

The image is a vertical composition. The left side shows a dense pattern of ferns in autumnal colors, ranging from dark brown to golden yellow. The right side shows a single, vibrant green fern frond against a soft, out-of-focus green background. A central black vertical band contains white text. The text is centered and reads "Counting on Nature" in a large, clean font, with "Numbers and patterns in nature" in a smaller font below it.

Counting on Nature

Numbers and
patterns in nature

Patterns are
visible regularities
of form found in
the natural world.

Symmetries (mirror & radial)

Fractals (branching)

Spirals

Flow

Foam

Waves

Tiling

Cracks

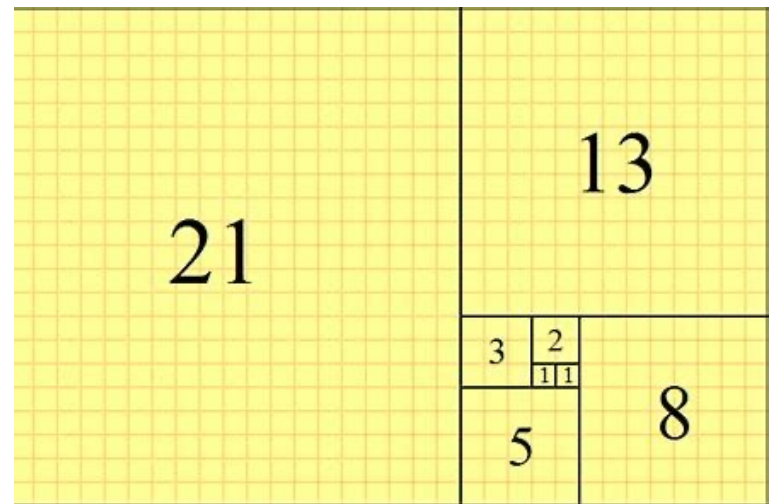
Spots & stripes

Plus, auditory patterns

Fibonacci

In Fibonacci numbers, first number is 0, the second number is 1, and each number after that is equal to adding the two numbers right before it together.

Fibonacci numbers are related to the golden ratio, also known as the divine proportion, a mathematical ratio of 1:1.618, or Phi.



