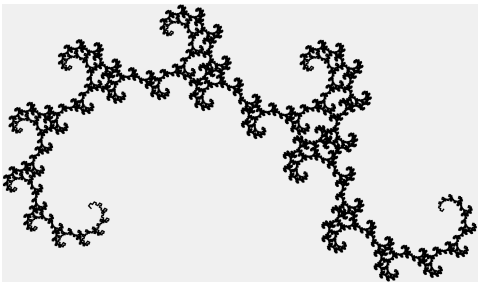
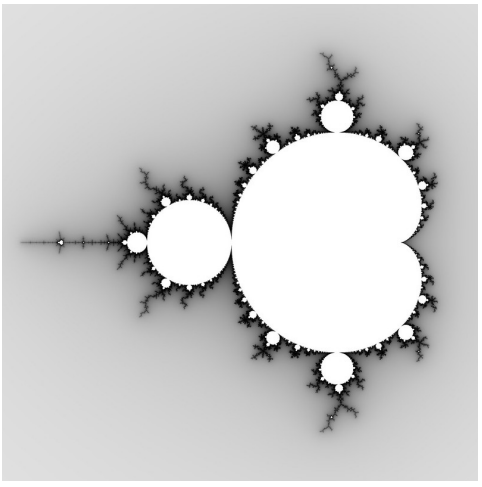
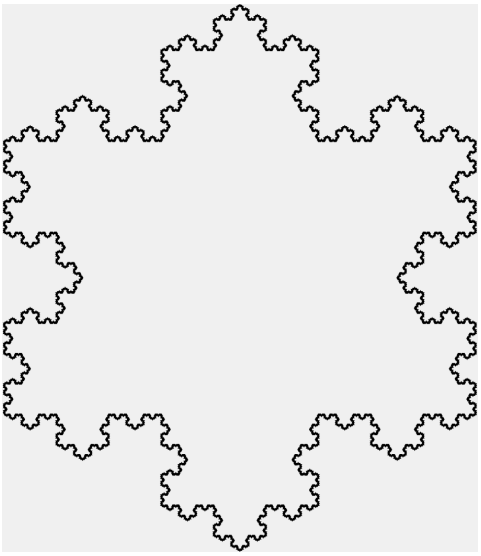
Introduction

Fractals are a type of mathematical pattern. If you zoom in on one part, the pattern looks similar to the original pattern ("self-similarity"). With math, we can imagine infinitely complex fractals. In nature, many patterns are fractal-like, from coastlines to romanesco cauliflower to clouds. Both mathematical and natural fractal structures can be beautiful. On the back of this page, you can start to create a classic fractal: the Sierpiński triangle.



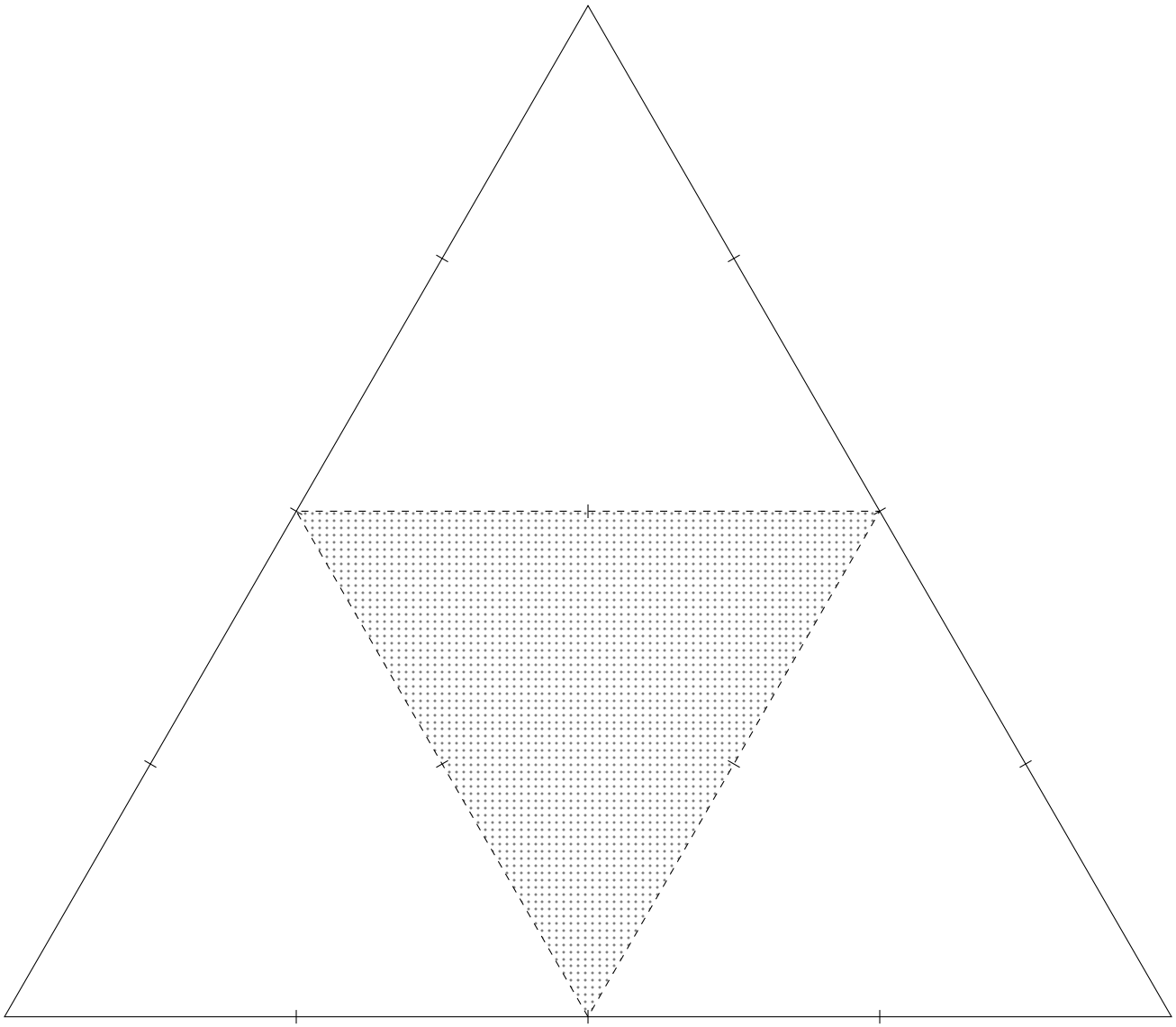




Enjoy :) and check out Fairview Math Club for more!

Email me = Dave Kaplan `kaplandm@missouri.edu` or Mr. Allee `tallee@cpsk12.org` for information
Visit `https://kaplandm.github.io/FVE/` for the full fractals worksheet from Math Club (and more)

Sierpiński triangle

Instructions: each round (or "iteration," or "stage"), shade the middle of each  to make it look like  and then keep repeating. Hint: as in the template, mark the halfway point along each side, then connect the three points to make the upside-down triangle, and remember to shade it in.



F1. After one iteration, when it looks like  , what fraction of the original triangle is shaded?
F2. After two iterations, what fraction of the original triangle is shaded?
F3. After three? Four? If you keep going forever, will the triangle ever get completely shaded?

M1. After one iteration, , when it looks like  , how many unshaded triangles △ are there?
M2. After two iterations, how many unshaded triangles △ are there?
M3. If there were N unshaded triangles in the last (previous) stage, then how many unshaded triangles will there be in this stage?