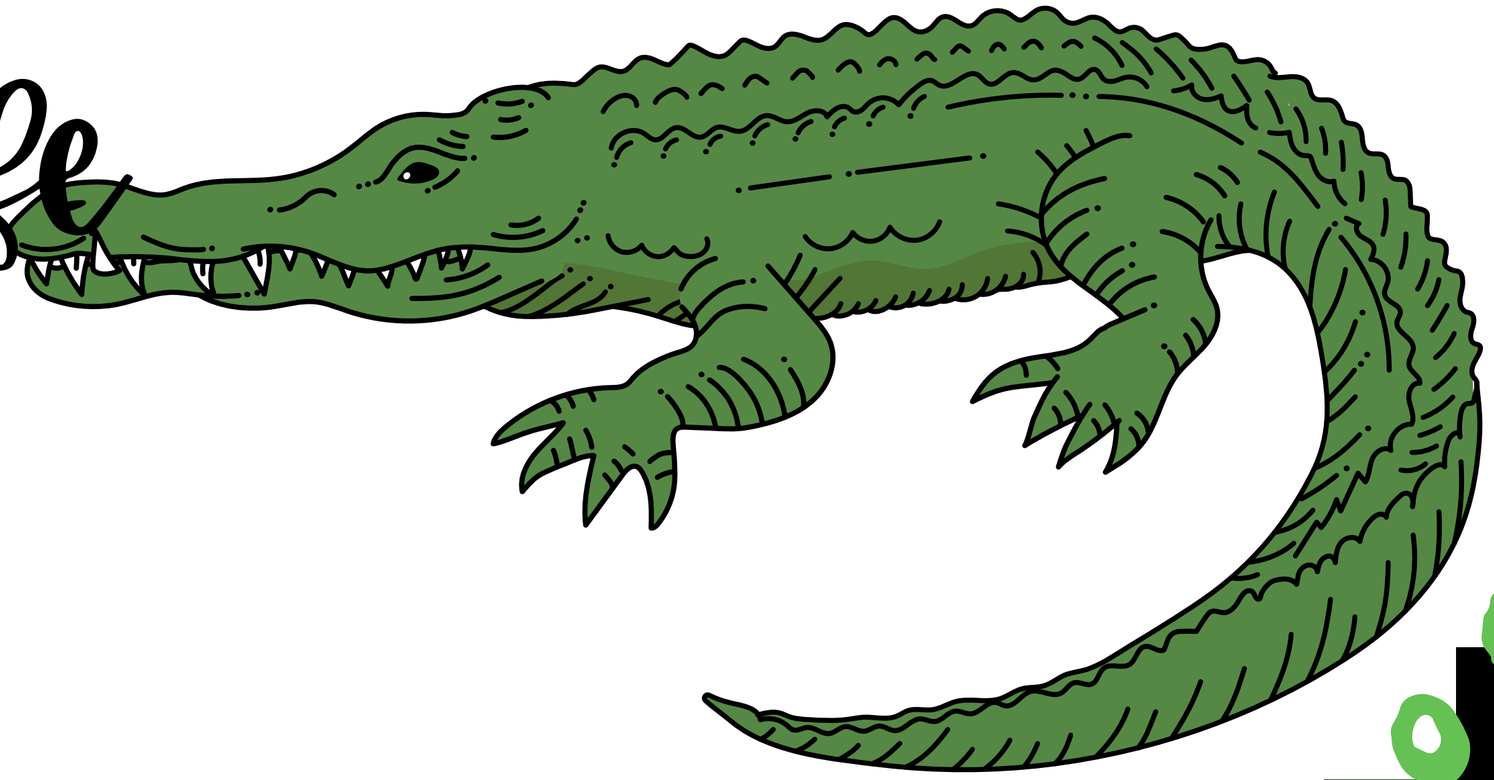
Logo

FIRE CROCE-ER

Wild Life



October 22nd 2025

Portfolio

By: [redacted]

To: Mr. Cornwall

Presented to you by Croce Flame Motors

What I will do as the designer

A successful design will run smoothly/freely and outperform others with speed stability and how funky it is .

