



# Innovative design of Spoon - A Case Study

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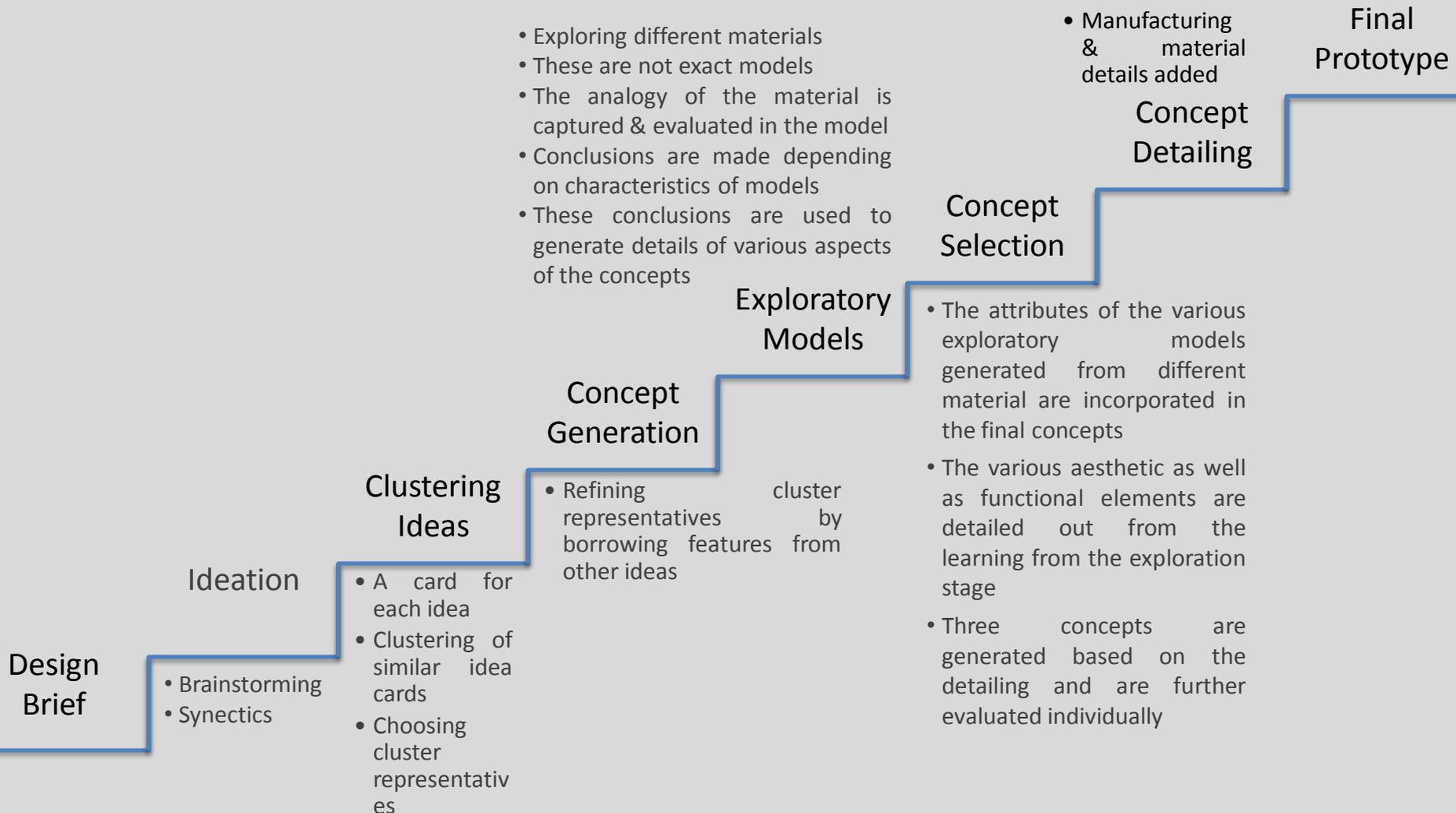
Yohan. S. Engineer

**Guided by Prof. B. K. Chakravarthy**

# Spoons

The challenges underlying the design of a spoon are the same as those underlying a car if the aspects of user centered design are considered. A spoon is one of the most common and simple tool of everyday use. Hence coming up with a innovative idea is a challenge and this learning can help students in breaking their mental blocks. Hence it was decided at the very beginning of the course to not look at user study or web search on spoons but directly get into brainstorming and idea generation. Thus the course was taken as a unique research in design pedagogic in generating innovative products.

# Design Process Used for Innovation



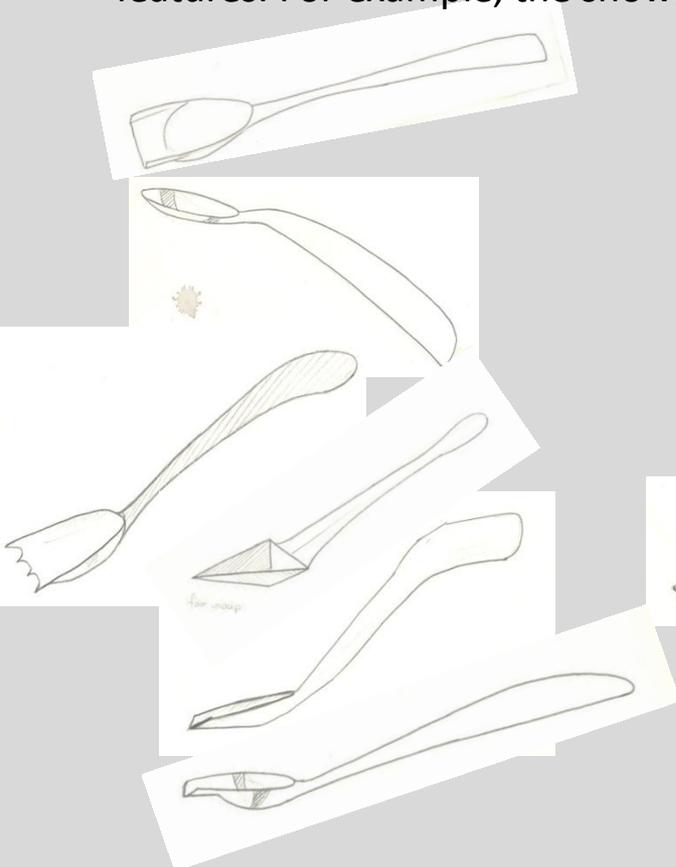
# Spoon for a 2-5 year old child

SarangKusale



# Cluster Formation

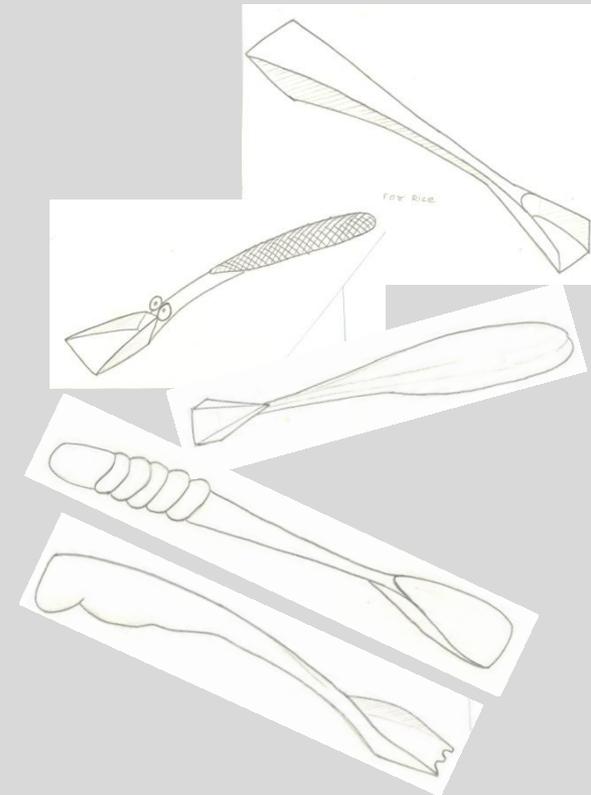
A card is made for each idea. The ideas are then clustered into groups depending on similarity in features. For example, the shown cluster 1 is made up of all spoon ideas with a wider spout.



CLUSTER # 1

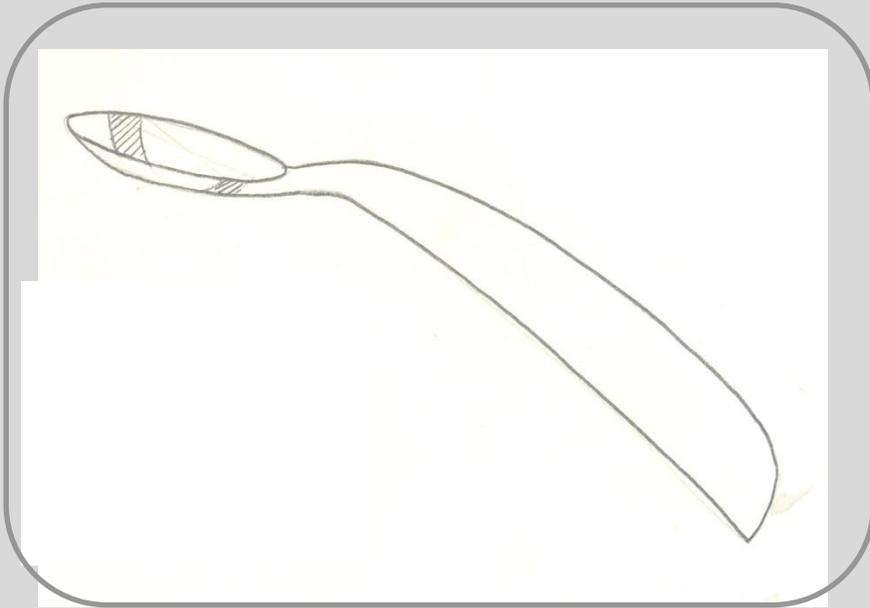


CLUSTER # 2

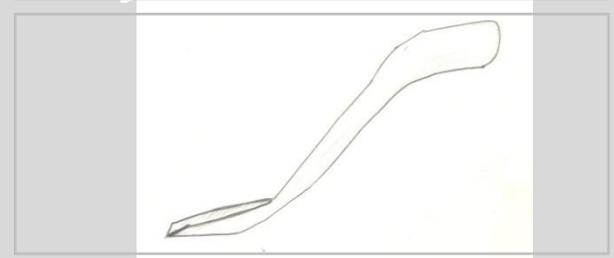
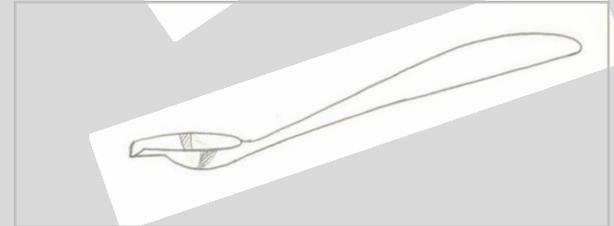
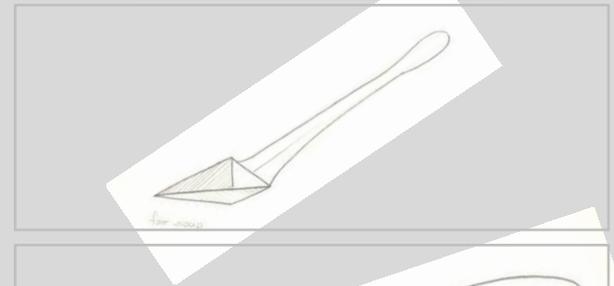


CLUSTER # 3

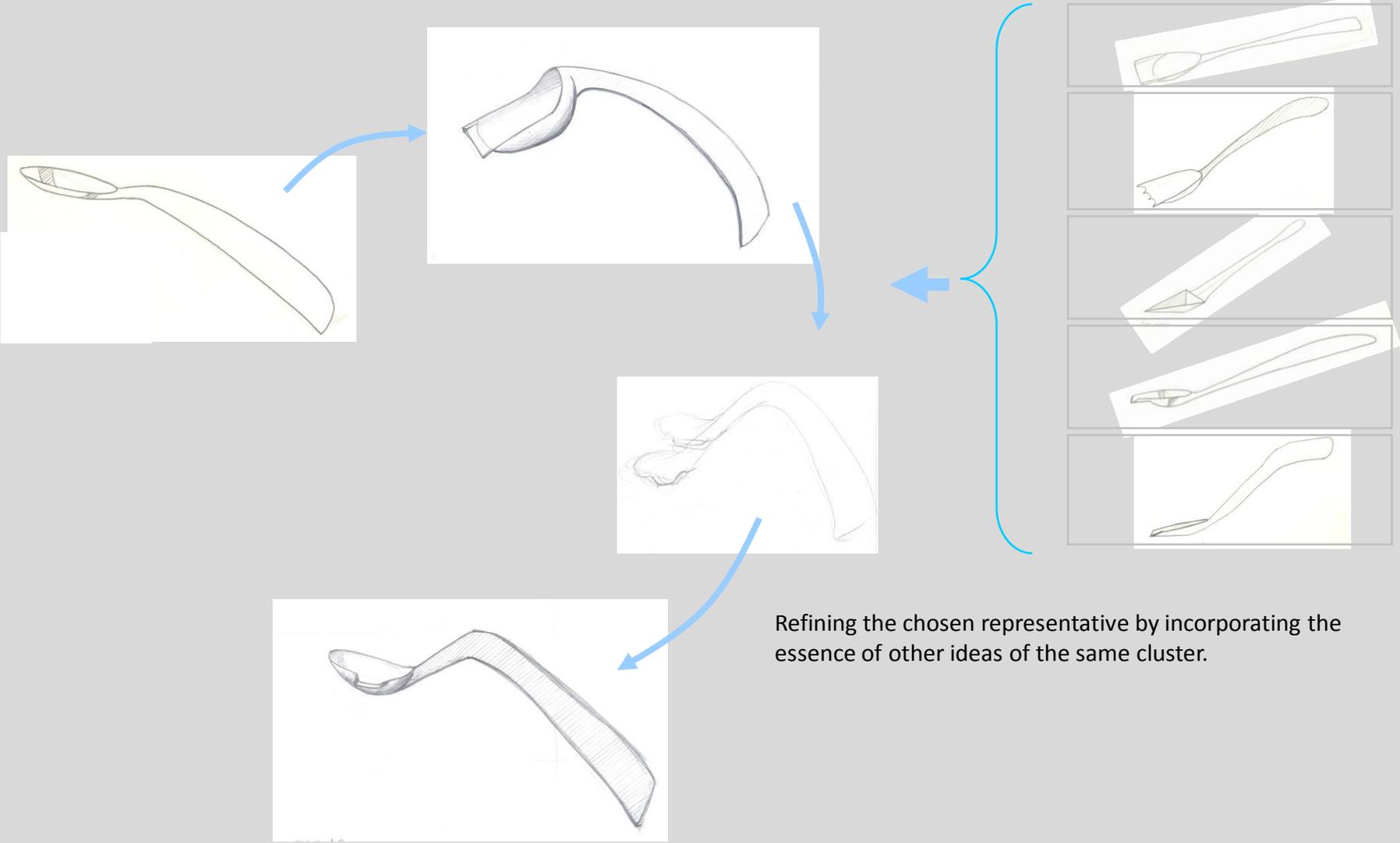
# Cluster 1 Representative



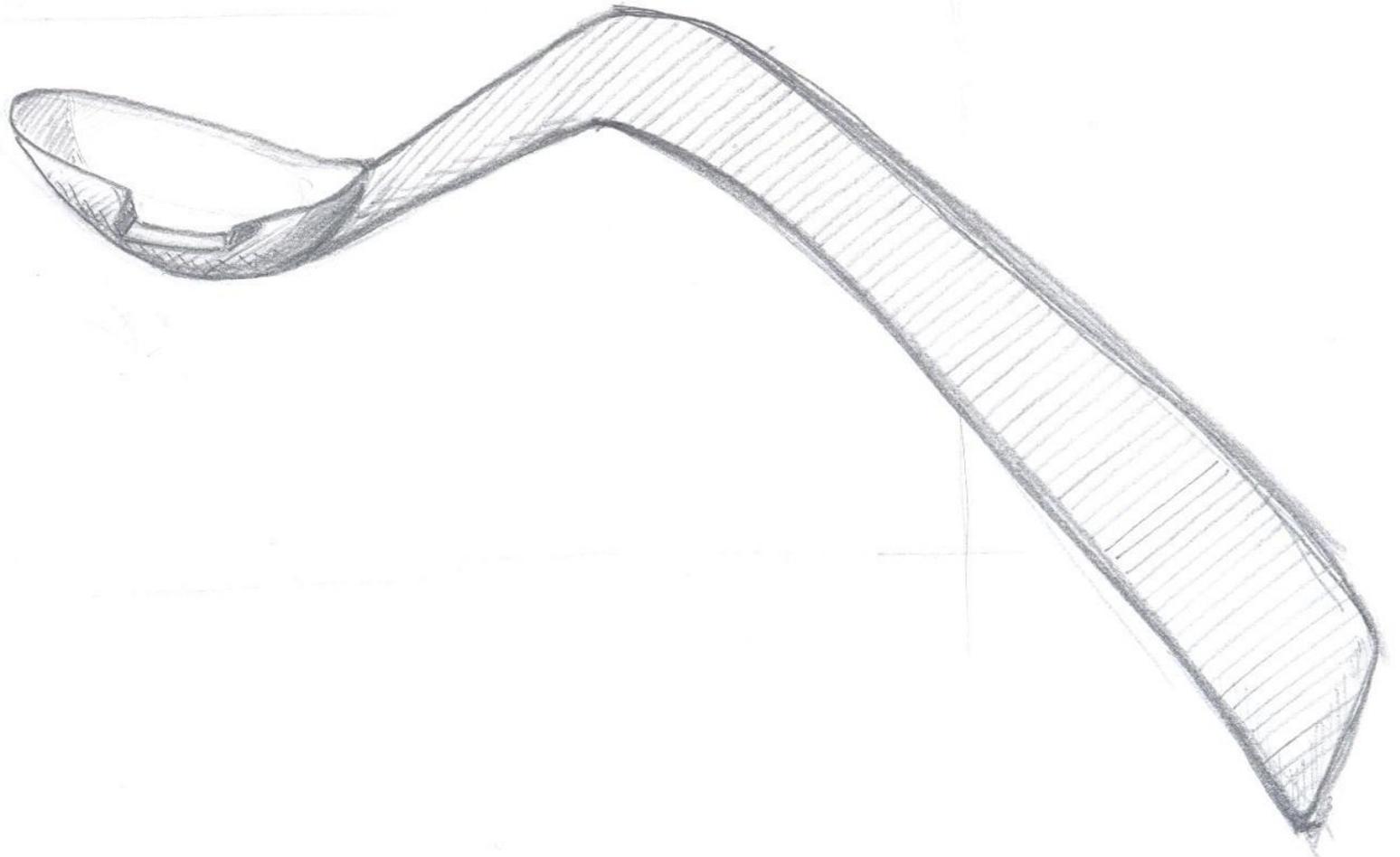
Cluster Representative – wide spout



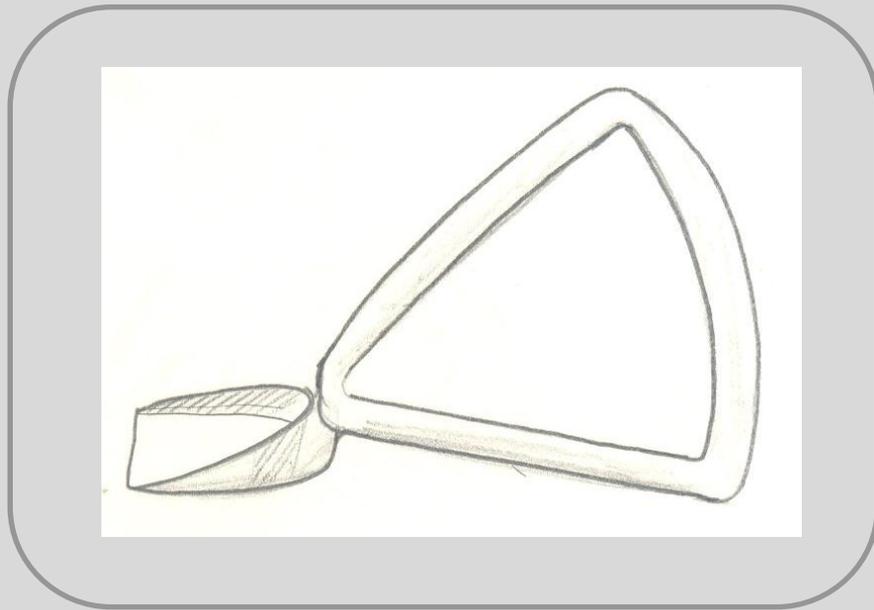
# Cluster 1 – Idea Development



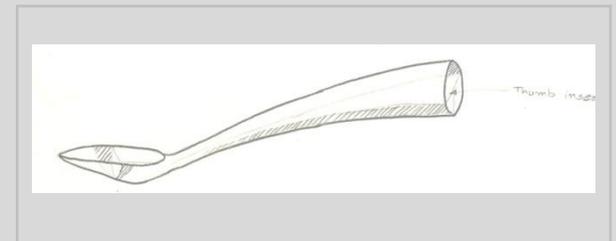
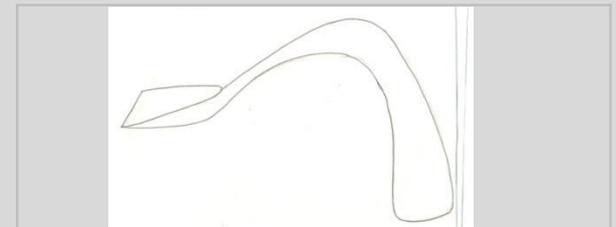
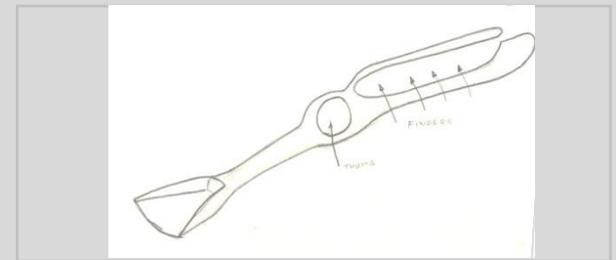
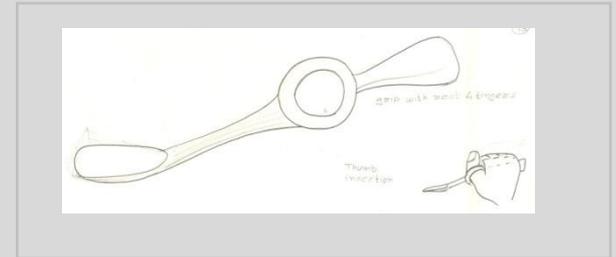
# Concept 1



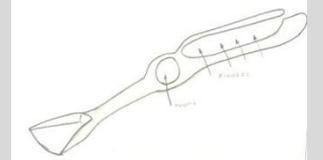
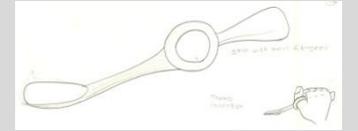
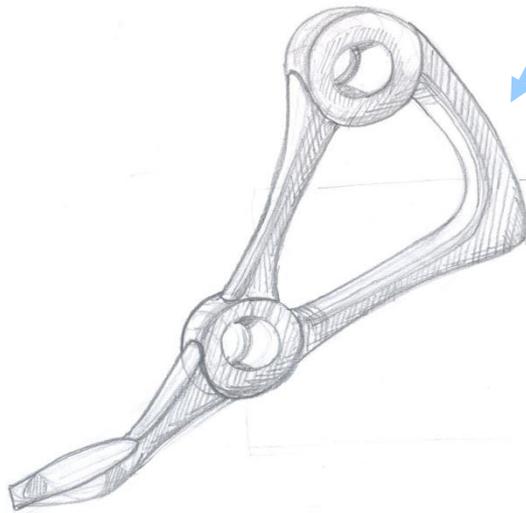
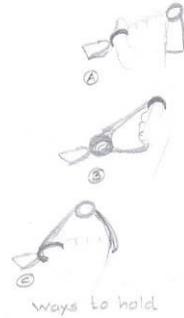
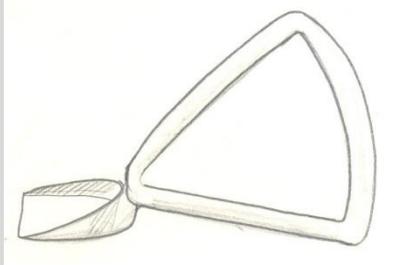
# Cluster 2 Representative



Cluster Representative - enclosed handle

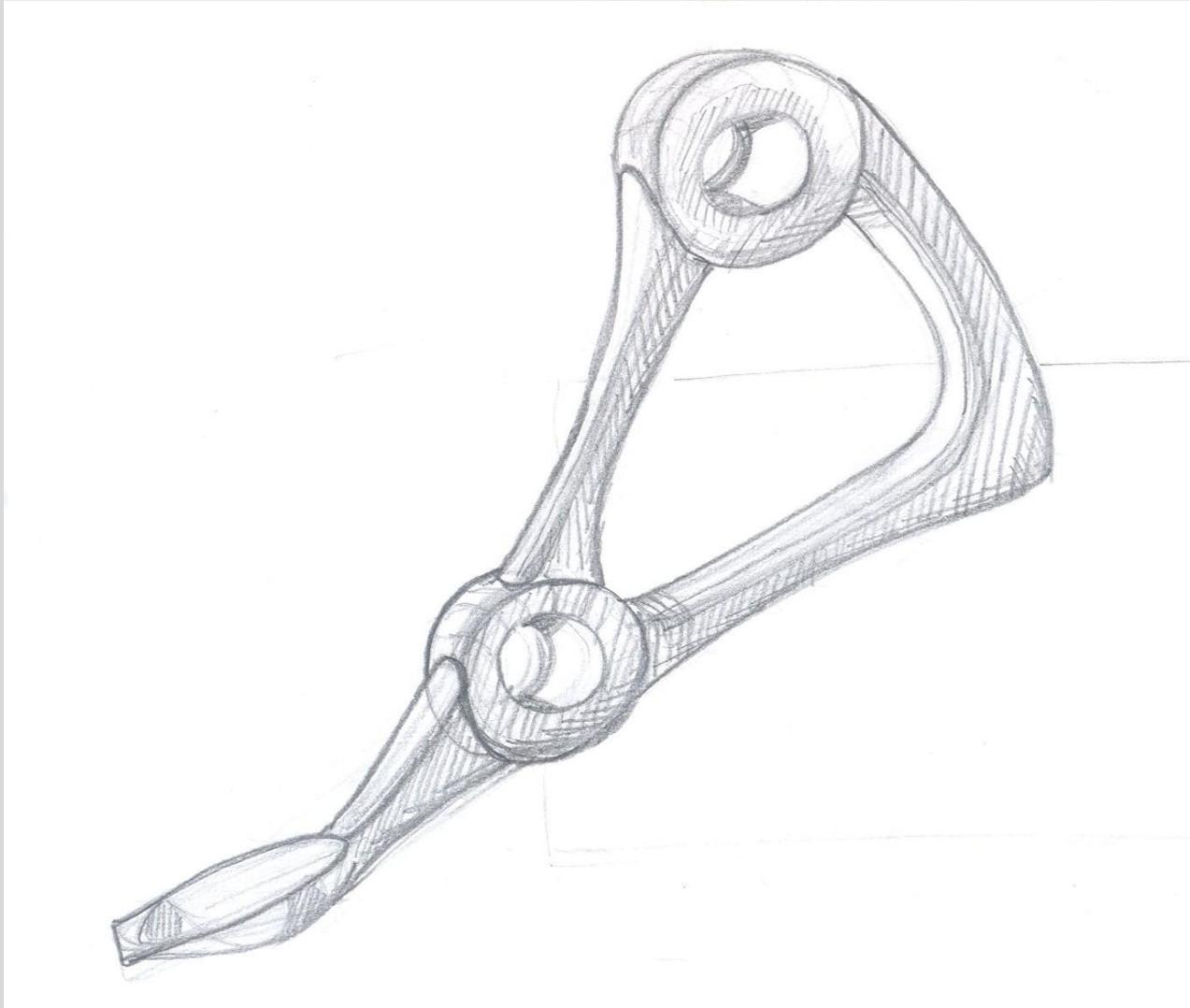


# Cluster 2 – Idea Development

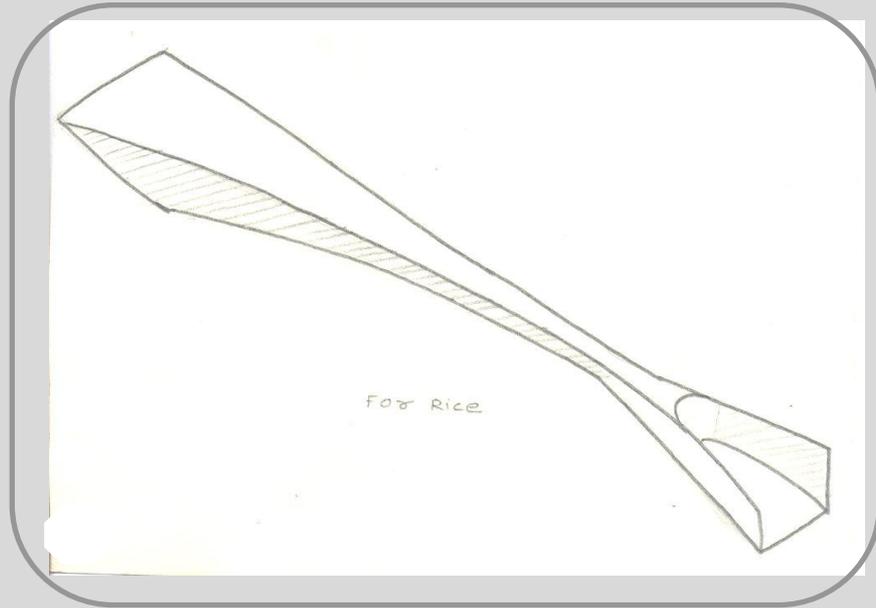


Slots in one of the ideas was incorporated into the cluster representative.

