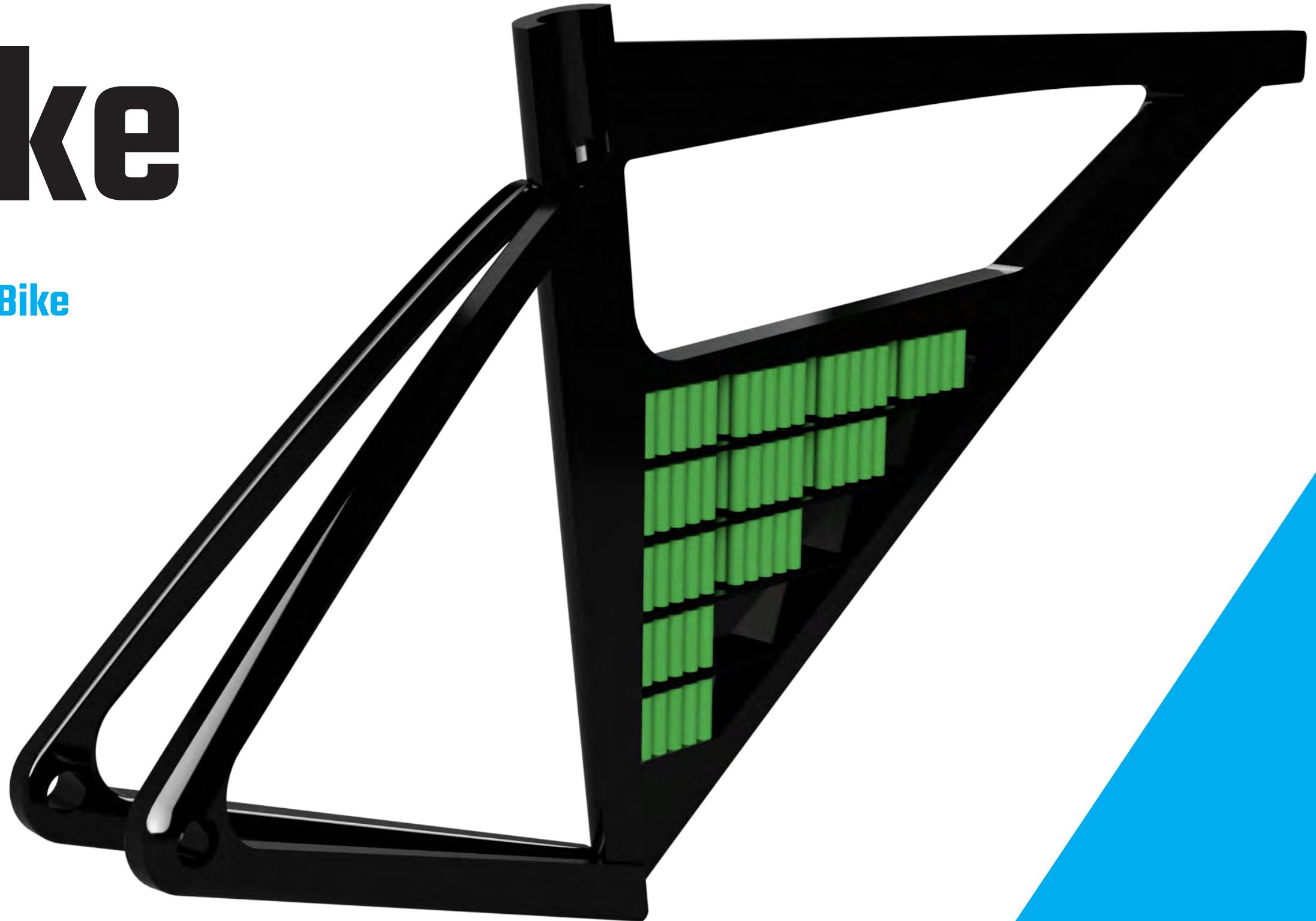


# VeBike

Urban Commuting Bike



# Who is it for?



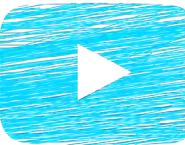
 **Mark Martinsen**

 **New York, USA**

**Environmentalist**



**Energetic**



**World Traveller**

**Entrepreneur**

**Video Blogger**

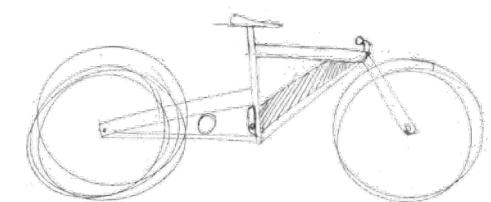
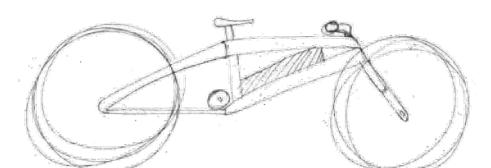
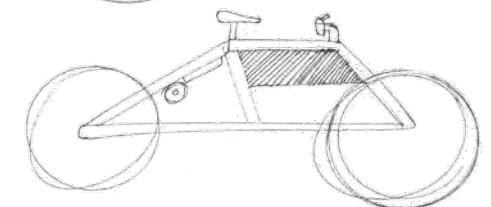
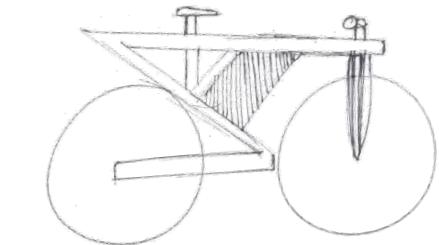
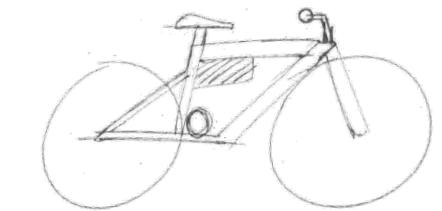
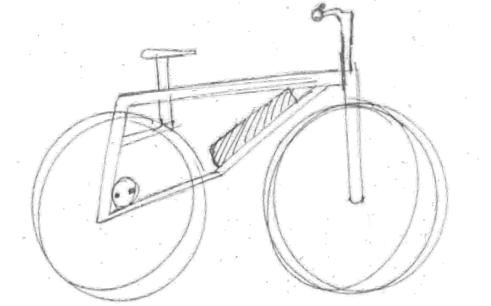
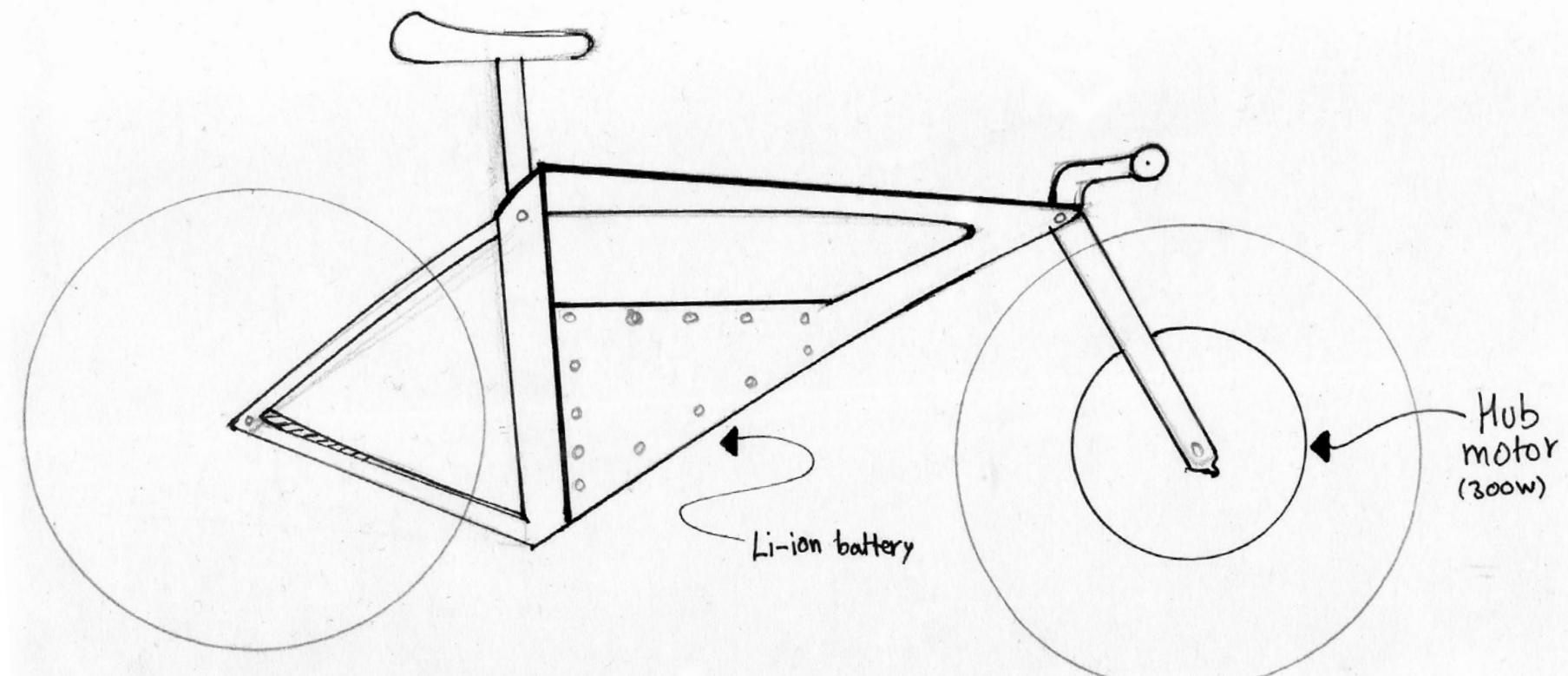
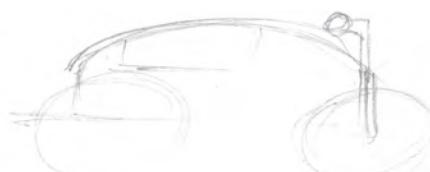
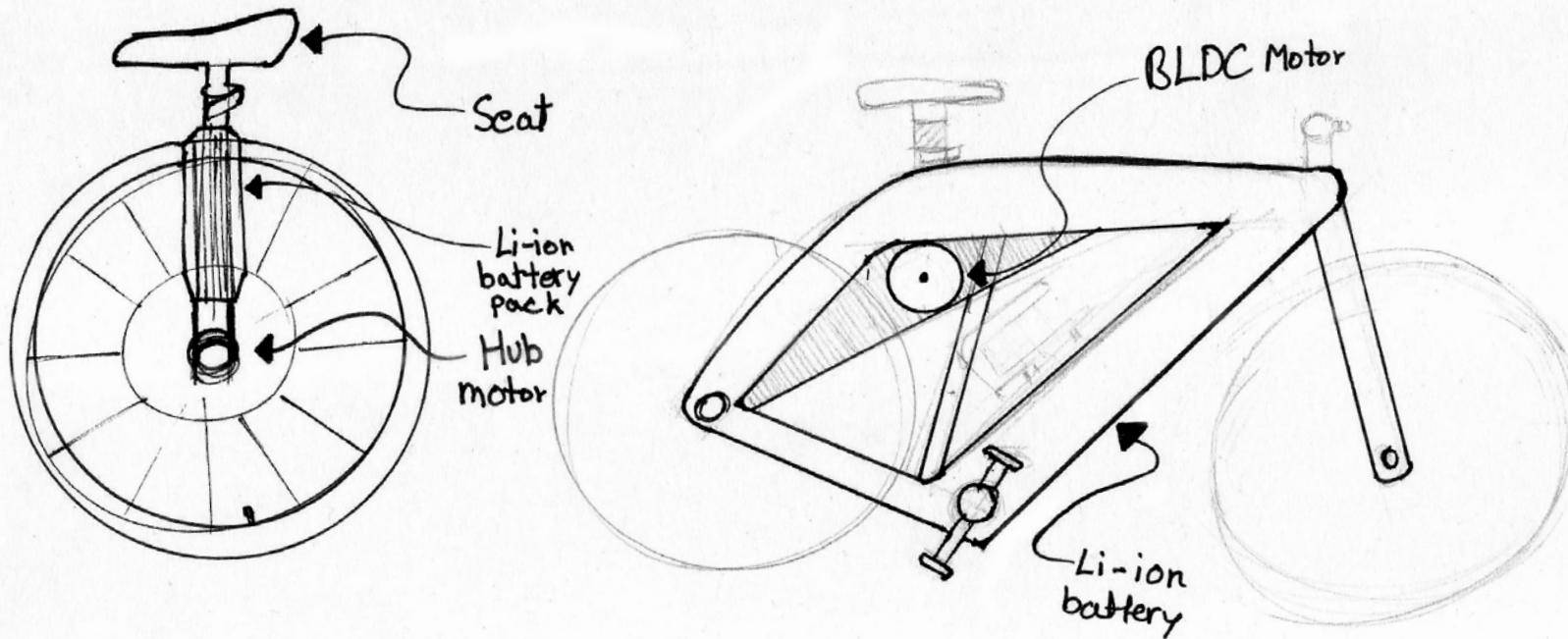
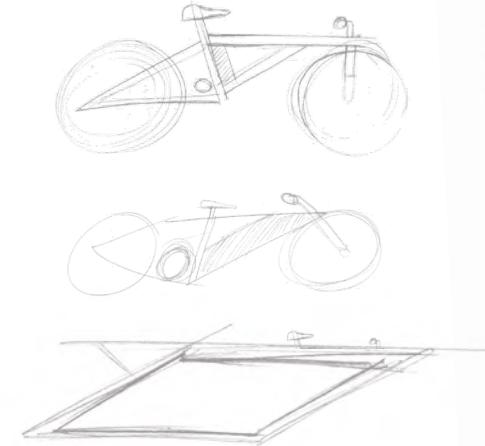
**Jack wants to upgrade his bike by making his own e-Bike**

