

Title: Is the System Fair?**Grade Level and Course: algebra****Time Frame: one 66-minute class period****Content Objectives:**

- Students will move from a concrete understanding of symbols to a more abstract understandings of symbols
- Students will understand the variable as a symbol that represents something else (unknown)
- SW begin to appreciate the significance of using variables
- SWBAT describe a pattern using a variable

Language Objectives:

- Students will be able to express what a variable is
- SWBAT explain the significance of using variables
- Vocabulary: variable, expression, symbol, pattern

Higher Order Thinking:

- Reflecting on the use of symbols in our society
- Connecting the idea of symbol use in society to the use of a particular symbol, namely x (or other letters) as variables in algebra

Materials:

- Powerpoint slides of various symbols
- Tiles
- Is the System Fair? worksheet

Initiation:

The initiation is a series of ppt slides of different symbols. Students are asked to do the following: In your journal, describe what comes to mind when you see each picture. Then students' ideas are discussed with the purpose of helping students see the power of symbols in our society (they represent other objects, ideas, are compact yet rich in meaning).

Procedures:

1. Show ppt slides with symbols; have students write what comes to mind.
2. Elicit from students what each slide made them think of. Emphasize some of the properties of symbols. E.g., if they say "Mercedes", ask if it's a Mercedes or a symbol for a Mercedes. Also ask what other ideas come to mind (students might say high status, expensive, elite)
3. Summarize features of symbols
4. Show them the slide with Malcolm X. Identify X as a symbol that Malcolm used. Discuss what it represented.
 - a. Malcolm X – born Malcolm Little. He thought of Little as his slave name, as that was the name given to his ancestors by their owners. He chose to use X to represent the unknown – his last name was not known.

- b. Malcolm X and Dr. Martin Luther King had different views on how to make change. One of Malcolm X's speeches was *The Ballot or the Bullet*. What do you think he meant by that?
<Ballots Audio at: <http://www.historicaldocuments.com/MacolmXBallotortheBullet.mp3> Text at: <http://browser.griek.net/www.historicaldocuments.com/BallotortheBulletMalcolmX.htm> >
5. Discuss Malcolm X's view of the system as unfair.
 6. Transition to the game: Explain that they're going to play a game – which is really a system of rules – and determine if it is fair. Ask what it means for a game to be fair – (how would you know that it's fair?). Check for understanding.
 7. Explain the game. Model. Explain/ask about the term winning strategy. (If there's a winning strategy, does that mean the game is unfair?)
 8. Handout worksheet and put students into pairs to play the game. Alert them to the Check Point.
 9. Monitor as students work. At the Check Point, ask students A) is there a winning strategy? Is the game fair? B) what expression did they come up with to describe the number of boxes left after each turn (given that x is the number of boxes at the beginning of each turn). If students haven't written the expression algebraically, ask them to describe it in words. If students have the expression (e.g., $x - 3$), ask what the x represents and what the -3 represents.
 10. (Students can play the extension game with extra time.)

Closure:

Have students put materials away.

Have students write in response to the prompt: Why do we use symbols or variables in algebra?

Discuss their responses. (Hopefully students see variables as a powerful means to express ideas/patterns.)

Student Work Products:

Worksheet

Journal

Assessment:

Can be worksheet and/or journal

Differentiation:

See Think Cards and Hint Cards (at the end of the worksheet)