# Boat Project Analysis

*Crescenta Valley High School*

# Project

## Project Description/Goal

In a paragraph, summarize the description of the project and goal of the project.

Our goal of the project is to build the cardboard boat with one roll of duct tape and go back and forth on the pool as much as possible. Other materials are not allowed, only cardboard, tape, and optionally, some rope if needed. The boat can be very big, but not as big as Mr Poole's classroom (if that's even possible). Also, extremely long boats are not allowed since you can just walk all the way to the other side of the pool, which defeats the whole "boat" purpose. (So making a bridge on the water is not allowed).

## Project Research

Provide what research has been done to back up your project. This should include articles, websites, and other resources as inspiration for why you're building this project. This should be a lengthier section of your project document.

- Flat bottom which will make as little gap between cardboard at bottom as possible and V shaped bottom is very delicate so when it is not perfect V shaped bottom will cause problems to the boat.
- Sitting or lying on the cardboard is better than standing or kneeling for the lowest center of gravity.
- Longer is faster but harder to turn(which mean we have to build a long boat)
- Don't cut much because water can go in through the gap and fold much.
- There should be side of the boat that blocks the water from coming into the boat

https://discoveryparkofamerica.com/uncategorized/the-dos-and-donts-of-building-your-cardboard-boat-for-the-races-on-may-16-2020/

- For rowing our team is going to use the hand paddle which is going to push the boat more efficiently than the hands and

Prototype 1: Same density prototype of the boat with the same density cargo. After reaching the limit we will be able to multiply it until we reach our measurements (weights) and see what the limit for weight is so we don't sink. The boat will be closed so it will work as a balloon and hold the air inside since air is less dense than water. 2 sailors will lay on the boat on their belly and push themselves.

## HOW TO CALCULATE THE WATERLINE: **Calculate the volume of liquid that has this same weight. This is the volume of the boat below the waterline. Divide that number by the area of the boat (length times width). That is the depth the boat sinks to.**

## Design Constraints

The constraints that your device will need to adhere to. Not all constraints necessarily need to

be met by the end of the semester as long as there is a clear understanding of a pathway to meet the constraint in the future. Constraints may include:

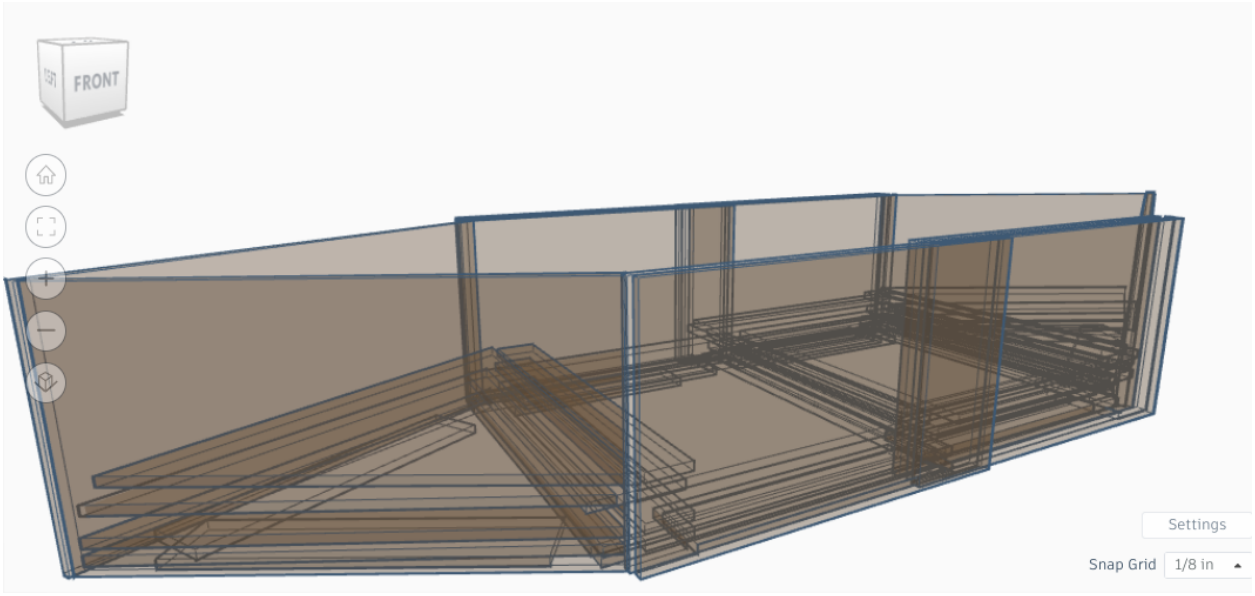
- Size-Smaller than pool
- Materials-unlimited cardboard with one roll of the duct tape. Little bit of string if needed.
- Form factor
- Etc.

