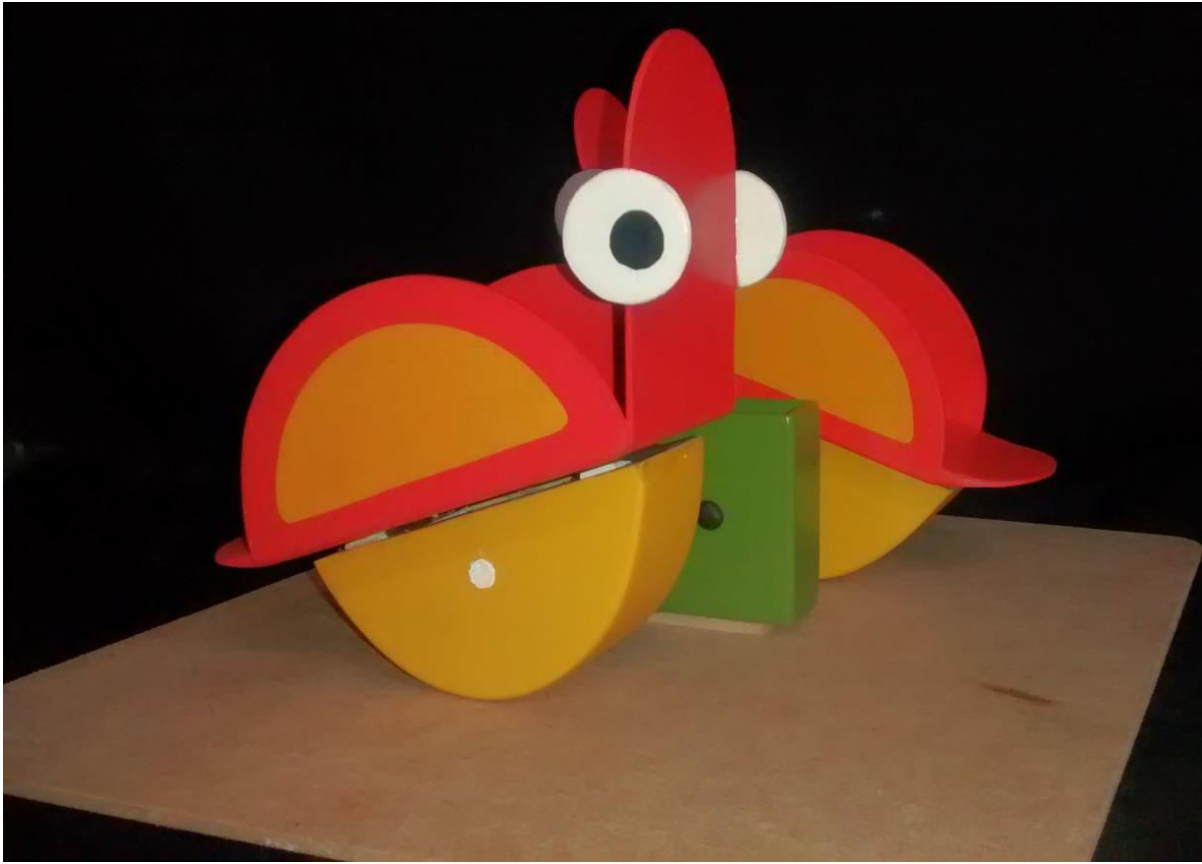




# TeeRox



Minu  
176130011

# Introduction

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Kids are known to be creative and innocent minded. They play and not only enjoy toys but also develop their physical skills subconsciously while playing on outdoor or indoor products. They are known to explore and love adventures. They are very curious and easily gets attached to toys and playing devices around them.

Our classroom was divided into two separate groups. Group 'A' was to design playground equipment or ride-on products for user group of 6 to 12years while group 'B' was to design a wooden toy for the user group of 9 to 15 months.

In order to complete the products some of the important method and approaches were taken which are briefly discussed in this report for Group 'A'.

# Process

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The final product was completed with the following stages of work:

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## STAGE 1: -User Studies

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The objective of this exercise was to study the people in the defined user group. Students were supposed to visit the playgrounds and

- observe the playground equipment,
- observe the ride on products in or outside the playground,
- how comfortable were the kids in using those products or
- what precautions were they considering while playing.
- How and where were the parents of those kids, what were they doing?

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## STAGE 2: -Design Insights

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After various visits and observations, each student had to come up with certain design observations and convert those to design insights, further categorize them to must haves and may haves.

### *My Observations:*

- Kids enjoy more adventurous and physical activity.
- Multifunctional toys, kids prefer to have more engaging play area.
- More spacious and easy to play
- Kids play independently but close to their friends preferably.

- Taking turns to play a particular game
  - Cheering each other
  - Help or give demos to their friends
- Damage of skin due to hard metal material
  - Kids get blisters – example in monkey bar
  - Edges can be sharp – causing cuts and bruises
- For safety sand or shock absorbent floor were there
  - Reportedly there are more injuries in playground due to hard surfaces
  - Parents prefer to have foldable and portable playground equipment
- Swing sets can be dangerous because of the knots in swing chains.
- Speed and spin is not always of interest
  - kids like speed in seesaws, swings and sliders(Linear motion)
  - but not in merry go rounds (rotational motion)
- Foldable and portable playground equipment
  - Parents prefer to have foldable and portable playground equipment
  - Sellers prefer to have portable equipment, as it reduces the storage and delivery charges
- No equipment that require pushing, pulling or rolling skills
  - Most of the products were to slide or apply least force
  - Playground could be seen as a tiny gym for kids but lacking the provision of equipment that help them to develop their lifting skills

Best 3 design observations of 7 students each were taken and categorized into “Must Haves and May Haves”.

Group A: PLAYGROUND EQUIPMENT OR RIDE ONs

Apurba | Archana | Maddu | Minu | Sai | Sukant | Vinod

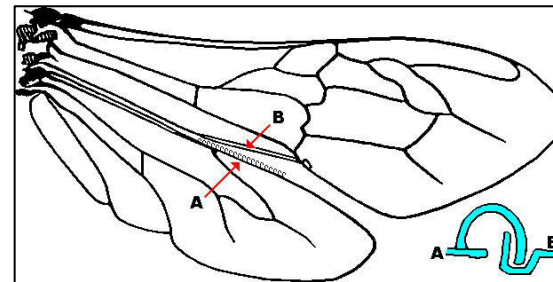
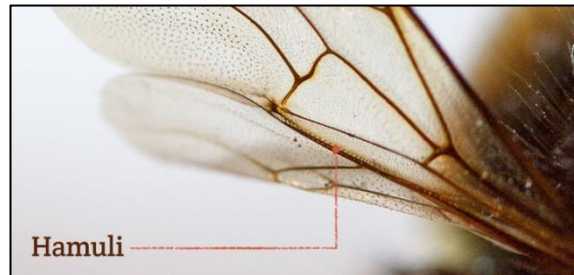
Sl. No	Initial Observation	Design Insights		
1	Like to scale heights	Thrill factor	MAY HAVES	
	Fascinated by Speed and Height			
2	Foldable and Portable	Space manipulating equipment with ease of assembly		
3	Static Jungle Gym	Equipment could have dynamic components		
4	Sense of Adventure	Equipment with a theme		
	Not much variety in playground			
5	Problem Solving	Enhancing intellectual development with equipment		
6	Team Play	Equipment with multiplayer strategy		
	Healthy Competition in Children			
	Tag Teaming			
7	Damage of Skin due to hard material	Softer material for contact points		
8	Encouragement of Imagination	Encouragement of Imagination		
9	Parents at close proximity	Equipment fostering confidence in parents		MUST HAVES
10	Unpredictability in Play	Flexibility of use		
	Element of Surprise			
11	Curious	Window for exploration		
	Freedom of Use			
12	Feedback	Interactive feedback system		
13	Cushioning Sandpit	Fall friendly		
	Shock Absorbant			
14	Well Ventilated	The equipment should not allow over-crowding		

### STAGE 3: -Toy shop visits and Inspiration from animal

Students were now supposed to visit toy shops and analyze various toys for their form and mechanism in-order to get inspired and help themselves for idea generation.

