Author: Amanda Rochford

Lesson Title: Adding and Subtracting with Equations

Suggested Grade Level: 8th

Estimated Lesson Time: 40 minutes

Student Prior Knowledge:

Students will know the definition of a variable and understand their use in an equation. They will also have knowledge with addition and subtraction in order to solve an equation.

With prior knowledge, I should not have used phrases like “will know”. I need to use states like “students know the definition of a variable”. I also need to include having prior knowledge or order of operations.

Standards:

Solve literal equations for a specified variable. (MA.8.A.4.1)

Goals:

Students will be able to define an equation and solve basic equations involving one variable using addition and subtraction. Understanding a literal equation will help students form their basic understanding of algebra in order to help their future math studies.

Learning Objective:

Given an equation, students will successfully solve for the variable using addition and subtraction.

Resources:

Smart Board

Procedures:

I would start class out with bell work or a few review problems from yesterday’s class that would help lead into the topic of today. This would also allow time to take attendance.

I will show definitions of the words variable and equation on the board. This would help the students understand the concepts of solving for variables using equations.

1. I will start by writing an equation on the smart board. I will continue to explain how to solve the equation by aiming to have the variable on one side of the equation and all numbers on the other side. I will elaborate on the fact that in order to get a number to the other side of the equation, you must do the opposite to both sides of the equation in order to cancel it out on the side with the variable. (For example, x+3 = 6, you must subtract 3 from both sides). Students will take notes during the explanation. (15 minutes)

Example problem-

10 = 6 + x

I will explain that in order to solve the equation, you must get the variable alone on one side of the equal sign. With this problem, you must move the 6 to the other side of the equation. Since the number is positive, you must cancel it out by subtracting it from both side of the equation.

10 – 6 = 6 – 6 + x

Then I should show that you do the addition or subtraction on both sides of the equation to get the answer

4 = x

1. Next I will put 4 example problems on the smart board and give students the chance to try and solve them. I will call on students to come up to the board to solve the equation using the smart board. After I will go over each equation with the class and make any corrections needed to the problem. (10 minutes)

I would then give an example of a real world problem having to do with equations. This would help the students understand how they can use equations in the real world.

Example problem-

Anna and Emily are sisters and are buying a birthday gift for their mother. The necklace they want to buy her cost $63. They have $27 to spend on their mother. How much additional money will they need?

Equation-

27 + x = 63

To get x on its own side of the equation, subtract 27 from both sides

27 – 27 + x = 63 – 27

X = 36

Anna and Emily need $36 more to purchase the necklace.

1. I will then pass out a worksheet with 30 practice problems that will be for homework. I will give students time in class to work on the homework in case they have questions. (15 minutes).

Assessment:

At the beginning of class the following day I will go over the worksheet which was for homework and answer any questions. After I will give a 10 question quiz in class to make sure the students understand how to solve the equations.

Author: Linda Crisanto (edited Amanda’s lesson plan)

Lesson Title: Edited Adding and Subtracting with Equations

Suggested Grade Level: 8th

Estimated Lesson Time: 40 minutes

Student Prior Knowledge:

Students know the definition of a variable and understand their use in an equation. They will also have knowledge with foiling and factoring equations.

Standards:

Solve literal equations for a specified variable. (MA.8.A.4.1)

Goals:

Students will be able to use their knowledge of solving basic equations to be able to solve more complex equations involving more than one unknown variable using factoring and foiling.

Learning Objective:

The student will solve multi-step linear equations and inequalities in one variable, solve literal equations (formulas) for a given variable, and apply these skills to solve practical problems. Graphing calculators will be used to confirm algebraic solutions.

Resources:

Smart Board

Graphing Calculator  
 Worksheets

Procedures:

1. Introduce students to the Problem of the Day. This will be on a section of the board throughout the lesson, and when students complete an assignment/task early, they may work on the problem of the day.
2. Begin by defining “Literal Equations.”
3. Give students math vocabulary to write definitions on their notebook.
4. Work 5-6 examples on the smart board, asking and taking questions. Call on students by name to keep them engaged and have students voluntarily come to the smart board to solve a math problem with reinforcement of reward or participation point. (example problems below lesson plan).
5. Show students how to graph these equation using a graphing calculartor.
6. Students will have a worksheet to start and the end of class and finish as homework.

http://uaimathteam.pbworks.com/f/Lesson+5+Unit+4+worksheet+literal+equations.pdf

Assessment:

At the beginning of class the following day I will go over the worksheet which was for homework and answer any questions. After I will give a 10 question quiz in class to make sure the students understand how to solve the equations.

Extensions and Adaptations:   
**1. Advanced/Gifted Students:**

Advanced and gifted students will have the chance of completing the Problem of the Day during class when they complete an assignment early to avoid having to do it as homework and instead of getting bored when having to wait for others to finish an assignment/task.

**2. Students with identified learning disabilities/processing issues:**

I can post a collection of videos on my class website that further explains the math concepts taught during class so that these students can watch, learn and repeat if needed at their own pace.  
1) Video of solving literal equations part 1

<http://mathvids.com/lesson/mathhelp/910-solving-literal-equations-part-1>

2) Video of solving literal equations part 2

<http://mathvids.com/lesson/mathhelp/911-solving-literal-equations-part-2>

**3. Struggling Students:**

I can pair my known struggling students in a group with a mixed group of students including some more advanced students but not with the gifted students because that can cause frustration for both students. I could also have tutoring after school for these students and that way I can better focus on their specific needs.

**Accommodations**:  
*Supplement oral instructions*: post assignment to class website, give a handout, and have instructions written on board during class.

Math problem that would be used during lesson:

* **Solve *A = bh* for *b***

If they'd asked me to solve 3 = 2*b* for *b*, I'd have divided both sides by 2. Following the same reasoning, I get:

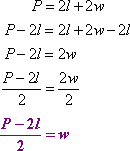
b = A/h

* **Solve *d = rt* for *r*** Copyright © Elizabeth Stapel 2002-2011 All Rights Reserved

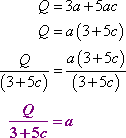
d/t = r

* **Solve *P* = 2*l* + 2*w* for *w***

If they'd asked me to solve 3 = 2 + 2*w* for *w*, I'd have moved the "free" 2 to the other side, and then divided through by the 2 on the variable. Following the same reasoning, I get:



* **Solve *Q* = 3*a* + 5*ac* for *a***



* **Solve *A* = ( 1/2 )*ah* – ( 1/2 )*bh* for *h***