As the designer of the Fire Croce-er (co2 dragster) I will, research and apply aerodynamic principles to reduce air resistance. As well as drawing different designs and seeing which one is the most eye catching and funky.

The Goal:

In this project, the goal is to design and build a CO2 dragster that moves as fast and smoothly as possible using the power of a CO2 cartridge. The problem I am solving is how to create a dragster that follows all the required rules while also being lightweight, aerodynamic, and low in friction. To do this, I need to understand the forces that affect the car, like thrust, drag, and friction. I also have to think about the materials I use, how air flows around the car, and how the wheels and axles are set up. By making smart design choices, I can improve my car's speed and performance during the race.

Research:

Keeping my car at 20.5 cm helps make it lighter and more aerodynamic, which can improve its speed. A shorter car can also reduce air resistance and make it more balanced during the race. I chose this length to help my dragster move faster while still following the rules.

The length of my CO_2 dragster is 20.5 centimetres. This size follows the official CO2 car specifications, which usually requires the car to be between 20 cm and 30.5 cm long.

Specification	Minimum	Maximum
Body Length	200 mm	310 mm
Body Height (rear with wheels)	50 mm	75 mm
Mass (without CO_2 cartridge)	50 g	170 g
Body Width at Axles	35 mm	42 mm
Wheelbase (axle-to-axle)	105 mm	270 mm
Distance Between Screw Eyes	150 mm	270 mm
Wood Thickness Around Cartridge Hole	3 mm	10 mm
Height of Cartridge Hole (floor to center)	33 mm	43 mm

⚠ **Safety Note:**

t least **3 mm of material** must remain around the CO_2 cartridge hole.

ars not meeting safety or specification standards will not race.

Research pt 2:

Friction:

In my CO_2 dragster project, friction, aerodynamics, and materials were important parts of my design. Friction happens when surfaces rub together, like where the wheels touch the axles. Too much friction slows the car down, so I made sure my axles were smooth and lined up properly so the wheels could spin easily.

Aerodynamics

Aerodynamics is how air moves around the car. My dragster had 4 bumps on the body as part of its design, which gave it a unique look, but may have added some air resistance. If the bumps caused more drag, it could have slowed the car down slightly.

Material list:

For the materials. I used

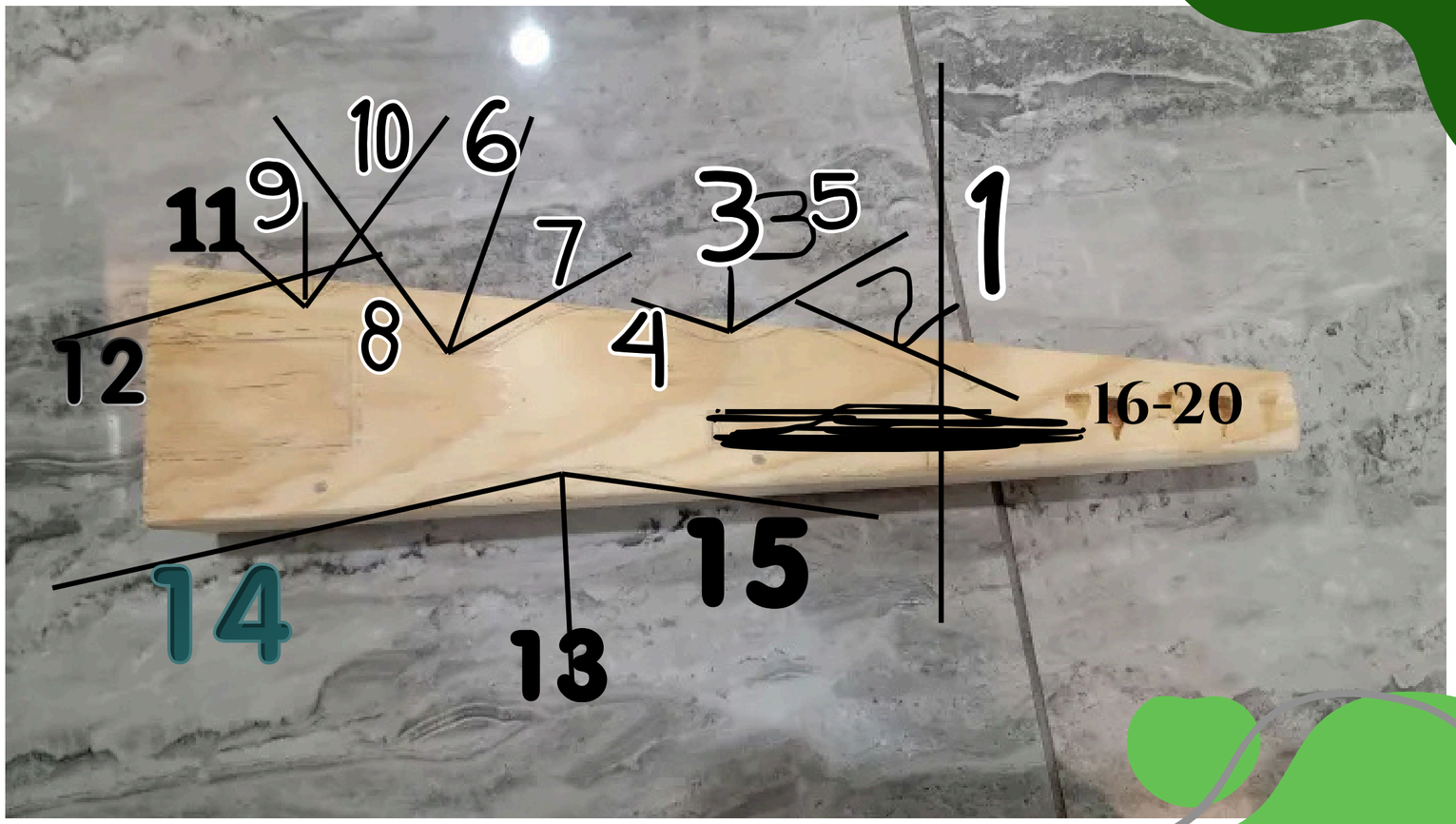
- a piece of wood shaped like a door stopper(wood blank)
- 2 front wheels
- 2 back wheels
- a brass washer
- 2 steel axles
- a straw for the 2 axles
- paint
- and lastly glitter.

My Plan

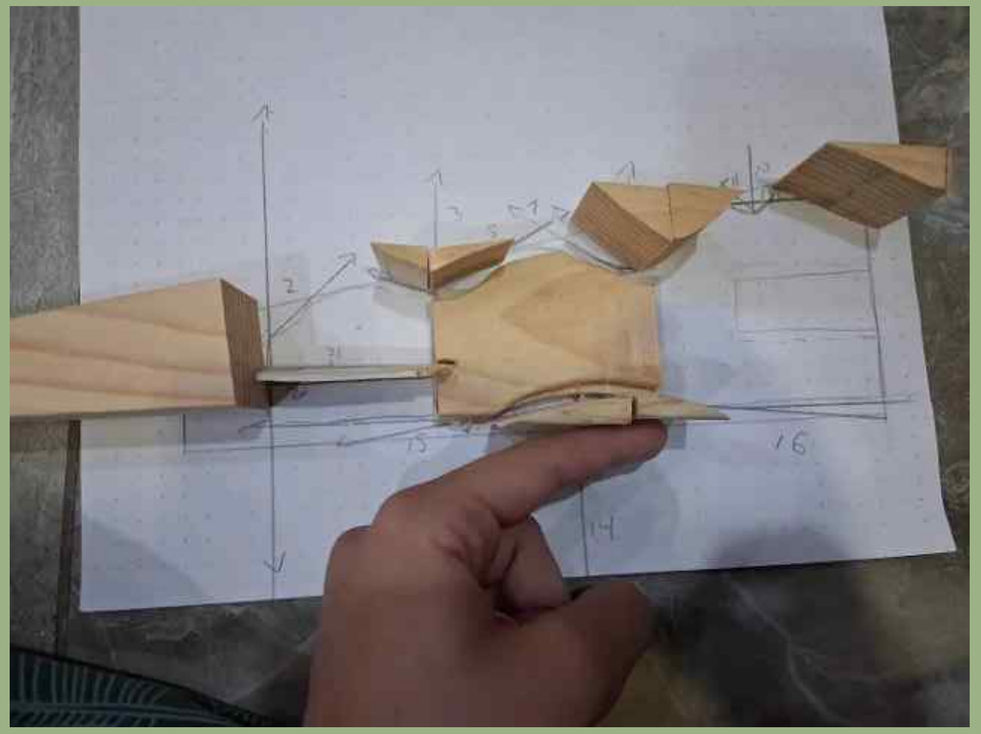
For my CO2 dragster project, I brainstormed three different design ideas to find the best balance of speed, stability, aerodynamic efficiency, and the funkiest. The first idea was a classic streamlined shape with a long, narrow body and a pointed nose to reduce air resistance, featuring smaller front wheels and larger rear wheels for stability. The second design focused on a wider, more stable body with rounded edges and equal-sized wheels, prioritizing control during the race. The third featured a crocodile with a elevated bottom and smooth waves at the top it also had a mouth that was narrow. The front wheels were thin as for the back wheels were thick. Although I did not test all of my designs. I had decided to make the crocodile because I wanted it to be the most funkiest while still being fast and I also wanted to have a matching set with my push stick.