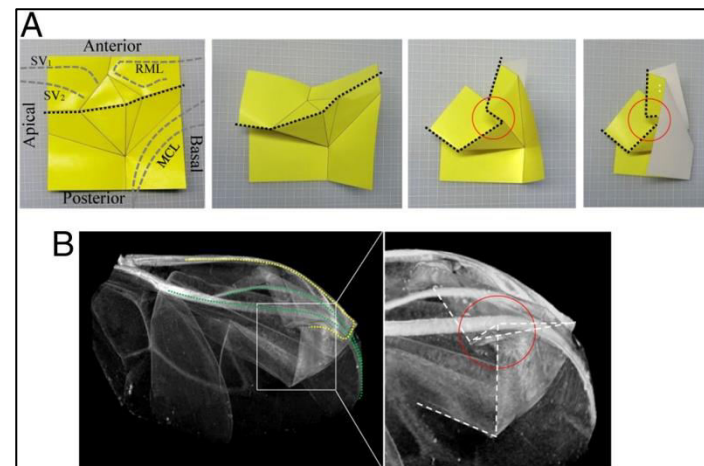
Some of the inspiring animal features to be mentioned:

#### *Locking mechanism – hook*

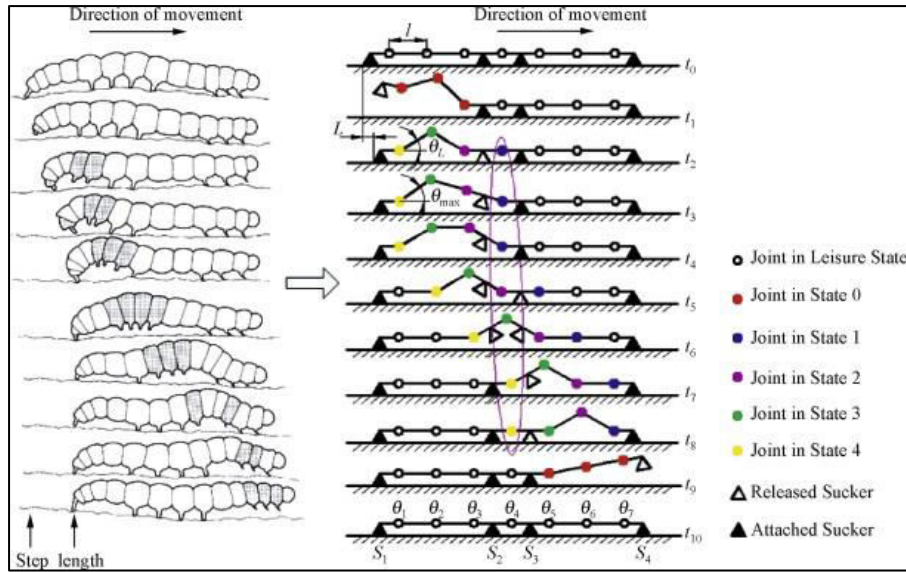


Tiny Hooks were used in the wings of a fly to join two separate pairs of the wings

#### *Packing – ladybug wings.*



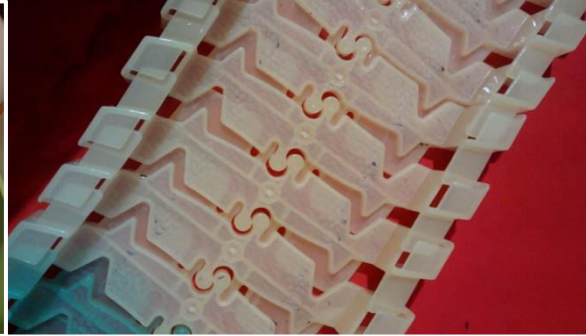
## Body movement of caterpillar



## Team work and lifting fruits



*Toy Study for the form and mechanism*





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## STAGE 4: -Design Brief

---

The product design brief is an important aspect of any design. It acts as a guideline for how to solve the problem. Thus it not only states the design problem but a plan to solve it.

The following points are covered in the design brief:

### User Requirements:

- The must haves and May haves were finalized.

### Servicing and Maintenance Issue

- Can be easily cleaned
- Manufacturing process should not be very complicated

### Scope of the Project

- Should target the kids at age group of 6-12 years
- They should enjoy and get involved with physical activities.
- It should provide sense of safety to the parents as well

### The Experience This Product Needs To Create

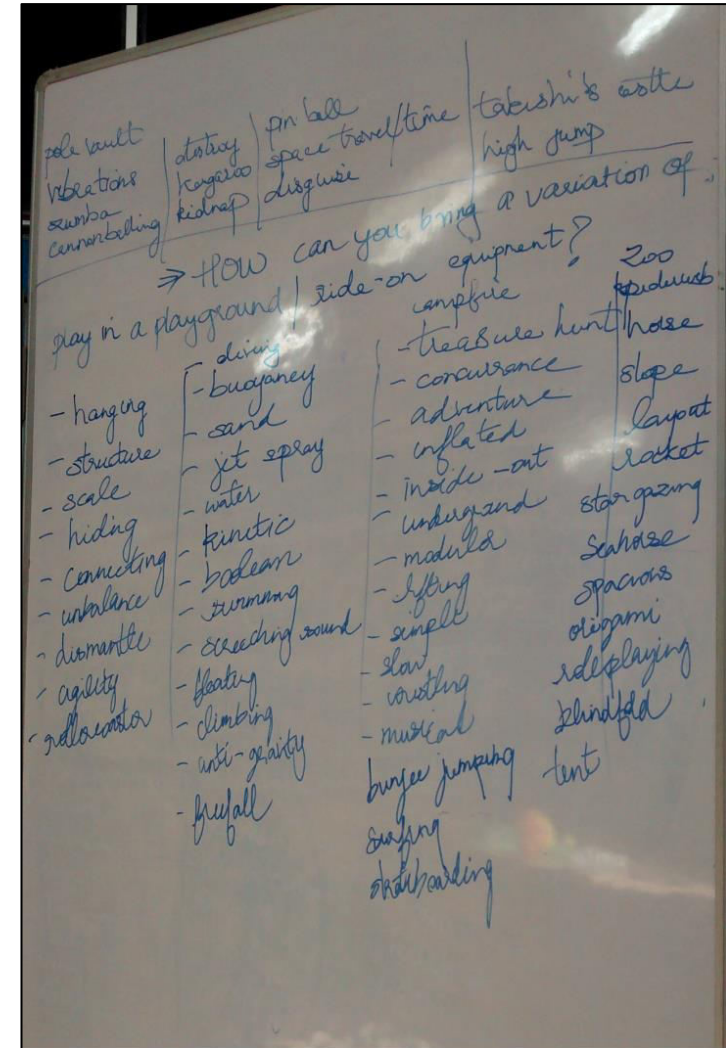
- The product should arouse emotions like Cheerfulness, happiness.
- Involve kids and keep them engaged.

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## STAGE 5: -Idea Generation

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**Brainstorming Technique:** The group was to perform brain storming in the class.



# Design Brief

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Design a playground or ride-on equipment for the user age group of 6-12 years which could help kids

- To develop the physical skills like pushing or pulling with the involvement of other kids/friends in the ground. The product can be indoor or outdoor.

