

Project 3

Bicycle design for a theme park

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Preface

- Promoting bicycle by making it fun to ride
- Making children and elder ones experience the pleasure of the ride





■ Project focus

Fun

Novelty

Experience

Joy

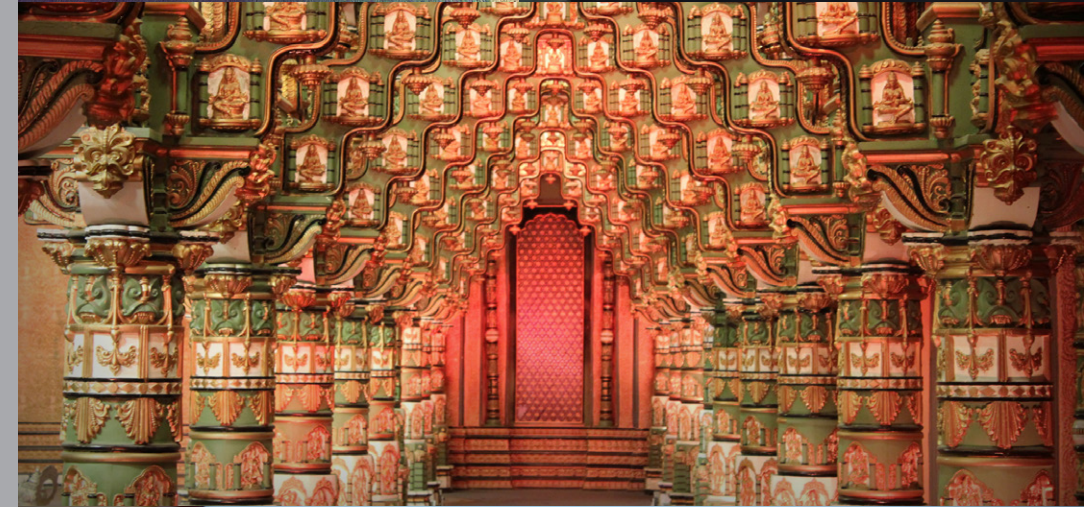
Rideable over a small area

Charactered to the context

Context

Ramoji Film city

- Located at Anajpur in Hyderabad, Telangana
- Largest integrated film studio complex in the world
- A popular tourism and recreation center
- Houses an adventure park and a bird park





■ People and their experiences at Ramoji

Scale of the park

■ People and their experiences at Ramoji

Scale of the park
A world of worlds



■ People and their experiences at Ramoji

Scale of the park

A world of worlds

A variety of experience



■ People and their experiences at Ramoji

Scale of the park

A world of worlds

A variety of experience

Greenery



■ People and their experiences at Ramoji

Scale of the park

A world of worlds

A variety of experience

Greenery

All of India in one place

Photo ops



■ People and their experiences at Ramoji

Scale of the park

A world of worlds

A variety of experience

Greenery

All of India in one place

Photo ops

Color and vibrance

Games

World of Indian cinema



■ Experiential Elements at Ramoji

Gardens

Film themed sets

Architectural replicas

Sculptures

Kids area

Color

Adventure park

Bird park

Live shows



Source: Author

■ Insights



Greeneries to off road terrain



Abstract sculptures to
life size comic heroes



Vintage cars to hi-tech ATVs



Source: Ramoji film city archive, Author



Mythology + Actuality



Monotone + vibrance



Vintage + modern



Illusion + real



■ At Ramoji

Vintage bus for guided tour

Giving the user an yesteryear feeling

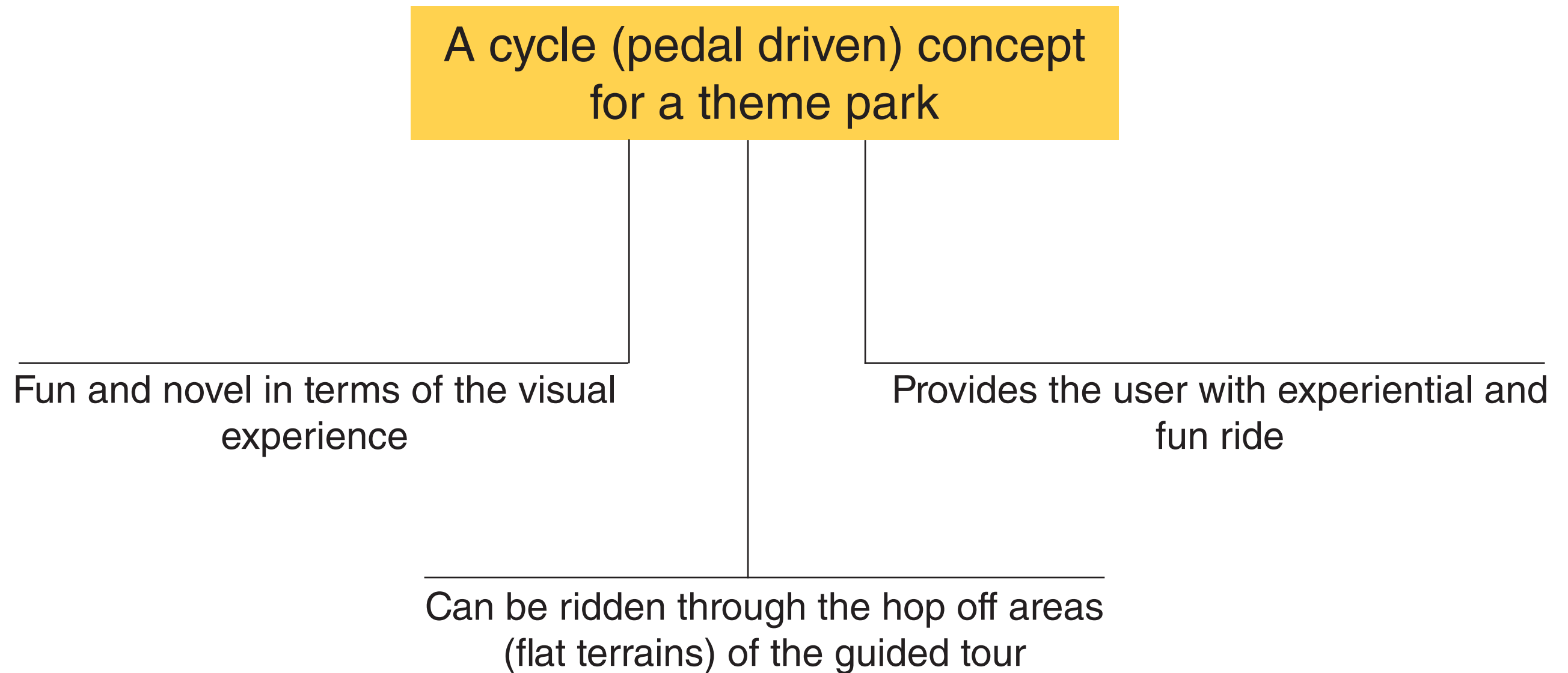
Own exploration of the hop off areas.



■ **Design Objective**

Provide an experience of fun ride through a novel bicycle design.

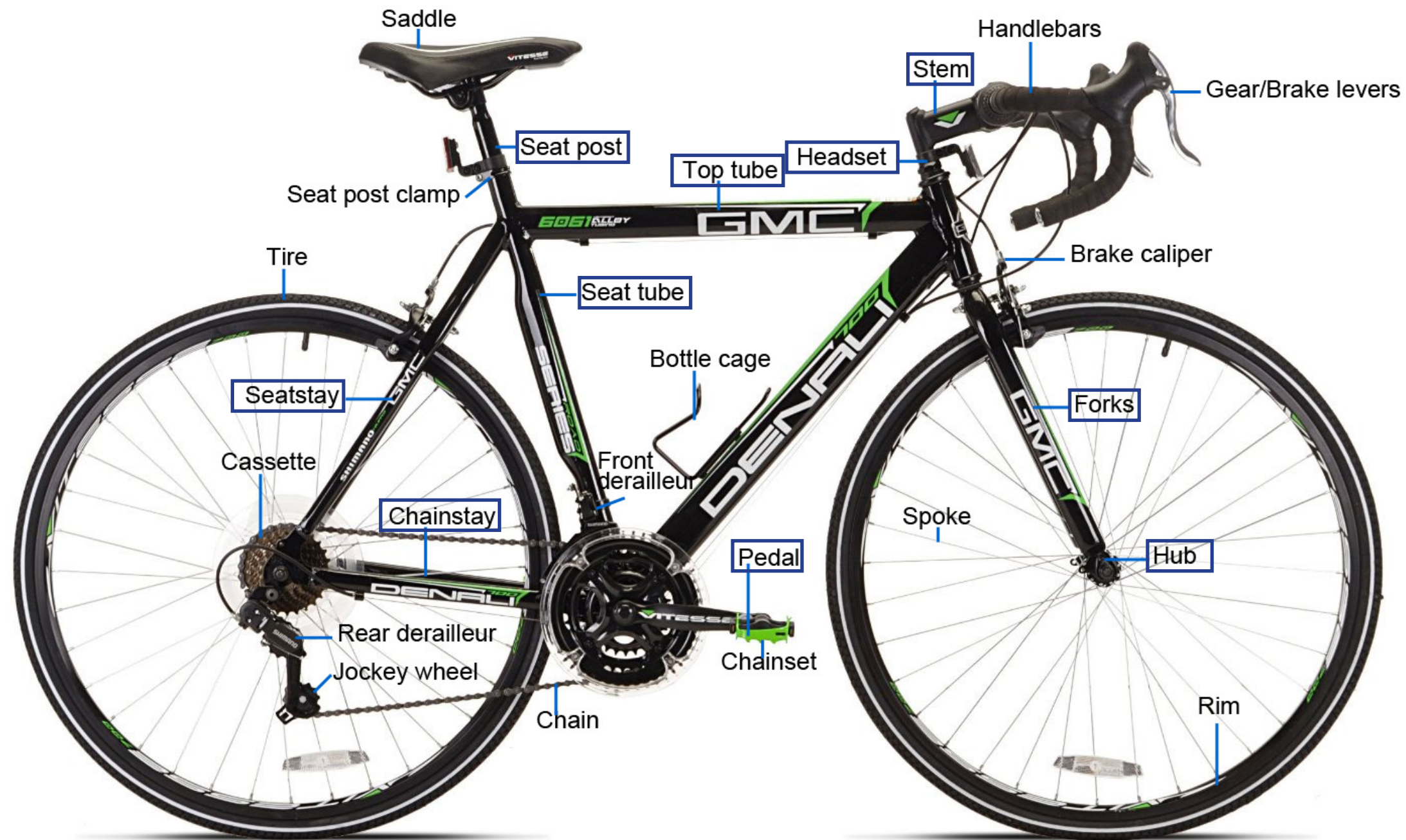
■ Design Brief



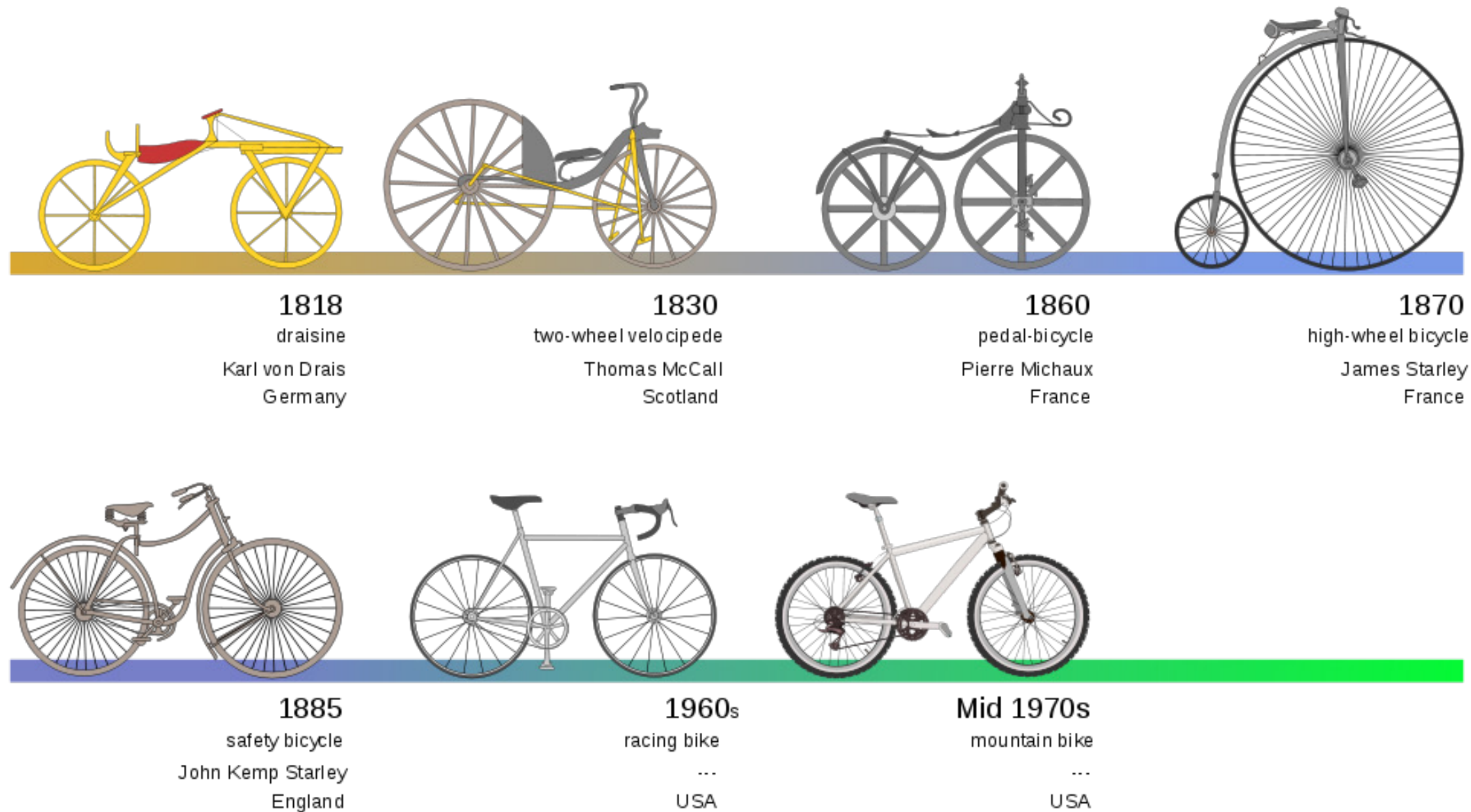
■ **Secondary research**

- Bicycle anatomy
- Bicycle history
- Study of previous projects
- Bicycle design case studies
- Fun bicycles
- Fun and experience in similar contexts

■ Bicycle Anatomy



Bicycle History



■ Previous projects

Campus bicycle for IIT Bombay

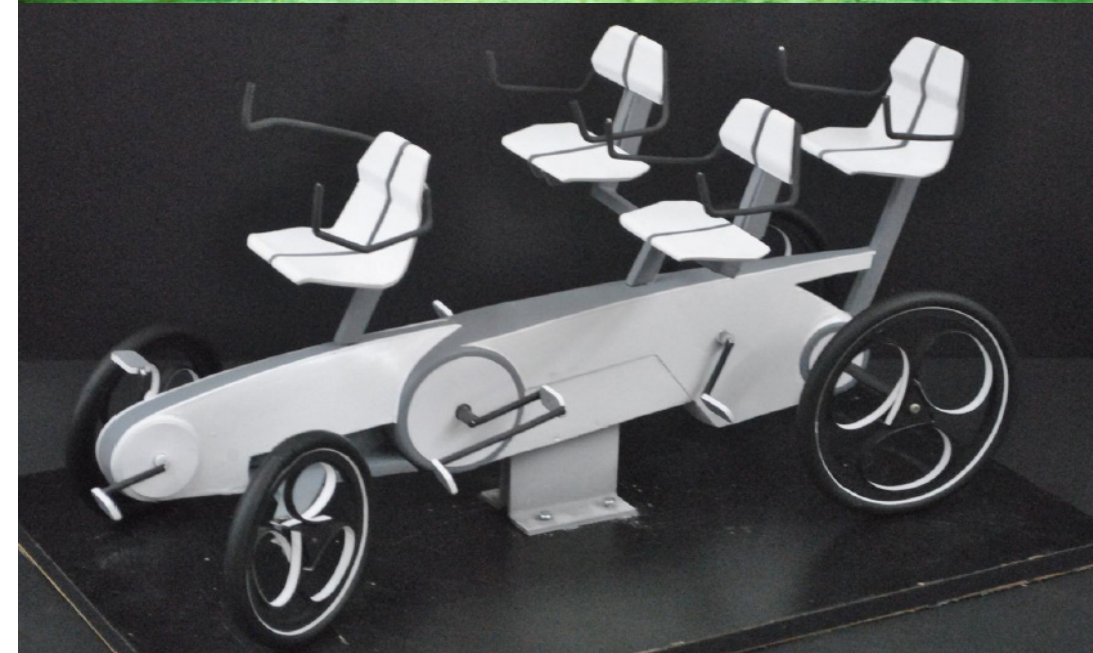
Quadricycle

Family cycle for joy ride

Electric hybrid commuter

Design of sheet metal bicycle

Promoting human powered mobility

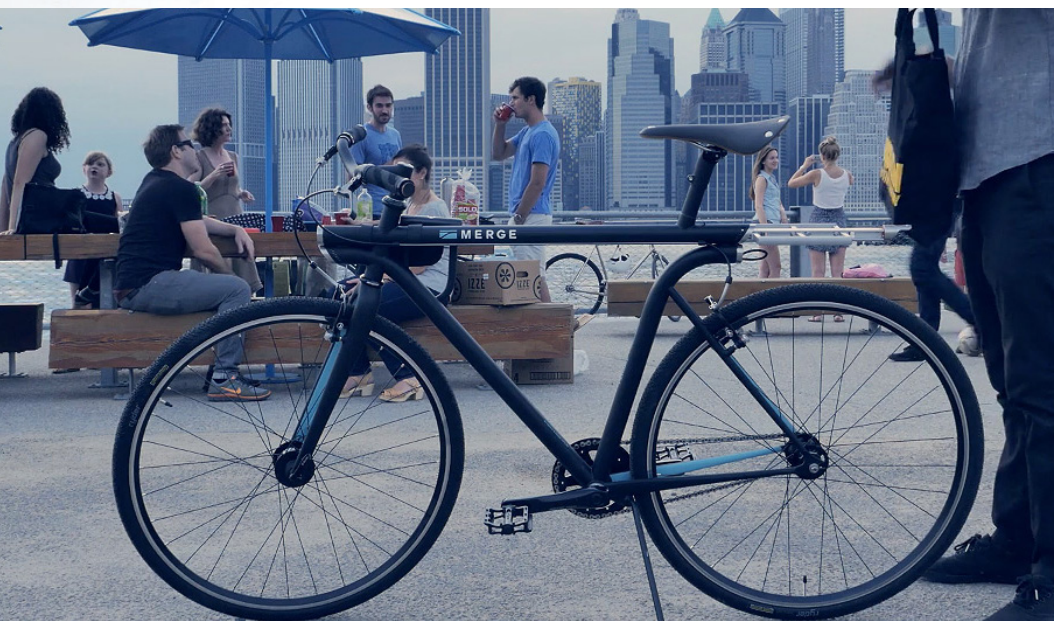


■ Case studies



INDUSTRY

TEAGUE



PENSA!

MML



HUGE
DESIGN LLC

IDEO



Source: <http://oregonmanifest.com/>

■ Fun bicycles



Artikcar

■ *play value through aesthetics*

■ Fun bicycles



Artikcar

■ *play value through aesthetics*

Feats per minute
Play with a different sence ■



■ Fun bicycles



Artikcar

■ *play value through aesthetics*

Feats per minute
Play with a different sence ■



Bicycle experiments by Todd Kundl

■ *wacky ideas to pedalling*

■ Fun bicycles



Artikcar

■ *play value through aesthetics*

Feats per minute
Play with a different sence ■



Bicycle experiments by Todd Kundl

■ *wacky ideas to pedalling*

Roller Shuttle
play value through riding fashion ■



■ Fun bicycles



Artikcar

■ *play value through aesthetics*

Feats per minute
Play with a different sence ■



Bicycle experiments by Todd Kundl

■ *wacky ideas to pedalling*

Roller Shuttle
play value through riding fashion ■



Shopping cart bicycle

■ *bicycle function to a similar object*



■ Fun bicycles



Artikcar

■ *play value through aesthetics*

Feats per minute
Play with a different sence ■



Bicycle experiments by Todd Kundl

■ *wacky ideas to pedalling*

Roller Shuttle
play value through riding fashion ■



Shopping cart bicycle

■ *bicycle function to a similar object*



Snowboard bike

play value through riding fashion ■



■ Fun bicycles



Merry go round bicycle

- *play value through group riding*

■ Fun bicycles



Merry go round bicycle

■ *play value through group riding*

Mini Bicycles

play with over all size ■



■ Fun bicycles



Merry go round bicycle

■ *play value through group riding*

Mini Bicycles

play with over all size ■



Bicycle by Sudha cars museum

■ *play with over all size*

■ **Design Process**

- Ideations
- Understanding Minions
- Configuring the bicycle
- Rig testing
- Working with montage
- Designing around hard points
- Detailing

■ Ideation | Level 1

How to bring in novelty?

