

## Wednesday Challenge Form

**Group Members:** Ara, Erin, people whose last Name starts with H-Z



**Problem Statement:** Find a way to place a marble from the stairs in the quad to a bucket in the quad. Use PVC pipes that have been cut horizontally. By holding them from the stairs to the bucket and roll the marbles. You may need to move after the marble rolls off your tube. You may not let the tubes overlap and you may not let the ball stop at any point on the journey.

**Approach:** My group decided to approach the situation head on. We lined up first and rotated who held the pvc pipes as the ball rolled on the track. We soon discovered that sheer speed wouldn't solve the problem effectively. So, we developed a system to line up first, check that all of the pipes are "connected" and then allow the marble to roll at a slow and steady pace. Unfortunately, we couldn't facilitate the plan effectively from the beginning so it took multiple attempts to finally reach the bucket. I decided to observe for the first few runs and see various issues we had in our technique. First, we were very susceptible to allowing the ball to speed up and eventually roll off the pvc bridge. Also, we allowed our own energy to get the best of us and had multiple attempts fail due to inadequate initial lining up. In our winning round I slowed the ball down to increase our control.



**Solution:** We had to line up, make sure all pipes were connected. Then gradually roll the ball from one pipe to another. Then by slanting the pvc bridge we increased our speed and aimed our ball into the bucket.

**Lessons Learned:** I learned two important details of engineering. Applying our ideas is not as effective as learning new ones from experimentation. Only after trying multiple tries were we successful.