# Concept 2

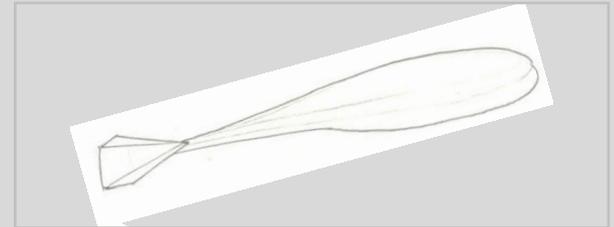
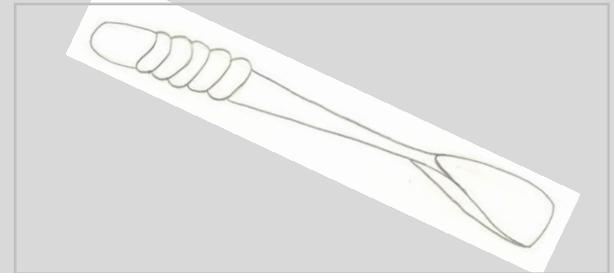
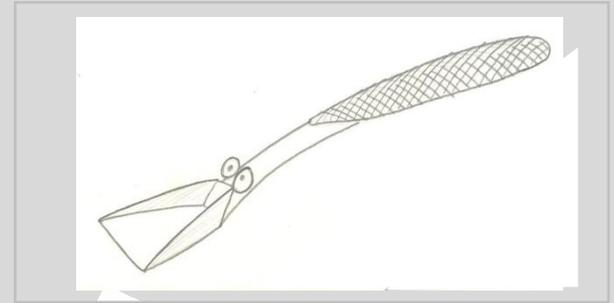


# Cluster 3 Representative

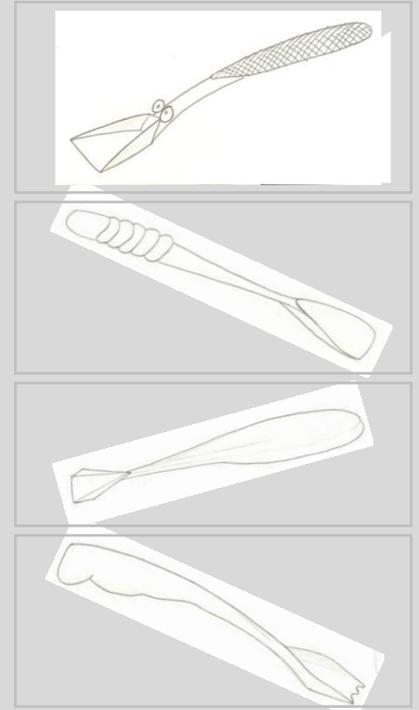
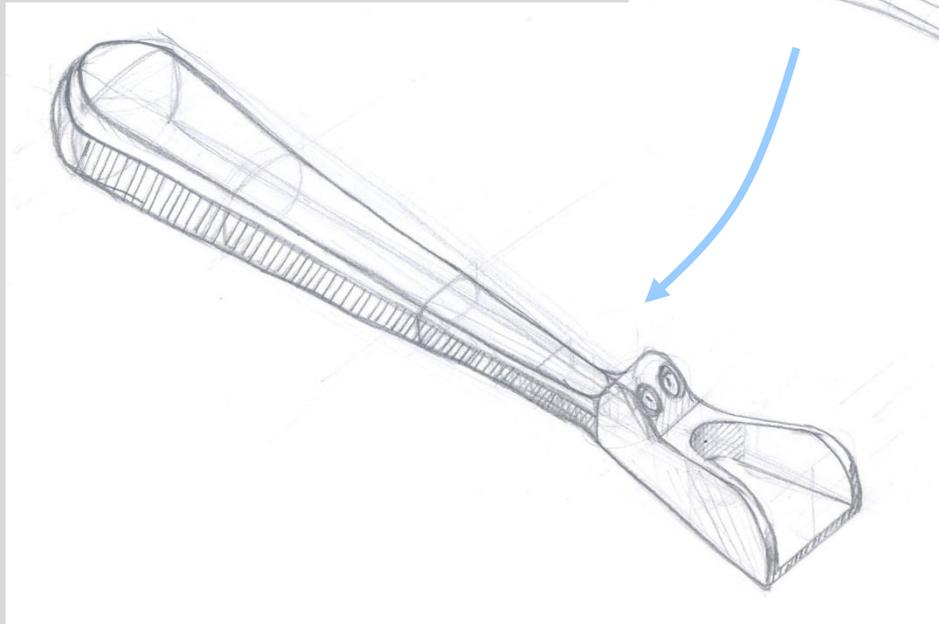
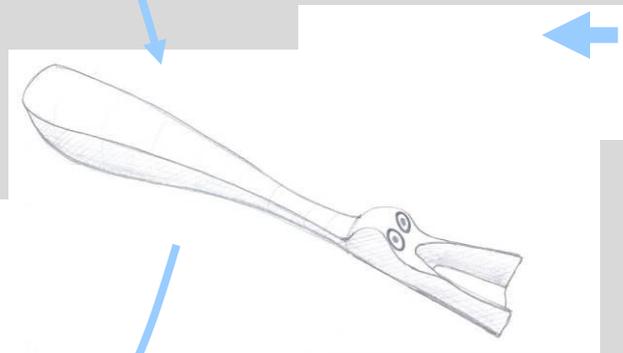
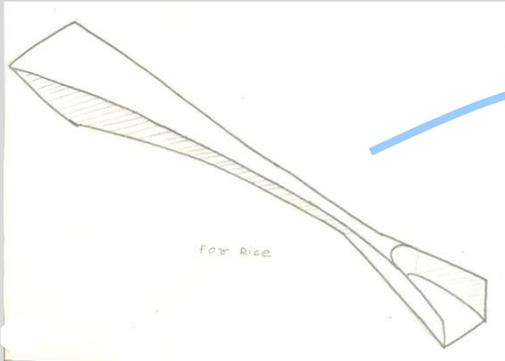


Cluster Representative

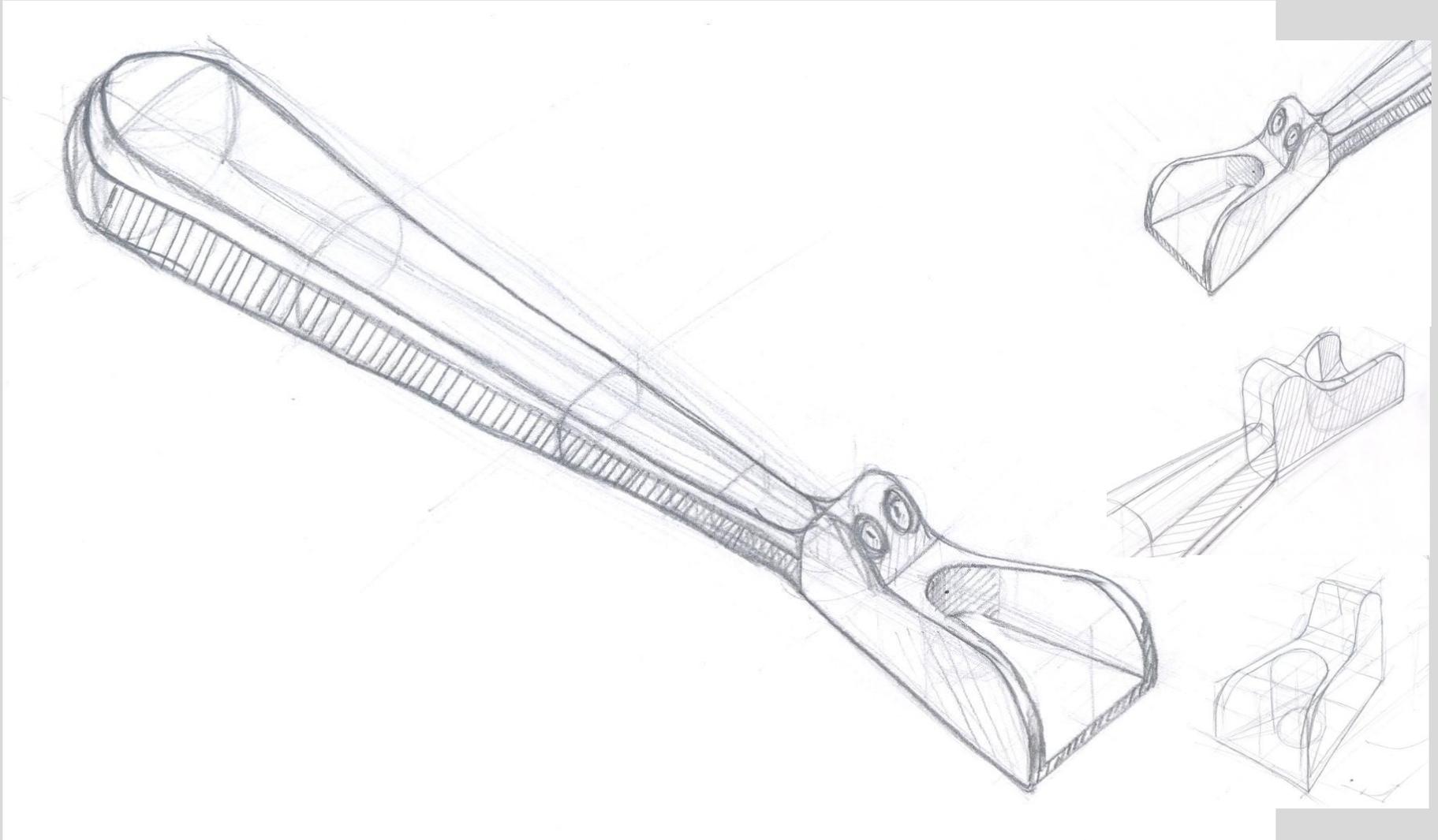
- Planar surface on the front and the end



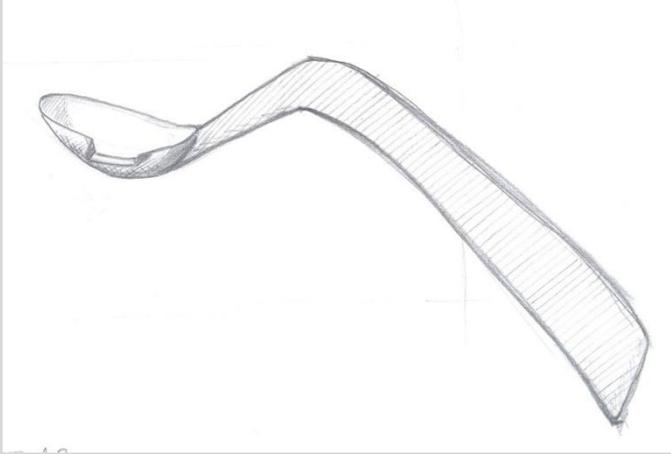
# Cluster 3 – Idea Development



# Concept 3



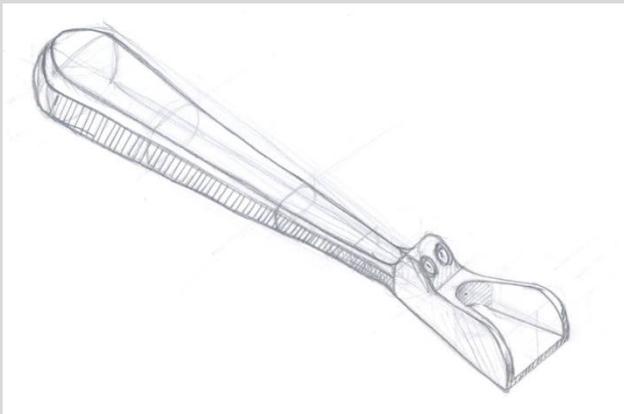
# Three Concepts



Concept 1

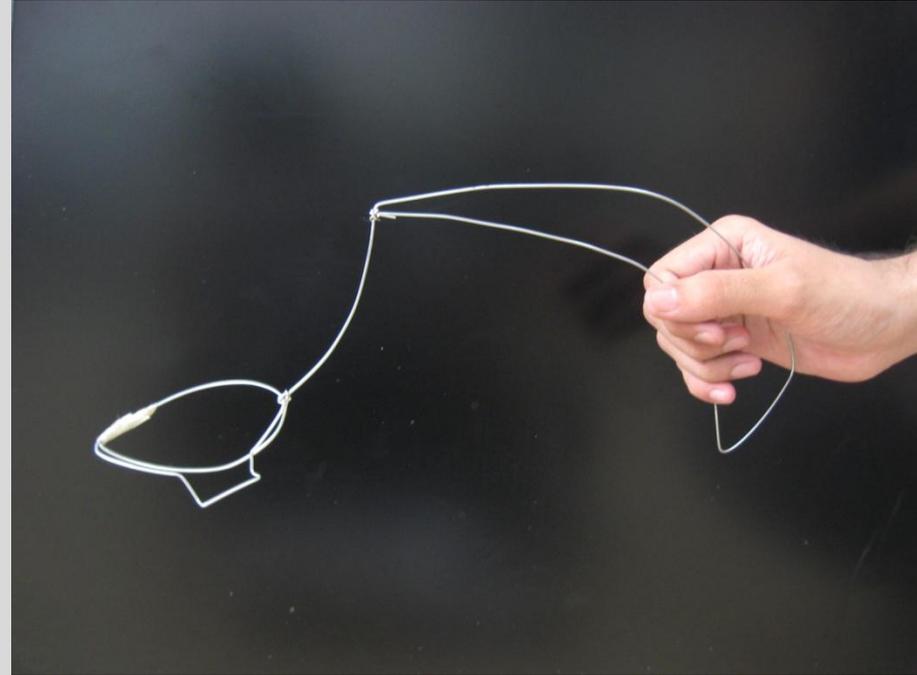
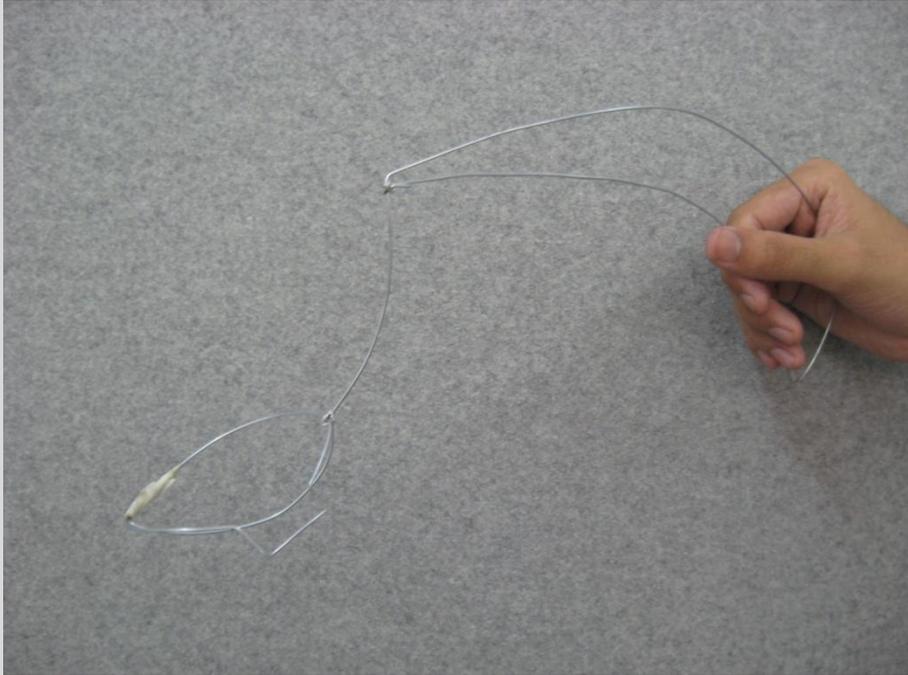


Concept 2



Concept 3

# Exploratory models – Concept 1

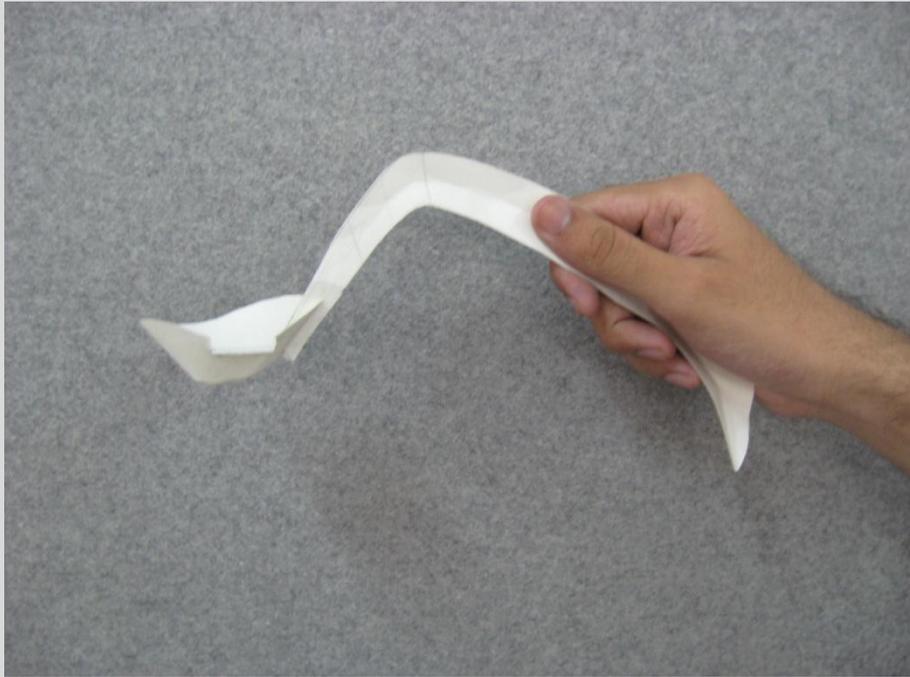


Medium: GI wire Ø1mm

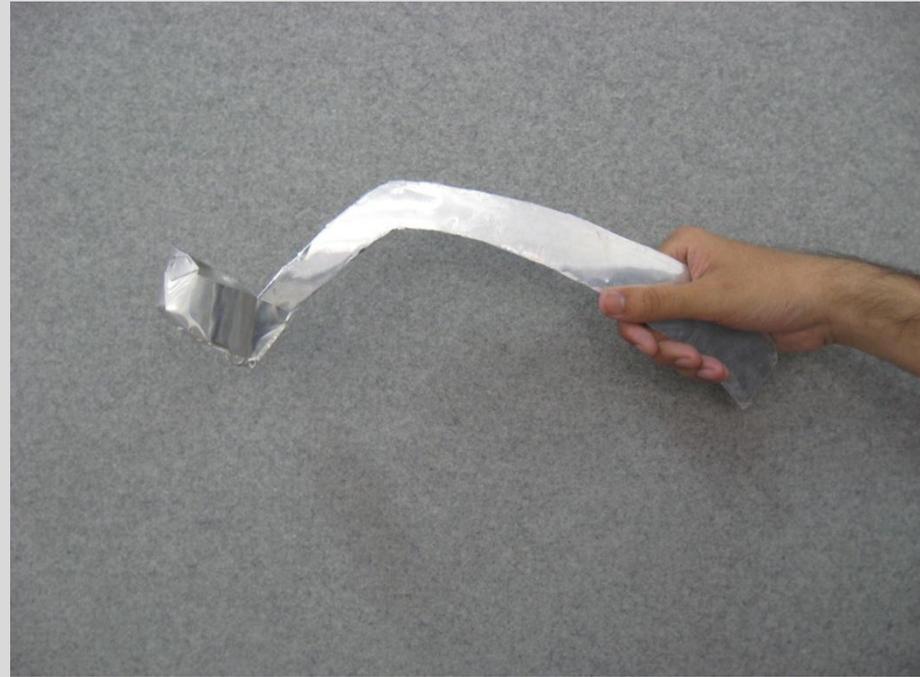
- Making exploratory models
- Experiencing each concept with acting
- Playing with different elements and material used for making models
- Refining the concepts by incorporating the essence of the exploratory models

For example - Wireframe of a spoon made with a wire gives tremendous opportunity to imagine innovative forms for the spoon as the wireframe only defines the boundary of the volume. Thus a boost to creative thinking occurs.

# Exploratory models – Concept 1



Medium: Cartridge paper



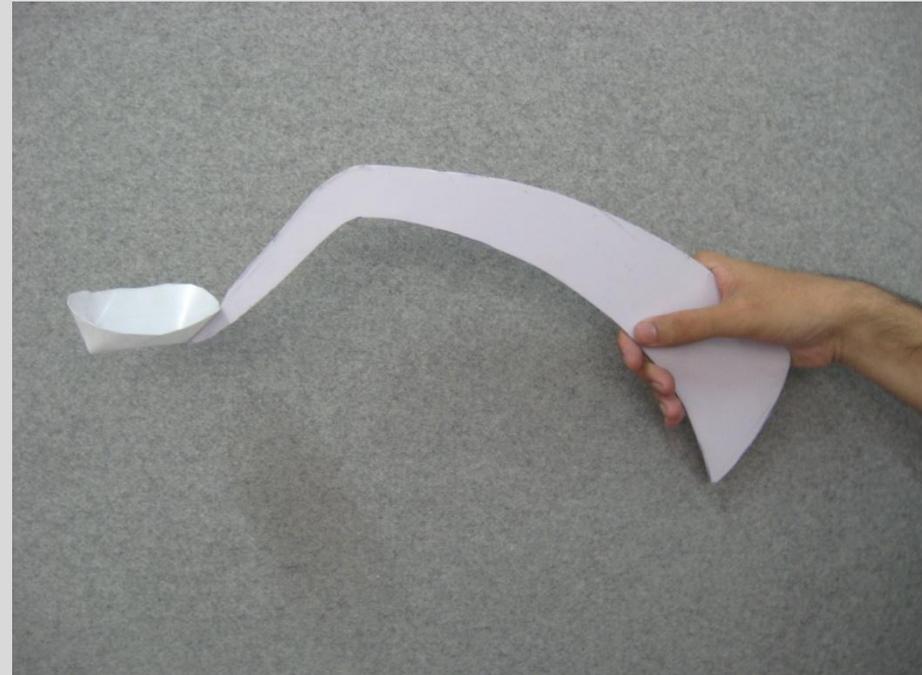
Medium: Aluminum sheet (0.5mm thick)

Exploratory model made with paper and aluminum helps to work with a media which is more planar in nature.

# Exploratory models – Concept 1



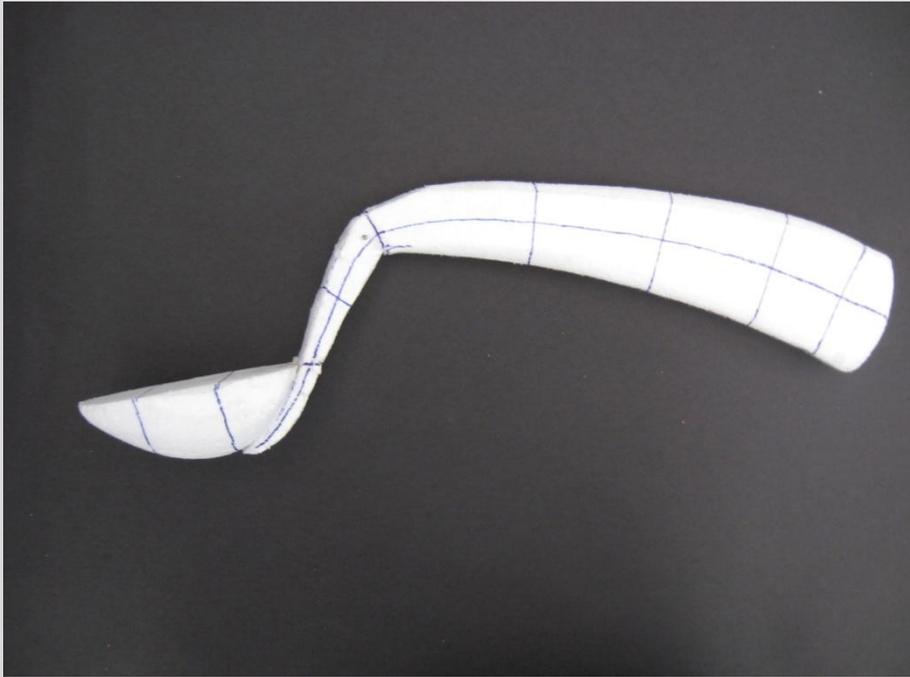
Medium: Wood ( 2mm thick ply)



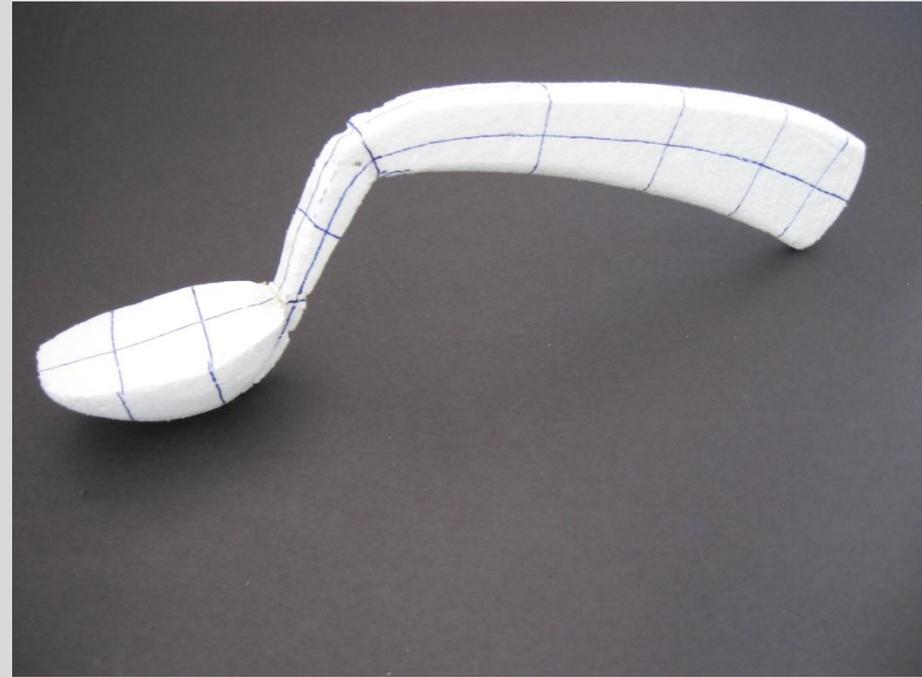
Medium: Styrene sheet (plastic)

The models were made in larger scale so that a familiar product becomes strange. This enhances the creativity.