Fibonacci

Petals

Seed heads

Pinecones

Pineapples

Cauliflower

Tree branches

Seashells

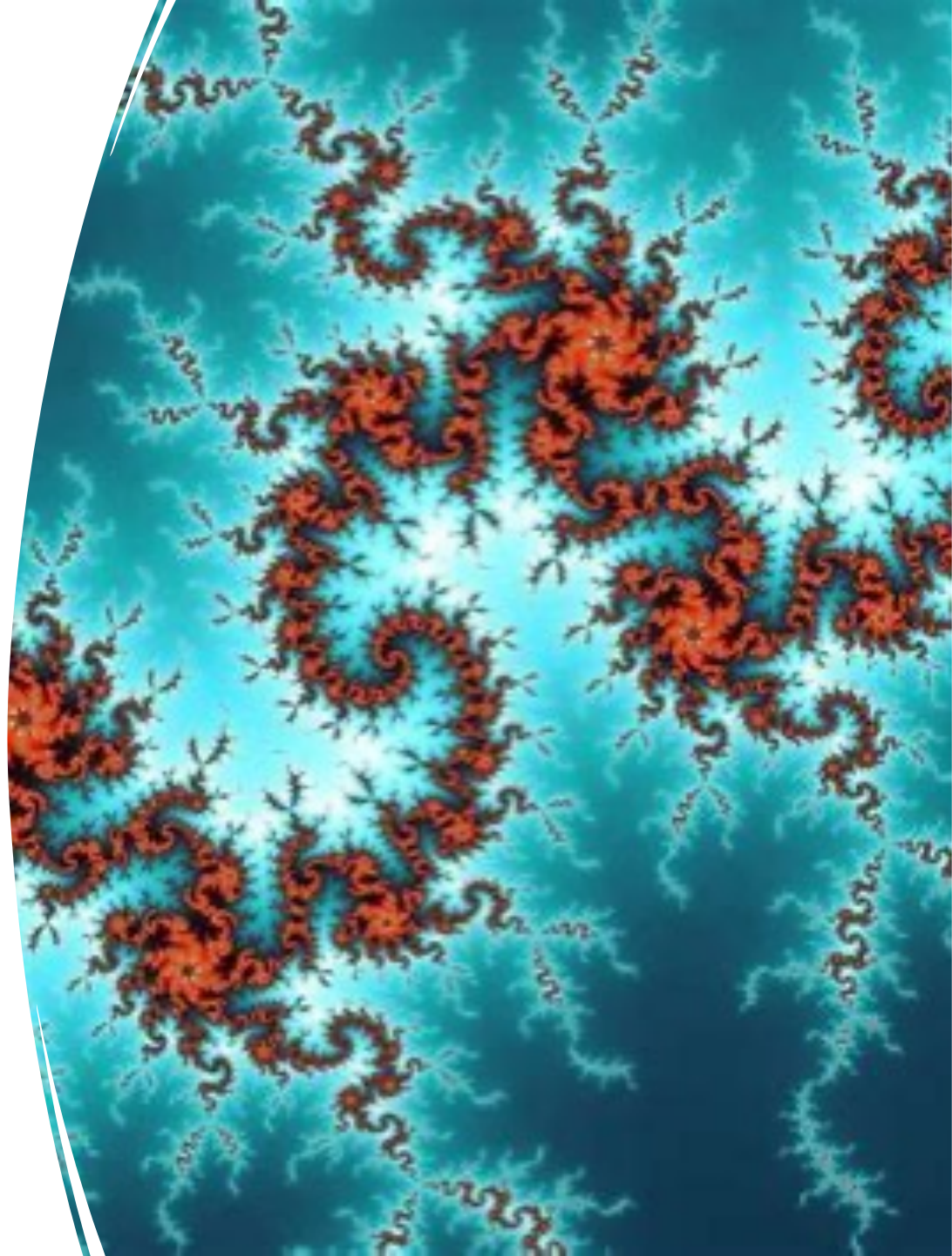
Spiral galaxies

DNA



Fractals

A fractal is a pattern, producing an image which can be cut into parts which look like a smaller version of the picture that was started with.



Fractal

Snowflakes

Lightning

Romanesco

Fern

Queen Anne's Lace

Peacocks

Clouds,

Fjords

Sea urchins

Stalagmites



Tessellation

Tessellation of a surface refers to the repeated placement of shapes with no overlaps or gaps.



Tessellation

Honeycomb

Snakeskin

Pineapple

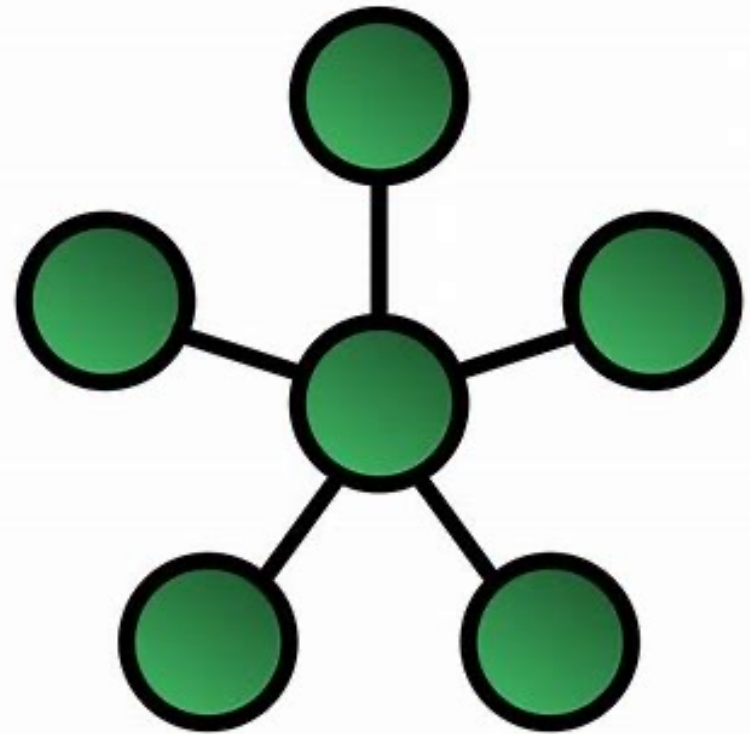
Giraffe



Topology

Topology is an area of math studying how spaces are connected and organized in terms of position

A recent study has shown that applying algebraic topology to climate models could help us predict the next abrupt change in Earth's climate.



Non-Euclidian geometry

Corals



Non-Euclidian Geometry

Non-Euclidian geometry including spherical and hyperbolic geometry, developed from two threads: understanding star movements in a spherical sky, and geometry without the Parallel Postulate. Non-Euclidian geometry is the mathematics of straight lines in curved spaces. Examples include corals, cactuses, sea slugs and lettuce leaves.



