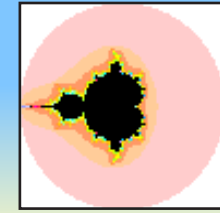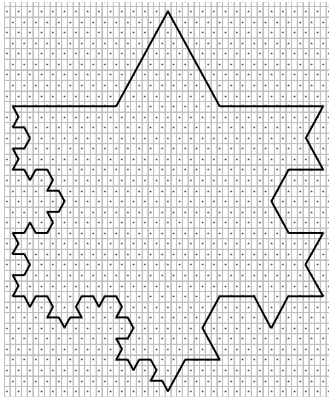# F R A C T A L S

The top left image is a picture of the Mandelbrot set discovered by Benoit B. Mandelbrot in 1980. It has become an icon for fractals and fractal geometry. As one zooms into the edge of the central blue region, new Mandelbrot-like sets keep reoccurring. This process goes on indefinitely and is governed by a single equation. See lesson 7--Recursion. The blue Mandelbrot image here was designed by Prof. McGrath of Gateway Community College using the free Fractint Fractal Generation program by the Stone Soup Group at Cornell University. The M set (another name for the Mandelbrot set) in the top right corner of the page is from the fractal geometry Web site, http://classes. yale.edu/fractals/ of Professors Michael Frame, Benoit Mandelbrot and Nial Neger, at Yale University. The image use is courtesy of Michael Frame.

The Koch curve is another fractal; it is generated by dividing line segments into thirds and using the shape ⎯⋏⎯ to replace the original line segment. Detailed instructions are given in lesson 4--Fractals in Nature and Science; the Koch Curve. It is named after the Swedish mathematician, Neils Fabian Helge von Koch, who first introduced the curve in a 1905 paper. The picture on the left shows three stages of the Koch curve. In lesson 7--Recursion, on specially designed and marked graph paper, you will draw this diagram after learning more about the Koch curve. If the process illustrated in the middle image is continued forever on all three sides, the Koch snowflake would result. This middle image is from one of the college visits (McGrath), "Fab Fractal Frenzy, Fractal Geometry For Girls (FG)[2]," given at Gateway Community College, North Haven Campus in both June 2006 and 2007. The image use is courtesy of Thomas McGrath.
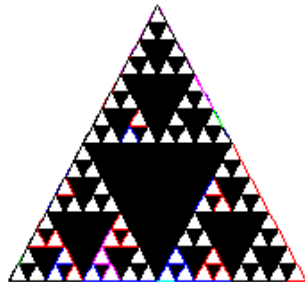
The bottom image shows some of portions (black) removed from the famous Sierpinski triangle. The Sierpinski triangle, named after the Polish mathematician, Waclaw Sierpinski is constructed by joining the midpoints of the sides of the triangle and repeating the process as described in lesson 3--Prof. Mandelbrot; Self-similarity. This image is from Prof. Cynthia Lanius' Web site, http://math. rice.edu/~lanius/fractals/ and is hosted by the mathematics department at Rice University. This is a site recommended for middle grades education. The image use is courtesy of Cynthia Lanius.

Graphic at top of page courtesy of Janet Hayes, Instructional Developer, Connecticut College