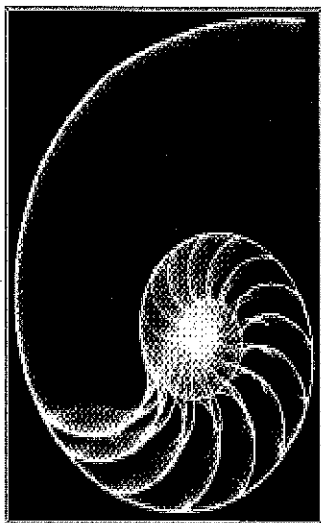


The Golden Ratio

The Physics of Everyday Things

Students will collect, graph, and interpret experimental data.

Before you explore...

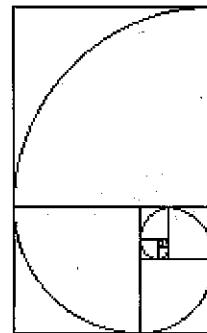


Have you ever wondered what made Bach's compositions so appealing or why some works of art or architecture take your breath away with their beauty? For thousands of years artists and architects have been using "the golden ratio" to help construct beautiful works of art.

Mathematically, the golden ratio has been determined to be ~ 1.618 . This means that, in music, one note may have a frequency of $1.618x$ that of the previous note. In architecture, it may mean that the width of a building may be $1.618x$ its height.

In fact, this ratio is also prevalent in nature, like the seashell that you see to the left. You can see that it resembles

the spiral created by 'The Golden Rectangle' shown on the right. Inside of the big rectangle is another rectangle that has an exact ratio of $1:1.618$. Inside of that rectangle that is also a perfect ratio of $1:1.618$. More rectangles can be added on forever. Notice that if you draw a curved line from the bottom left vertex of the outer rectangle to the top right vertex of the outer rectangle and then to the bottom right vertex of the first inner rectangle and so on, you will get a spiral that continues to approach the center, but in theory will never touch itself.



The Golden Ratio is represented by the Greek letter *phi* (ϕ). Some say that this "golden ratio" was used in constructing pyramids in both Egypt and Mexico and it is also found in ancient Greek art. Most importantly, this ratio is also found in the human body. This lab will have you measuring and comparing in a ratio certain parts of your body and finding out where the golden ratio exists.



In your lab group, complete a 'Place Mat' Activity to summarize what you know about ratios, how they are written, what they represent, and where you might see them in the world.