## MUST HAVES:

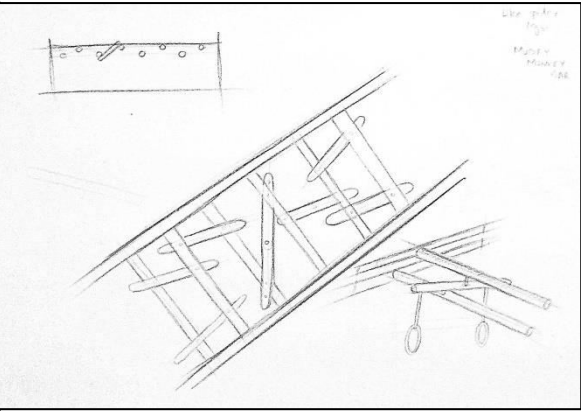
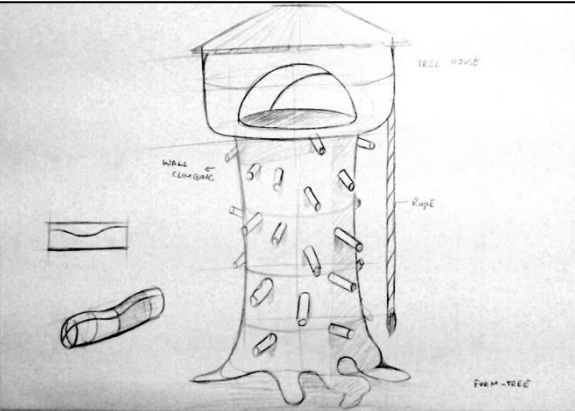
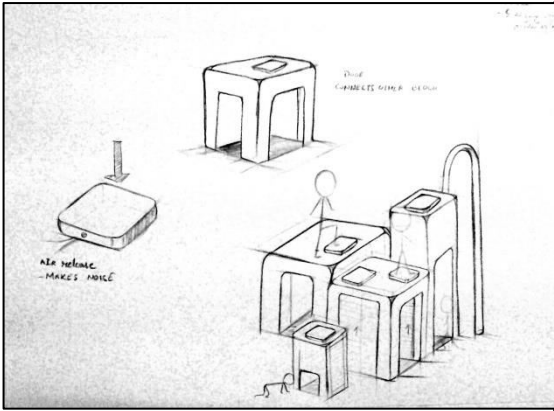
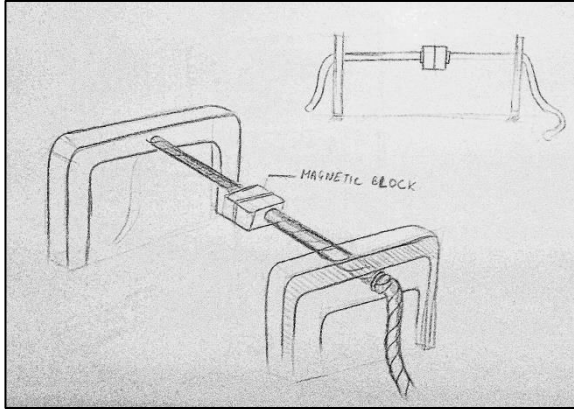
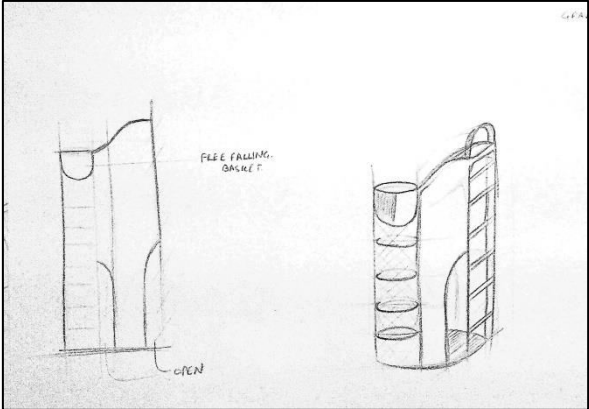
- Flexibility of use
- Window for exploration
- Fall friendly
- Equipment should not allow over crowding

## MAY HAVES:


- Softer material for contact points
- Equipment with a theme
- Thrill factor

# Ideation Process

## Initial ideas



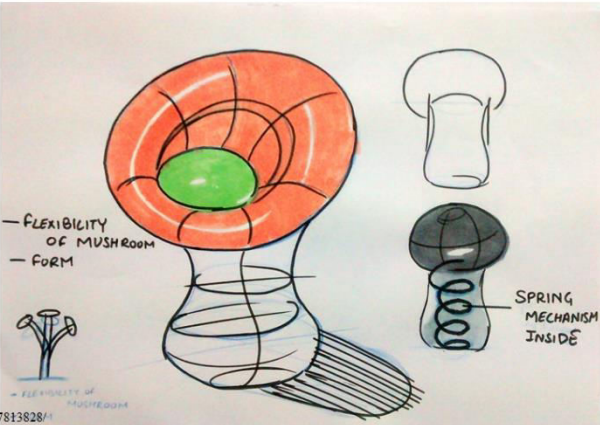
10 best Ideas and corresponding inspiration from nature



**Mushroom**

They have a delicate stem which gives an effect of spring

**Mushroom Seat**




FLEXIBILITY OF MUSHROOM  
- FORM

SPRING MECHANISM INSIDE

FLEXIBILITY OF MUSHROOM

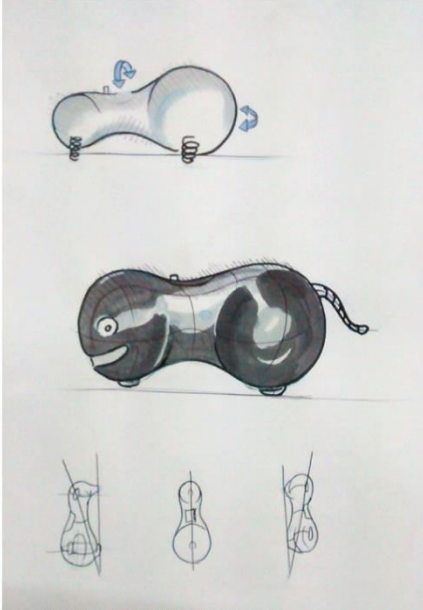
<https://www.pinterest.com/pin/782852347697813828/>



**Hippopotamus**

The slippery and round body of the Hippo allows to keep the skin surface clean

**Sit on the Hippo and balance**



[https://lh6.googleusercontent.com/-mne5rPISv3k/TW0gmiRmXnl/AAAAAAAAA-BPAkCk-O7rGk\\_c/s1600/330811704\\_282ee8a597.jpg](https://lh6.googleusercontent.com/-mne5rPISv3k/TW0gmiRmXnl/AAAAAAAAA-BPAkCk-O7rGk_c/s1600/330811704_282ee8a597.jpg)

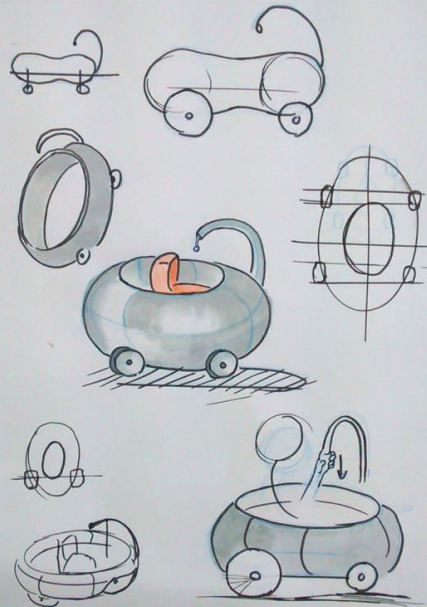


**Deep sea Angler Fish**

The prey bites the fleshy growth from the fish's head and the fish opens the mouth to eat

**Pull the rope to drive the car**

[https://res.cloudinary.com/dk-find-out/image/upload/q\\_80,w\\_1920,f\\_auto/42-53005836\\_bowayv.jpg](https://res.cloudinary.com/dk-find-out/image/upload/q_80,w_1920,f_auto/42-53005836_bowayv.jpg)