My Planned cuts:

When I got my wooden blank I traced my design onto it.After that a carefully planned my cuts. For the mouth I made multiple cuts before using a wood scraper to scrape the wood out from in side. (I drew the lines in black for better seeing).



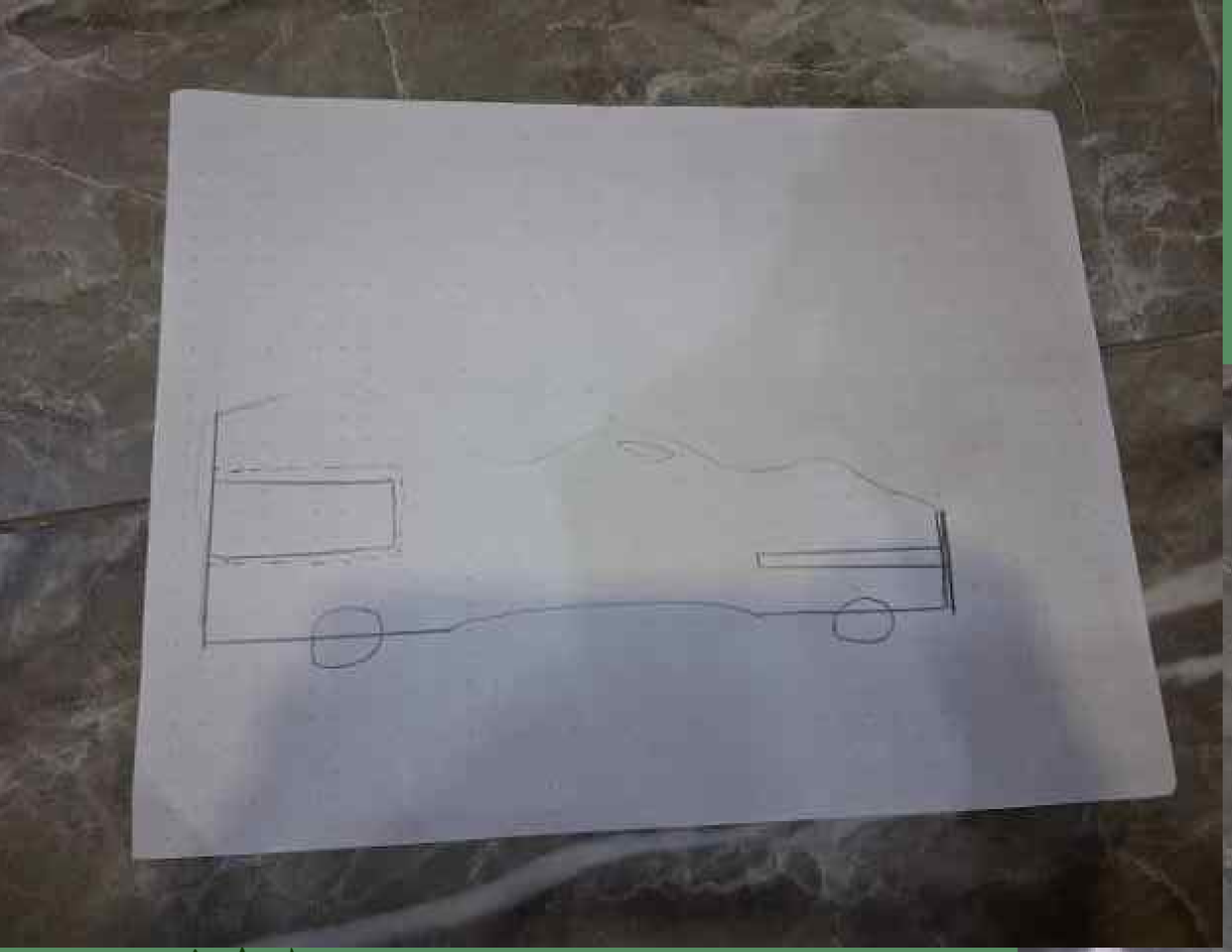
How the Planned cuts turned out:

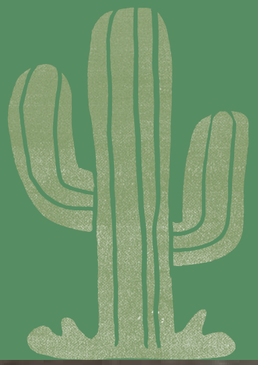


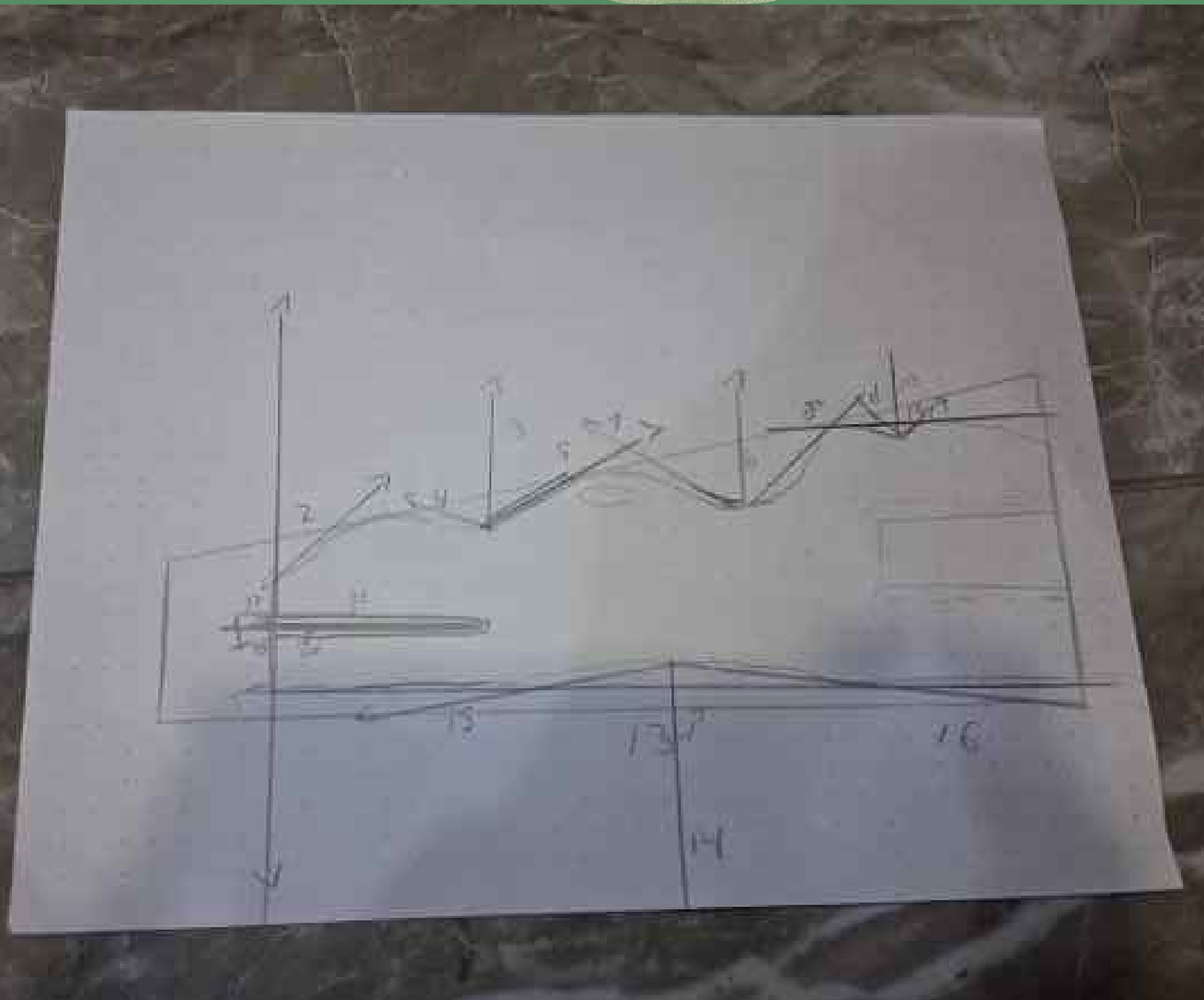
Tool list:

The tools I used were:

- Safety glasses/ goggles
- A rasp
- A file
- A drill press
- A band saw
- wood scraper
- sand paper (60 grit, 100 grit , and 220 grit)
- A ruler
- A pencil
- A vice
- design template
- paint and paint brushes







Step by-Step pr 1

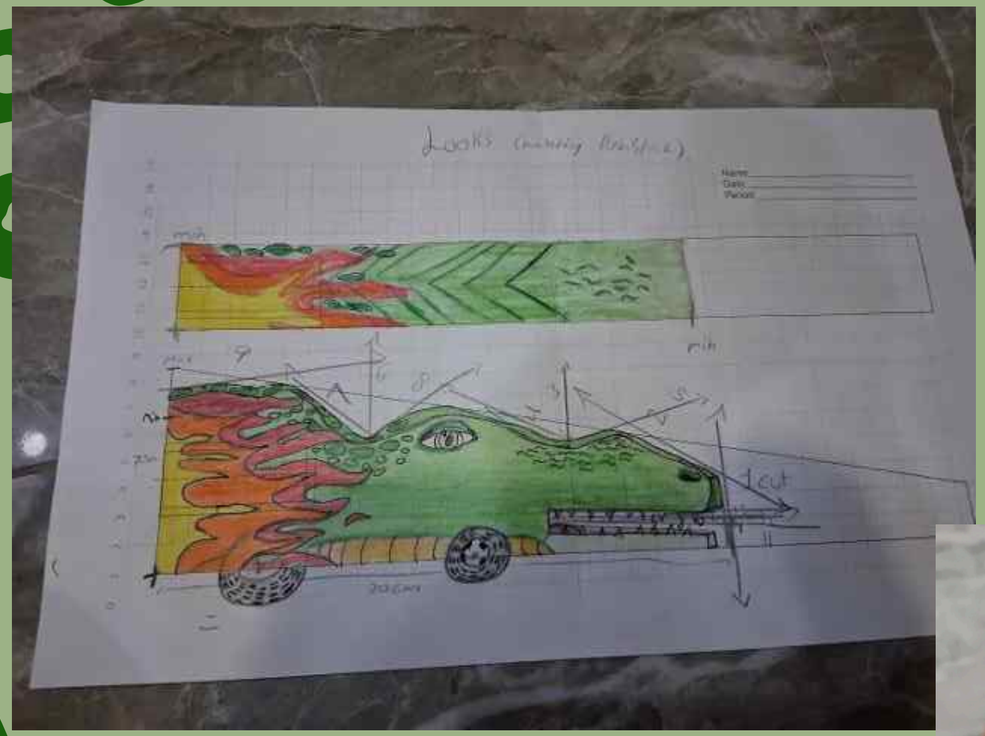
Step 1. I started by sketching my dragster on paper and planning how it would look. I wanted it to have a crocodile theme, so I included four bumps on the top to make it stand out and match the design idea.

