

**I. What do we want to learn from this lesson?**

**We want to see if the use of a restaurant and the menu is a concrete idea that can help students connect to the abstraction of variables and solving equations?**

**QUESTION FOR OBSERVERS:** What evidence did you see that showed that the use of the menu was a concrete idea that helped students understand the abstract idea of variable and the solving of equations?

**II. The overarching Lesson Study goal is: To have students be confident learners of mathematics**

**The goals for this lesson are for students to multiply decimals, combine like terms, correctly label units, substitute with variables, and solve problems.**

Steps of Research Lesson	What is the teacher doing?	What are students doing?	What do students need to know/be doing to successfully engage in the lesson?
<p><b>Building a context for the lesson. Math in Context (MIC) Operations.</b>                      -Order of operations from <i>Expressions and Formulas</i>                      -The <i>Operations</i> text had lessons on positive and negative integers.                      -Connections to restaurant real life ordering off of a menu</p>	<p>Setting the stage of using the restaurant connection</p> <hr/> <p><b>Possible Responses/ Questions to Pose:</b>                      Have you ever eaten in a restaurant?</p>	<p>Students will be sitting in their seats and with their group members</p> <hr/> <p><b>Possible Questions or Misconceptions:</b>                      -I just tell them my order, I don't look at the bill</p>	<p>Students need to know basic operations including addition, subtraction, multiplication, and division as well as reading, writing and sequence of events. They will need to have some experience with order of operations, distributive property, grouping, simplifying, solving for unknowns, multiplying decimals, formulas, and variables</p>
<p><b>Laying the framework for the learning experience (Presenting the activity)</b>                      -Engaging students in a real-life situation of being in a restaurant and having to figure out what amount each person owes so that no one gets stuck paying more than their share                      -Having a problem to hook the students into the idea of the lesson</p>	<p>-Putting a copy of the bill on the overhead                      -Teacher telling the students about a visit to a restaurant and receiving a bill with letters and a total. Explaining that there were all these numbers and letters on the bill. Trying to figure out how much each person owed for portion of food                      -Ask students what they order when they go to a burger restaurant                      -Choose students to share on the board</p>	<p>-Listening to the scenario about being at a restaurant                      -Students looking at the bill on the overhead                      - Students are writing down what their order would be</p>	<p>-Students need to be looking at the problem presented to get them hooked into the lesson see what they will be doing</p>

	<p><b>Possible Responses/ Questions to Pose:</b></p> <ul style="list-style-type: none"> <li>- Why did you multiply before you added?</li> <li>-Why did you assign names to variables?</li> <li>-Why did you solve it this way?</li> <li>-Did someone get a different answer?</li> </ul>	<p><b>Possible Questions or Misconceptions:</b></p> <ul style="list-style-type: none"> <li>-I don't look at the bill</li> <li>-What type of restaurants use a bill?</li> </ul>	
<p><b>Engaging students with concepts</b> (<i>Exploring, investigating, problem solving</i>)</p> <p><b>Provide brief description of this lesson step</b></p> <ul style="list-style-type: none"> <li>-Transparency #1 with restaurant bill</li> <li>-Students will be given a problem to view that has letters and prices on it.</li> <li>-Write down a sample order of their own. -Hand out menu (transparency #2) and ordering food in a restaurant</li> <li>-Transparency #3 has problems with variables in the problems</li> <li>-Reveal one problem with variables and solve the simple problem.</li> <li>-Students will solve problems from the overhead</li> <li>-Students will put answers on the board for the problems off of the overhead</li> <li>-Copy the problem</li> <li>-Write the problems from the words (Transparency #4 and hand out)</li> <li>-(Transparency #5) Substitute in the value and solve and writing out the order</li> <li>-Write equations for the orders that were placed.</li> <li>-Solve the equations</li> <li>-Put problems on overheads</li> <li>-Write out orders for the orders that have letter variables in them</li> <li>-(Transparency #6) Take orders and simplify them for the cook</li> </ul>	<p>-Teacher will lead the class in the solving of the first problem</p> <p>-Uncover the rest of the problems to solve</p> <p>-Hand out to groups the sheet with the monologue of orders on it</p> <hr/> <p><b>Possible Responses/ Questions to Pose:</b></p> <p>As teacher is circulating around the classroom she can ask people in groups:</p> <ul style="list-style-type: none"> <li>- Why did you multiply before you added?</li> <li>Why did you assign names to variables?</li> <li>Why did you solve it this way?</li> <li>What operation would you use when you see "7f"?</li> <li>Is there another way to write this equation?</li> </ul>	<p>-Students will be trying to solve the first sample problem then trying to solve the whole problem.</p> <p>-Students will then solve the remainder of the problems on the overhead</p> <p>-Students will put answers on the board</p> <p>-Write problem in words</p> <p>-Substitute in value and solve</p> <p>-Simplify the orders given to the cook</p> <hr/> <p><b>Possible Questions or Misconceptions:</b></p> <ul style="list-style-type: none"> <li>-I don't get it.</li> <li>-What are we doing?</li> <li>-Does it matter what letter we chose?</li> <li>-How do I know how to simplify them?</li> <li>-How do I know when to add and when to multiply?</li> </ul>	<ul style="list-style-type: none"> <li>-Students need to be following the teacher</li> <li>-Students and groups need to follow each step or part of the lesson</li> <li>-Students need to take turns and discuss the different possibilities</li> <li>-Need to record all answers to help reinforce learning of concepts</li> <li>-Need to know what they will present to the rest of the class.</li> <li>-Students translating to other students (Students need to have an understanding of the concept in order to translate to other students)</li> </ul>

<p><b>Sharing ideas/solutions</b> <i>(Whole group, small group, written)</i></p> <p><b>Provide brief description of this lesson step</b> -(Transparency #5) The students will share from their group and have written their answers on poster board</p>	<p>-Facilitating the sharing of answers to the questions</p> <hr/> <p><b>Possible Responses/ Questions to Pose:</b> -These questions can be posed to the groups presenting solutions -Why did write your order this way? -Did somebody get a different way? -Are they write or wrong with their answer? -Why are the poster boards of the same questions the same or different?</p>	<p>-Working in their groups and solving the problems presented to the group</p> <hr/> <p><b>Possible Questions or Misconceptions:</b> -What did they do? -Who has the right answer? -Am I right? -Why did you pick the letter?</p>	<p>-Have their answers recorded clearly on their paper -All members of the group need to participate</p>
<p><b>Closure/Summarizing</b> <i>(Tying ideas together)</i></p> <p><b>Provide brief description of this lesson step</b> -Put original equation on overhead and have students solve the ticket problem.</p>	<p>-Teacher will hand out the original bill to be solved</p> <hr/> <p><b>Possible Responses/ Questions to Pose:</b></p>	<p>-Students will try to solve the original bill and how much each person owes</p> <hr/> <p><b>Possible Questions or Misconceptions:</b> I still don't get what letter to use... how do you know if you should use a "h" or an "i" or a "j"</p>	<p>Students work with the original bill and try to figure out what each person owes on the bill</p>