Mind map

Use of analogies

■ Direct



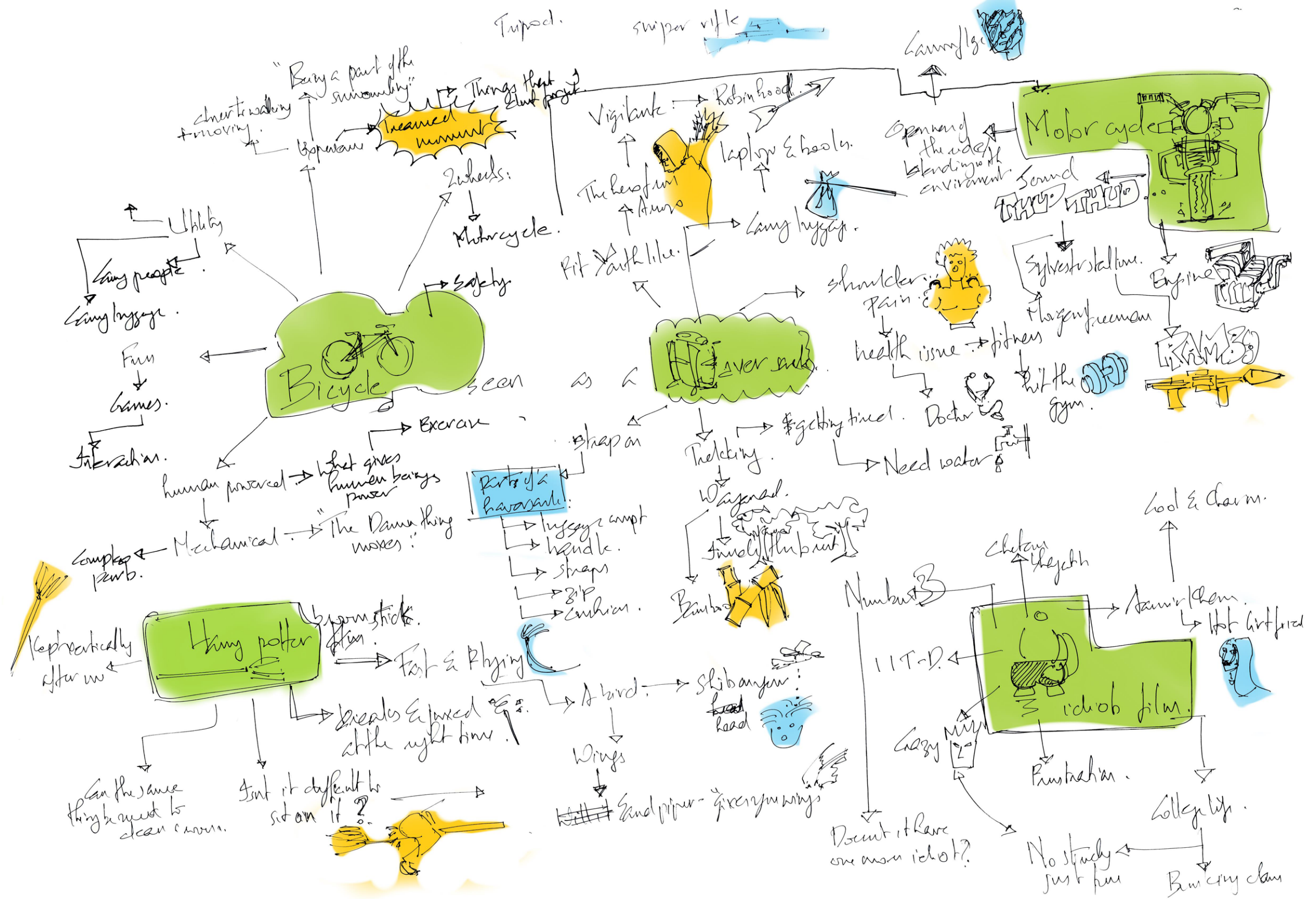
■ Indirect



■ Fantasy

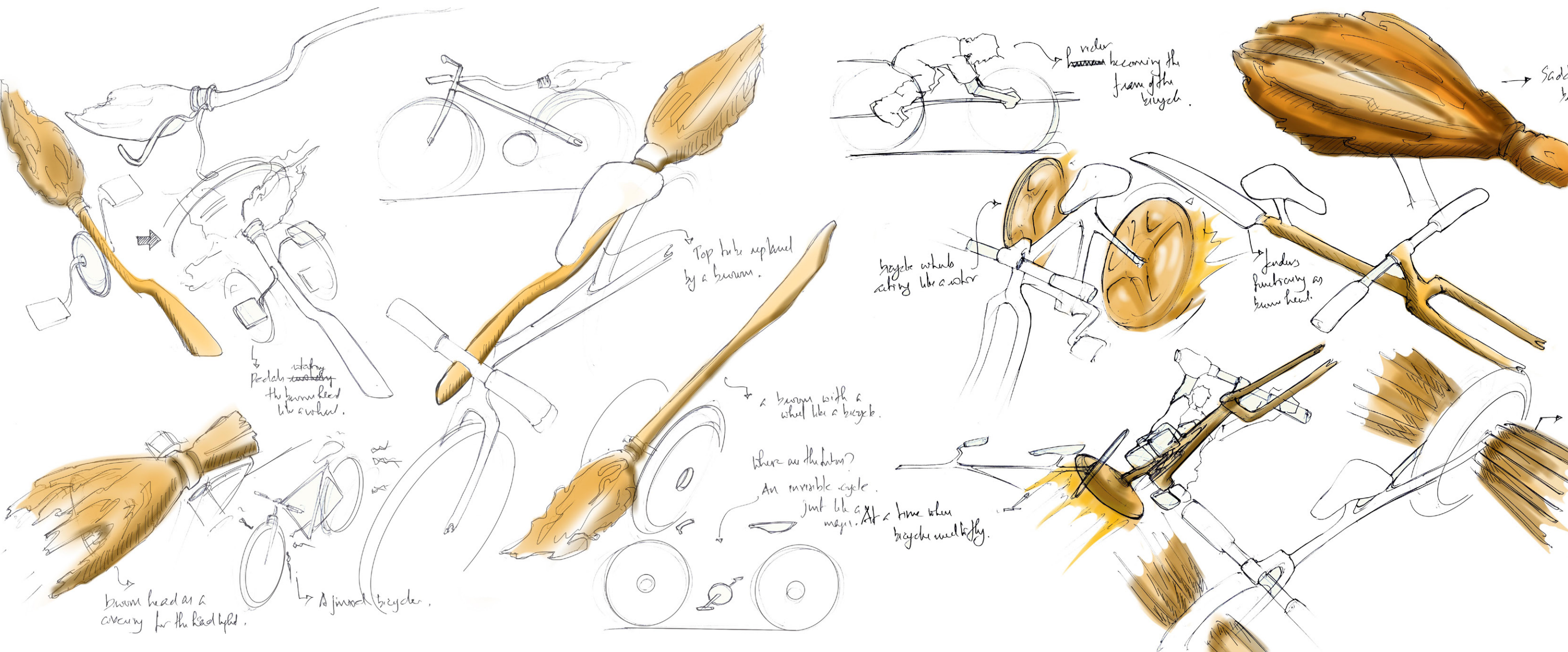


Ideation | Mindmap



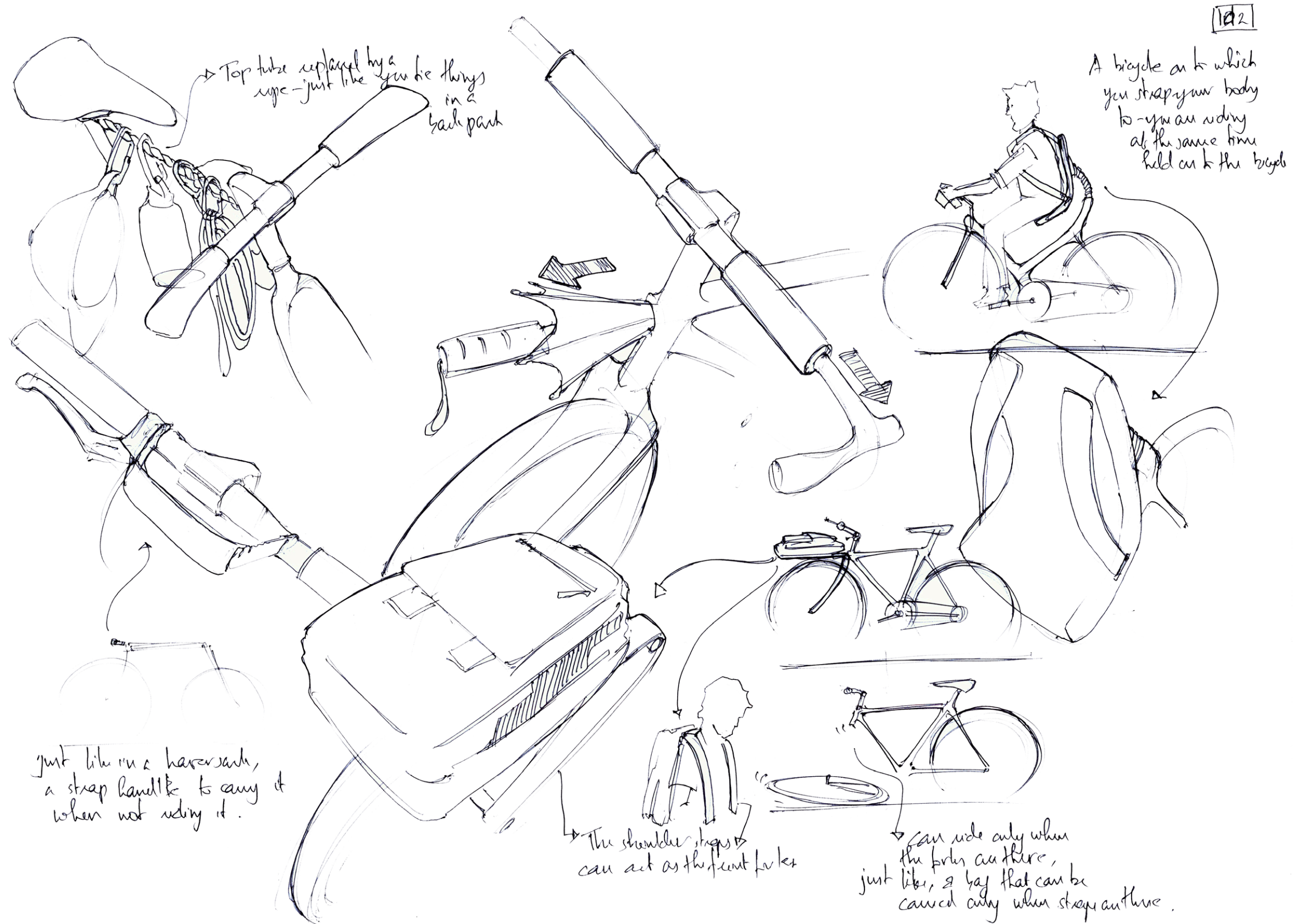
Ideation

Fantasy analogy - Harry potter broom stick



Ideation

Indirect analogy



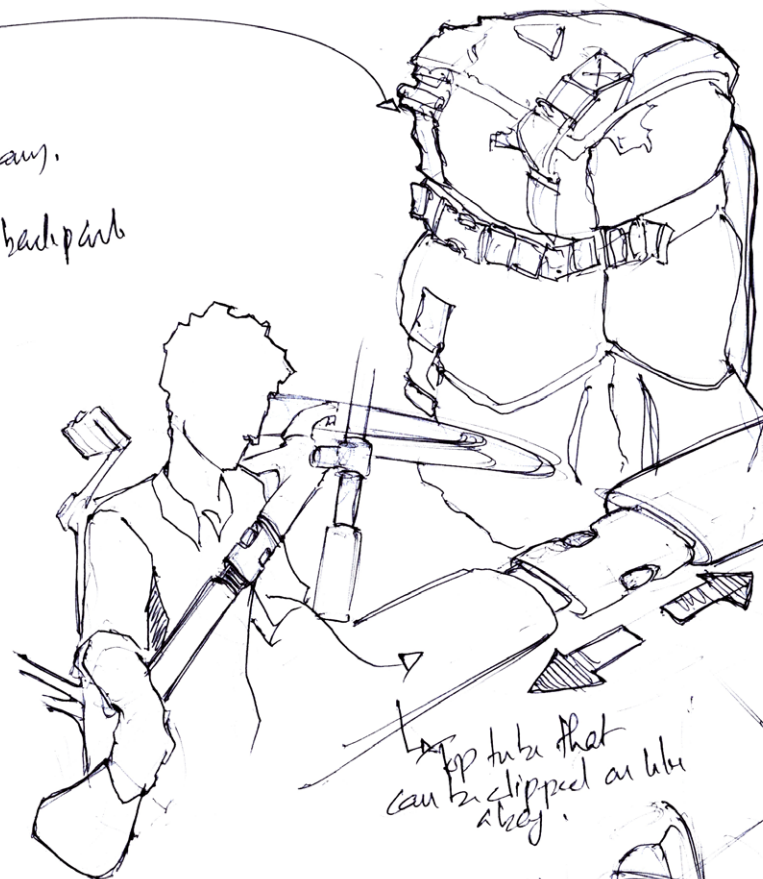
Ideation

Indirect analogy - Haversack



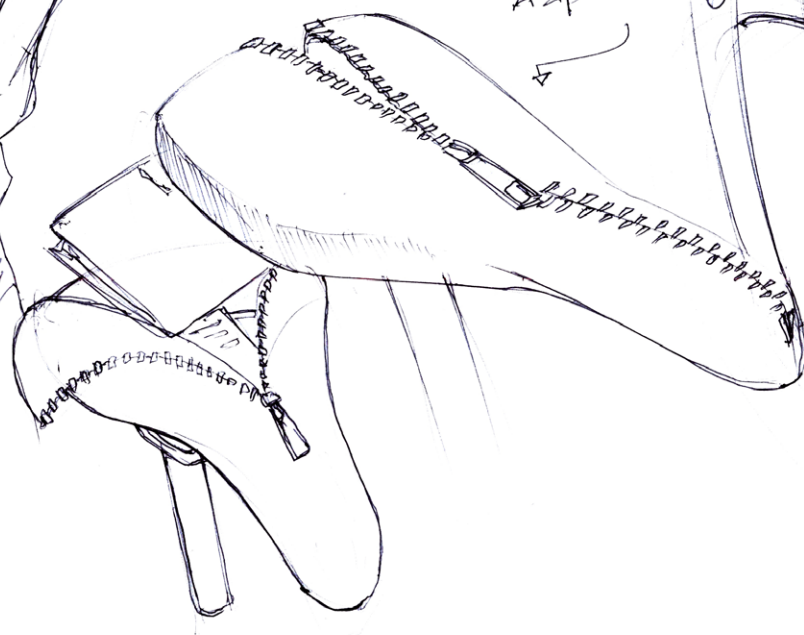
Bicycle seen as a haversack.

A bicycle that you can carry,
just like you
carry a backpack.

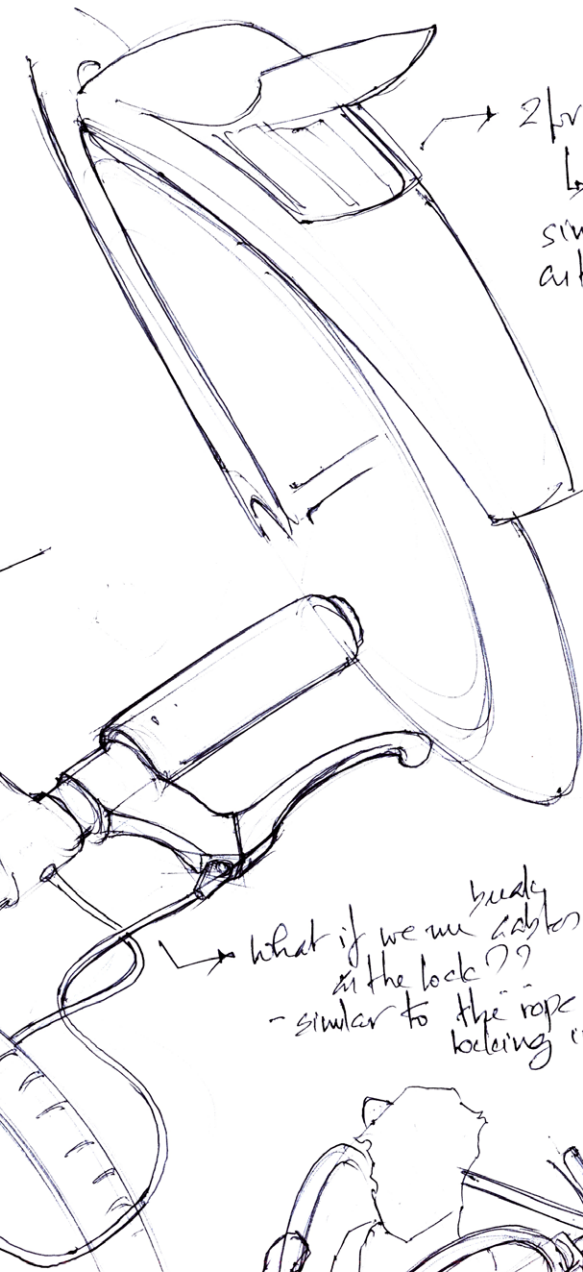


top tube that
can be clipped on like
a bag.

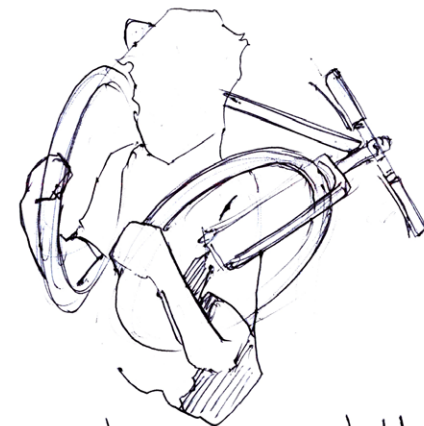
A zip like thing



2 fork + fender
↳ having
similar analogy
as that of a backpack.



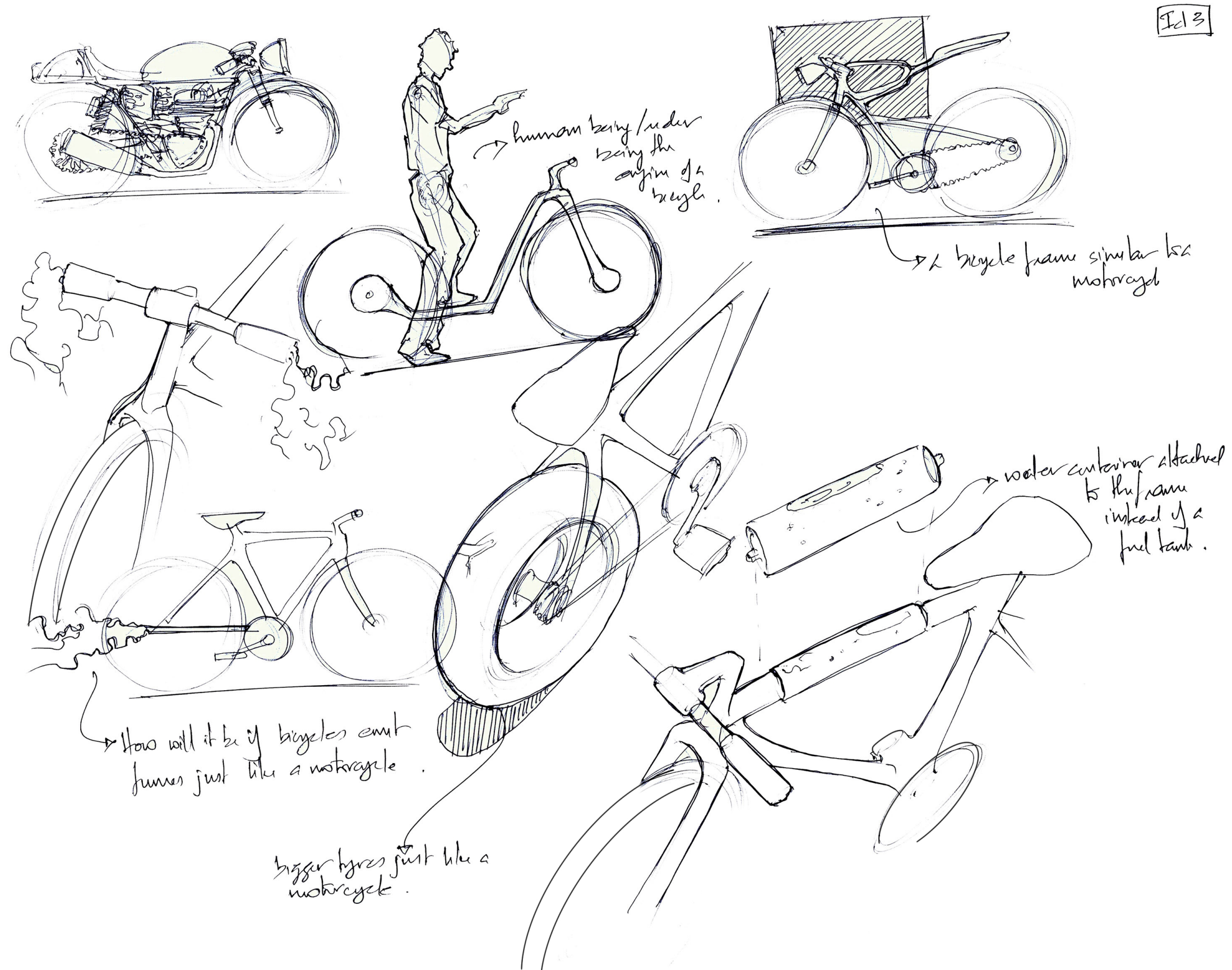
what if we use cables
at the lock??
- similar to the rope extenders
belonging on backpacks.



just like
shoulder straps of
a backpack.

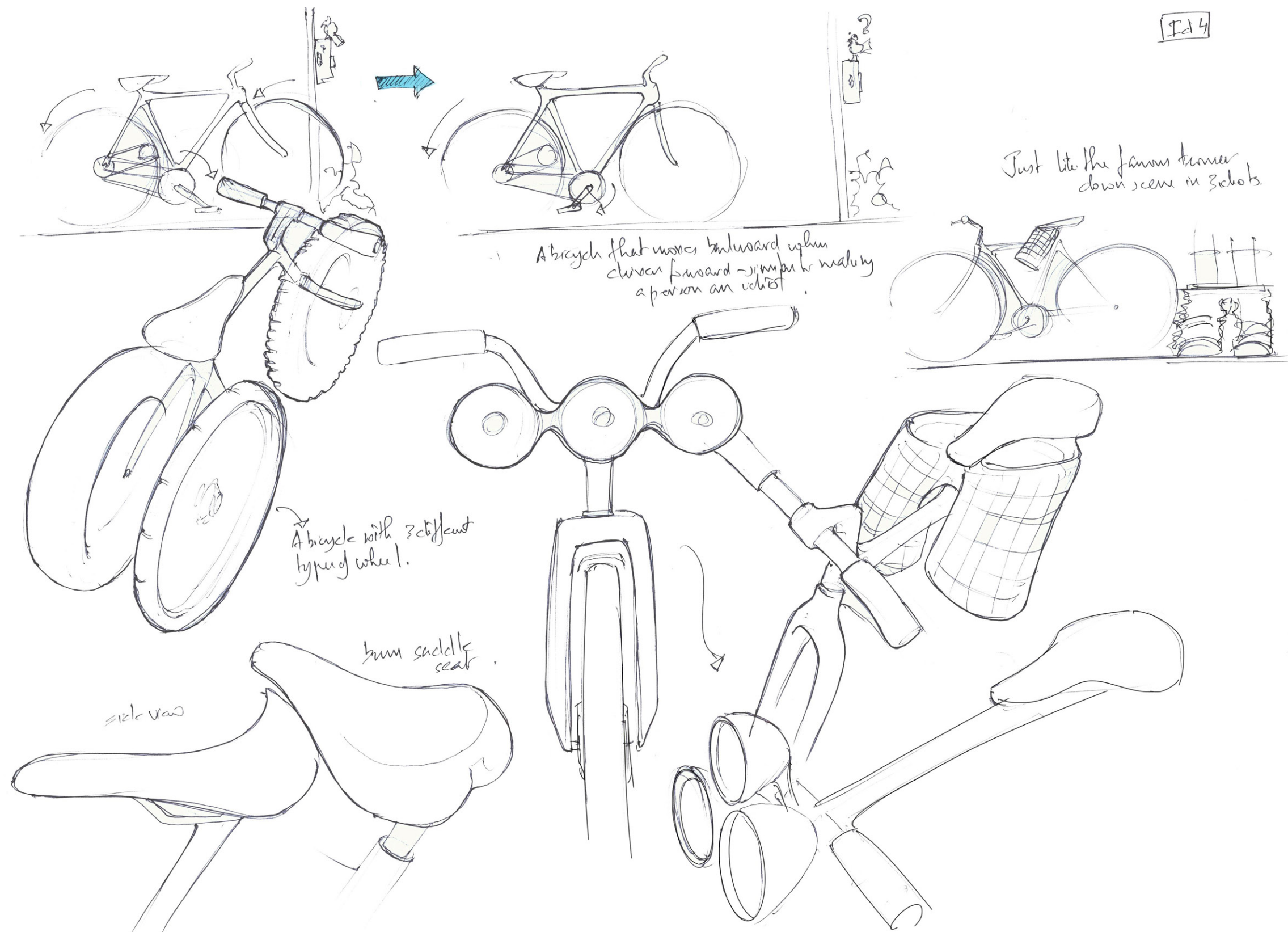
↳ carrying just like a
backpack - 2 types
becoming th.