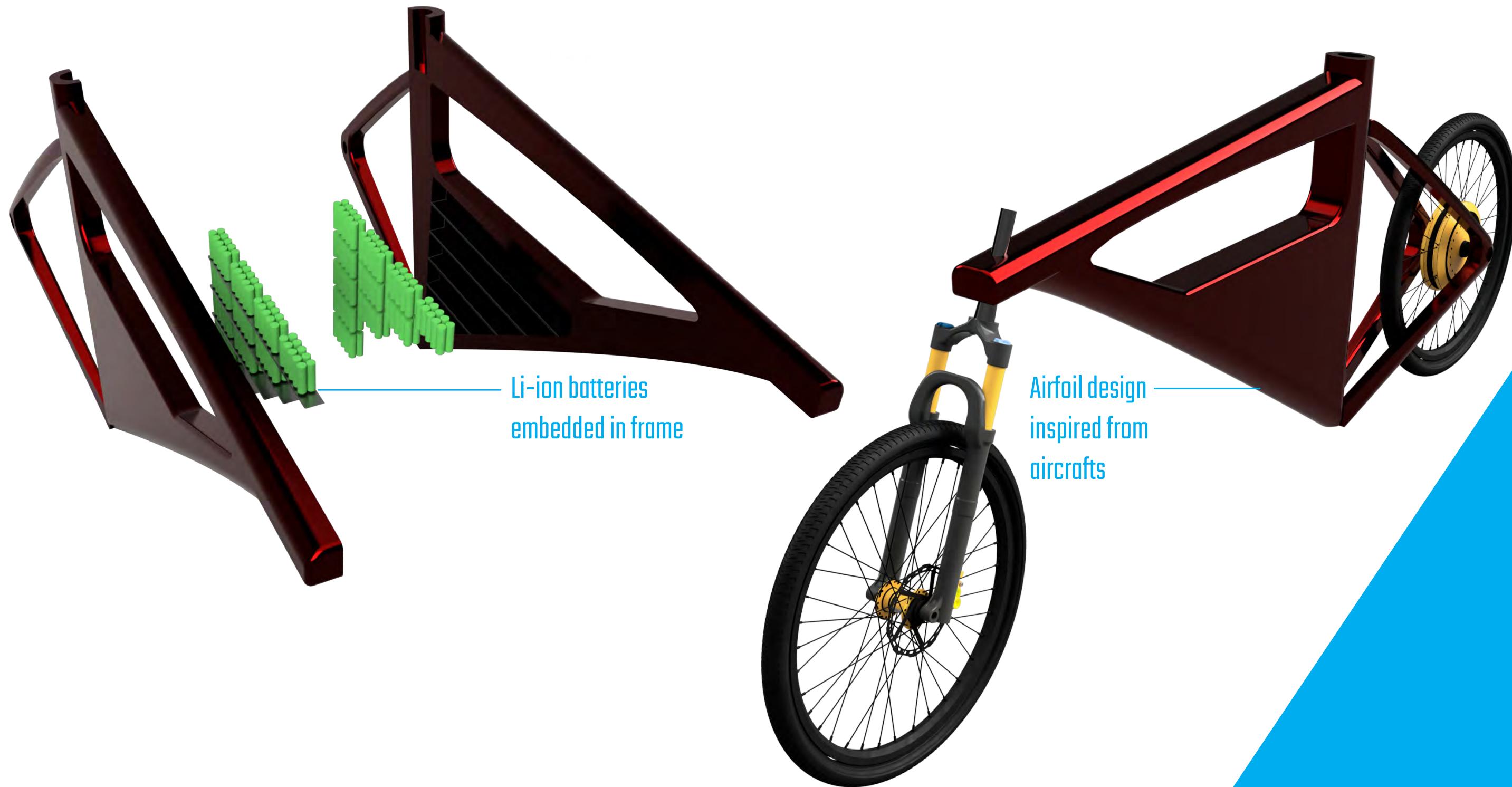


# Inspiration



# Ideation

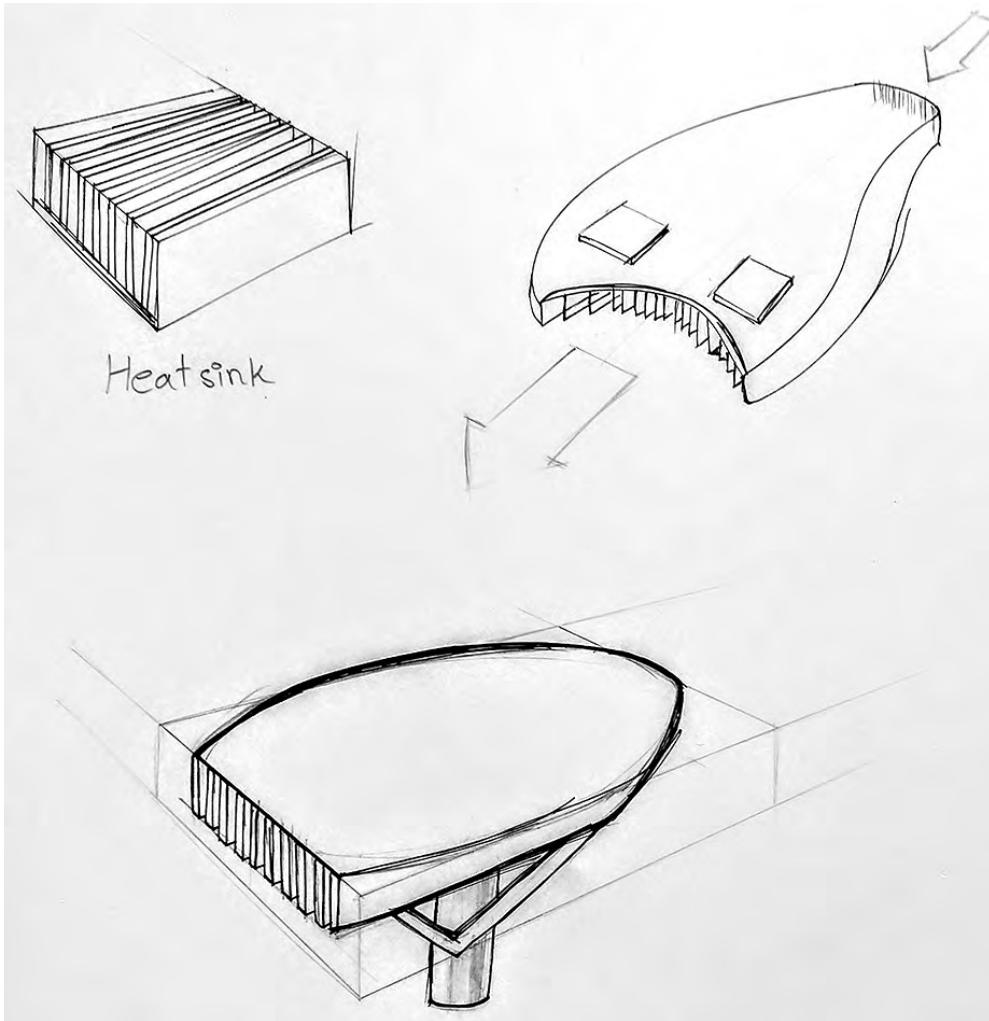




Li-ion batteries  
embedded in frame

Airfoil design  
inspired from  
aircrafts

# Seat Design



## Challenges:

- Soft material that conducts heat
- Weight of heat sink
- Efficiency of TECs

## Technical Specifications:

- 3 peltier tiles connected in series
- Connected to Joule Thief circuit
- Voltage output between 8-12V stepped down to 5V for increased current and suitable for charging phones using USB



Covered by a seat cover

# Seat Design

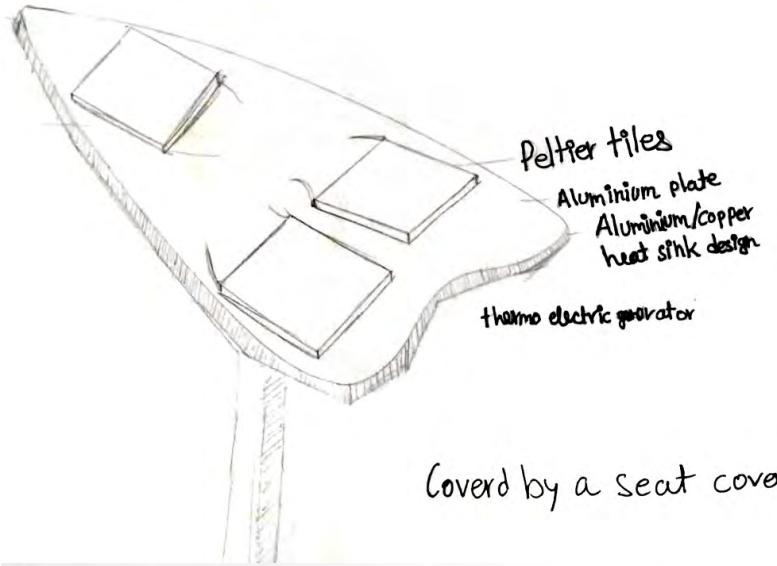


## Challenges:

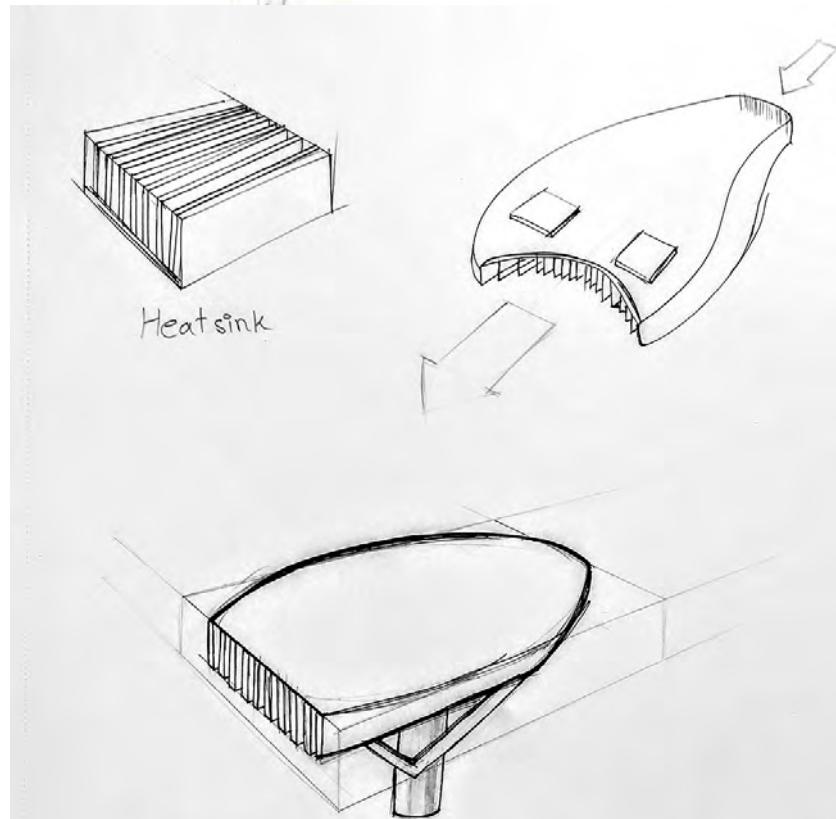
- Soft material that conducts heat
- Weight of heatsink
- Efficiency of TECs

Technical Specifications:

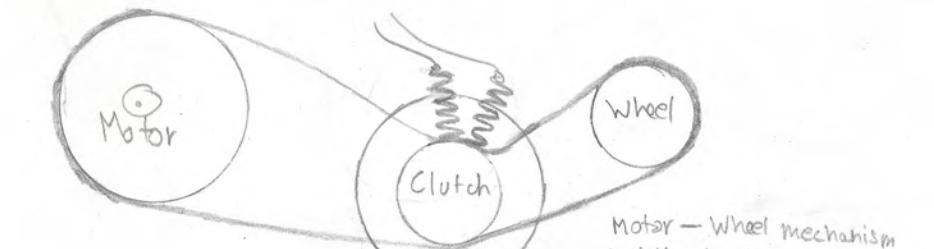
- 3 peltier tiles connected in series
- Connected to Joule Thief circuit
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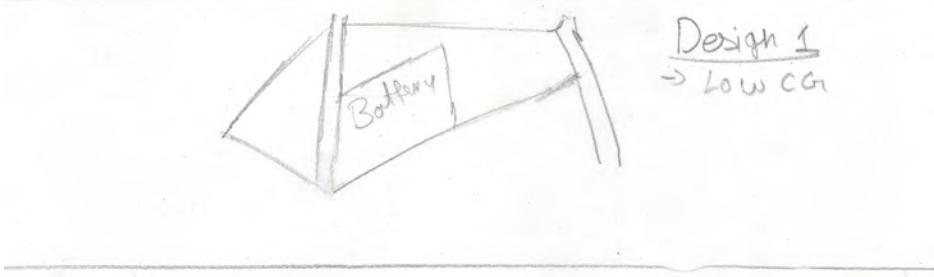
Covered by a seat cover



