**Lesson Title:** Class Picnic – Problem Solving **Subject:** Math **Grade Level:** 3rd

**Length:** 1-2 class sessions

**Learning Objective:** Students will apply their understanding of the properties of multiplication and demonstrate their understanding of the relationship between multiplication and division to solve real world problems.

**CCSS for Mathematical Content:**

* 3.OA.1
  + Interpret products of whole numbers
* 3.OA.5 –
  + Apply properties of operations as strategies to multiply and divide
* 3.OA.6 –
  + Understand division as an unknown-factor problem
  + Understand the connection between division and repeated subtraction and multiplication

**Prior Learning:**

This lesson comes at the culmination of the unit on multiplication and division. Prior to this lesson students have spent time exploring the properties of multiplication and its relationship to division and as a shortcut for repeated addition. They have worked with arrays, number models, and picture representations to solve multiplication and division number stories. The majority of the students are still working on the automaticity of their multiplication math facts, while a few students have them mastered.

**Materials:**

Part I:

* Base-ten blocks to be used as manipulatives
* Picnic item and quantity cards
* Slates and dry erase markers for problem solving pictures
* MATH - Class Picnic Task recording sheet Part I
* Shopping List Chart Paper

Part II:

* Base-ten blocks to be used as manipulatives
* Shape cards to represent picnic tables
* Slates and dry erase markers for problem solving pictures
* MATH - Class Picnic Task recording sheet Part II
* Glue sticks
* Construction paper

**Instructional Grouping:**

Students will work on the transfer task assignments in small groups of 2-4 students. The picnic item and quantity cards will be differentiated based on the small group’s instructional level as related to their understanding of the properties of multiplication.

**Lesson Sequence:**

**Transfer Task Part I:**

* **Anticipatory Set:** Explain to students that the school is planning a picnic for the third grade. In planning for the picnic, they need to be sure to purchase enough food and supplies for all of the third graders in attendance.The teachers would rather have more than not enough of all the food and supplies.
* **Explanation of Task:** Explain to students that they will work together in small groups to help the teacher create a shopping list for the picnic. Before going to the store, I need to know exactly how many packages of each food item and supply we will need. Each group will receive a particular food item they will be responsible for adding to the shopping list. On their food item card, it will list the quantity in each package of that particular item. Groups will need to decide how many packages of their particular item are needed for the 42 third graders at the picnic.
* **Problem-Solving Activity Process:**
  + Pass out food item cards and MATH – Class Picnic Task recording sheet Part I to groups.
  + Groups will begin problem solving using their assigned food item card. Groups will complete the M (Make a picture) portion of the acronym MATH on the task recording sheet. They will generate a picture, array, or model to represent how many packages of their particular item will need to be purchased.
  + Groups will complete the A (Algorithm or number model) portion of the acronym MATH on the task recording sheet. Together they will develop an algorithm or number model to represent their portion of the scenario.
  + Groups will complete the T (Tell your answer) portion of the acronym MATH on the task recording sheet including their unit label.
  + Groups will each share their thought process and problem solving strategies with the class and add the quantity of their assigned item to the class shopping list.
* **Formative Assessment Questions:** As groups are working or sharing their responses, the teacher will ask the following formative assessment questions to the groups:
  + How many packages have you tried?
  + How will you know when you have enough packages of this particular item?
  + Will you have any extra or leftover items? If so, how many/much?

**Transfer Task Part II (portions may carry over into Day #2 depending on time):**

* **Anticipatory Set:** Explain to students that after shopping for the picnic items, the next task to be sure we have enough picnic tables for the 42 third graders. The school has a variety of picnic tables we can use, we’ll just need to ensure there is a seat for everyone.
* **Explanation of Task:** Explain to students that they will work together in small groups to create a table arrangement that will seat all 42 third graders. Explain that the following styles of table will be available:
  + Square tables – seat one person on each side (total of four students)
  + Circular bistro tables – seat three students
  + Hexagonal tables – seat one person on each side (total of six students)
  + Rectangular banquet tables – seat twelve students
  + Pentagonal tables – seat one person on each side (total of five students)
* **Problem-Solving Activity Process:**
  + Pass out the shape manipulative cards. Students will use the shape manipulatives to create a table arrangement that will have enough seats for all 42 third graders.
  + Groups will then complete the Class Picnic Task Recording Sheet Part II.
* **Formative Assessment Questions:** As groups are working or sharing their responses, the teacher will ask the following formative assessment questions to the groups:
  + What combinations of picnic tables have you tried so far?
  + How will you know when you find the right combination?
  + Do you think there is more than one right solution for this task? Why?
  + How many \_\_\_ (square, circular, hexagonal, pentagonal, rectangular)
  + Will you have extra spaces at any of the tables? How many? In your number model, what represents these extra spaces?

**Resources:**

Georgia Department of Education – Mathematics Grade 3: Unit 2: Operations and Algebraic Thinking: the Relationship Between Multiplication and Division. Dr. John D. Barge, State School Superintendent. July 2013