Ideation | Direct analogy - Motorcycle



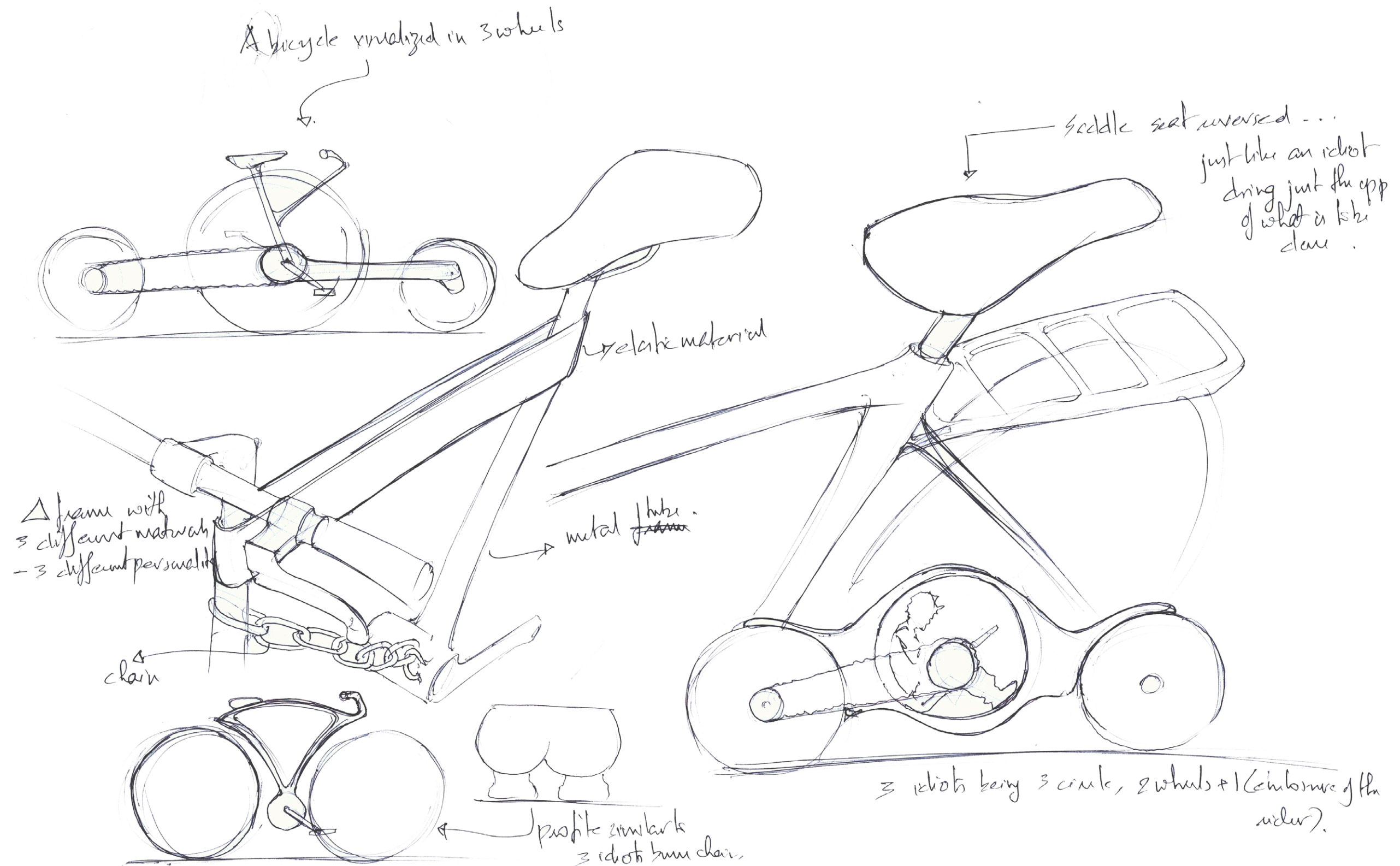
Ideation

Direct analogy - 3 idiots film



Ideation

Direct analogy

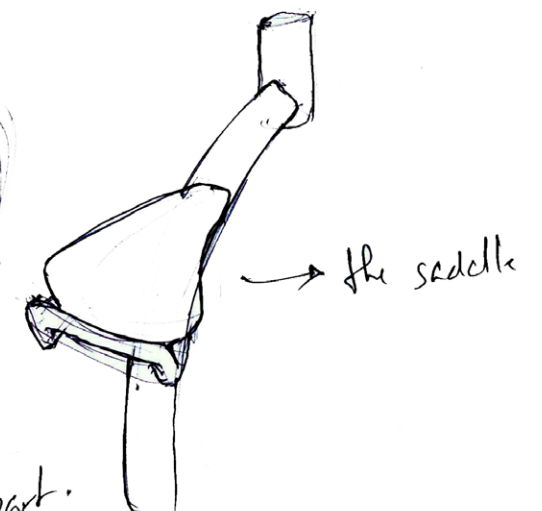
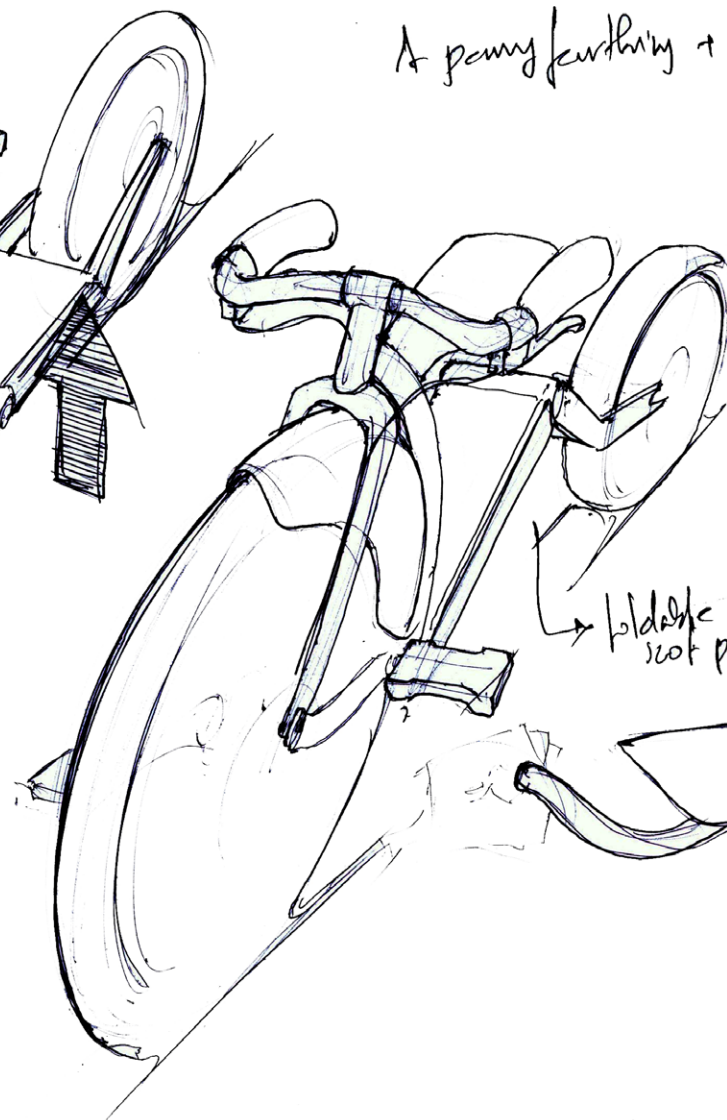
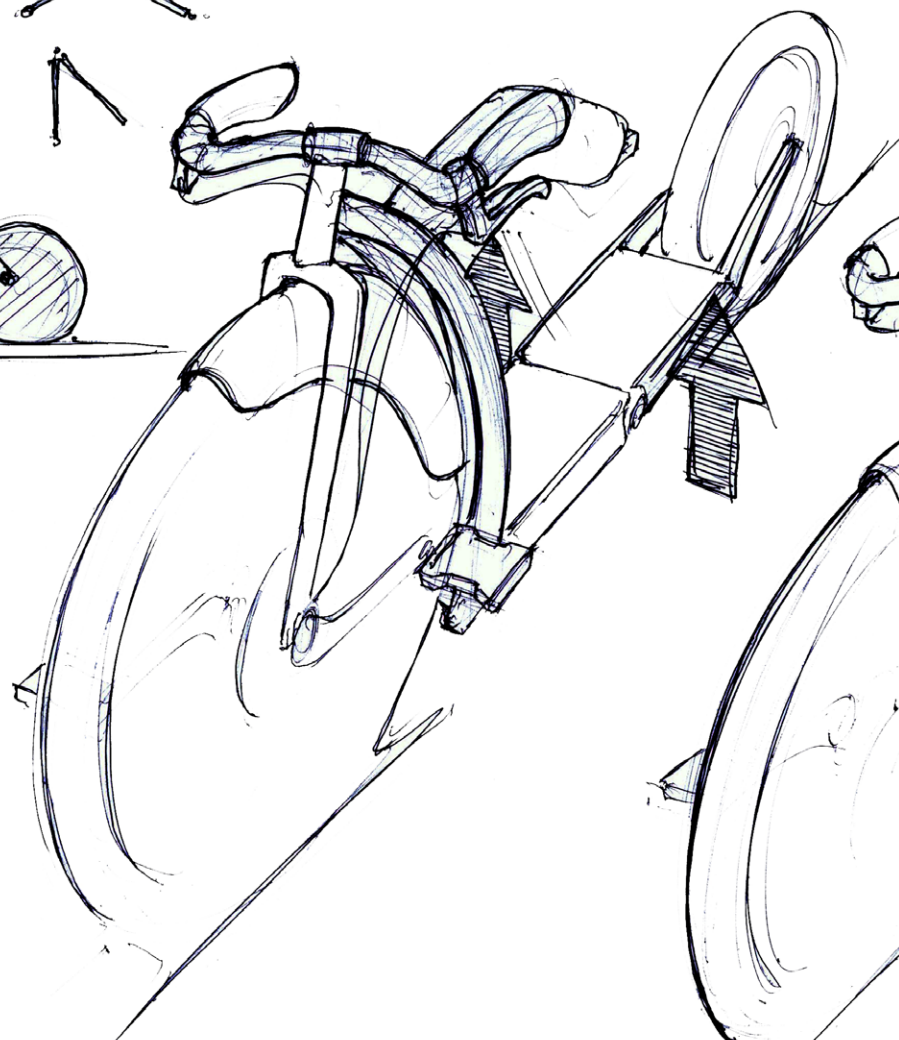
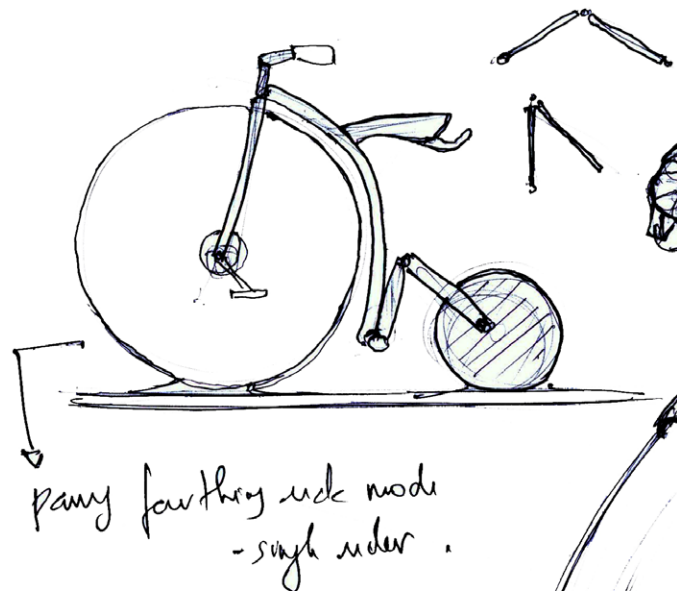
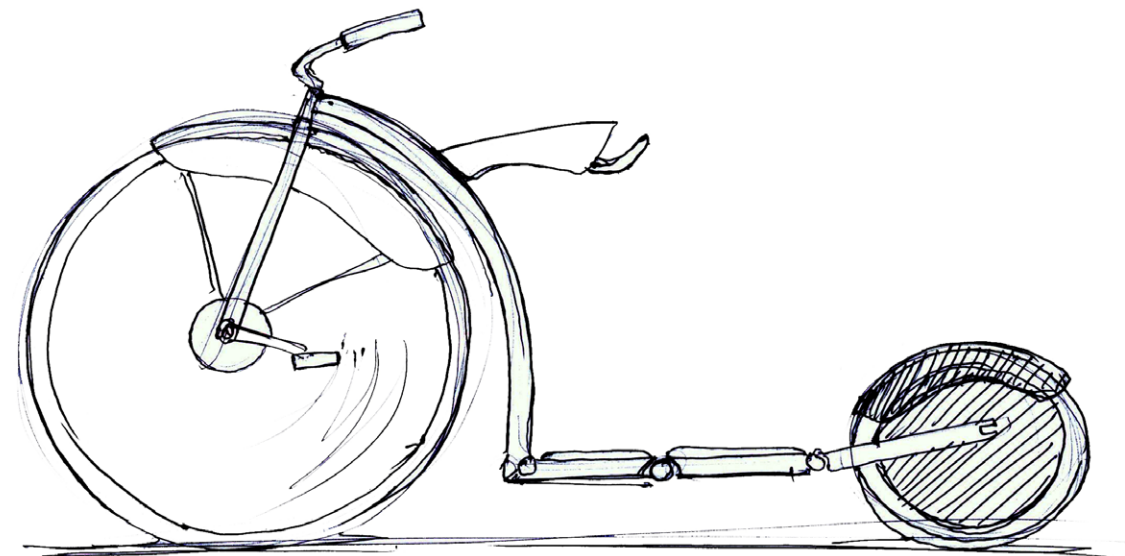
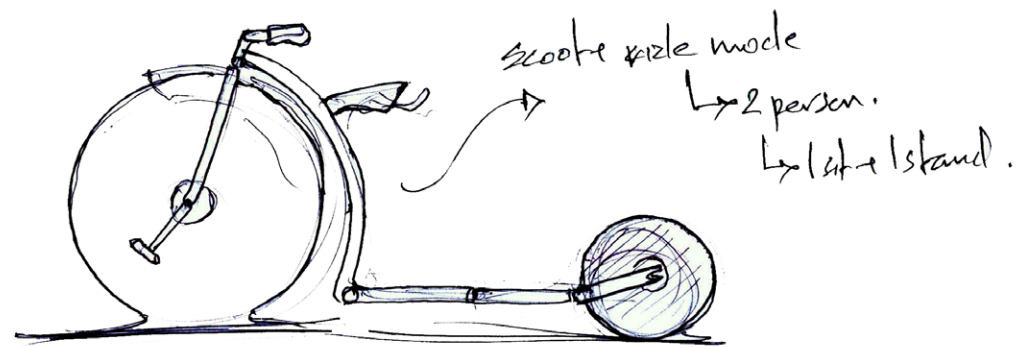


Clustering

- Visual aesthetics, structure, theme
- Movement, ride
- Experiential

Ideation

Design direction 1



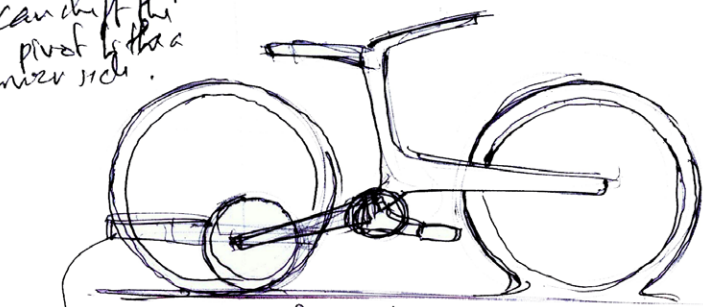
foldable
seat part.

saddle side view.

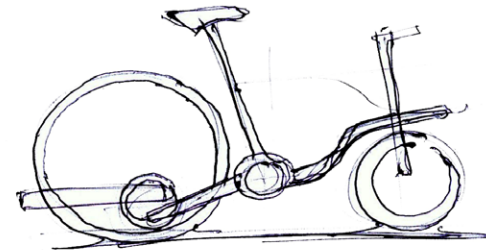
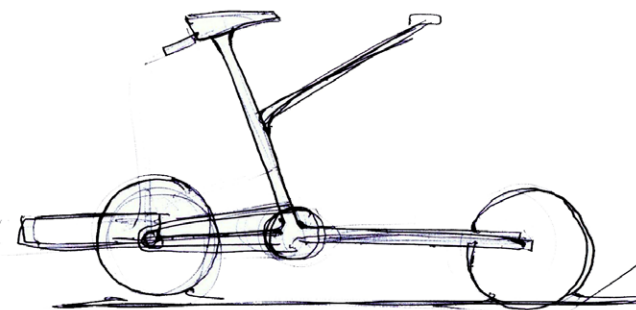
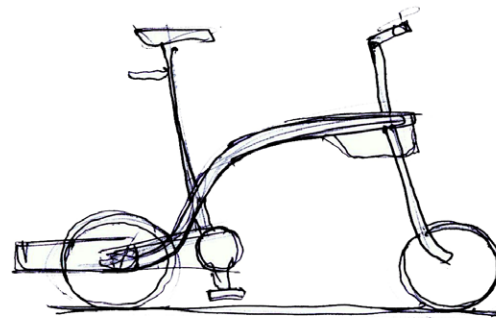
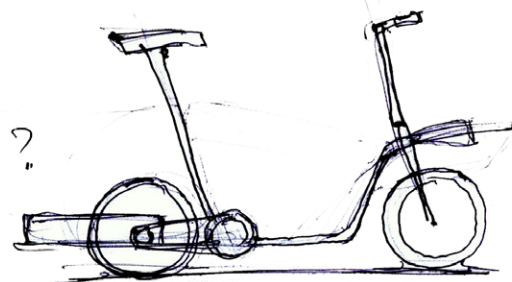
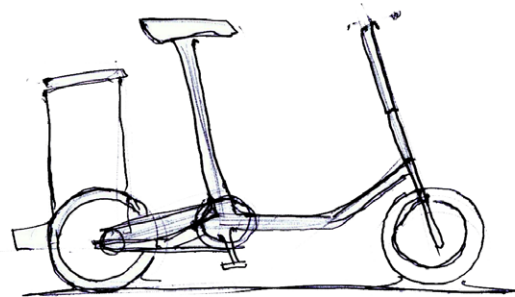
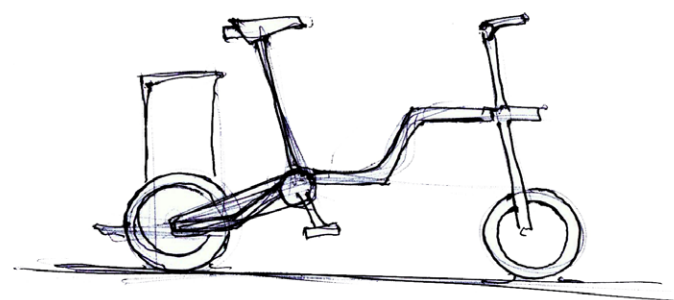
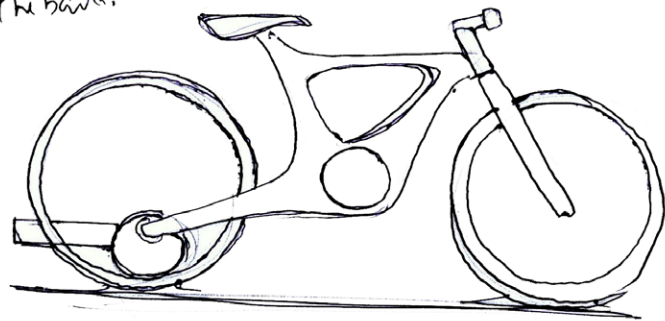
Ideation

Design direction 2

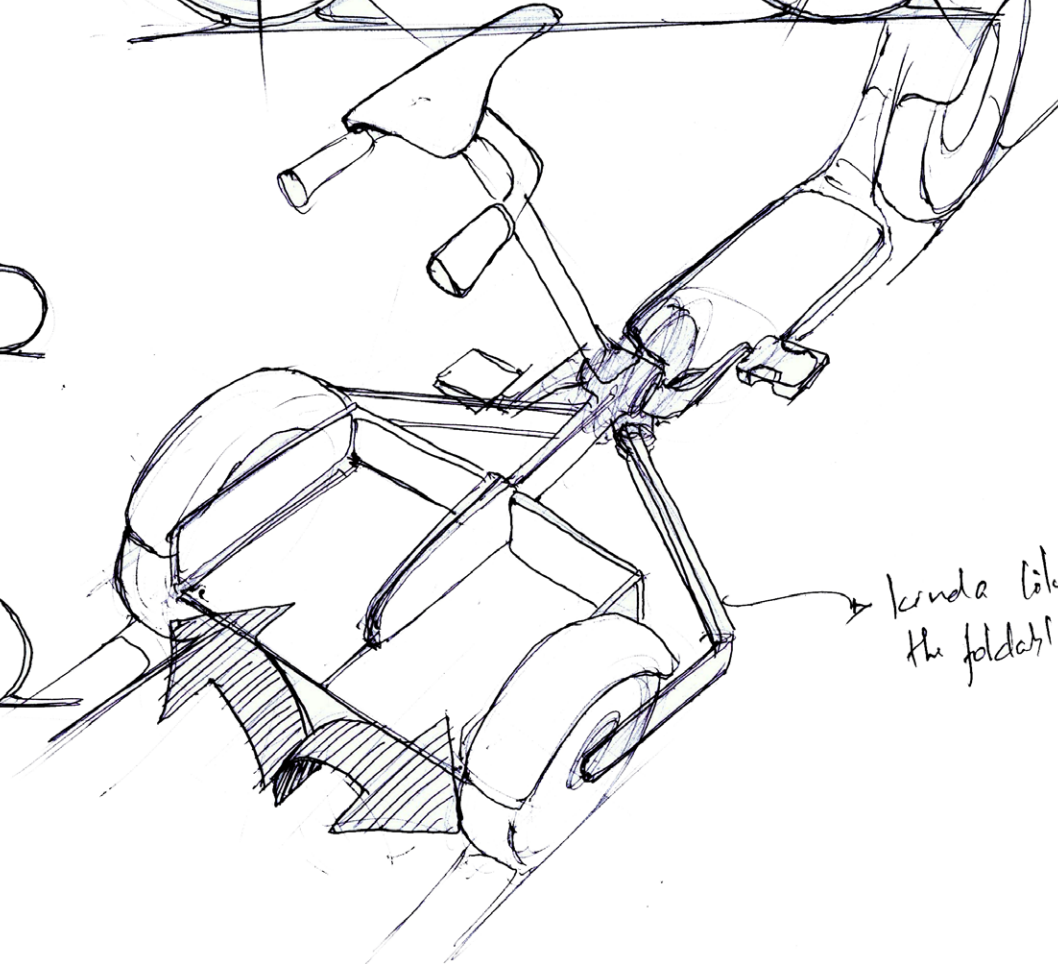
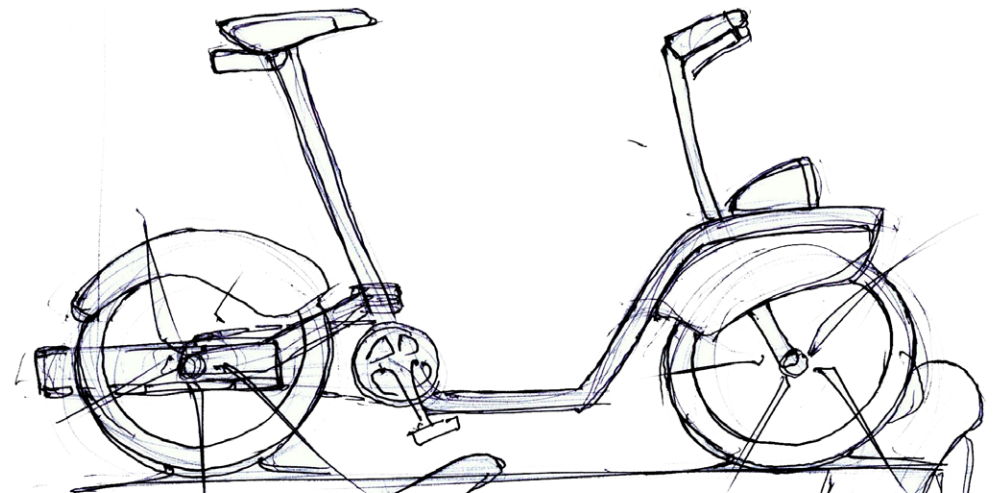
hidden concept
can shift the
pivot to the
inner side.



→ how about a hidden concept?



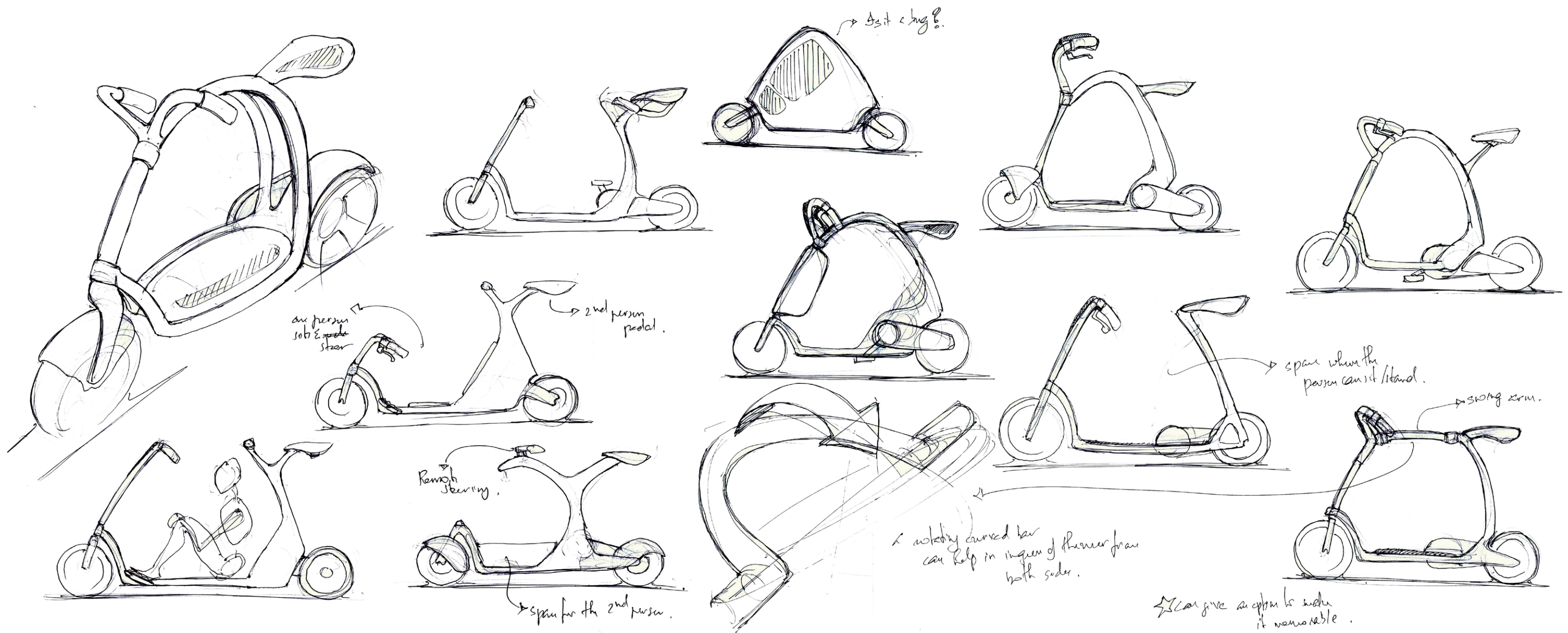
- chariot
- small but wide wheels
- tandem scooter.
- exploration of tandem power.



→ kinda like
the foldable scooter.

Ideation

Design direction 3



■ Concept selection

```
graph TD; A[Concept selection] --- B[Fun factor in terms of visual aesthetics]; A --- C[Novel ride experience for the fellow rider.]; A --- D[Better visibility for both riders]; B --- E[Design direction 3]; C --- E; D --- E;
```

- Fun factor in terms of visual aesthetics
- Novel ride experience for the fellow rider.
- Better visibility for both riders

Design direction 3

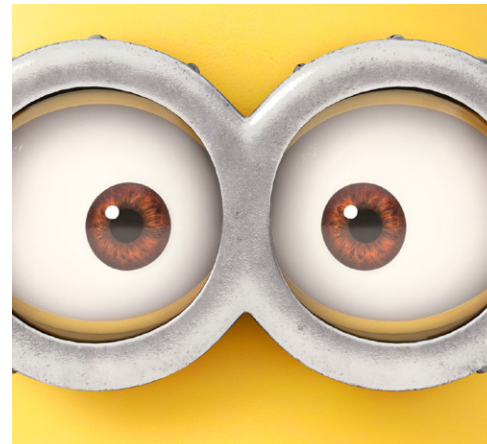


Understanding minions

- Appearance
- Personality
- Color palette

■ Appearance

- Small, yellow and cylindrical
- Single as well as double eyed
- Characteristic features:



■ **Personality**

- Serves the most despicable master
- Strange jabber to communicate
- Childish sense of humor
- Varied likes and dislikes

■ Color palette



R 244
G 193
B 68



R 255
G 225
B 105



R 82
G 115
B 146

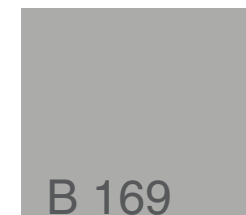


R 112
G 145
B 175



R 55
G 55

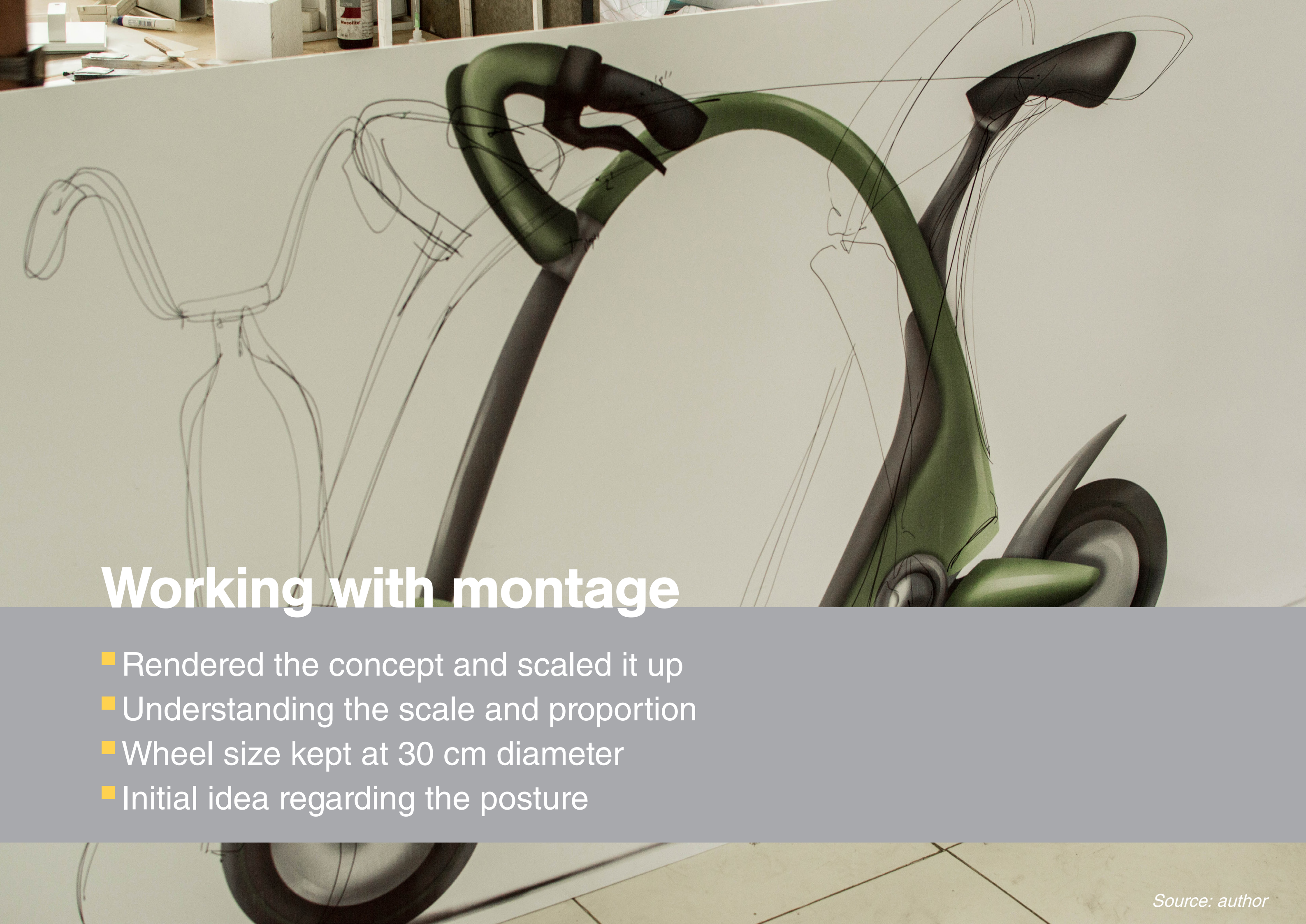
B 57



R 171
G 171

B 169





Working with montage

- Rendered the concept and scaled it up
- Understanding the scale and proportion
- Wheel size kept at 30 cm diameter
- Initial idea regarding the posture

