

Lesson Plan: Creating Linear Equations  
Blue Ribbon Math I For All  
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This lesson plan is for a five day introductory unit on Creating Linear Equations.

**Rationale for Choosing Lesson Objectives:**

Creating linear equations is a huge part of applying math to real world situations. I chose this objective because if the students had a better understanding of how equations are formed then it would be easier for these students to understand how, why, and when we use equations. Students need to learn critical thinking skills and be able to implement the material that they were taught in high school into their future lives.

**Timeline for Implementation and Student Background:**

I plan to implement my lesson in late January 2014 in an alternative high school Math I course. Students enrolled in this course have been unsuccessful in their regular high school courses for a variety of reasons. The class participants are students who have failed the majority of their freshman courses thus far and have been recommended for special assistance in core subject areas. Participants will include students from five Harrison County high schools and will be made up of first year freshman and older students who have failed Math I or Algebra I previously.

**Objectives (Next Generation Standards):**

**M.1HS.RBQ.5**

Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. (Limit to linear and exponential equations, and, in the case of exponential equations, limit to situations requiring evaluation of exponential functions at integer inputs.)

**M.1HS.RBQ.6**

Create equations in two or more variables to represent relationships between quantities; graph equations on a coordinate axes with label and scales. (Limit to linear and exponential equations, and, in the case of exponential equations, limit to situations requiring evaluation of exponential functions at integer inputs.)

**Day 1:**

Students will take a pretest on writing equations.

Students, as a class, will construct a word wall made up of terms that represent the four basic operations: addition, subtraction, multiplication, and division.

Each student will make a foldable for the four basic operations. Students will list words from the word wall onto the foldable along with a mathematical sentence for each word.

Students will use most of the remainder of class to explore one or more of the activity links/applets provided at the end of this lesson plan.

Students will respond to the following prompt on an exit ticket: Name one thing you learned today or one thing that you would still like to know about writing algebraic expressions.

### **Day 2:**

Teacher will respond to questions from exit tickets from previous day.

Teacher will provide direct instruction as to how to model equations using pictures.

Students will practice modeling equations with pictures.

Students will complete worksheet on modeling equations with pictures.

Students will play the applet: Algebraic Expressions Millionaire during any remaining class time.

Students will complete an exit ticket on what they either liked or disliked about today's activities.

### **Day 3:**

Students will be put into small groups. The students will be asked to group familiar items or pictures of familiar items, into envelopes and give each a single letter, variable, label and a colored star that represents the type of object in the envelope. For example, all apples could be grouped together with the label being an "a" and a red star, that represents edible items, while all oranges could be grouped together with an "o" and a red star.

The students will be asked to write how many of each item they have using only a variable. Next, students will be asked to show what happens if they gain more of an item, lose items, or share items.

The students will then be asked to add, subtract, multiply, or divide types of items using the envelope. For example, add all red star items using only their variable labels.

Students will model and create equations of real world scenarios using the variables that they already created as well as the items in their envelopes. This will be done on an individual basis.

Students will complete an exit ticket describing what they feel is the most important thing they have learned during this unit, thus far.

**Day 4:**

Teacher will provide direct instruction on how to create expressions and equations.

Students will practice creating expressions and equations in pairs.

Possible answers to practice problems will be given and discussed as a class.

Students will complete practice problems individually with teacher assistance if necessary.

Students will complete an exit ticket expressing how comfortable they now feel creating expressions and equations.

**Day 5:**

Teacher will answer any exit ticket questions and address any concerns.

Students will take the post test.

When students have finished the post test, they will explore the Algebra Meltdown link listed below.

