## Math 5 - Act. 09: Table Settings

Summary
This activity has students making organized lists and finding patterns to help them solve problems.
Materials

- Spaghetti and Meatballs for All by Marilyn Burns
Paper and pencil
Additional Resources
Lessons for Algebraic Thinking by Maryann Wickett, Katharine Kharas, and Marilyn Burns
Family Math: The Middle Grades by Virginia Thompson and Karen Mayfield-Ingram
Elementary School Mathematics by John A. Van De Walle


## Background for Teachers

Many of the values of attribute activities and pattern analysis are the same: development of logical reasoning, perseverance in solving problems, a willingness to solve problems, and the ability to test ideas.
Younger children love to build and extend patterns. When using patterning with older children, it is also a matter of testing ideas, extending patterns to test relationships, and developing general formulas. All of these are important aspects of mathematical thinking and problem solving. Numeric sequences are good early examples of the concept of functional relationships. Each term in the sequence or pattern has a unique value, depending on its position.
Younger children need to use repeating patterns. Older children should develop patterns that grow. Be careful not to move too quickly because children of all ages need plenty of opportunities to construct ideas about patterning.

Intended Learning Outcomes

1. Demonstrate a positive learning attitude toward mathematics.

Instructional Procedures
Invitation to Learn
Ask, "How many people can sit around your kitchen table at home?" Call on several students to respond. Draw a square on the overhead or board. Ask students, "How many people could sit around this table if one chair fits on each side?" Draw lines to represent chairs. Instructional Procedures

Begin reading the book Spaghetti and Meatballs for All. As the story progresses, continue to draw the new formations. Instruct students to draw the table formations in their math journals and label how many people are able to sit there. Use different questioning strategies to help students make predictions about how the tables will be set up and what will happen to the seating.
When finished with the story, tell the students that they are going to host a banquet and that this time all the tables will need to be set up in one row. Have the students draw what their banquet arrangements will look like using one to six tables including lines for the chairs.

Tell the students that they are going to transfer the information to an organized list or table and look for patterns. Make a T-chart on the board and have students copy it in their math journals.

Ask the students what the headings should be. Then fill in the numbers in the left column one to six.

Students then fill in the number of chairs for each of the table arrangements. Have students make predictions about the patterns that they see.

Students will probably look at the patterns going vertically which is good, but the focus should be on what is the relationship between the sets of numbers. Have students test their theories (e.g., if someone says you add three each time, go down the list and test it to see if it applies to each set). Encourage the students to communicate what they believe the pattern to be.
Point out the pattern: the number of chairs is equal to the number of tables, times two, plus two more chairs for the ends. Explain that this would be easier to see and explain in an equation. Write the equations for each of the numbers:
$(1 \times 2)+2=4$
$(2 \times 2)+2=6$
$(3 \times 2)+2=8$
Have the students continue writing the equations through number six (or beyond) on their tables. End by challenging students to use the equation to find out how many chairs would fit around 10 tables, 15 tables, or 25 tables. Have students understand the connection between making organized lists and finding patterns to problem solving.

## Extensions

## Possible Extensions/Adaptations

Challenge students to do the same thing (make an organized list and find the pattern) with triangular tables, hexagonal tables, trapezoid tables, etc.
Attribute activities also help students see patterns. Use attribute blocks to have students make logical connections between the blocks using the words and, or, or not.
Some students may need to use pattern blocks to visualize the chairs around the square tables. Have them available for those students (everyone will use pattern blocks in the Let's Build It activity). Some students may find it easier to see the clues of pattern relationships in drawings rather than in charts, so allow this as necessary.
Homework \& Family Connections
Challenge students to use their own kitchen tables as a base to create patterns. What if they used two of their tables? How many people could sit around it? What if they had a triangular table? What patterns would emerge then?

## Assessment Plan

Monitor students' drawings and lists as they fill in the numbers. Pay close attention to their pattern theories. Have everyone continue their lists through the number ten and assess if the corresponding number of chairs is correct.

## Authors

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