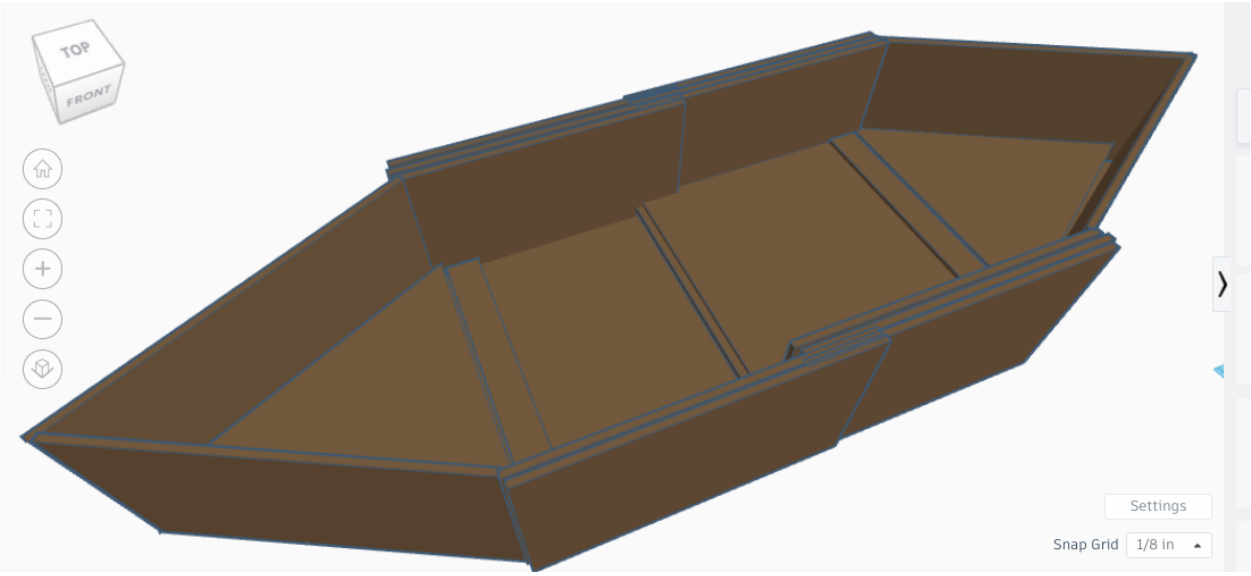
Describe what tradeoffs you made to

**Is the boat light or heavy enough? Is it the right size for a boat to float on the water? Was the boat large enough for people to sit and not too large to not cover the pool because covering the pool is not allowed.**

## Design of Project (CAD)

Please provide your intended design and a paragraph of why you chose this design. 2-3 paragraphs.






(The dimensions are 1:1 to the real boat)

**We made a multilayer design to prevent the boat from sinking for as long a time as possible because we thought staking multilayer as possible takes in water layer by layer, not all of the water at one time.**

## Changes and Modifications

Describe ALL changes you made to your design and what you learned along the way. 2-3 paragraphs.