**Activity Links:**

[www.math-play.com/Algebraic-Expressions-Millionaire/algebraic-expressions-millionaire.html](http://www.math-play.com/Algebraic-Expressions-Millionaire/algebraic-expressions-millionaire.html)

[media.mivu.org/mvu\\_pd/a4a/homework/applets\\_one\\_step.html](http://media.mivu.org/mvu_pd/a4a/homework/applets_one_step.html)

[www.mangahigh.com/en\\_us/games/algebrameltdown](http://www.mangahigh.com/en_us/games/algebrameltdown)

**Differentiated Instruction Chart:**

	<b>Content</b> (What you are teaching)	<b>Process</b> (How students are learning)	<b>Product</b> (How students show what they learned)
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<p><b>Student Readiness</b></p>	<ul style="list-style-type: none"> <li>• Students will be pretested to determine content knowledge.</li> <li>• Students will create a word wall to demonstrate prior knowledge.</li> <li>• Terms will be grouped into basic operation categories.</li> </ul>	<ul style="list-style-type: none"> <li>• Creating a foldable from the word wall.</li> <li>• Grouping items and providing a variable label.</li> </ul>	<ul style="list-style-type: none"> <li>• Students will complete a post assessment.</li> <li>• Students use terms in correct mathematical sentences.</li> <li>• Students will create equations given real world scenarios.</li> </ul>
<p><b>Student Interest</b></p>	<ul style="list-style-type: none"> <li>• Use of manipulatives to represent variables.</li> <li>• Use of exit tickets to gauge student interest.</li> </ul>	<ul style="list-style-type: none"> <li>• Use of familiar items in hands-on grouping exercise.</li> <li>• Students work in pairs and groups during activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Students create expressions and equations using variables in place of manipulatives and words.</li> <li>• Use of exit tickets.</li> <li>• Pictorial representations of expressions and equations.</li> </ul>
<p><b>Student Learning Profile</b> (Multiple Intelligence)</p>	<ul style="list-style-type: none"> <li>• Use of manipulatives.</li> <li>• Use of art and familiar objects.</li> </ul>	<ul style="list-style-type: none"> <li>• Drawing pictorial representations.</li> <li>• Grouping of manipulatives.</li> <li>• Use of computer applets.</li> </ul>	<ul style="list-style-type: none"> <li>• Students can use manipulatives to create and demonstrate equations.</li> <li>• Students can create equations orally.</li> <li>• Success in applet games can be used to show understanding.</li> </ul>

**Indicators of Student Learning:**

Pre-test and Post-Test

Word Wall Terms Used in Correct Mathematical Sentences

Completion of Pictorial Representation Worksheet

Creation of Equations by Substituting Variables in for Manipulatives

Student Exit Tickets

## Writing Algebraic Expressions and Equations Pre-test/Post-test

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Directions: Write an algebraic expression or equation to represent each given situation

1. 4 more than a number
2. 8 less than a number
3. Twice the sum of  $x$  and  $y$
4. A number divided by 5
5. 13 minus a number
6. The product of 3 and a number
7. The difference of a number and 2 is 16.
8. 7 more than a number  $x$  is  $y$ .
9. The quotient of 20 and a number is 10.
10. 4 less than three times a number  $x$  is  $y$ .
11. A number  $x$  is three less than a number  $y$ .
12. 54 divided by a number is 6.
13. Mia is 5 years younger than three times her brother, John, who is  $j$  years old.

14. Robert has 12 candy canes that he divides evenly between his best friends. Each friend gets  $y$  candy canes.
15. The sum of two numbers is 18.
16. The difference of two numbers is 24.
17. Jane picks 50 strawberries. After she eats  $x$  strawberries, she picks twice the original amount. How many strawberries does she have now?
18. George scores four times as many goals as Tom. Tom scores 1 more than Frank. How many goals did George score?

Name: \_\_\_\_\_

Directions: Model each algebraic equation using pictures.

1.  $x + 5 = 15$

2.  $x - 3 = 10$

3. April buys one bag of marbles. Then she buys another bag of marbles. April now has 40 marbles.

4. Jack has one box of candy. If Jack shares his candy evenly with John, each boy will have 7 pieces of candy.