The chaos game is used to illustrate how a random process can generate a non-random pattern. This activity is designed to show students how the Sierpinski triangle can arise from seemingly totally unrelated process. This gives the students an appreciation of the interconnections of different kinds of mathematics.

This lesson is best started on paper with each student working individually. Plan on 10-15 minutes for individual exploration. Make sure to review fractals.

Start the activity by demonstrating the beginning of the Chaos Game. You place three large dots on the board so that they represent the corners of an equilateral triangle. Label the dots A, B, and C. Explain that you are going to start at a random place on the board, place a dot, and call on them one by one to have them choose A, B, or C. Then, place a small dot half way between the last dot drawn and the corner called out by the student. Now, let the students do this on their own transparencies.

Materials: transparencies, dry erase markers, rulers, and computers if available.

1. Play the chaos game by hand on the transparency. Plot 25 points. Do you see a pattern emerging? Now take all of the transparencies from your classmates and line them up. Do you see a pattern now? What pattern do you see?

2. Play the standard Chaos Game adding 100 dots at a time. When do you see the pattern? Is it the same as the one you saw by hand?

If computers are available in the classroom, here is a good interactive website of the Chaos game:

http://www.shodor.org/interactivate/activities/TheChaosGame/
The Chaos Game Transparency