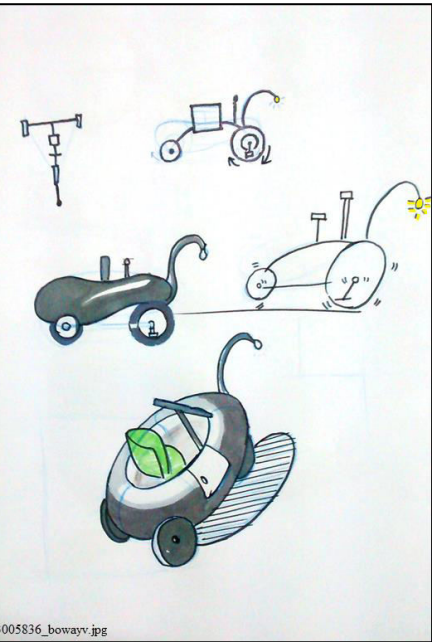


**Deep sea Angler Fish**

Some species uses light gland (covered with bacteria) to glow the fleshy bulb

**Cycle hard to glow the bulb**

[https://res.cloudinary.com/dk-find-out/image/upload/q\\_80,w\\_1920,f\\_auto/42-53005836\\_bowayv.jpg](https://res.cloudinary.com/dk-find-out/image/upload/q_80,w_1920,f_auto/42-53005836_bowayv.jpg)

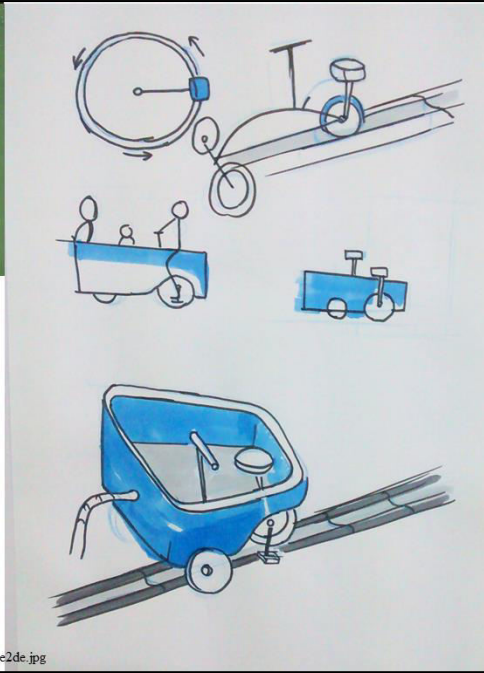




**Dolphins**

They perform 'Mud ring feeding'- a cooperative feeding behavior  
Dolphins use this hunting technique to forage and trap fish

**Pedal round the ring with friends**



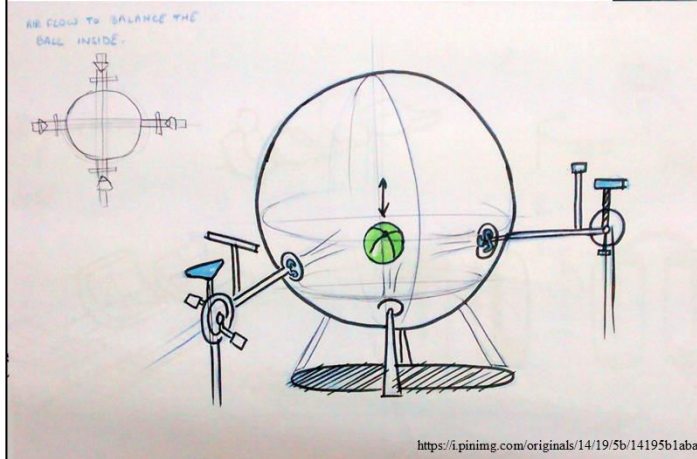
<https://i.pinimg.com/originals/f6/2a/5b/f62a5b85259b69d74332305b0134e2de.jpg>



**Float the Ball inside**

**Whales**


They are known to spout out air through blowhole at the top of the head to breathe



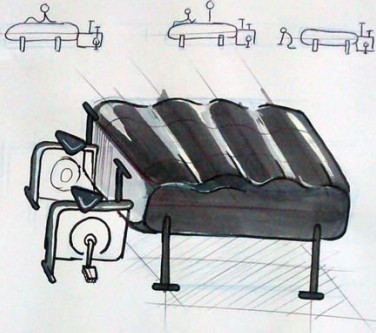
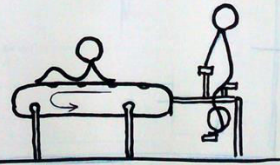
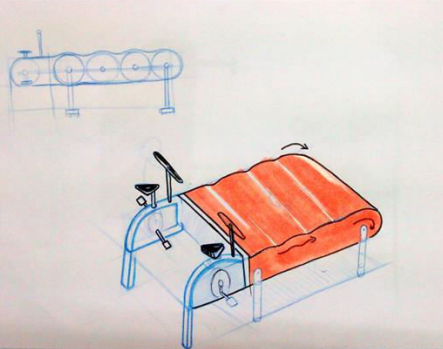
<https://i.pinimg.com/originals/14/19/5b/14195b1aba81ba436f99309dc076c632.jpg>

**Waving water**

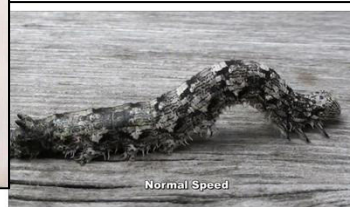
The wavy motion of the water surface moves the particles on the surface to the edge (of the river)



**Try not to fall**

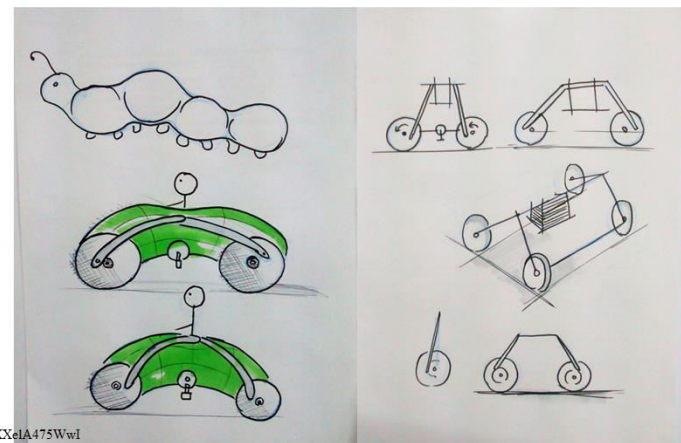
<https://giphy.com/gifs/cinemagraph-cinemagraphs-14hLPzGuhO9FYXQd2>



**Caterpillars**

The gut of the crawling caterpillar moves forward independently and in advance of the surrounding body wall and legs, not with them

**Ride the Caterpillar**



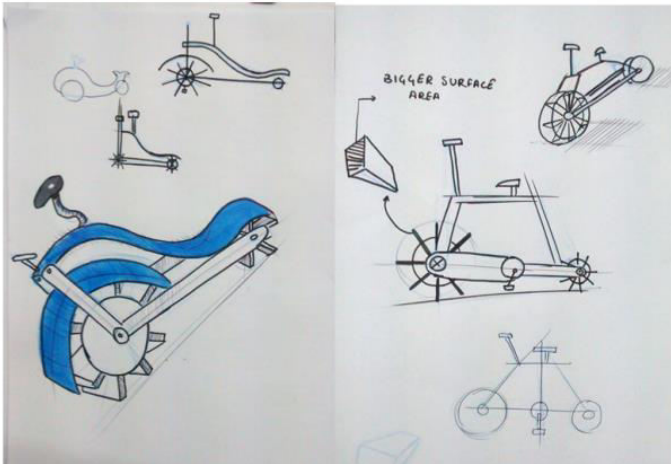
<https://www.youtube.com/watch?v=XXe1A475WwI>

**Whale**

The form of the body of the whale is bulky and heavy at front

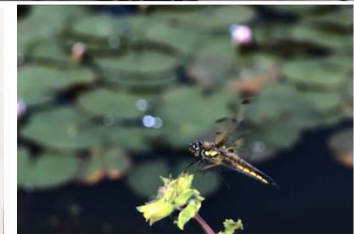
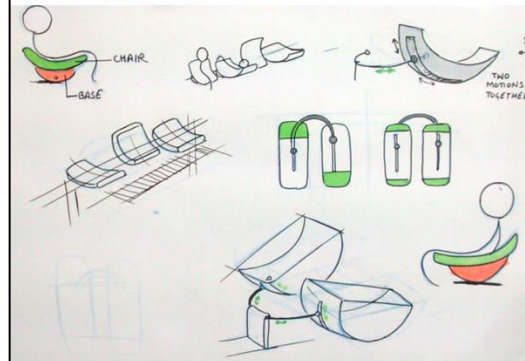


**Bicycle for sand**



**Dragon Fly wing movement**

The alternately motion of 2 pairs of the wings of the dragon fly.