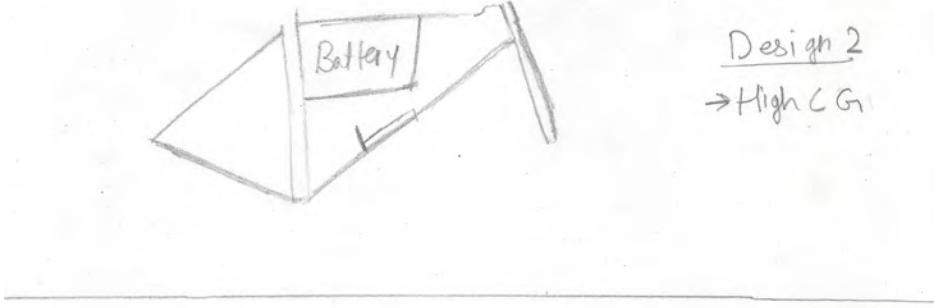
# Development



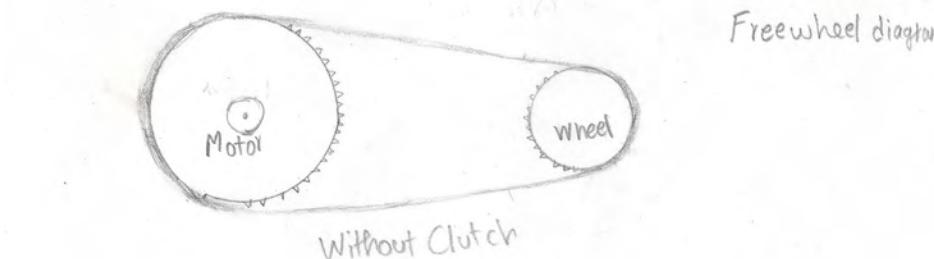
## Motor - Wheel mechanism With clutch



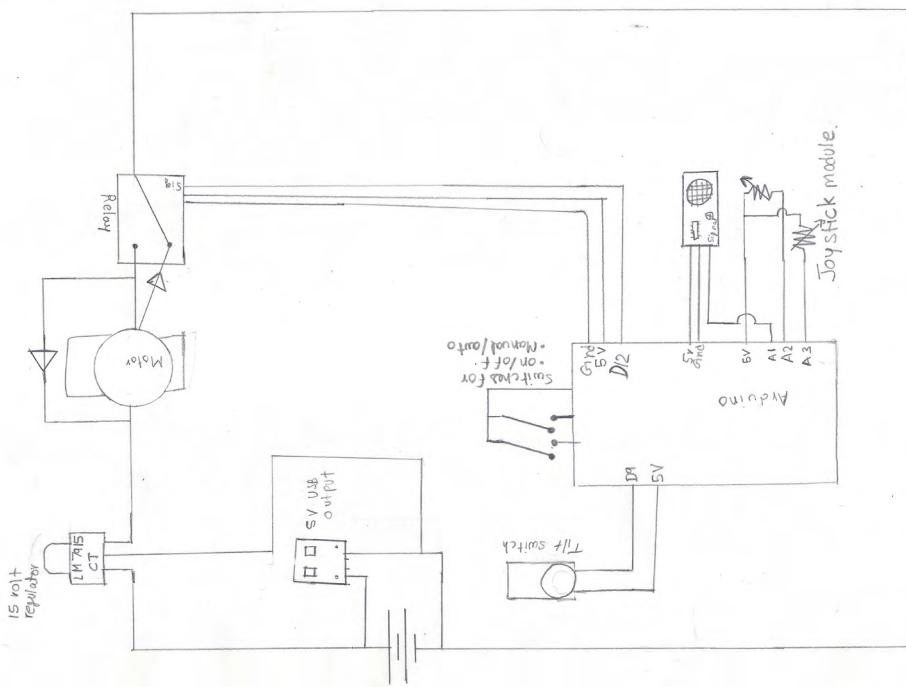
Design 2  
→ High C G



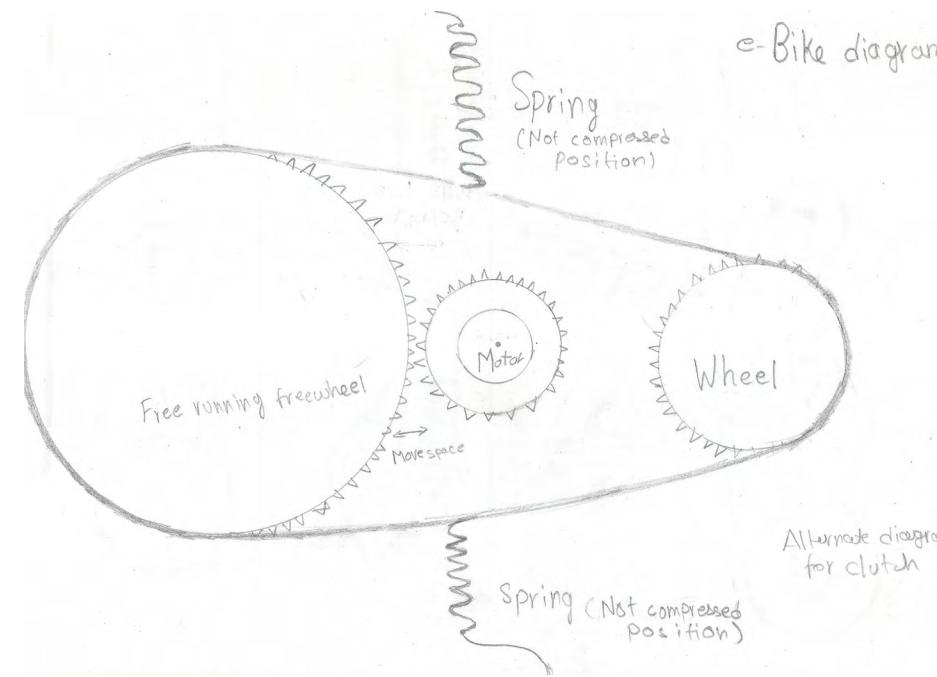
## Freewheel diagram



Without Clutch



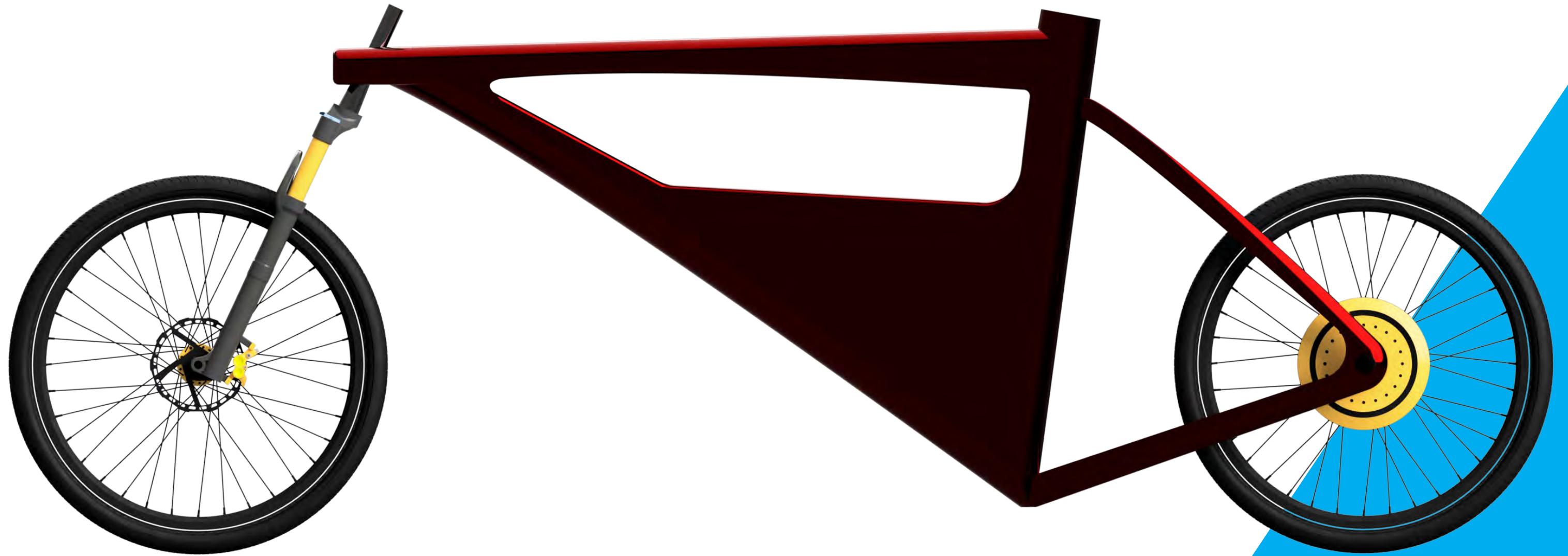
e-Bike diagram

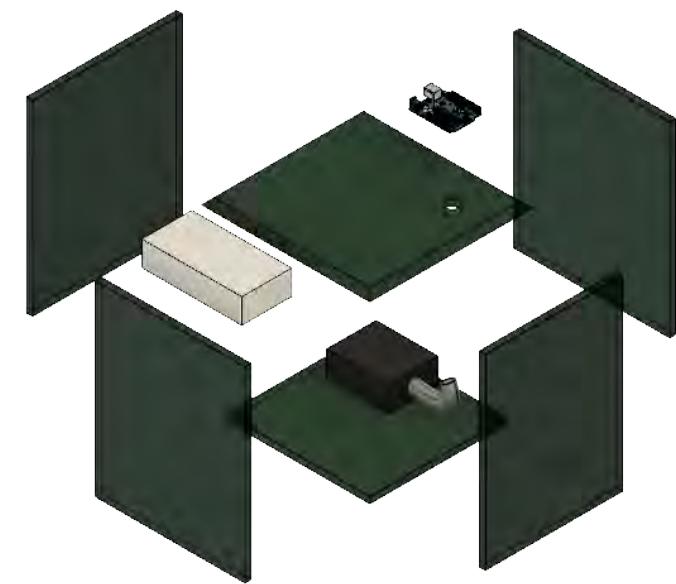
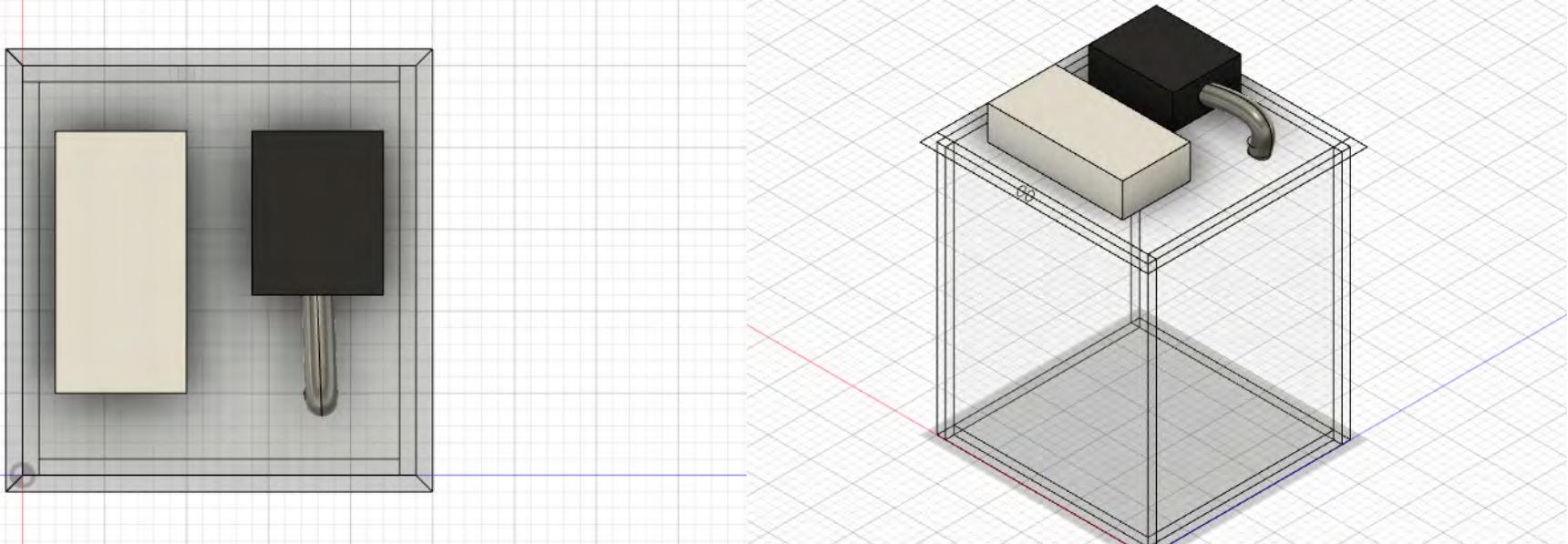


Alternate diag  
for clutch



# VeBike





# Eureka

---

## Automated Watering Assistant



# Why Automate it?



# Existing Products



## IKEA PS FEJÖ Self-watering Planter

This product relieves the user of watering their plants every day by using a mechanism which involves using threads to suck water from the bottom of the pot to the soil because of the lower content of water in the soil.

### Advantages:

Caster wheels make it easy to move

Reasonable cost (\$20)

Made of recyclable material

Water gauge indicates the water level

### Disadvantages:

Not ideal for the outdoor environment

No effective way to drain excess water



## GrowOya

This product is a terracotta pot that can be buried into the soil and filled with water about once a week. The water inside slowly seeps out through the walls to water the plants at the roots.

### Advantages:

Saves water and time

Reduces weed growth

Plants get how much water they need

Material and development process is not hazardous to the environment

### Disadvantages:

Expensive (\$25 for 1 small product which is sufficient for 2 feet diameter)

Difficult to install

Breaks at temperatures below zero if left in the soil



## Rainbird Drip-Irrigation System

This product controls water flow to a set of plants through a pipe laid across the area that has to be watered. This method allows water to seep into the soil, providing sub-surface watering.

### Advantages:

Saves water compared to usual watering

Better growth of plants

Does not require digging

One time set-up

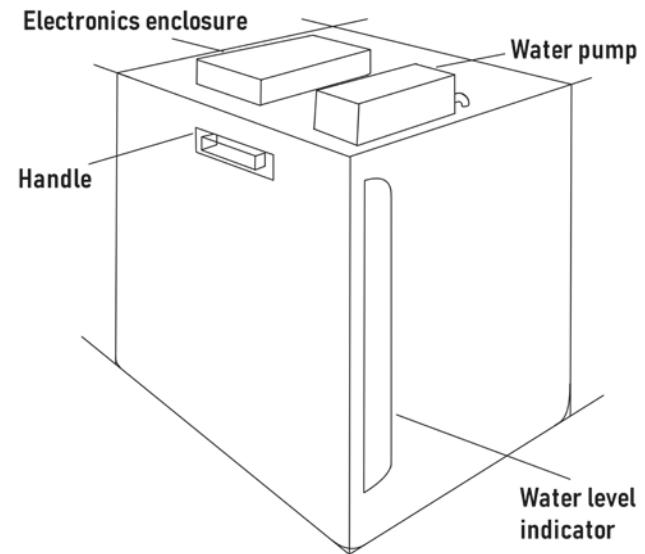
### Disadvantages:

Requires a constant pressurized water supply

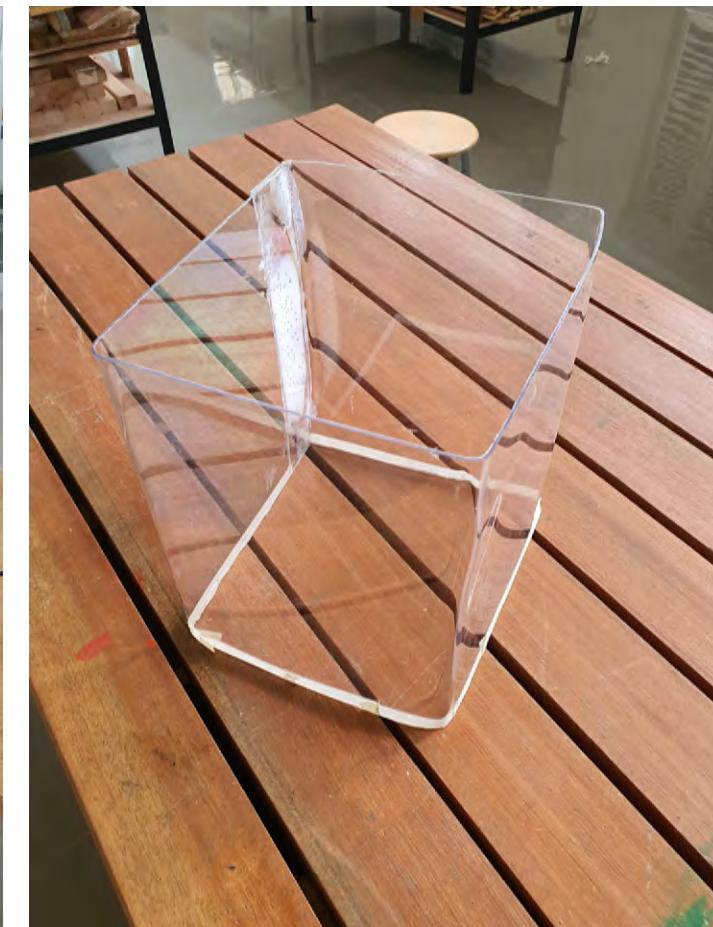
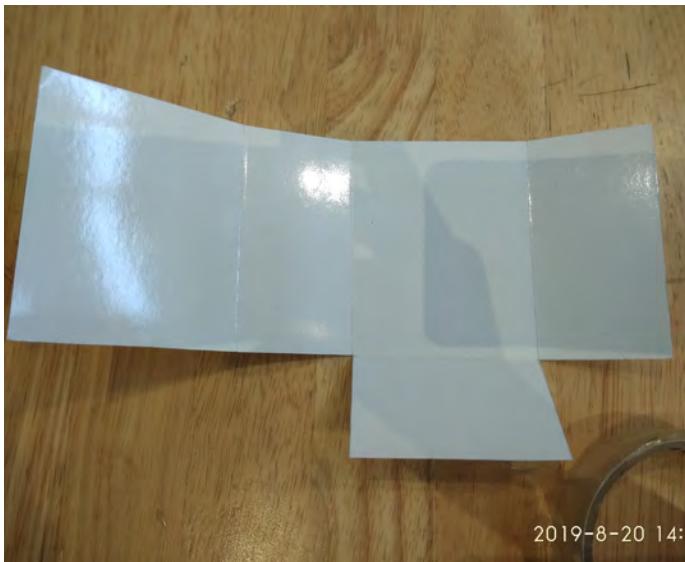
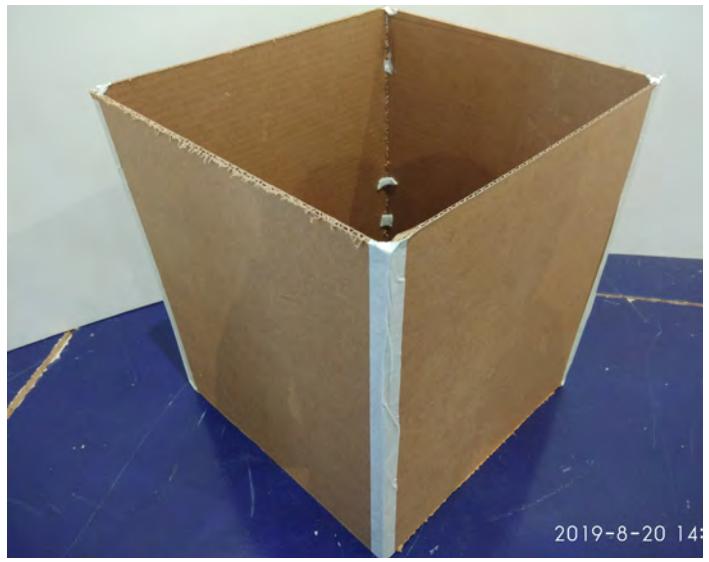
Expensive (\$130 for an area of up to 75 square feet)

User set watering frequency, not based on soil humidity

# Sketch Modeling



**Sketch Evolution page goes here**

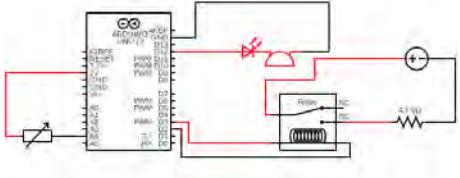


# Material Exploration



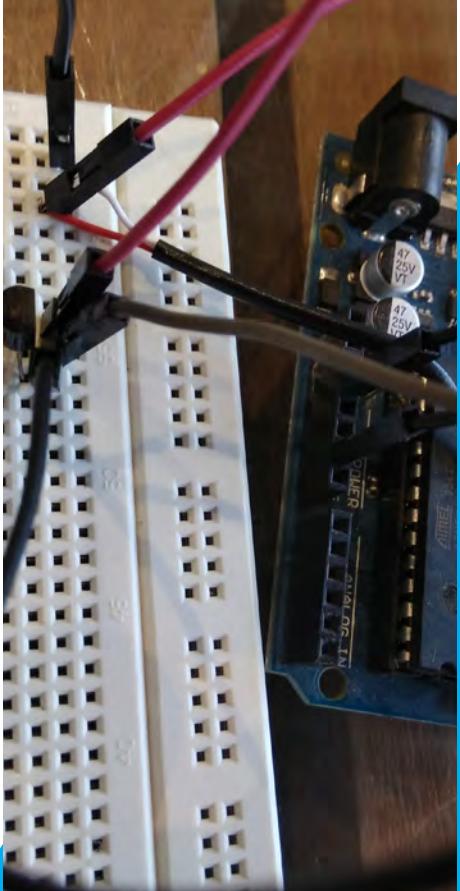
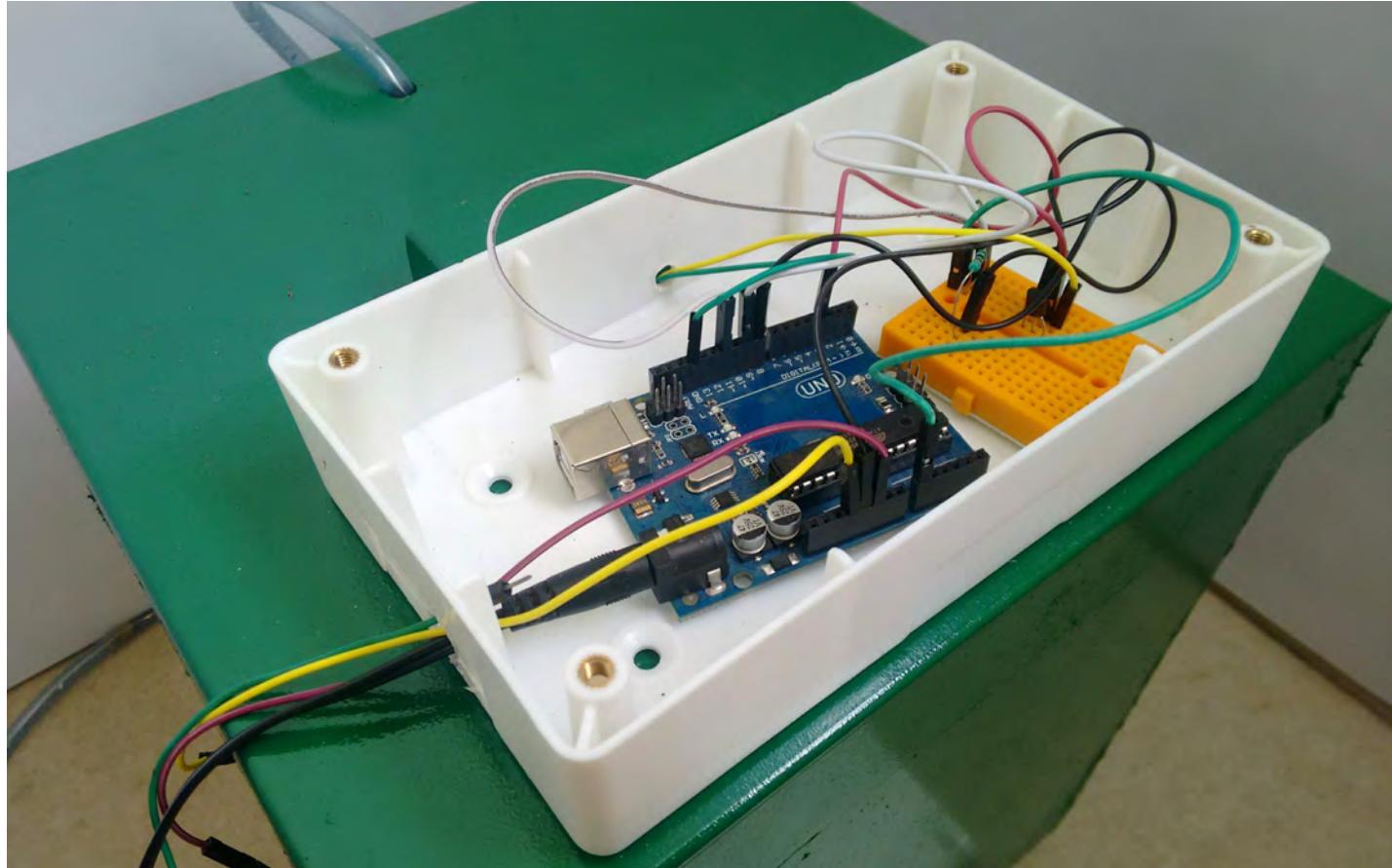
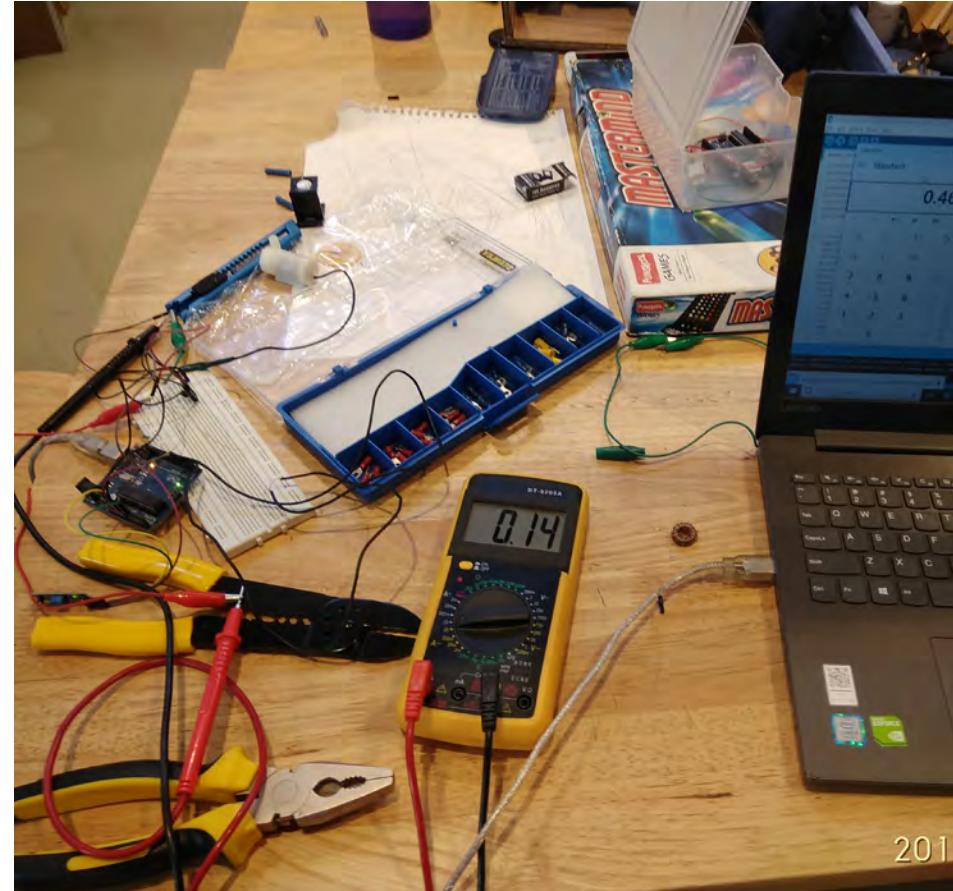
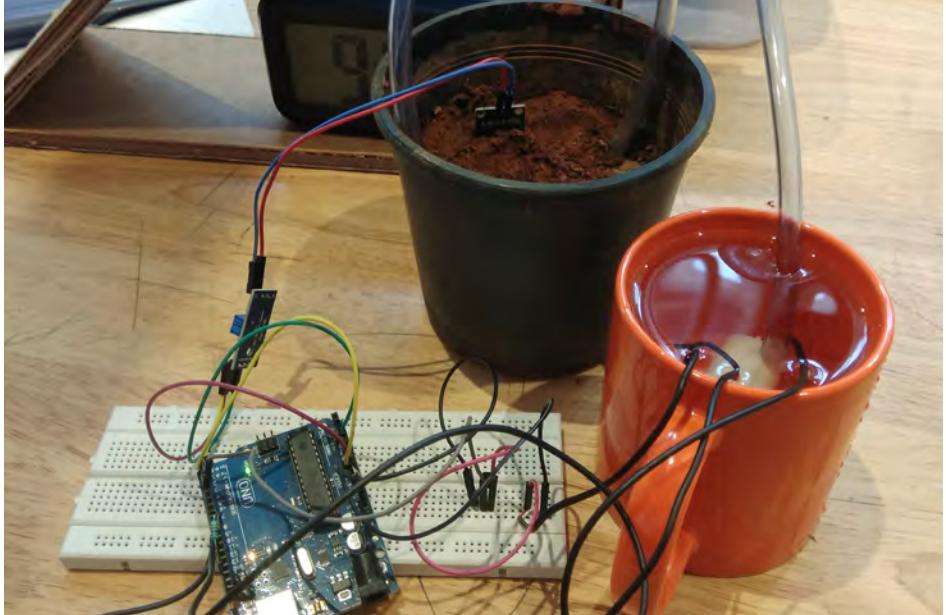