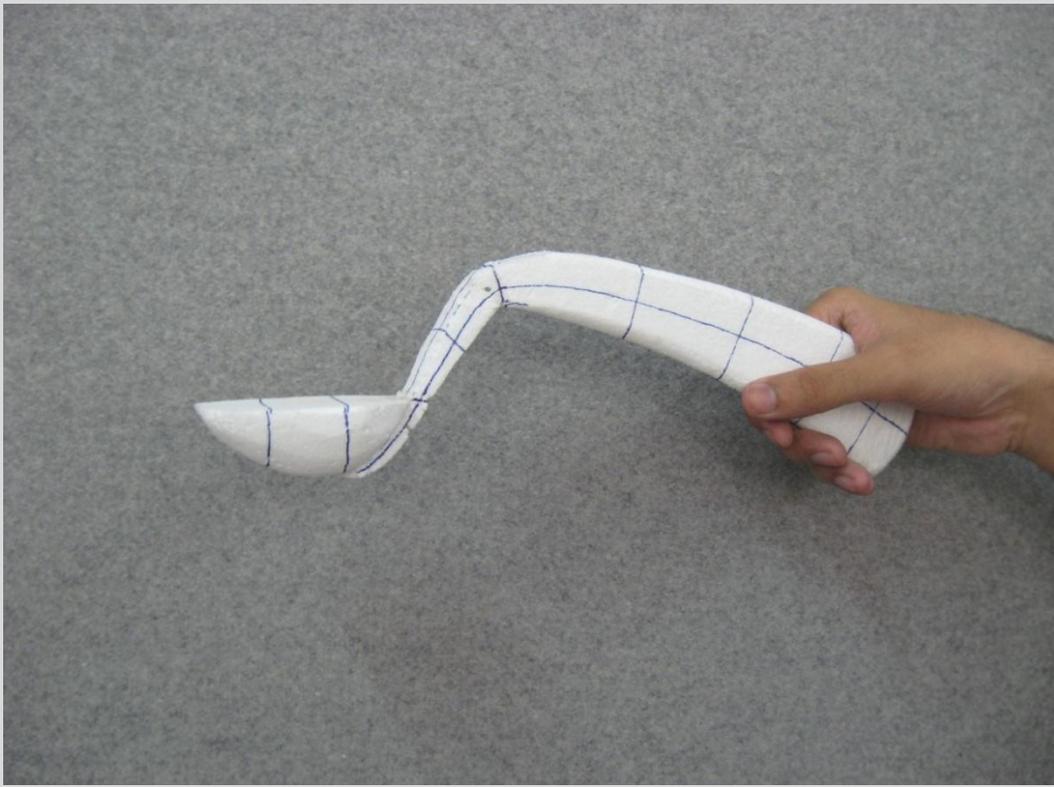
# Exploratory models – Concept 1



Medium: High density Poly-styrene foam



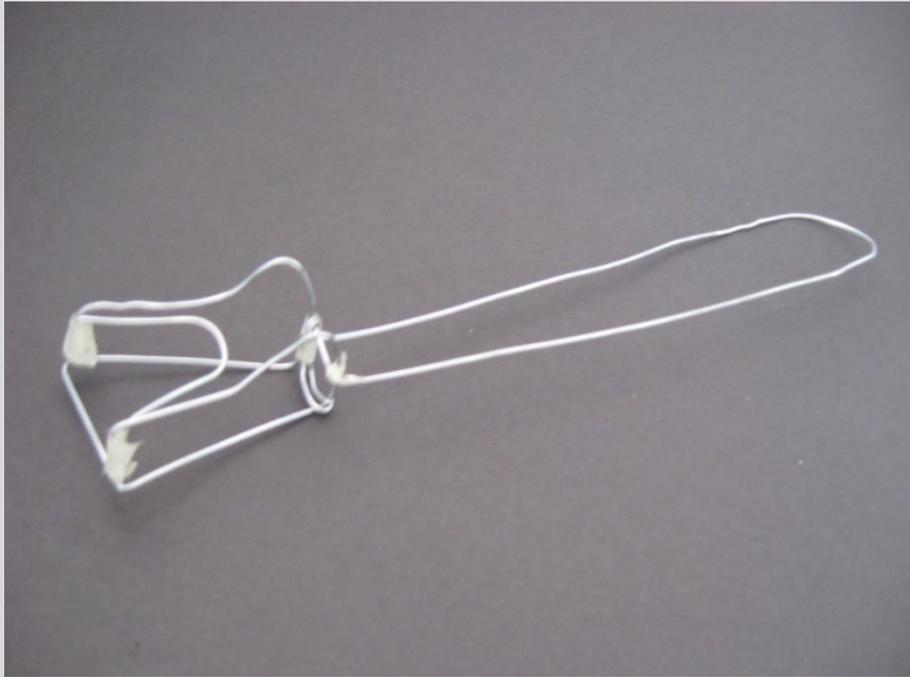
Medium: High density Poly-styrene foam



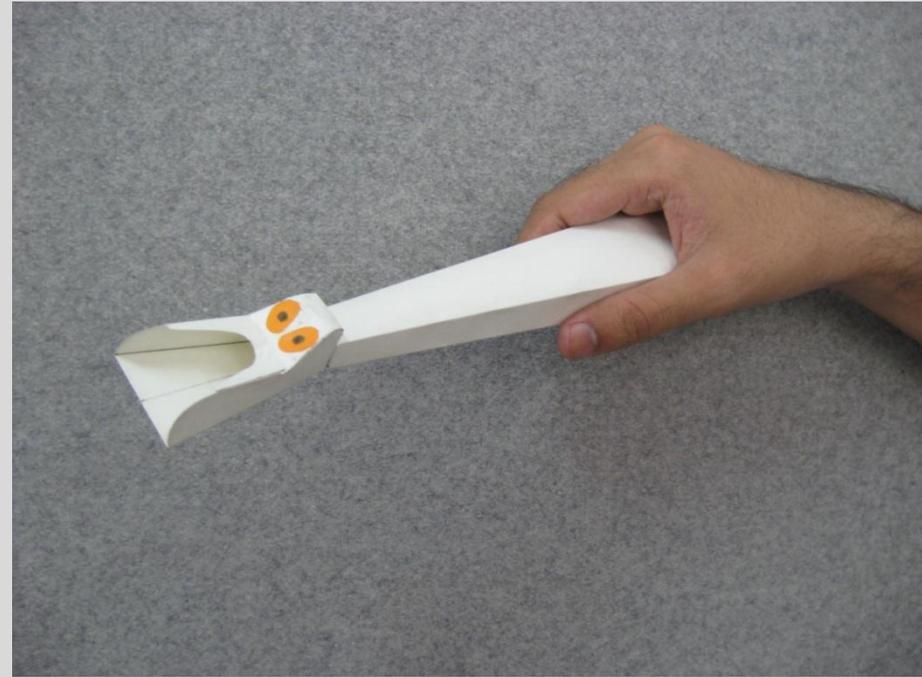
Experiencing and playing with the model



# Exploratory models – Concept 2

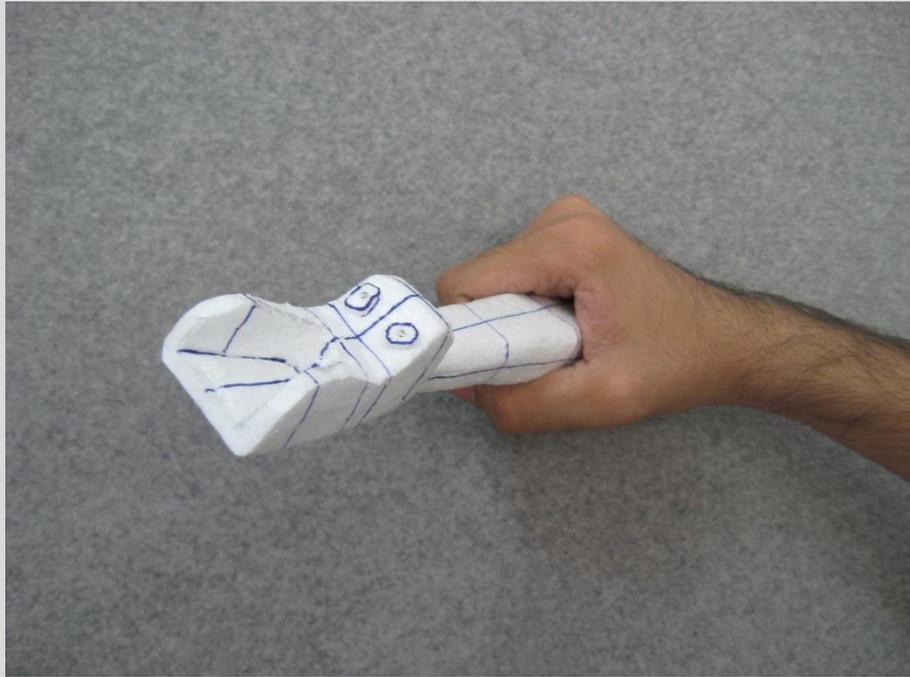


Medium: GI wire  $\varnothing$ 1mm

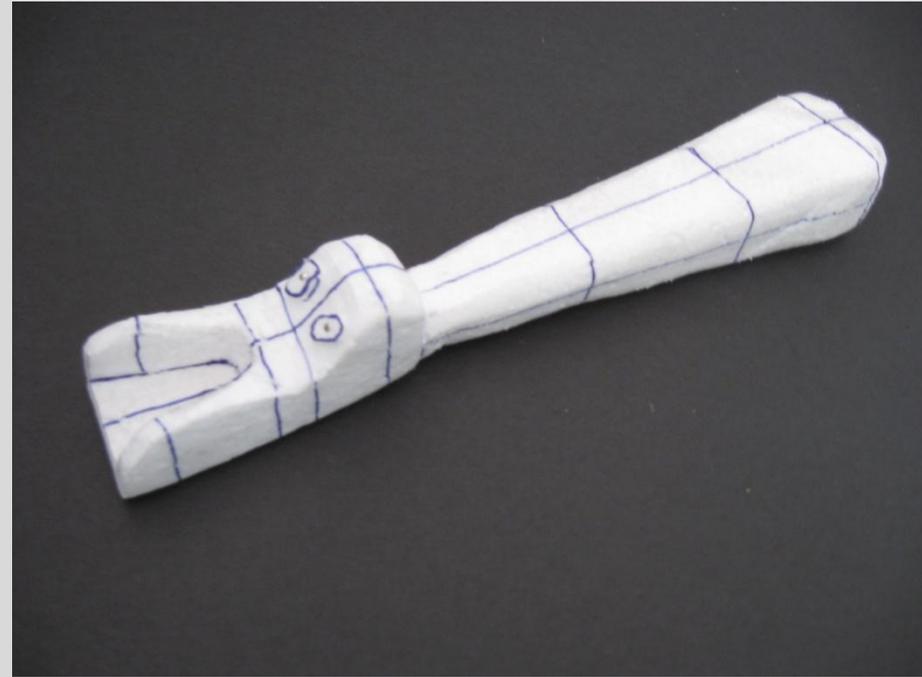


Medium: Cartridge paper

# Exploratory models – Concept 2

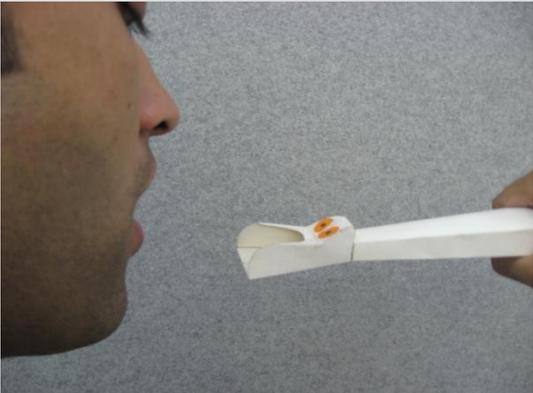
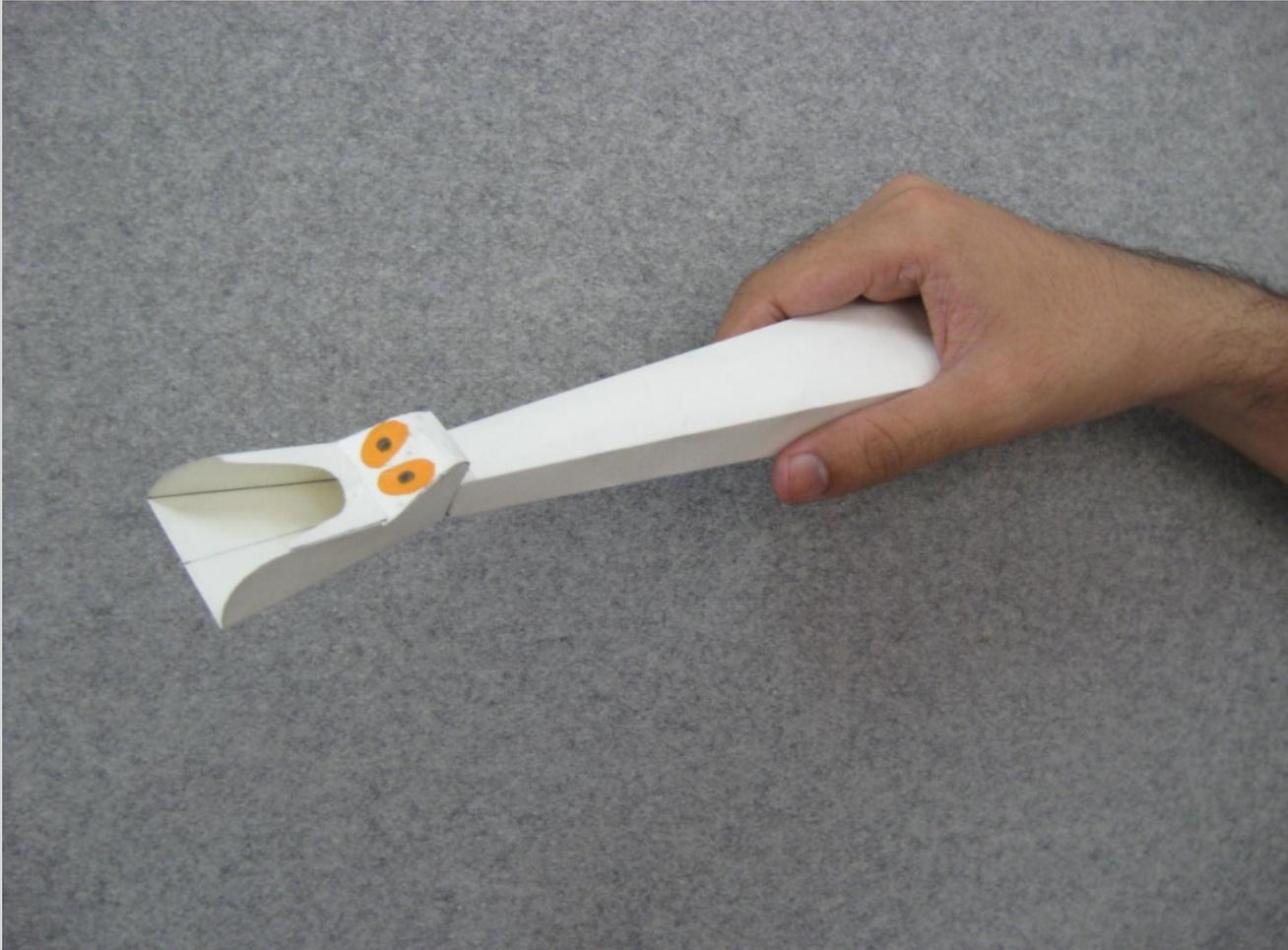


Medium: High density Poly-styrene foam

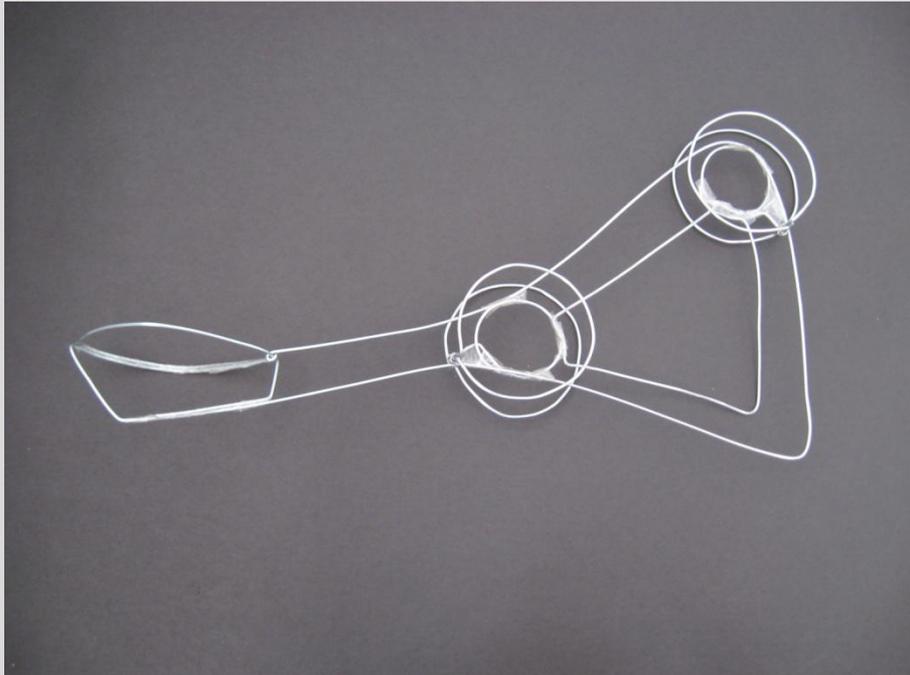


Medium: High density Poly-styrene foam

Experiencing and playing with the model



# Exploratory models – Concept 3



Medium: GI wire  $\varnothing$ 1mm

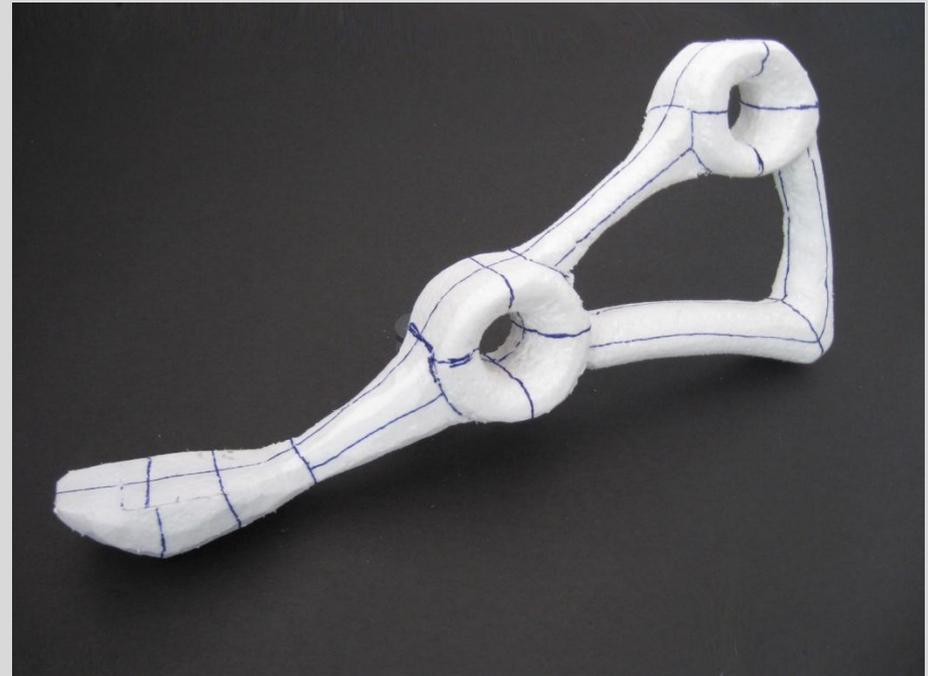


Medium: Cartridge paper

# Exploratory models – Concept 3



Medium: High density Poly-styrene foam

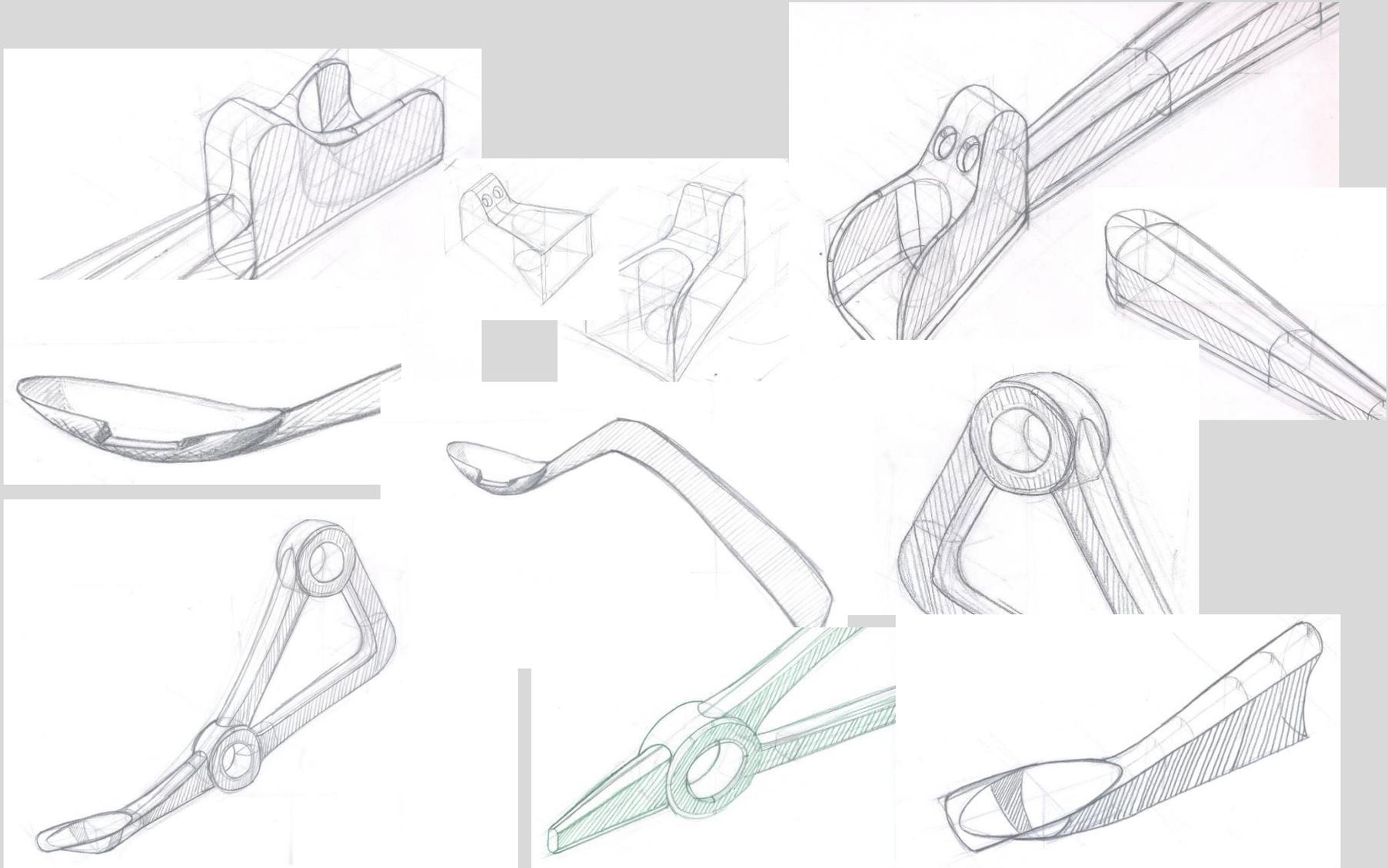


Medium: High density Poly-styrene foam

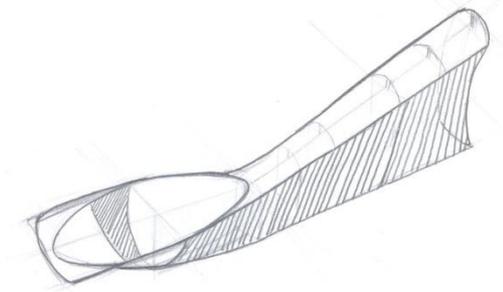
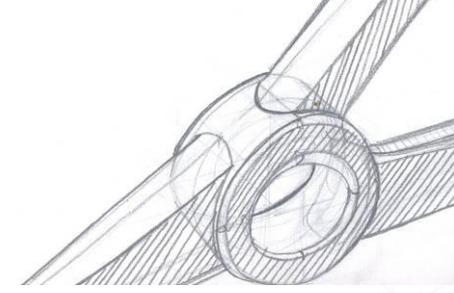
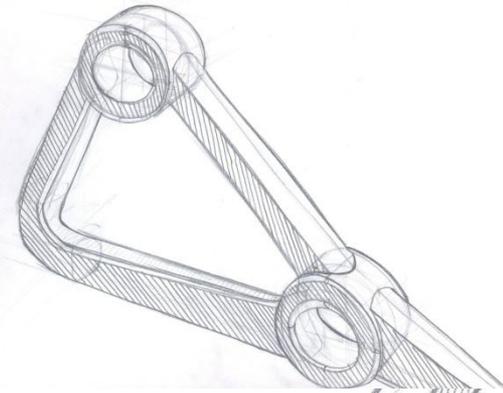
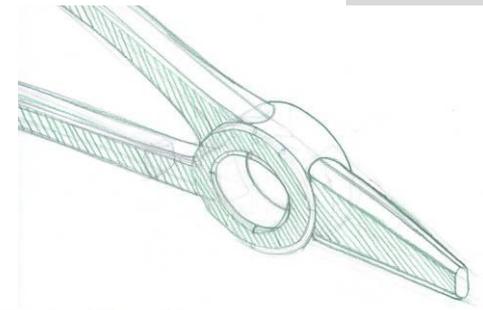
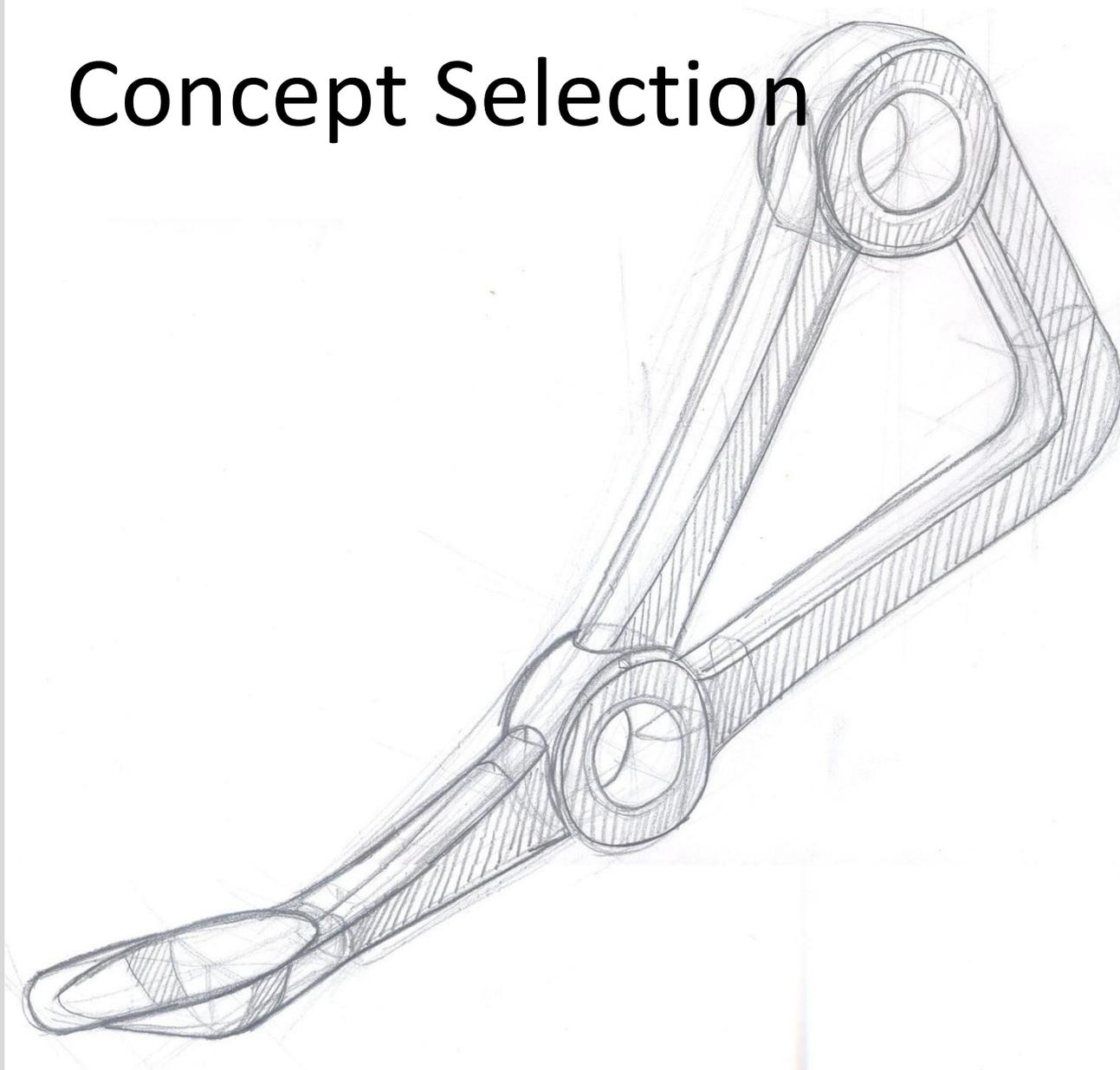
Experiencing and playing with the model



# Sketching the Details



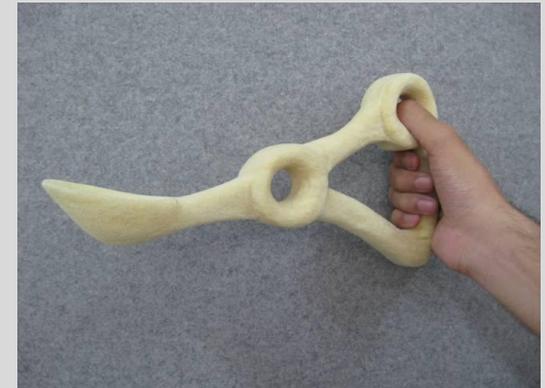
# Concept Selection



# Mock up Models

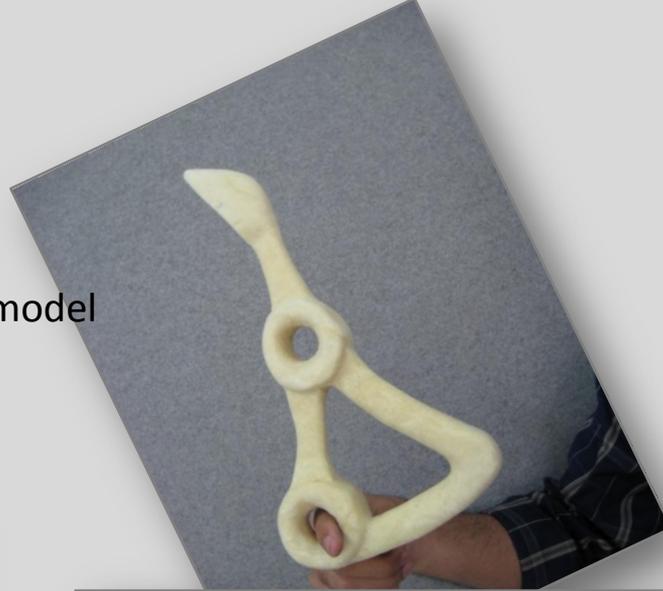
Innovation in...