- **We added more layers to the boat and decreased the number of sectors so that the boat is not too long and not too weak and well armored".**
- **We first designed the boat as square shape then we designed our boat as a rectangular shape and we added a triangular part of the boat to lessen the water resistance as possible.**
- **Then we made the boat that was 4 layers of 5 sectors on the bottom including triangular part and rectangular parts to 5 layers of 4 sectors on the bottom to increase time on the water as much as possible.**
- **Also, at first we made rolls of cardboard to prevent boat from sinking but now we chose the way of staking the cardboard which we thought was efficient**

## Final Product

Describe your final project and predictions of how you feel like your boat will do. Will it last? Will it make it down the pool and back? What would you do differently if given another chance? 1 paragraph.

The boat is is 10'4" long, 3'4" wide, 1'9" tall. The base is constructed with 5 layers. We overlap the 5 inch edges of each layer with the next one. This layering technique is what makes us different from the other groups. The walls also incorporate the same technique. The central walls are triple layered while the corner walls are only one piece of cardboard each. We decided to go this way about the corner walls in order to maintain the integrity of the wholeness and use no tape on the overlapping part. We used tape heavily on the bottom and some on the walls. The main point of the tape in our boat is to cover up the overlapping parts and any possible holes as well as keep the structural integrity of the design.

Predictions (per person)

**Joel:** I think it will float for at least thirty seconds when all the combined weight is on the boat.

**Rafayel:** I have no doubt that our boat is gonna outperform everyone else's.

**Tigran:** I have a bad feeling about this…

**Mingyu:** The boat will sink in 5 minutes.

## Team Member Biographies

Each team member should have a biography of themselves. This should include contributions made to the boat.

### Tigran's Bio:

As you know, my name is Tigran Karyan. I was born in Yerevan, Armenia. Grew up there and lived there for most of my life. I came to the US in 2019 for education and because the US can offer better career opportunities. The type of engineering I like is Aerospace Engineering, it interests me because it's the future and because I like rockets and planes in general. But I also look forward to computer engineering and science as well since it is something that Aerospace Engineering requires too. I am interested in making robots as well that will be conducted to be used for medicine, extreme jobs like mining, and replacement for soldiers for now until the world becomes peaceful and just in general I see robots as something that will do the hard work for people or at least assistance to humanity. Engineering is not the only thing that interests me, one more thing that does are politics. For me, the government that most countries use today is an absolute failure. I would like to bring a start to a government that will benefit all people and will finally bring peace to the world. I won't stay in the US for long and will go back to Armenia when I feel it is the time to do so. As for now, I focus on school and how to graduate in a way that will help me enter a great university to get the desired degree in physics and mathematics as well as I suppose politics.

As if in my personal life, well, my hobbies are art, video games, astronomy, and I guess just thinking if you can count it as a hobby. I am sure this project will go great. Only thing I need is confidence.

**Rafayel's bio**

17 years ago I was born in Yerevan, the capital of the Republic of Armenia. I spent my childhood like any other ordinary kid in Armenia: playing outside with friends and paying little attention to school. My life changed when my dad was offered a job in Russia and our family relocated to the city of Perm in search of a better life. It was not very easy for a 8 year old kid to adapt to a completely new environment, having left behind a lot of what he had managed to gather in his lifetime. The first couple of weeks were challenging, as I was put in a school environment that spoke a new language that needed some time and practice to enter your system. Fortunately, I managed to make new friends and started feeling at home in a couple of months. A couple of years later we moved back to Armenia. In Armenia I discovered my passion for soccer and started playing as a goalkeeper in the U-16 League. I was having fun competing and also I made friends with whom I keep a very warm connection till this day. Over time, my passion for soccer faded and I replaced with obsession with movies and literature. We stayed there for 5 years and moved again. This time to Los Angeles. In two years I ended up in this wonderful (not a sarcasm) class.
In this project, I just as my three wonderful teammates worked on pretty much everything. I helped to design the boat in tinkercad and on paper. I helped build the prototype and test it. I helped better the design and cut out the cardboard. And finally, I helped to assemble and tape the boat.