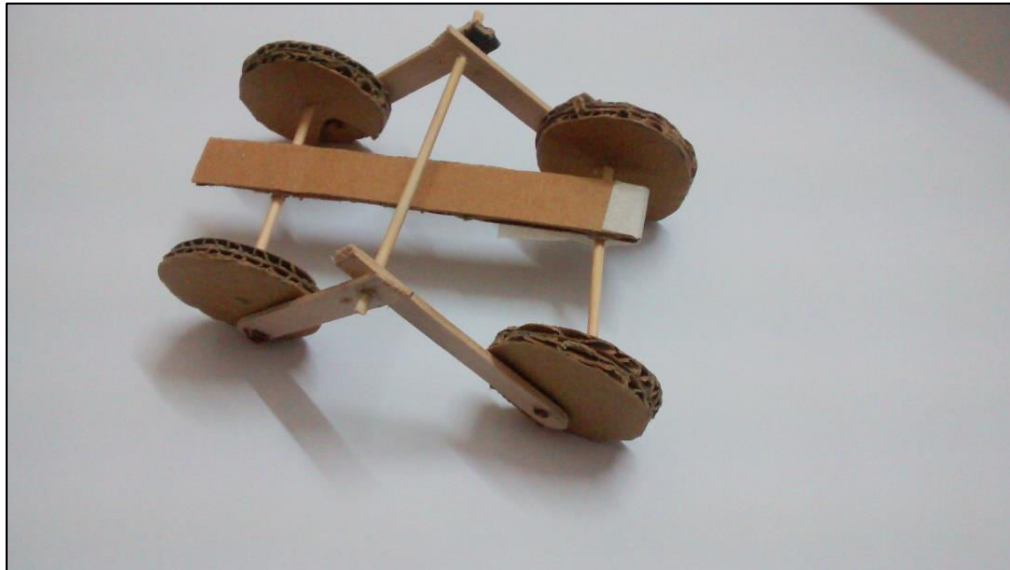


**Relaxing chair seesaw**

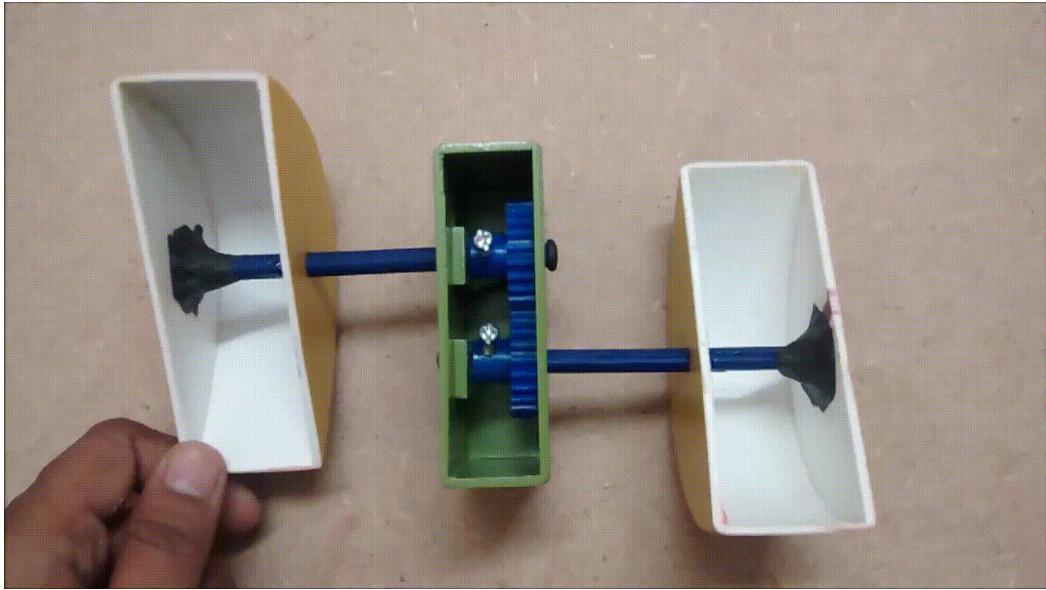


# Prototype, POC and Mechanism

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# Conceptualization

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In order to finalize the concept, the marking for each of the top 10 ideas was done on the basis some common factors which are listed in the table below:

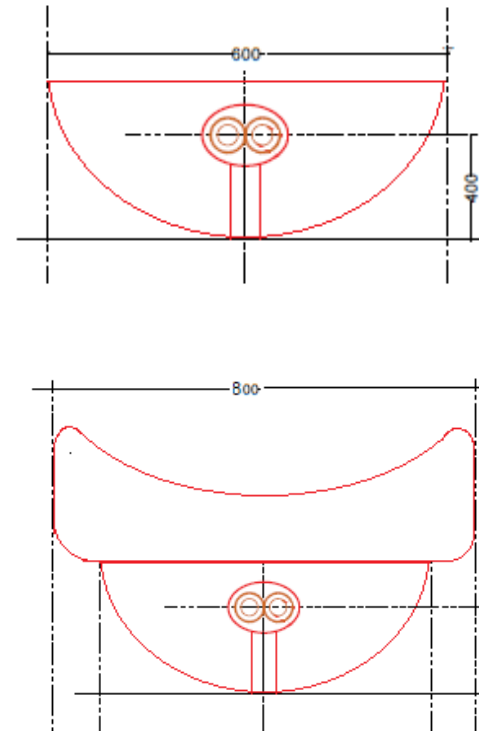
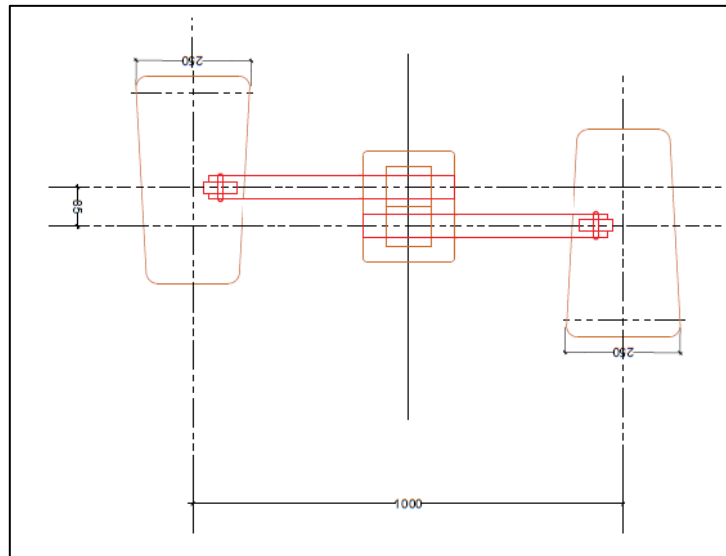
	A	B	C	D	E	F	G	H	I	J
Ease of Use	0	0	+1	-1	-1	-1	-1	-1	0	+1
Ease of manufacturing	+1	+1	0	0	0	-1	-1	0	+1	0
Assembly ease	+1	-1	0	-1	0	-1	-1	0	0	+1
Portability	-1	-1	0	0	0	-1	-1	0	0	-1
Mechanism	0	0	+1	+1	0	+1	0	-1	+1	+1
Safety for kids	0	-1	0	0	-1	0	-1	-1	-1	+1
Novelty	0	0	+1	+1	0	+1	+1	0	0	+1
	<b>+1</b>	<b>-2</b>	<b>+3</b>	<b>0</b>	<b>-2</b>	<b>-2</b>	<b>-4</b>	<b>-3</b>	<b>-1</b>	<b>+4</b>

Based on the above markings the relaxing chair seesaw was considered for taking on to further implementation.

