

Ice Breaker Exercise – The Marshmallow Challenge

The Marshmallow Challenge was a great way for our team to work together by implementing the entire design process in 20 minutes. Although most of the steps were suppressed into the larger categories, we managed a small brainstorming session, built our design, then tested and modified our design striving to meet the challenge requirements.

Each of the 34 design teams were tasked to work together in an “Ice Breaker” challenge to design a tower to support a marshmallow. The 3 teams with the highest standing structure would therefore be rewarded 2 extra points on their Midterm 1. Each team was allotted 20 spaghetti noodles, 1 yard of tape and 1 yard of string to build their structure. The lack of more instructions meant a wide open design field that yielded many forms of structure.

Our team started the design process like all other projects with a brief brainstorming session. We quickly decided upon a triangular prism design where each leg met to form a crude “tee-pee” structure. We decided to build the legs 3 noodles long using our engineering intuition and the amount of material we had. We approximated the noodles to be 10 inches long which would yield a structure height of a little under 30 inches with the joint overlap and angle. We decided this was a reasonable goal to shoot for and we would have more noodles left for support.

We started the build by forming each 3 section leg, overlapping the joints approximately $\frac{1}{2}$ inch and taping them together. We quickly realized the strength of one noodle was insufficient and decided to double noodle each leg section. This added support in the legs would use 18 of the 20 noodles but would decrease the time and tedious work needed to tape bracing to the side of the structure. We tested our design with no added support bracing but realized it was just too wobbly and needed at least one triangular support between the legs which we added with the remaining noodles. We also added a small piece of tape to each leg to keep them from sliding on the table and made a circle with the rope to slide over the legs to hold them in from bowing outwards. With a little balancing we got our structure to hold and measured to be $27 \frac{3}{8}$ inches tall.

Communication is key in any endeavor where multiple people are working together. Although we didn't win the challenge, we definitely won in this aspect because all group members exhibited an open minded approach to the whole process. This was a great ice breaker challenge and it proved a well rounded group that can work well together which will ultimately lead to success in our senior design project.

Individual Comments:

Brian Roberts:

The time frame for the project led to a rush to get things done. Our group consists of only 4 members and I personally feel this helped our communication. We each had ideas but made sure to listen to others when they were expressing their own thoughts on how to proceed. At no time did we outright dismiss anyone's ideas, we instead discussed pros and cons of our design concepts and agreed on a path forward.

During this project my personal role involved acquiring supplies and working with the string. My attempts at taping the noodles together met with the only unintentional breakage we encountered. As a result of my ham-handed handling of the delicate noodles I instead concentrated on helping to hold things in place while other team members did the more delicate steps needed.

Keenan Checks:

During this 20 minute project I was able to listen to my teammates ideas and constructively contribute my ideas to help improve on them and find an optimum design. I listened to everyone before objecting to anything and was able to visualize everyone's concerns. Personally I helped to build part of the supporting legs by taping noodles together and combining them with my teammates for reinforcements. As time diminished I helped to cut and hand out more tape to my teammates as a means to work faster and more efficiently.

Beau Rodgers

The communication and teamwork our group exhibited was outstanding. We all worked together under a time constraint to come up with a design that was satisfactory to all of us. The best communication quality to have is to be open minded to others ideas and we all have this quality.

I helped in all aspects of the challenge mainly on the assembly and modification. I helped build the legs by taping them together as well as attach the support triangle in the middle due to my delicate handling of the noodles. It was also my idea to form tape supports on the table for the legs to hold together. I enjoyed this project and think we will be successful in our future projects