Catenary

Catenary is the curve which is formed when a chain of uniform density is hung from two points. This arch shape occurs naturally in nature. It is the shape of an egg or the hanging threads of a spider's web



Catenary curve

Spider web

Egg

Soap bubble



An unusual measurement

Botox, the only toxin approved for clinical use in the United States, is packaged in vials of 100 mouse units (MU)--. One MU corresponds to the calculated median lethal Intraperitoneal dose (LD50) injected in mice.



Collective names—Committee (resting), wake (feeding), kettle (in flight) of vultures!

Cloud of bats sleuth of bear, scorn of camels, business of ferrets, tower of giraffes, bloat of hippos, prowl of leopards, romp of otters, fluffles of rabbits, mischief of rats, surfeit of skunks and dazzle of zebras!



Counting on Nature rhyme

As you travel down the path, (wavy hand)

See how Nature connects with math!
(hand at eyes)



Counting on Nature melody

Fractals, patterns, Fibonacci,
tessellation now you see,

Catenary and topology don't
forget your symmetry!

To the tune of *Clementine*



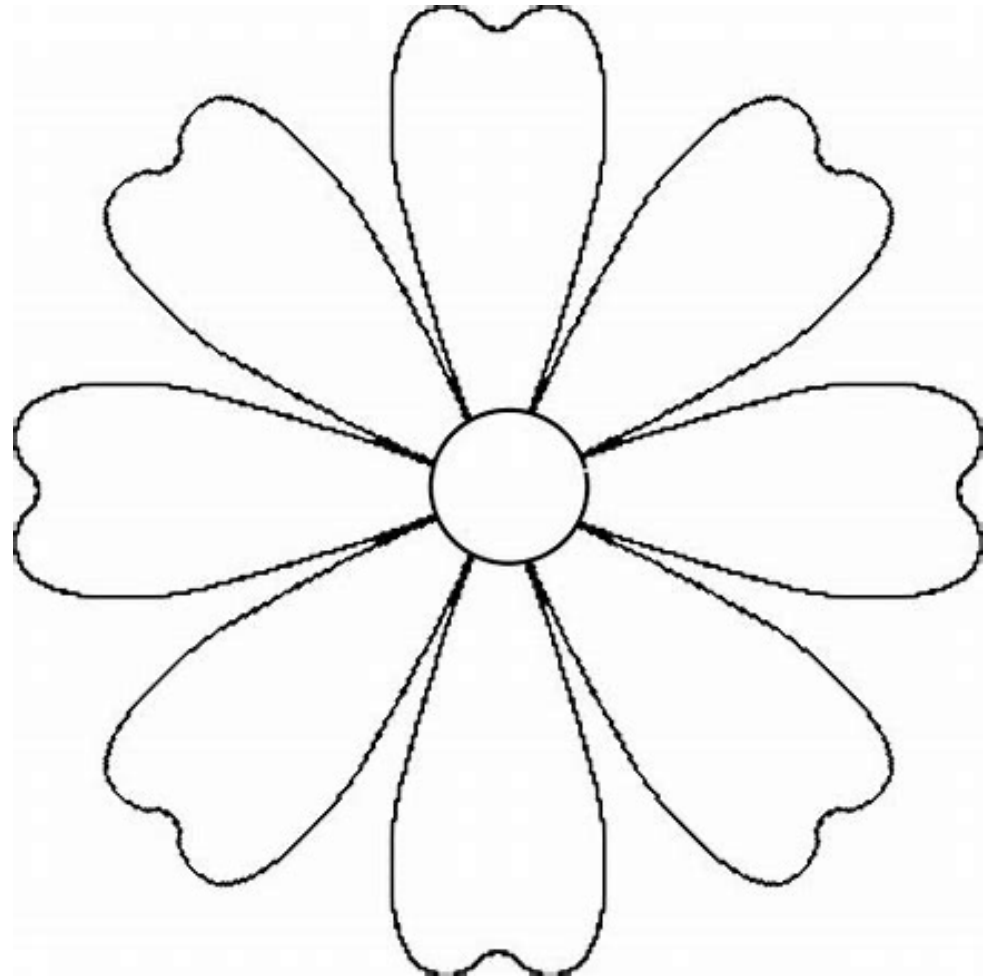
A mathematical adventure hike

What patterns can you
find along the trail—
waves, foam, tiling,
spirals, cracks,
Fibonacci?



Fibonacci flowers

The first few numbers in the Fibonacci sequence are 0, 1, 1, 2, 3, 5, 8, 13—
Can you design some flowers with Fibonacci petals and leaves?



Fibonacci
sequence
snack!



You can use
honeycomb cereal to
make a tessellation
snack!

Tessellation snack



A book about
patterns in
nature

