The Sierpinski Gasket

        The Polish mathematician Waclaw Sierpinski first discovered the Sierpinski gasket in 1915. It was an early example of a fractal.  It's an enjoyable art project as well as a math project.

1)  Start with an equilateral triangle. (It will need 60 degree angles, and it's probably best to start with sides of 16 cm.)  Mark the midpoint of each edge.  Connect the midpoints with straight lines to create four smaller equilateral triangles. Now "remove" the middle triangle by coloring it. Next you repeat this procedure with the three smaller equilateral triangles, and so on. Try using different colors at each level.  How far can you go?

2)  Can you explore the area of the gasket at each level?  Remember that the area of a triangle is one half times the base times the height.  Can you use the Pythagorean Theorem to find the height of an equilateral triangle with sides of 16 cm? So what's the area at "level 0" when you start with the full triangle?  What's the area at level 1 when the middle triangle is removed?  Can you make a function chart showing the area at several levels?  Can you figure out what the area would be at the tenth level?  How about after an infinite number of iterations?  Another way to work on the area is to just call the original area one unit, and then see what the next areas will be.

3)  There's a connection between Pascal's Triangle and the Sierpinski Gasket. Do you remember Pascal's Triangle?  It begins:

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          1
         1 1
        1 2 1
       1 3 3 1
      1 4 6 4 1
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Make a Pascal's Triangle with as many rows as you can. Then color all the odd numbers one color, and all the even numbers a contrasting color. What do you notice?!

4)  Have fun!