

Objective

Relate multiplication to repeated addition.

Common Core State Standards

- **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.

Operations and Algebraic Thinking

Repeated Addition

When multiplication is introduced to children as repeated addition, it is not a “new” process, but an expansion of a familiar one. Repeated addition combines identical number groups, for example, $3 + 3 + 3$. Multiplication also combines identical number groups, but is more efficient. Children should learn the differences between these two operations while appreciating the equality of the answers.

Try It! Perform the Try It! activity on the next page.

Talk About It

Discuss the Try It! activity.

- Have children look at their completed Color Tile Arrays 1 and 2 worksheets (BLM 4, BLM 5). Direct them to Exercise 1. **Ask:** *How many rows are there? How many tiles are in each row? Does each row have exactly the same number of tiles?*
- **Ask:** *How did you use addition to find the number in all?* Invite children to explain how to use repeated addition to find the total number of tiles in the array. Repeat the questions for other exercises on the worksheets.

Solve It

With children, reread the problem. Play an array game like the one described in the problem. For example, **say:** *3 rows with 6 tiles in each row.* Have children build the array and find the number in all. Then invite volunteers to tell how they used repeated addition to find the answer.

More Ideas

For other ways to teach relating multiplication to repeated addition—

- Have pairs of children use Two-Color Counters to model and solve repeated addition problems. For example, **say:** *Tara saw 2 birds on a tree, 2 birds in a birdbath, and 2 birds on a bird feeder.* **Ask:** *How many birds did Tara see in all?* Have children write an addition sentence ($2 + 2 + 2 = 6$), and complete this sentence: [3] groups of [2] is [6].
- Have children set out 5 trapezoid Pattern Blocks, cover them with triangle blocks, and find the total number of triangles. Then have them write the addition sentence ($3 + 3 + 3 + 3 + 3 = 15$) and complete this sentence: [5] groups of [3] triangle blocks is [15].

Formative Assessment

Have children try the following problem.

Circle the number sentence that matches the tiles.

- A. $4 + 4 + 4 = 12$ B. $2 + 2 = 4$ C. $3 + 3 + 3 = 9$



Try It! 30 minutes | Pairs

Here is a problem about relating multiplication to repeated addition.

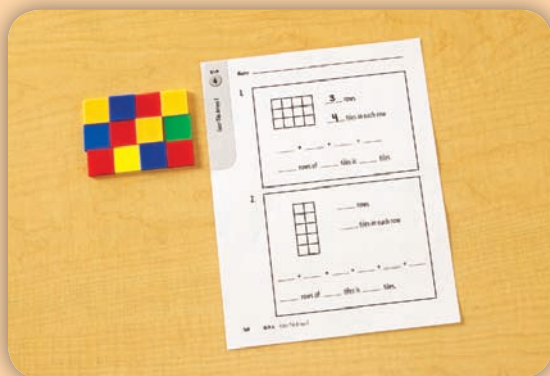
José is playing a game during math club. José's teacher describes a Color Tile array by calling out the number of rows and the number of tiles in each row. Then one child finds the total number of tiles in the array. How can José use the number of rows and the number of tiles in each row to find the number of tiles in all when it's his turn?

Introduce the problem. Then have children do the activity to solve the problem.

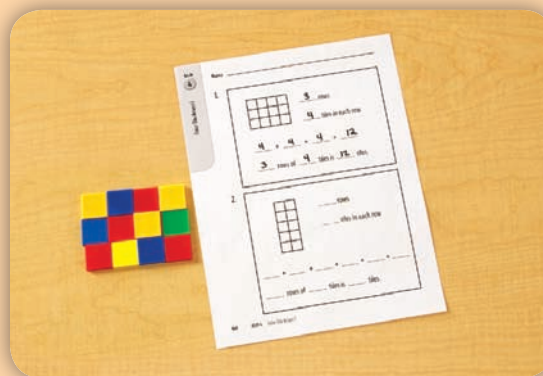
Distribute tiles and copies of the Color Tile Arrays 1 and 2 (BLM 4, BLM 5) to children.

Materials

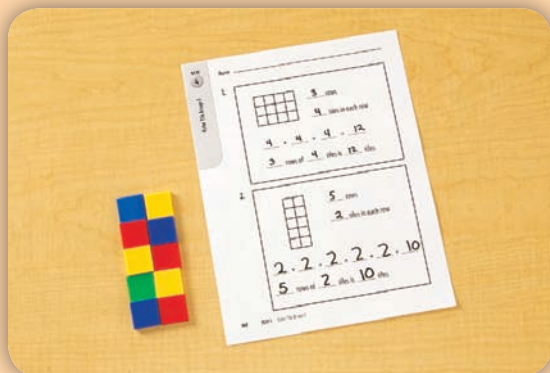
- Color Tiles (50 assorted tiles per pair)
- Color Tile Arrays 1 (BLM 4; 1 per child)
- Color Tile Arrays 2 (BLM 5; 1 per child)



1. Ask: *What do we do when we see the words "in all"? How can we find the number of tiles in all?* Guide children to conclude that they should add. Then instruct children to look at the first array on the worksheet. Have children use their tiles to model the same array. **Ask:** *How many rows are in this array? How many tiles are in each row?* Have children write the correct numbers next to the first array.



