Metamaterials are an active field of research within the disciplines of Engineering and Physics. They are characterized by periodic geometries that aim to produce material properties that cannot be found within naturally occurring materials. Some of the potential applications of Metamaterials include the ability to propagate light or sound in ways that may bend or deflect their presence around the Metamaterial, or interesting dynamic abilities that would allow a structure to deform and respond in unusual ways to certain stress or environmental inputs such as heat. Extensive crossover exists between mechanical morphing metamaterials and origami inspired structures. The ability for structures to fold and deploy has become increasingly of interest for the necessity of efficient space travel. The current literature on origami inspired metamaterials has largely been focused on the Miura pattern, which is most often utilized in folding solar panel structures. While a remarkably interesting and useful geometry, it seems necessary to explore the vast sea of possible geometries that still remain uncharted. We choose to investigate surfaces with square pyramid tessellations. Numerical simulations are coupled with a mathematical framework to examine how these specific surfaces deform in response to different conditions. Energy minimization techniques such as Gradient Descent are used to predict the particular deformations as a result to certain inputs. Applications of the specific geometry are also explored with possibility of deployable structures and hydraulic applications. Further research is needed to understand issues that may exist with efficiency and stability for both applications.