# Dimensional Parameters

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Final mechanism



\*All Dimensions in mm



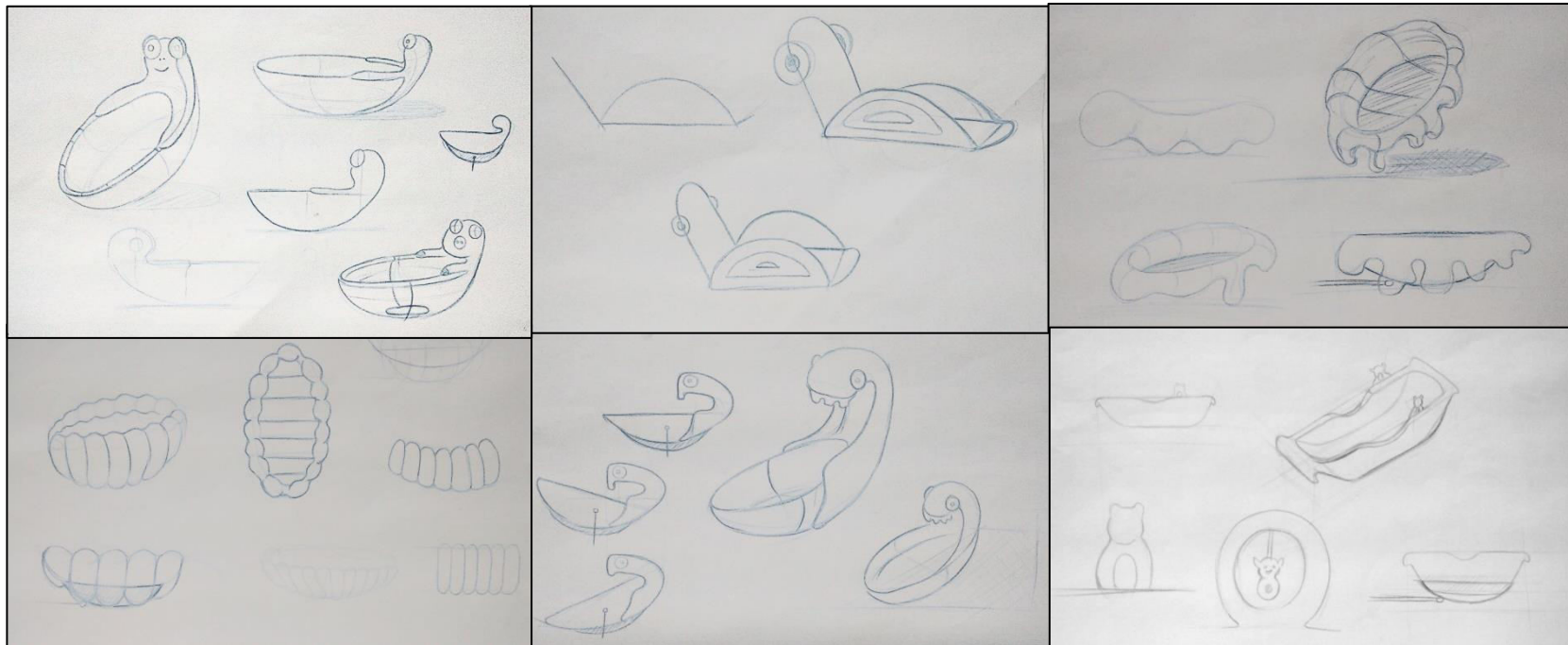
# Bill of Materials

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Parts	Material	Manufacturing process
Gears	Brass	Honing
Seat	Fiber glass or ABS	Hand Lay-Up (Open Molded)/Fiberglass molding (Fiberglass), Rotational molding(ABS)
Metal rod	Steel	Extrusion
Covering for gears	Aluminum	Sheet Bending

# Form Variation for the seat

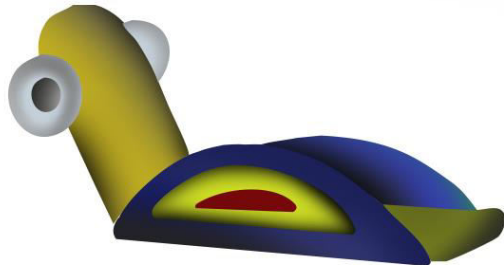
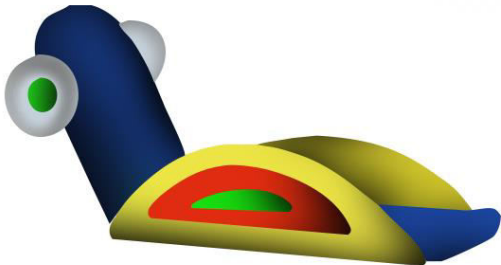
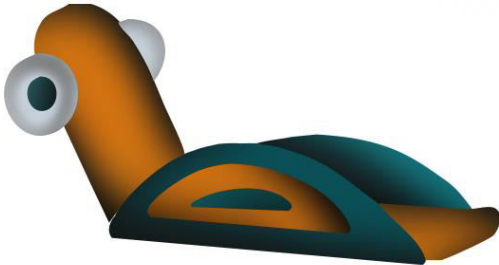
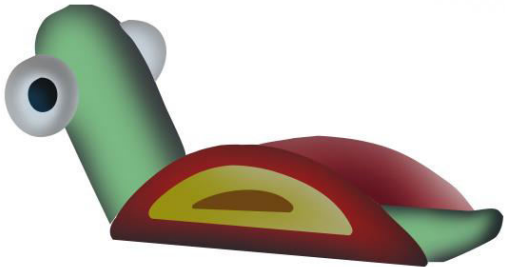
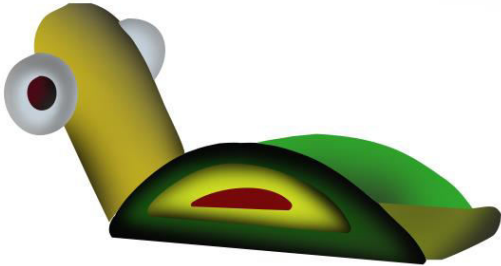
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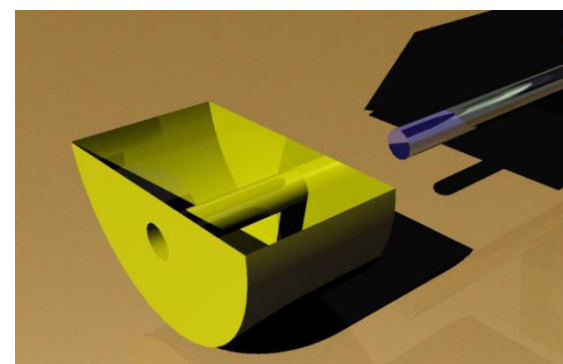
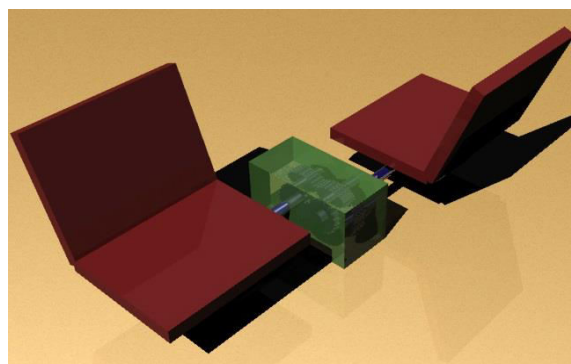
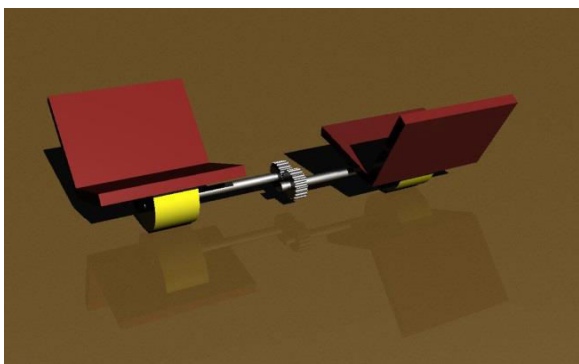
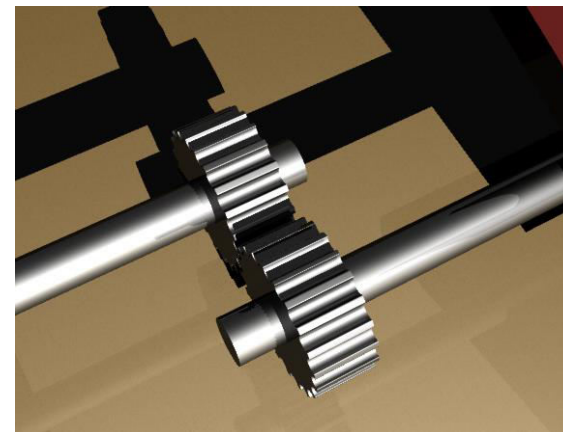
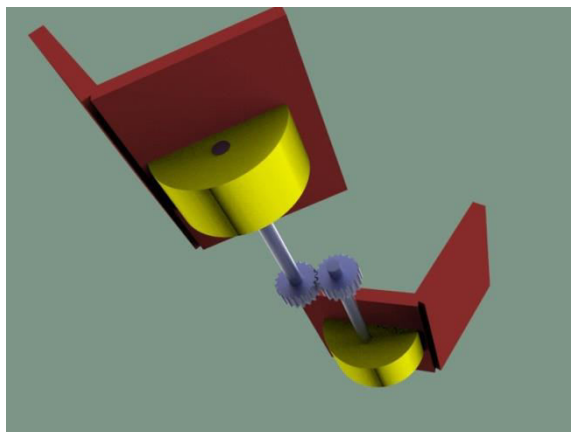
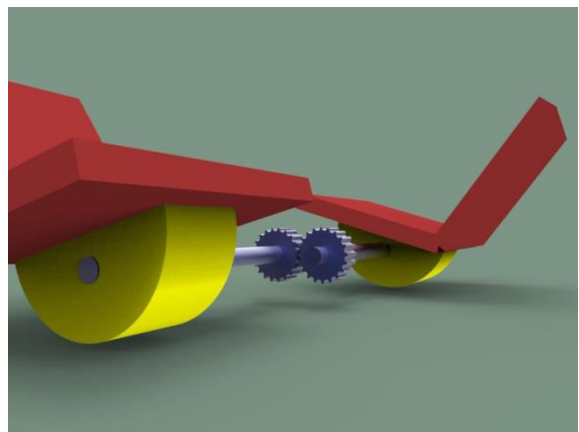
# Color Variation

