The Global Math Circle

WHAT DIMENSION IS THE **ENDLESS SNOWFLAKE?**

Earlier in our Circle, we had created what we called "The Endless Snowflake" — a shape that has so many bumps that the edge is actually infinitely long. If you were to walk around it, you would be stuck forever going in and out of its infinitesimal curves, and never actually make progress along it!

With the nature of the shape itself still sort of a mystery, we decided to try and figure out what dimension it is. A normal bumpy line is, of course, one-dimensional — you can tell because if you make it three times longer, it gets three times bigger. But what about this shape?

To try and answer this question, we started pasting smaller copies of it inside itself. It turned out that a copy, one third the size, fit perfectly into one of the six corners of the snowflake. As we fit these copies in, a voice rang out:

"Oh my gosh."

"What's going on?"

"Well, if you stop where we are right now, you can see that in the area between the copies, in that area there's another copy of the Endless Snowflake, except just smaller and rotated."

"You can put together different shapes and sizes of Endless Snowflakes to make a whole giant Endless Snowflake!" Said another participant.

"Wait, this is not the only way to fit more E.S.'s inside a giant E.S.," she continued. "If you put ones here, here, here, and here, you can make some kind of snowflake on the inside. You can make it even smaller."

We were in awe of the shape we were creating, and it gave us answers, too — the flakes-inside-flakes showed us that an Endless Snowflake three times as big is actually *four* times as long. It seemed to be neither one-dimensional nor two-dimensional!
