1077-E1-2857 **Patricia Williams*** (pwilliams1101@lions.piedmont.edu) and **Elizabeth C. Rogers** (brogers@piedmont.edu). *A Partial Examination of the Evolution of Structural Design.*

The fields of mathematics, science and engineering are all different portals into the task of building a large structure. Science develops basic equations about the nature of our world, mathematics gives us the language to write these equations, and engineering takes them and turns them into concrete (or steel or wood) realities. Put another way, the scientist ponders "Why?";the mathematician gives us the "What?"; and the engineer devises the "How?". Entering through the mathematics portal, this paper will describe the historical development of four types of structures – cathedrals, bridges, skyscrapers and some ancient structures still in place today. How can we build a light and airy cathedral? How can we cross a river? How tall can we build a building? How did ancient engineers create structures that are still in place today? The evolution of the mathematics involved in the designs is featured. Some successes and some failures are presented since unfortunately some of the most enlightening lessons come from the process called trial and error. (Received September 22, 2011)