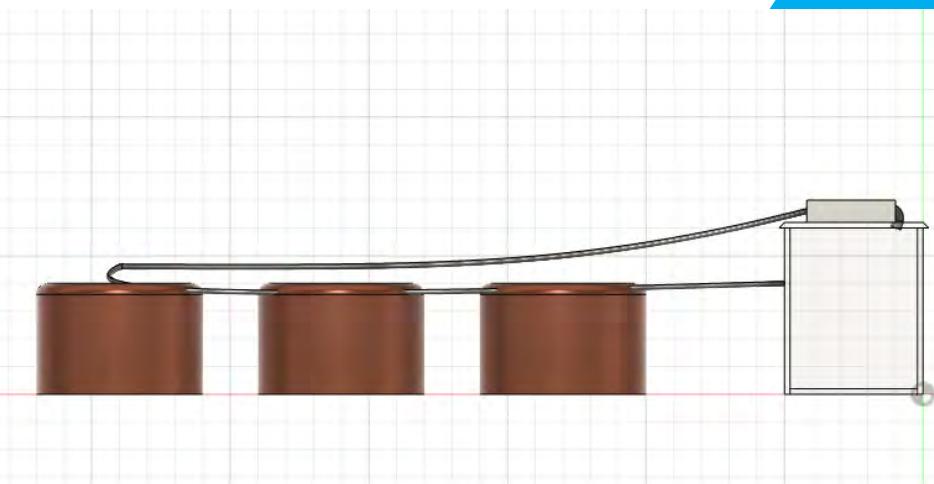
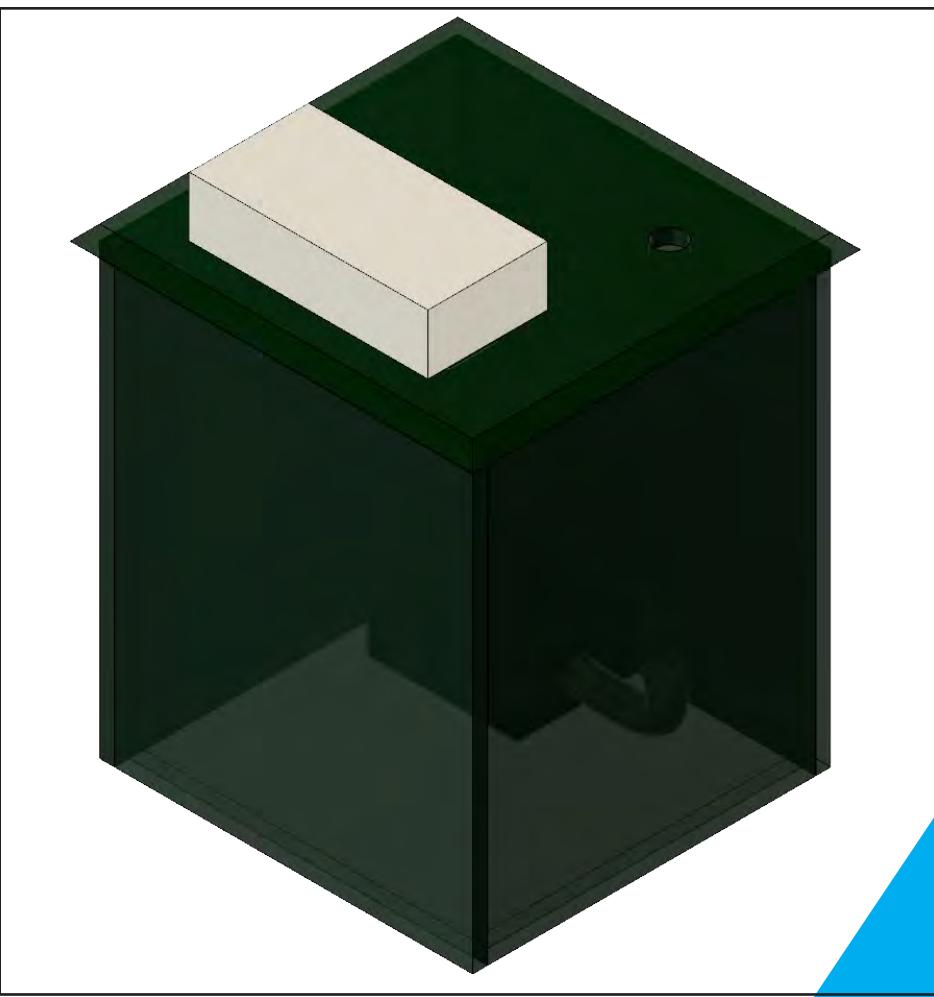
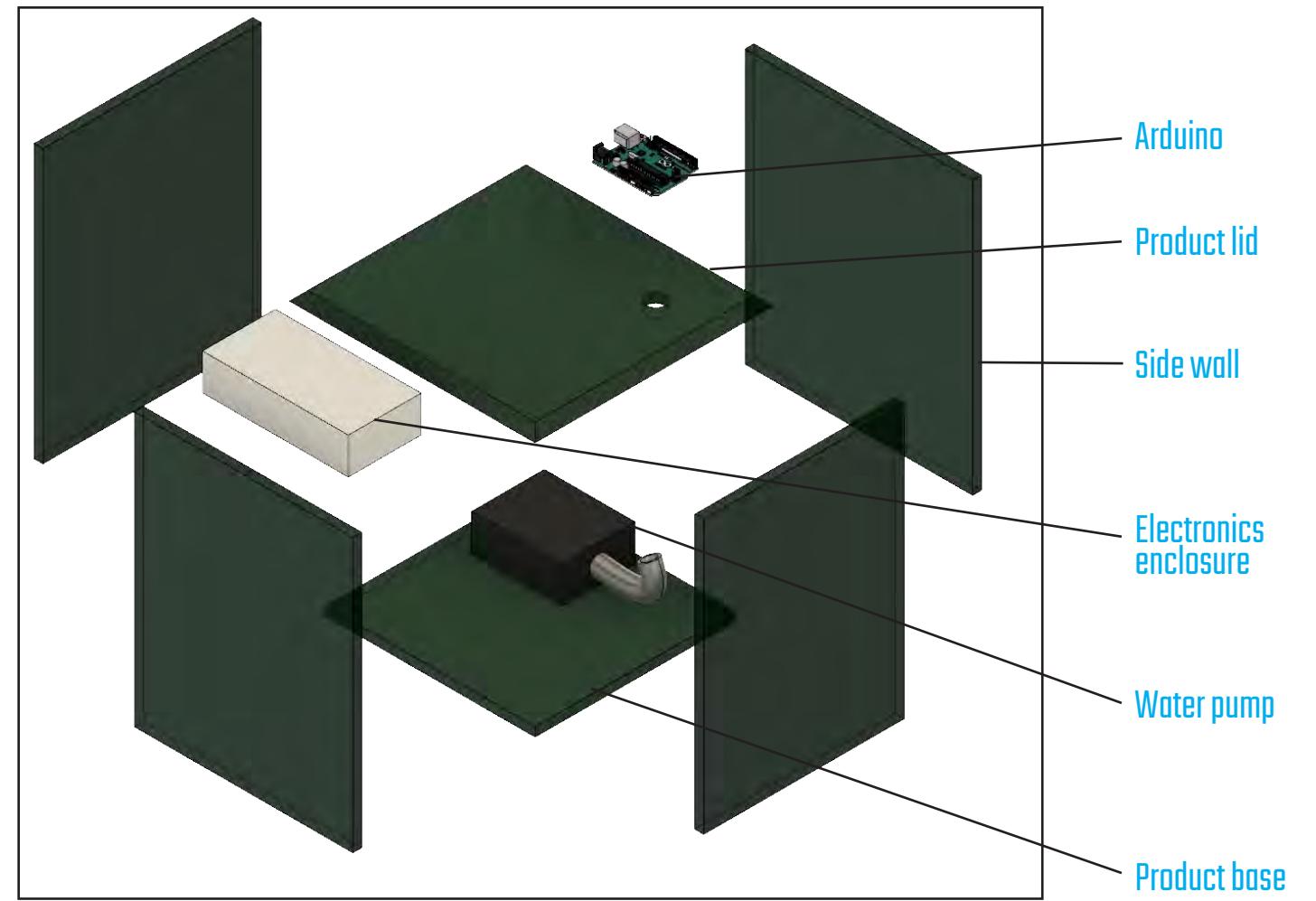
# Electronics

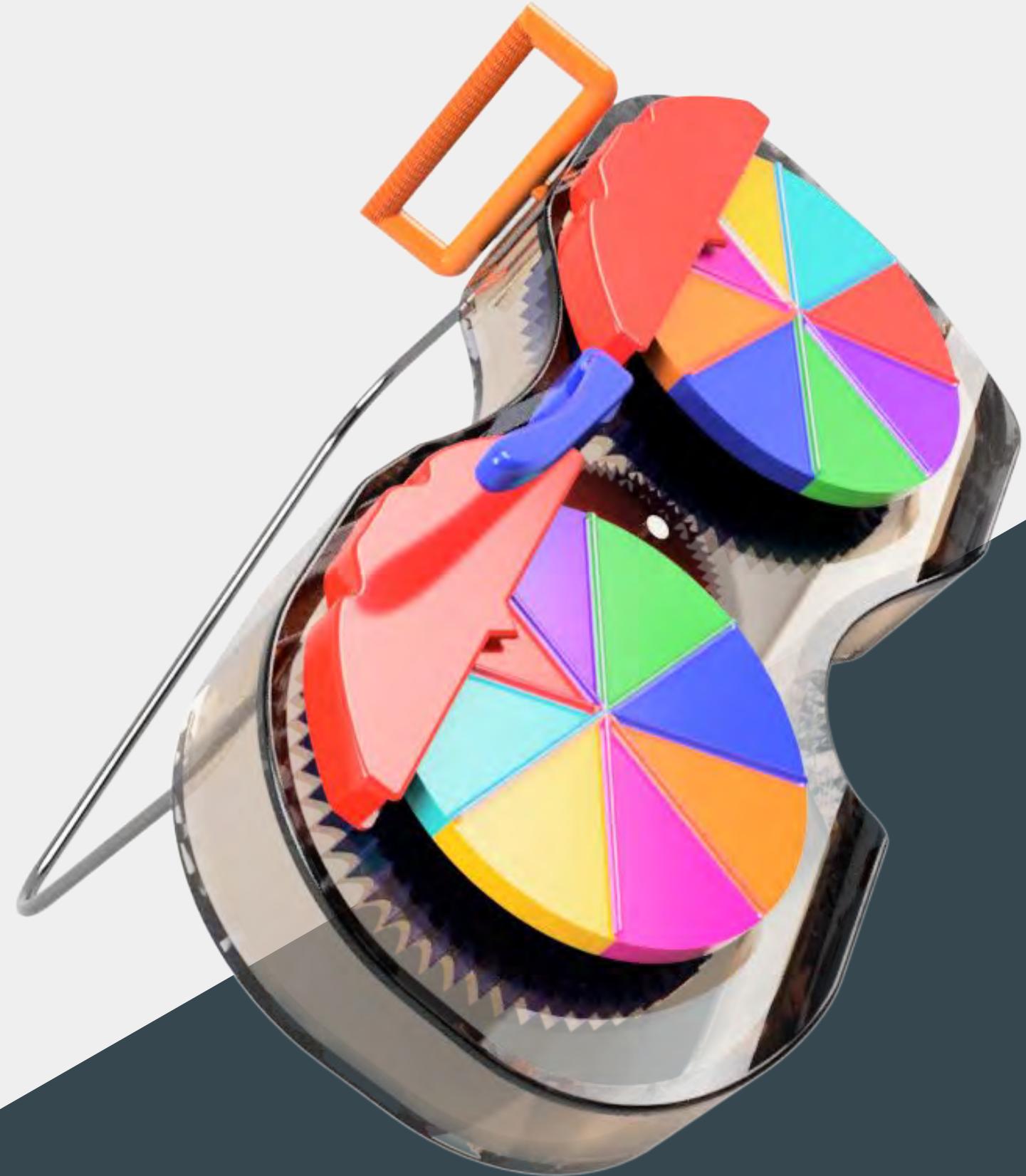


sensor sketch | Arduino 1.0.9 (Windows Store 1.8.21.0)  
File Edit Sketch Tools Help  
COM9  
sensor\_sketch  
void loop() {  
 temp = dht.readTemperature();  
 Serial.print(temp);  
 Serial.print(" ");  
 soil = analogRead(A0);  
 Serial.println(soil);  
 water = digitalRead(9);  
 Serial.println(water);  
 delay(1000);  
 if (water == 0) { //Warn user if tank is empty  
 digitalWrite(11,HIGH); //Switch on LED  
 digitalWrite(12,HIGH); //Switch on buzzer  
 delay(1000); //Buzz for 1 second  
 digitalWrite(12,LOW); //Switch off buzzer  
 enabled = 0; //Disable water pump  
 }  
 if (soil < 500) { //If soil humidity is low  
 if (enabled == 1){ //If water is in the tank  
 digitalWrite(12,HIGH); //Switch on water pump  
 delay(2000); //Keep pump on for 2 seconds  
 digitalWrite(3,LOW); //Switch off water pump  
 }  
 }  
}

Done uploading  
Sketch uses 5138 bytes (1%) of program storage space. Maximum is 32256 bytes.  
Global variables use 220 bytes (1%) of dynamic memory, leaving 102 bytes free.







# DISCOY

A toy for children aged between three and six  
By Vikram Mishra



# ABOUT THE PROJECT

The intent of the project is to design a toy that is inspired from an object that does not commonly interact with children.

**TARGET AUDIENCE:  
PRE-SCHOOL CHILDREN**

# INSPIRATION

The project is inspired from disk brakes that are found on cars or motorcycles. These generally have no direct interactions with children.



