Creative Educational Experience

Topic: Mathematics
Title: Patterns on the Plane ($9^{\text{th}} - 12^{\text{th}}$ grade)
Presenter: Ruth Vanderpool Ph.D. Lecturer at University of Washington Tacoma

Activity: This presentation follows Chapter 2 & 3 of John Conway's *The Symmetries of Things* closely. Ideally this activity would take 90 minutes and stretch over two days.

Ten minutes is spent introducing the idea of planar patterns and in particular mirror symmetry. After seeing a few examples students are given a few minutes to make their own planar patterns. Notation (called a signature) for the mirror symmetry is introduced to the class and students are given time to identify their own creations. The natural question, "Do I have all the symmetries for this pattern?" will then be addressed. We will associate a cost with each digit in a pattern's signature and the students will be shown that the total cost of each pattern is \$2.

The next day we will examine the symmetries that the students bring to class. Rotational symmetry will have to be introduced along with its signature. The cost for rotational signatures will be introduced and students will again be shown that the cost of each digit in a pattern's signature again adds up to \$2. If discovered and if time allows for it, students may be told of the two remaining patterns whose signatures have yet to be introduced. The remaining time will be given to identifying the signatures of planar patterns around the room and discussing how many different kinds of planar patterns there are.

Materials I would need from the classroom:
Overhead projector to project examples

Homework:

1. Can you find a plane pattern that isn't quite of the 'blue' form?

2. Bring three of your own made or found patterns on a plane.