- Form
- Interaction
- Material
- Manufacturing process
- Technology



Innovation in interaction

Experiencing and playing with the model



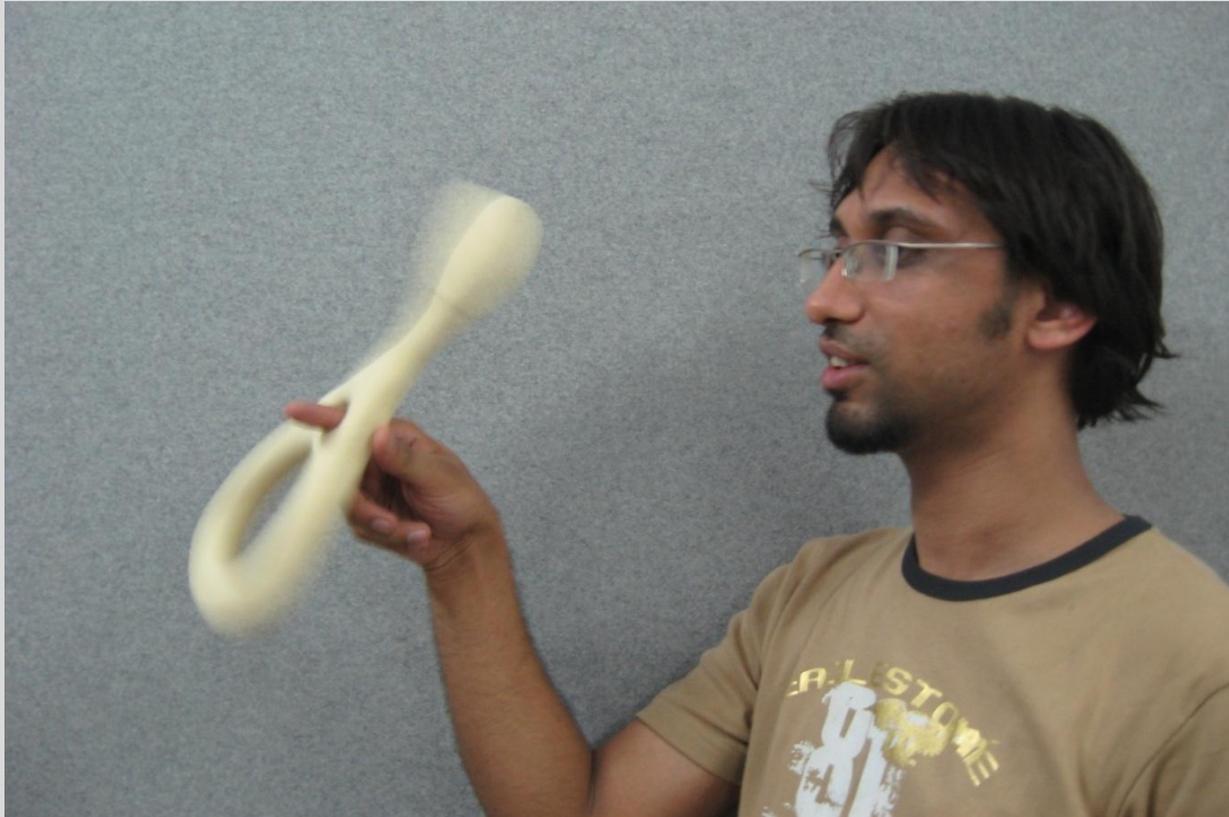
Children would like to play with it, see through it, etc



# Further Refinement



Playfulness of product



# Evaluation



the concept options are evaluated with following parameters

- Innovative Form
- Innovative Interaction
- Innovation in Material
- Innovation in Manufacturing process
- Innovation in Technology

# Innovative Spoon

- Innovative Form
- Innovative Interaction
  - more deeper level of interaction with user
- Innovation in Material
  - Thermoset food grade plastic
  - Hygiene
  - Specific weight should be less than  $1\text{gm}/\text{cm}^3$
- Manufacturing process
  - Roto-molding
  - Minimum possible wall thickness
- Innovation in Technology
  - Opportunity to create tools, develop skills, understand the materials with the application of science

Selected concept



# Prototype



Spoon for kids (two to five years old )



# Innovative Interaction

Ways in which the spoon can be held and handled by kids.



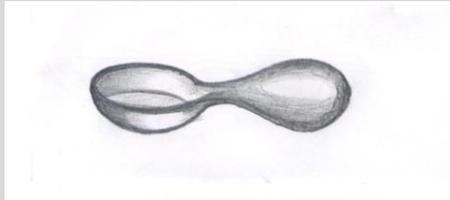
Creation of playing environment



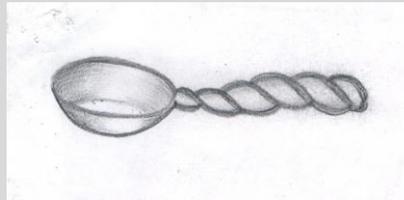
# Soup Spoon

Abhishek Prasad

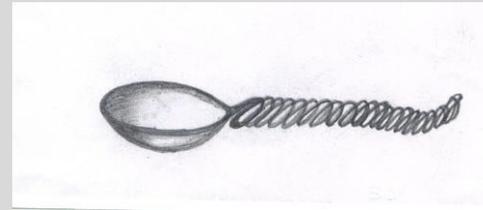
# Cluster 1 - Radical Spoons



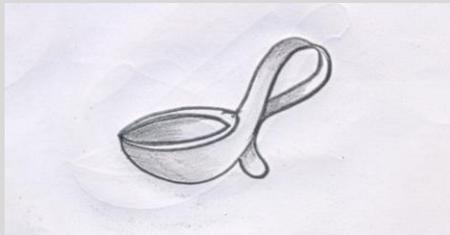
Complete spherical handle for better grip



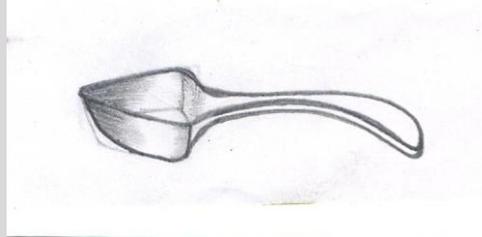
Spiral depression for handle for better grip



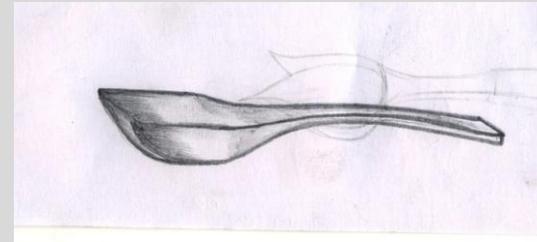
Spring Handle for flexible movement



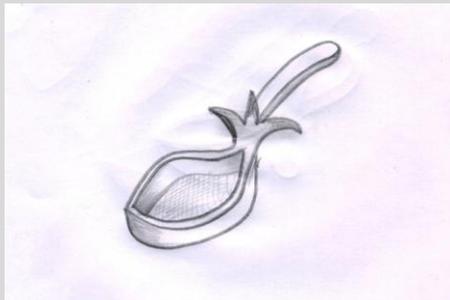
Inspired from Diya



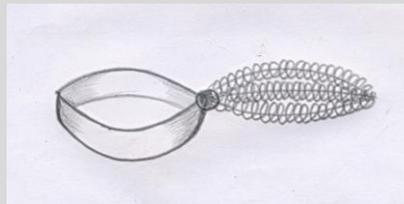
Triangular Scoop was there for good looking



Square shallow scoop

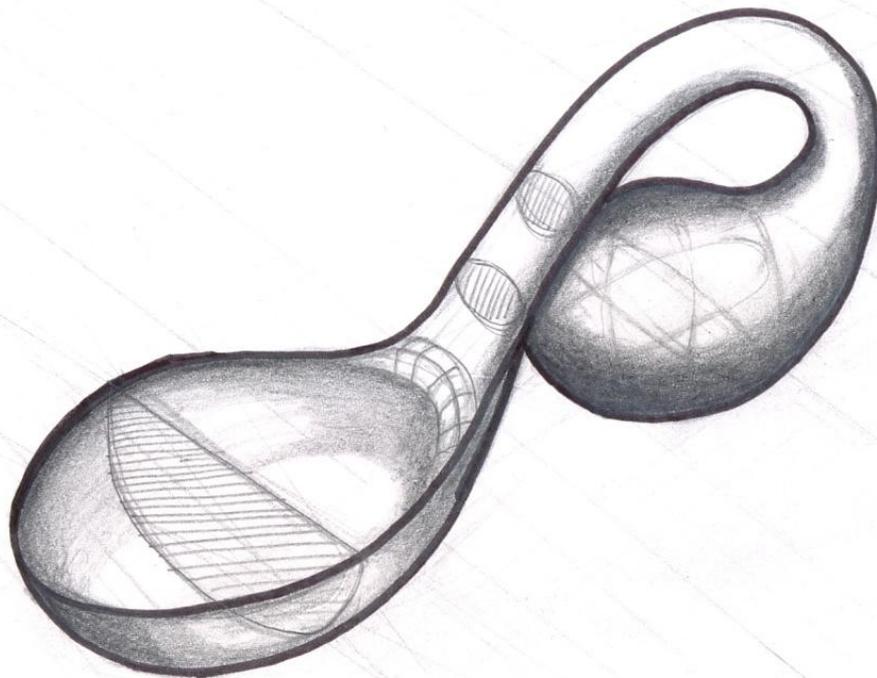


With three spring helical structure for better grip

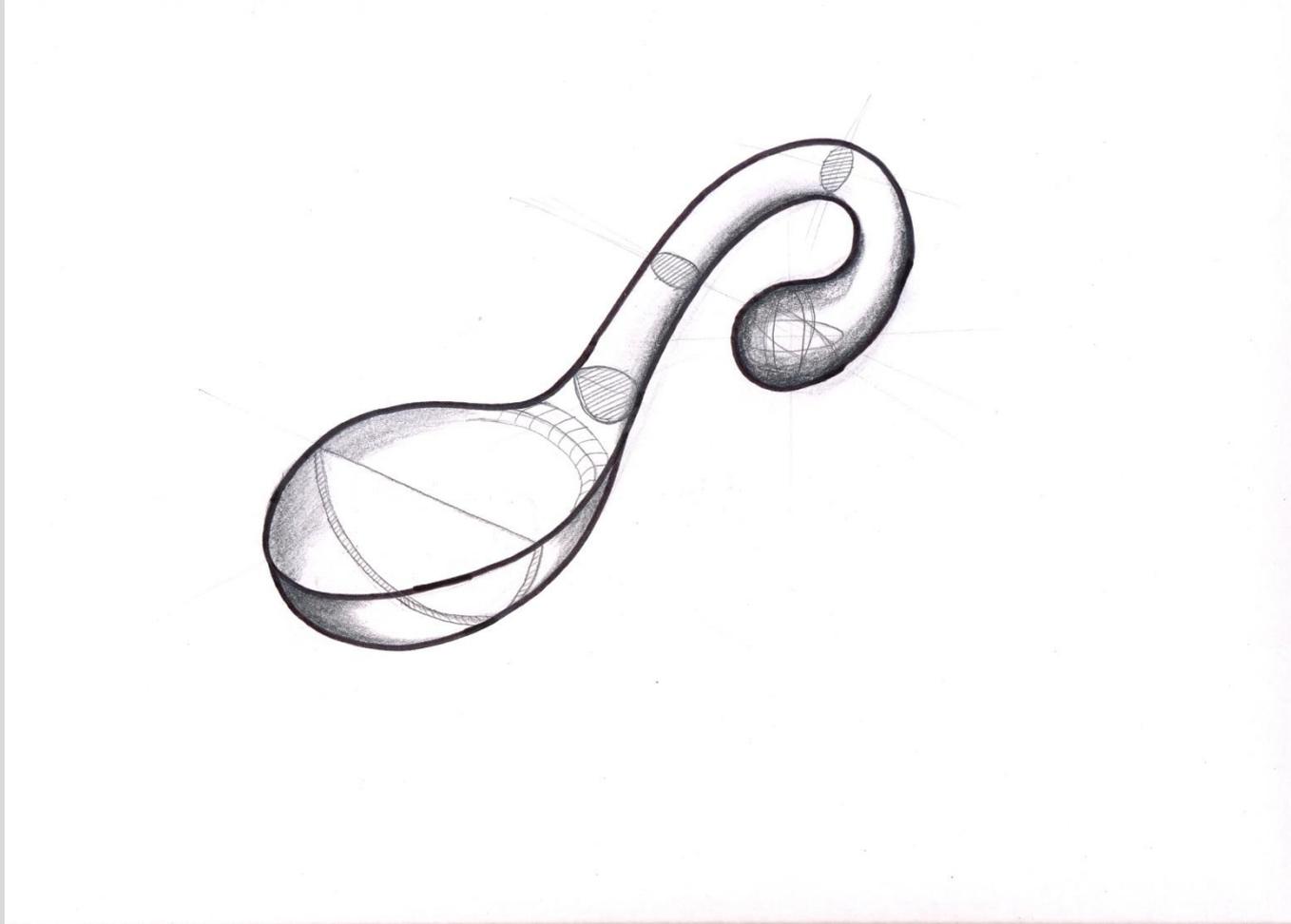


Spoon with Knife in the back for cutting

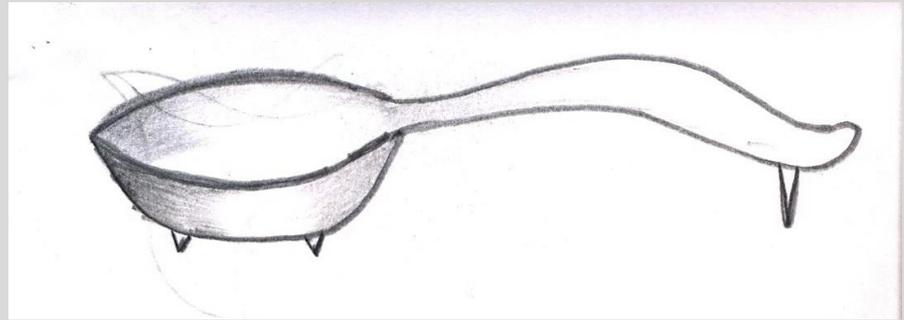
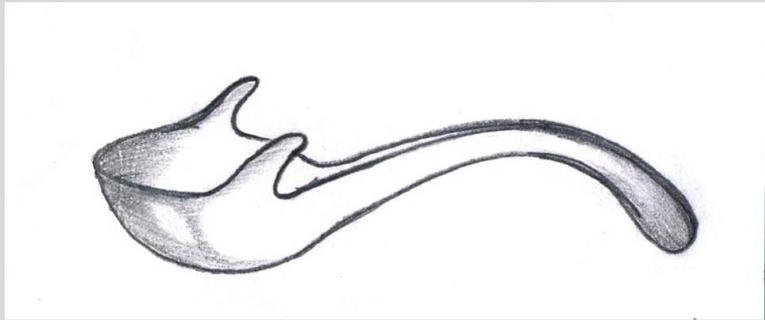
# Cluster Representative - Radical Spoons



# Concept 1



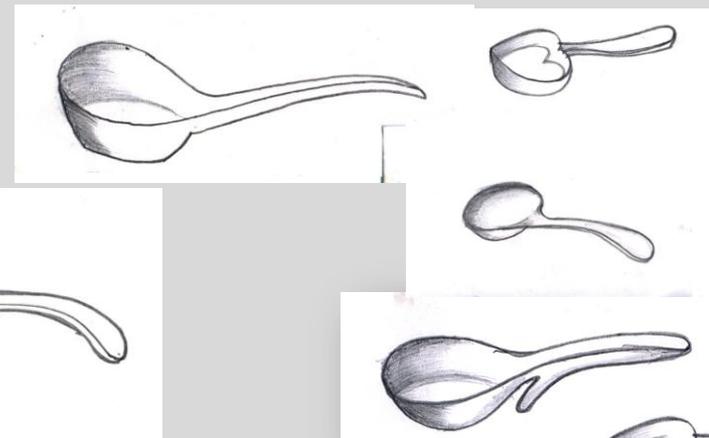
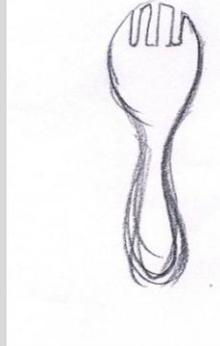
# Cluster 2 - Thin Handel Spoons



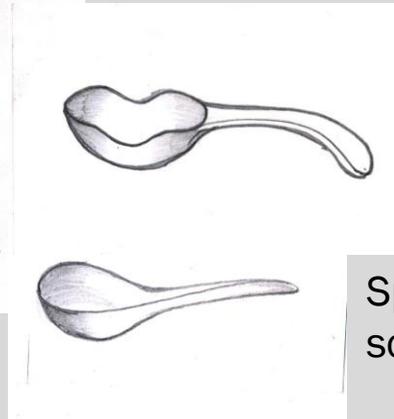
Inspired from fins of the Dolphin. Also helps spoon to place on the Bowl.



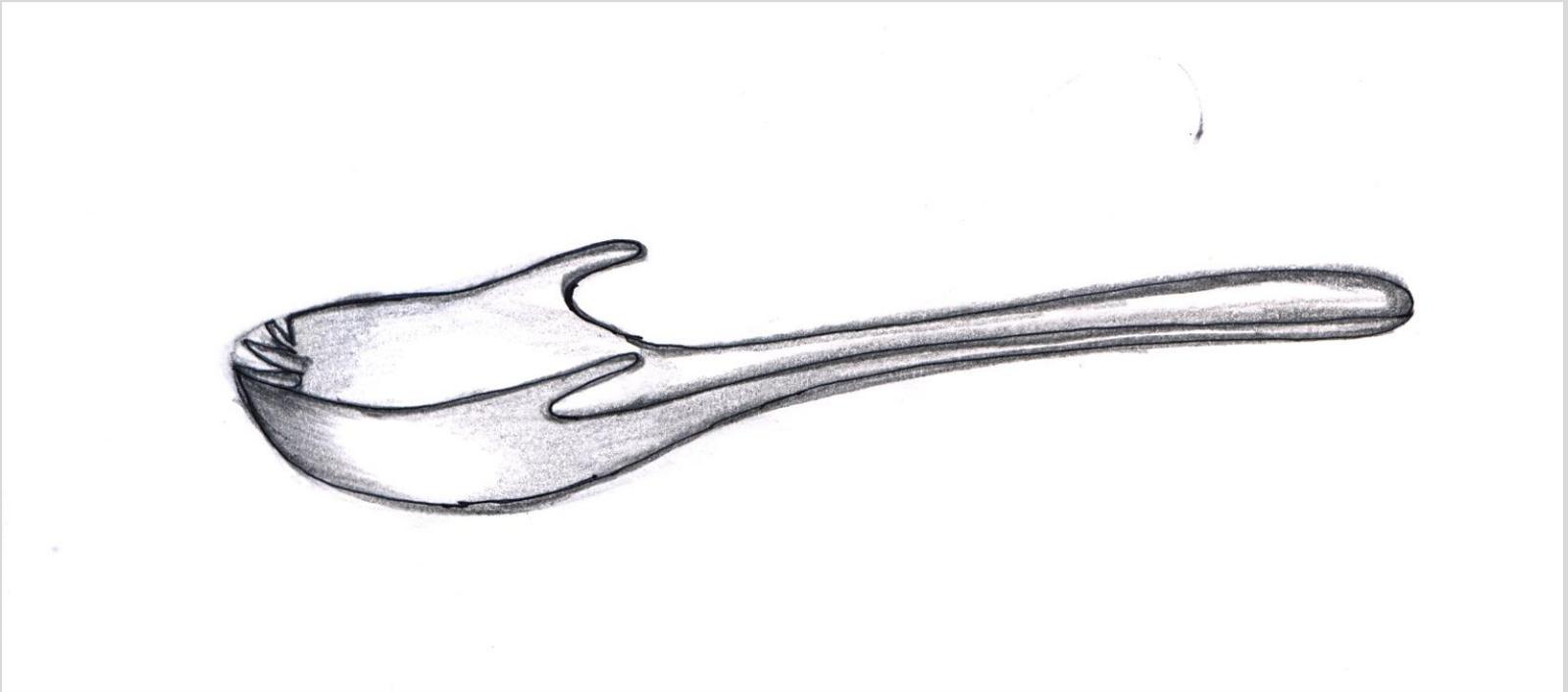
Spoon with integrated Fork in the Scoop



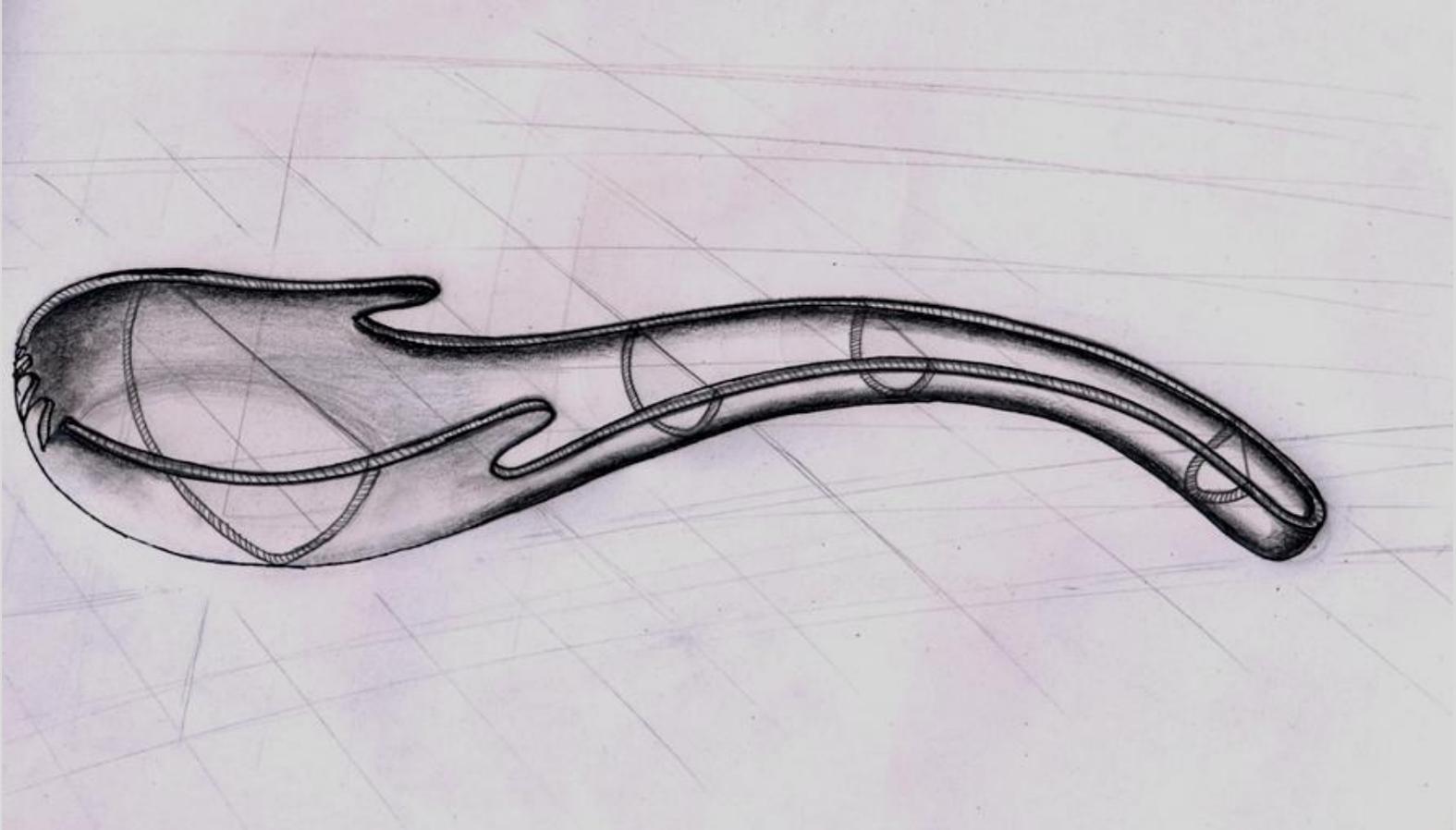
Spoon with depression in the scoop for easy intake of soup



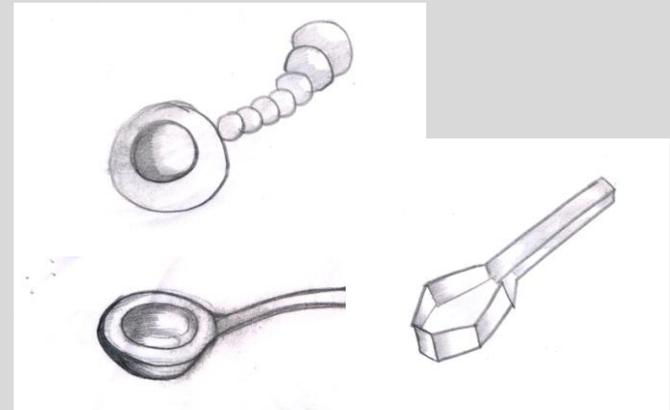
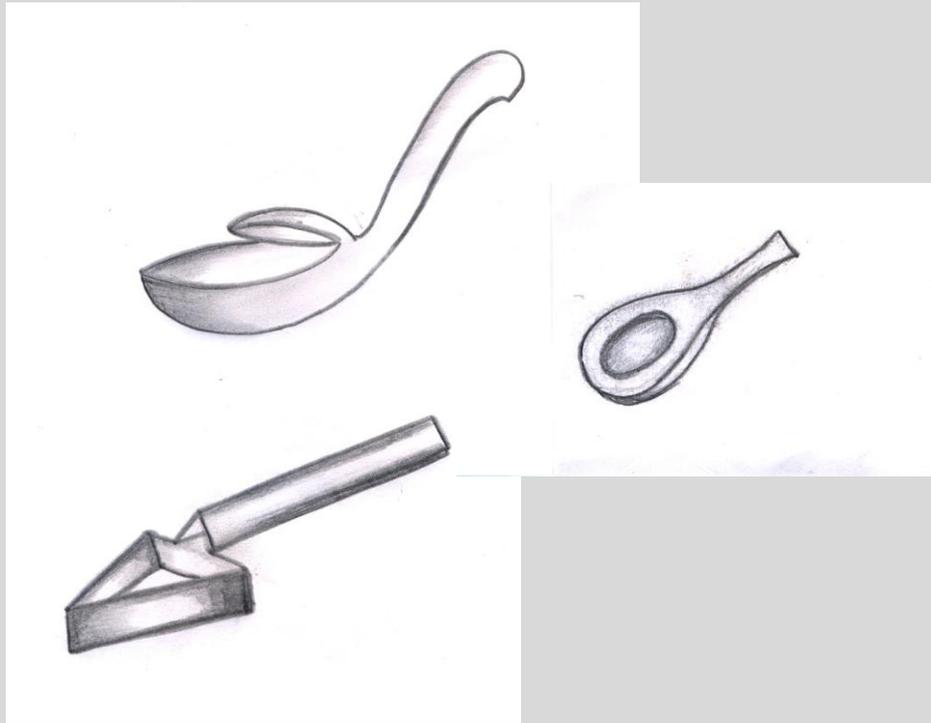
# Cluster Representative - Thin Handel Spoons



