

Ammonites – The Fibonacci and Fractal Fossil

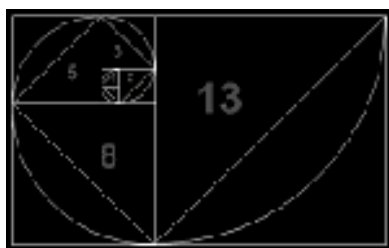
What is the Fibonacci sequence? The Fibonacci sequence is a list of numbers where every number is the sum of the previous two. The Fibonacci sequence starts at 1 and grows infinitely:

1, 1, 2, 3, 5, 8, 13, 21, 34, 55 ...

To put this sequence into mathematical terms, each term $F_n = F_{n-1} + F_{n-2}$. The Fibonacci sequence can be illustrated geometrically by drawing boxes. The first box should be 1×1 , the second box 1×1 , the third 2×2 , the fourth 3×3 , the fifth 5×5 , the sixth 8×8 , and so on. Each box should be adjacent to the boxes that come before it, forming a spiral of boxes. Create your own Fibonacci squares – graph paper with small boxes works best.



What do the ammonites have to do with Fibonacci? Ammonite shells are a naturally occurring example of the Fibonacci sequence. If you draw a quarter circle in each Fibonacci square, they connect to form an ever increasing spiral. Try to find the Fibonacci squares in your ammonite fossils – photocopy the fossil, and then start at the very centre by drawing two small boxes right next to each other. With most fossils, the first boxes are .25 cm by .25 cm. Continue drawing boxes with Fibonacci dimensions. You'll notice that the spiral of the shell always falls within the Fibonacci squares.



Fractals

Ammonite suture lines (the joints between each chamber) are reminiscent of a fractal: 'a rough or fragmented geometric shape that can be split into parts, each of which is (at least approximately) a reduced-size copy of the whole'. In other words they are a repeating pattern reducing in size.

