LISTENING - Ron Eglash is talking about his project

http://www.ted.com/talks/

1) **Do you understand these words?**

iteration mission scale altar mound recursion crinkle

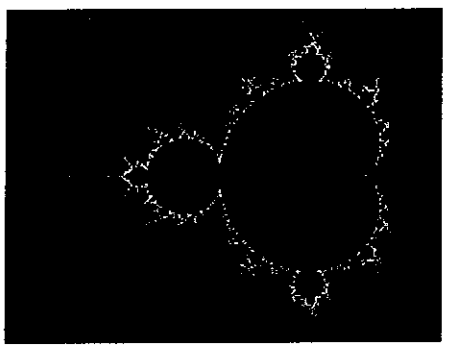
2) **Listen and answer the questions.**

1. What did Georg Cantor discover? What were the consequences for him?
2. What did von Koch do?
3. What did Benoit Mandelbrot realize?
4. Why should we look at our hand?
5. What did Ron get a scholarship for?
6. In what situation did Ron use the phrase "I am a mathematician and I would like to stand on your roof." ?
7. What is special about the royal palace?
8. What do the rings in a village in southern Zambia represent?

3)Listen for the second time and decide whether the statements are true or false.

1. Cantor realized that he had a set whose number of elements was equal to infinity.
2. When he was released from a hospital, he lost his faith in God.
3. We can use whatever seed shape we like to start with.
4. Mathematicians of the 19^{th} century did not understand the concept of iteration and infinity.
5. Ron mentions lungs, kidney, ferns, and acacia trees to demonstrate fractals in nature.
6. The chief was very surprised when Ron wanted to see his village.
7. Termites do not create conscious fractals when building their mounds.
8. The tiny village inside the larger village is for very old people.

Fractal From Wikipedia, the free encyclopedia



The Mandelbrot set is a famous example of a fractal

1) Read the text and fill in the missing words.

iteration characteristics coined zoom inclusion cauliflower geometric broken magnification self-similarity

A **fractal** is "a rough or fragmented 1.....shape that can be split into parts, each of which is (at least approximately) a reduced-size copy of the whole," a property called 2..... Roots of the idea of fractals go back to the 17th century, while mathematically rigorous treatment of fractals can be traced back to functions studied by Karl Weierstrass, Georg Cantor and [illegible]lix Hausdorff a century later in studying functions that were continuous but not differentiable; howe[illegible] the term fractal was 3..... by Benoît Mandelbrot in 1975 and was derived from the L[illegible]in fractus meaning "4....." or "fractured." A mathematical fractal is based on an equation that undergoes 5....., a form of feedback based on recursion. There are several examples of fractals, which are defined as portraying exact self-similarity, quasi self-similarity, or statistical self-similarity. While fractals are a mathematical construct, they are found in nature, which has led to their 6..... in artwork. They are useful in medicine, soil mechanics, seismology, and technical analysis.

Because they appear similar at all levels of 7....., fractals are often considered to be infinitely complex (in informal terms). Natural objects that are approximated by fractals to a degree include clouds, mountain ranges, lightning bolts, coastlines, snow flakes, various vegetables (8..... and broccoli), and animal coloration patterns. However, not all self-similar objects are fractals—for example, the real line (a straight Euclidean line) is formally self-similar but fails to have other fractal 9.....; for instance, it is regular enough to be described in Euclidean terms.

Images of fractals can be created using fractal-generating software. Images produced by such software are normally referred to as being fractals even if they do not have the above characteristics, such as when it is possible to 10..... into a region of the fractal that does not exhibit any fractal properties. Also, these may include calculation or display artifacts which are not characteristics of true fractals.

2. Answer Qs. **a) Who was the first to use the term "fractal?**

b) Where can fractals be useful?

c) Is a straight Euclidean line a fractal? Why Y/N?

d) Where can you find fractals in nature?