# DESIGN GOALS



## EDUCATIONAL

An academic learning opportunity



## IMPROVE MOTOR SKILLS

Children encouraged to use their hands



## NEW TO THE MARKET

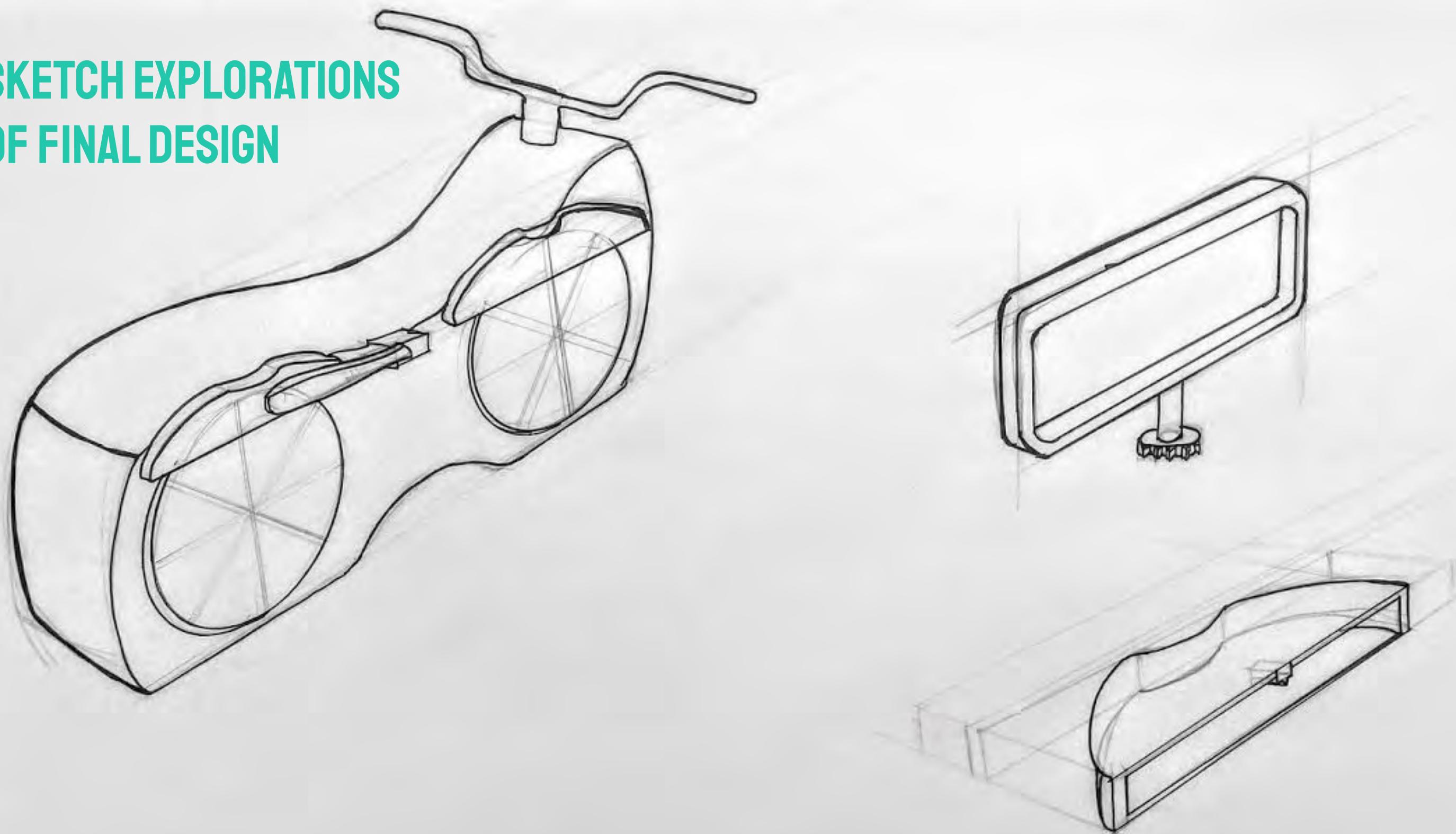
A toy that does not conceptually exist in the market currently



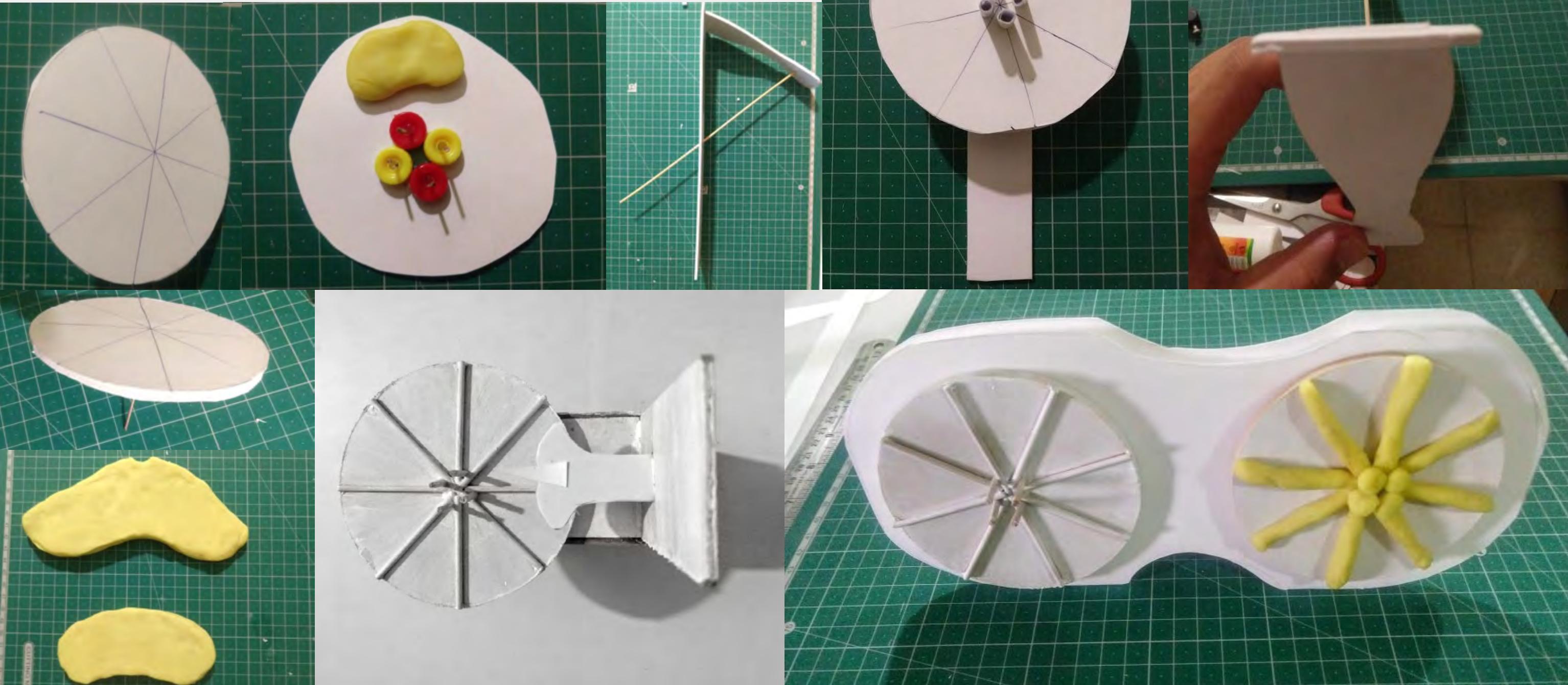
## APPEALING TO AUDIENCE

Colorful, interactive sounds, and competitively priced

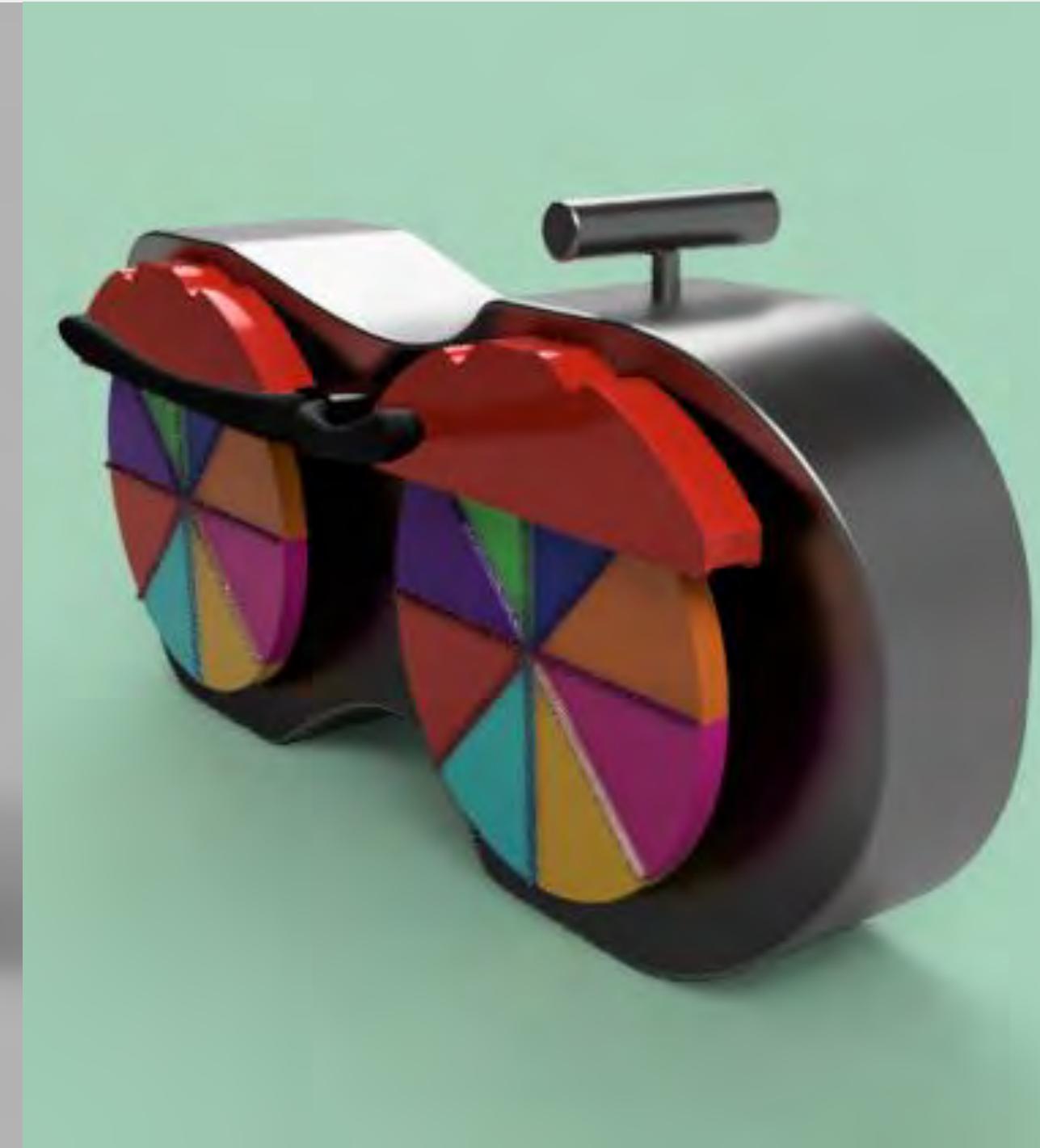
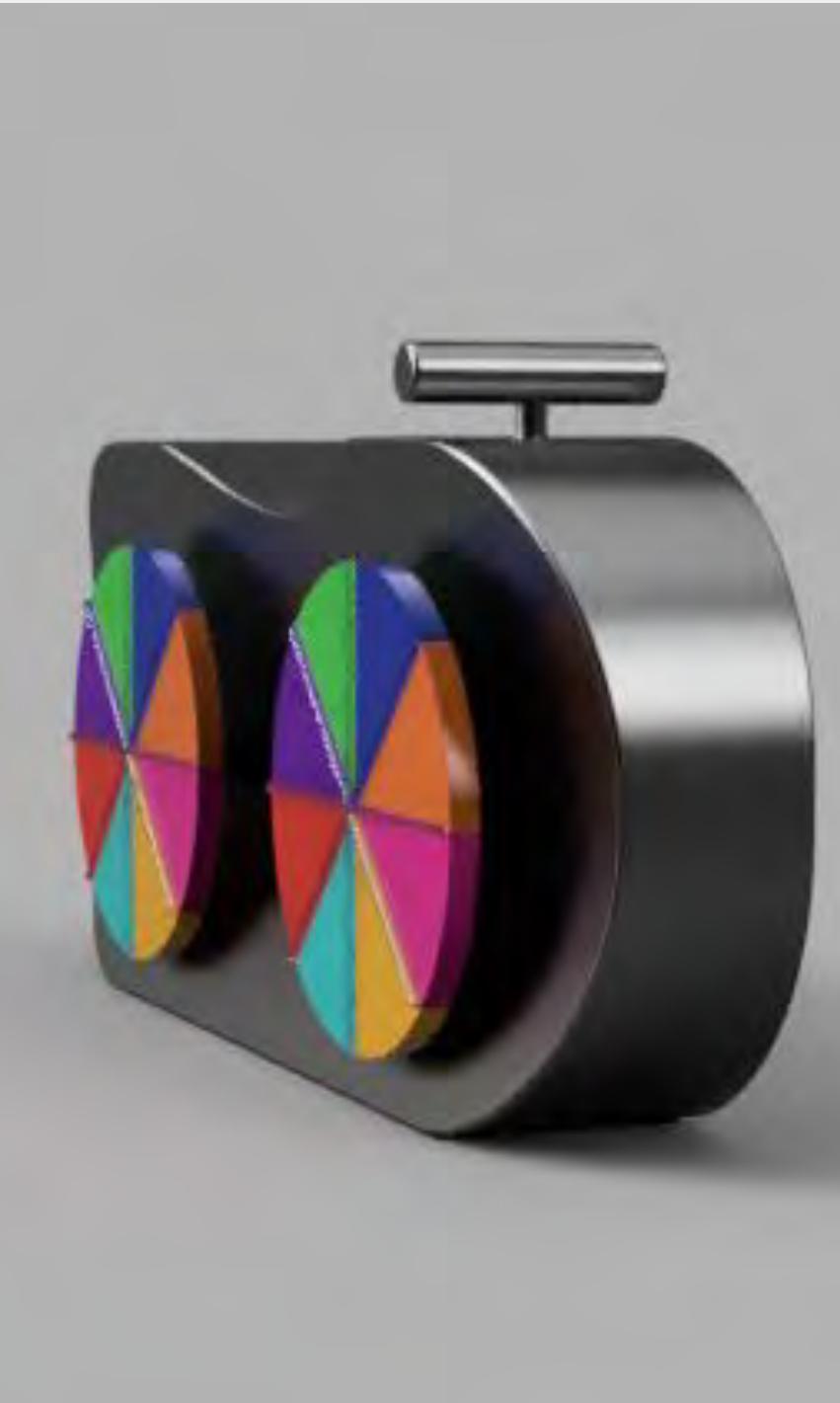
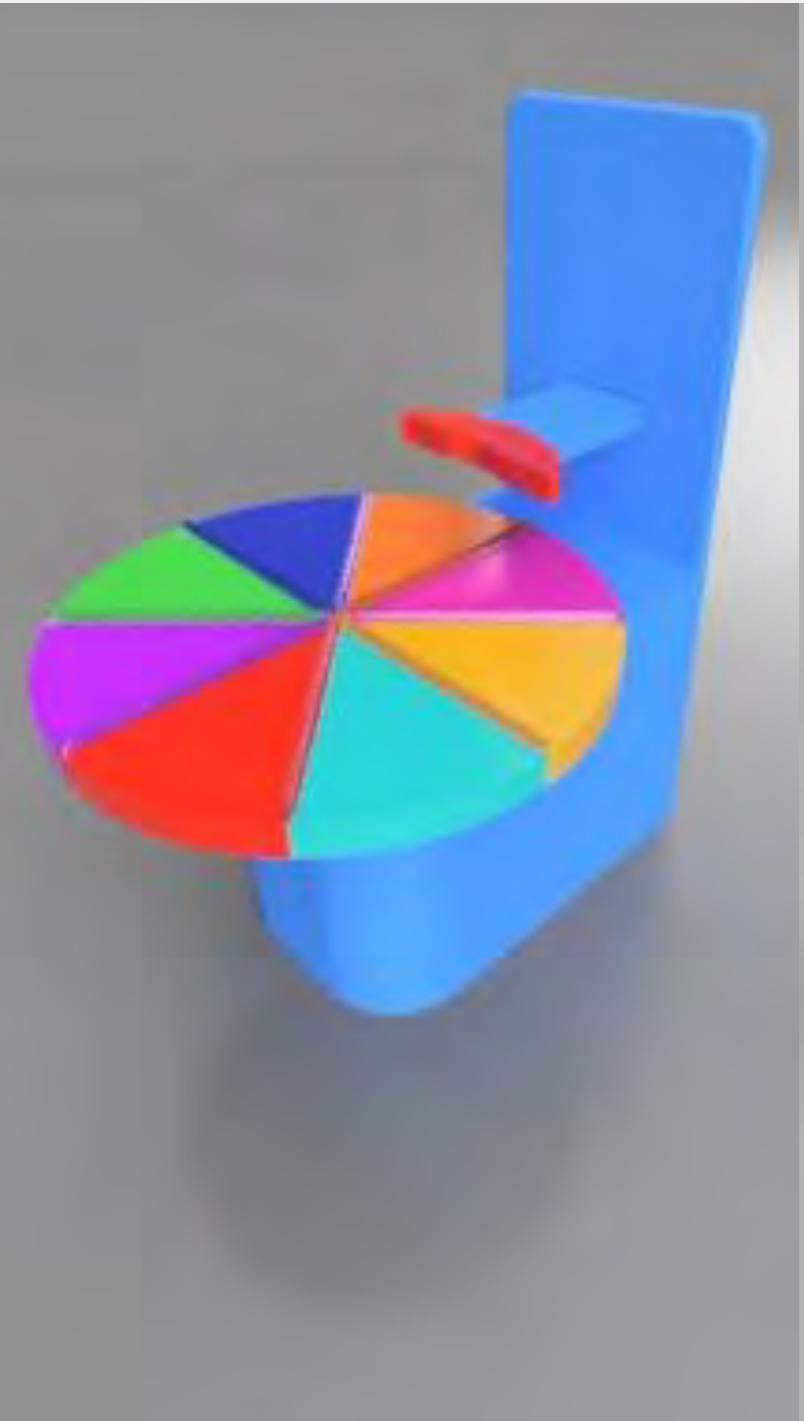
# SKETCH EXPLORATIONS OF FINAL DESIGN