■ Working with montage

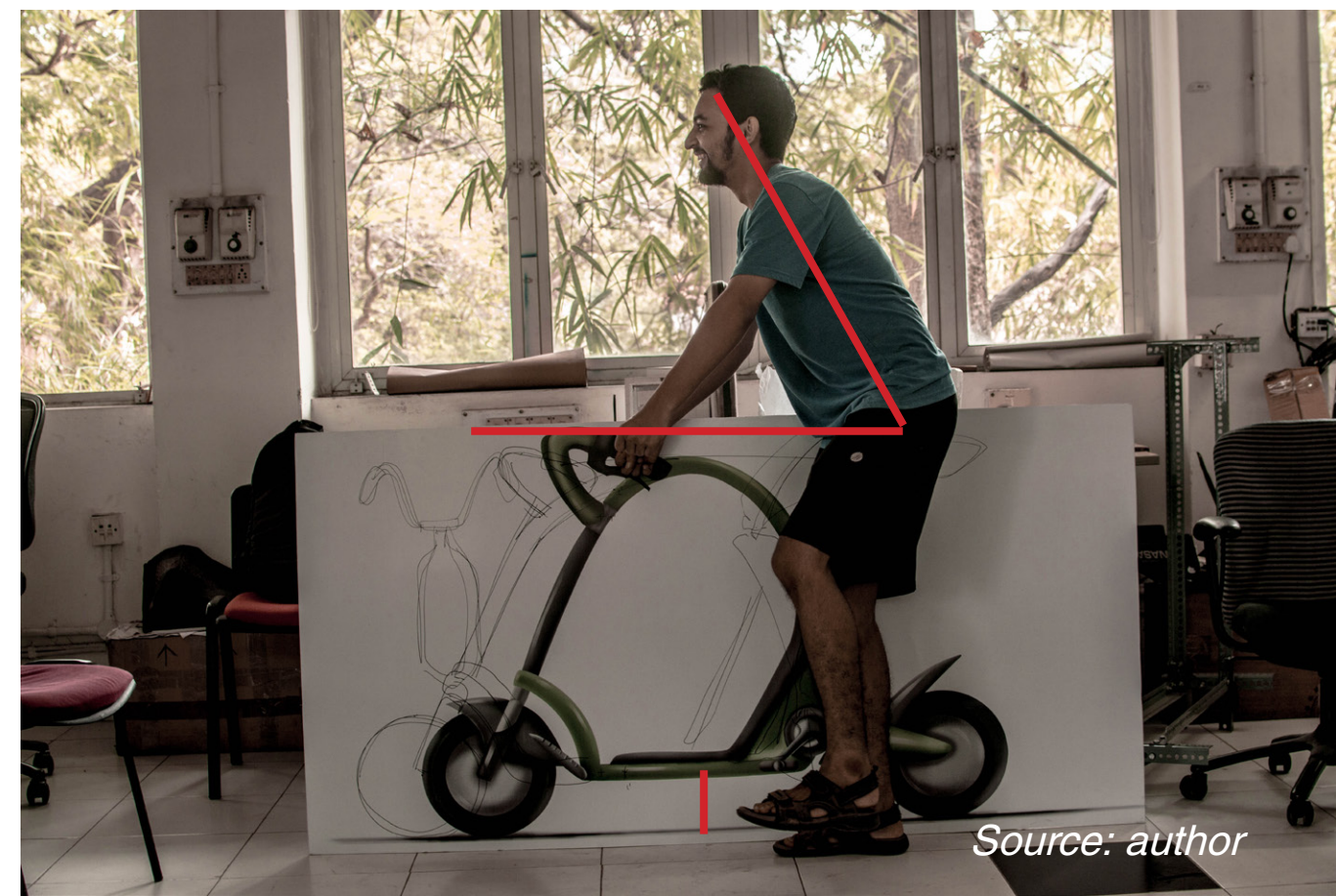
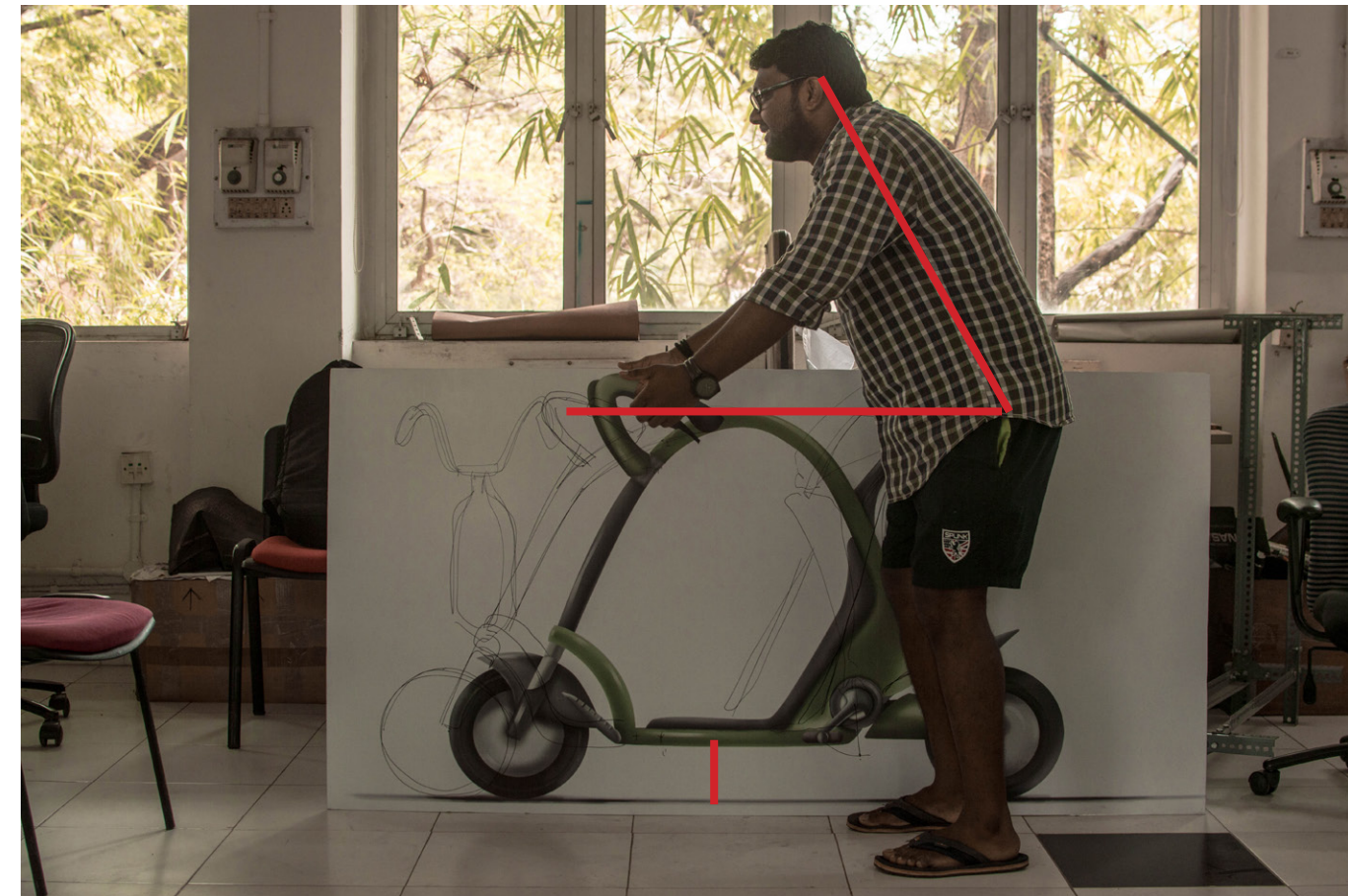
Posture analysis

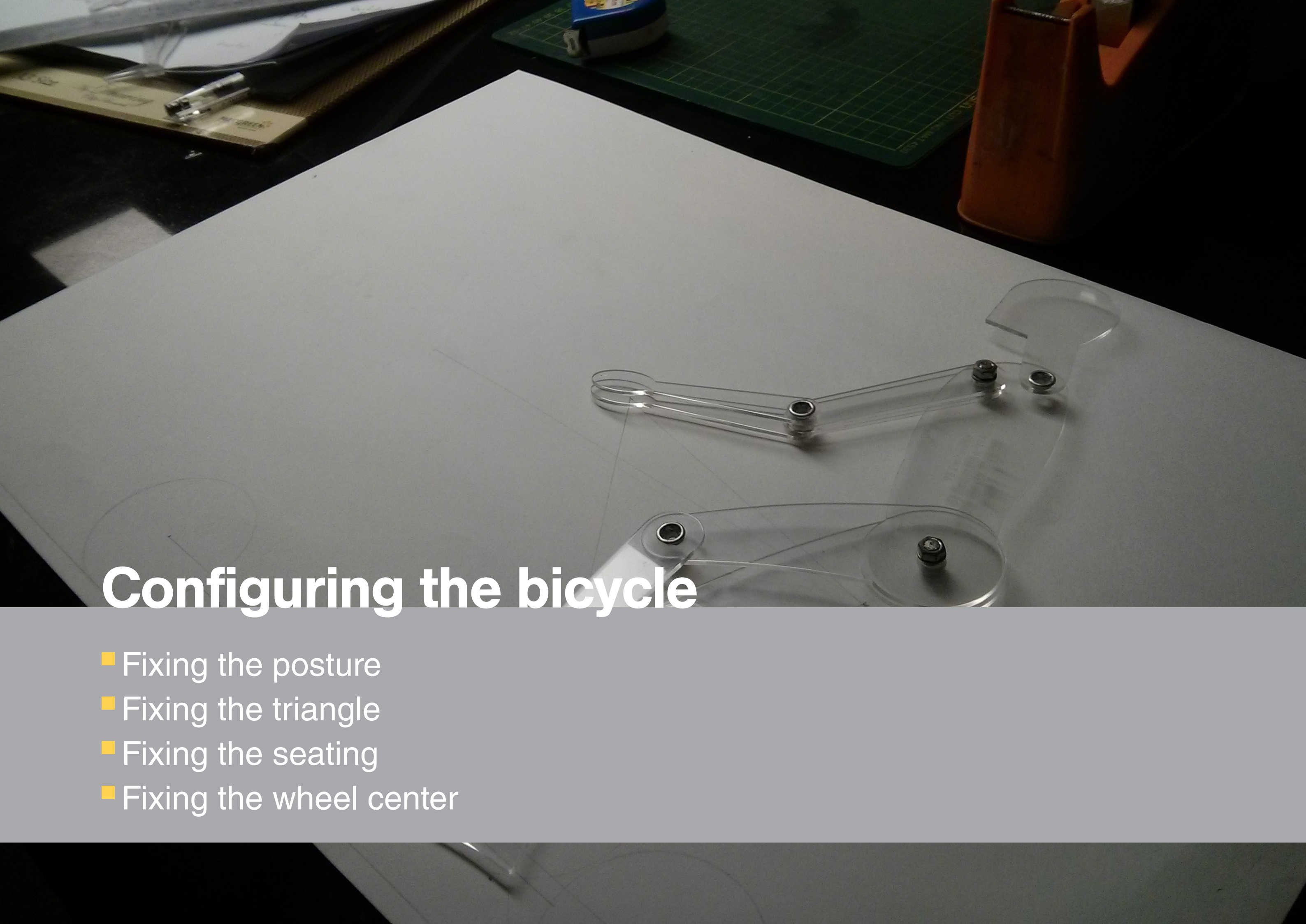
Handle reach

Clearance of the bottom seat

Knee room

Wheel base



A transparent mechanical linkage model is shown on a white sheet of paper. The model consists of several clear plastic or acrylic components connected by small black pins or rivets. It includes a long horizontal link, a shorter vertical link, and a circular component that resembles a wheel or a crank. The background shows a workshop environment with a green cutting mat, a blue tape measure, and an orange folder.

Configuring the bicycle

- Fixing the posture
- Fixing the triangle
- Fixing the seating
- Fixing the wheel center

■ Fixing the posture

The posture should aid in stress free ride

The posture should facilitate good view of the environment

The posture should be ideal for short distance rides



Dutch bike posture



Cruiser bike posture



Trek bike posture



Road bike posture

■ Fixing the posture

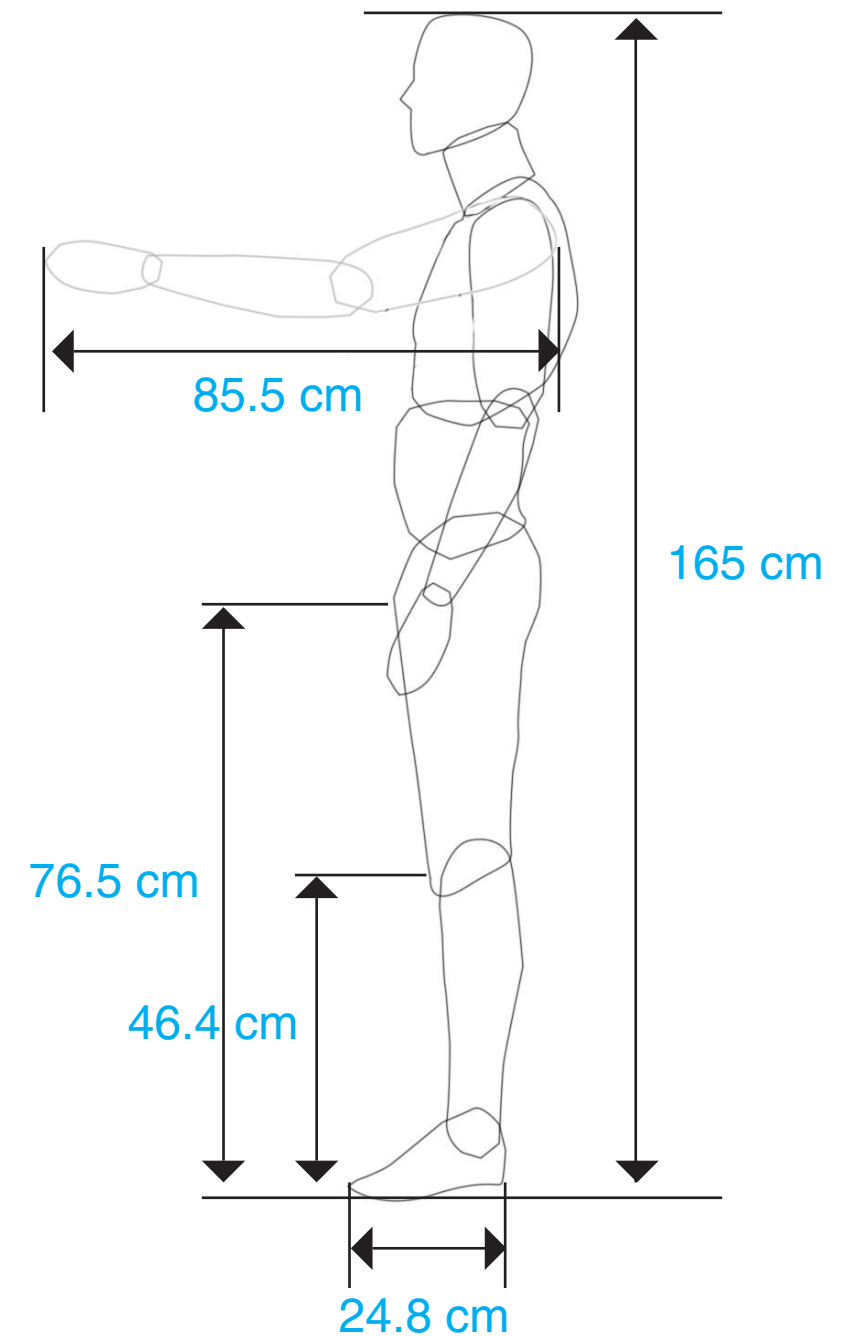
Cruiser bike posture advantages:

- Good visibility
- Ideal for short distance rides
- Low stress
- Adequate control



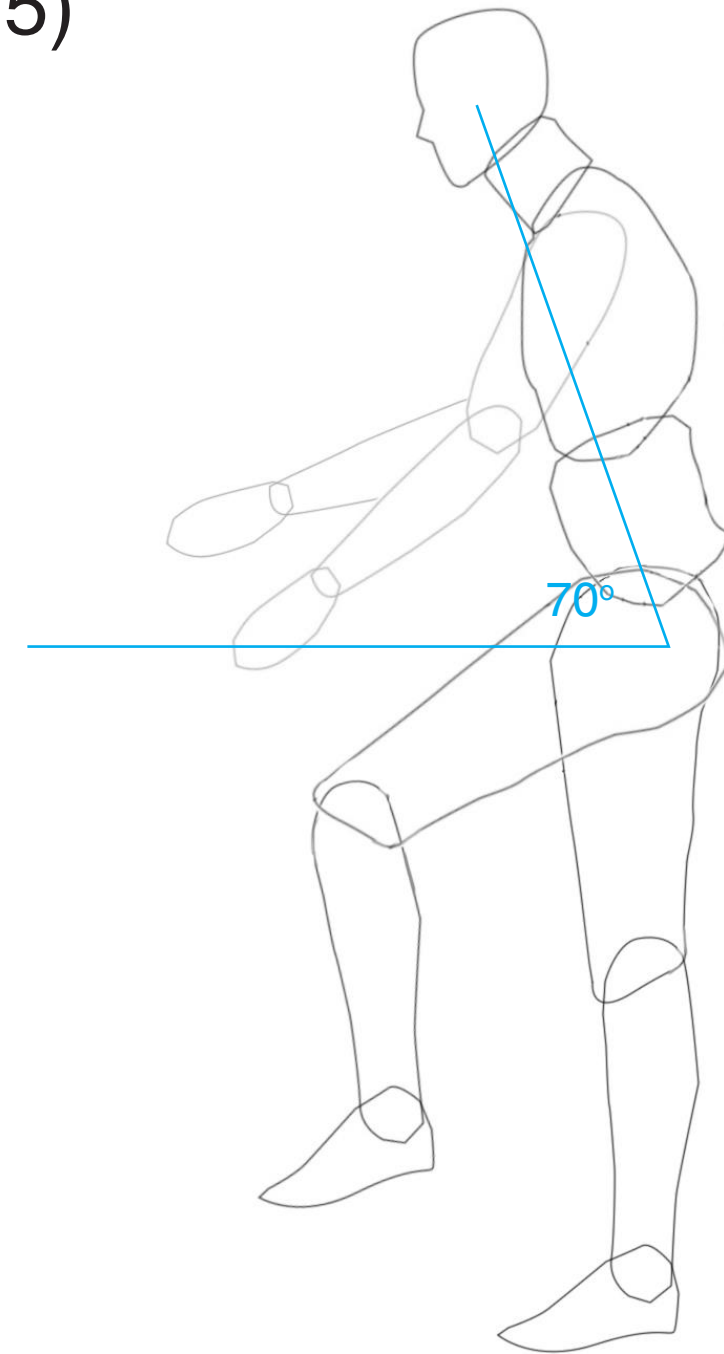
■ Fixing the triangle

- Fixing the bottom bracket, saddle point and handle
- Used a 50 percentile male mannequin (1:5)



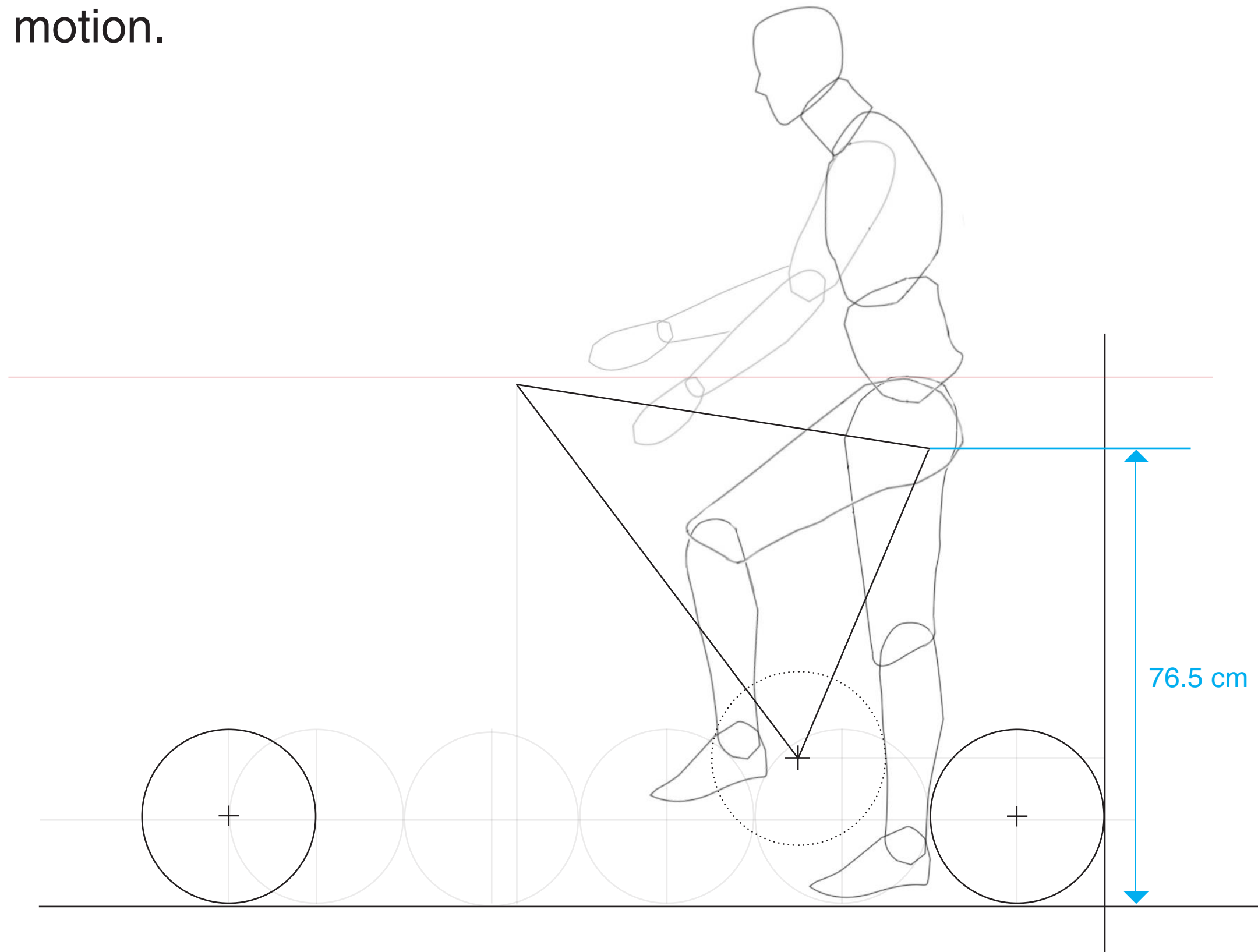
■ Fixing the triangle

- Fixing the bottom bracket, saddle point and handle
- Used a 50 percentile male mannequin (1:5)
- Chose a posture angle of 70°



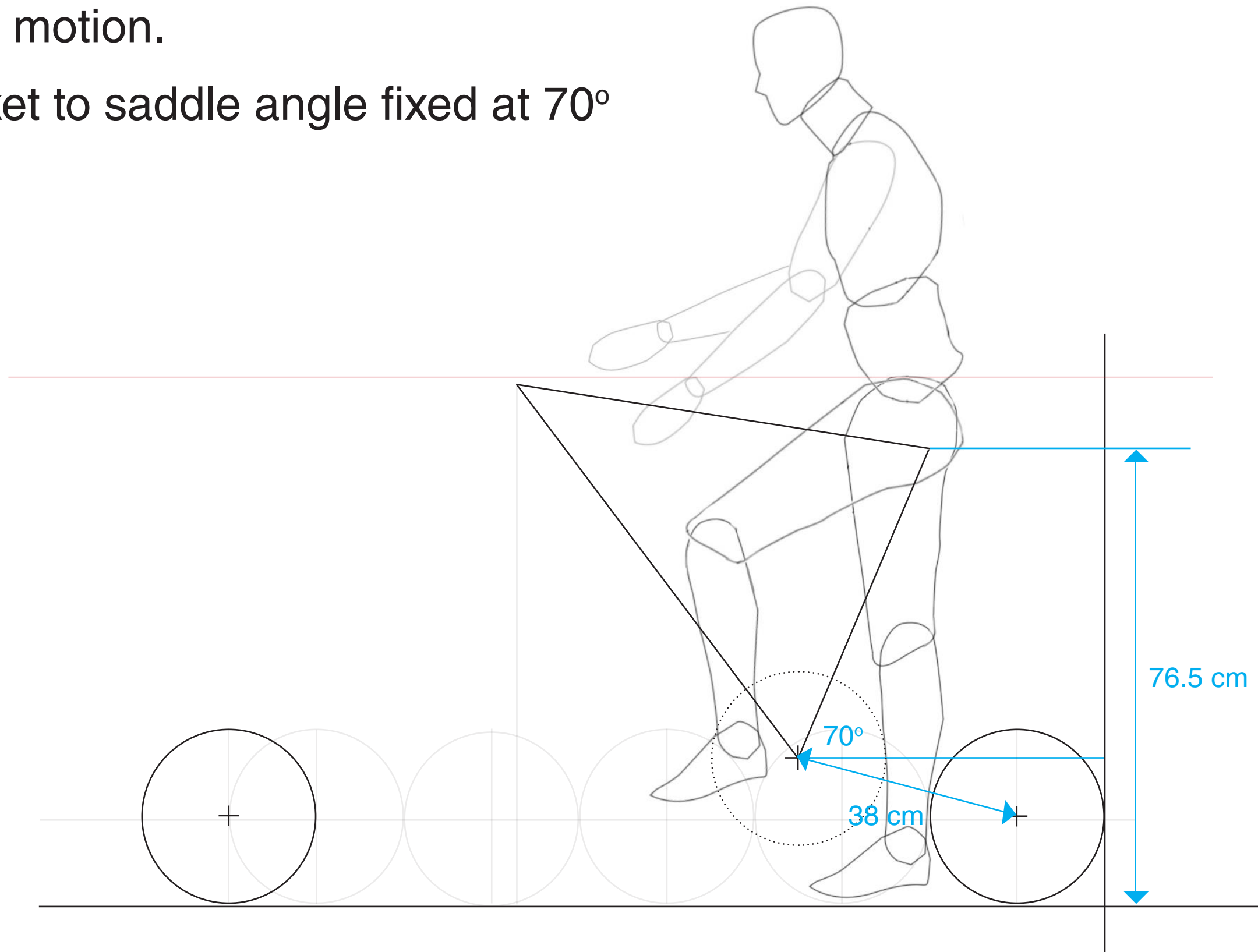
■ Fixing the triangle

- Saddle height fixed so that foot rests when bicycle not in motion.



