Mississippi Mathematics Manipulatives Manual
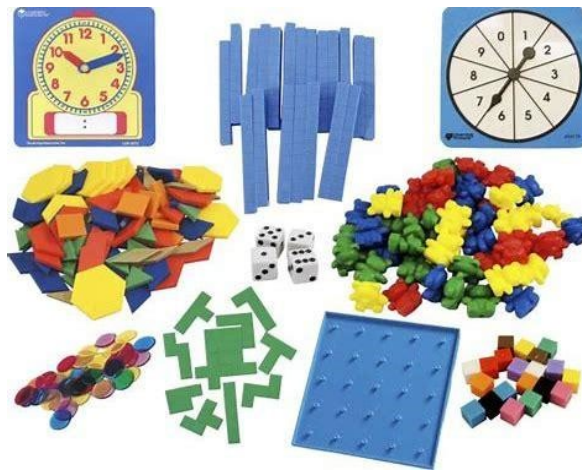# Featured Activity

"Arrays for Repeated Addition"

2.OA.4

Carey M. Wright, Ed.D.
STATE SUPERINTENDENT OF EDUCATION

Nathan Oakley, Ph.D.
CHIEF ACADEMIC OFFICER

Wendy Clemons
EXECUTIVE DIRECTOR
Office of Secondary Education, Dropout Prevention, & Professional Development

Marla Davis, Ph.D.
STATE DIRECTOR OF CURRICULUM AND INSTRUCTION
Office of Secondary Education

Tommisha Johnson
K-12 MATHEMATICS CONTENT DIRECTOR
Office of Secondary Education

As we continue our efforts to develop high-quality instructional materials (HQIM) and resources, the Mississippi Department of Education (MDE), through the Academic Education Office, would like to showcase instructional practices and activities that foster conceptual understanding through the use of manipulatives in the mathematics classroom.

The **Mississippi Mathematics Manipulatives Manual** features activities meant to serve as short, hands-on procedures that may be implemented before, during, or after a lesson to support the teaching and learning process of the Mississippi College- and Career-Readiness Standards (MCCRS) for Mathematics. Alignment with the MCCRS Scaffolding Document has been included for additional support. Teachers may contact staff at the MDE if they would like to borrow manipulatives for classroom use.

Teachers may modify these activities to meet the needs of the students they serve and their instructional delivery model (virtual, in-person, or hybrid).

Arrays for Repeated Addition

MANIPULATIVE(S):

- Counters
- Dry Erase Boards and Dry Erase Markers

GRADE LEVEL OR COURSE TITLE:

CCRS Mathematics Grade 2

DOMAIN and CLUSTER HEADING:

Operations and Algebraic Thinking (OA):
Work with equal groups of objects to gain foundations for multiplication.

STANDARD(S) :

2.OA.4: Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

PREREQUISITE SKILLS :

- Distinguish between rows and columns. This foundational knowledge is crucial for a proper understanding of algebraic concepts addressed in later grades. The proper notation is Number of Groups x Number in Each Group (For example: 3 groups of 4 would be three rows and four columns).

- Understand the terms "row," "group," and "number sentence" or "equation."

ACTIVITY:

1. Before the activity, create cards with grouping statements such as three rows of 4, two rows of 5, three rows of 1, four rows of 2, etc. (***Note: For this standard, limit the number of rows and numbers in each row to* 5**). On the back of each card, write the corresponding repeated addition expressions such as *4+4+4, 5+5, 1+1+1, 2+2+2+2,* etc.
2. Provide each student or pair of students with counters, a dry erase board, and a dry erase marker. If boards and markers are not available, pencil and paper will suffice.

3. Hold up one of the repeated addition expressions. For example, the card marked *4+4+4.*
4. Ask students what they notice about the expression. Examples of their responses could include, " I see a plus sign" (or two plus signs), "I see three 4s", etc.
5. Ask students/pairs of students to model this statement with their counters. ***Note: Depending on prior knowledge and experiences, most students may create three piles or groups of 4 counters.***
6. "Move around the room" to observe what students have modeled. Purposefully choose student models that scaffold the lesson's idea and ask them to present their work to the entire class. For example, you might choose to call on a student with a stacking model first, then one with a grouping model, and then call on a student who displayed their counters in rows.

7. If no student has created rows (an array model), use the grouping model to rearrange the counters into rows by turning each group into a row.
8. Ask students if rearranging the counters changed each row's number or the number in each group.
9. Ask students the total amount of counters used. Then, write the number sentence *4+4+4=12* for the students to see.
10. Ask students to relate the number of rows, the number of counters in each row, and the total number of counters to the number sentence you have just written.

11. Tell students, "When we arrange our counters in rows with the same number in each row, we create an array. Today's activity will focus on understanding and creating arrays."
12. Begin the activity by holding up one of the repeated addition expressions and ask the students to create the array that models the expression.
13. Hold up each of the cards so that students can view and call out the written content on the card.
14. Have each student or pair of students create these arrays on their own.
15. If students work in pairs, ask students to check one another and be sure that they both agree with the arrangement.
16. Once each student/pair has created their array, they should create an addition sentence/equation representing their array. For example, three rows of 4 would be *4+4+4=12.* ***Note, some students may want to write it as 3+3+3+3=12, and while that equation is true, it does not represent the array using the proper notation***. Students must understand that 3x4 is three groups of 4 (or 3 rows x 4 columns in upper elementary mathematics).
17. After students have begun understanding the relationships between rows of items and repeated addition statements, you can reverse the cards and show them the grouping statements.

18. Hold up each of the cards so that students may view them and you can call out the written content on the card. For example, three groups of 4. Ask students to create the array that matches the grouping statement.

QUESTIONS TO CONSIDER:

- What is an array?
- What is a row?
- What is a column?
- What does it mean to add numbers together?
- Does rearranging groups into rows change the number of counters used?
- What is the benefit of repeated addition?

RESOURCES:

- [Mississippi Mathematics Scaffolding Document](#) (Grade 2, Page 4)
- [2016 MCCRS for Mathematics](#)

Optional: The University of Mississippi's Center for Mathematics and Science Education has an extensive inventory of math (and science and technology) tools and manipulatives that teachers may borrow for classroom use, at no charge. Click the link below to access the inventory list and complete a check-out request.

- [CMSE Manipulatives](#)

BEYOND THE ACTIVITY:

- **Assessment:** Use this activity to assess if students understand how to write an equation or number sentence given an array and vice versa.
- **Misconception(s):** This activity could be used to help students understand the proper notation of rows by columns.