# Concept 2

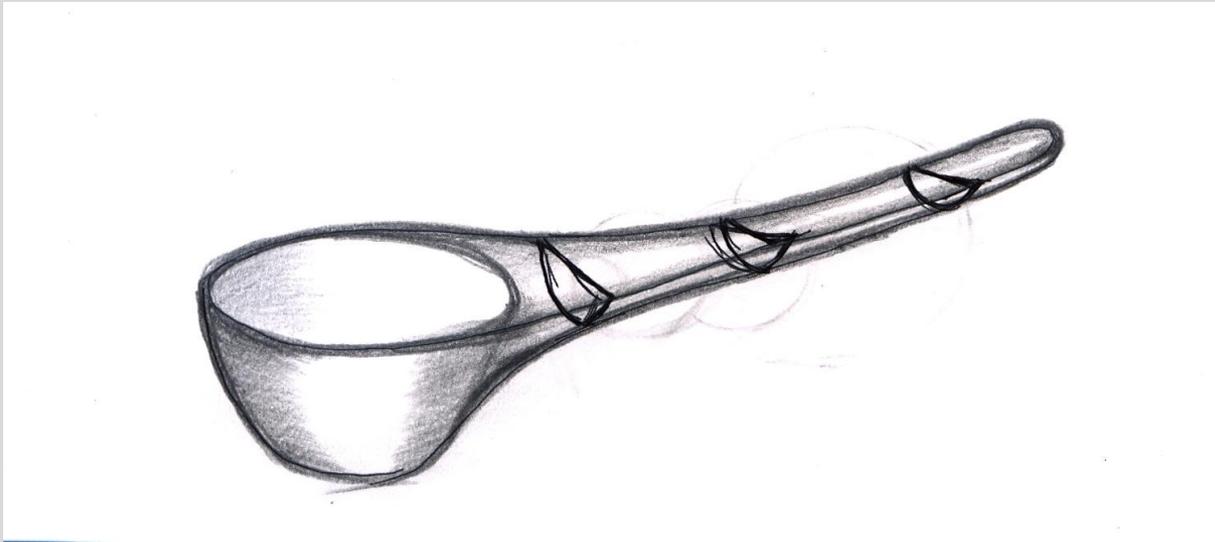


# Cluster 3 - Thick Handel Spoons

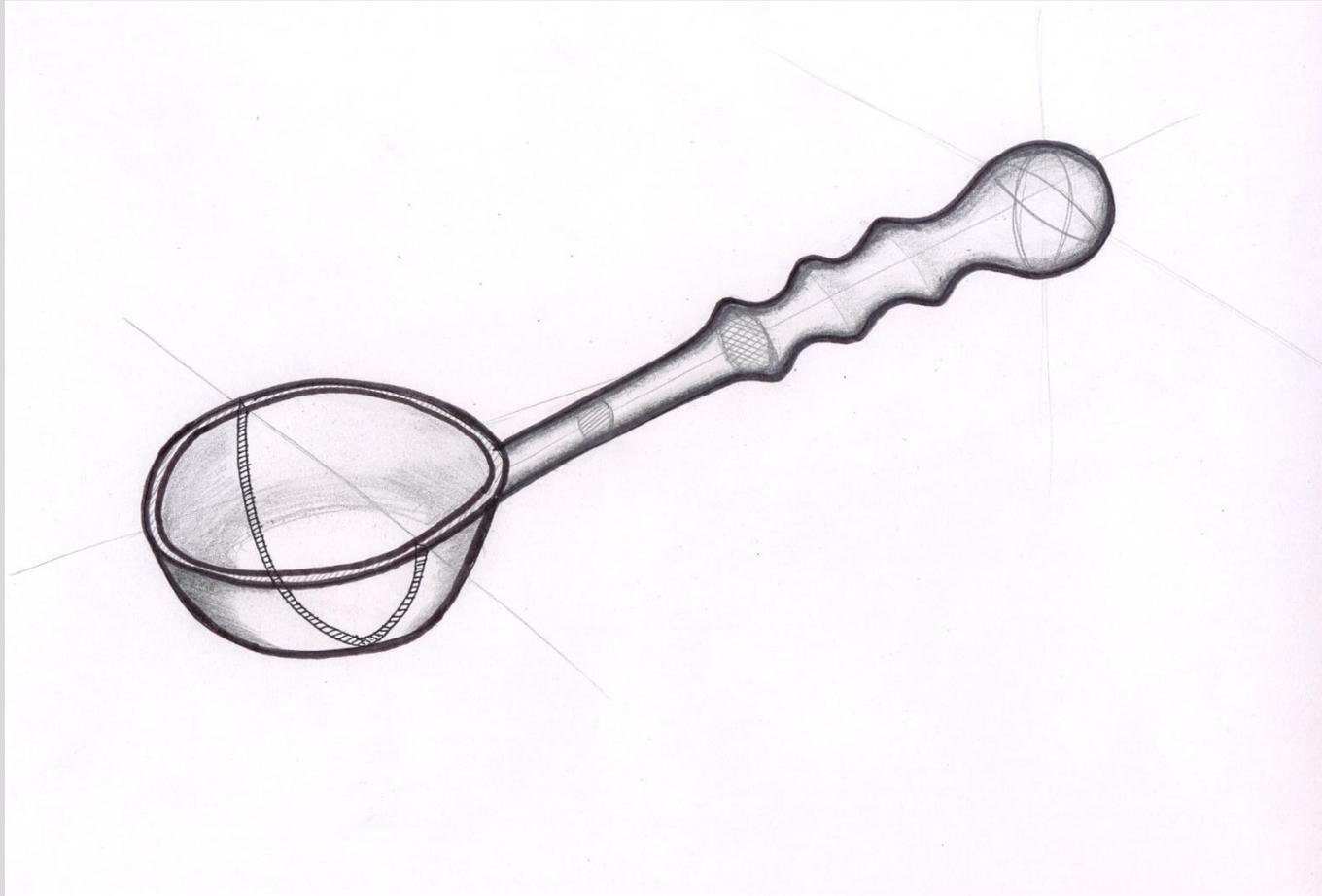


Some spoons  
inspired from  
cigars.

# Cluster Representative - Thick Handel Spoons



# Concept 3



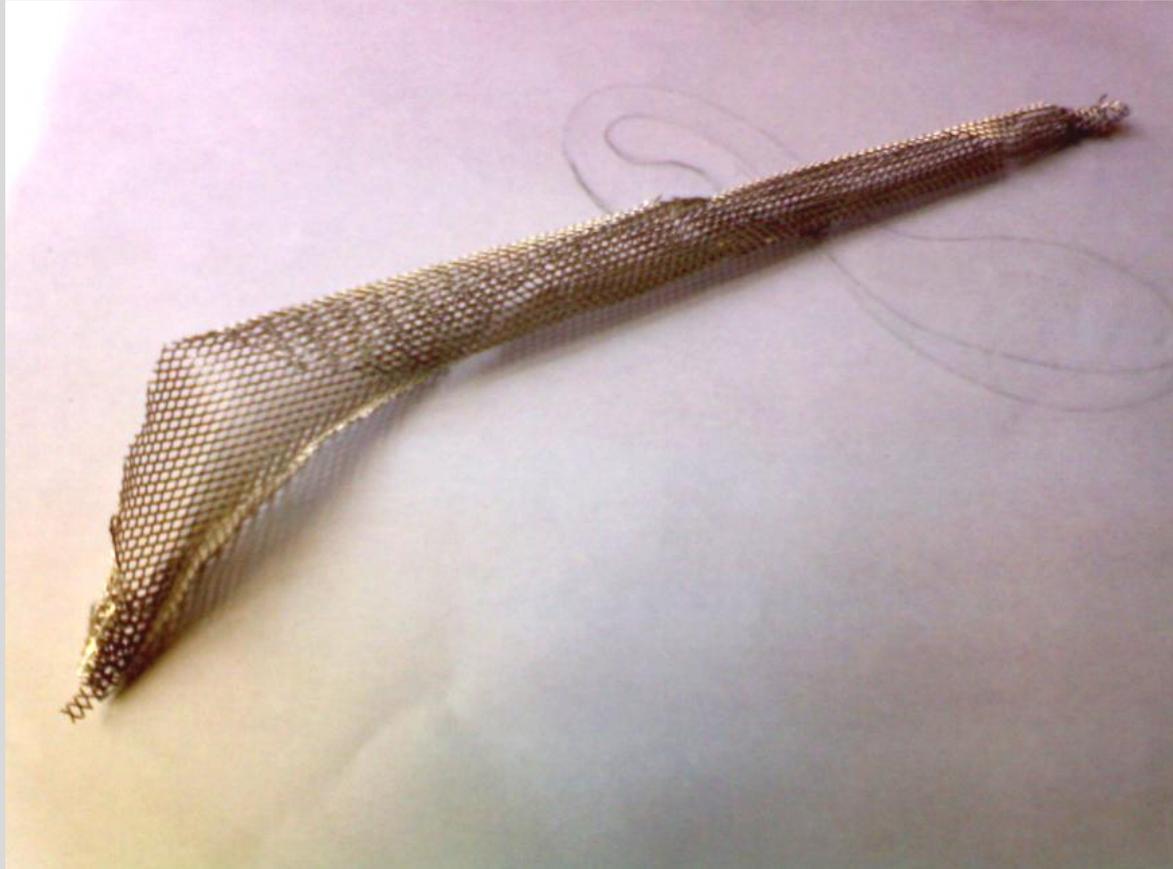
# Exploratory Models



# Exploratory Models



# Exploratory Models



# Exploratory Models



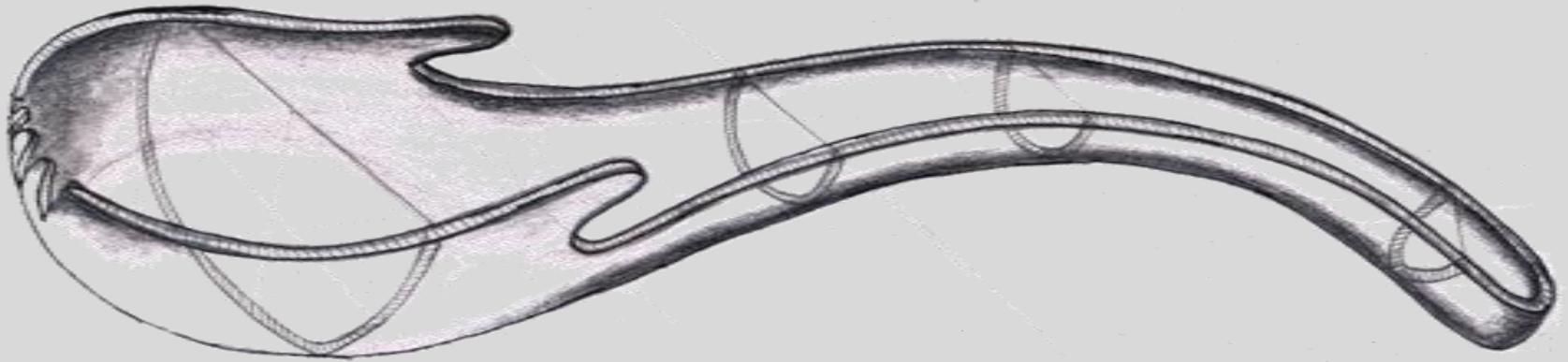
# Exploratory Models



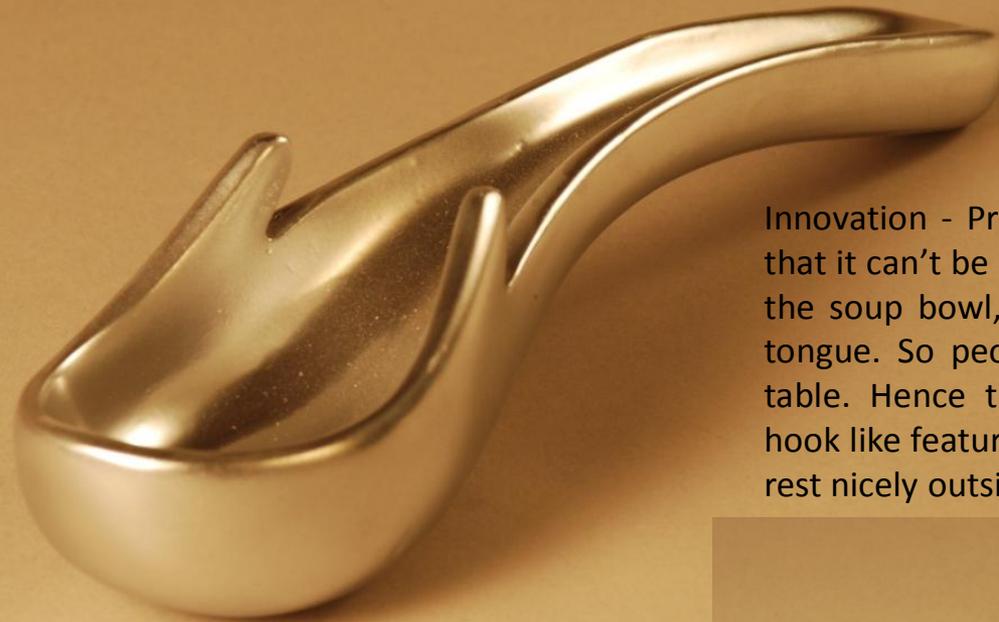
# Exploratory Models



# Detailing



# Final Spoon Prototype



Innovation - Problem with a soup spoon is that it can't be kept anywhere. If it is kept in the soup bowl, it gets hot & will burn the tongue. So people tend to keep it on the table. Hence the designer integrated two hook like feature on the spoon so that it can rest nicely outside the soup bowl.

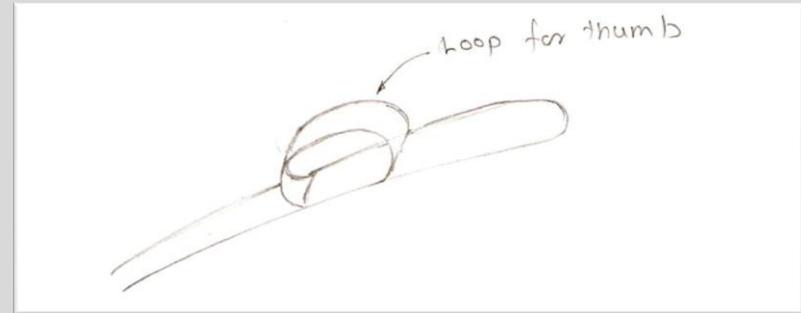
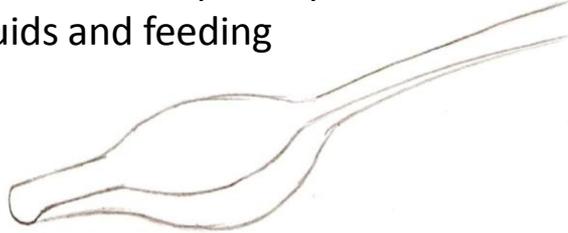


# Spoon for Elderly (70+)

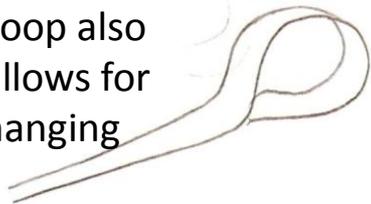
AmeyaNaik

# Cluster 1 : Spoons with large scoops and looped & wide handles

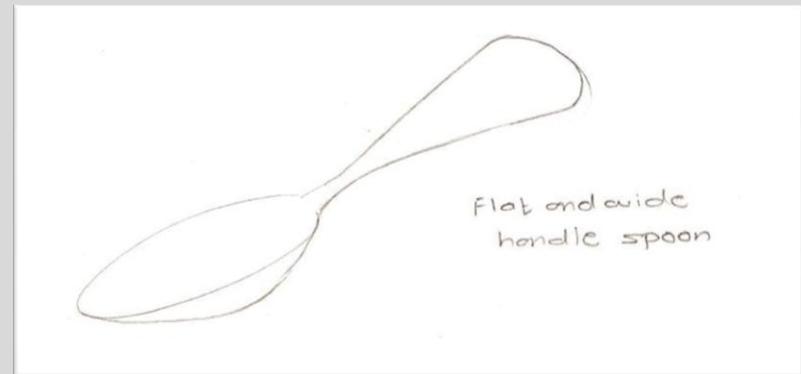
Spout and deep scoops makes it easy for liquids and feeding



Loop also allows for hanging



Single loop handle



Flat and wide handle spoon

Opening at bottom allows for easy feeding



Bottom Opening flap

# Cluster 2 : Spoons with fork and non-looped handles

Fork with spoon



Spoon & fork – left handed

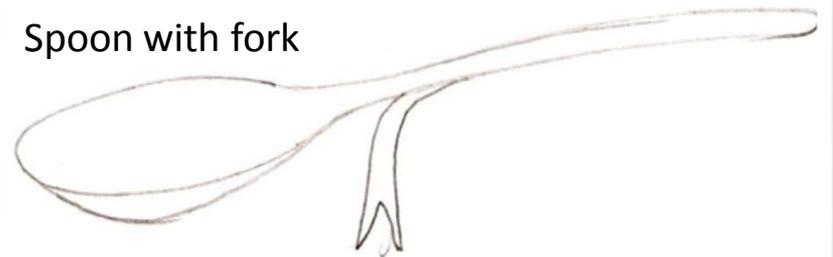


Openable flap can act as fork

Openable flap

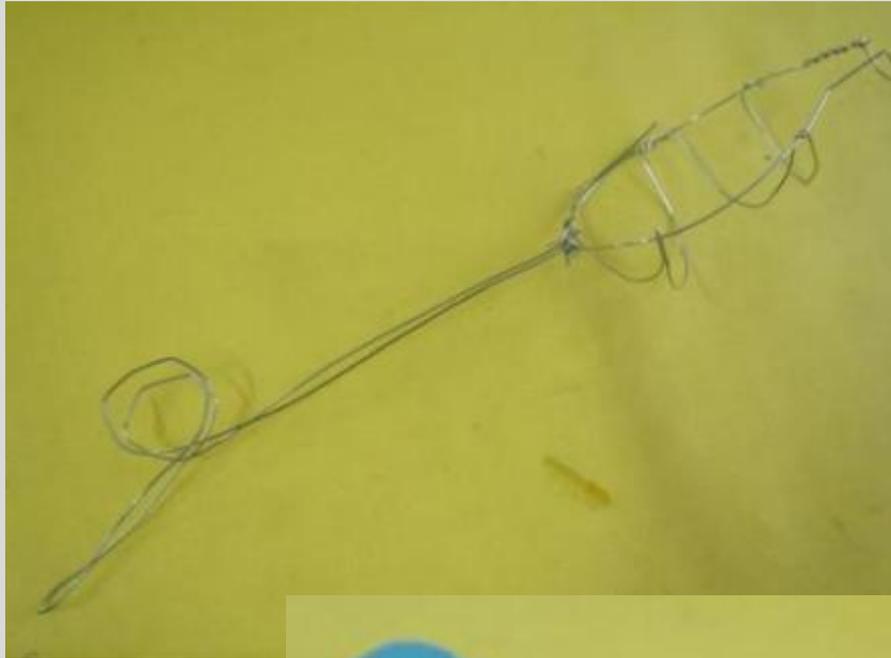


Spoon with fork



# Exploratory Model – Cluster 1





# Exploratory Model– Cluster 2





# Concept Detailing – Concept 1



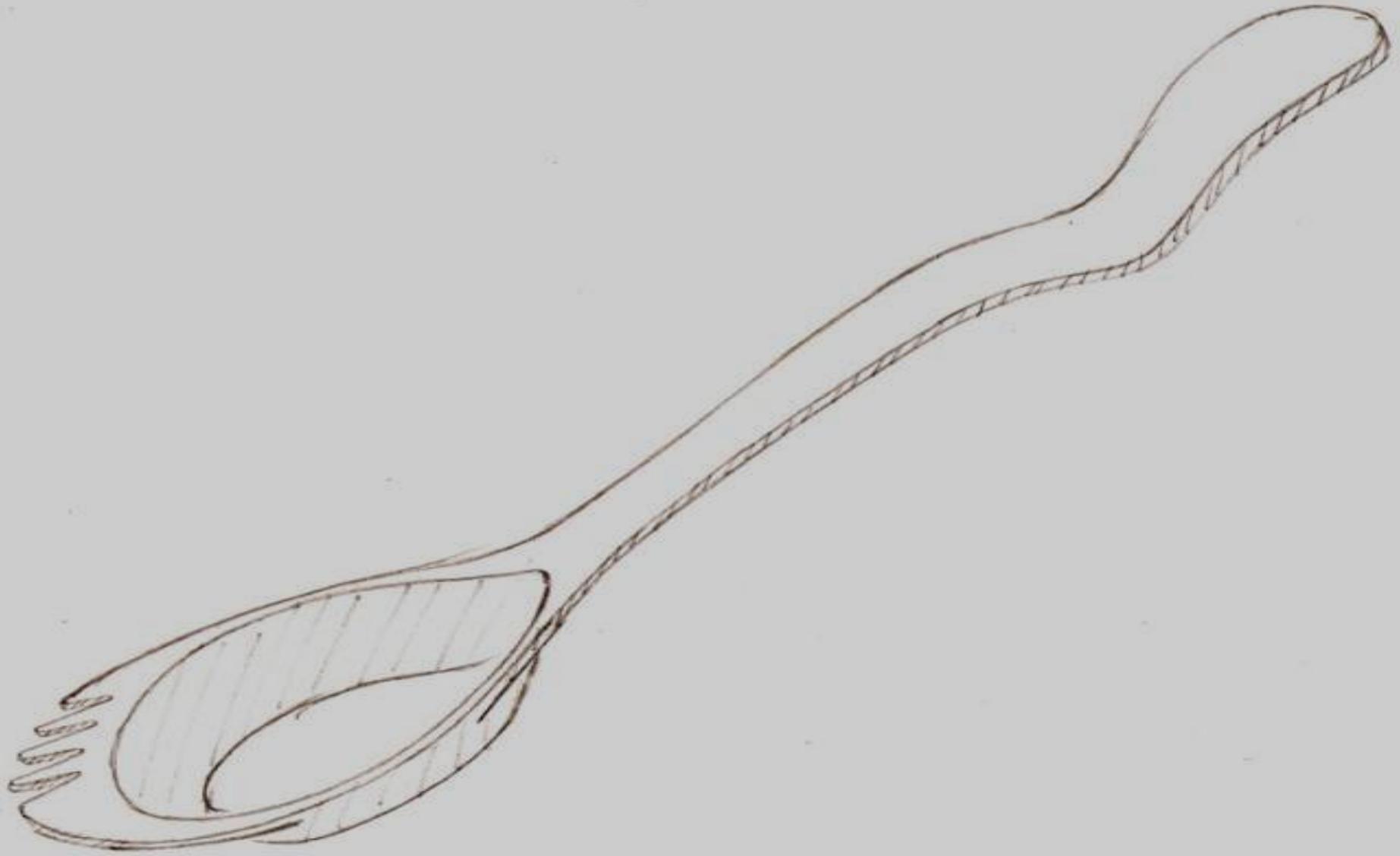


# Concept Detailing – Concept 2





# Concept Detailing – Concept 3



# Innovations

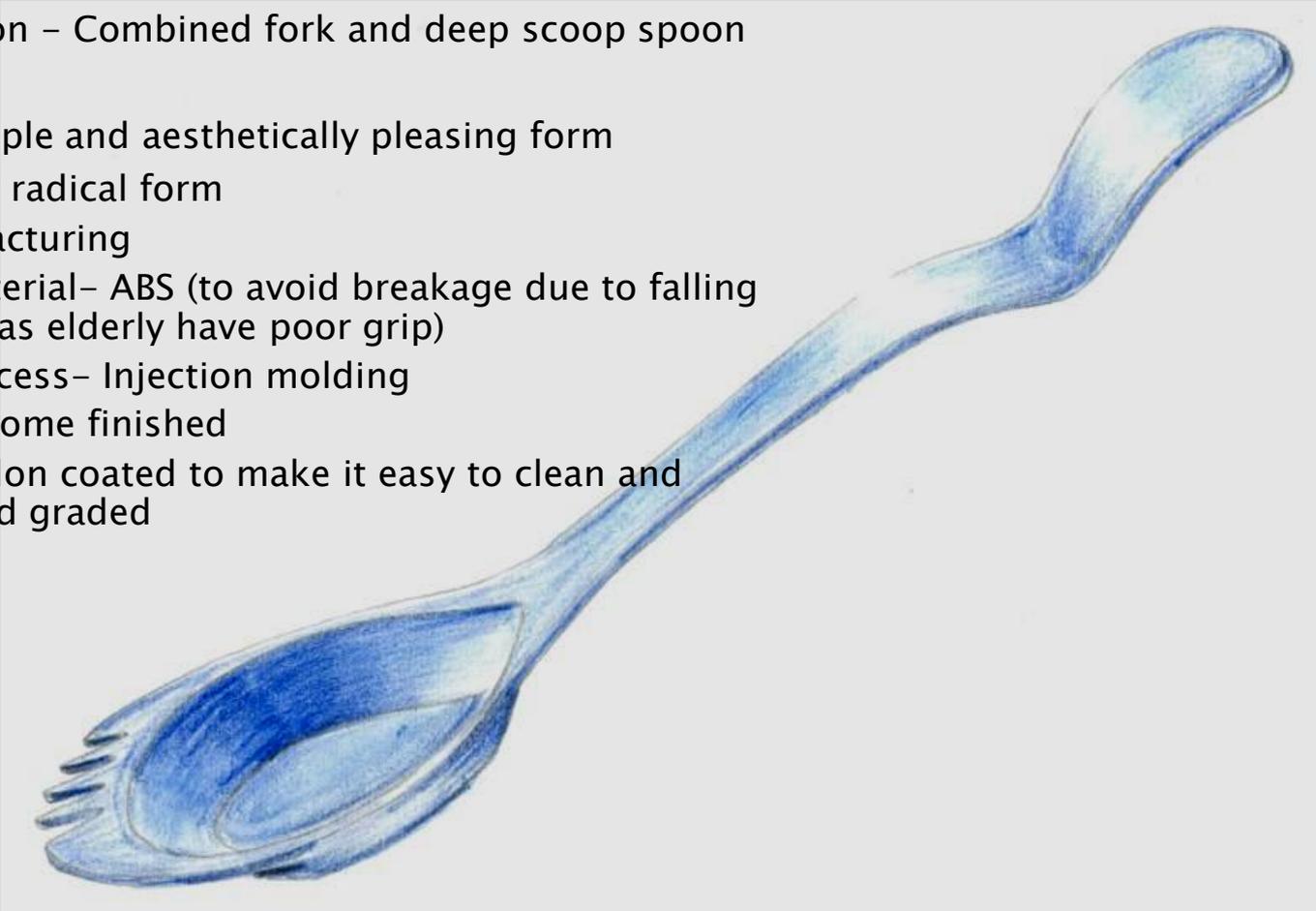
Function – Combined fork and deep scoop spoon

Form

- Simple and aesthetically pleasing form
- Not radical form

Manufacturing

- Material– ABS (to avoid breakage due to falling off as elderly have poor grip)
- Process– Injection molding
- Chrome finished
- Teflon coated to make it easy to clean and food graded



# Prototype



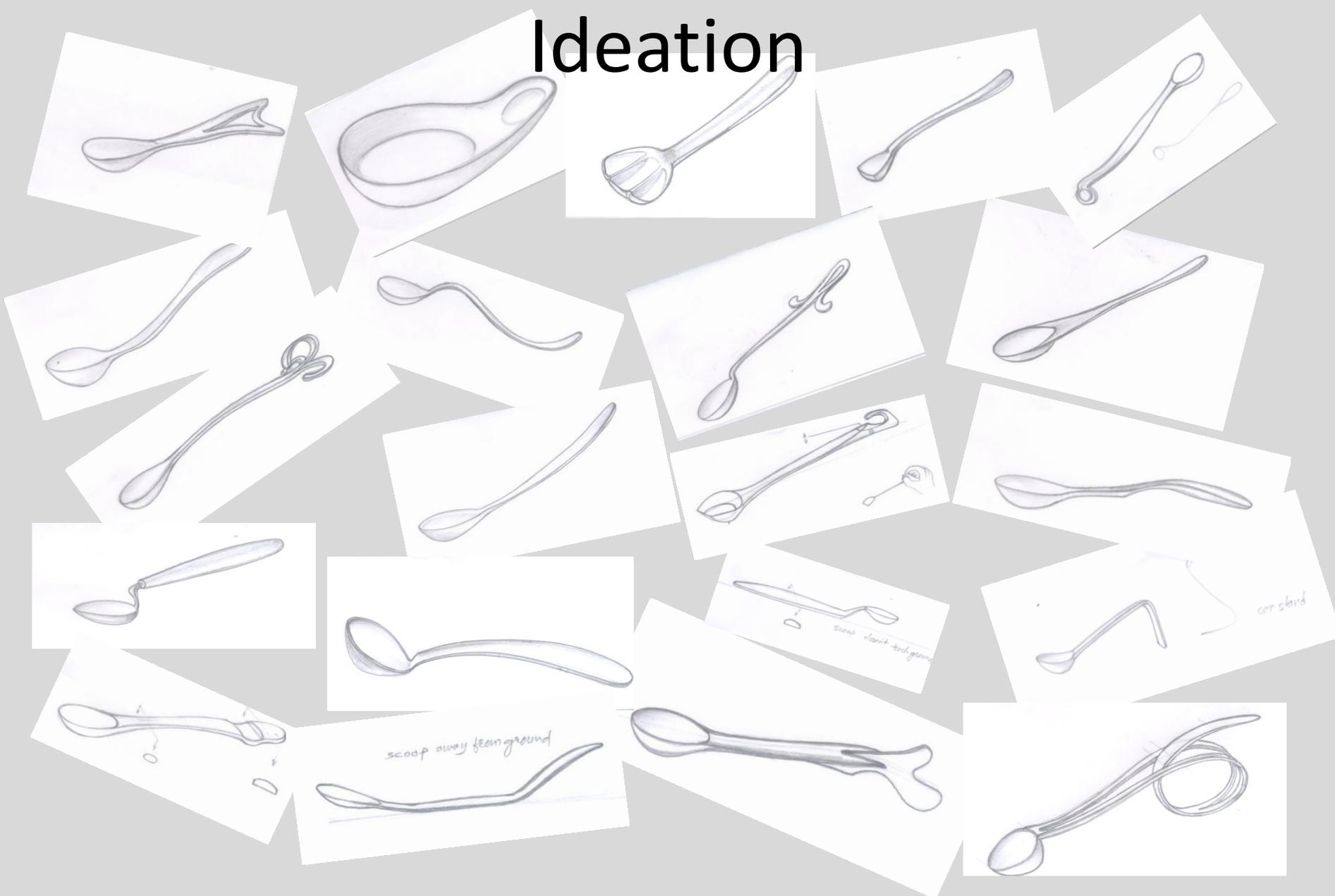
# A “Bridal spoon” for tasting food in Gujarati Weddings

Nagsen P. Nandurgekar

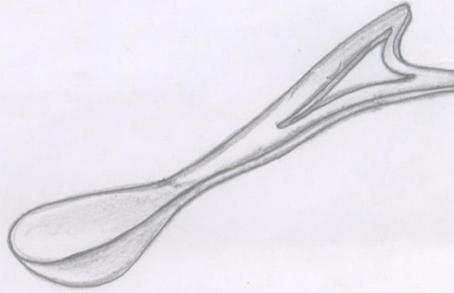
# Bridal Spoon

As per Gujarati customs, the groom tastes all the food prepared by the bride's family for the marriage and gives his approval. This is a grand ceremony. Hence the spoon should represent the grandeur and ceremonial nature of this tradition.

