

Meeting: 1003, Atlanta, Georgia, MAA CP N1, MAA Session on Teaching Visualization Skills

1003-N1-396 **Nathaniel Miller*** (nat@alumni.princeton.edu), Department of Mathematical Sciences, Ross Hall, University of Northern Colorado, Greeley, CO 80631. *Visualization on Pool Tables and Cones using Geometer's Sketchpad*. Preliminary report.

In this talk, I will discuss several ways in which I have used Geometer's Sketchpad in activities developing students' visualization skills in a Modern Geometry class consisting mainly of pre-service elementary and secondary teachers. In particular, I will discuss a lab in which students are asked to construct a model of a pool table, showing all of the paths that a cue ball can take before hitting another ball after bouncing off of a given number of rails. They do this by looking at all possible repeated reflections of the target ball over sides of the table. This leads naturally to a kind of covering space construction and a proof that there are $4n$ paths in which the ball hits exactly n rails. Later in the course, the students are asked to write an open-ended paper in which they explore aspects of geometry on the cone on their own, in groups. I will show how some students have used the ideas developed in the pool table lab to construct 2D covering space models of the cone in Sketchpad; have printed and cut these out in order to make physical models of the cone; and have used them to answer the question of how many straight paths connect two points on a particular cone. (Received September 13, 2004)