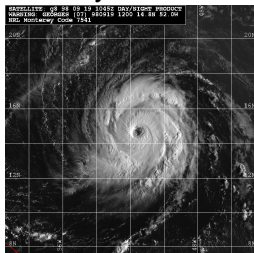


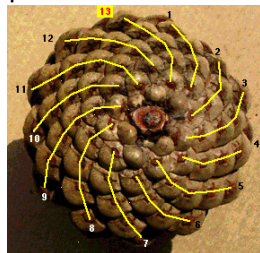
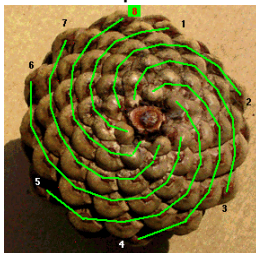
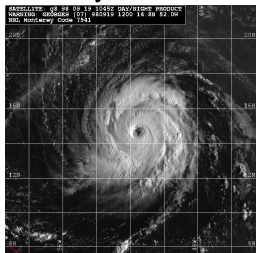
Statistics from Nature

Benford's Law and the likely frequency of the first digit applied to many data sets. Is there a pattern to spirals in nature?



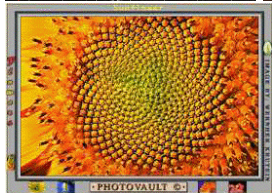
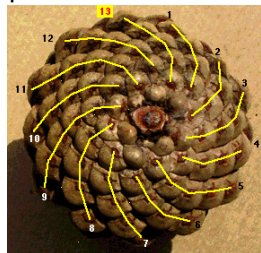
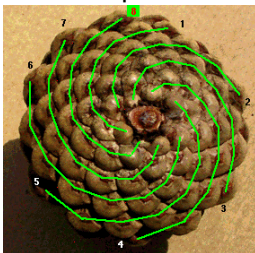
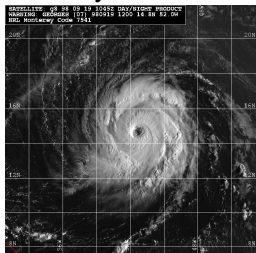
Statistics from Nature

Benford's Law and the likely frequency of the first digit applied to many data sets. Is there a pattern to spirals in nature?



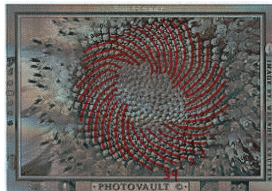
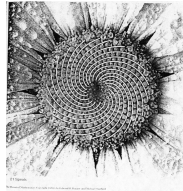
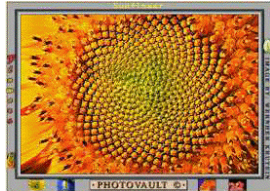
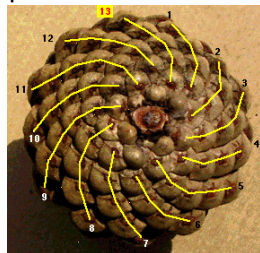
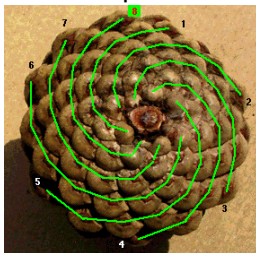
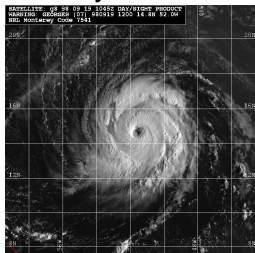
Statistics from Nature

Benford's Law and the likely frequency of the first digit applied to many data sets. Is there a pattern to spirals in nature?



Statistics from Nature

Benford's Law and the likely frequency of the first digit applied to many data sets. Is there a pattern to spirals in nature?



Picture credits:

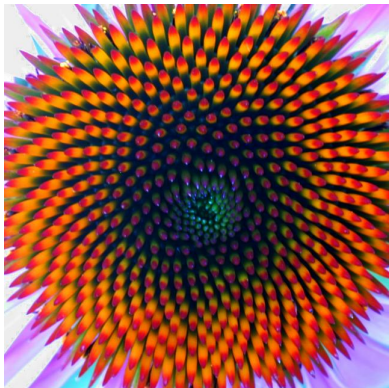
1. Clockwise hurricane Georges originated in southern hemisphere:

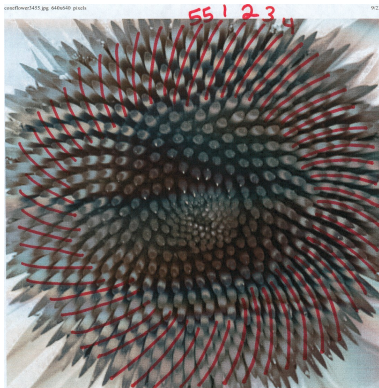
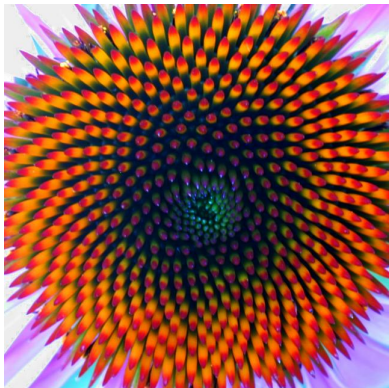
http://www.aoml.noaa.gov/hrd/Storm_pages/georges1998/sat.html

2-3. Ron Knott <http://www.maths.surrey.ac.uk/hosted-sites/R.Knott/Fibonacci/fibnat.html>

4 and 6. Werner Krutein

5. *The Heart of Mathematics*

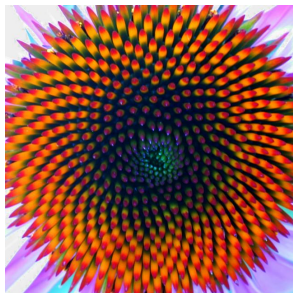




Picture credit:

Ron Knott <http://www.maths.surrey.ac.uk/hosted-sites/R.Knott/Fibonacci/fibnat.html>

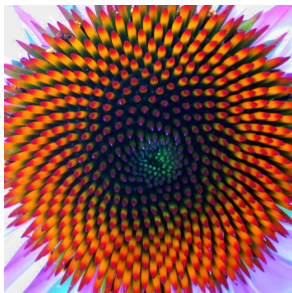
- Explore ideas systematically
- Look for a pattern
- Create abstract ideas by modeling nature
- Unexpected patterns are often a sign of hidden, underlying structure [and Excel can help us find it]
- Explore the consequences of new ideas



Picture credit:

Ron Knott <http://www.maths.surrey.ac.uk/hosted-sites/R.Knott/Fibonacci/fibnat.html>

- Explore ideas systematically
- Look for a pattern
- Create abstract ideas by modeling nature
- Unexpected patterns are often a sign of hidden, underlying structure [and Excel can help us find it]
- Explore the consequences of new ideas



Picture credit:

Ron Knott <http://www.maths.surrey.ac.uk/hosted-sites/R.Knott/Fibonacci/fibnat.html>

$$\frac{1+\sqrt{5}}{2} \approx 1.618033988749894848204586834365638117720$$