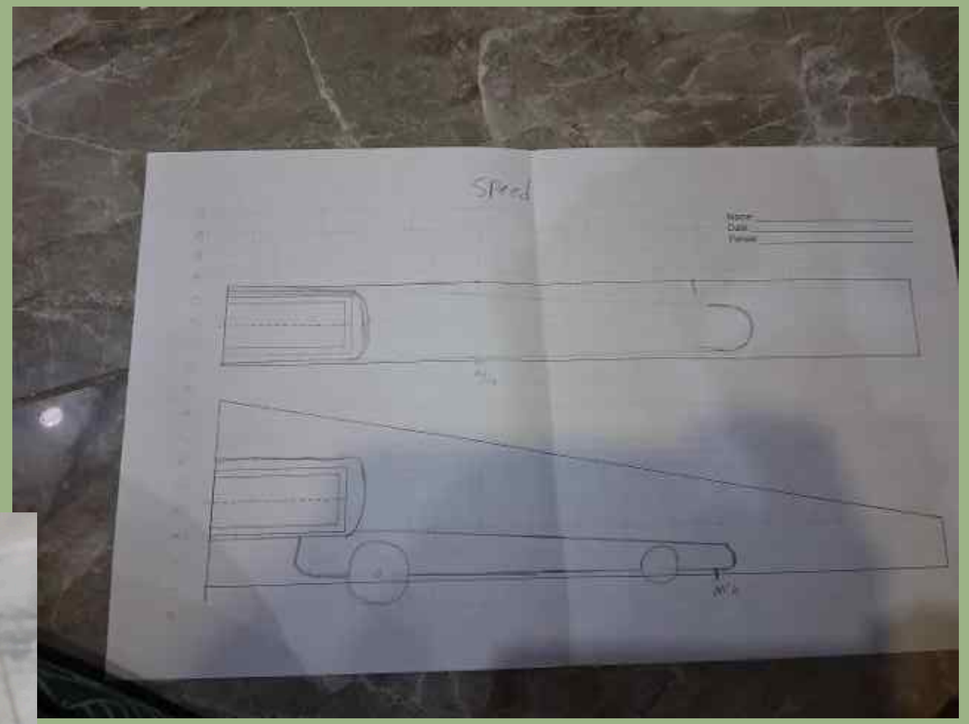
Step 2. Next, I measured my wood block carefully and marked where to cut, drill, and place the axles. I used a ruler and pencil to make sure everything was straight and even.

Step 3: Before cutting I drilled the holes for the axles and the CO_2 cartridge. I made sure the holes were level so the car would roll straight during the race.

Step 4: After, I used a saw to cut out the shape of my dragster. I followed my design closely, making sure the crocodile bumps were the right size and smooth. I also made lost of release cuts for the curves.

Step 5: Then I put the car in a vice and started filling away at it.