2. Explain to children that to find the answer (the number of tiles in all), they need to add the number of tiles in each row (4) 3 times. Have children complete the addition sentence on their Color Tile Arrays 1 worksheet. Then have them complete the final sentence for the exercise by filling in the number of rows and tiles and the number in all.



3. Have children repeat steps 1 and 2 to complete Exercises 2 through 4 on the Color Tile Arrays 1 and 2 worksheets.

Look Out!

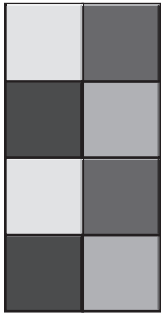
Watch out for children who try to add the number of rows instead of adding the number of tiles in each row. Encourage these children to count the number of tiles in row 1 and write that number in the addition sentence, then the number of tiles in row 2, and so on until they have filled in the addition sentence. It might also help these children to build their arrays with a different color for each row. That way, they will more easily see the arrangement of a group of tiles in one row.



Use Color Tiles. Make each model.

Fill in the blanks.

1.

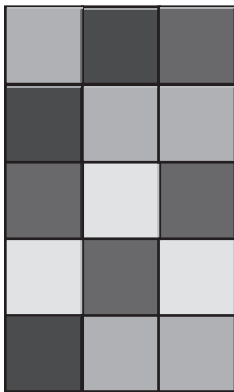


(Check students' work.)

$$\underline{2} + \underline{2} + \underline{2} + \underline{2}$$

4 rows of 2 tiles is 8 tiles.

2.



$$\underline{3} + \underline{3} + \underline{3}$$

$$+ \underline{3} + \underline{3}$$

5 rows of 3 tiles

is 15 tiles.

Use Color Tiles. Make a 4×5 array.

Draw the model. Fill in the blanks.

3.

$$\underline{5} + \underline{5} + \underline{5} + \underline{5}$$

4 rows of 5 tiles is 20 tiles.



Answer Key

Challenge! What repeated addition does 6×2 represent?

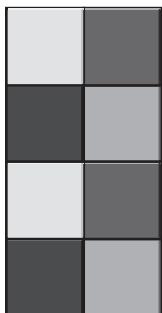
Challenge: $2 + 2 + 2 + 2 + 2 + 2 = 12$

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Use Color Tiles. Make each model.

Fill in the blanks.

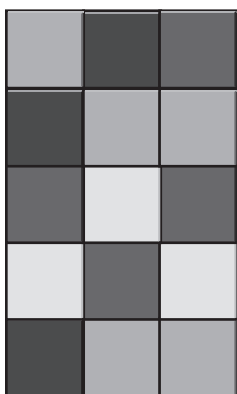
1.



_____ + _____ + _____ + _____

_____ rows of _____ tiles is _____ tiles.

2.



_____ + _____ + _____

+ _____ + _____

_____ rows of _____ tiles
is _____ tiles.

Use Color Tiles. Make a 4×5 array.

Draw the model. Fill in the blanks.

3.

_____ + _____ + _____ + _____

_____ rows of _____ tiles is _____ tiles.

Name _____

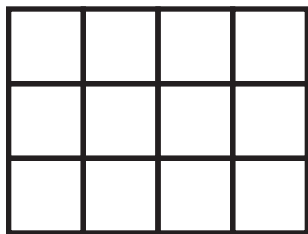
Challenge! What repeated addition does 6×2 represent?

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Name _____

1.



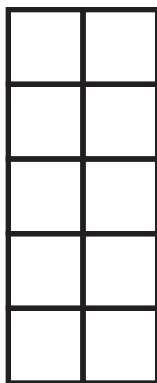
_____ rows

_____ tiles in each row

_____ + _____ + _____ = _____

_____ rows of _____ tiles is _____ tiles.

2.



_____ rows

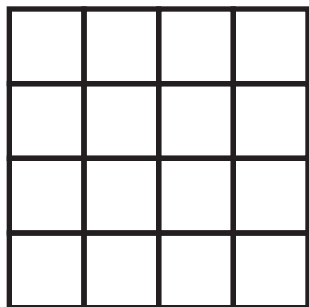
_____ tiles in each row

_____ + _____ + _____ + _____ + _____ = _____

_____ rows of _____ tiles is _____ tiles.

Name _____

3.



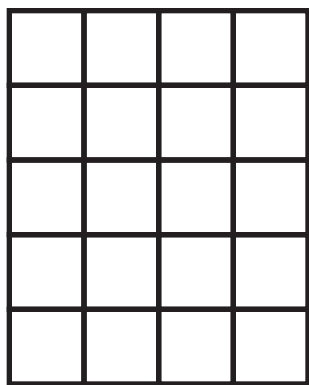
_____ rows

_____ tiles in each row

_____ + _____ + _____ + _____ = _____

_____ rows of _____ tiles is _____ tiles.

4.



_____ rows

_____ tiles in each row

_____ + _____ + _____ + _____ + _____ = _____

_____ rows of _____ tiles is _____ tiles.