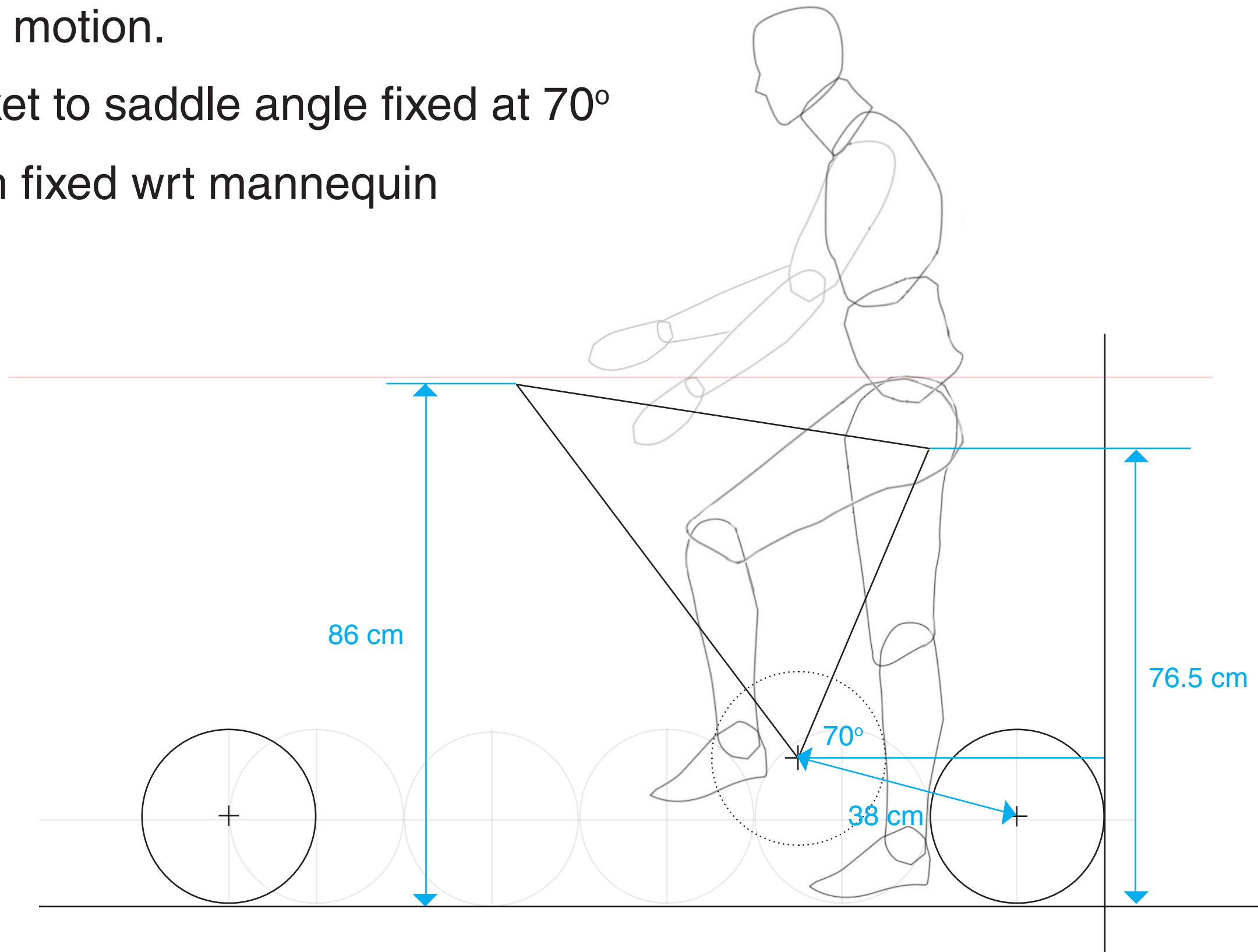
■ Fixing the triangle

- Saddle height fixed so that foot rests when bicycle not in motion.
- Bottom bracket to saddle angle fixed at 70°



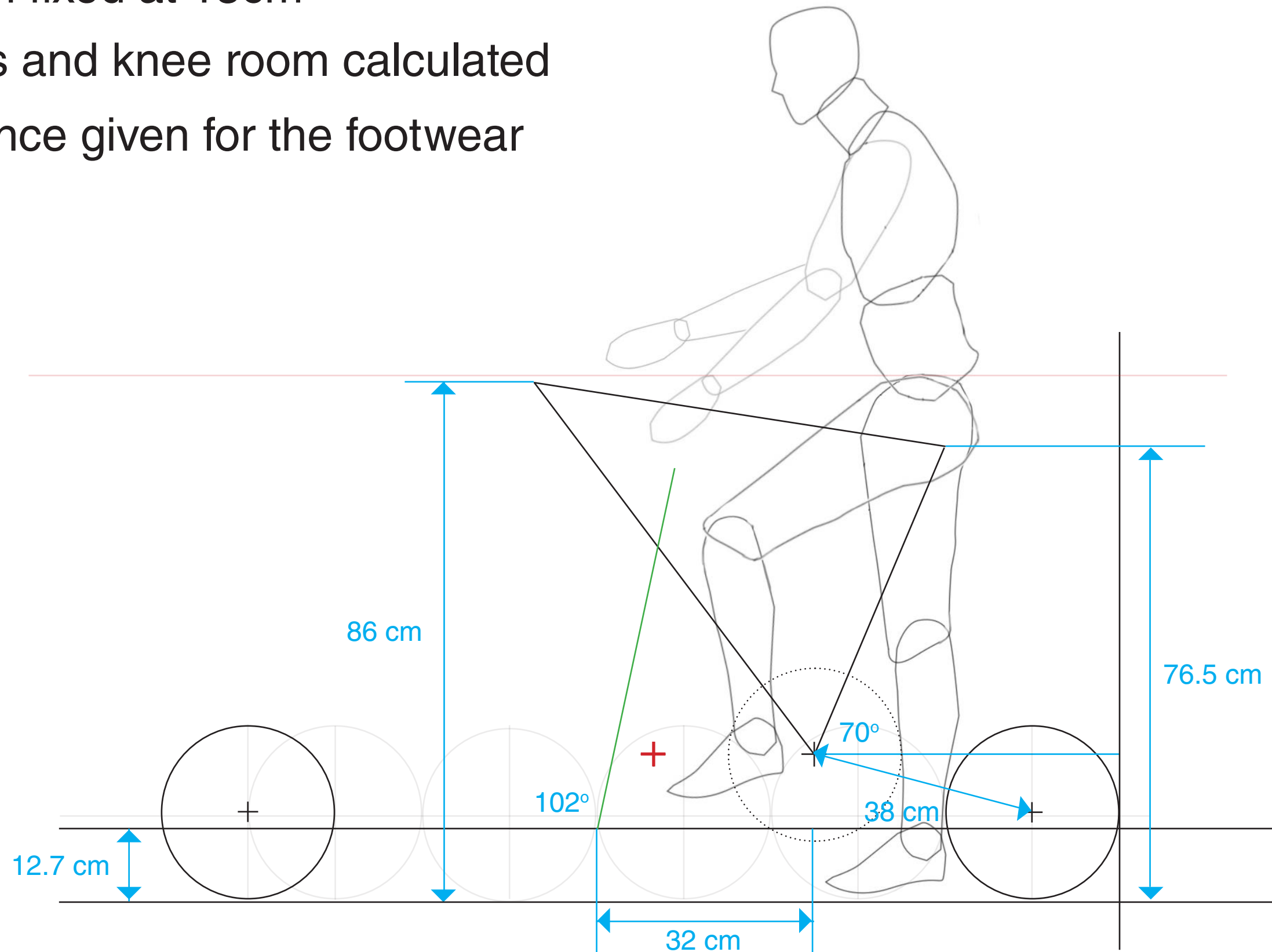
■ Fixing the triangle

- Saddle height fixed so that foot rests when bicycle not in motion.
- Bottom bracket to saddle angle fixed at 70°
- Handle reach fixed wrt mannequin



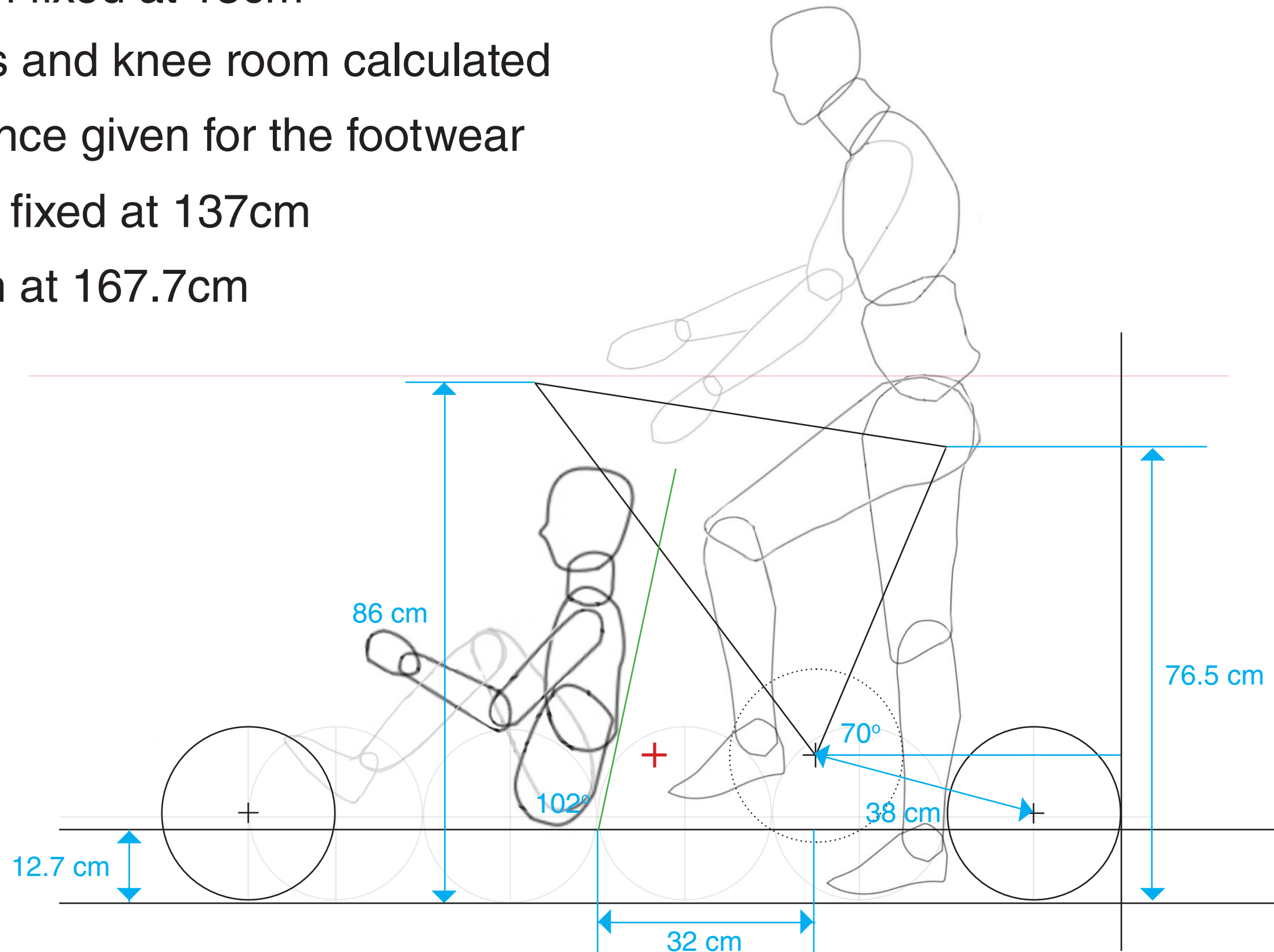
■ Fixing the bottom seat

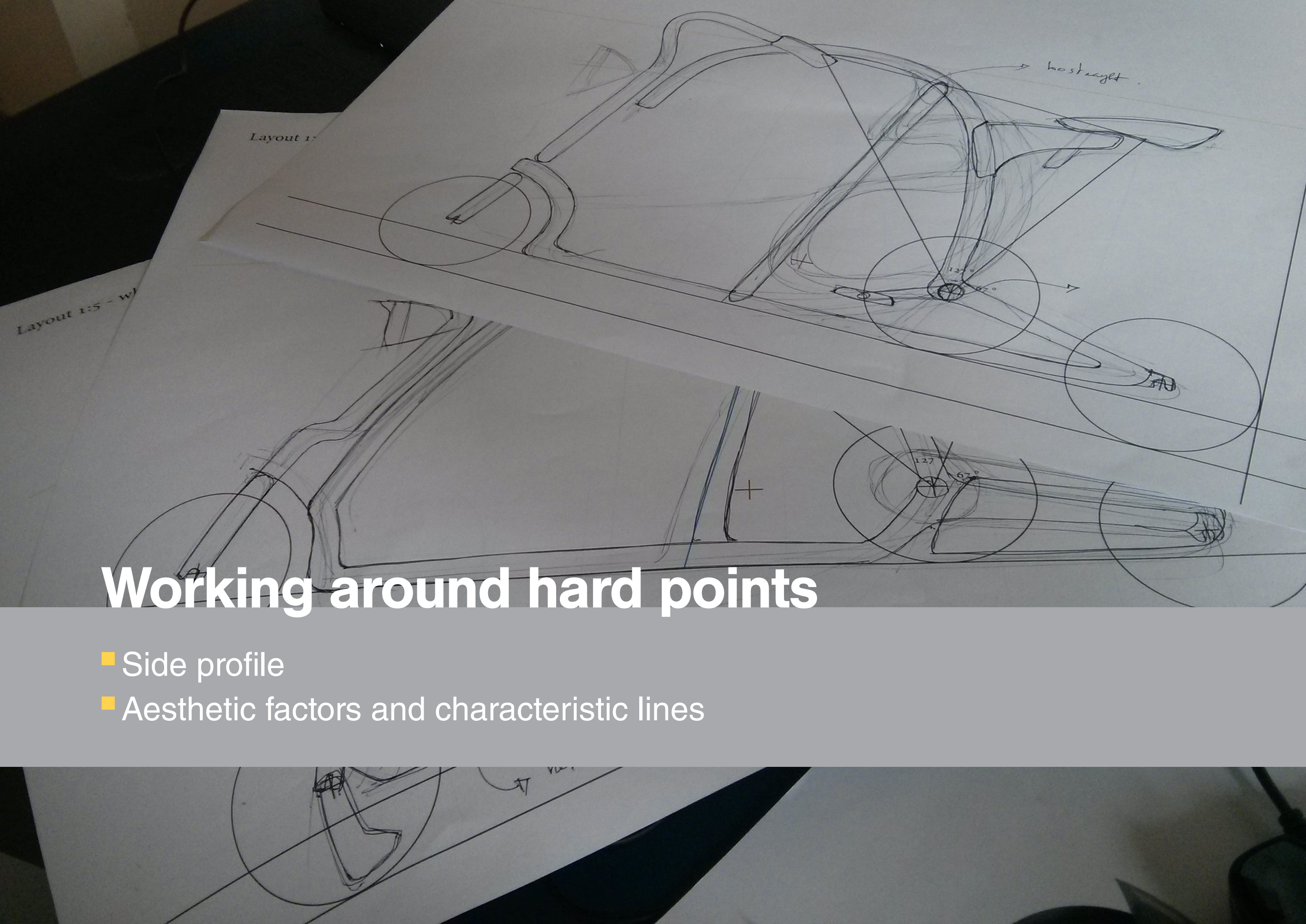
- Crank length fixed at 15cm
- Pedal radius and knee room calculated
- 5 cm clearance given for the footwear



■ Fixing the bottom seat

- Crank length fixed at 15cm
- Pedal radius and knee room calculated
- 5 cm clearance given for the footwear
- Wheel base fixed at 137cm
- Cycle length at 167.7cm

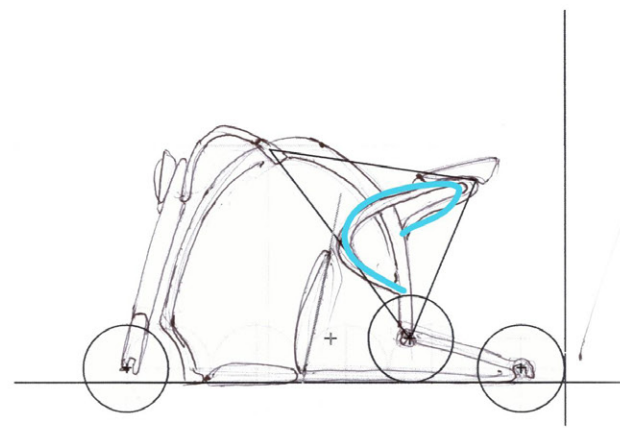
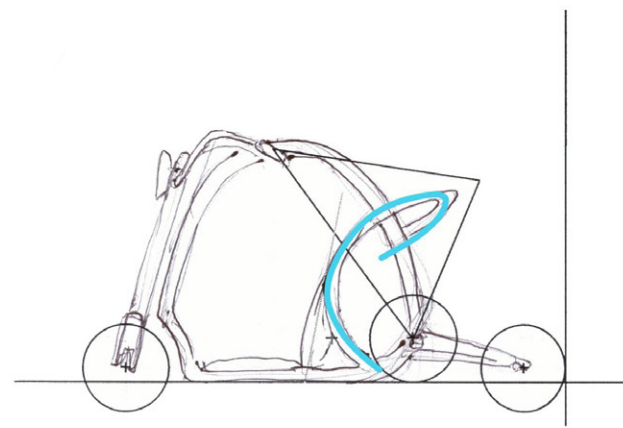
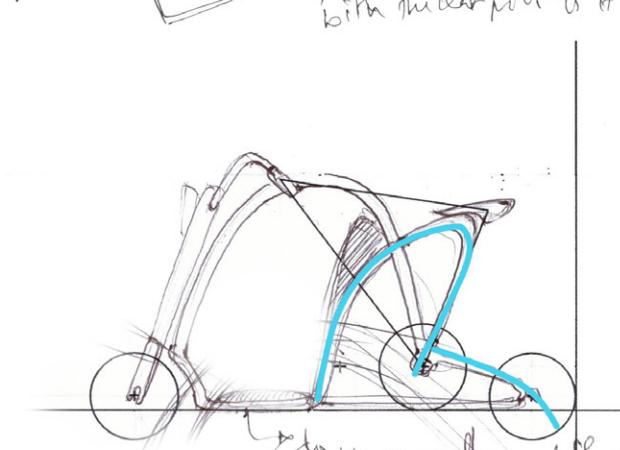
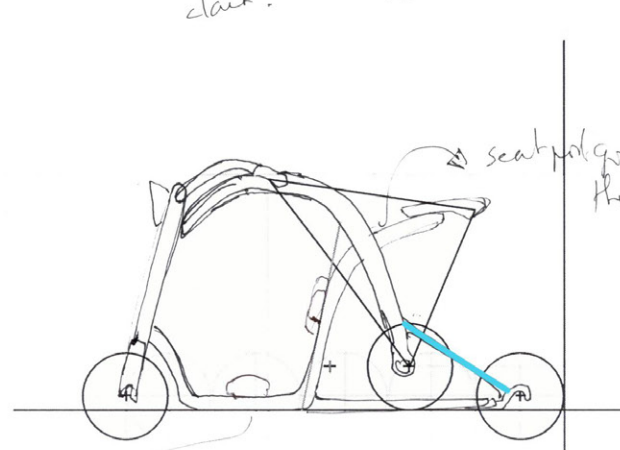
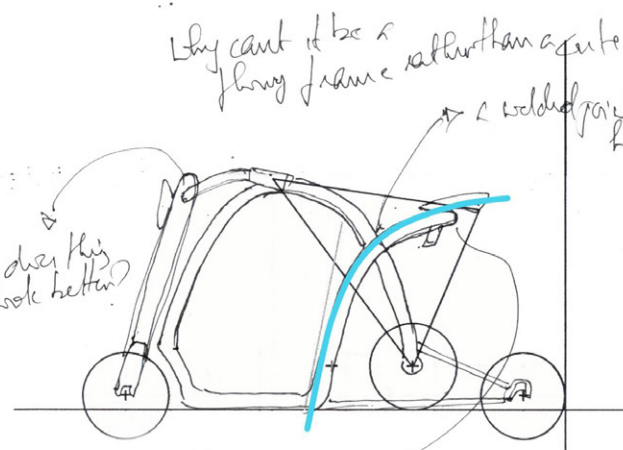
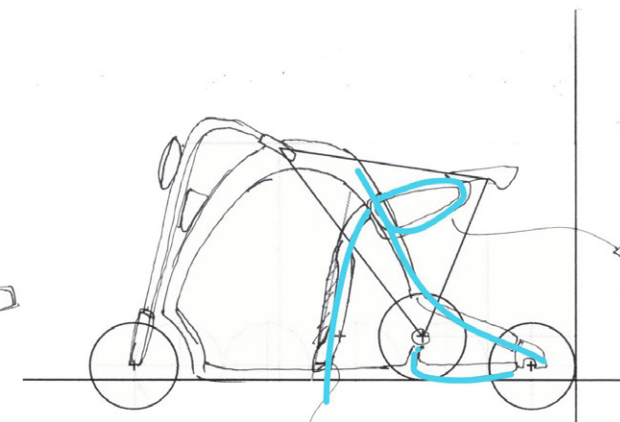
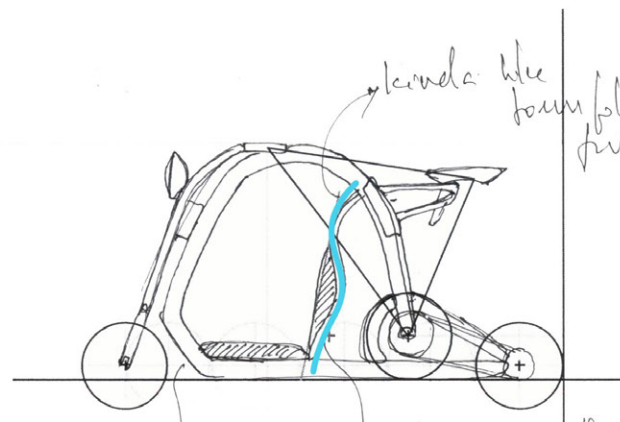
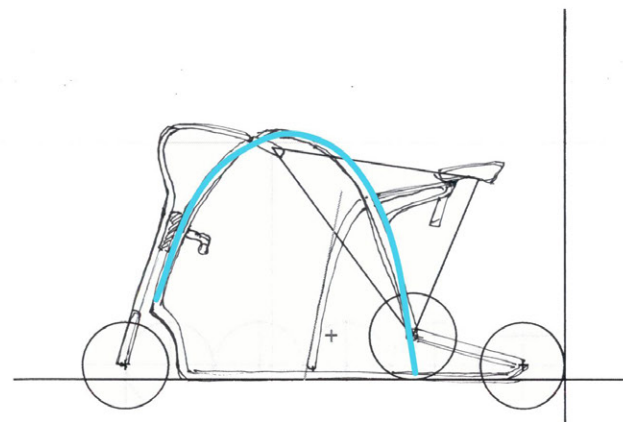


The image shows two overlapping sheets of paper with hand-drawn sketches. The top sheet, labeled 'Layout 1', features a side profile of a car with a large, rounded rear end and a smaller front end. A wheel assembly is sketched at the rear, with a circular hub and a rectangular brake caliper. The bottom sheet, labeled 'Layout 1:5 - w', shows a similar side profile but with a more elongated rear end. It also includes a wheel assembly sketch. Both sketches use light pencil lines and include various construction lines, circles, and angles (e.g., 127°, 67°) to define the car's proportions and wheel geometry. The text 'host right' is written in the top right corner of the top sheet.

Working around hard points

- Side profile
- Aesthetic factors and characteristic lines

Lines and Curves



Why cant it be a
strong frame rather than a quite welded one

→ welded point over
here

does this
look better?

→ advantage is the
support for seat

→ handle like
frame following the
function

→ making
climb

→ but some how the
road is not communicating

→ does it
do the job
better?

→ with the seat post is it working
better?

