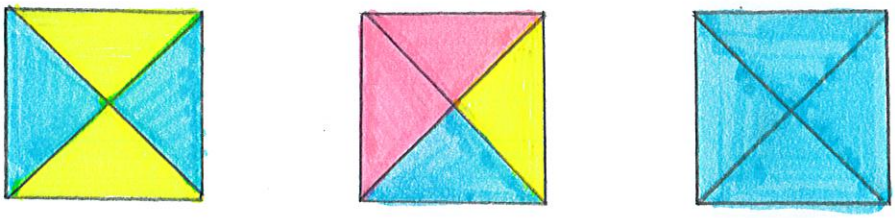
PFS 32-1 9/17/18 Name _____

The Return of Color Squares

Color squares are something like dominoes, but they can be matched on all four sides. Here's how to make them:

1) Choose three colors, for example red, blue and green. Each square is divided into four triangles by its diagonals. Start by using templates provided. Color each triangle as shown in the examples below. Work with a friend or family member. How many different color squares are there? How did you check that your set is complete, and has no repeats? Remember: rotations are not counted as different.



2) Can you discover how many color squares there are theoretically, not just by coloring? For example, there are three that are all one color...

3) How many color squares could be made using two colors? Four colors?

4) Can you find a formula for how many color squares there are using n colors?

5) How many color cubes could be made, using one of three colors for each face?

6) In Pettown, every family has four pets. Only cats, dogs and birds are allowed. How many different possible combinations are there? (For example: 3 cats, 1 bird.) Is this the same number as the number of color squares? Why or why not?

7) The set of color squares makes a great puzzle. Color them carefully onto cardstock, cut them out, and put your initials on the back of each one. Fit all the squares together to form a 4 x 6 rectangle. Edges that touch must be of the same color. The border colors don't matter.

8) (The challenge!) Fit the squares together to form a 4 x 6 rectangle as above, but now the border must be all of one color! You'll be happy to know there are 12,261 different solutions to this puzzle, not counting rotations or reflections as different. Still, it is a little difficult to find even one!

9) Can you find more than one solution to #9?

10) Have fun!