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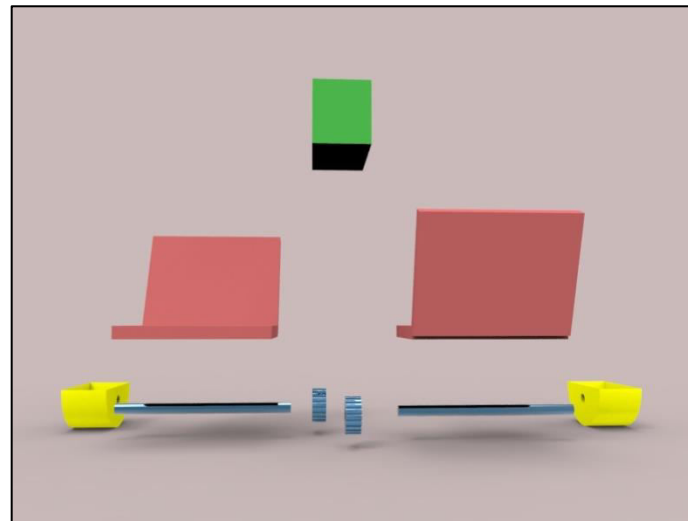
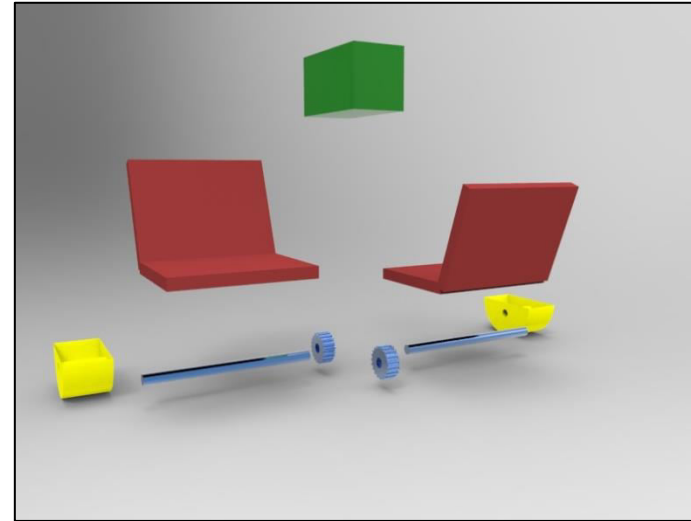
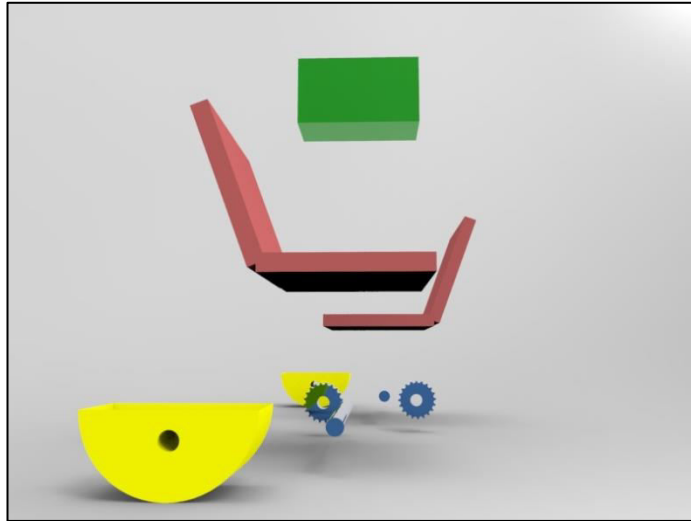
# Rendered 3D View