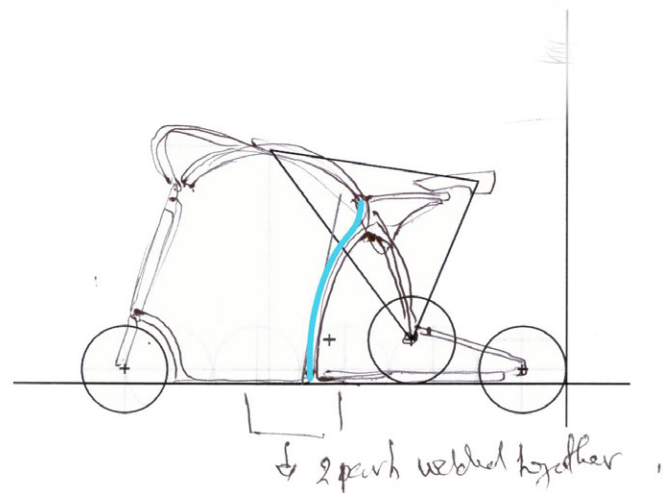
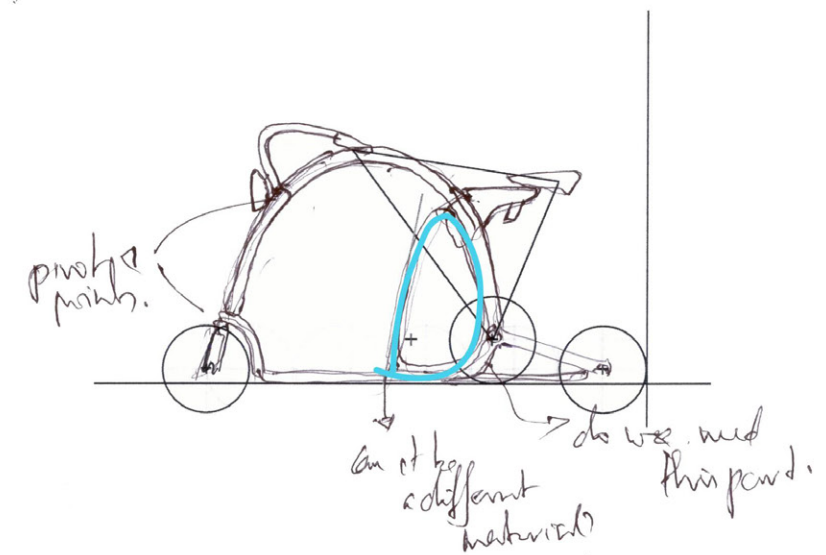
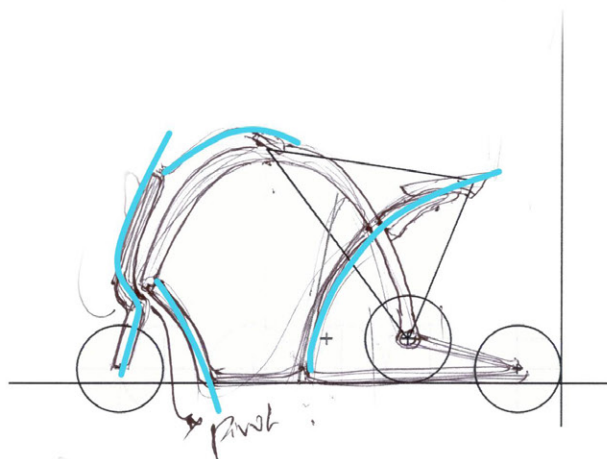
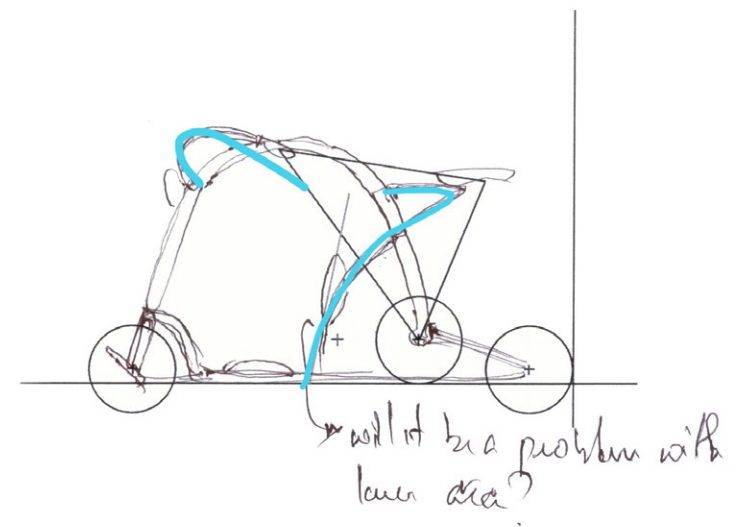
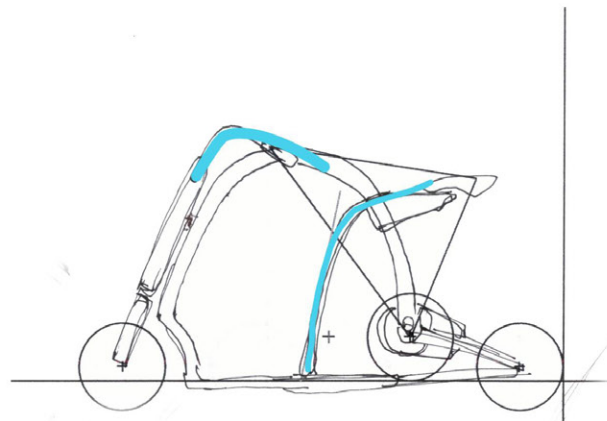
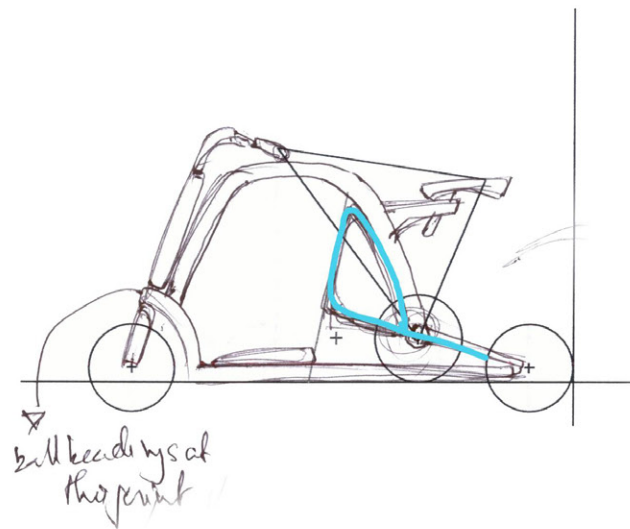
→ seat post going through
the frame

→ do you really need this part

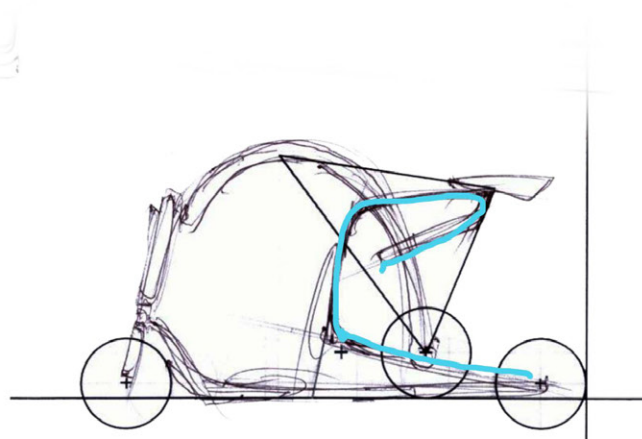
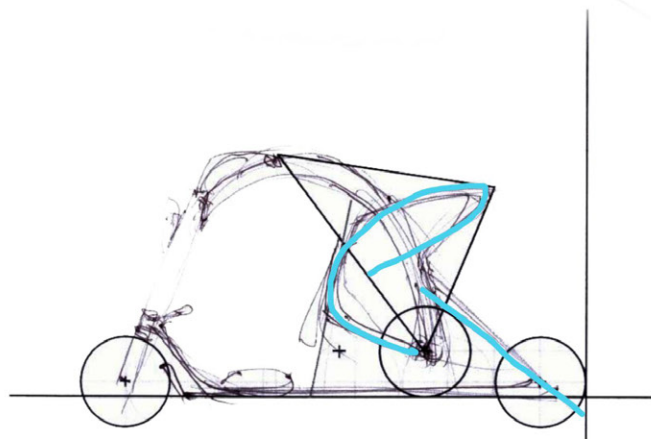
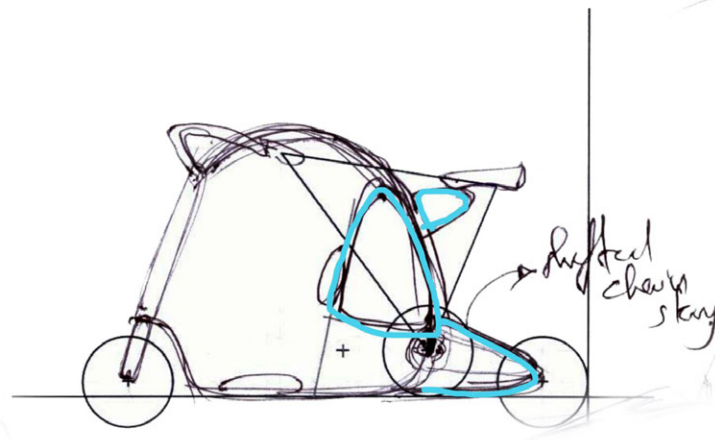
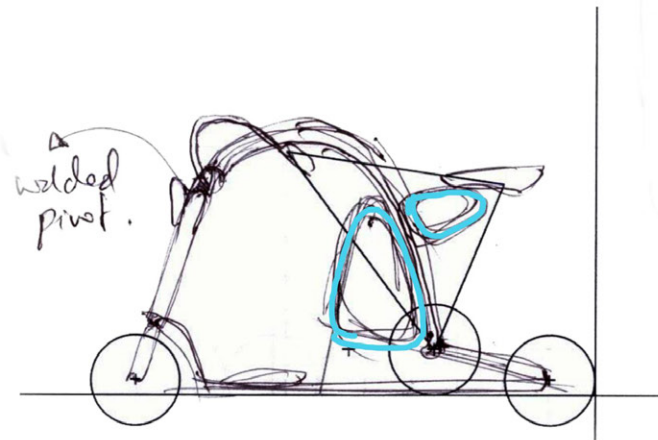
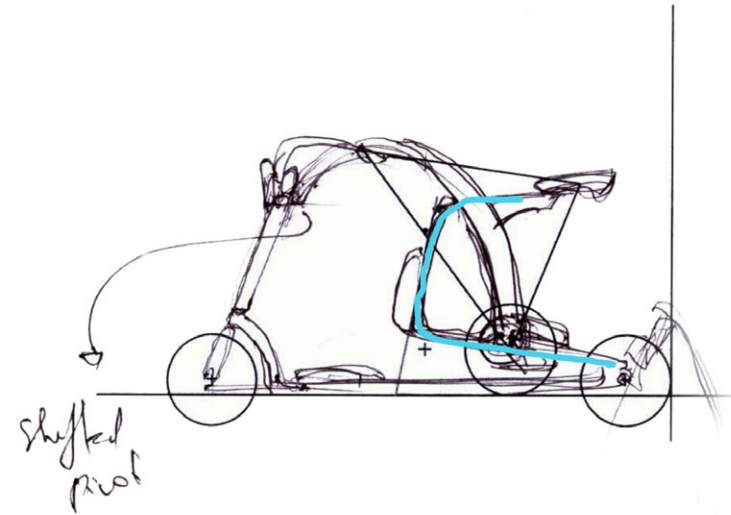
→ welded

→ making it a
bit away
from the
suspension

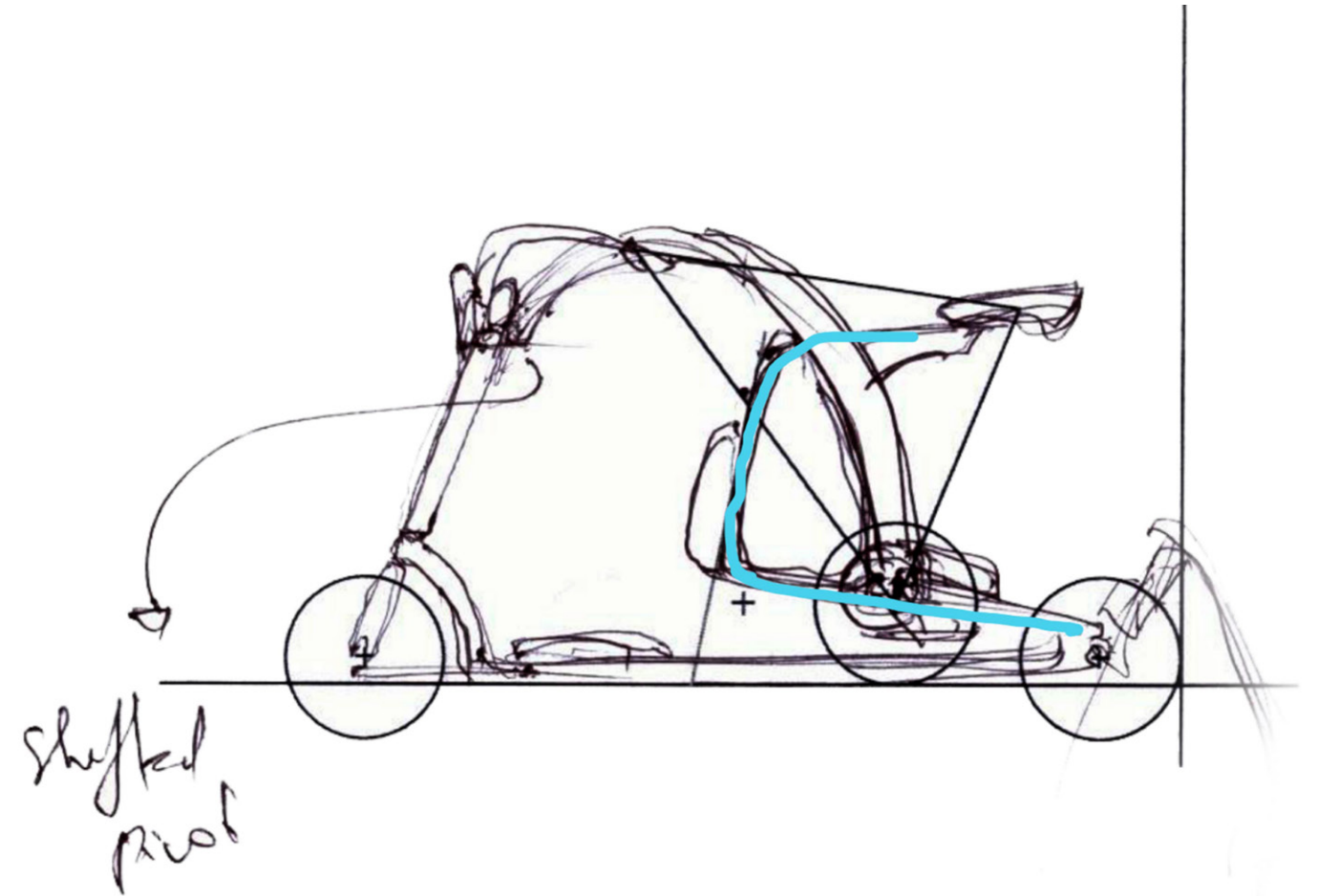
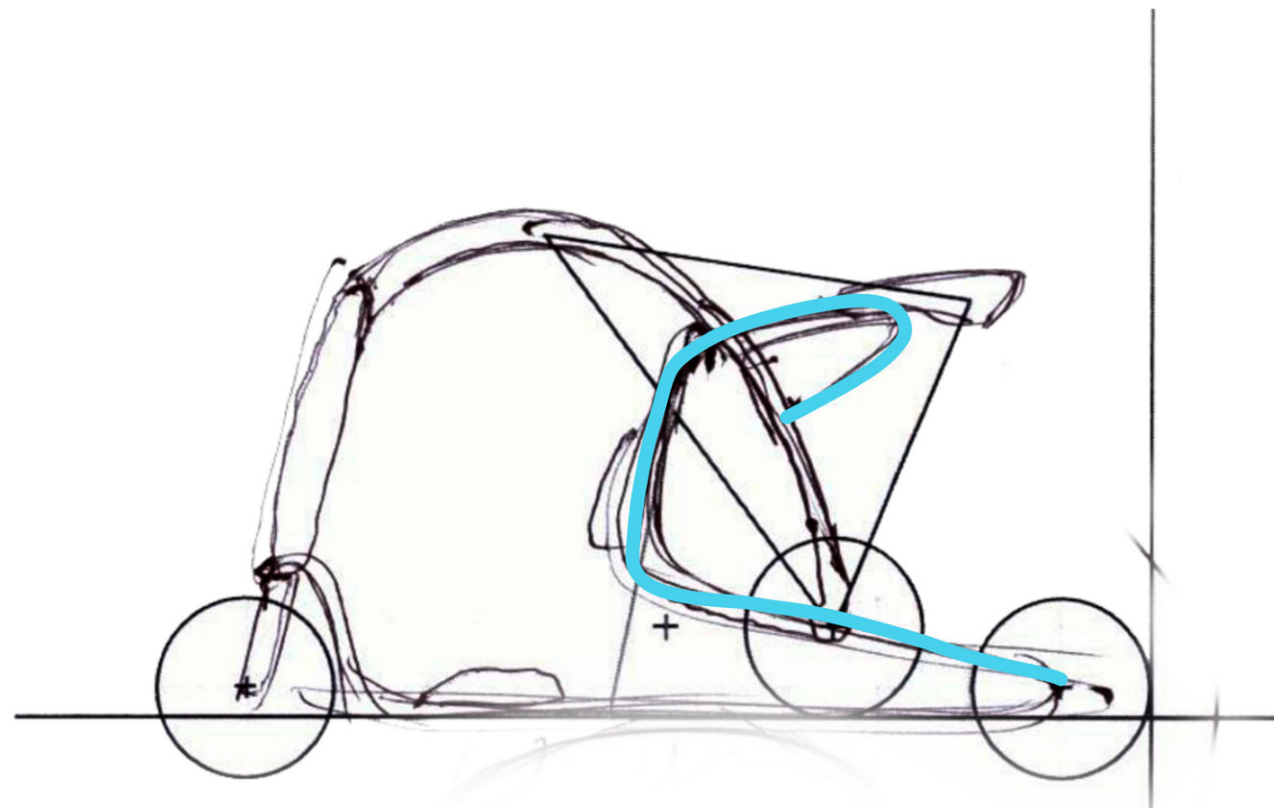
Lines and Curves



■ Lines and Curves

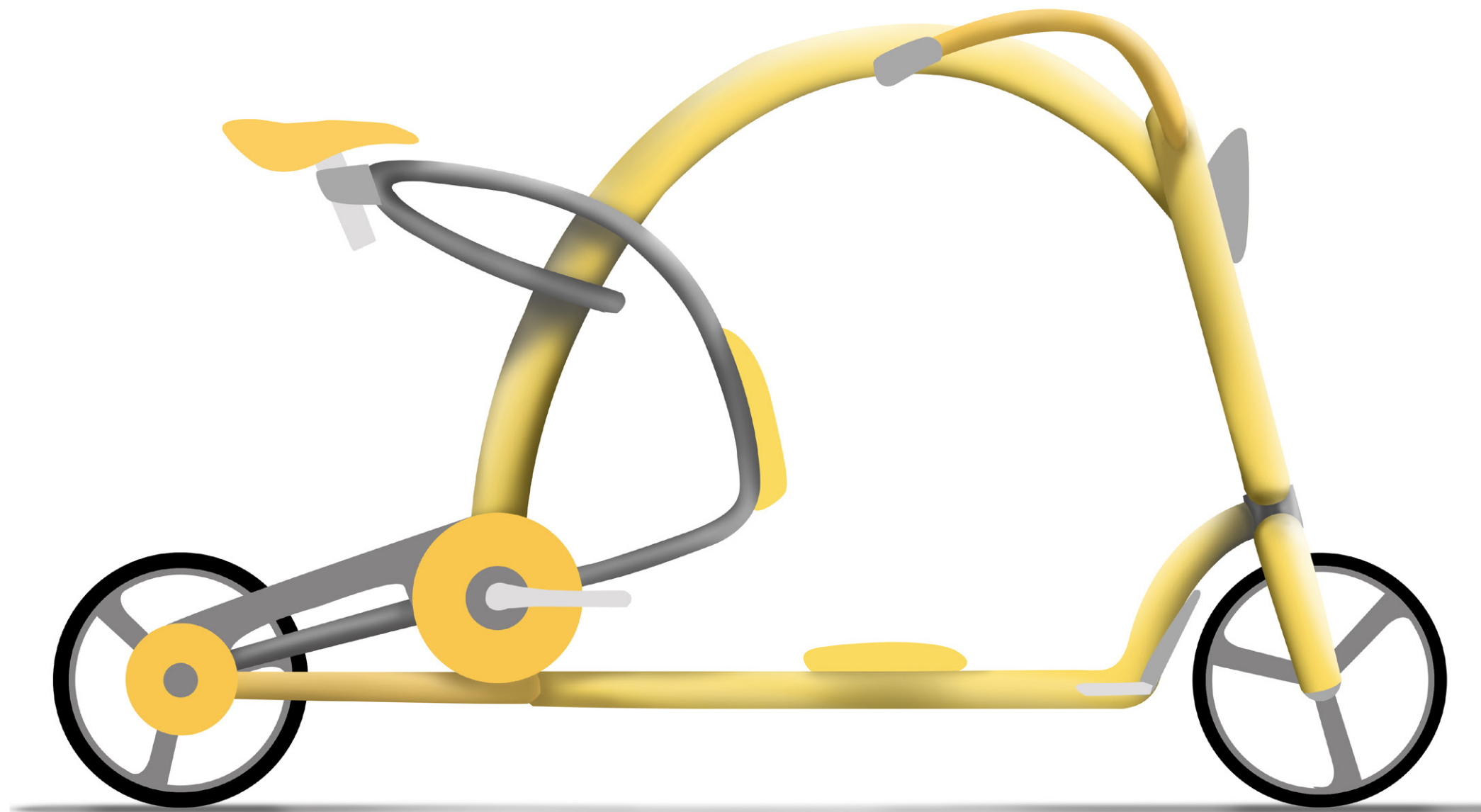


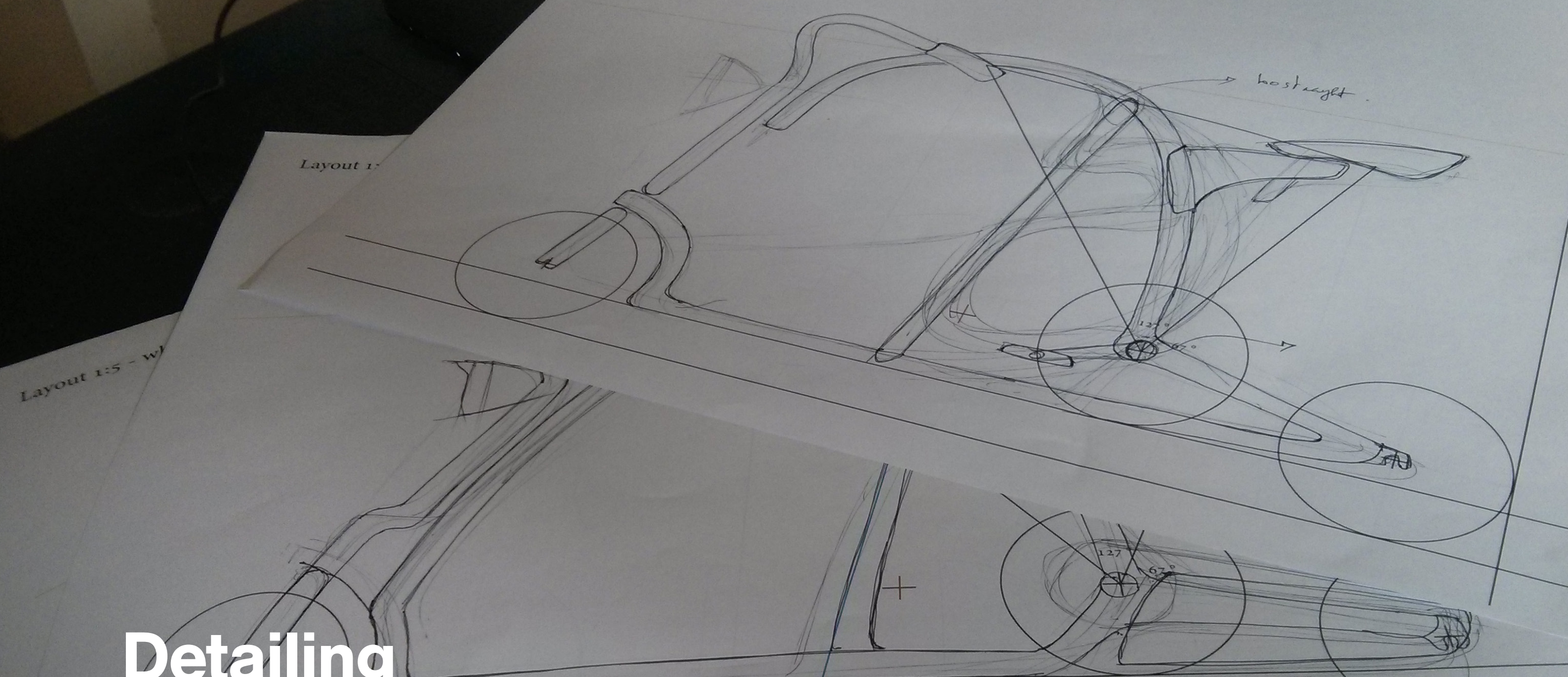
■ Lines and Curves



- Characteristic top tube
- Flow of curve from seat post to chain stay
- Down tube curvature following wheel profile
- Better play of lines and curves

