

A Course: Mathematics and the Visual Arts

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Background:

This course was designed and taught as an honors course. The students taking this course are sophomore honors students satisfying a requirement in Math and the Natural Sciences. Presenters of these courses are encouraged to be innovative and interdisciplinary while maintaining a high level of expectation. The students in my course were majoring in theatre arts, music, biology, and political science.

Course Description:

'Mathematics and the Visual Arts' will explore several of the many bridges between the visual arts and mathematics. We will look at mathematics as a subject matter for art, the influence of art in the creation of a new kind of geometry, the role of mathematicians in the creation of Medieval Islamic art, the importance of pattern and symmetry in both mathematics and art, the role of aesthetics in the development of mathematics, and the mathematical approach in contemporary art. Our purpose will be to find interplay and commonality between the visual arts and mathematics.

Sources:

I drew upon a wide variety of sources to cover the interplay and commonality between math and the visual arts. The sources included books, papers, a video, an Islamic student from outside the class, and colleagues from Millikin University's Art department.

Students' Learning Activities:

The students wrote short papers, solved a wide variety of mathematics exercises, lead discussions on the readings, wrote one long paper, created a Math/Art object, and took exams. The requirements for the Math/Art object was that it be 'an artifact that conjoins aspects of mathematics and art. This artifact does not have to satisfy rigorous standards of art or be an original work of mathematics. The artifact must, however, represent and combine significant insights into both the areas of art and mathematics. Part of the project will be a written paper, poster display, or some other appropriate means of documenting and explaining your math/art object.'

Some of the projects involved computer graphics of geometric solids along with an explanation of some of the math involved, origami objects along with a mathematical analysis, a scaled down stage set for a mathematical play, a quilt with a Penrose tiling design and color selection to highlight various symmetries, and a play scene with dialogue between an artist and a mathematician.

Conclusions:

I found it to be a challenge to design an interdisciplinary course covering subject matter that has not been previously organized and tested as course material for an honors class of bright and demanding students. It required an approach quite different from the more familiar methods that I have used for many years to teach more standardized mathematics courses. On the other hand, I found teaching the course to be extremely stimulating and satisfying. It has helped to maintain and renew my zest for teaching.