# PROTOTYPE EVOLUTION



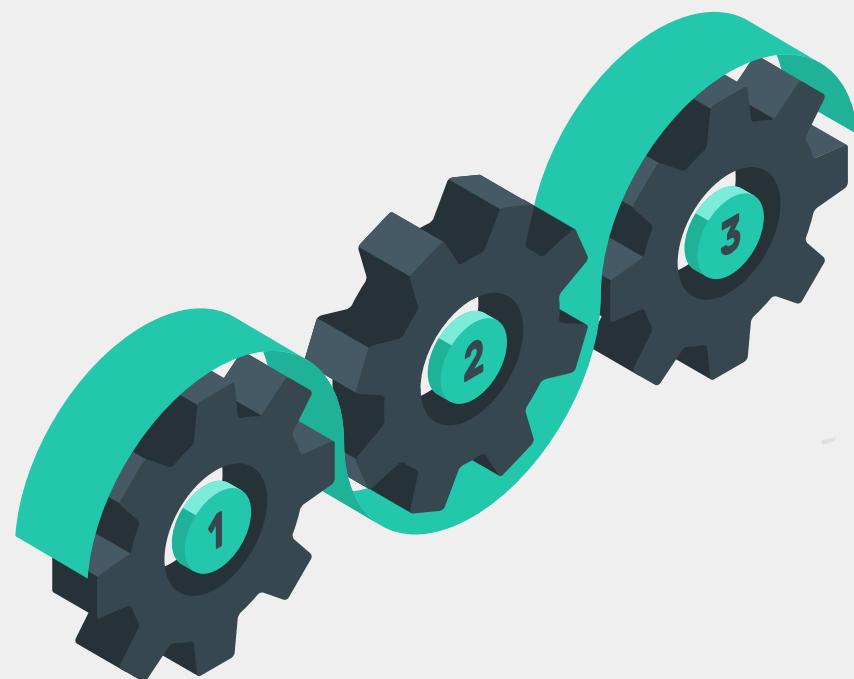
# EVOLUTION



# EVOLUTION



# INTERACTIONS



## MECHANISMS

Child turns handle bar and correlates it to spinning of the wheel

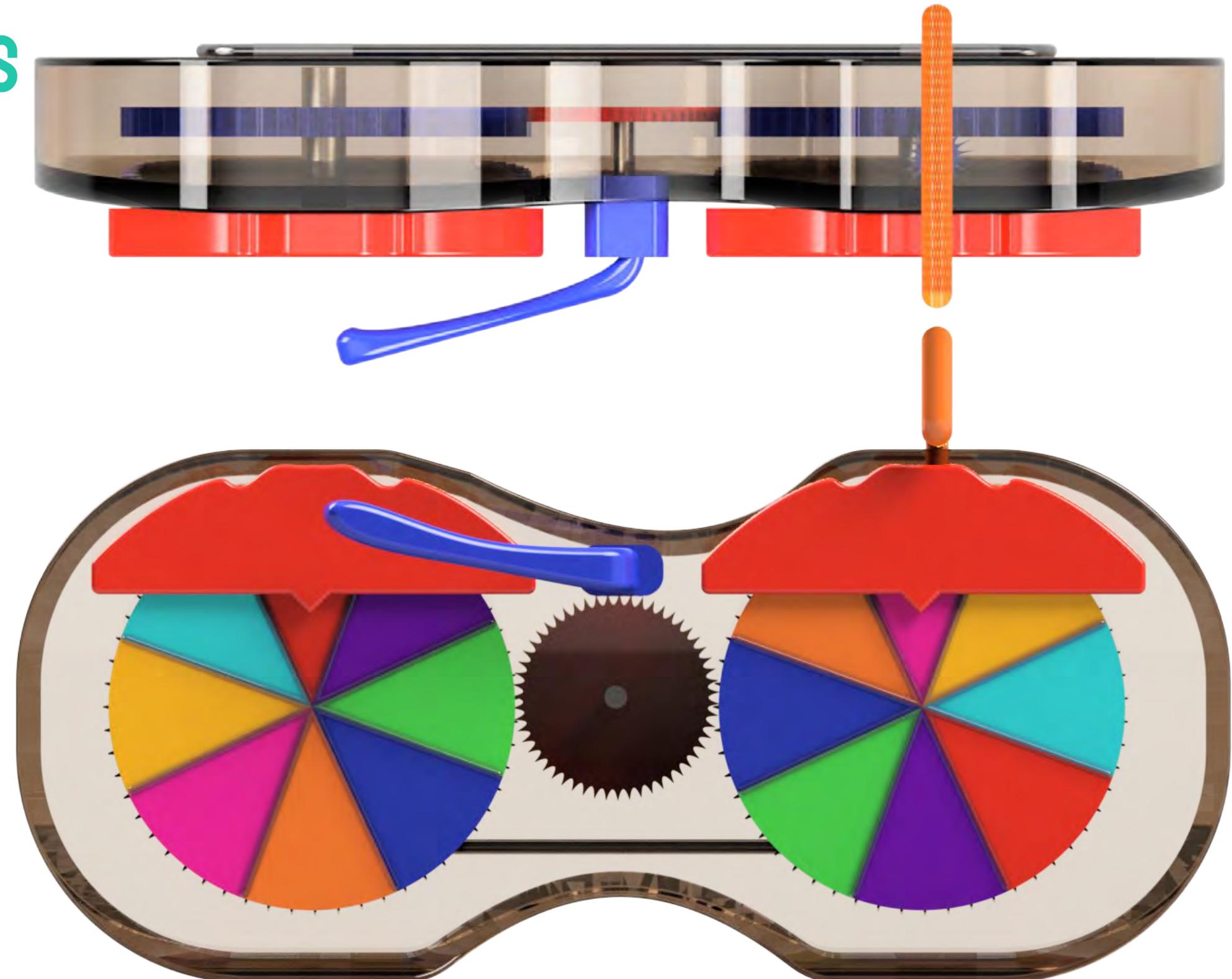
## SOUND

Intriguing clicking sound while braking is fascinating for the child

## VISUAL

The spinning wheel is colorful to catch the attention of the child playing

# ORTHOGRAPHICS

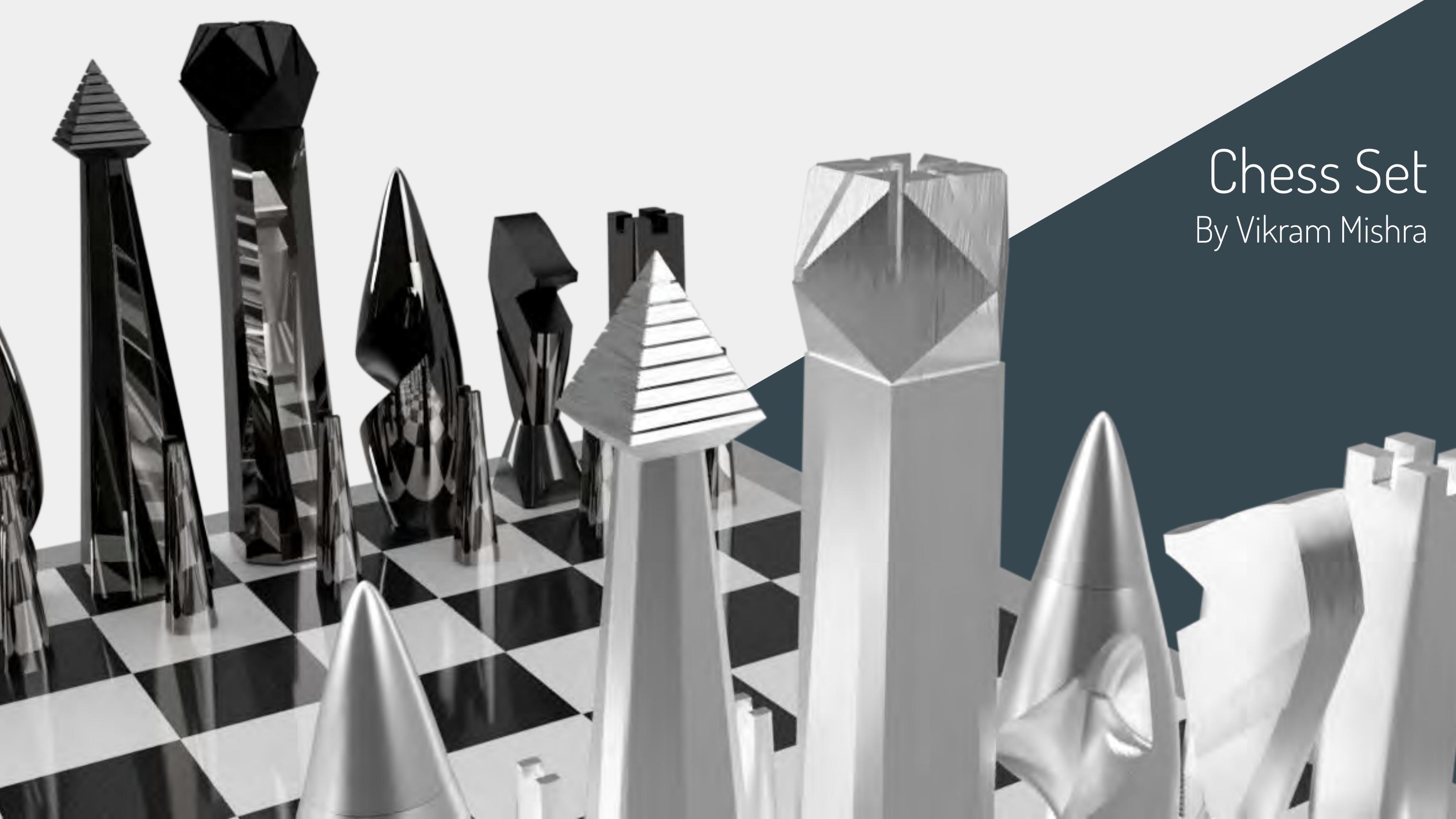


## IN CONTEXT SHOT



# POINT OF PLAY





# Chess Set

By Vikram Mishra

# POSSIBILITIES MATRIX

## WHO

- Automobile Companies Offices & Showrooms
- Car Enthusiasts who use Custom Made Parts
- Automobile Collectors

## WHAT

- Showpiece
- Gift to Guests
- Collectible

## WHERE

- In a Cabinet
- On a Glossy Table
- With a Car Collection

## WHEN

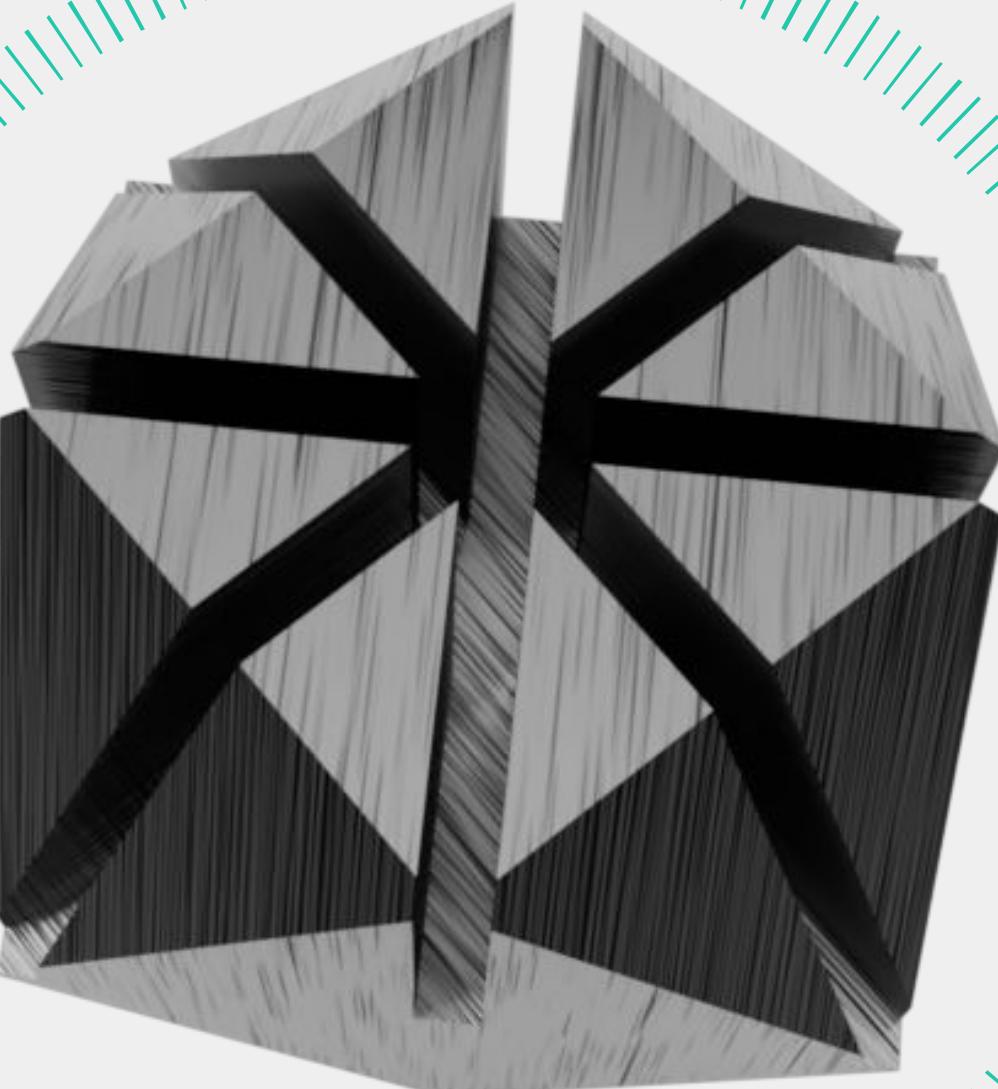
- Used Occasionally when Meeting a Chess Player

## WHY

- A Style Statement and Expression of Enthusiasm for Automobiles
- Creates Ambiance

## HOW

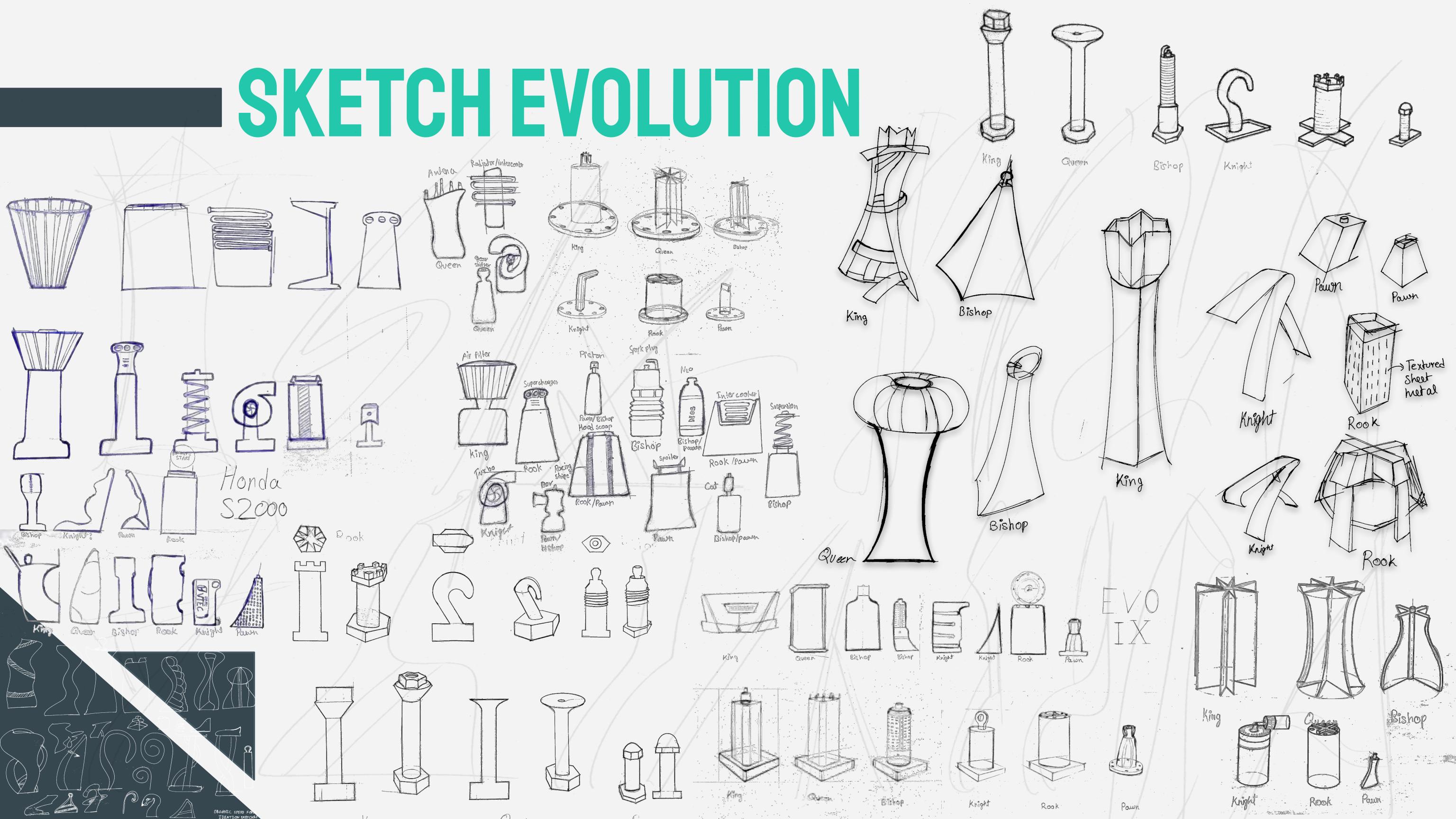
- Made of Finely Cast and Machined Stainless Steel