■ Side profile | Flat render

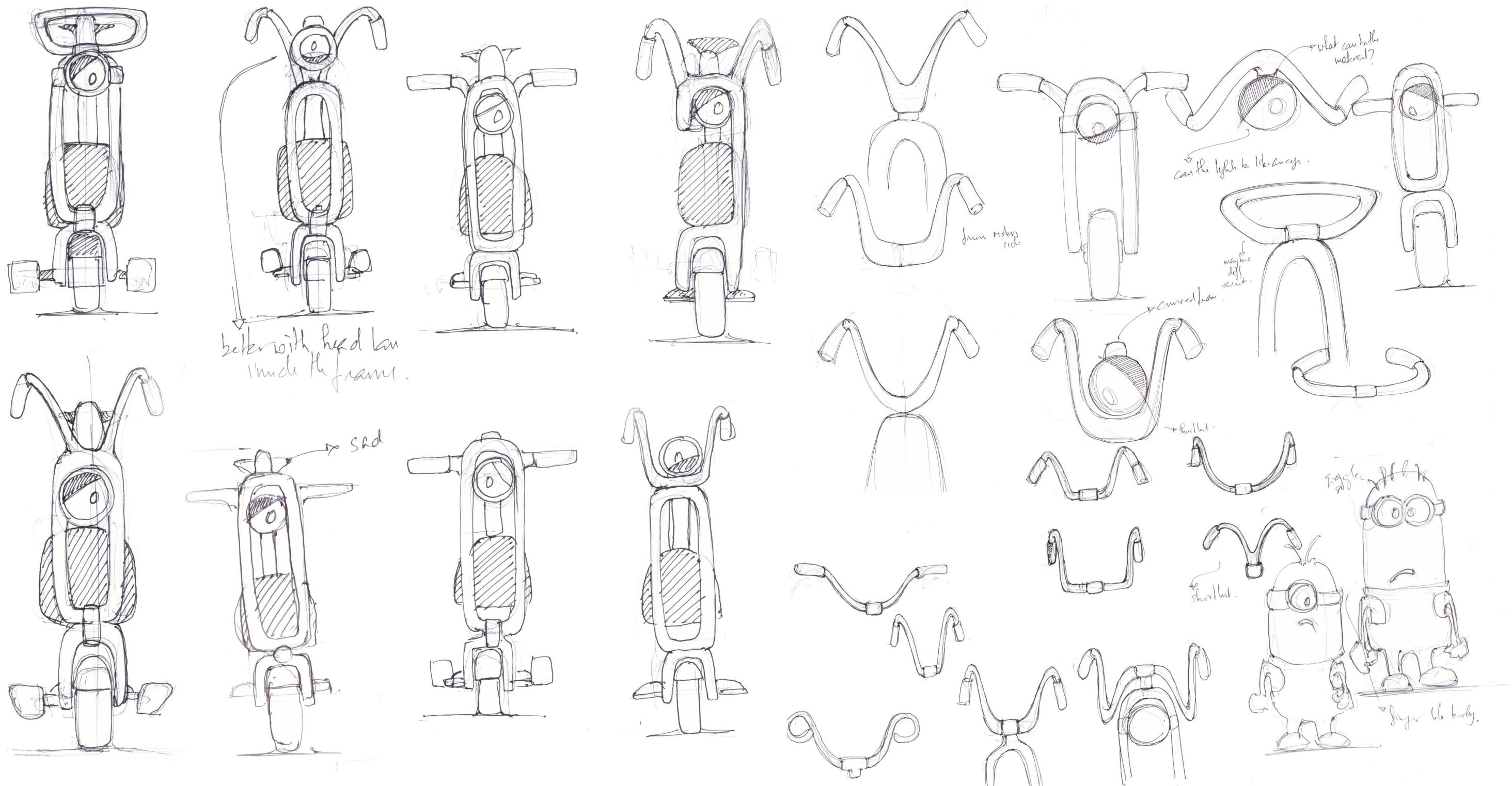




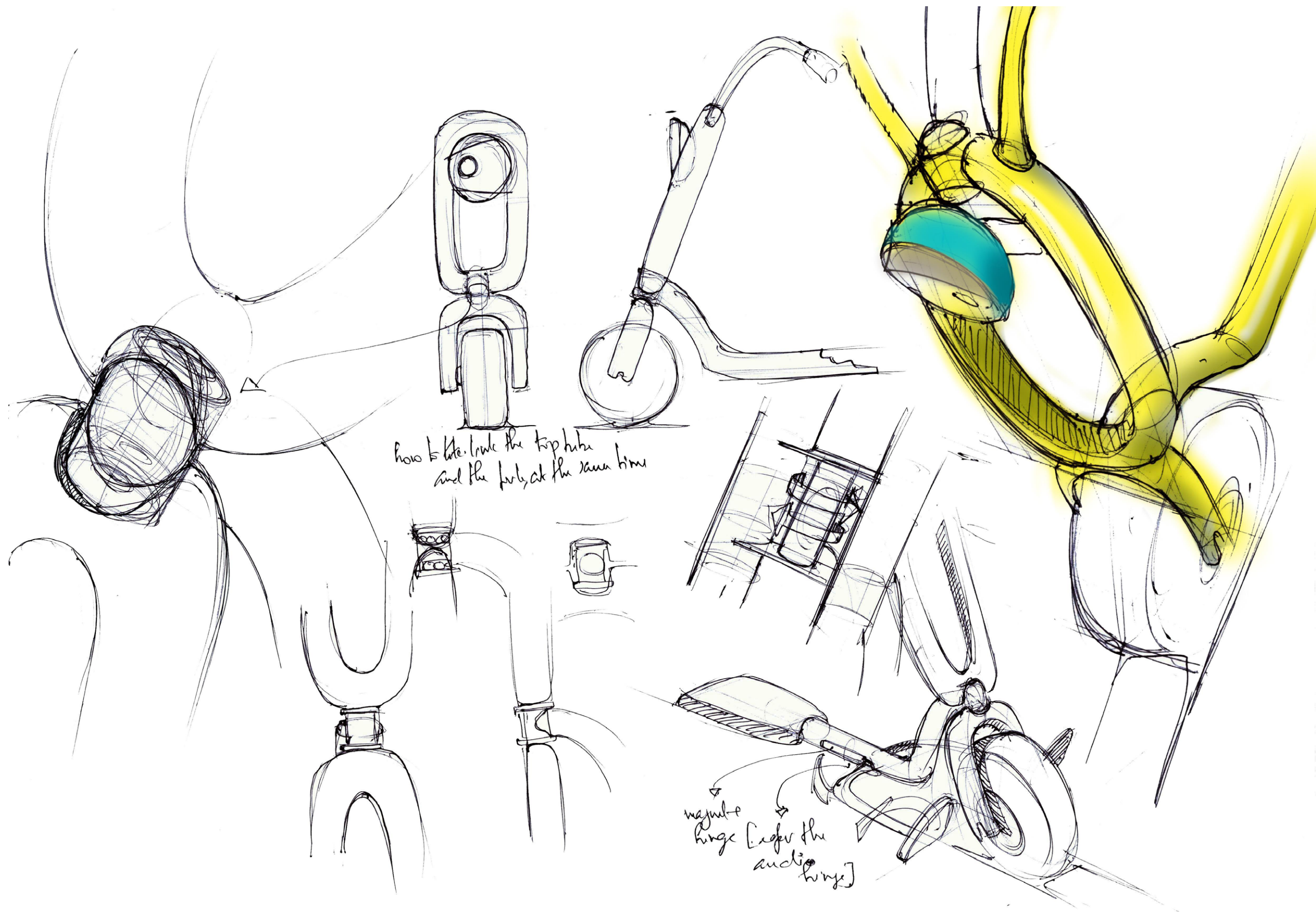
Detailing

- Frame
- Kids seat
- Kids handle + footrest
- Spokes
- Chain case

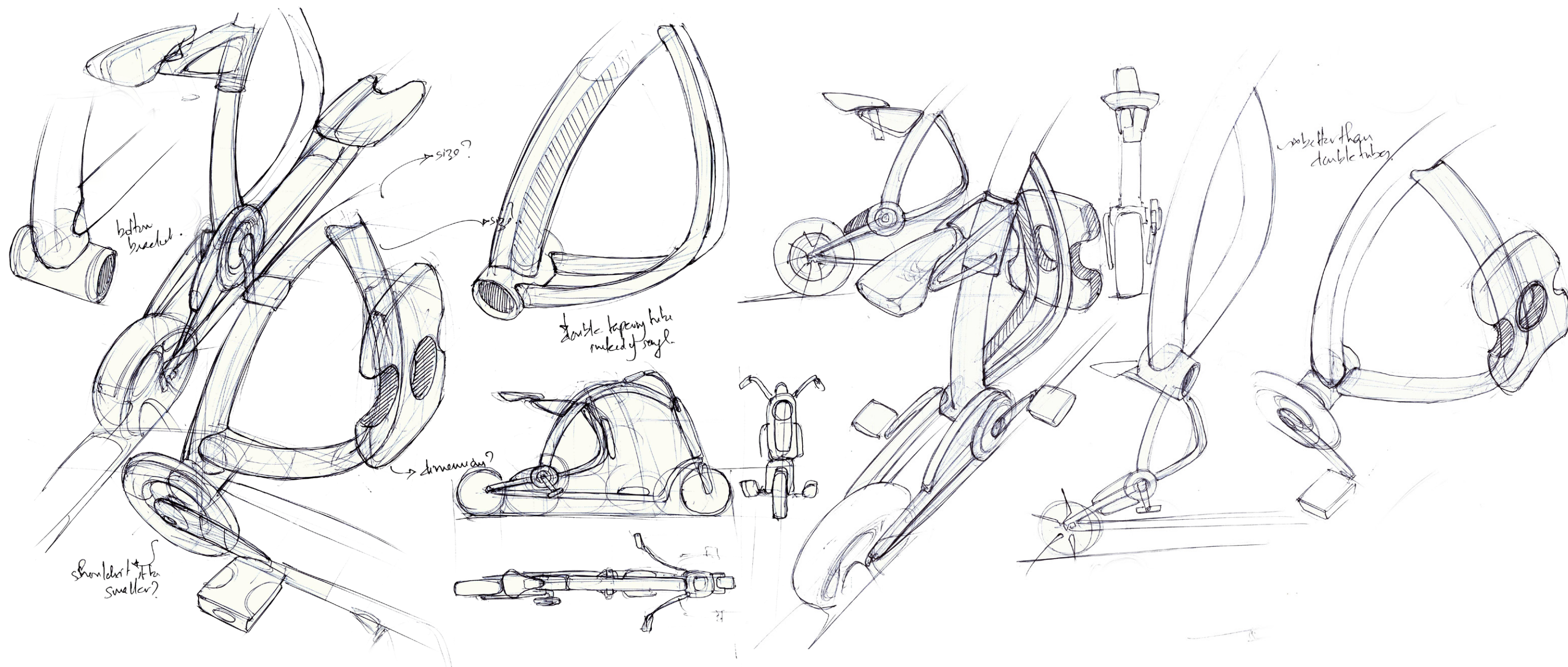
■ Detailing | Frame - Headtube + Handle



■ Detailing | Frame - Headtube + Handle

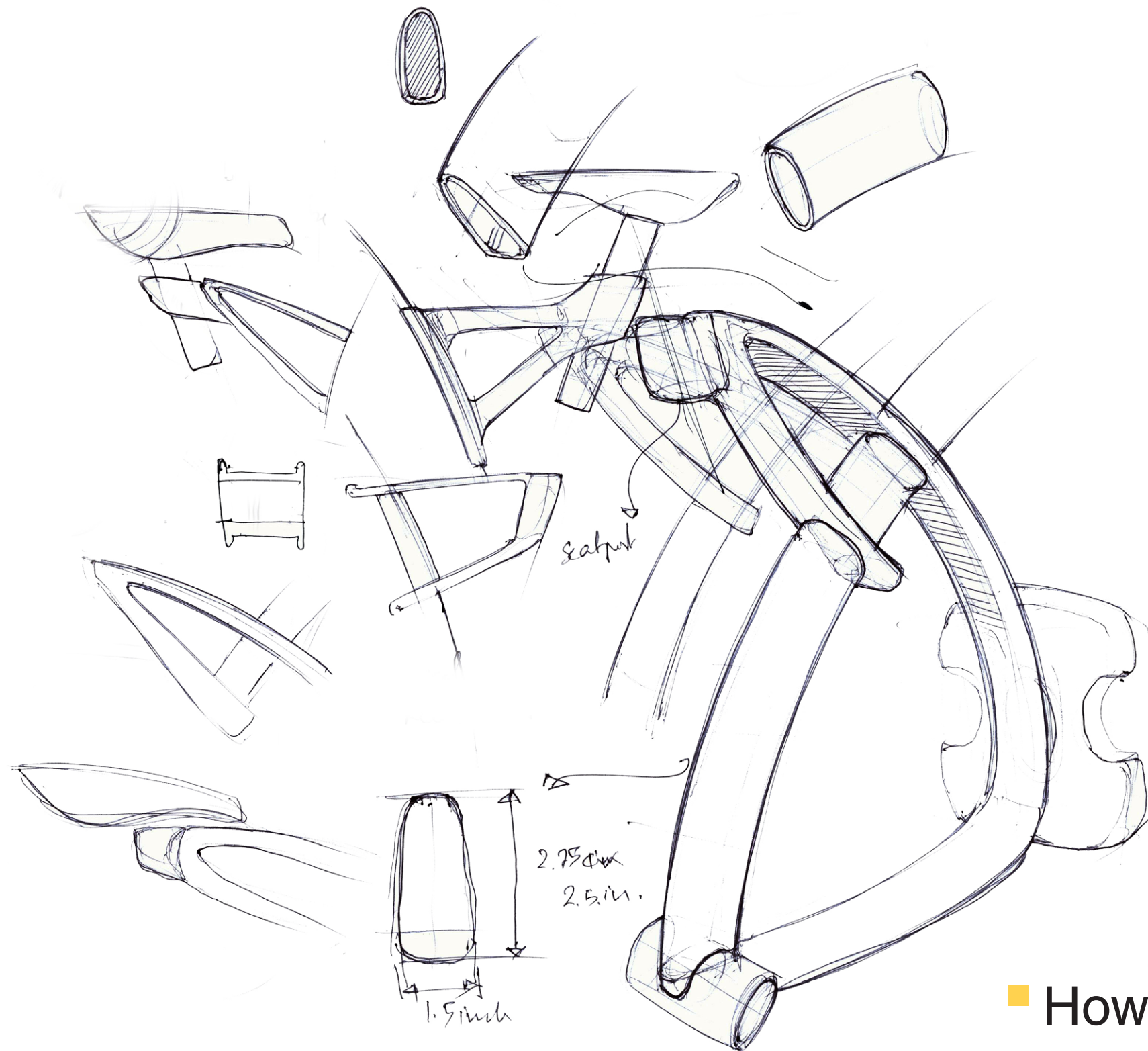


■ Detailing | Frame - seatpost



■ Single tubes and double tubes

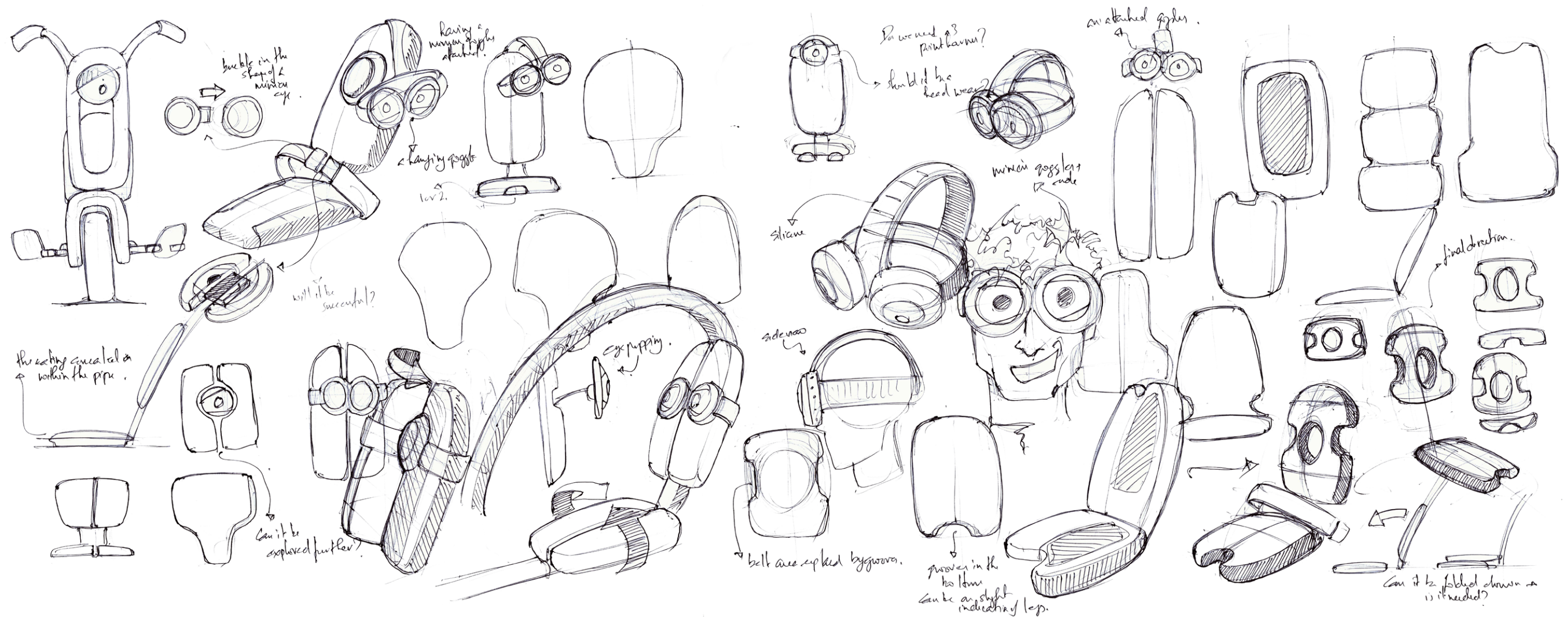
■ Detailing | Frame - seatpost



■ How saddle joins the seatpost

■ Detailing

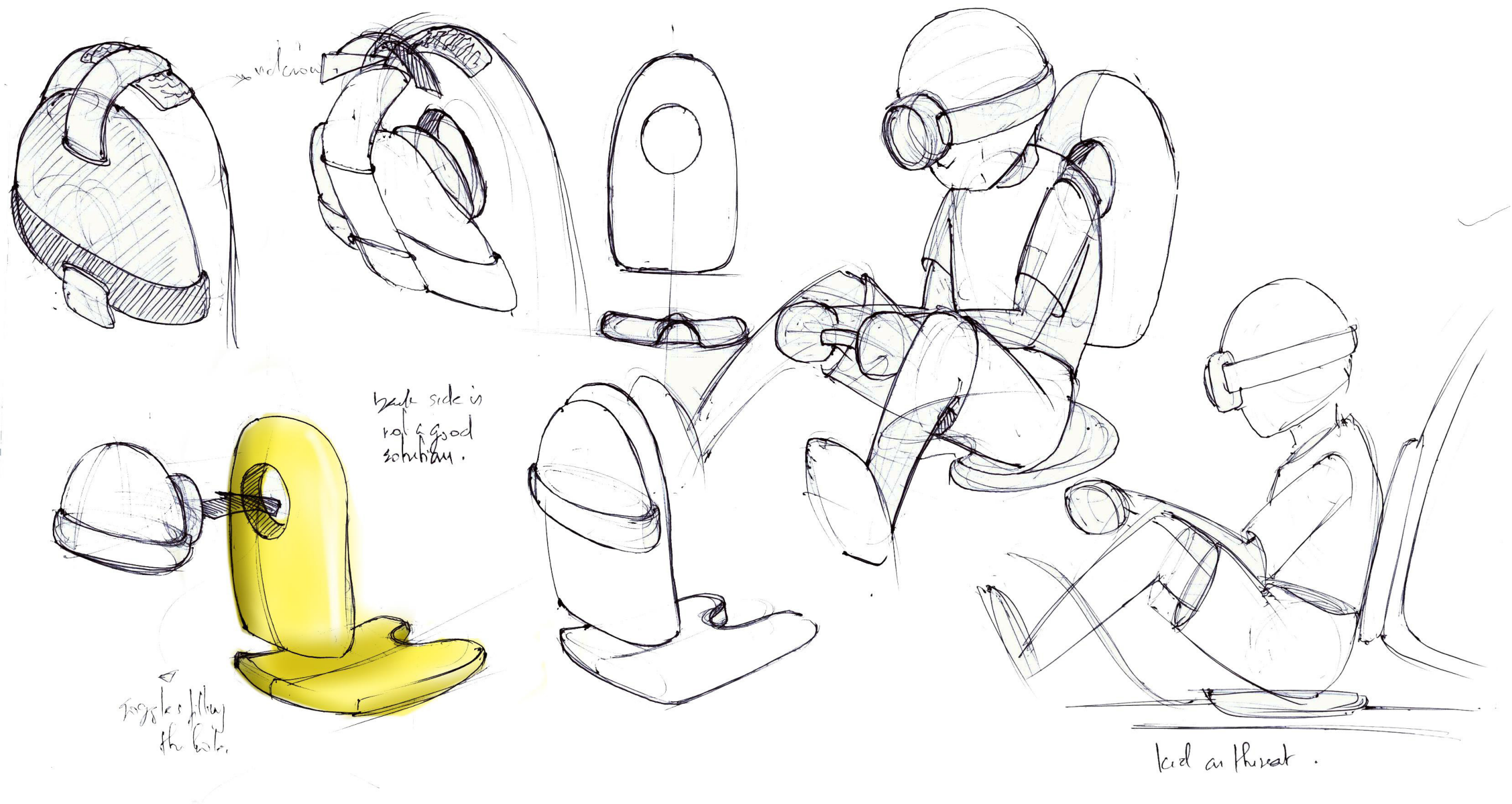
Kids seat



- How play elements could be brought into the seating

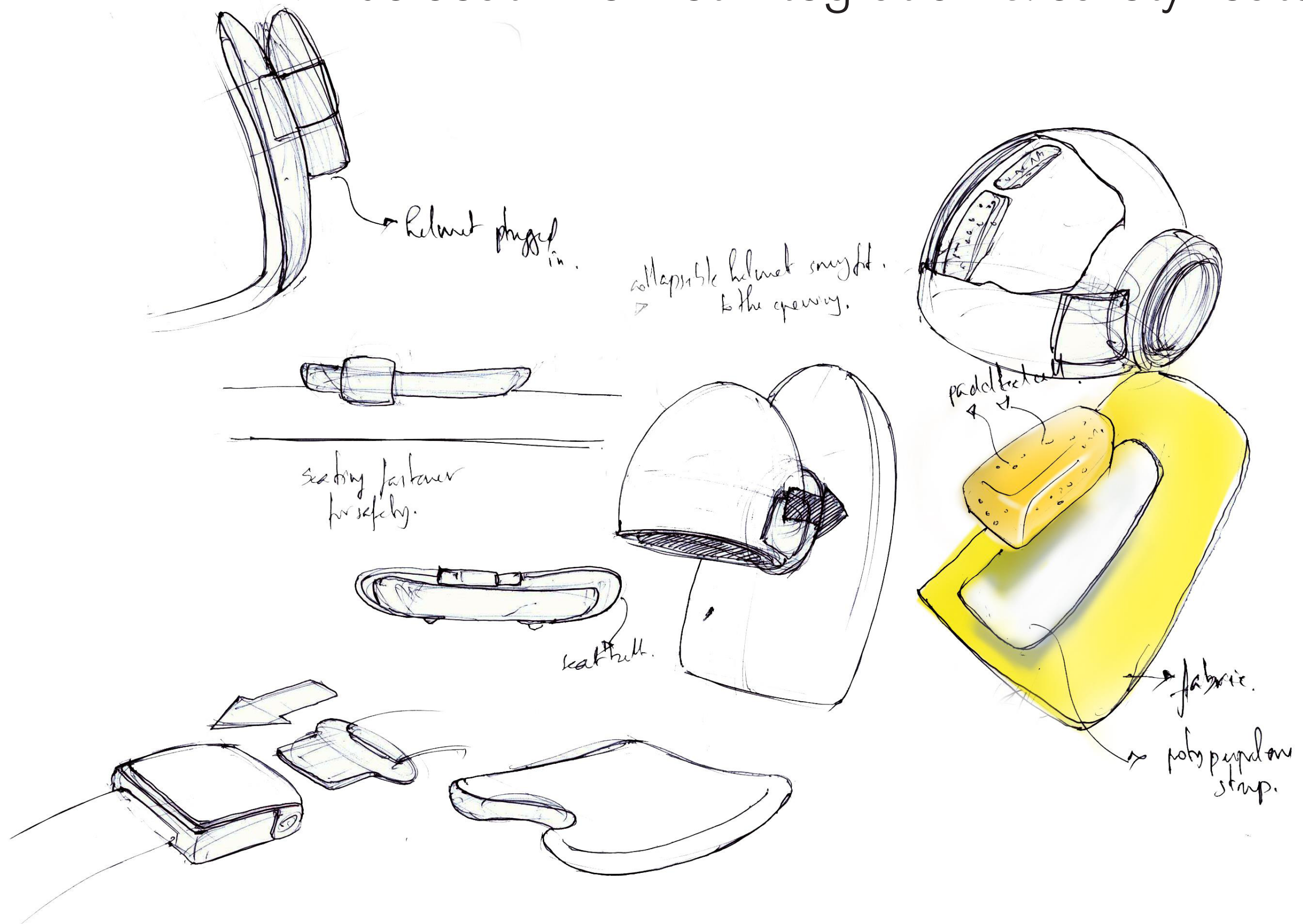
■ Detailing

Kids seat - fun factor

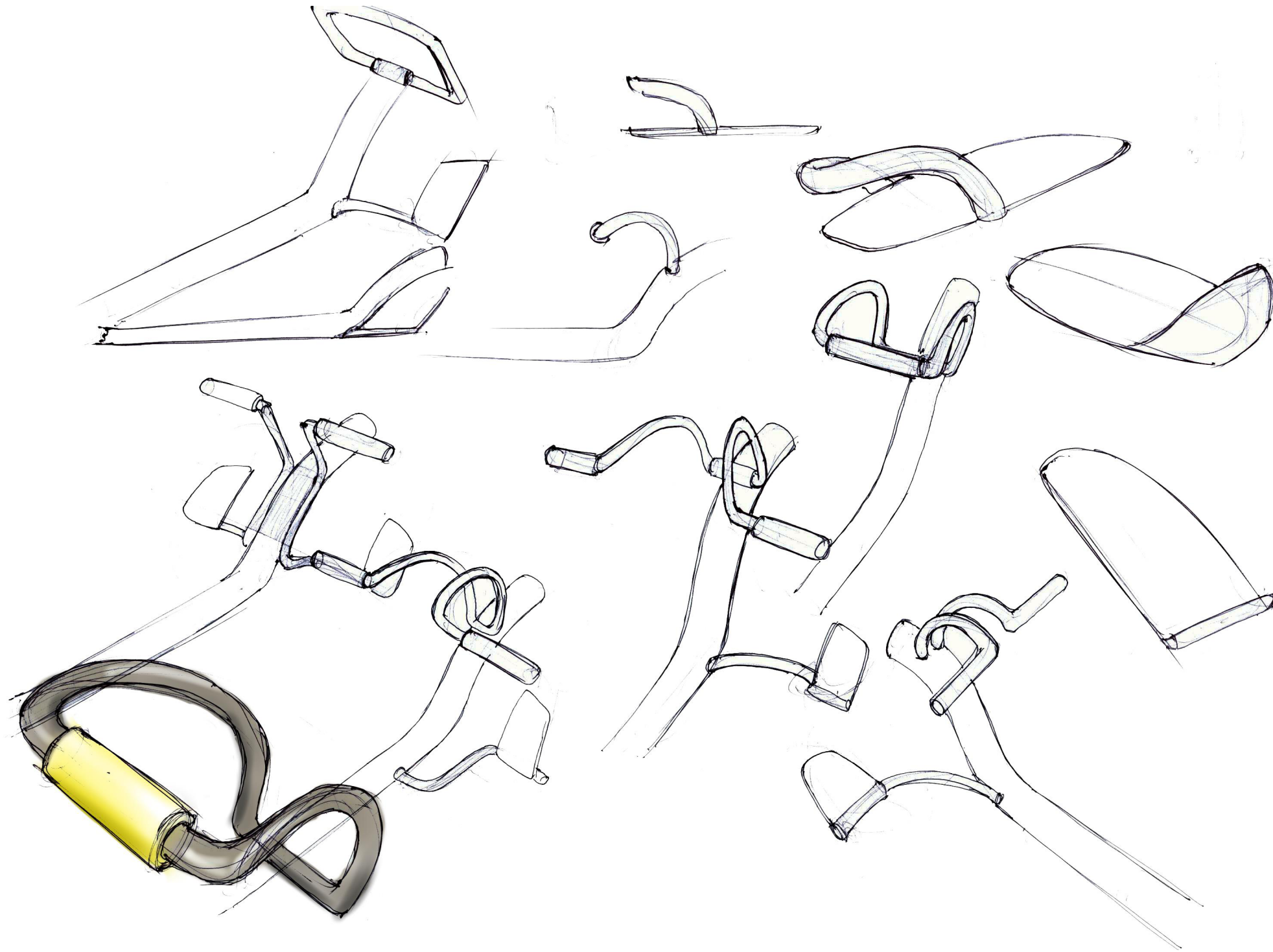


- How the rider could become the character

■ Detailing | Kids seat - helmet integration & safety features

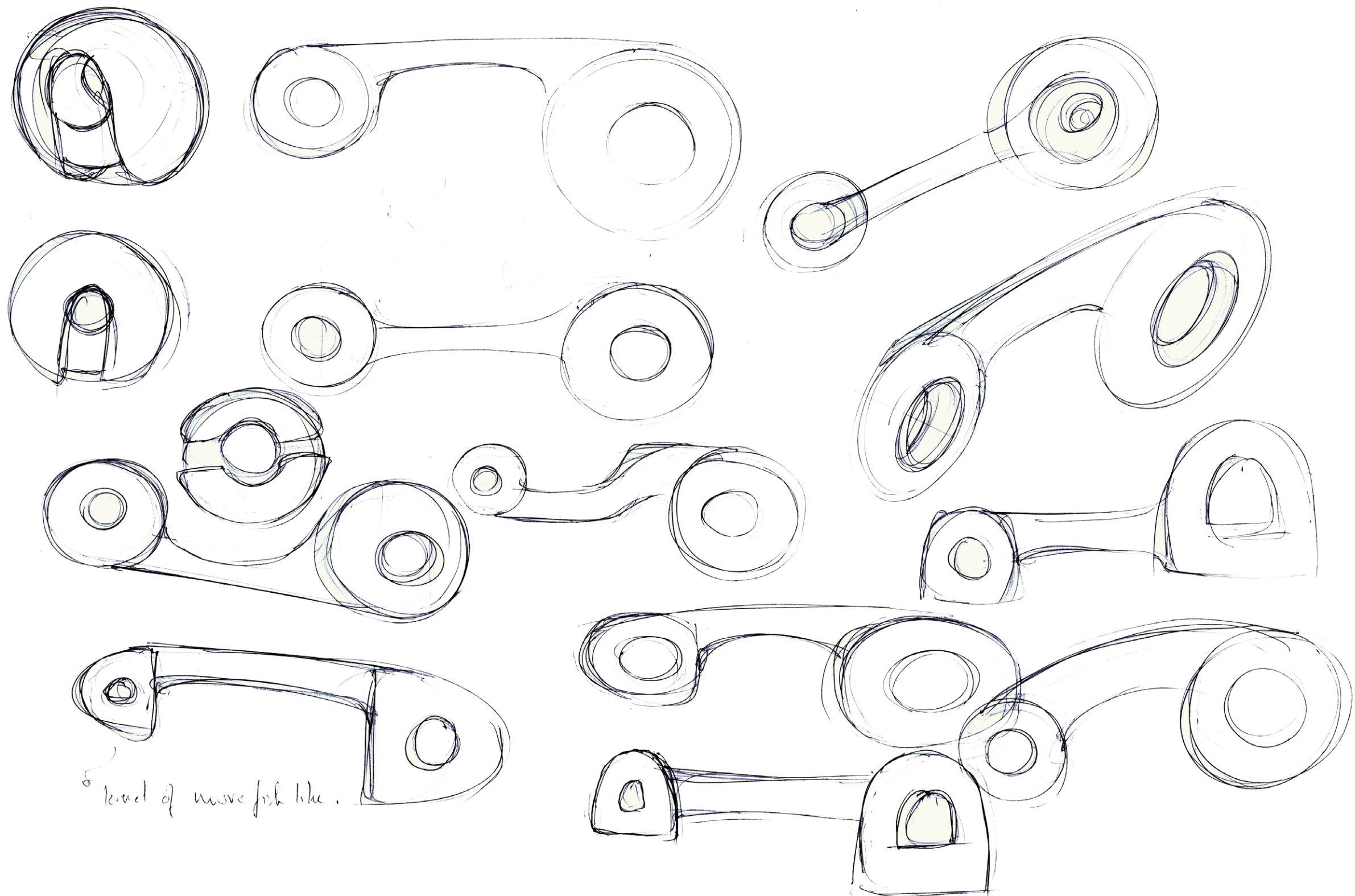


■ Detailing | Kids handle and foot rest



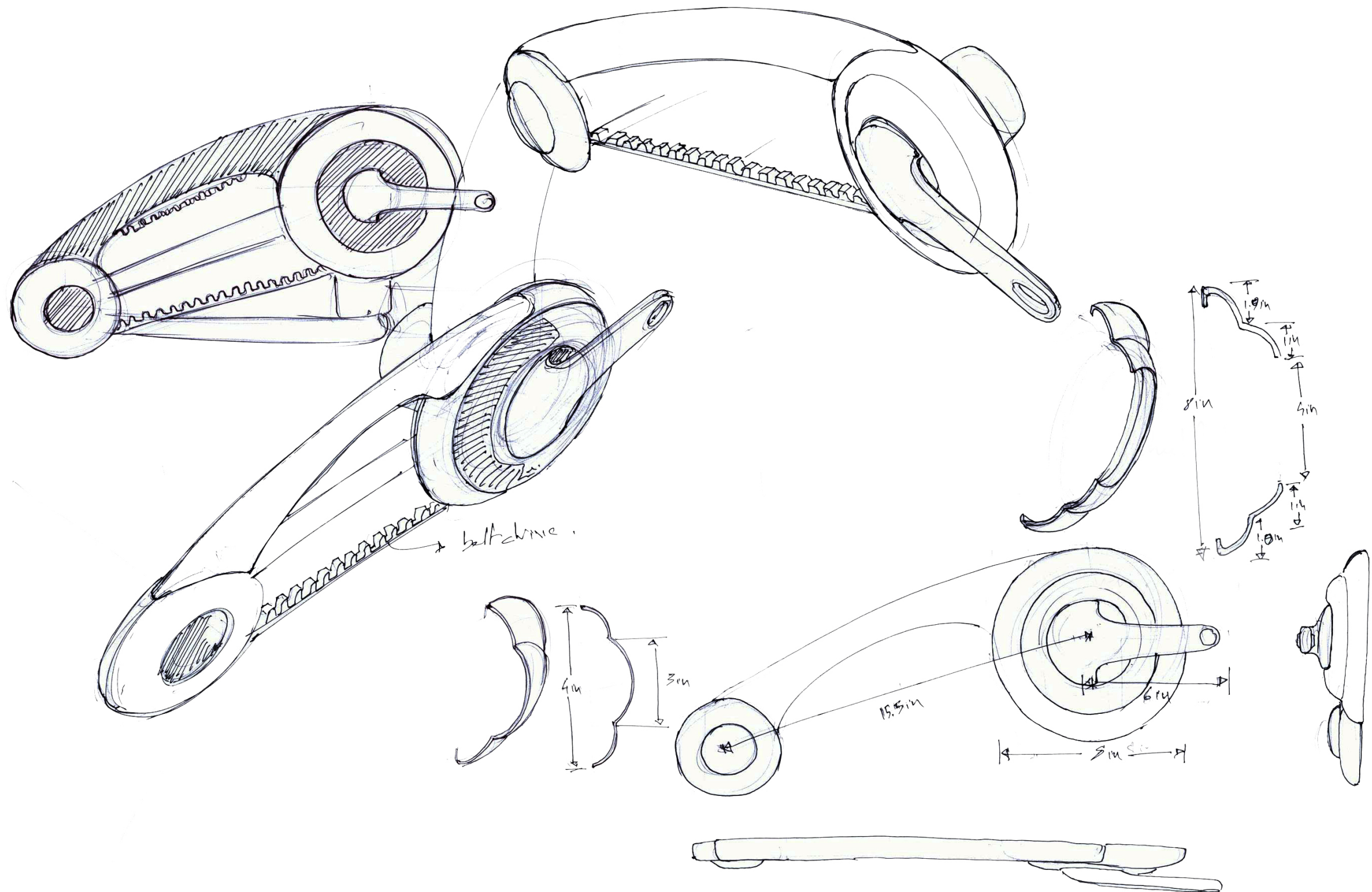
- Giving the kid, a rider like feel and ensuring his safety

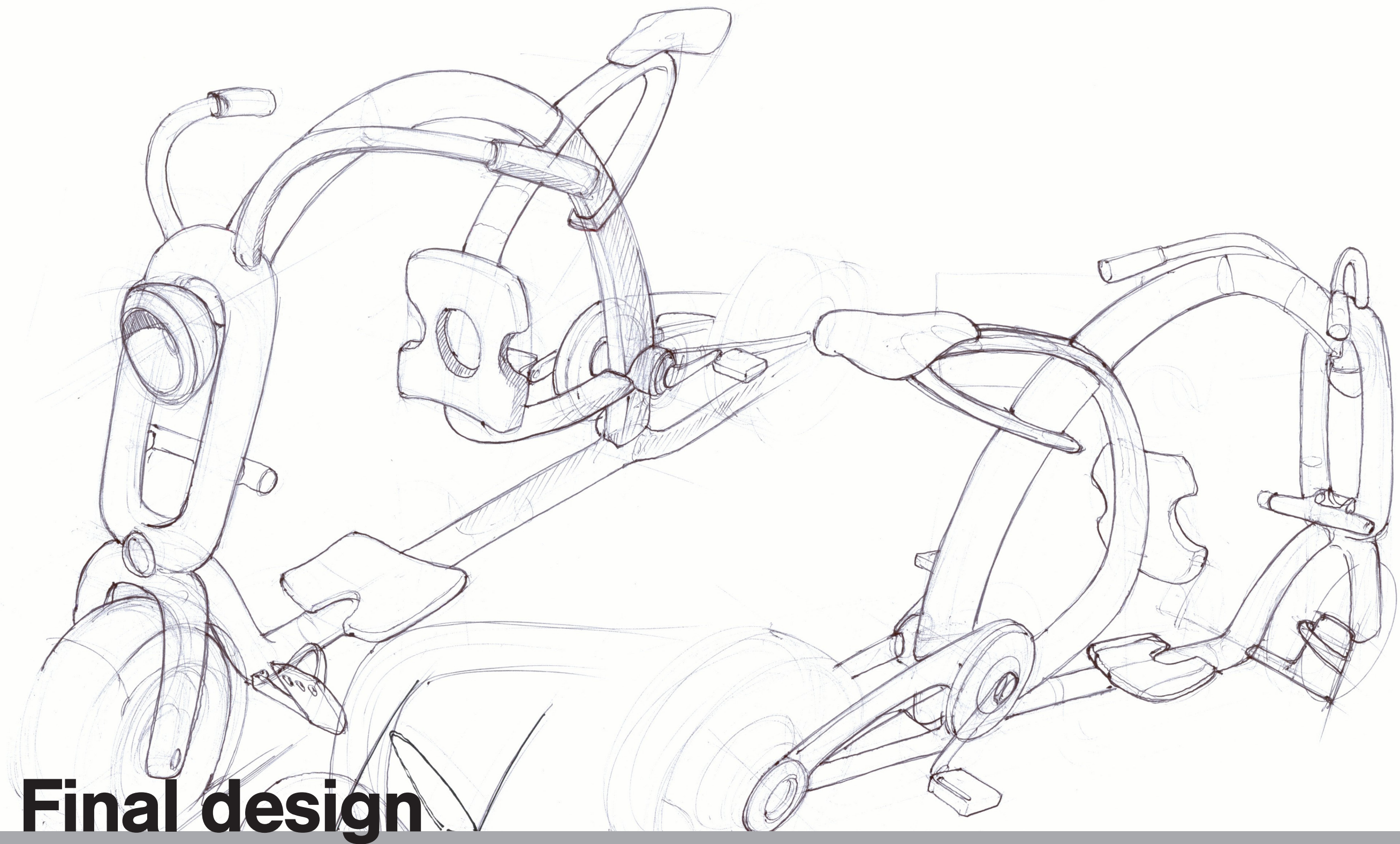
■ Detailing | Chain casing



- Bringing in character to the chain cover

■ Detailing | Chain casing - final

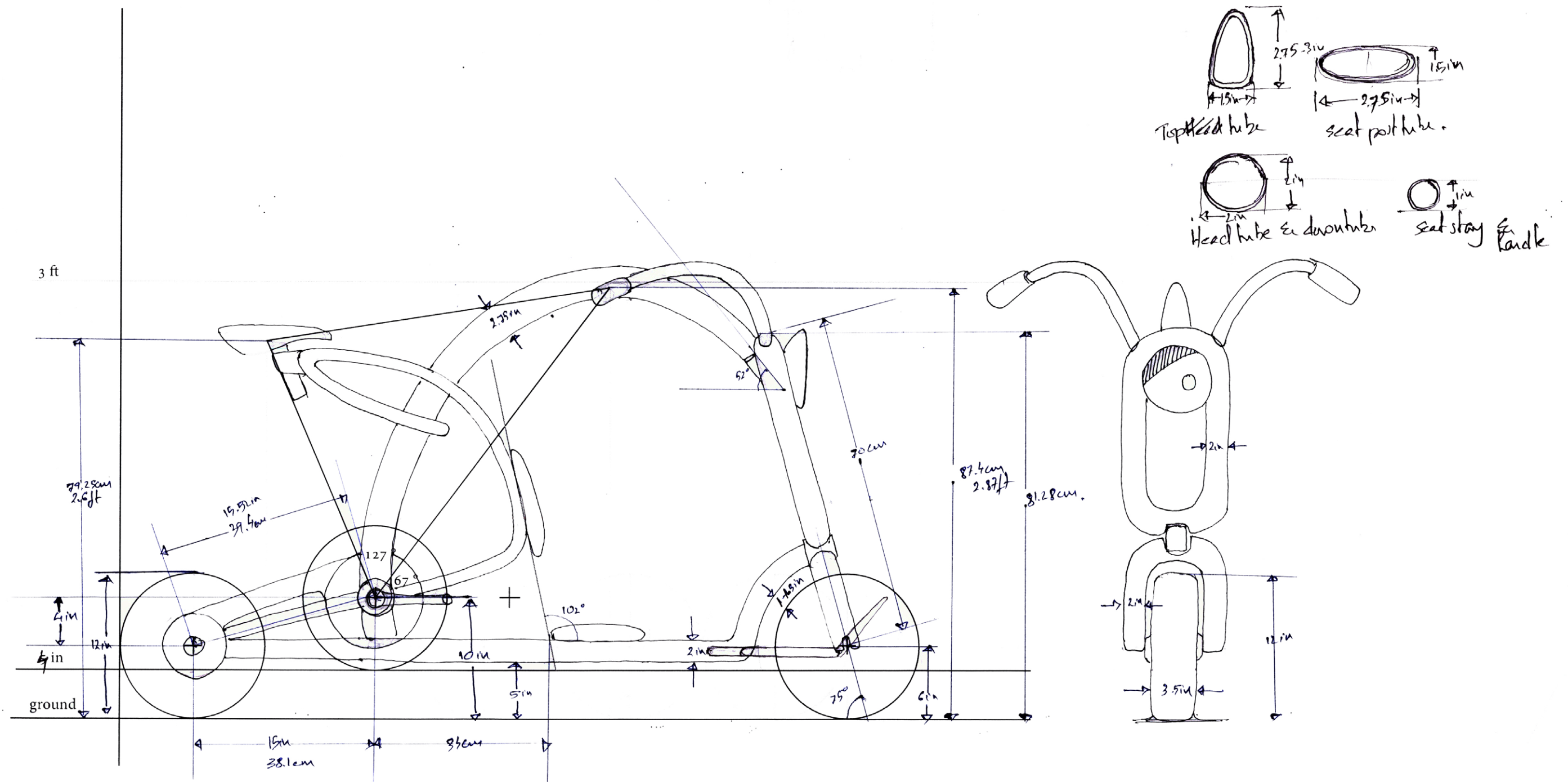




Final design

- Blue print
- CAD model

Final Design | Dimensions



Wheel base: 137 cm ; Bicycle length : 167.6cm ; wheel size: 30.5 cm

■ Final Design | CAD model

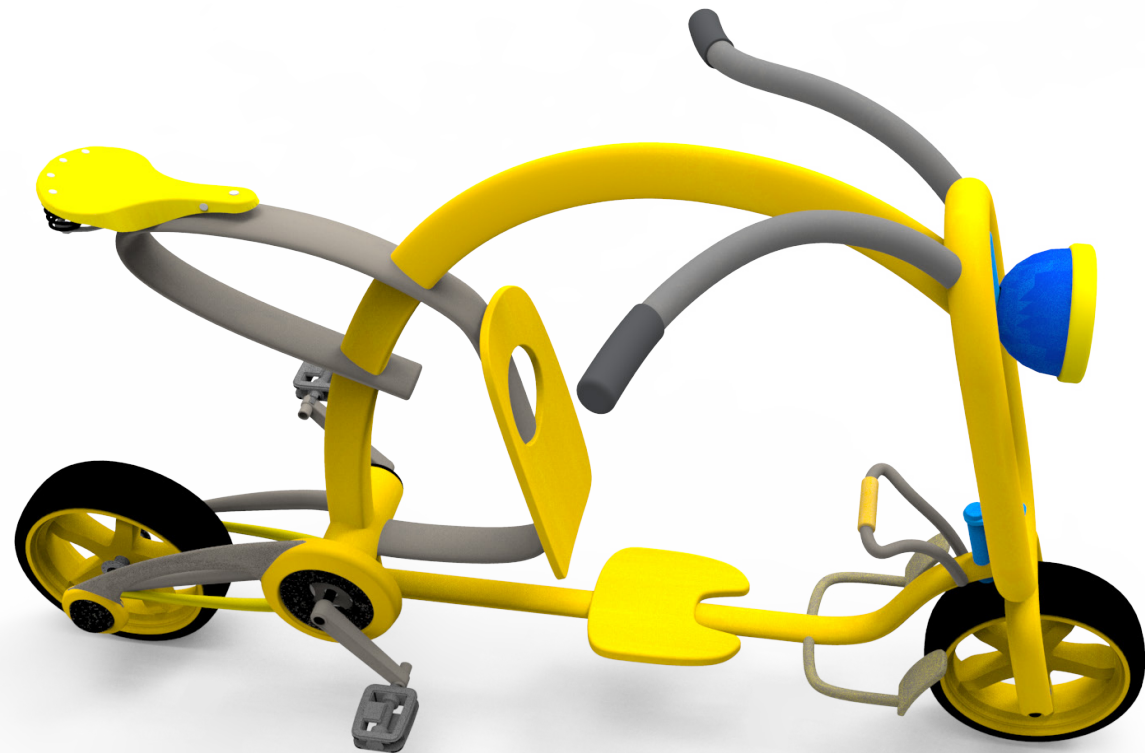


Final Design | Features



