

NUMBER CONCEPTS SESSION

Activity: Let's Make Arrays

Objective: Investigate factors using arrays. Determine characteristics of prime and composite numbers from the arrays.

Materials: Color tiles
Markers
Scissors
Tape
Centimeter grid paper
Newsprint, chart paper or construction paper

Procedures:

1. Introduce activity by explaining to the participants that they are going to make arrays with color tiles.
2. Using color tiles, make different arrays which show the number 6. One way to make this is to line all 6 squares in a straight row across the paper, one square long.

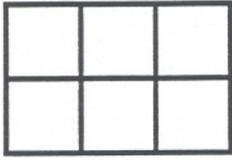


3. Another arrangement would be to make a column one square wide and 6 squares long.

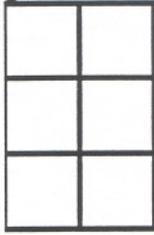


4. Although these two arrangements are the same basic shape, for this activity they are considered two different arrays.

5. Another arrangement of 6 squares would be an array 3 squares wide and 2 squares long.



6. Yet another array for six would be an array 2 squares wide and 3 squares long.



7. There aren't any other ways to arrange 6 squares in even rows and columns, to be an array the arrangement needs to have all rows and columns "filled."
8. Ask, "Are there any other arrangements of 6 tiles that will make an array?" (no) (Some students want to make an "oblique" array. Explain that an array is defined as a rectangle with horizontal rows and vertical columns. Show how coloring an oblique array on the grid paper would not be a rectangle.)
9. Essentially an array creates a type of rectangle. (Remember that a square is also a rectangle.) An arrangement of 6 squares which has 4 squares in one row and 2 in another row is not an array because an array has all of its rows equal to each other and all of its columns are equal to each other.
10. Assign each group a different number (or numbers) from 1 to 25 and ask participants to make as many arrays representing that number as possible. Some numbers will have only two arrays while others will have several. When participants have arranged their squares into the appropriate arrays, have them color the arrays on the centimeter grid paper, cut out the arrays and attach them to construction paper. (Make sure that you assign both prime and composite numbers.)
11. Wait for the groups to complete their work.
12. Upon completion compare the different numbers and the arrays they made. Let the groups present their information stating any relationships that might exist between the number of rows or the number of columns in an array and the original number they were given.

13. What common relationship did you find?
 - The number of rows is one of the factors of the original number, and
 - The number of columns is also one of the factors of the same number(You can multiply the number of rows by the number of columns to get the original number.)
14. Have participants display their arrays on the wall for the others to see.
15. Notice that some numbers have only 2 arrays--one of which is 1 square wide and the other of which is 1 square long--and therefore have only 2 factors. These numbers have only 2 arrays and only 2 factors, the factors being one and itself. They are called PRIME NUMBERS.
16. The other numbers which have more than 2 factors and more than 2 arrays are called COMPOSITE NUMBERS.

Extensions:

1. Ask students if they notice anything about the arrays for 1, 4, 9, 16, and 25. (These numbers have an odd number of arrays. They are square numbers. Remember the focus activity?)
2. Have students make the Sieve of Eratosthenes to find prime numbers.
3. Connect this idea with multiplication. The area model for multiplication is an array. Ask students to make an array to show 5×6 , 8×11 , and 12×13 .
4. Represent two digit multiplication with base 10 materials.

Notes:

1. Have numbers from one to twenty-five written on index cards. Give each group at least two cards. Make sure each group gets a composite number.
2. If you have students record the prime numbers in a table with six columns instead of ten, after the numbers 2 and 3 a very nice pattern emerges.

Resources:

A Hundred Angry Ants; A remainder of One; I Can Count the Petal from NCTM Sea Squares.