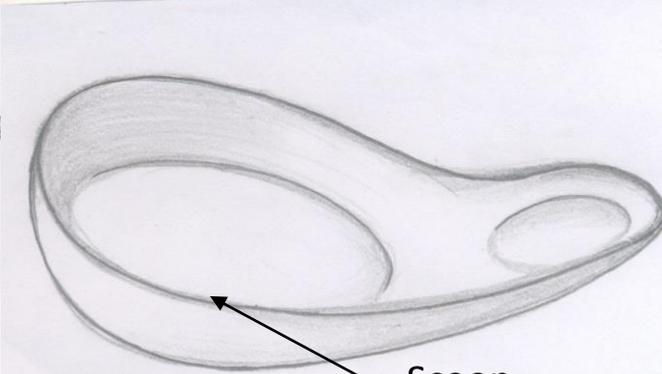
# Ideation



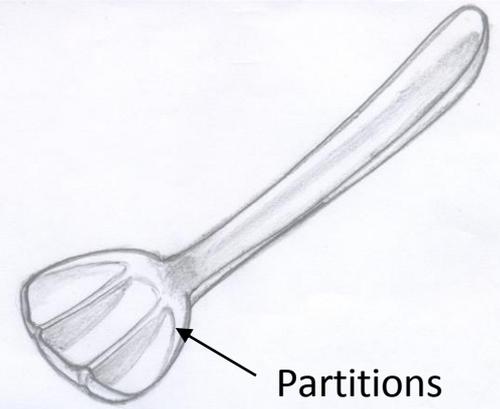
# Cluster 1



Representative

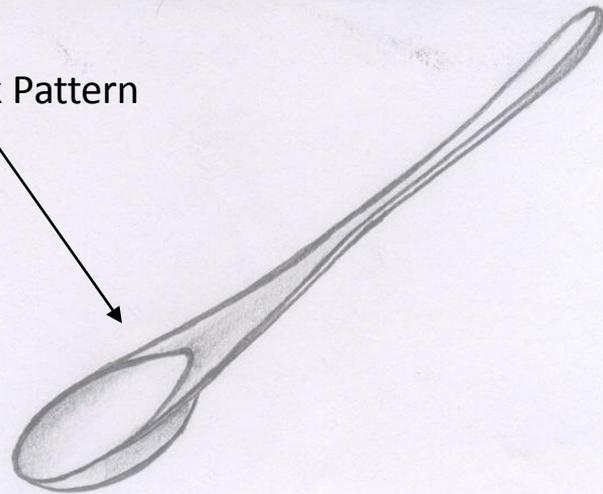


Scoop

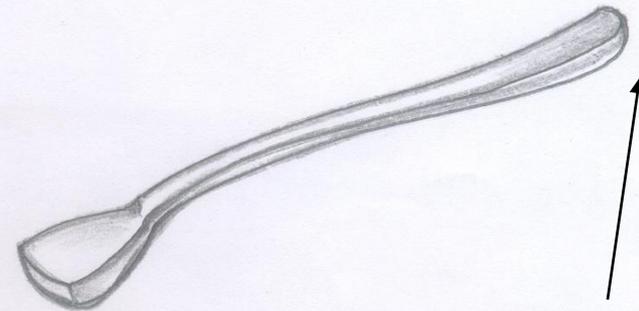


Partitions

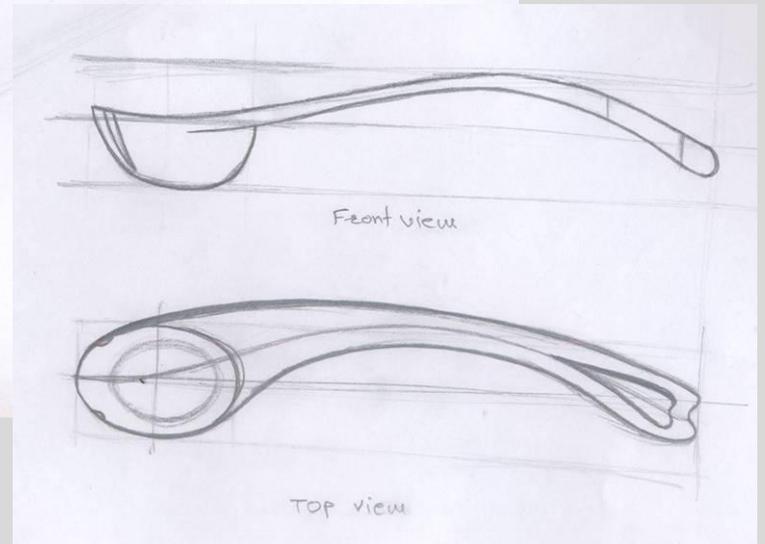
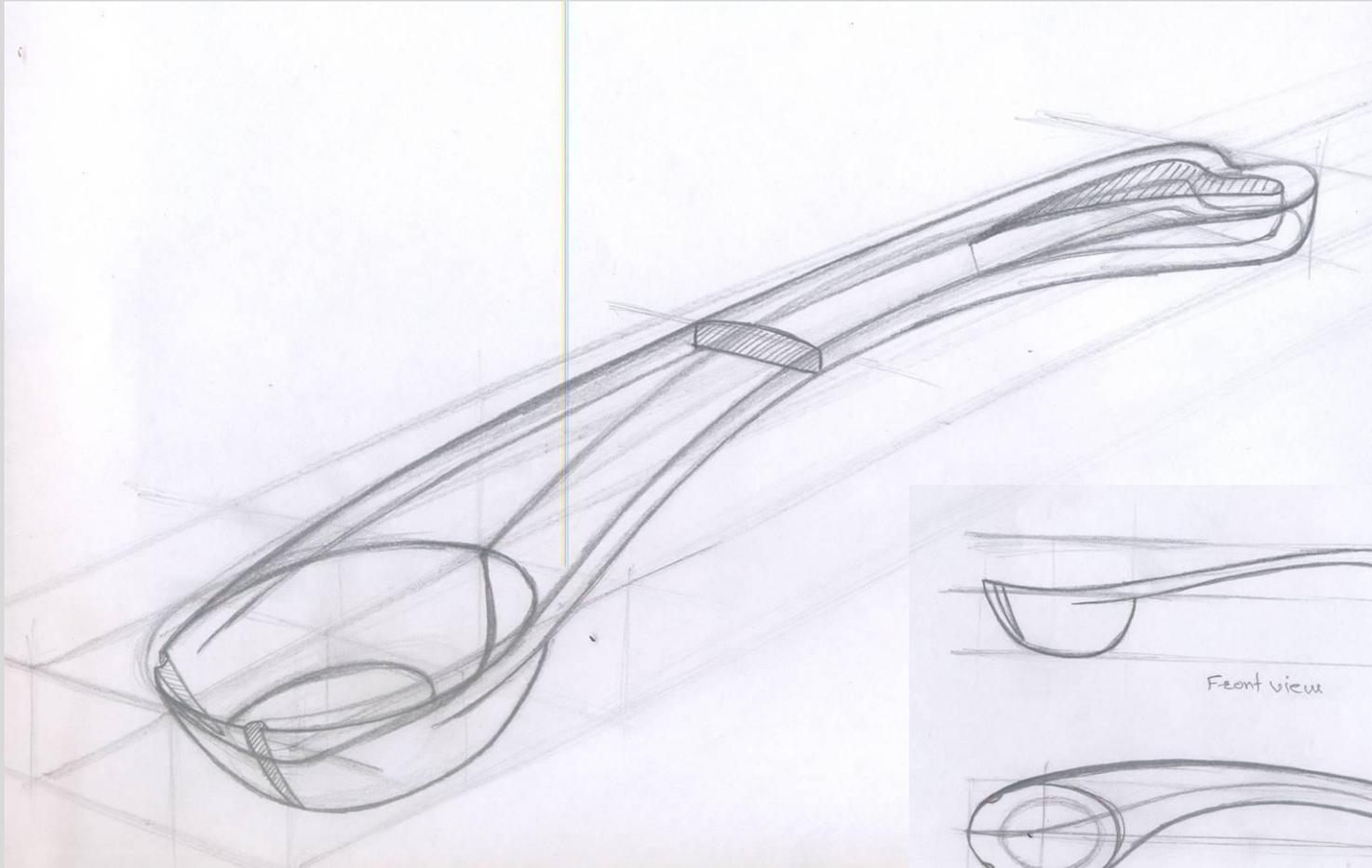
Neck Pattern



Increasing  
Thickness

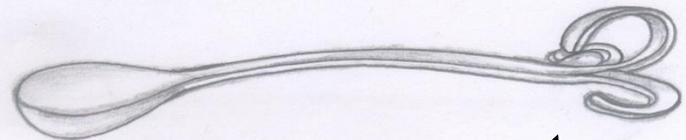
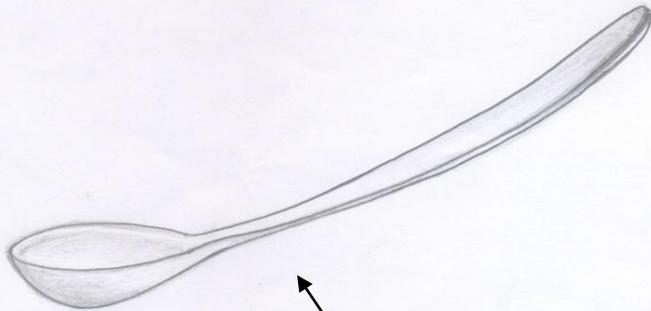
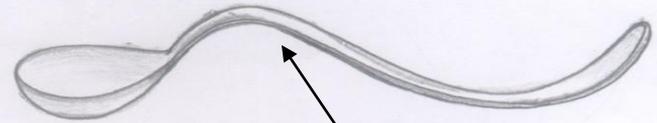


# Concept 1



# Cluster 2

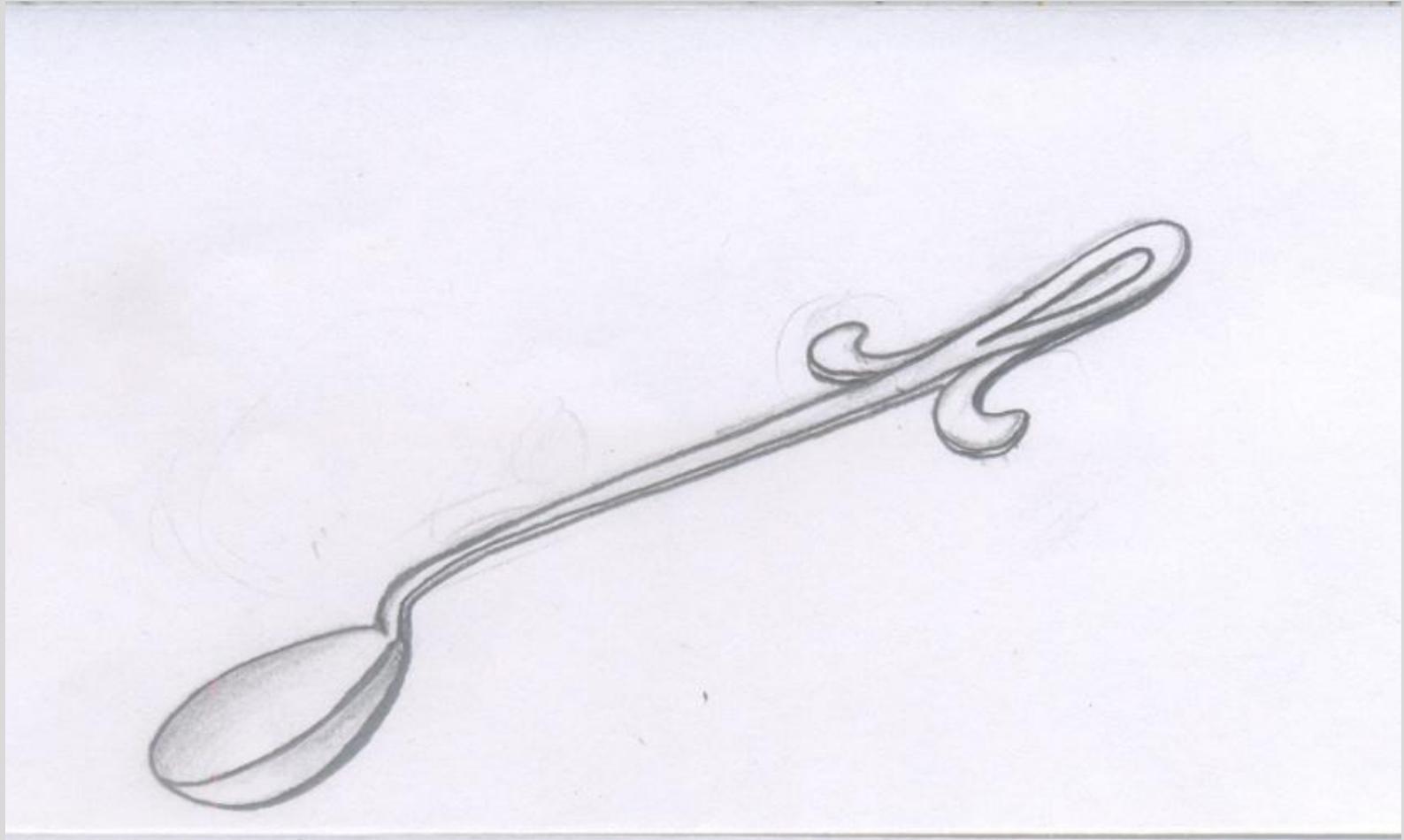
Grandeur of lifting the food and putting it into the mouth



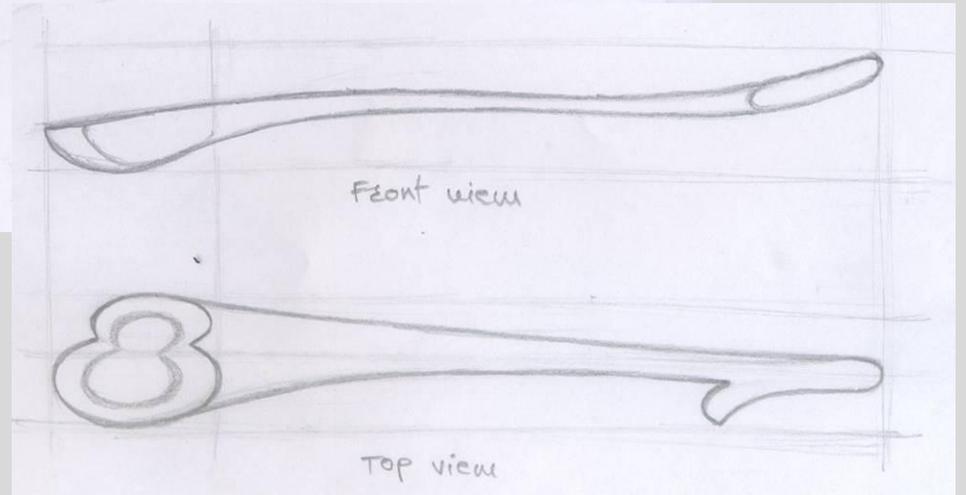
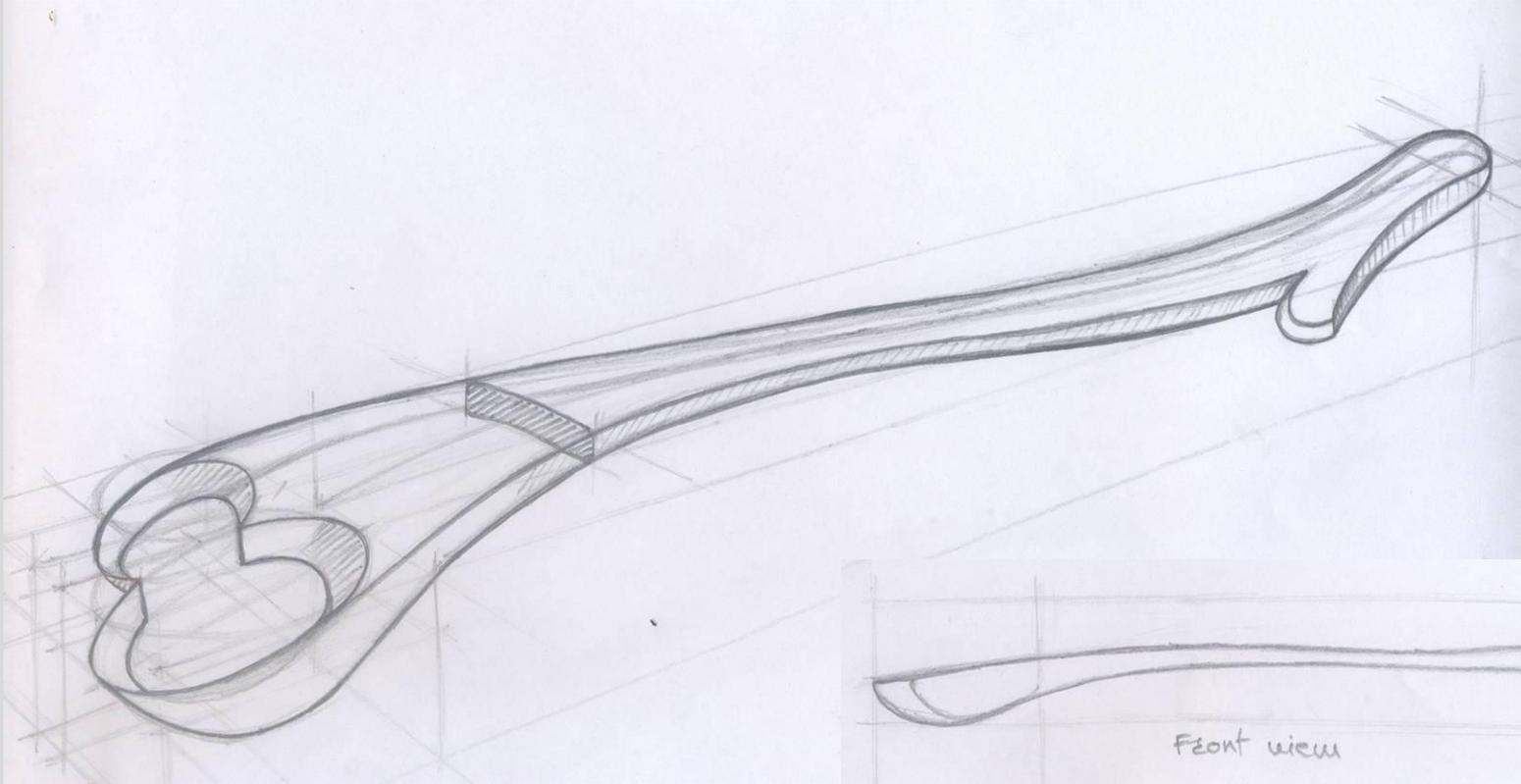
Rectangular c.s.

Handle pattern

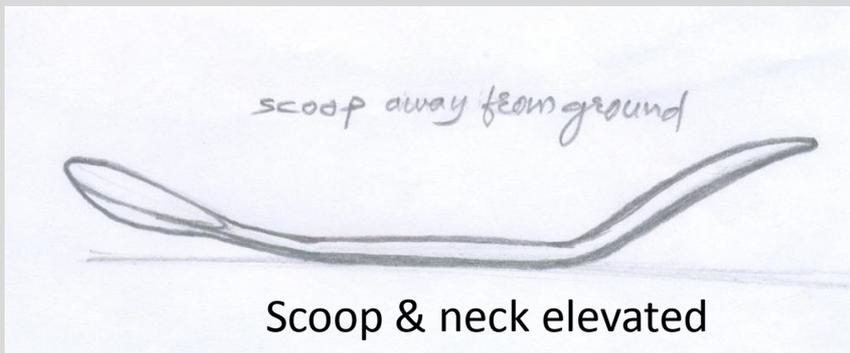
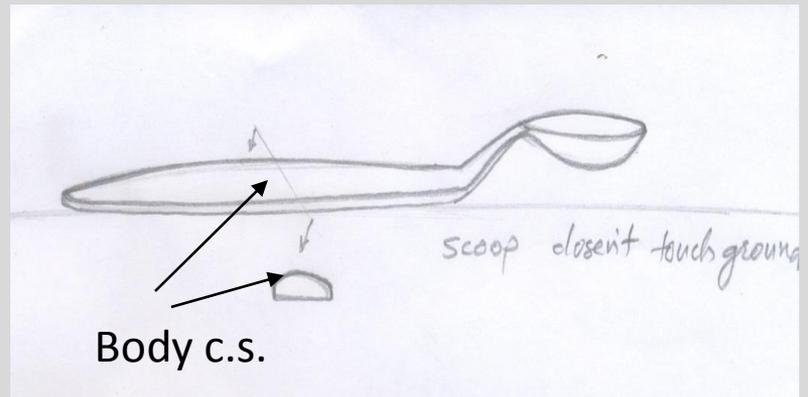
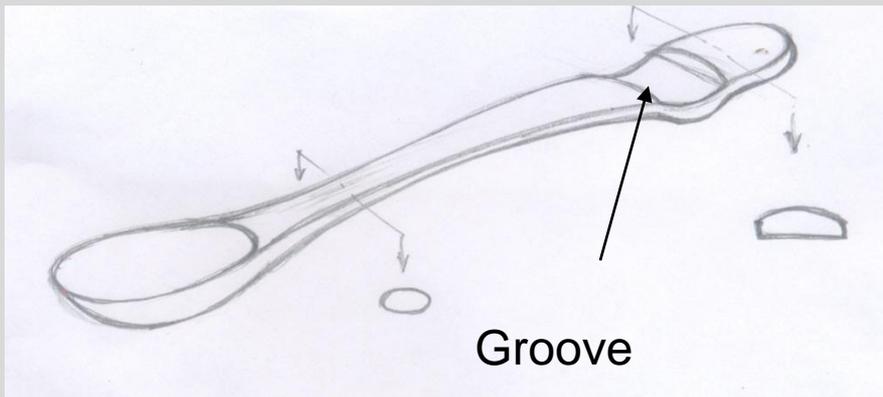
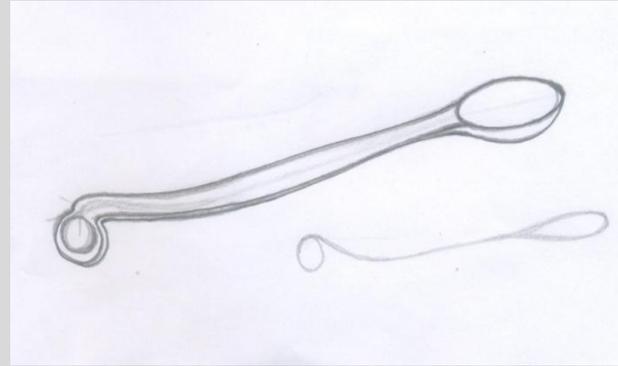
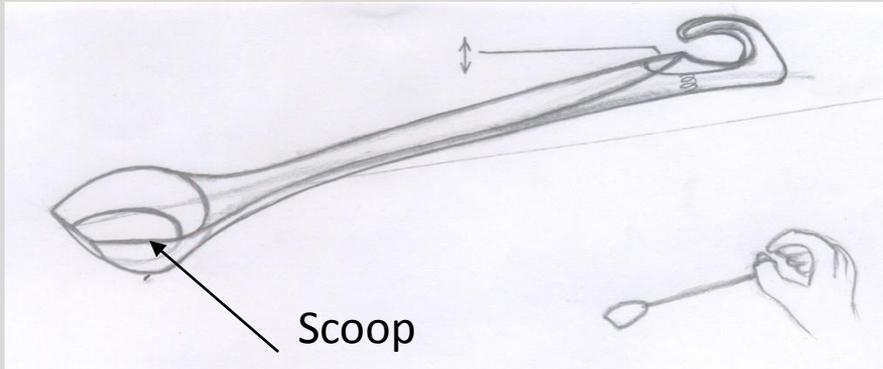
# Cluster 2 Representative