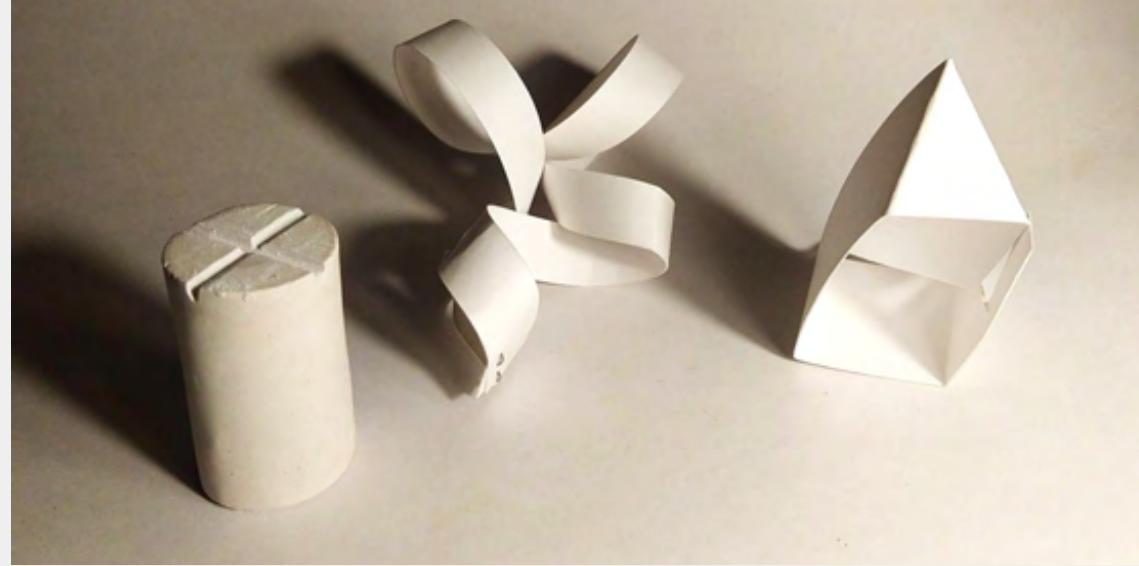
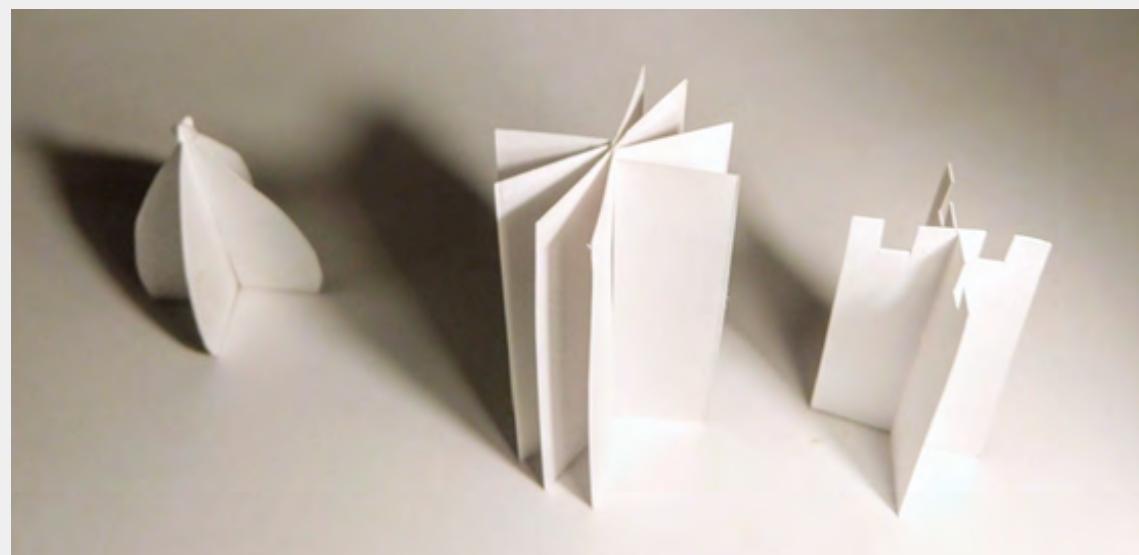
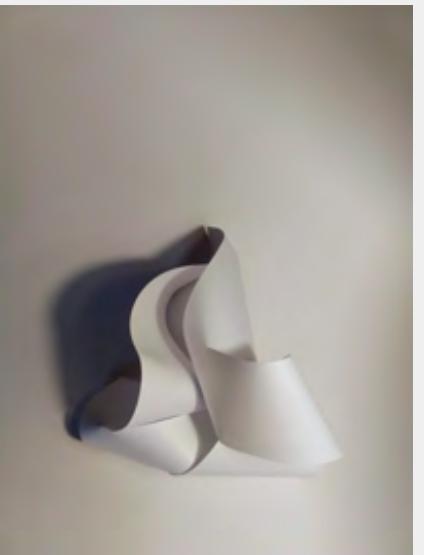
# AESTHETIC

Made from finely machined metal pieces, this chess set will fit in corporate offices of automotive companies and in car showrooms and dealerships, as well as in garages with collectable cars and as a showpiece in cabinets in houses of automobile enthusiasts who enjoy customizing vehicles, especially with custom made parts

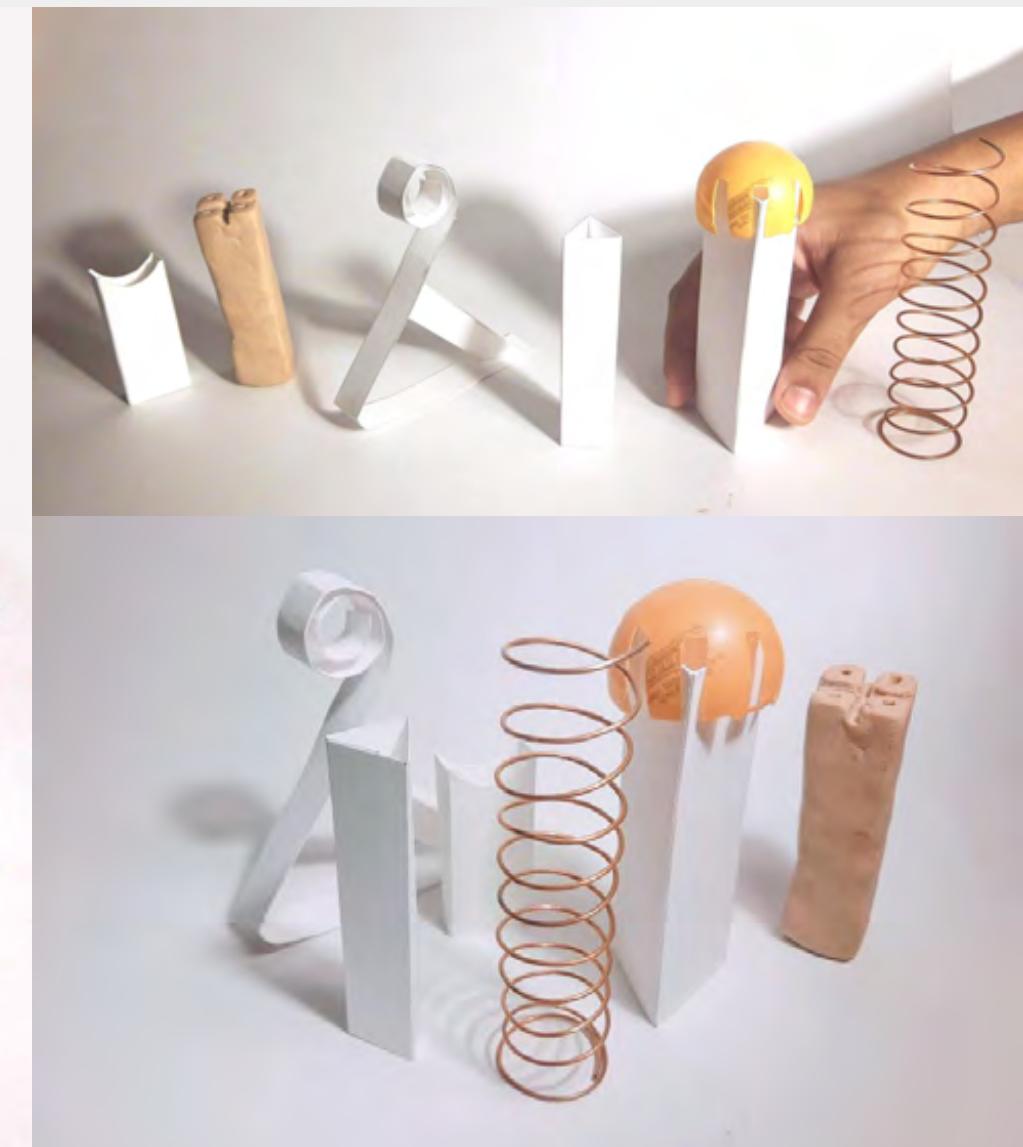
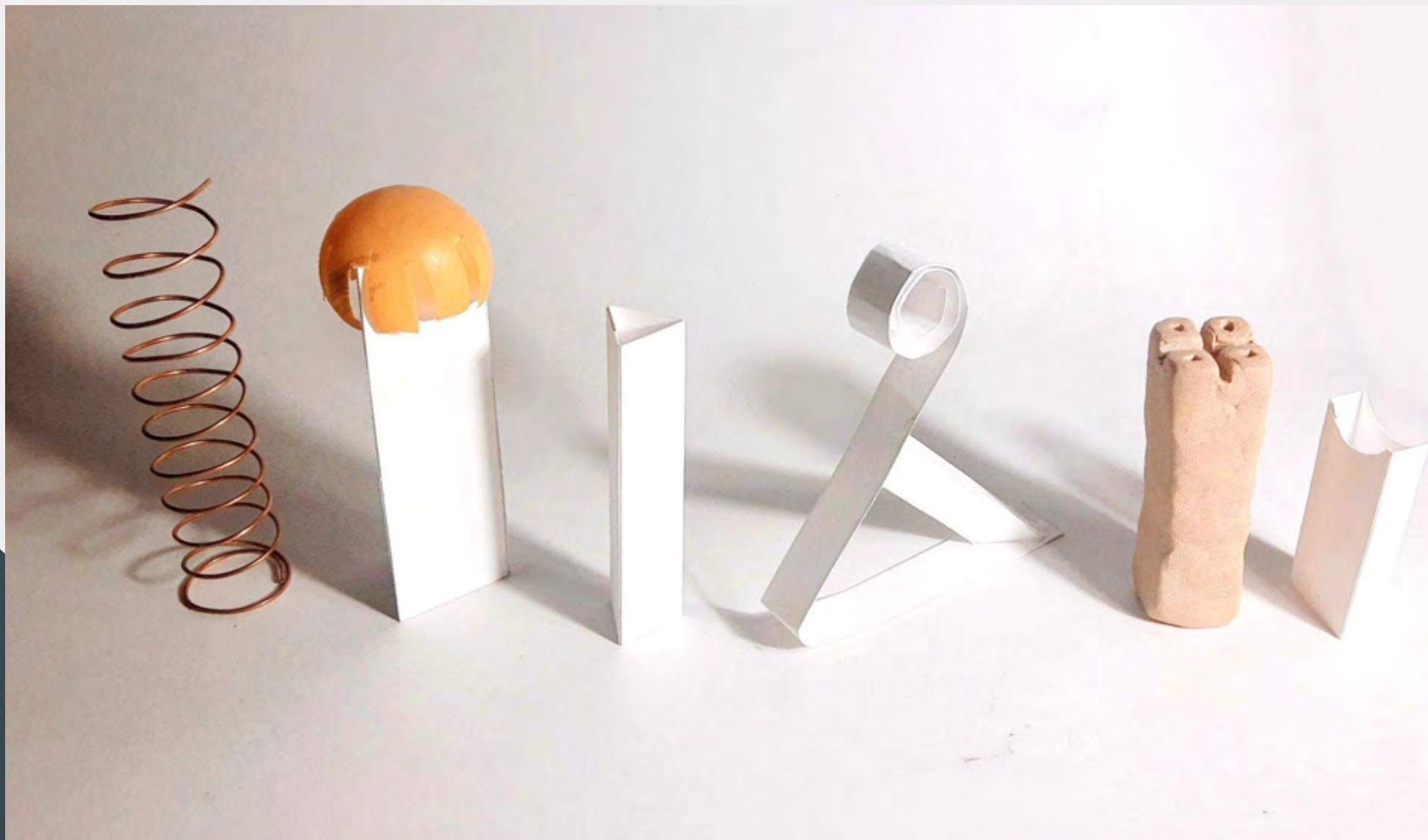
# SKETCH EVOLUTION



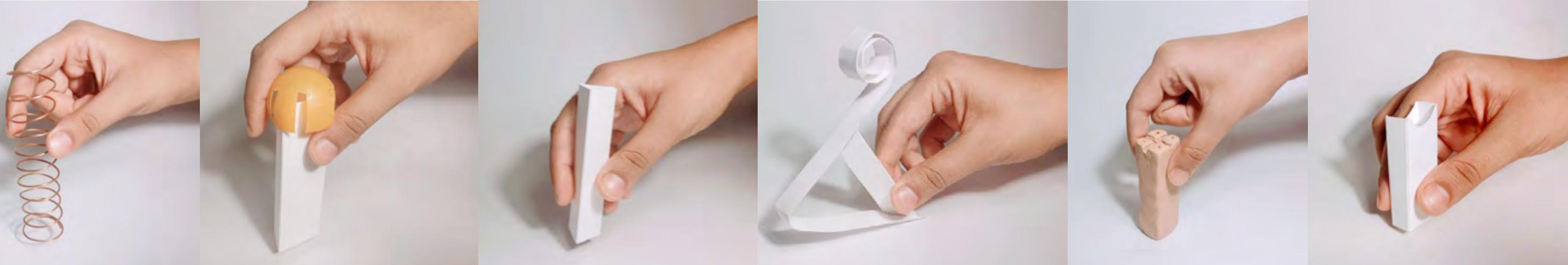
# 3D SKETCHES



# FINAL PHYSICAL PROTOTYPES



# HUMAN FACTORS EVALUATION



## IDENTIFICATION

- The pieces were identifiable primarily through the hierarchy
- The bishop doesn't have any features of the conventional bishop, it is difficult to identify

## GRASPING

- The pieces were grasped without any hesitation and without much thought
- The rook and Queen were grasped from the top while the rest were grasped from the middle or the bottom

## CONCLUSIONS

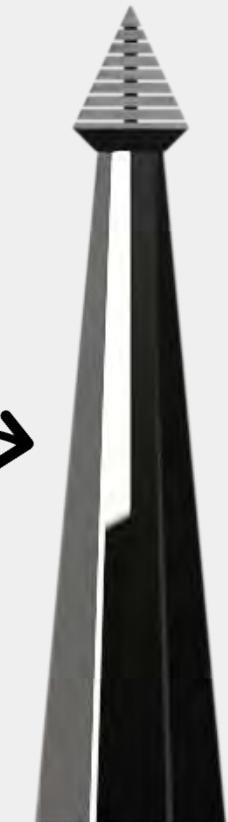
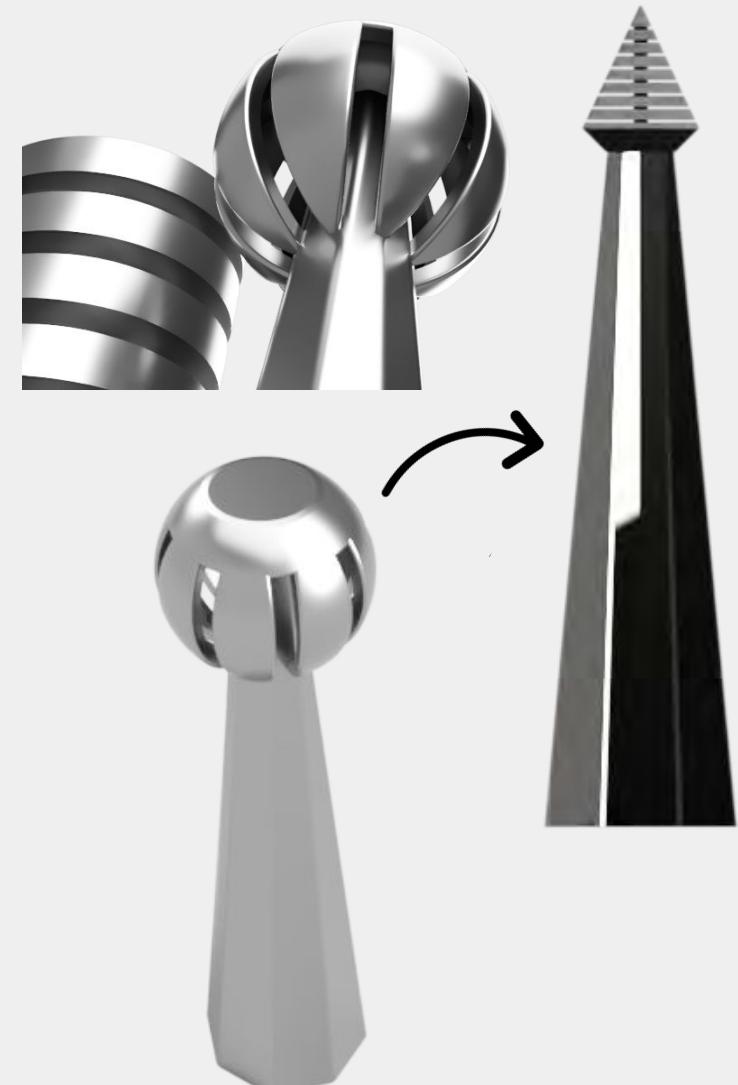
- The pieces could be more successful at being identifiable using features other than the hierarchy of size
- The design of the pieces does not interfere with grasping and picking them up

