

# FRACTALS

Typically, we like our lives to have order. We have a schedule that we follow, we have calendars that order upcoming events and we all constantly check our smartphones to see what time it is or what is happening next. This year, our order of life was thrown “out of order” by COVID 19 and the coronavirus. It changed how we went to work, how we completed school and how we socialized with others when we had to “stay at home”. Even though our schedules were thrown into disorder, most of us found a way to work through the chaos of our current situation and put order back into our lives. The same is true when we think about nature.

Most of what we see in our daily lives follows the laws and principles that we have learned about in math in relationship to shapes, sizes and other geometric ideas. We can see geometry everywhere in reference to the different shapes, angles and lines that appear both inside and outside of our homes. We see rectangular windows, cylindrical columns, triangular roofs, right angles in corners, and parallel lines with railroad tracks. These are just some common examples that most of us have seen and recognized in real life.

Nature however, is full of geometrical relationships that do not fit our basic ideas of geometry. These relationships do not fit the “order” that we are accustomed to seeing and experiencing within our daily lives. These relationships stem from the idea of “chaos”, but from this chaos comes order. This idea is the basis of Fractal Geometry and allows us to understand the complexities of nature and the world around us.

Chaos leading to order is the main theme of Fractals. The same action performed over and over again but each time on a smaller scale, leads to the creation of fractals. Nature is full of fractals, where a smaller portion of the whole resembles the original whole. Through repetition of the same action continually we create miniature versions of the original whole.

Broccoli, ferns, snowflakes, coastlines, tree branches, landscapes, lightning and cracks in rocks, pavement and the ground are natural examples of fractals. If

you take a small portion and look at it on magnified scale, it will resemble the original object.

Fractal Geometry exists throughout nature and the ideas and relationships within it help to create computer programs that replicate realistic examples of the art we see in nature. Through the use of Fractal Geometry, computer programs can generate realistic landscapes, coastlines, mountain ranges, snowflakes and lightning. These computer-generated images are used to replicate real life scenarios in movies, architecture and art.

Some of the more well-known fractals are The Mandelbrot Set, The Sierpinski Triangle and The Koch Snowflake.

## Here are some additional resources to learn about and create Fractals

**1). What is a Fractal (and what are they good for)?**

<https://www.youtube.com/watch?reload=9&v=WFtTdf3l6Ug>

**2). What is Fractal Geometry?**

<https://www.youtube.com/watch?v=2kZv22lp1Vs>

**3). An Introduction to Fractals**

[https://www.youtube.com/watch?v=STSS3\\_cVauk](https://www.youtube.com/watch?v=STSS3_cVauk)

**4). Drawing Fractals in Under 5 Minutes**

<https://www.youtube.com/watch?v=sFEYQMrWNHU>

## 5). Hand Drawing Fractals

[https://www.youtube.com/watch?v=PU1dwwB\\_Im0](https://www.youtube.com/watch?v=PU1dwwB_Im0)