- Minion characterized head tube
- Handles inspired from minion hair
- Small wheels creating the fun and suspense
- Frontal space for the child
- Minion like pedalling through small crank
- Minion helmet with kids seat - Rider becoming character
- Characteristic flow of tubes

Final Design | different views





Prototyping

- Materials and process
- Frame building

■ **Prototyping** | Materials and processes

- Hydroforming
 - Tube bending
 - Tack welding
 - Calibrating
 - MIG welding
-
- Material used - stainless steel tubes

■ Prototyping | Frame building



■ Fixing down tube and head tube



■ Head tube connection top tube



■ Fitting the bottom bracket and crankset

■ Prototyping | Frame building



■ Checking the kids seat rear tube



■ Welding the bends



■ Correcting the connection and angle

■ Prototyping | Frame building



■ Top tube welding



■ Frame before seat post fixing



■ Finishing seat post support

Prototyping | Frame building



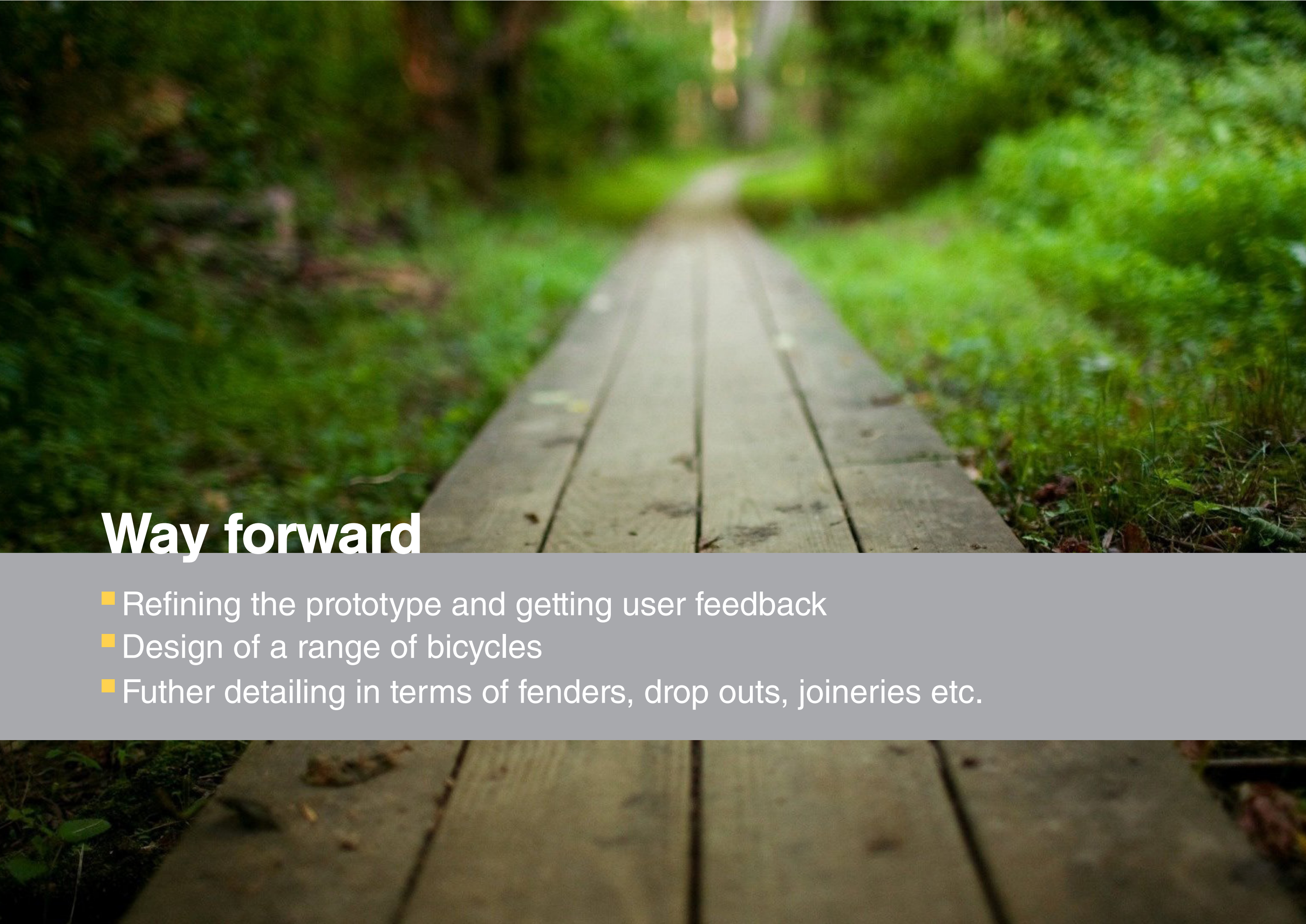
- Seat post in position



- Painting of frame



■ Final working model

A photograph of a wooden plank path leading through a lush green forest. The path is made of several parallel wooden planks and leads towards a bright, sunlit area in the distance. The surrounding vegetation is dense and green, with some sunlight filtering through the trees.

Way forward

- Refining the prototype and getting user feedback
- Design of a range of bicycles
- Further detailing in terms of fenders, drop outs, joineries etc.

Thank you

