

Fibonacci's Math

Activity 5 - The Golden Rectangle and the Golden Ratio

The Golden Rectangle is a very special shape in Mathematics, Nature and Art. Many people believe that it is the most pleasing shape to look at. In fact, many artists and architects use the concept of the golden rectangle in their work. Moreover, picture frames are often golden rectangles. The golden rectangle also appears in nature:

- **Flower Seedheads, Petals and Leaves:** Nature likes to use the golden ratio because it creates the best arrangement of objects which uses the smallest amount of space possible. The golden ratio ensures that each leaf on a plant gets maximum exposure to the sun, that the falling rain is directed at the stem of the plant and that petals are arranged to attract the most number of insects.
- **Sunflower:** It has 55 clockwise spirals and either 34 or 89 counter-clockwise spirals. The neat thing is that $55/34$ and $89/55$ equals to the golden ratio once again!

What does it mean for a rectangle to be golden?

- There is a special ratio, a golden ratio, which is hidden in the golden rectangle. The golden ratio equals to approximately 1.6180339887498948... or it can be expressed as:

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

- This means that the ratio of the length to the width of the golden rectangle equals exactly the golden ratio.
- Each time a square is drawn inside the rectangle it leaves a rectangle of the same shape as the original one but smaller. If you start with a golden rectangle and draw a square the size of the width of the rectangle you will get a smaller rectangle and a square inside the original golden rectangle. The smaller rectangle is also golden!! Now if you draw a square inside the smaller rectangle you will be once again left with an even smaller golden rectangle. You can continue this process for as long as possible, each time creating smaller and smaller golden rectangles.

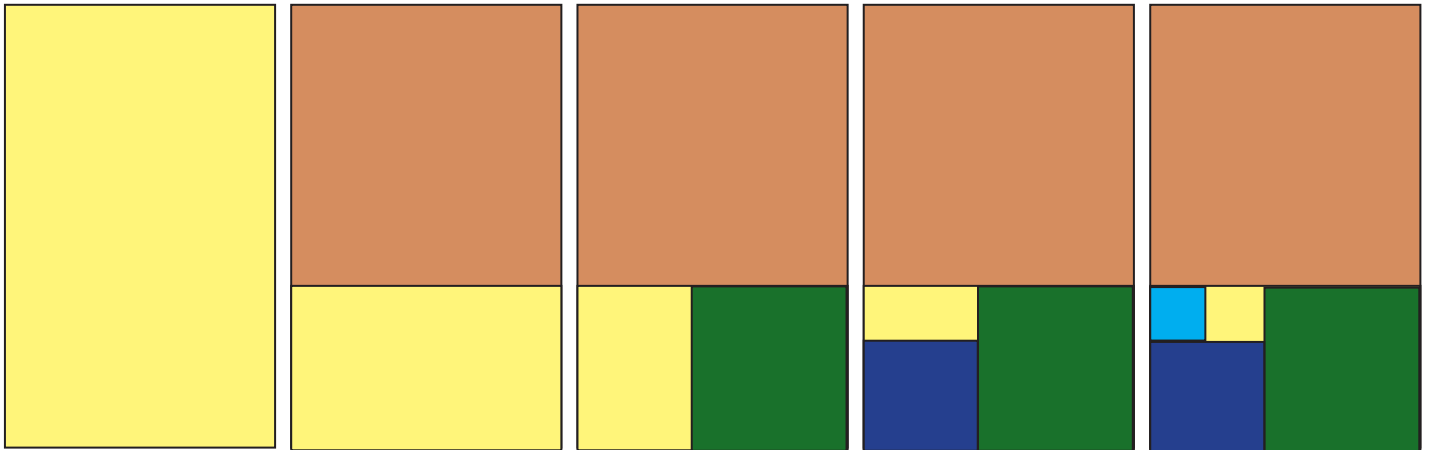
Can you believe THIS is math?

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Activity 5 - The Golden Rectangle and the Golden Ratio - *continued*

Activity Instructions:

Draw your own golden rectangles. Begin with a large rectangle (16 by 26 cm; this is almost the size of the standard sheet of paper). Follow the diagrams below to create your golden rectangles. Use different pencil crayons to colour them in!!



Can you believe THIS is math?