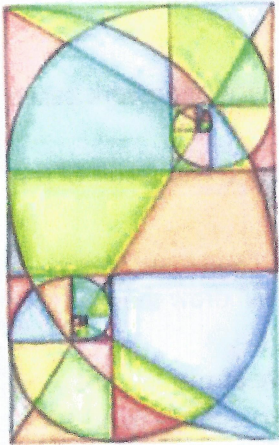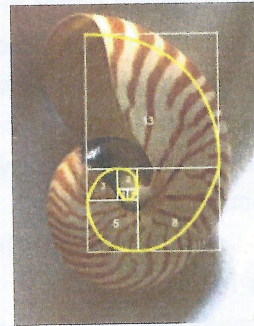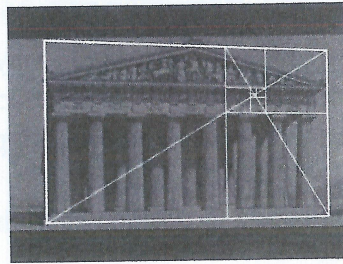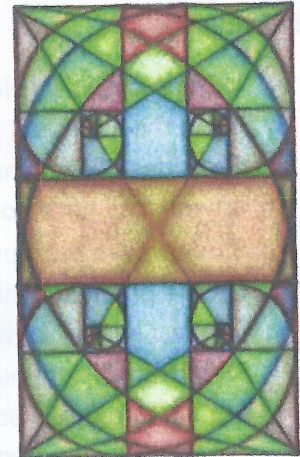# Fibonacci Art

$$F_n = F_{n-1} + F_{n-2}$$

Ever wonder why a piece of art appears pleasing to the eye? Or why some species of flowers have the same number of petals, or why a building is built the way it is? Ever pondered why a nautilus shell looks the way it does? Get ready to explore this fascinating intersection of ART, MATH, SCIENCE and ENGINEERING in this challenge!

Overview

In this STEAM activity, students in High School Art 2D 1 will create a piece of artwork using a very unique sequence of numbers called the Fibonacci Sequence:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, ...

Fibonacci Explained:

With teacher guidance, students can engage in a brief video tutorial on the Fibonacci Sequence, and what is known as the "Golden Ratio" or "Golden Mean," **and** the different ways this is found in the world around us:

Fibonacci and the Golden Mean: Beau Janzen

Formulaic Expression:

After taking in the tutorial, students will then be introduced to the mathematical expression $F_n = F_{n-1} + F_{n-2}$, which describes finding the next number in the Fibonacci sequence, where the result is the addition of the two previous numbers in the sequence (e.g. 2 is the sum of 1+1, 3 is the sum of 2+1, 5 is the sum of 3+2, etc.). Students will not be given the sequence, rather asked to compute it at least up to F_{12}.

Art Challenge:

- Using a provided piece of white, lightly lined graph paper, students will create a piece of artwork based upon the Fibonacci numbers found.
- The sides of the graphed paper provided will be sequential Fibonacci numbers, so the end result of the artwork will have no unused squares, if the math has been computed correctly.
- Students are prompted to compute the Fibonacci sequence up to F_{12}.
- On the provided white lined graph paper in the Golden Ratio rectangle, students will draw the next smallest square in the sequence, in the direction of their intended spiral.
- Students will continue drawing the smaller squares in the sequence until they arrive at the 1x1 box.
- A minimum of 2 Fibonacci spirals must be created on the artwork. Students can expand this to add variety to their artwork by simply starting over again with the same process, positioning the graph paper in a different direction.
- Artistic license now takes over, as students have free reign to design within their artwork using the Fibonacci spirals as their focal point(s).
- Each pilot school will provide one winning artwork from their building to be submitted and evaluated according to a specified art rubric.
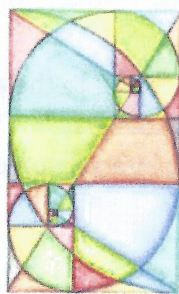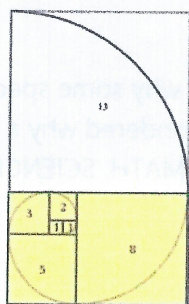
Evaluation and Student Reflection:

- Students will respond to the provided reflection questions regarding their artwork and the process to create it, which is tied to the standards
- Students will respond to the provided reflection questions regarding mathematical practices required to complete the art project
- Students will respond to the provided reflection questions about the many connections between this art project, other subjects, and the world around them.