Pentomino Farms

       Pentominoes are shapes made of five squares, joined together edge to edge. There are 12 different shapes you can make if rotations and reflections are not considered different.

1) Using cubes or graph paper find all 12 pentominoes. Check with a classmate that they're all different. If you wish, make your own set using cardstock.

       There are many different puzzles using pentominoes. Here are four challenges from Victor G. Feser of Saint Louis University. Use the 12 pentominoes to build a fence around a field in your farm. Pentominoes must touch edge to edge. For each type, what's the largest field you can enclose? (Each pentomino has an area of 5.)

2) A fence of any shape enclosing a field of any shape.

3) A fence of any shape enclosing a rectangular field.

4) A fence with a rectangular border enclosing a field of any shape.

5) A fence with a rectangular border enclosing a rectangular field.

       For at least one of your solutions make a neat and artistic presentation that can go on the bulletin board! We're working with pentominoes that have unit squares of one square inch, but you can scale down to make your drawing if you wish. Include some sentences to explain what you did and what area your field is.

       Here are some extra challenges relating to pentominoes:

6) Tile the 12 pentominoes to make a 6 by 10 rectangle. (There are 2,339 ways to do this, but finding even one is challenging!) Record your solution!

7) Use nine pentominoes to make a three times taller model of a single pentomino. Choose one pentomino and set it to one side to look at. Use nine of the other eleven to make your triple-size model. (Why are *nine* pentominoes needed for this job?)

8) Find all the hexominoes, made with six squares. Which of the hexominoes could fold up to make a cube?

9) Have fun!