Big Ideas for Little Scholars
RESOURCES for GIFTED & ADVANCED LEARNERS

TEACHER PAGE

3-5 "Math Behind the Games"

Find the video portion of this lesson HERE

MATERIALS:

For each student

a pencil, colored markers or crayons and white paper

Combinations

In this part of the video lesson, students discover patterns in combinations and are presented with a simple problem that involves completing a chart. Have students record their pairings and groupings using crayons or letters (e.g., R-B-Y-G).

Answer:

Number of Crayons	Number of Pairs	
3	3	
4	6	+3
5	10	+4
6	15	+5

Lead students to discovering the pattern shown in red. This is the pattern when pairs are made.

The patterns will change depending on the number of items being grouped and how many in each group. So, it would be difficult to lead students to finding the actual formula for determining combinations. This online calculator reveals the formula and you and your students can use it to find patterns with different numbers and groups.

Permutations

Here students see how order or position changes things when making guesses to fill three slots. It should help them see that with increasing numbers of slots, such as when guessing a four or five-letter word, there will be even more permutations. Students may discover patterns depending on the level of your students. You can find the formula explained **HERE**.

# of Colors (3 SLOTS)	Number of Permutations (COLORS USED ONCE)		Number of Permutations (UNLIMITED REPEATING OF COLORS)	
3	6	3x2x1	27	3x3x3
4	24	4x3x2x1	64	4x4x4
5				
6				

If you and your students use the online calculator to complete the 2nd column of this chart, they may be able to figure out the formula for permutations with repetition.

Extension: Initiate a class list of all the permutations students discover around them.
Ask, "*Should a combination lock be called a permutation lock?*"
(Yes, to be accurate!)