Additional Project Materials:

- Part 1 Resource
- Triangle Grid Paper

Fractals: Mini-Project (Part 1) **Name:**

For this mini-project we will investigate two fractals: Siepinski triangle (Part 1) and Koch snowflake (Part 2). Both of these fractals have unusual, surprising properties. In this project, you will explore and compare these two fractals.

PART 0: Research

Look up some images of the **Sierpinski triangle**. What does the original shape (Stage 0) look like? How do you make the next stages? Begin by researching this fractal and thinking through the patterns.

Write a general description of how this fractal is constructed. In particular, how do the side-lengths change at each stage?

Response:

PART 1: Construction

Now you will construct **four stages** of the Sierpinski triangle (Stage 0 through Stage 3). Get the triangle grid paper (**handout**) for this.

Think carefully about the **side-length** of your Stage 0 triangle. You will want to choose a side-length that is convenient for constructing each of the next stages. I suggest using a side-length greater than 8 for your Stage 0 triangle.

Color your Sierpinski triangle pattern after you've constructed it up to Stage 3.

Next carefully **describe** a process you could use to continue constructing the fractal *ad infinitum* (on and on).

Response:

PART 2: Analysis

Complete the table of "Basic Information" on the **Fractal Mini-Project: Part 1 Resource** sheet.
Then answer these questions:

1) Is the Sierpinski triangle a **self-similar** pattern?
Response:

2) What makes the Sierpinski triangle a **fractal**?

- Include a discussion of dilation, scale-factor, and self-similarity.

Response:

3) What can you say about the **perimeter** of the Sierpinski triangle as “n” (the number of stages) increases? What conclusions can you make about perimeter as your stage number approaches infinity?
Answer this on the **Mini Project: Part 1 Resource** handout.

Now complete the table of “Advanced Information” on the **Fractal: Project Resource** sheet.

- Here’s further guidance if needed: LINK

3) What can you say about the **area** of the Sierpinski triangle as “n” (the number of stages) increases? What conclusions can you make about the area as your stage number approaches infinity?
Answer this on the **Mini Project: Part 1 Resource** handout.

4) Compare the **area** and **perimeter** of the Sierpinski triangle as “n” (the number of stages) increases. Do these results make sense? Explain.
Answer this on the **Mini Project: Part 1 Resource** handout.

When finished, submit this document in Canvas. Then continue onto Fractals: Mini-Project (Part 2).