

MA.2.AR.3.2

Overarching Standard: *MA.2.AR.3 Develop an understanding of multiplication.*

Benchmark of Focus

MA.2.AR.3.2: Use repeated addition to find the total number of objects in a collection of equal groups. Represent the total number of objects using rectangular arrays and equations.

Benchmark Clarifications

Clarification 1: Instruction includes making a connection between arrays and repeated addition, which builds a foundation for multiplication.

Clarification 2: The total number of objects is limited to 25.

Related Benchmark/Horizontal Alignment

MA.2.NSO.2.1

MA.2.NSO.2.3

Vertical Alignment

Previous Benchmarks

MA.K.NSO.1.1

MA.1.NSO.2.1

Next Benchmarks

MA.3.NSO.2.2

Terms from the K-12 Glossary

- Equation
- Rectangular array

Purpose and Instructional Strategies

The purpose of this benchmark is to connect the idea of repeated addition as a way to represent equal groups. At this grade level, students are also introduced to the array as a model for arranging groups into equal rows and equal columns.

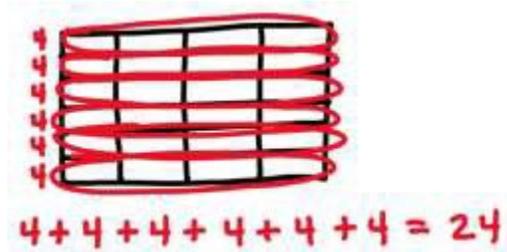
- Instruction includes the language of rows and columns to reinforce the number of groups and the number of objects in each group. The number of groups can be represented by the number of rows with the number of objects in each group being represented by the size of the row (the number of columns), or the number of objects in each group can be represented by the number of columns and the number of objects in a group represented by the size of a column (the number of rows).
- Instruction includes the idea that a scattered collection can be arranged into equal groups in various ways without changing the total number (i.e., the Cardinality Principle).
- Instruction includes the use of number lines and counters.

Common Misconceptions or Errors

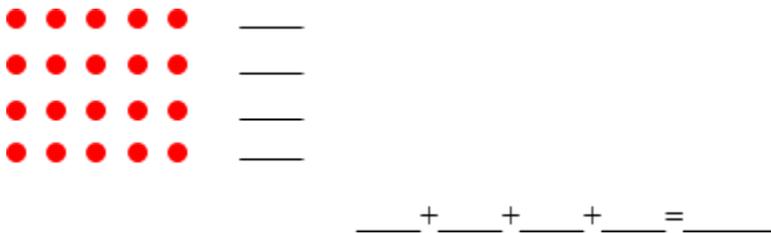
- Students may mistakenly add the number of rows and columns instead of the number of objects in each row.
 - Students may count the array total as the perimeter instead of the area.
 - Students may not recognize that when rows and columns are rearranged in arrays the total number of objects in the array remains the same
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Strategies to Support Tiered Instruction

- Teacher provides opportunities to create multiple arrays for a specific number using two-color counters and write a repeated addition equation to represent the sum of the array.
 - For example, students build arrays for the number 24, count the number of objects in each row and write a repeated addition equation to represent the array. While each array will be different, the sum will always be the same, building understanding that the equation changes based on the number of objects in each row.



- Teacher provides arrays cards to match multiple variations of an array that match a specific number.
 - For example, students may see a variety of arrays for the number 24. Arrays are presented as arrays of 3 rows of 8, 8 rows of 3, 2 rows of 12, 12 rows of 2, 4 rows of 6, 6 rows of 4, and some non-examples of arrays for 24. By sorting the arrays into a group that represents 24, students develop an understanding that columns and rows can be rearranged and still represent the same sum.
- Teacher provides a template of an array for students to number the number of objects in each row and write a repeated addition equation to represent the array.
 - Example:



Questions to ask students:

- **Ask: Point to an array and ask how many are there total? Explain how you know.**
 - Sample answer that indicates understanding: "The array has ___ I know because I skip counted by ___."
- **Ask: Give students 16 tiles and ask them to make an array. Then ask them to write an equation to match the array.**
 - Sample answer that indicates understanding: 1 row 16 columns; 16 rows 1 column; 4 rows 4 columns; 2 rows 8 columns; 8 rows 2 columns
Sample equations: $4 + 4 + 4 + 4 = 16$ $2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 16$ $8 + 8 = 16$

Instructional Tasks

Instructional Task 1 (MTR.2.1, MTR.7.1)

A teacher is putting chairs at a table for a class party. The teacher puts five chairs at each of the four tables.

Part A. Use counters to represent the total number of chairs, and write a repeated addition equation to show the total number of chairs.

Part B. Represent the chairs by putting counters into an array in more than one way.

Instructional Items

Instructional Item 1

Part A. Draw three triangles in each of the groups below.

Part B. Create an array to represent the total amount of triangles.

Part C. Write a repeated addition equation to show the total number of triangles.

Group 1	Group 2
Group 3	Group 4

Additional Resources:

[CPALMS Resources](#)

[LearnZillion](#) Video: Use repeated addition to find the total number of objects in an array

Resources/Tasks to Support Your Child at Home:

- The array game. Using a dice (with the 6 marked out), have your child roll two numbers. The first number will represent the number of rows in the rectangular array. The second number will represent the number of circles/squares/etc in each row. Have your child create or stamp the model. Then have them extend to record an equation that relates. (For example: If your child rolls a 4 and 3, they would make a rectangular array with 4 rows and 3 in each row. The equation would be $3+3+3+3=12$).
- Khan Academy: [Repeated Addition](#)
- Youtube: [Repeated Addition with Arrays](#)