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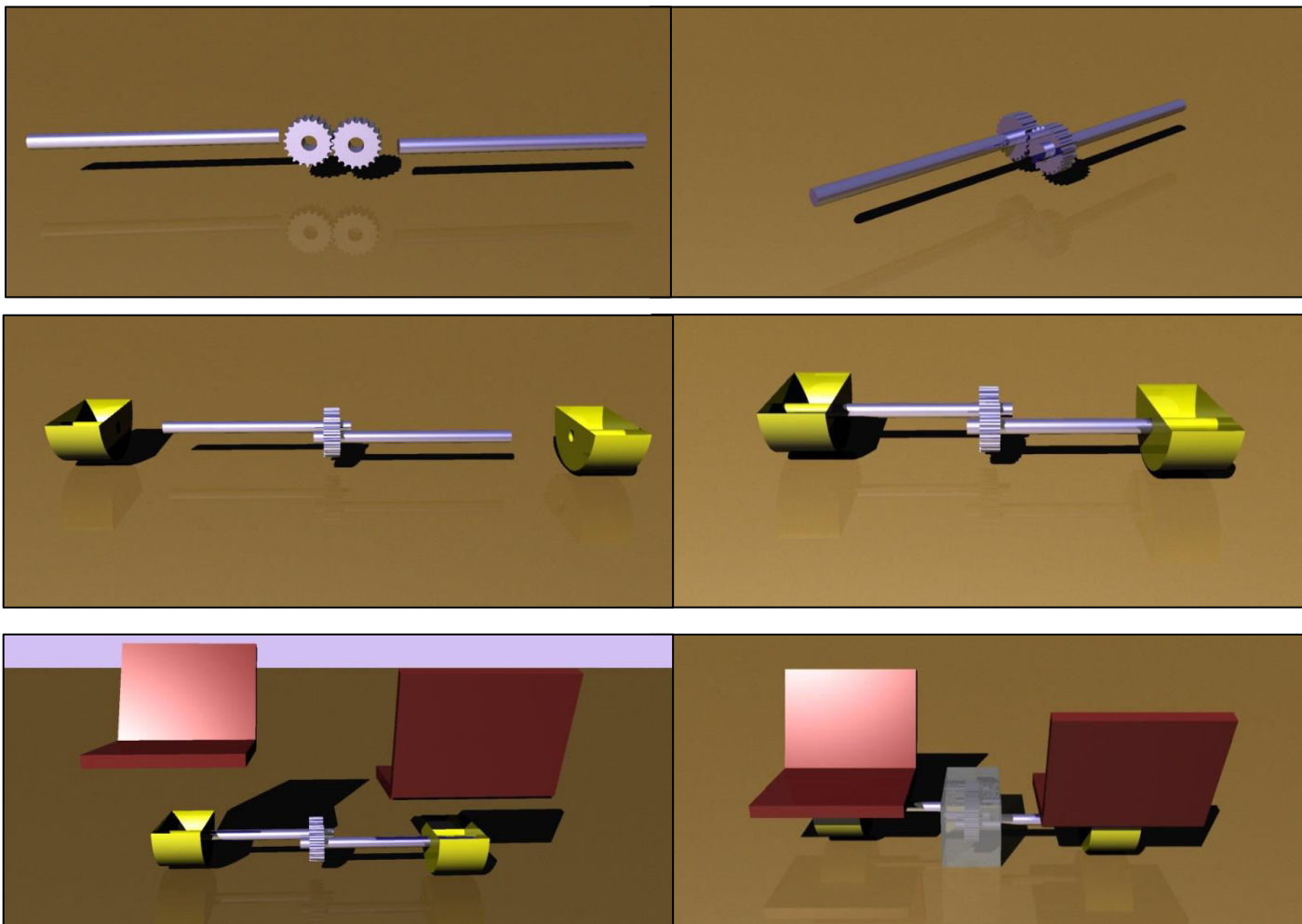
# Exploded View

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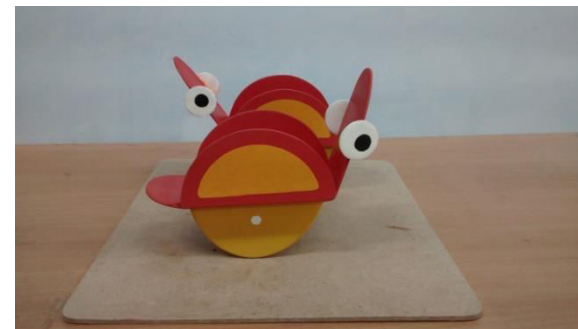
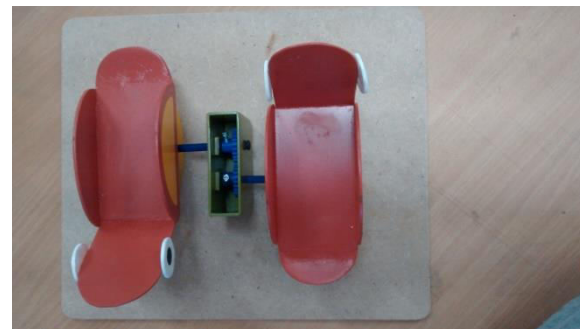
# Assembly

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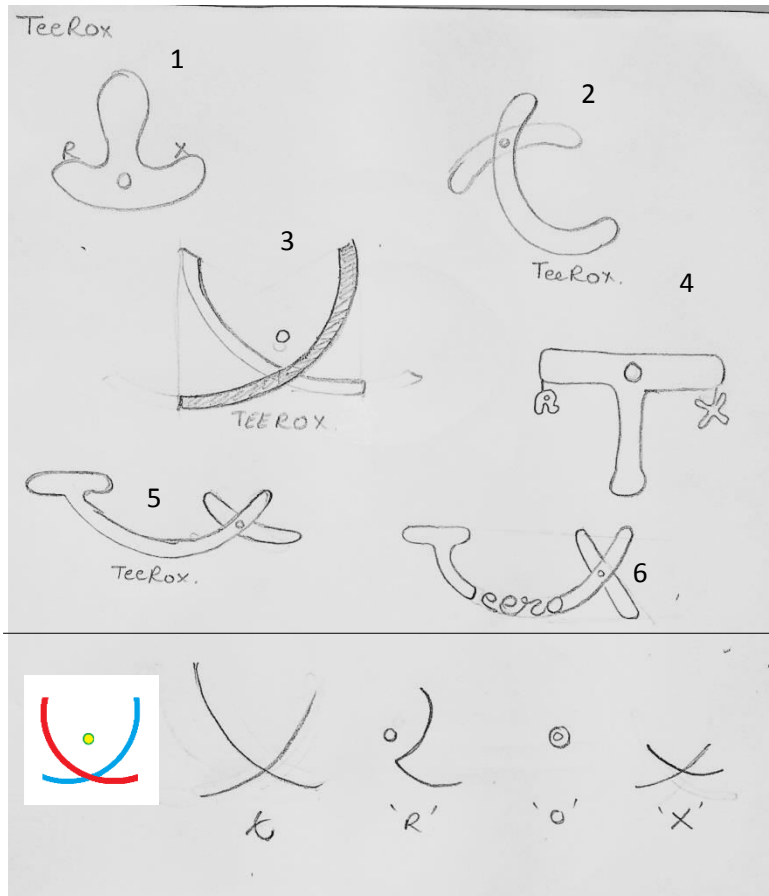


# Final Product

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# Product Branding



## TeeRox

Teeter +Rock = TeeRox

I chose the above logo '3rd' of all the 6 other because of the following reasons:

It contains the letters 'T', 'R' and 'O' and 'X' in the logo itself which completes the name of the product as "T-Rox" (short form) while it represents the two seats in opposite direction similar to the product.

The logo suits the product for its form and structure as well while having the hidden letters of the suggested name.

'TeeRox' on the product







# Reference

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1. <https://www.lifetime.com/swing-set-accessories>
2. <https://kidshealth.org/en/parents/playground.html>
3. <https://www.understood.org/en/friends-feelings/child-social-situations/playgrounds-playdates/8-common-playground-problems-and-how-to-help>
4. <http://www.cbc.ca/news/playground-equipment-involved-in-rising-number-of-injuries-1.1858497>
5. [www.sciencedirect.com/science/article/pii/S1002007109002871](http://www.sciencedirect.com/science/article/pii/S1002007109002871)
6. <http://www.nwlink.com/~donclark/perform/brainstorm.html>
7. <https://www.smartdraw.com/mind-map/>
8. [https://en.wikipedia.org/wiki/Fiberglass\\_molding](https://en.wikipedia.org/wiki/Fiberglass_molding)
9. <https://www.arrowheadinc.com/fiberglass-manufacturing-processes/>
10. <https://www.youtube.com/watch?v=gdmZI-jqJG0>