# DESIGN CHANGES



King incorporates idea of a finely machined custom top attached to a casted base

Changes from a more functional design to an aesthetic one



Top of the queen becomes easier to manufacture in a CNC machine

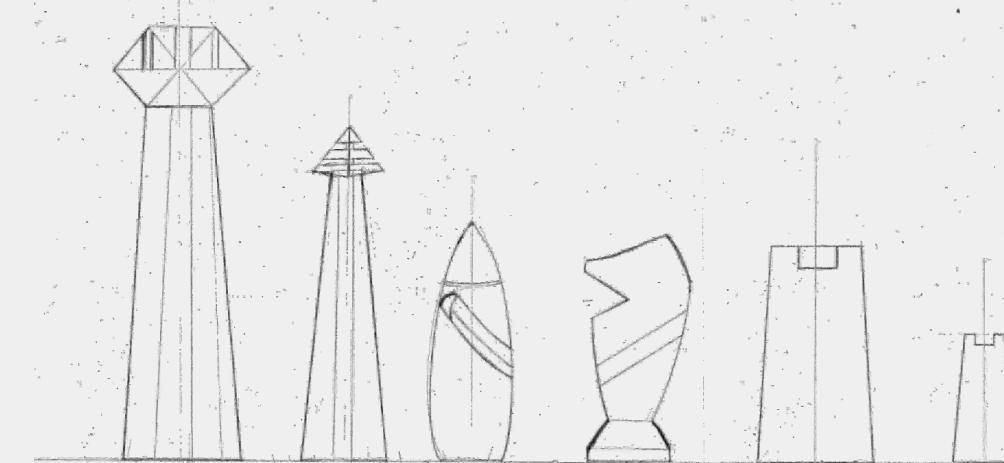
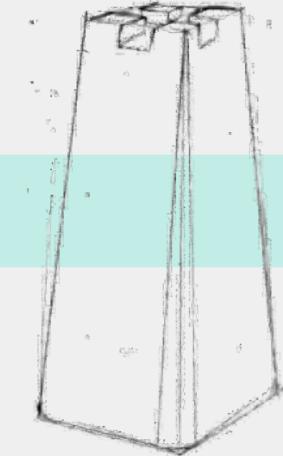
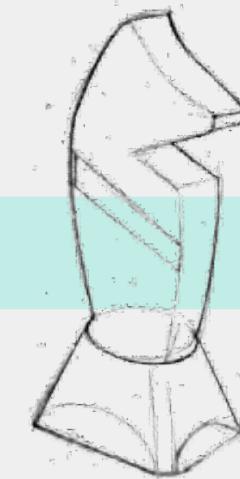
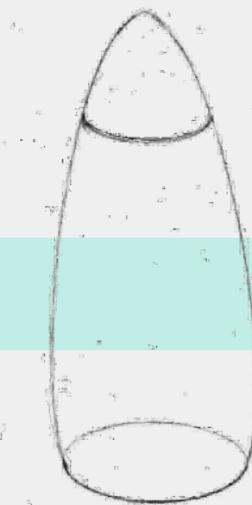
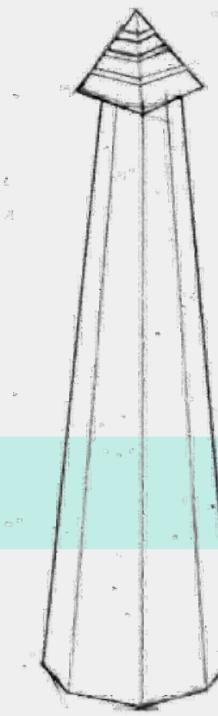
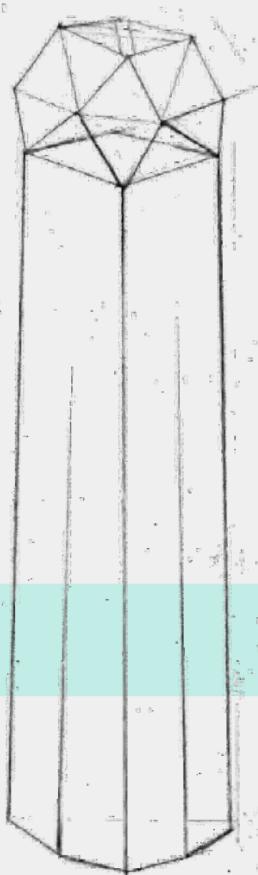


Bishop becomes more aesthetic and uniquely identifiable

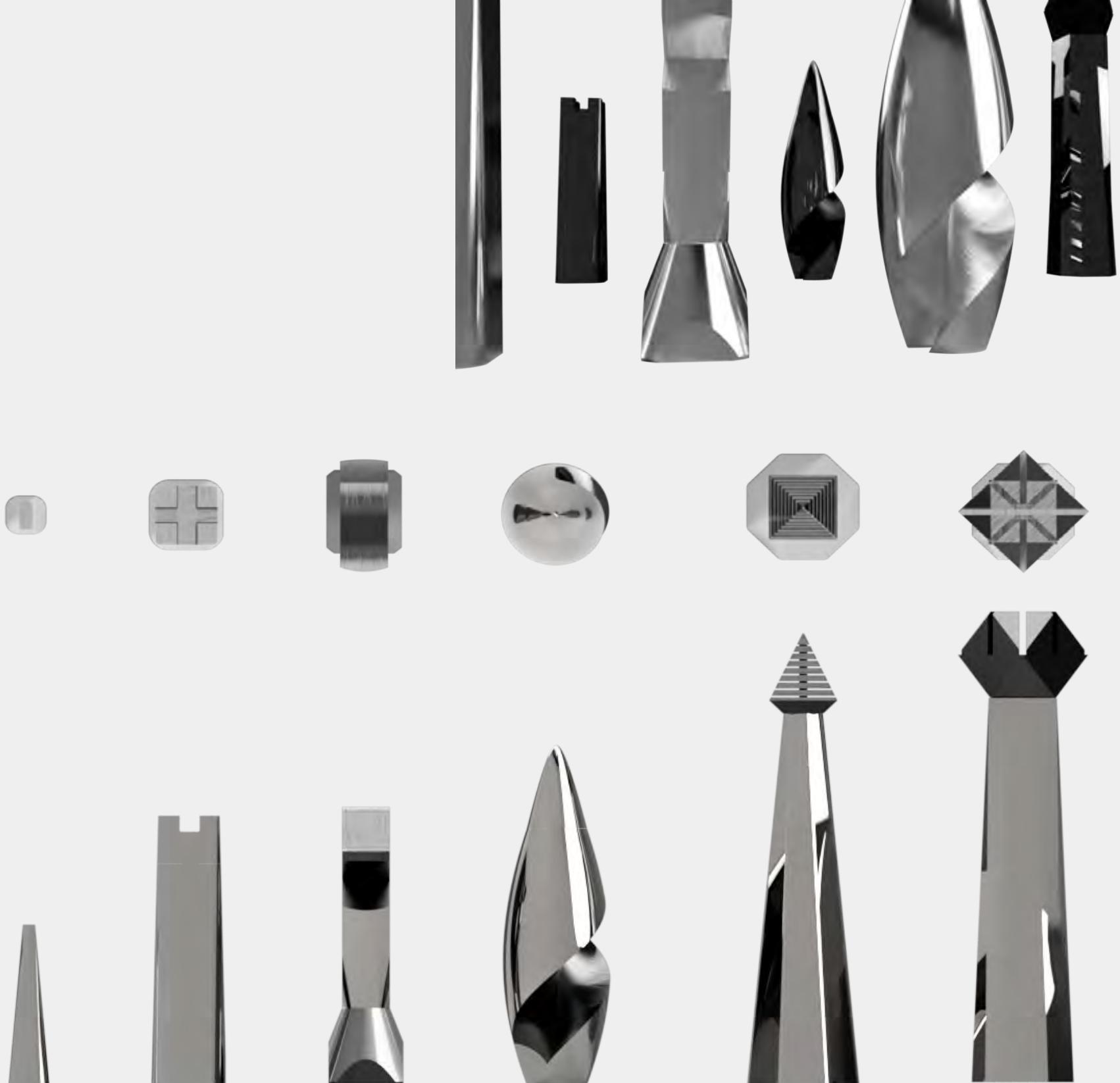


Knight design changes from a more functional design to an aesthetic one  
Manufacturing process changes from bending sheet metal in a metal shop to a CNC machine

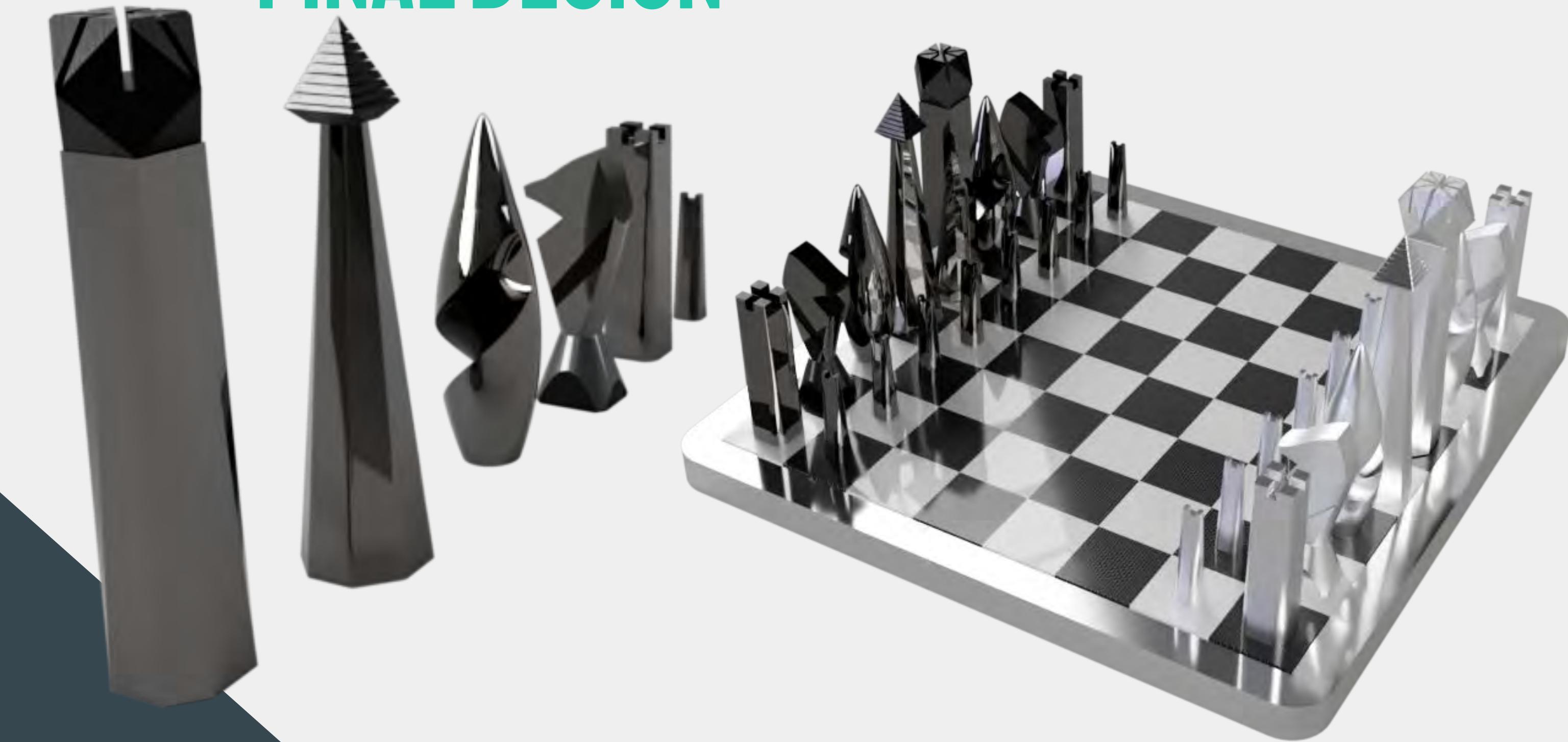
# FINAL 2D SKETCHES

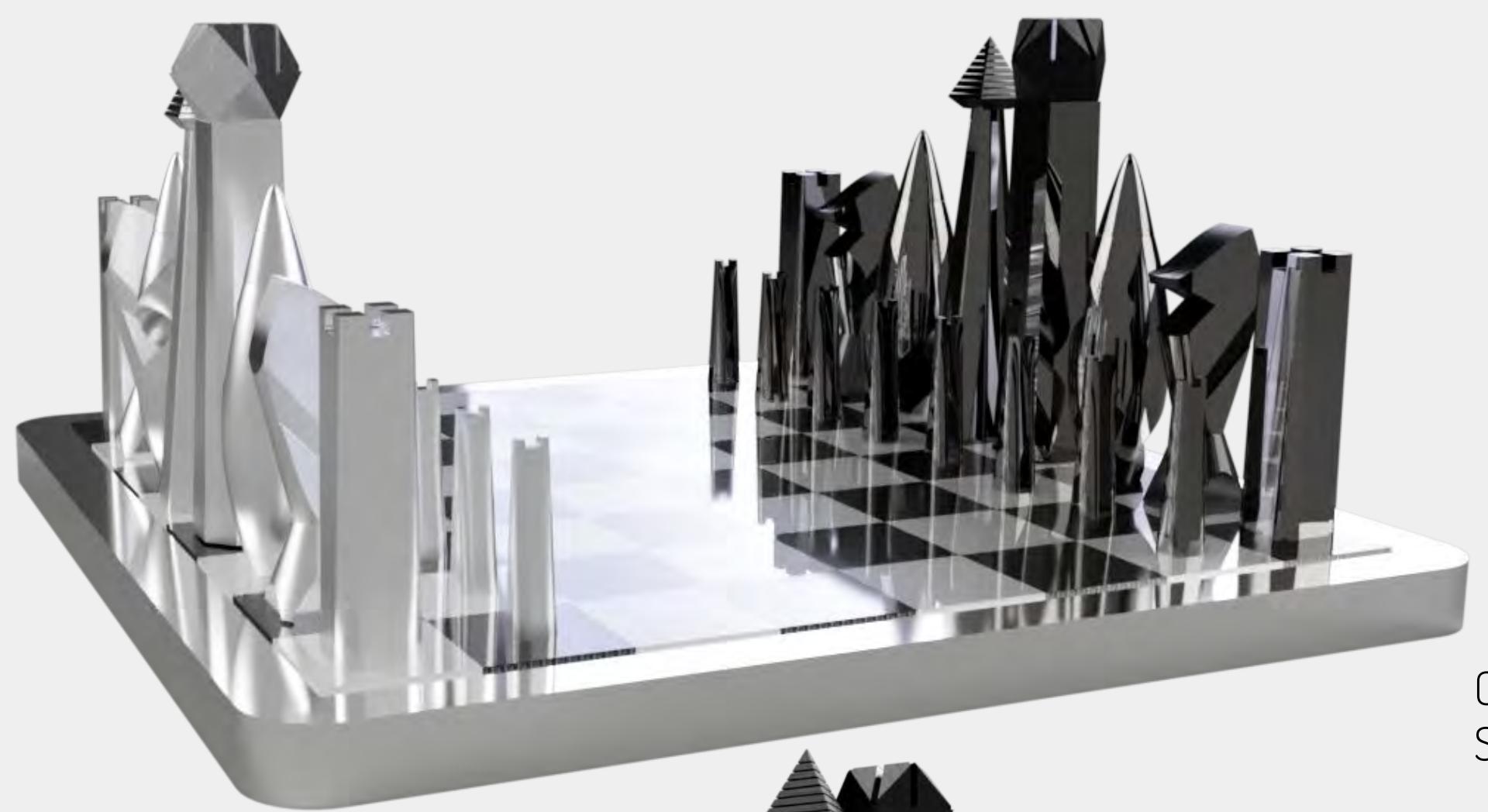


# SET OF SIX

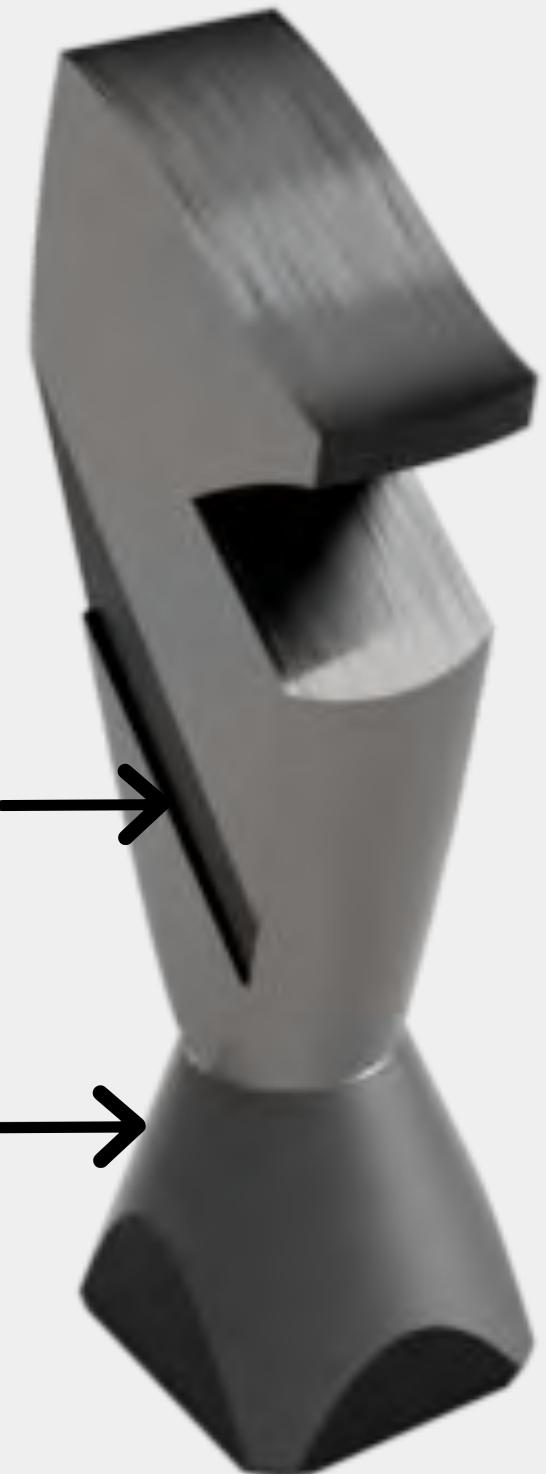


# FINAL DESIGN





CNC Brushed  
Stainless Steel



Smooth Casted  
Stainless Steel

