The Great Granola Grab

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Title: The Great Granola Grab

Objective: The objective of this lesson is to introduce “open sentences”. Students will explore relationships using variables ( ) and fact families.

Standards/Performance Indicators:
Mathematics, Science, Technology, Standard Number 3, Elementary
1.PS.4 - Formulate problems and solutions from everyday situations (i.e., counting the number of children in the class or using the calendar to teach counting)
1.PS.8 - Use manipulatives (i.e., tiles, blocks) to model the action in problems
1.PS.10 - Explain to others how a problem was solved, giving strategies and justifications
1.N.24 - Develop and use strategies to solve addition and subtraction word problems
1.N.25 - Represent addition and subtraction word problems and their solutions as number sentences
1.N.26 - Create problem situations that represent a given number sentence

Introduction:
This lesson is designed for a first grade class and is a blend of whole group instruction with plenty of class participation and cooperative learning groups. The opening activity is a great hook to motivate the students and peak their interests. Students will need to draw on their previous knowledge of fact triangles and fact families. Manipulatives will help students solve for the empty box, or the unknown. The lesson can be geared to older students by increasing the difficulty of the number sentences.

Materials:
handouts
transparency of handout
box of granola bars
Unifex cubes

Opening Activity:
Explain to the students that you have a box of granola bars. “Let’s take a look inside the box, how many granola bars do I have?” Count the number of bars as a class and record the number on the board. “I need a volunteer to share my granola bars with me.” Ask the volunteer to reach inside the box and grab some granola bars but not to show anyone how many they have grabbed (you may need to remind the students that we are sharing so they will need to leave some in the box). “Now let’s look in the box and see how many we have left.” Write the problem symbolically on the board, leaving a box ( ) to represent the amount your volunteer has hiding in their hands (ex. 5- =3). Lead the students to the reasoning for placing the box there instead of a number (it is a mystery, we don’t know how many “Suzie” has taken so we need to leave a blank box that we can fill with an answer). Allow the students to work in small groups to solve the problem. Follow with a class discussion. Have students give the reasoning behind their answers.

Lesson (Using Fact Triangles to discuss Open Sentences)
Display the fact triangle (children should be familiar with them at this point) for the problem above. Leave one factor of the triangle blank (the amount "Suzie" grabbed from the box), review with the students what belongs there. Below the triangle list the number sentences that belong to that fact family. Place boxes in place of factors and enlist the help of the students to fill them in. An example is provided.

Ask the students to use the unifex cubes to find other ways make the original sum (original amount in the box) using two factors. Construct and fill in the appropriate fact family triangles in the same procedure as above. Be sure to leave boxes for the students to solve.

Group Work
Pass out the coordinating handout and allow children to work cooperatively in groups. Be sure to walk around the room and observe the students. Interject into groups and help students that seem to be struggling. Review the worksheet as class on the overhead projector and allow for ample class discussion.

Closure
End the lesson by returning to the granola bar problem. Review the instructions and place a new amount into the box. Repeat the process with another volunteer.
Directions:

Fill in the boxes with missing fact family member.

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\begin{align*}
5 + \square &= 8 \\
8 - \square &= 5 \\
3 + \square &= 8 \\
9 - \square &= 3
\end{align*}
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