

## Problem Solving in Pre-Algebra

---

### Lesson Overview

Students will work in small groups to continue developing problem solving skills by writing then solving equations from situations presenting in word form. Students will learn how to work cooperatively while focusing on writing the desired equation to solve the problem in each situation.

### Standards Addressed

CCSS.7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

CCSS.7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

### Disciplinary Literacy Best Practices

Highlighting  
Collaboration

### Lesson Plan

Time Required – One 30-minute portion of a Class Period

Disciplinary Vocabulary : equation, inverse operation

Materials Needed:

- Highlighters
- Worksheet of Word Problems

## Engage

- The teacher will show the benefit of highlighting by showing a grocery list (5 items) with only key words highlighted. Students will write descriptors for each highlighted word to complete the final list. Share out of completed lists to show that the highlighted items are the distinguishing factor despite the variances from their added words. Time: 5 minutes
  - Example: **Sour Cream** 16oz Low Fat Sour Cream; 8oz Daisy Sour Cream; 1 cup store brand sour cream

## Explore

- Students will work in small groups to consider word problems requiring writing out expressions or equations to solve.
- Questions to Ask as Students Work:
  - What is the purpose of highlighting key words?
  - How are key words determined?
  - Might key words vary by person within the group?
- As students are working, monitor to ensure groups are collaborating. Student explanations should be shared and agreement for the operation and expression/equation will be recorded. Students should model collaboration skills such as Bounce Card prompts to respectfully share and disagree with other group members. Teacher will walk to groups to refocus and/or redirect as needed. Students will solve all problems within the group.

## Explain

- Discussion with the entire class will follow group work to emphasize group roles and procedures for highlighted that benefitted solving the problems. Lastly, students will share how the process of highlighting and collaborating with group members may be used in other areas of mathematics.
- Higher order thinking questions
  - How were highlighted words relevant to solving the problem?
  - How may you vary the highlighting itself to provide further information for group members? Underline, circle, \*, etc.
  - Are there different ways can an equation be written to yield the same solution? Justify your thinking.
  - How can the highlight strategy be used in another area of mathematics?

### Extend

- As a challenge for early finishers, for exit slip, for homework bonus, etc., students will be given the opportunity to practice further problem solving and highlighting word problems.
- How do others use highlighting? Plumbers, hair dressers, chefs, pharmacists?

### **Teacher Reflections and Biographical Information**

This class was already comfortable collaborating but I observed that some still wanted to exclude members of the group to get the task accomplished. Refocus was necessary to keep groups working at the same pace throughout and achieve deliberate collaboration.

Lesson Author: Cathy Ward, 7<sup>th</sup> grade mathematics teacher at Middle School of Pacolet in Spartanburg School District 3 in Spartanburg, SC.