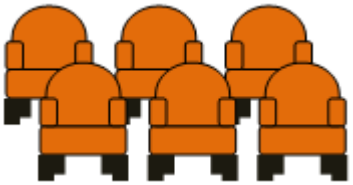


CONSTRUCTING TASK: Seating Arrangements

1 Day

STANDARDS FOR MATHEMATICAL CONTENT

MCC.3.OA.5. Apply properties of operations as strategies to multiply and divide.
Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)
Use arrays, area models, and manipulatives to develop understanding of properties.

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.

*****Mathematical Practices 1 and 6 should be evident in EVERY lesson. *****

BACKGROUND KNOWLEDGE

(Information quoted from Van de Walle and Lovin, Teaching Student-Centered Mathematics: Grades 3-5, page 62)

"In the beginning, students will be able to use the same models – sets and number lines – for all four operations. A model not generally used for addition but extremely important and widely used for multiplication and division is the array. An array is any arrangement of things in rows and columns, such as a rectangle of square tiles or blocks.

To make clear the connection to addition, early multiplication activities should also include writing and addition sentence for the same model."

ESSENTIAL QUESTIONS

- How does understanding the commutative property help us create arrays?
- How does drawing an array help us think about different ways to decompose a number?

MATERIALS

- "Seating Arrangements" recording sheet
- Grid paper, if needed
- Manipulatives, if needed

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

In this task, students will solve a word problem requiring them to make arrays using the number 24.

You may want to provide grid paper or have students draw the arrays on plain copy paper. Students should develop the following arrays: 1 x 24, 2 x 12, 3 x 8, 4 x 6, 24 x 1, 12 x 2, 8 x 3, and 6 x 4. As students examine both the 4 x 6 array and the 6 x 4 array, for instance, help them understand that while both arrays have the same area, their orientation can make a difference. For example, when arranging chairs in a room, the shape of the room could dictate whether there are 6 rows of 4 chairs or 4 rows of 6 chairs.

Task Directions

Students will follow the directions below from the "Seating Arrangements" recording sheet.

Your class is going to have a special presentation and your teacher has asked you to figure out a good way to place 24 chairs in your room for seating. There is only one requirement. All the chairs must be placed in an array.

1. Draw pictures to show all the ways you can arrange the chairs in an array.
2. Label and write matching number sentences for each array.
3. Choose your favorite arrangement and explain why you think it would be the best arrangement so that every student could see the presentation.

FORMATIVE ASSESSMENT QUESTIONS

- Explain how you built each array.
- With 24 blocks, can you have an array with 7 in each row? Why or why not?
- Is there a way to determine the measurements of an array for 24 without building it with blocks or drawing a diagram?
- How many different solutions do you think there are to this problem? Is there a way to check to see if you have found all possible solutions?

DIFFERENTIATION

Extension

- Using 24, or another appropriate number, have students multiply to find the number of chairs needed for 2, 3, 4, 5, and 6 third grade classrooms that use twenty-four chairs each. Ask students to develop a strategy to solve the problem. Then allow students to share their strategies.
- Replace 24 chairs with 30, 36 or 72 for students who wish to work with larger numbers.

Intervention

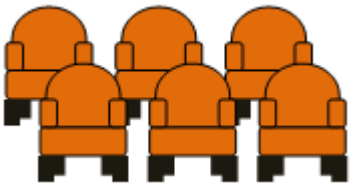
- Replace 24 with a smaller number such as 12, 18 or 20.
- Model this task or a similar one in a small group setting.

TECHNOLOGY CONNECTION

http://illuminations.nctm.org/LessonDetail.aspx?id=U109 Numerous ideas for introducing multiplication, including the array model.

Name _____ Date _____

Seating Arrangement



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