**Inequalities**

**Part 1: Opening Scenarios**

1. Xavier has more than $8 in his wallet. What are some possible amounts he might have in his wallet?

2. John scored fewer than six points in the basketball game. What are some possible amounts of points John may have scored?

3. Each bus can carry a maximum of 60 students, but to be cost effective, each bus must carry at least 25 students. How many students could be on a bus?

4. Raquel had some money in her wallet. She found some money while walking home from school and she now has $10. What are some possible amounts of money she may have found?

**Part 2: Organizing your work.**

Directions: Looking back at the possible answers you listed for each problem above, try to represent all of the numbers on each number line provided below.



1.



2.

3. 



4.

**Part 3: Representing each scenario algebraically**

In math, if there is only one possible answer, we record that answer using an *equal sign* (=). To show that it could be anything more or less than a given number, we use *inequality symbols*, shown below.

**Inequality Symbols**

> means greater than ≥ means greater than OR equal to

< means less than ≤ means lesson than OR equal to

Use the symbols from the box above to write an inequality to represent each of the scenarios from part 1.

1.

2.

3.

4.

**Part 4: Graphing the Inequality**

Note: if a boundary point is included, we fill in or darken the circle

If the boundary point is NOT included, we leave the circle open.

using the information in the box to the

right, represent ALL possible solutions

to scenarios 1-4 by representing ALL

possible answer on the number lines.



1.



2.

3. 



4.

**Part 5: Practice!** For each row below, complete the missing box by creating a scenario, writing the inequality algebraically or by representing the inequality on the number line.

|  |  |  |
| --- | --- | --- |
| **Algebraic Representation** | **Scenario** | **Number Line representation** |
|  | Lupe has at least 3 cats |  |
|  |  |  |
|  |  |  |
|  | The trip will not cost more than $6 |  |
|  |  You must be at least 4 feet tall to go on the ride |  |
|  |   |  |
|  |  |  |

**Part 6: Summary**

How are inequalities *different* than equations?

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**Inequalities- Teacher Directions**

**Part 1: **Give the students 5 minutes to complete part 1. Encourage them to write down any and all answers they think could work.

**Part 2:** Without giving any direct instruction, ask the students to use the number lines provided to show all the answers they thought of or could think of from part 1 on the number line below. Choose a few students at random to show how they represented all the possible answers and make sure other students can understand the thinking. Ask a few probing questions, such as, “Could it also be \_\_\_?” “What about a number in between 4 and 5?”

**Part 3:** Begin by asking the students “How many answers are there to each of these problems?” “Do you think we could represent the answer with an equation, such as *x* = 3?” “Why or why not?” After the class agrees that there is a whole group of possible answers, direct their attention to the reading at the top of page 2. Ask the class if they recall seeing these symbols in elementary school and what they might mean. Then allow them to work alone or with a partner to write in inequality for each of the 4 scenarios.

**Part 4:** Direct the students’ attention to the box on the right of part 4. Go over the math conventions for noting if a point is or is not included and discuss the concept of a “boundary” point by asking them, for each of the scenarios, what was the largest or smallest number it could have been. Ask the students to try to represent scenario 1 using the correct notation and check the work as a class. Finally, have them graph the other 3 scenarios and choose students at random to present their solutions.

**Part 5:** Allow the students 5-10 minutes to try to complete the chart on their own, explaining that they need all three representations for each row. The second row may pose a challenge and is there to help them be aware that not all inequalities are single. After most students are finished, have them work in a group of 4 and use roundtable to share (begin with 1 member of the group and go in a circle, having each student share their work on each problem). While they are sharing, circulate to see how well they are understanding and provide additional explicit instruction and practice, if necessary.

**Part 6:** End class by having the students try to summarize or explain what in inequality is by comparing it with an equation.