Math Magic: Arrays to Explore Basics

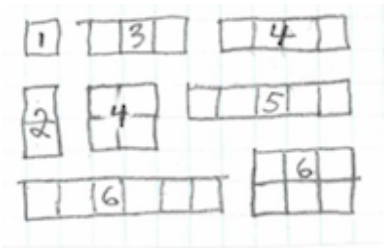
Issue #17: dev. August 2018 multi-concept activity-worksheet for 5-8 graders An Index of All Math Magic Activities

"In math, an array refers to a set of numbers or objects that will follow a specific pattern. An array is an orderly arrangement—often in rows, columns or a matrix—that is most commonly used as a visual tool for demonstrating multiplication and devision."

-from an excellent online source

ARRAYS ON GRAPH PAPER TO UNDERSTAND BASICS AND MORE

Activity #1: After introducing arrays (above) work with the class on modeling how to draw arrays to represent the various the numbers 1 through 12 as started below. See and share what the students notice about all of the shapes (rectangles and squares—arrays; and that numbers can be represented by several drawings. Have the students continue individually to draw all the arrays for through 24, labeling each by the number each array represents. Neatness counts, and its a great way to practice drawing straight lines freehand. This page of arrays which represent the numbers 1-24 may be the data page from which other conclusions will be discovered below.



Discussion: From the above data page of all the ways to draw the numbers 1-24 with arrays, be able to identify the shapes of the arrays (rectangles or squares), their lengths and widths (heights or bases), and have some class discussion of areas and perimeters.

Activity #2: Ask the students to chose 6-7 arrays above and describe them in a length by width formal. Example, 12 can be described as 1x12 or (1 by 12), 2x6, 3x4 array or rectangle.

Activity #3: Have students draw a 4 by 7 array or rectangle. Have them find and describe in writing three different ways of finding the squares inside without counting each. Introduce *area* of rectangles as length x width, or base x height, measured in square units.

Activity #4: Have students figure all the *perimeters* of all the arrays in a number. Where 24 might have different arrays with the same areas, what do they notice about the perimeters of each.

Activity #5: After introducing the concept of *factors*, have students use the data in #1 above to draw conclusions about the number of arrays in a number and its factors. This is just another way of looking at multiplication.

Activity #6: Use data in #1 above to talk about or introduce *prime numbers*.

Activity #7: Use data in #1 above to draw conclusions about *square numbers*, e.g., a 6x6 array. (See #9 below.)

Activity #8: Use data in #1 above to draw conclusions about which rectangles would be the most and least useful as doors, bowling alleys, and various types of tables, cookie sheets, etc.

Activity #9: Use definition of a *rectangle* in #1 to discuss if a square is a rectangle, and if every rectangle is a square. ID rectangles in a room.

Activity #10: If students are able, use data in #1 above to draw, label and identify the location of some rectangles on a coordinate graph.

Welcome any other observations and discoveries student may make. Playing with arrays is a great way to learn concepts and skills. Have fun! -Joe

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FINAL NOTE: Encourage students to play around with their drawings, making hypotheses to test, etc. Sometimes they discover "rules" the teacher is not even aware of. These theorems I name after the student discovers. Janie's Rule of Prime Numbers, for example. Have fun!

- Joe Barile 7/31/2018