**Mingyu Jeong's Bio:**

When I was in La Crescenta Elementary School I learned how to program using the Scratch at Lego Robotics which was an after school program. Second thing I did was learn Scratch again at the library during summer break after 6th grade. And when I was in 7th grade I got into Coding class that was going on after school and I learned how to program using the Python turtle. I used a few simple commands at the class and it got harder and faster , which was too hard to learn at the end so I left the class.

**Joel's bio:**

My name is Joel Savin, I am 16, and of course you know that my favorite person is Joe❤️Ñoskill✨. All jokes aside though, I was born in Moreno Valley, California, USA, when I was about three years old, I moved out of Riverside County to L.A. County, and I have been in the Glendale Unified School District for basically my whole life. The only other school that was not part of Glendale was my preschool (if you can count that). I went to John C. Fremont elementary followed by Rosemont Middle school, and now I am here at Crescenta Valley High school. My goal in life is to become a Gourmet Chef and to just generally master the art of cooking. I like playing Clash Royale, Chess, and other games with my friends. I like improving in the things that I like and climbing the ladder of skill and soon being able to dominate the things I enjoy. Engineering is not my spark, however, working with the other students and being able to have a good time with them as I do so is a different story. I think if you find the right group, you can make anything a good activity. I would like to take a moment to thank my current group members, (and my previous ones if they're somehow reading this). Thank you for giving me a good experience, it is my teammates that have made this whole class a fun experience. Here's something I haven't told anyone in this class yet. When I was first told that I had engineering, I didn't want to do it,  I thought I would have a hard time and not do well at all! In fact I wanted to actually change classes initially. However, with time, I got attached and soon enough I did not want to leave this class at all. Why? Because, I was having fun. So thank you to my teammates, and thank you Mr. Poole.
Our project currently, (5/22/23) has some bumps to it, but I think we will still be successful if we continue trying, so we will not stop. And we will continue to make the best boat possible. Thank you for reading this.

**Pictures** 😱😱😱😱😱

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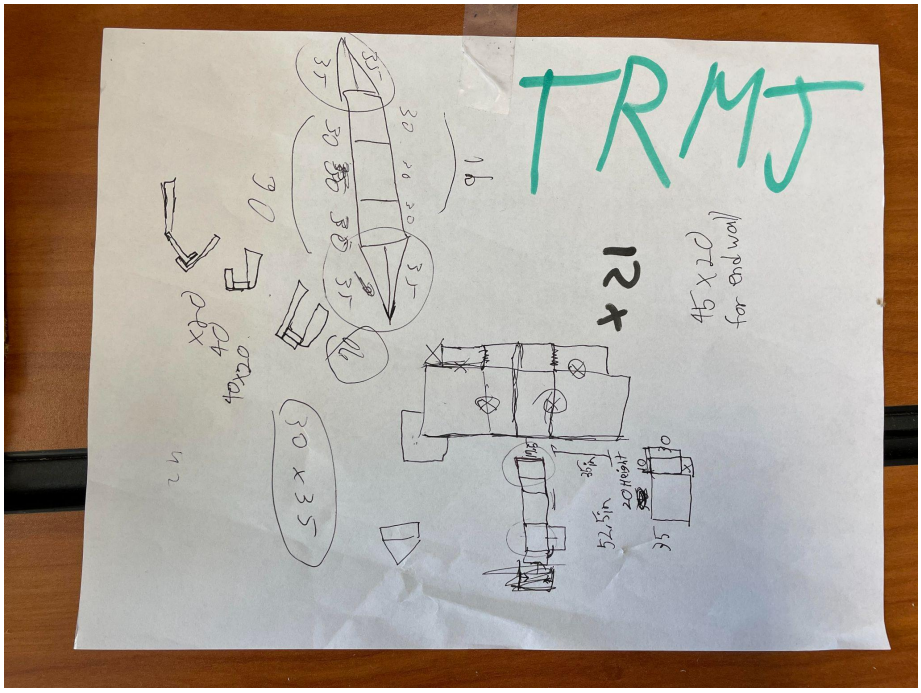


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