INQUIRY-BASED 5E LESSON IN A HIGH SCHOOL GEOMETRY CLASSROOM: THE REDISCOVERY AND APPLICATIONS OF THE GOLDEN RATIO

COOPER, PHILIP
MARThA DAY
LISA C. DUFFIN
WESTERN KENTUCKY UNIVERSITY
GSKY TEACH PROGRAM
Inquiry-Based 5E Lesson in a High School Geometry Classroom: The Rediscovery and Applications of the Golden Ratio

Synopsis:

The 5E inquiry model of instruction is a constructivist teaching methodology that allows students to develop their own pathways to understanding of novel concepts. In this lesson, high school geometry students explore the golden ratio of phi. Students discover and derive the golden ratio through a guided inquiry activity. This methodology allows students to become immersed in the subject matter while creating their own explanations of mathematical concepts.
### Introduction

#### 5-E Learning Cycle

The 5-E learning cycle is a product of the constructivist learning theory. In a constructivist classroom, the teacher assumes students enter with the unique experiences and beliefs about how the world works (i.e., scientific ideas) based upon those experiences (Collburn, 2000 – “Constructivism: science education’s ‘grand unifying theory’”). The 5-2 learning cycle is an inquiry approach to understanding science and mathematical concepts.

### Prior Knowledge

- Determine Similarity and use proportions to find missing lengths
- Solve a quadratic equation using the quadratic formula

### STEAM Connection

Though this a mathematics lesson, the artistic and visual elements the golden ratio provide appeal to artists and art education.

### The Golden Ratio

Students are shown a series of rectangles in a single series. The teachers asks the students which rectangle their eyes were drawn to first and what rectangle they find the most aesthetically pleasing to the eye.

By dividing a rectangle to create two similar rectangles, students must rely on their prior knowledge of similar shapes and solving proportions to find the value of x.

#### If you ignore the text and images on this poster, which size of the bold, blue rectangles draws your attention the most?

### Evaluation

Evaluation occurs through informal questioning and observation throughout the lesson.

### Summary

The 5E inquiry model of instruction is a constructivist teaching methodology that allows students to develop their own pathways to understanding of novel concepts. In this lesson, high school geometry students explore the golden ratio of phi. Students discover and derive the golden ratio through a guided inquiry activity. This methodology allows students to become immersed in the subject matter while creating their own explanations of mathematical concepts.