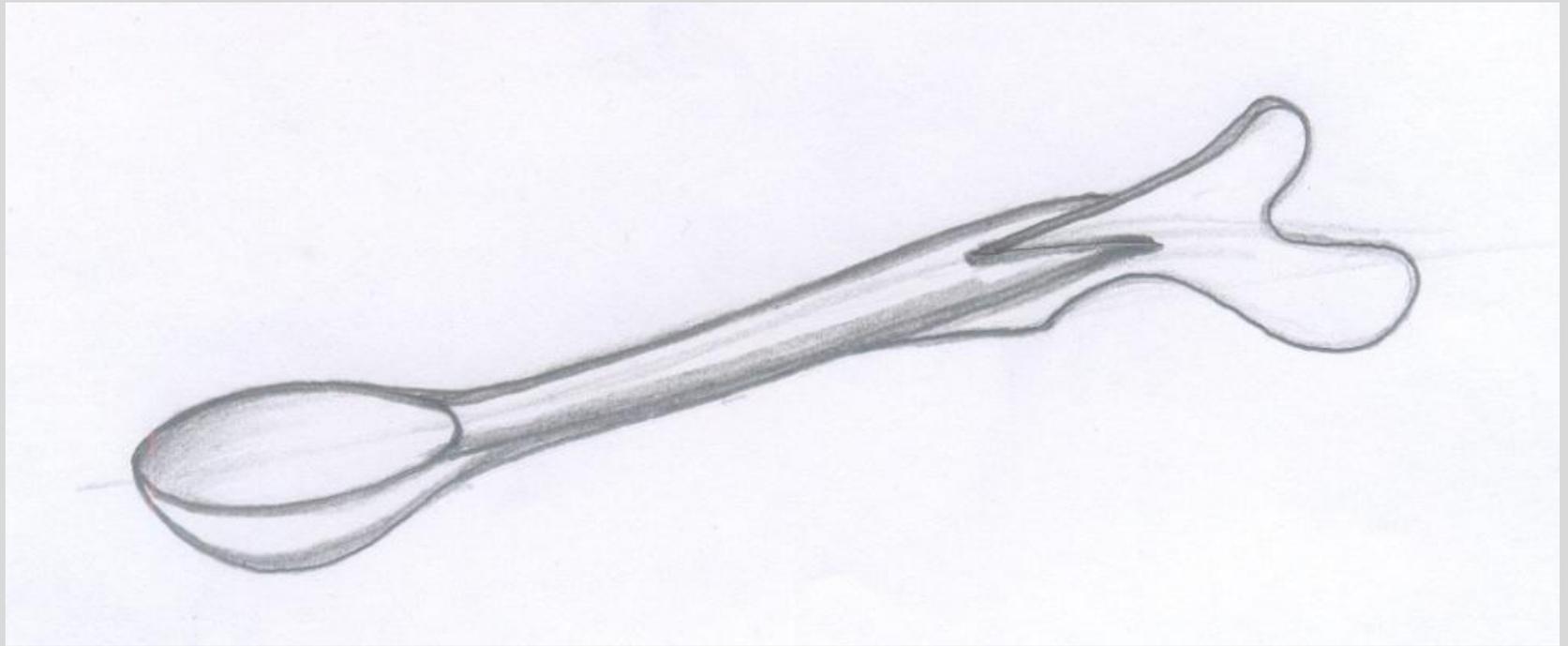
# Concept 2



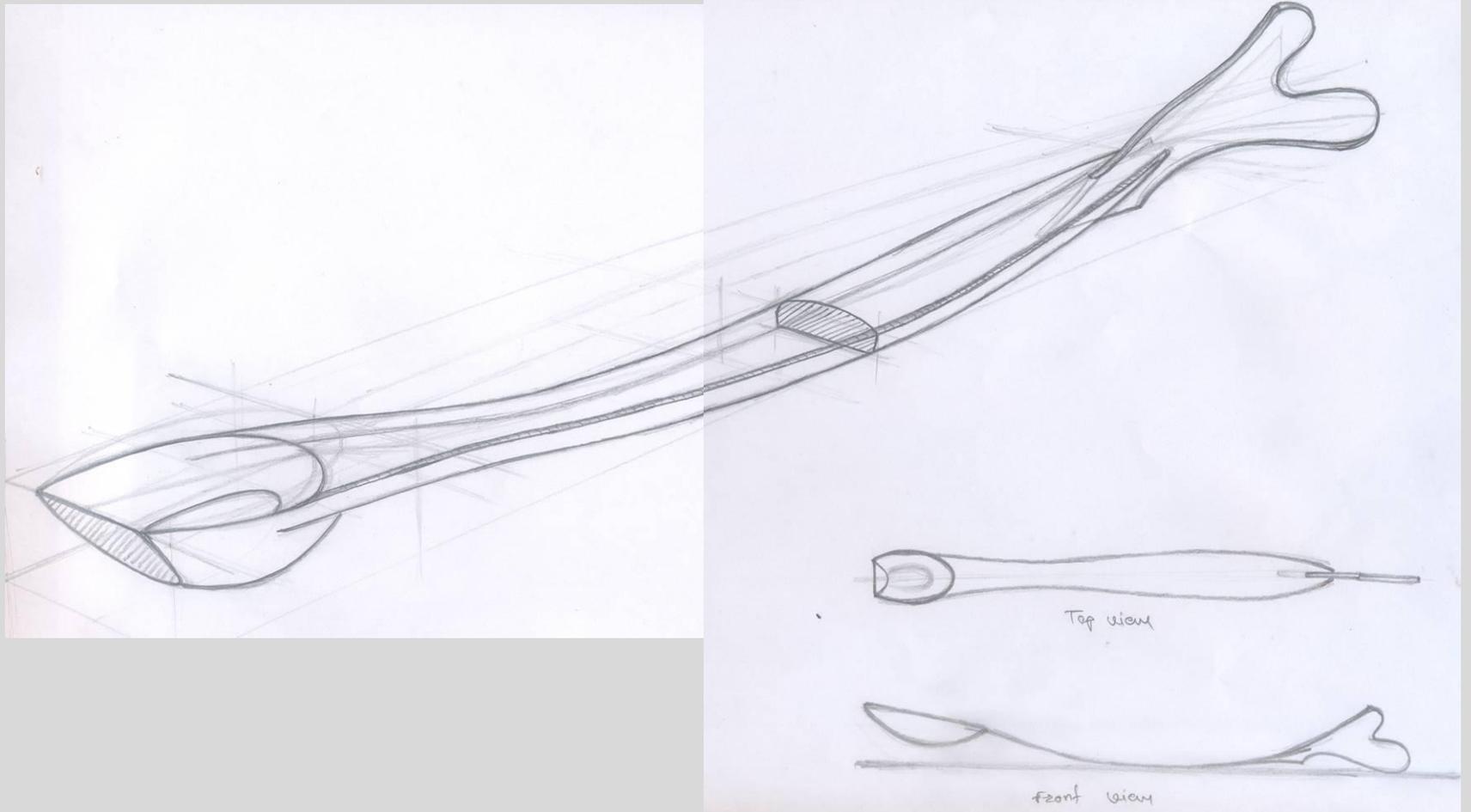
# Cluster 3



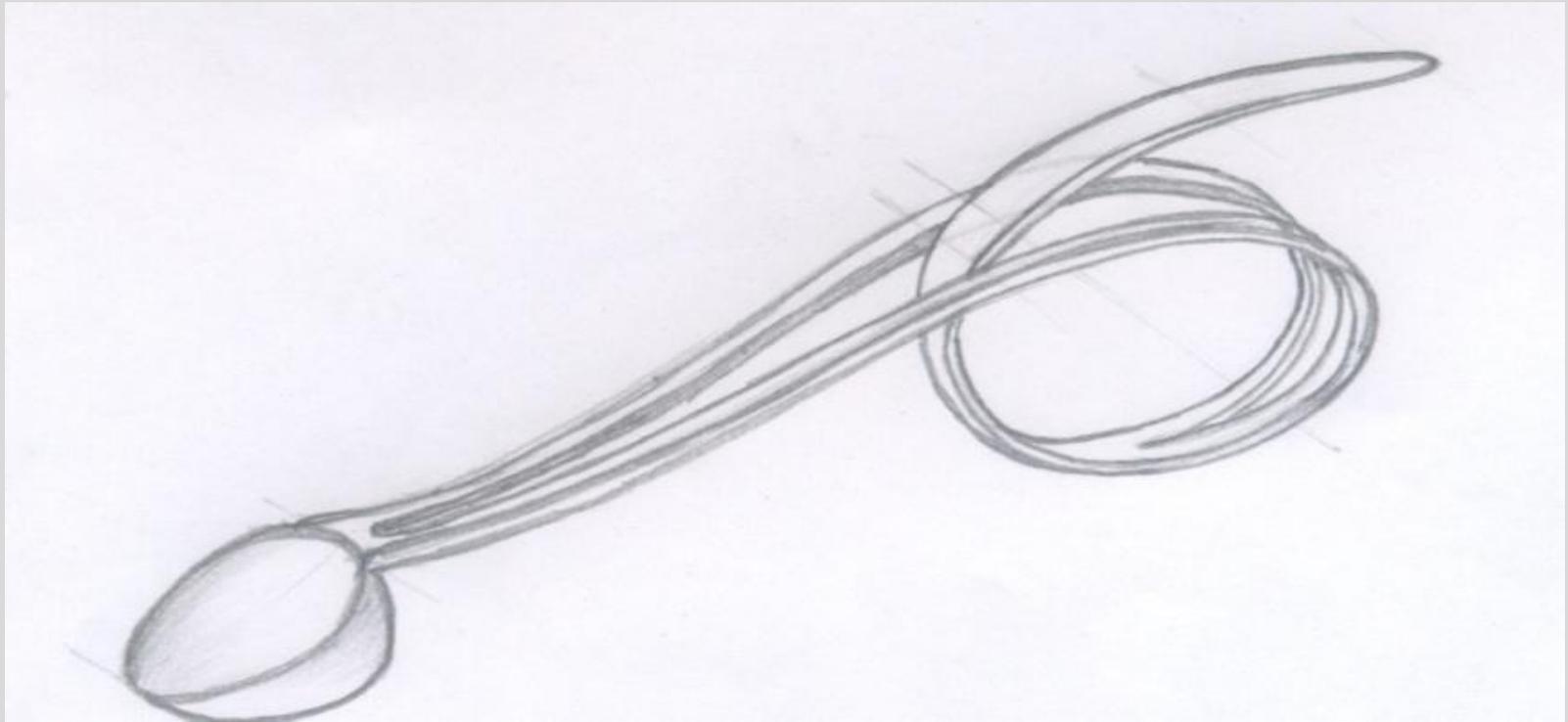
# Cluster 3 Representative 1



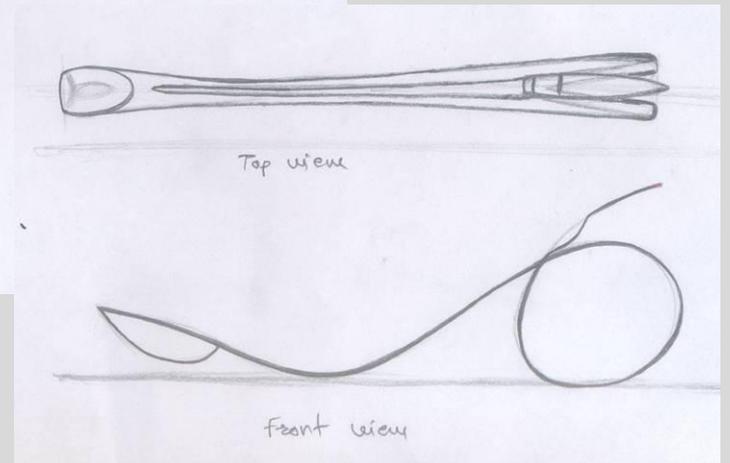
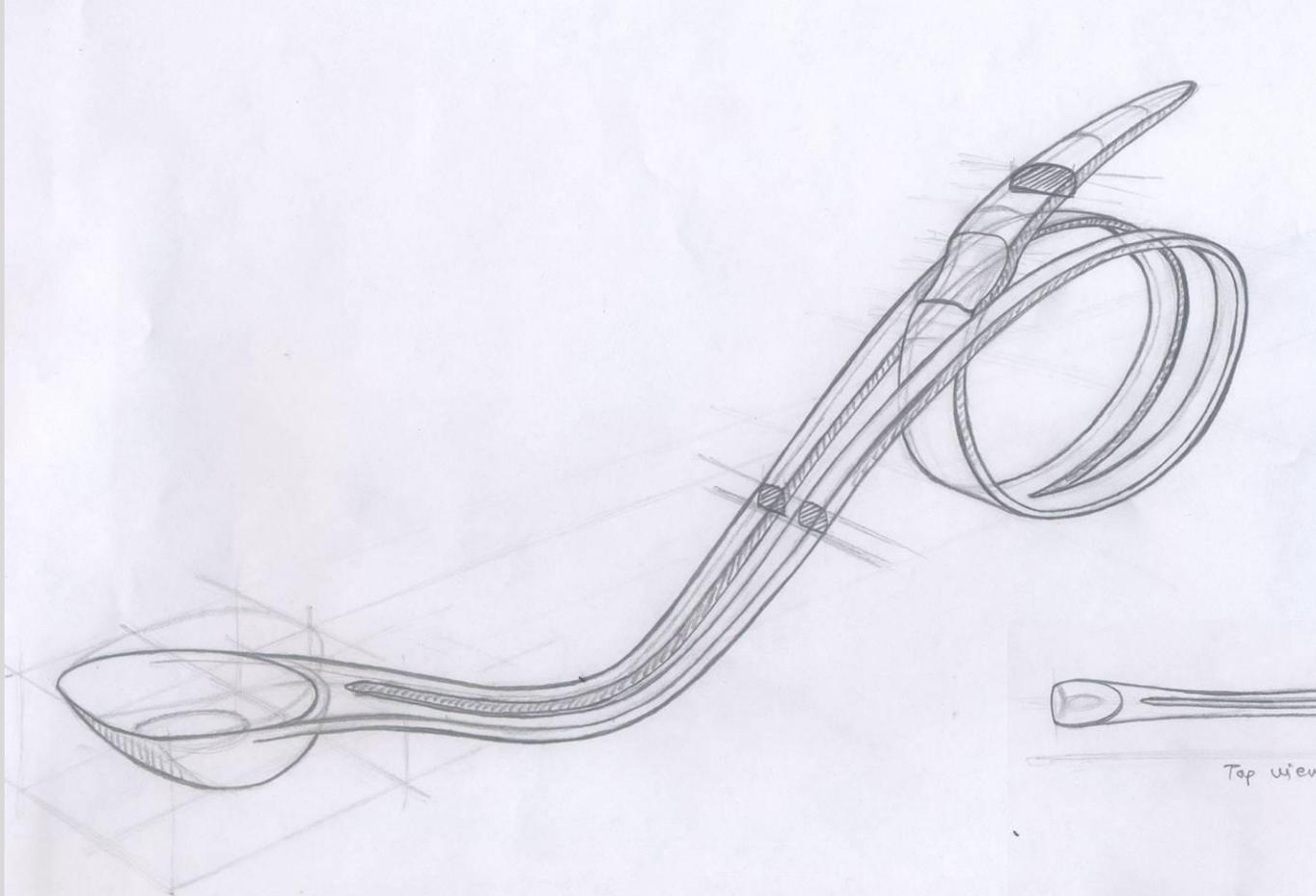
# Concept 3



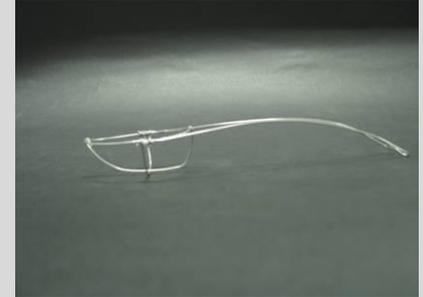
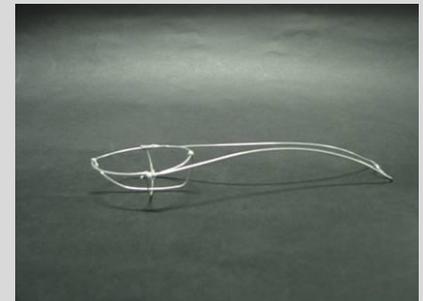
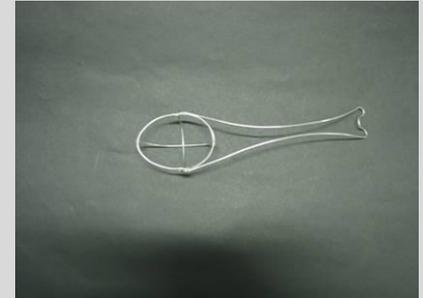
# Cluster 3 Representative 2



# Concept 4



# Exploratory Models



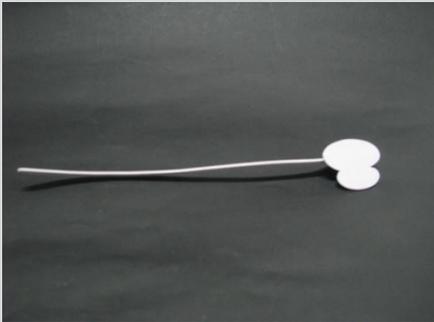
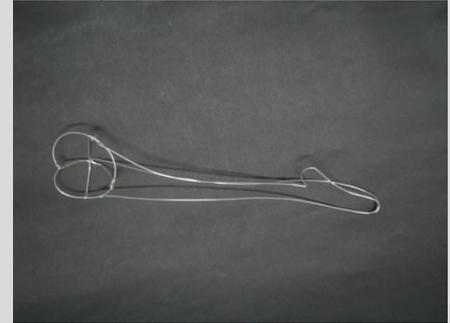
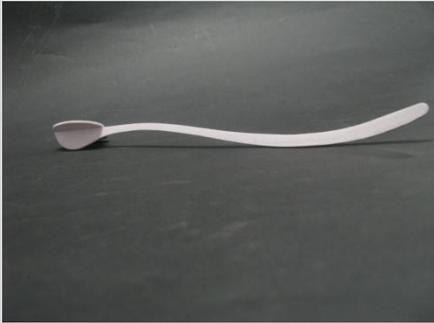
Paper Models

Styrene Models

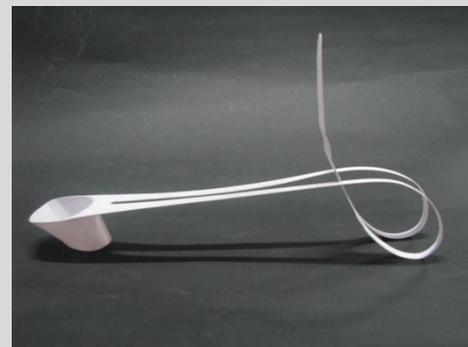
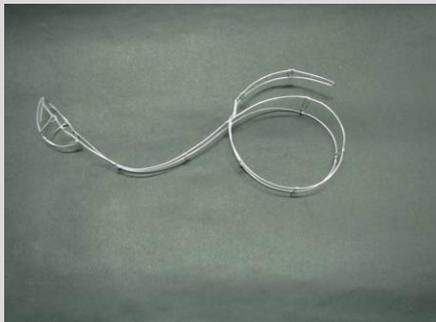
Thermocol Models

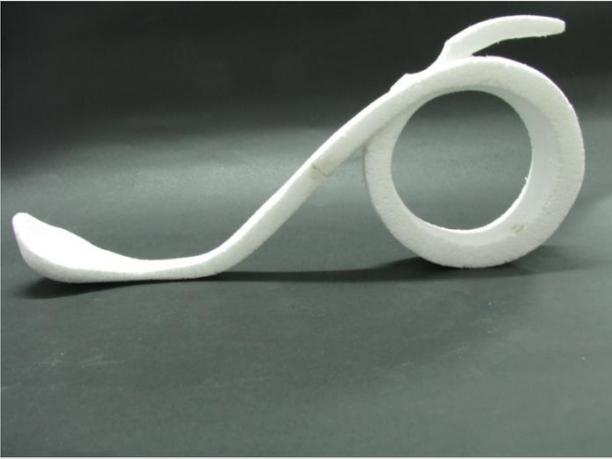
Wire Models

# Exploratory Models



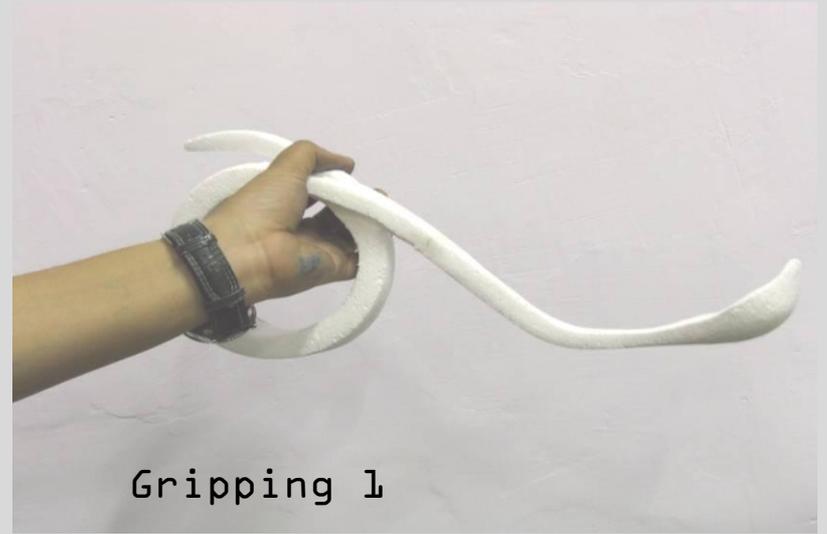
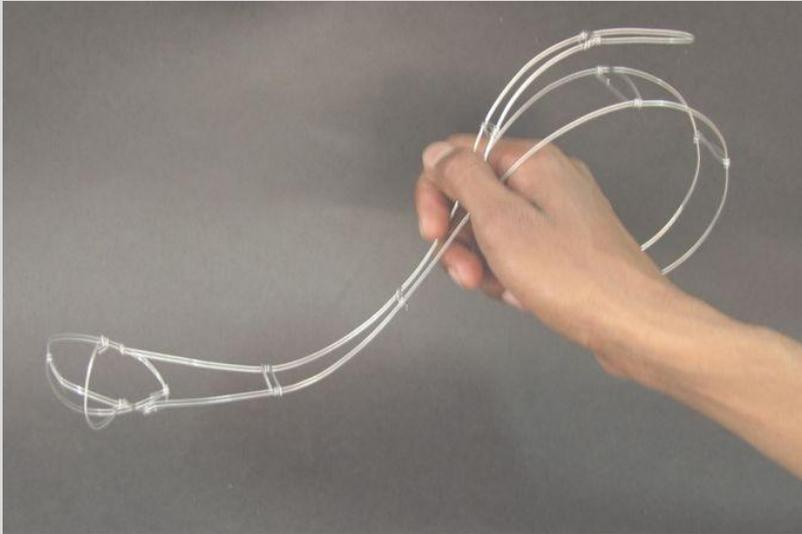
# Exploratory Models





# Final Selected Concept





Gripping 1

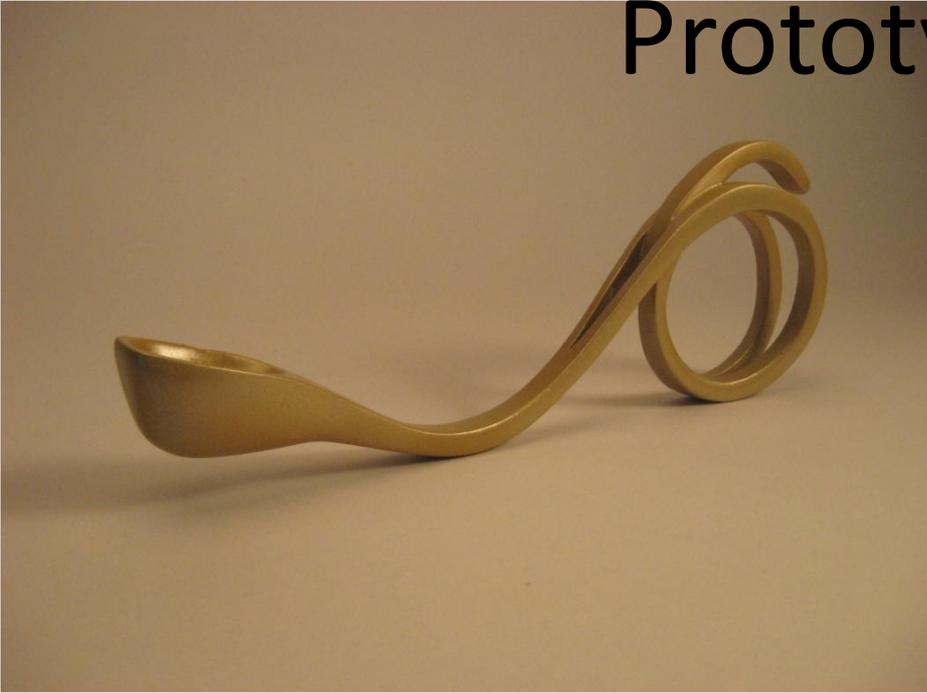
Depicts the eventful nature of the spoon. The grandeur comes with the size and the form.



Gripping 2



# Prototype

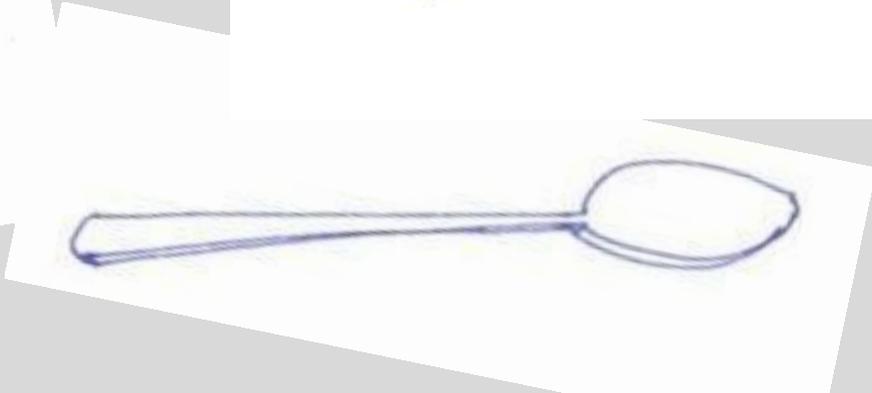
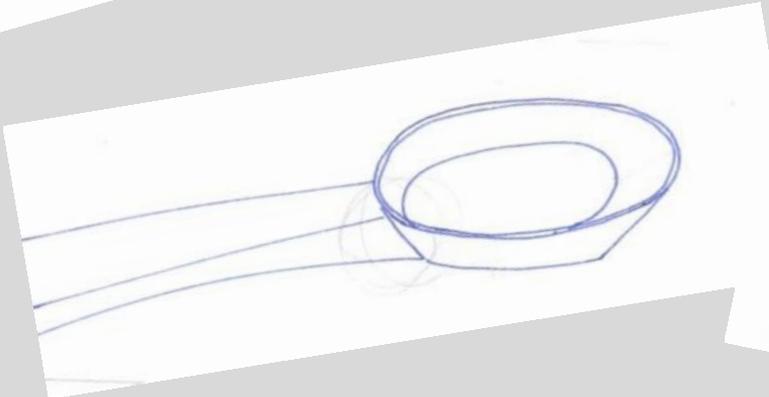
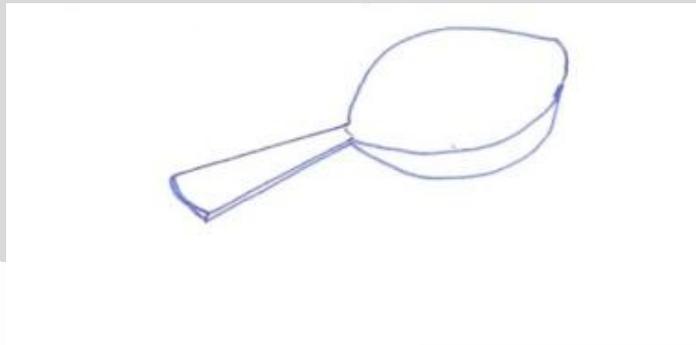
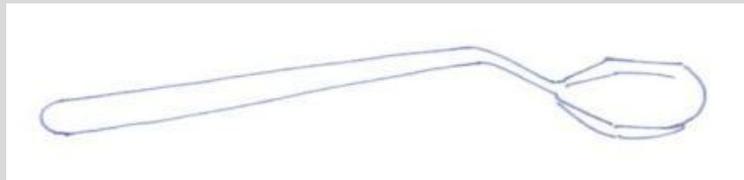
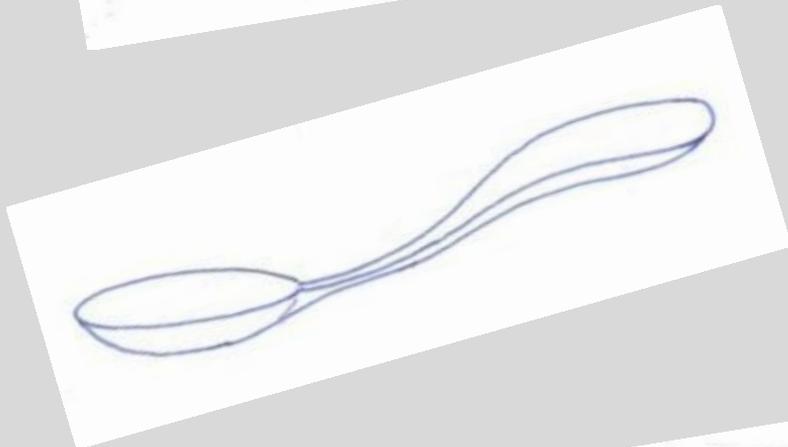
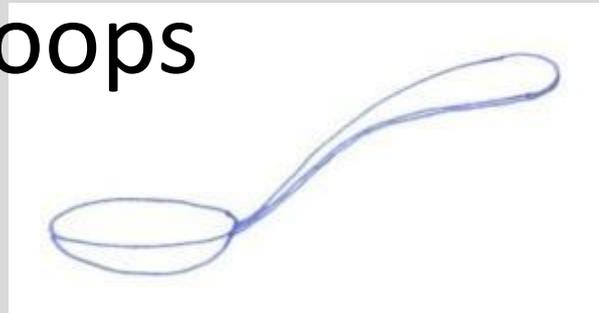
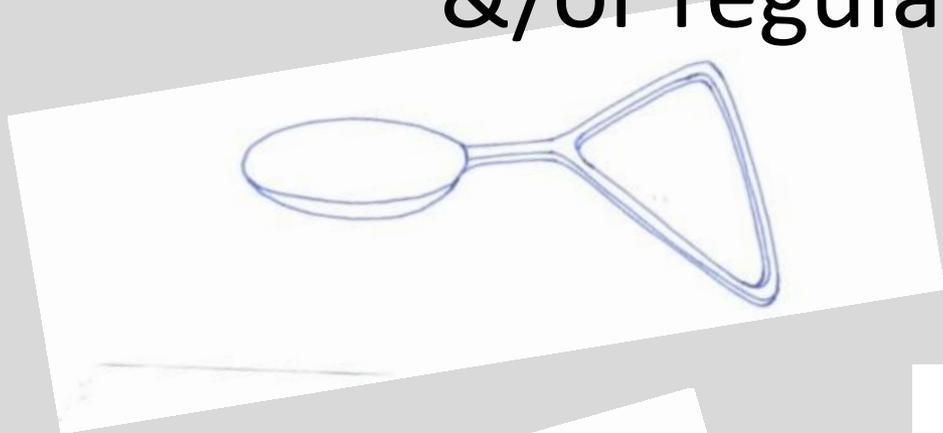


