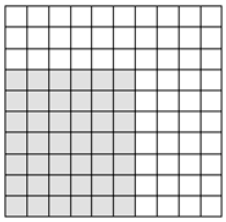


PRACTICE TASK: Array Challenge

STANDARDS FOR MATHEMATICAL CONTENT

MCC3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

MCC3.MD.7. Relate area to the operations of multiplication and addition.

a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

The students should know that area covers a certain amount of space.
The students should know that the numbers that are multiplied to find a product are called factors.

It is important to understand that filling regions with units and counting does little to help students develop multiplicative formulas. Even when rectangles are filled with a grid of squares, students are more likely to count the squares than to relate the number of squares to the dimensions of the rectangles (Van de Walle, page 236-237).

ESSENTIAL QUESTIONS

- How does knowing the length and width of a rectangle relate to multiplication?
- Can the same area measurement produce different size rectangles? (Ex. 24 sq.units can produce a rectangle that is a 3 X 8, 4 X 6, 1 X24, 2 X 12)
- How does the length and width (factors) impact the area of the rectangle?
- Do different factors with the same area cover the same amount of space? (Ex. Is a 3 X8 the same area as a 1 X 24?)

MATERIALS

- "Shaded Array Cards" copied on card stock and cut out
- "Array Challenge" game directions and recording sheet

GROUPING

Partner/Small Group

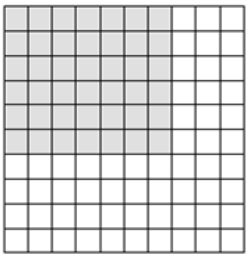
TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

In this task, students work in small groups to play a game in which array cards are used to represent area models for multiplication facts. Students have opportunities to display their cards and respond with the multiplication fact(s) that apply to the array.

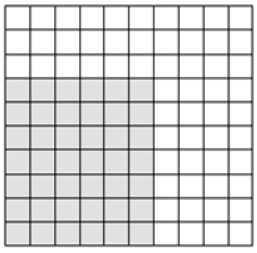
Comments

The Shaded Array Cards provide an excellent opportunity for students to make visual connections between multiplication facts and the corresponding area models. Students are able to relate the commutative property of multiplication to the model quickly because it represents a fact and its related fact. For example, the area model for 6 x 7 is the same as 7 x 6 with a different orientation. Also, familiarity with array models for multiplication facts builds number sense as students understand that a smaller array represents a smaller product of two facts.

6 rows of 7or 6 x 7 = 42



7 rows of 6 or 7 x 6 = 42



Task Directions

Have students follow the directions below:

1. Place the Array Cards face down in a stack.

2. For each round, each player should draw one card from the stack and, using the commutative property, record both multiplication facts that apply to the card. (If the array is a square, there will be only one multiplication fact for the array.)
3. At the end of each round, the player with the largest product collects the cards from the other players.
4. Play continues until all cards have been played.

NOTE: The rules can be changed so that the player with the smallest product collects all the cards.

FORMATIVE ASSESSMENT QUESTIONS

- How can you use your Array Card to show the commutative property for multiplication?
- How does the size of the array change as the factors get larger? Smaller?
- How are the dimensions of the array and the number of shaded squares related?
- How does an array model show repeated addition?

DIFFERENTIATION

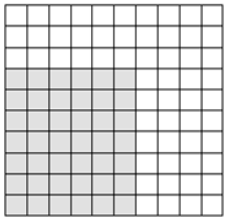
Extension

- Make additional Array Cards that model higher levels of multiplication facts.
- Play Double Challenge where students draw two cards at a time and add the products.
- Have students use the Array Cards to explain the division facts that are related to a given array and write the corresponding fact family for multiplication and division.

Intervention

- Make Array Cards with lower level multiplication facts, or with other math facts and concepts that students need to review.
- Use this game in small group instruction to informally assess a student's level of multiplication fact mastery and to pinpoint specific areas to target instruction.

Name _____ Date _____



Array Challenge

Game Directions

Array Challenge is a game for 2 – 4 players.

Materials:

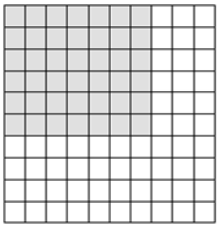
One deck of Array Challenge cards
Array Challenge recording sheet

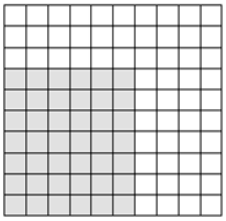
Directions:

1. Place the Array Cards face down in a stack.
2. For each round, each player should draw one card from the stack and, using the commutative property, describe both multiplication facts that apply to the card. (If the array is a square, there will be only one multiplication fact for the array.)
3. At the end of each round, the player with the largest product collects the cards from the other players.
4. Play continues until all cards have been played.

NOTE: The rules can be changed so that the player with the smallest product collects all the cards.

Record the multiplication facts for your array cards in the table on the back of this sheet.
Example: If you drew a 6 x 7 array card, two number sentences can be written.

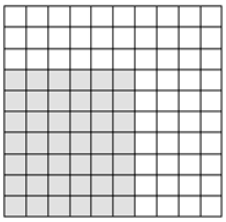




6 rows of 7
or
6 x 7 = 42

7 rows of 6
or
7 x 6 = 42

Name _____ Date _____



Array Challenge

Recording Sheet

Record the number sentences for each array card in the table below.

Round	Number Sentence	Number Sentence	Highest Product?
Example	6 x 7 = 42	7 x 6 = 42	✓ or ✗
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Shaded Array Cards