of linear equations by the substitution method. They use properties of the rational numbers to evaluate and simplify algebraic expressions. They further extend their understanding of the relationship between equations and graphs by connecting slopes to rates of change and by drawing graphs of quadratic functions and simple cubic functions.

8.3.1 Write and solve linear equations and inequalities in one variable, interpret the solution or solutions in their context, and verify the reasonableness of the results.

Performance Objective: After today's class, the entire class will be able to solve equations with inequalities with at least 75% accuracy on the daily assessment. Students need to be able to recognize when to use the correct inequalities. Problems with inequalities will also appear on the paper and pencil assessment that will be issued at the end of the chapter, of which the students should pass with at least 80% accuracy.

Advanced Preparation: The teacher should be prepared to teach the lesson and have all the accommodations and modifications ready for students. The teacher should have the agenda, homework assignment, and bell ringer activity ready when students come to class. The teacher should already have an idea about where the class should do the activity for today. If the classroom works that is probably the best option, however, maybe they should use the hallway, gym, cafeteria, or etc. The teacher should have all the examples ready when students come to class, with appropriate solutions.

Assessment: When the students walk into the classroom there will be a daily assessment or homework assignment written on the board. This assignment will be due at the beginning of the next class. The goal of the daily assessment is to give extra practice and test the knowledge and understanding of the lesson of that day. In the homework assignment the students will be creating inequalities and graphing them. This will help give the teacher feedback to where the students are at. There will also be a paper and pencil assessment at the end of the chapter, and a quiz in the middle of the chapter to help test the students overall knowledge of the lessons.

Homework Assignment: The students need to create 10 inequalities that they can find in nature; they can go on a nature walk or just simply come up with 10. They need to be written on a piece of paper when they come to class, and also they need to use all 4 symbols (Multiple Level of Naturalistic).

Also in the textbook, Page 343 (13- 31 odd), and 41

Procedure:

Introduction: When the students walk into the classroom the teacher should have a bell ringer activity ready for them. The bell ringer should be over yesterday's lesson, which was solving equations with grouping symbols. The teacher should use this time to take attendance and make any further preparations he/she needs to make before the lesson. After the students have finished the bell ringer activity the teacher should go over the problem thoroughly and make sure all the students are on the same page. Now it is time to start today's lesson. The teacher should start by writing a problem on the board such as: A savings account decreased by \$75 is now less than \$500. The teacher should have the students try to set up an equation. At this time the students only know how to use equal signs, thus that is what they should use to set up an equation. The teacher should then ask for suggestions for an equation. The students should tell the teacher to set up the equation **(Bloom's Level of Knowledge):**

$$S - 75 = 500$$

The teacher should explain to the students that if you solve this equation you get $S = 425$. The teacher should then ask the students if this really answers the question. Hopefully after some dialogue the students will realize that other numbers also answer this question and not just 425. The teacher should now explain that the only way to solve this problem is with the use of inequalities, which is what today's lesson will cover. Hopefully the students will see how important inequalities are and be interested to learn about them.

Step by Step: The teacher should start by explaining to the students what an inequality is. The teacher should then write the four inequalities on the board, $<$, $>$, $\leq$, and $\geq$. The teacher should then explain what each of these symbols represents, and when to use each one. The teacher can set up a table on the board to better explain these inequalities.

$<$	$>$	$\leq$	$\geq$
- is less than - is fewer than	- is greater than - is more than - exceeds	- is less than or equal to - is no more than - is at most	- is greater than or equal to - is not less than - is at least

This table should help the students grasp a better understand of when to use each symbol. Now the teacher should go over some very symbol examples and the board.

Examples (Bloom's Level of Comprehension)

- 1) Your speed is less than or equal to 35 miles per hour.
- 2) You age is less than 6 years.

Now the teacher should incorporate an activity to get the students involved. The teacher should have the students push all the desks to the edge of the room, so that there is enough room for the students to move. The teacher should explain to the class that

he/she will read a problem and the student's job (as a whole class) is to form themselves into the symbol that is needed to solve the problem (**Multiple Level of Bodily-Kinesthetic**). For example if the teacher reads the previous first example (Your speed is less than or equal to 35 miles per hour), the class would need to form a $\leq$ symbol.

Examples (**Bloom's Level of Application**)

- 1) The size of Texas is _____ compared to the size of Indiana
- 2) The trip from here to California is _____ compared to the trip from here to Michigan.
- 3) You have to be at least 40 inches tall to ride this ride.
- 4) You can be at most 6 years old to eat off the kid's menu.
- 5) The length of the Mississippi River is _____ compared to the length of any river in Indiana.

The teacher should then have the students come back to their seats and put the room back to order. Now the teacher needs to explain to the students that once they have the correct symbol they will be able to now graph the inequality. The teacher first needs to explain a number line, and how it is used. The teacher should then check understanding about which numbers are higher or lower on the number line (such as negatives are less than positives). After that the teacher needs to explain the difference between a closed dot and an open dot. Explain that a closed dot is only when it is $\leq$ or $\geq$ and an open dot is when you have the symbols $<$ or $>$. Once the students have that concept down, the teacher should do some examples on the board (**Multiple Level of Spatial**).

Examples

- 1) $x > 4$
- 2) $y < -8$
- 3) $a \leq 10$
- 4) $w \geq -1$

The teacher should then have the students do some problems at their desks (**Bloom's Level of Analysis**). The teacher will read a problem or write it on the board and the students should work on it by themselves (**Multiple Level of Intrapersonal**). The teacher should walk around and check for understanding.

Closure: The teacher should make sure that all the students have an understanding of when to use the correct symbol. If a student or students need more practice the teacher can keep giving problems to the class, and the teacher can work one on one with the student who needed the extra practice. The teacher should remind the students about the assignment to find ten inequalities in nature and write them down, as well as the assignment in the book. The teacher should have the students start their assignment if time allows for this.

Adaptations/Modifications: The teacher should be prepared to make various adaptations or modifications when teaching this lesson. It is important that the teacher should consider a lot of things when choosing groups. The teacher should make sure to avoid creating behavioral problems by putting two students who do not get along in the same group. Also a teacher should try and spread out the students who struggle more

then others. It is important to choose groups that will maximize success for everyone. Also it is important to make sure there is adequate room for every student during the activity, maybe the teacher will feel it is better to do the activity in the hallway, gym, or cafeteria. The teacher should be willing to work with students who might need modifications made to their homework for various reasons. The homework might be too easy for a student, thus the teacher might want to choose harder problems for that student. The teacher should also be prepared to do more examples if the students are not behaving during the out-of-their seat activity. The teacher has the control of whether or not to end the activity if the students are not doing what they should be.

Self Reflection: What worked for the teacher during this lesson? What did not work for the students during this lesson? What did the student enjoy? What could the teacher have done differently next time if they had to teach the lesson again?