

One of the BEST ways to be successful at counting problems is to list the STEPS in the Multiplication Principle carefully, and not rely just on lists of blanks, as simpler problems can afford. Then, for each step, ask yourself if you will treat the items chosen DIFFERENTLY or not. If no, you have a COMBINATION step. If yes, you should think Multiplication Principle or permutations.

The game of Super-Mastermind involves putting eight colored pegs in order in a row. The pegs come in six different colors, and colors may be repeated.

1. How many Mastermind arrangements have exactly one red peg?
2. How many Mastermind arrangements have exactly one red and 2 blue pegs?

3. How many Mastermind arrangements have exactly four pegs the same color, and all others different?

4. How many have 3 pegs somewhere that are the same color, 3 other pegs somewhere that are the same color as each other but different from the first, and the remaining two pegs are each a new color?