Name
Date
Period
cut


Speed
Name
Date
Period

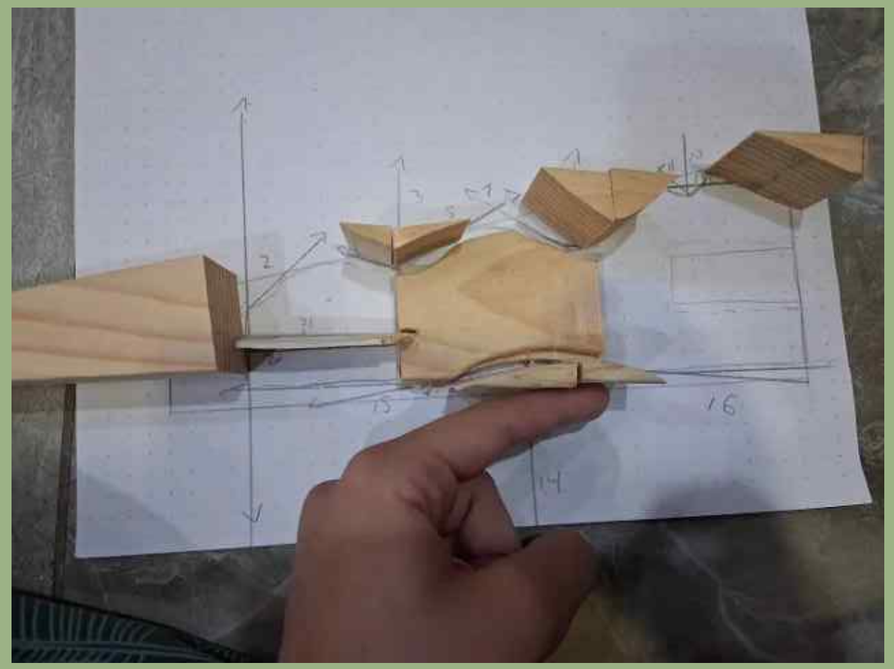
Step by-step pt2

Step 6: I started sanding , first I used a 60 grit sand paper then 100 grit and lastly 220 grit.This step also helped improve aerodynamics so the dragster could move faster through the air.

Step 7: When the car was smooth, I painted it to fit the crocodile theme. I added colour and details to make it unique and give it a clean, finished look.

Step 8: After the paint dried, I added the wheels and axles. I checked that they spun easily and didn't rub too much to reduce friction.

Step 9: Finally, I waited for my turn to watch my dragster race down the tack and see what I needed to improve on.



VERY VERY SHORT AD BREAK

Final design:

What I Learned, What went well, and How I can improve:

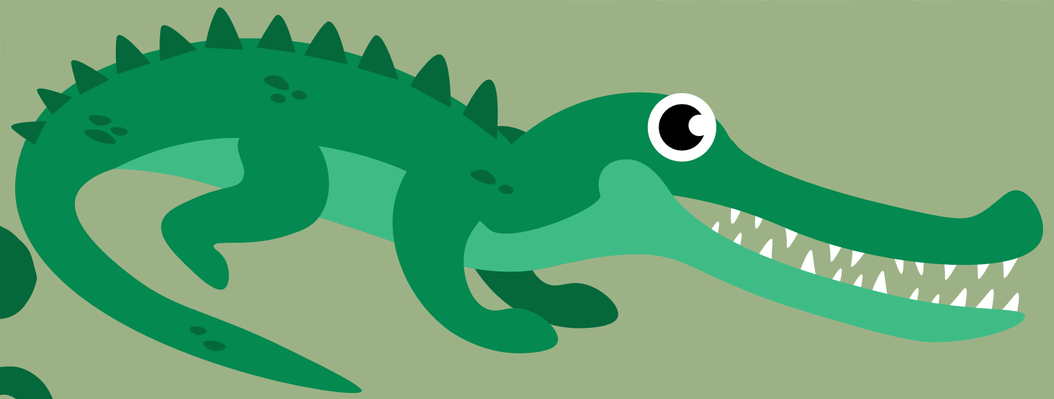
During this project, I learned how to safely and correctly use many different tools, such as a vice, rasp, file, band saw, and drill press. I also learned the difference between 60–220 grit sandpaper and how each one helps make the wood smoother at different stages. I discovered how to make precise cuts and shape my dragster carefully, and I realized that building something like this takes time, patience, and attention to detail.

What worked well for me was the overall design and shape of my crocodile dragster. The four bumps on top made it unique, and the smooth sanding helped it move faster. If I could improve my design, I would try to make it even more aerodynamic by reducing extra bumps or shaping the front more sharply. I would also spend more time making sure the wheels were perfectly aligned to reduce friction and help it go even faster on the track.

COST $$:

Wood Blank	1	8.00
CO2 Cartridge	1	2.00
Front Wheel	2	0.60
Rear Wheel	2	0.60
Brass Washer	4	0.40
Screw Eye	2	0.30
Steel Axle	2	0.40
Straw for Two Axles	1	0.15
Total paint+ paint brushes		0.50

The final race:



My first race went really well. But it tied with Margaret's dragster.I was not able to capture it on camera but I did manage to capture the redo. in the beginning of my second race I was beating Margaret but then everything went down hill and I started to slow down.

The End!

Made by [redacted]

To Mr. Cornwall

And with that the Fire Croce-er has been completed

Thank you for reading my portfolio hope you have a wonderful day!