# Traveling Spoon

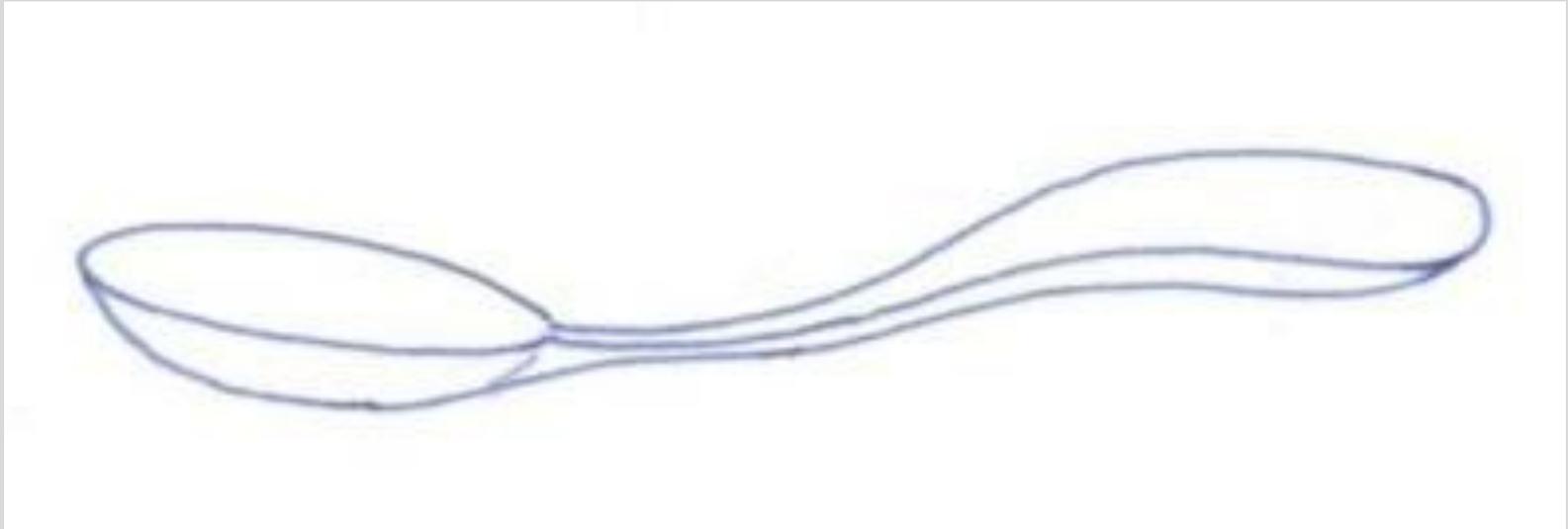
Darshan M. Nerkar



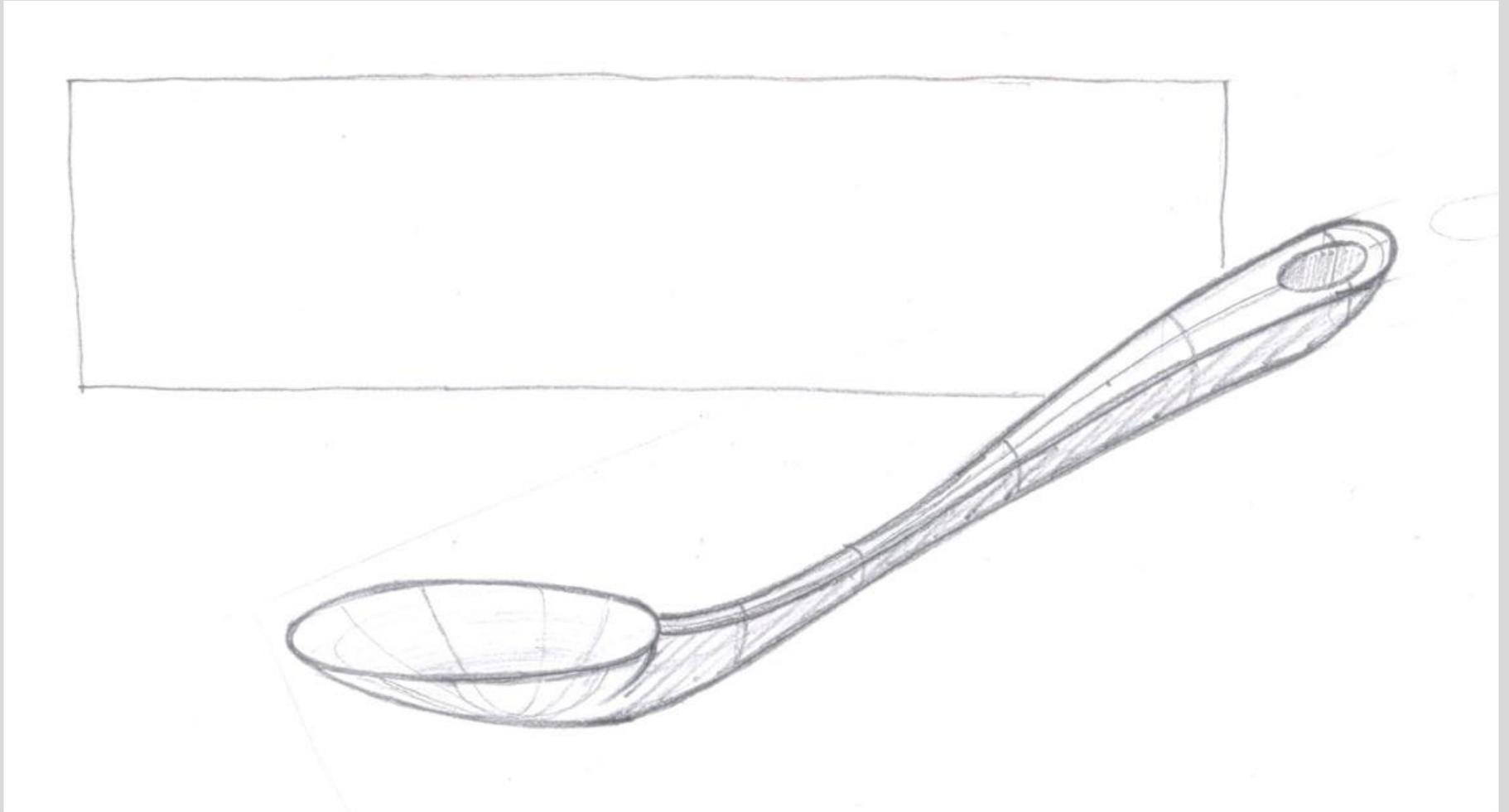
# Cluster 1 - Spoons with short handles &/or regular scoops



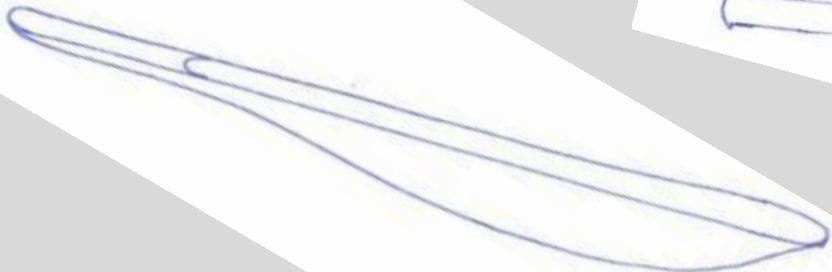
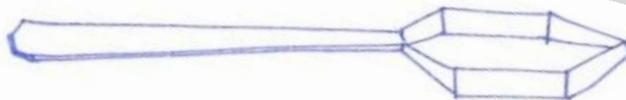
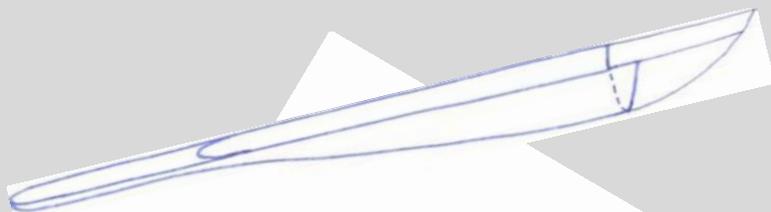
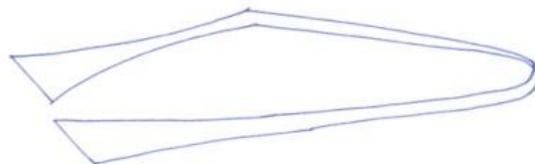
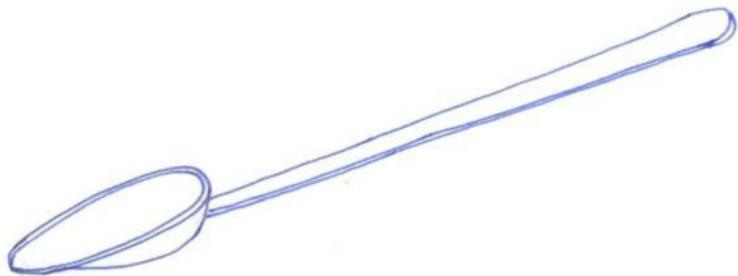
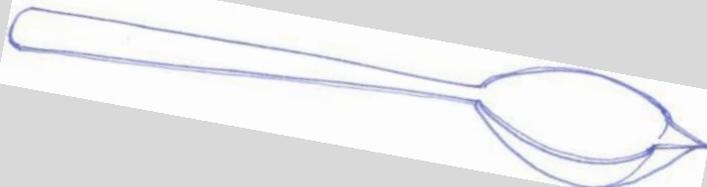
# Cluster 1 Representative



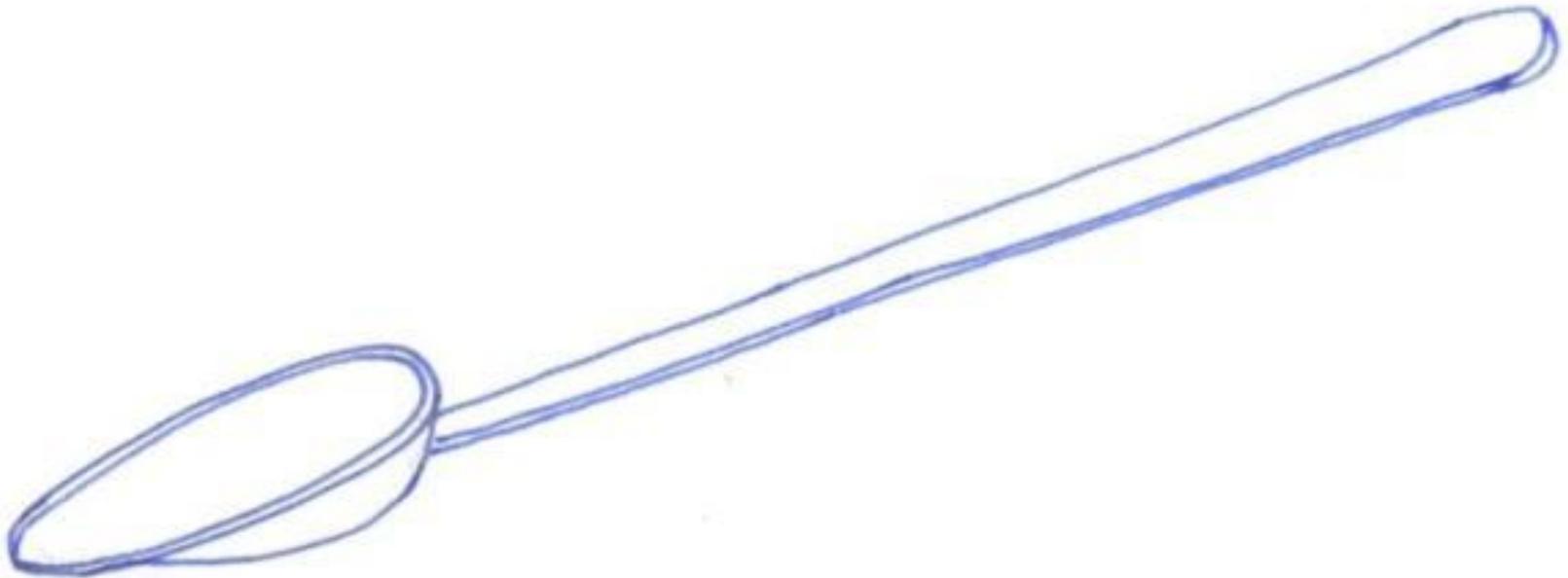
# Concept 1



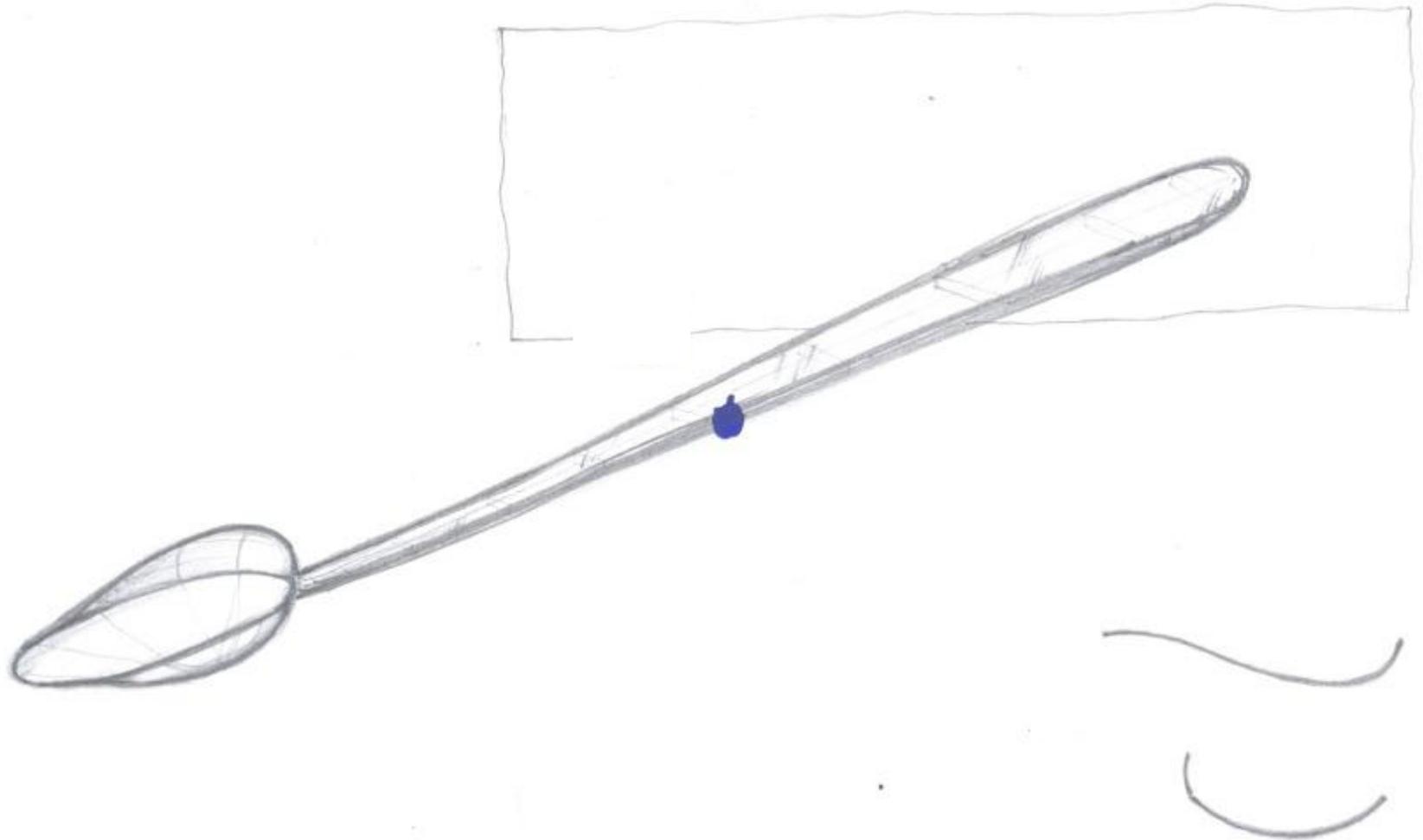
# Cluster 2 - Spoons with radical design



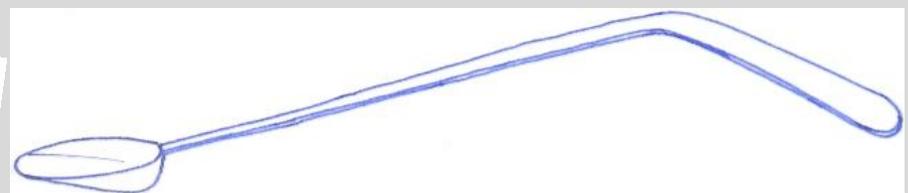
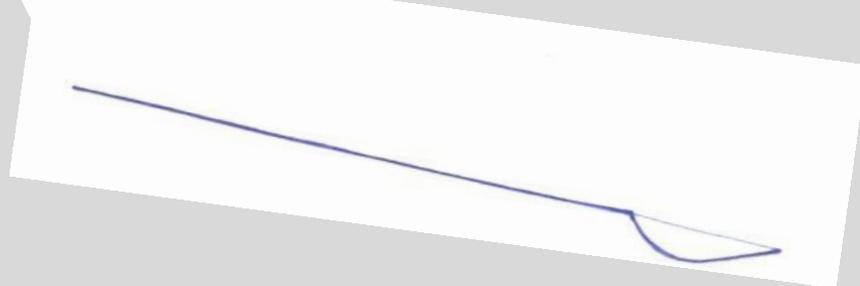
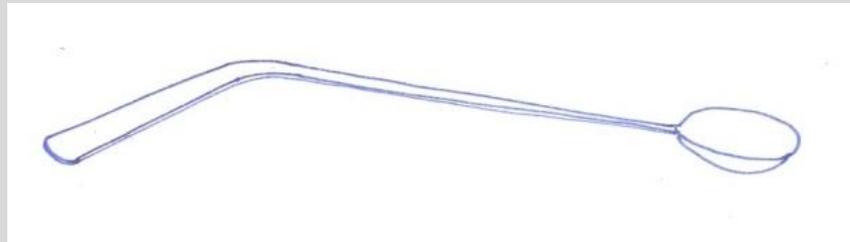
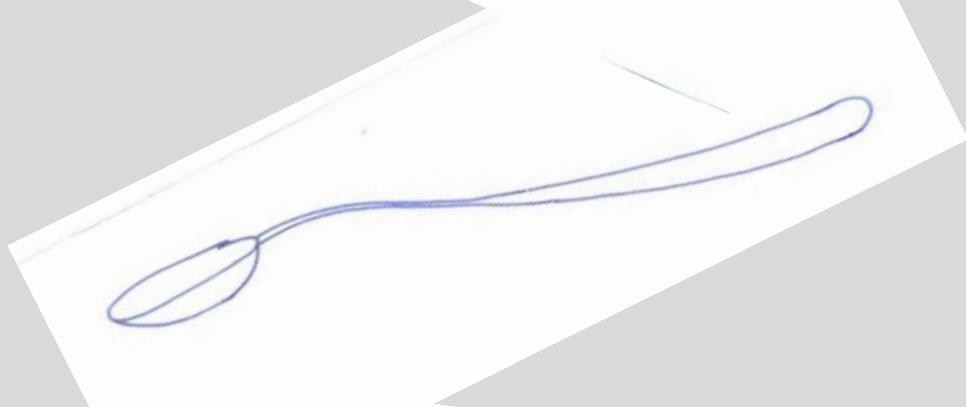
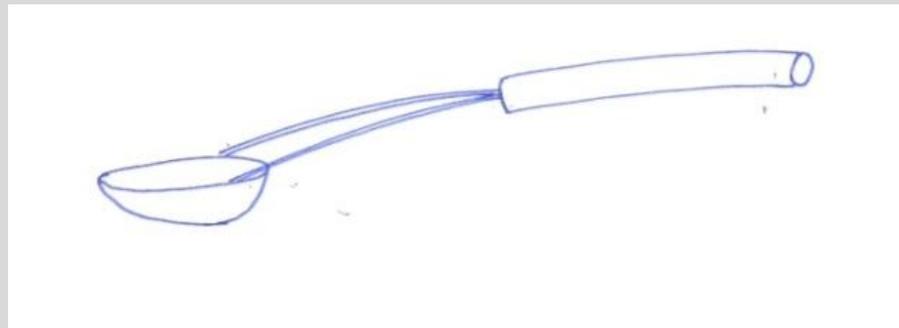
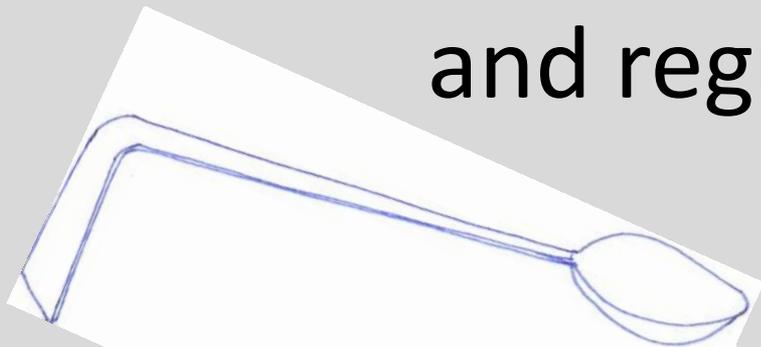
# Cluster 2 Representative



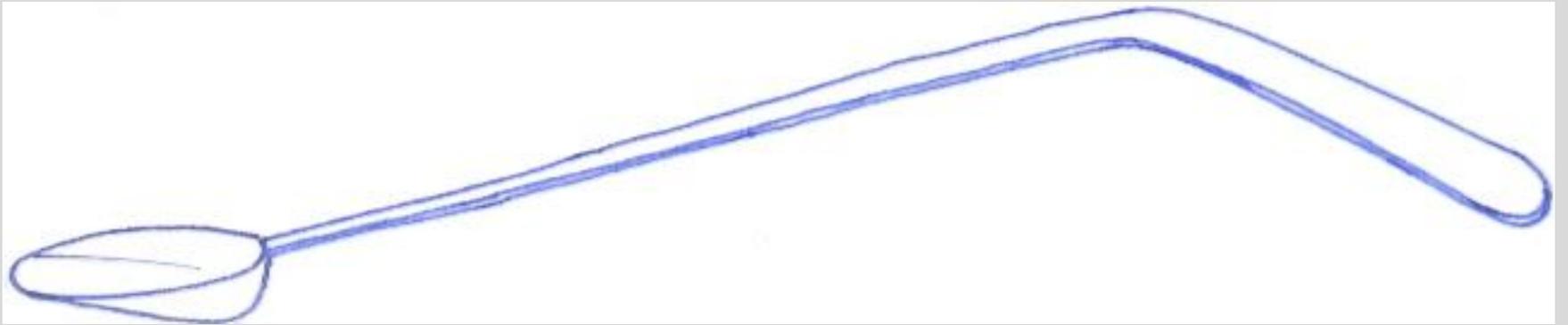
# Concept 2



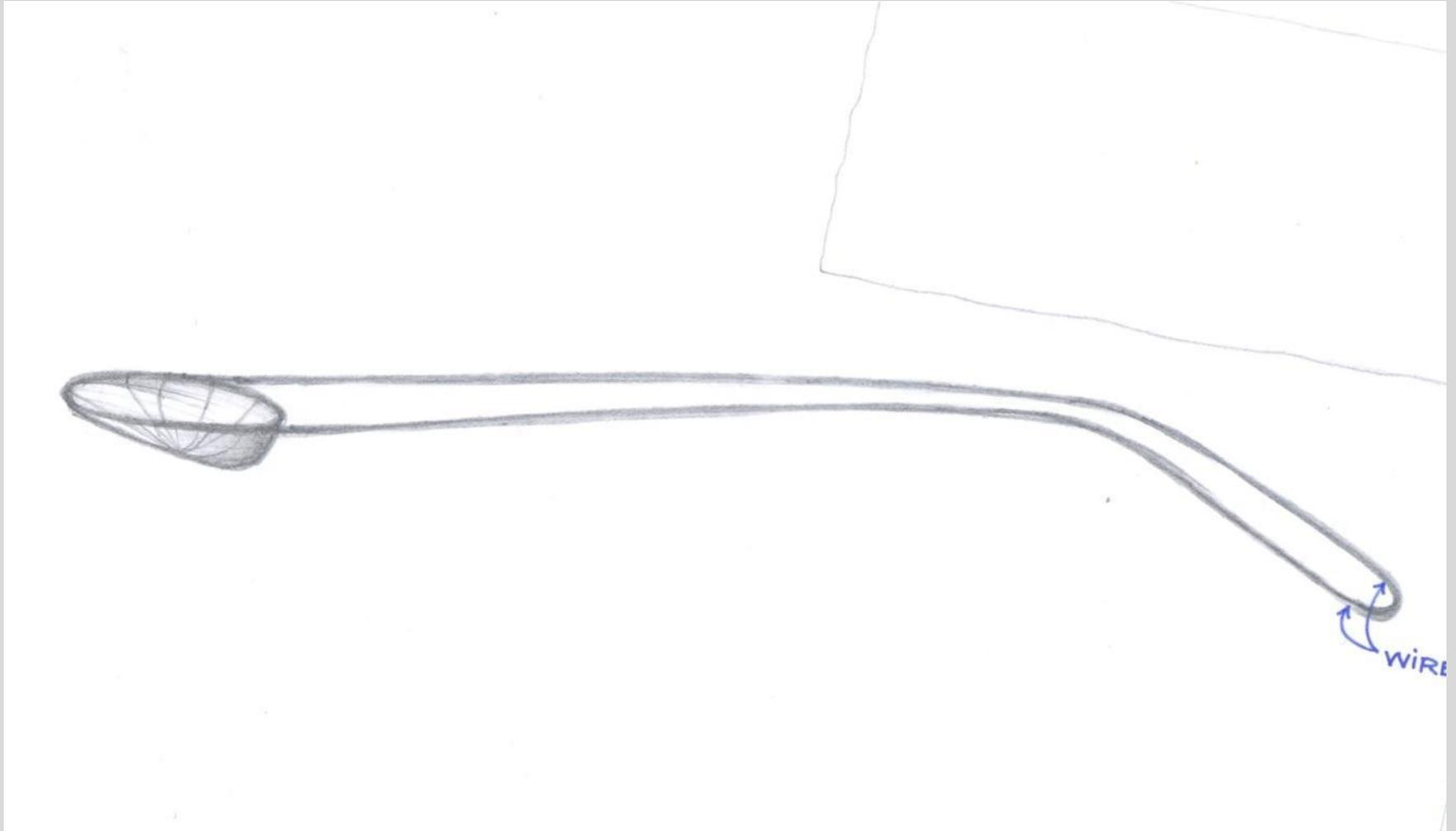
# Cluster 3 - Spoons with long handles and regular scoops



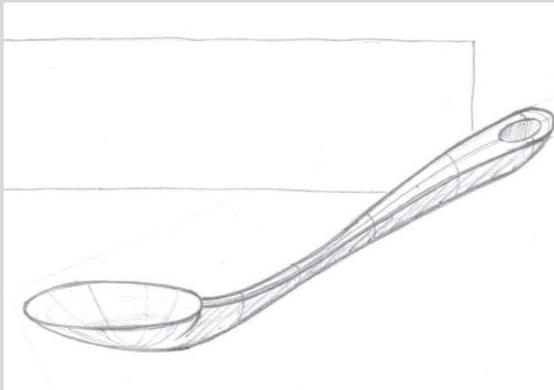
# Cluster 3 Representative



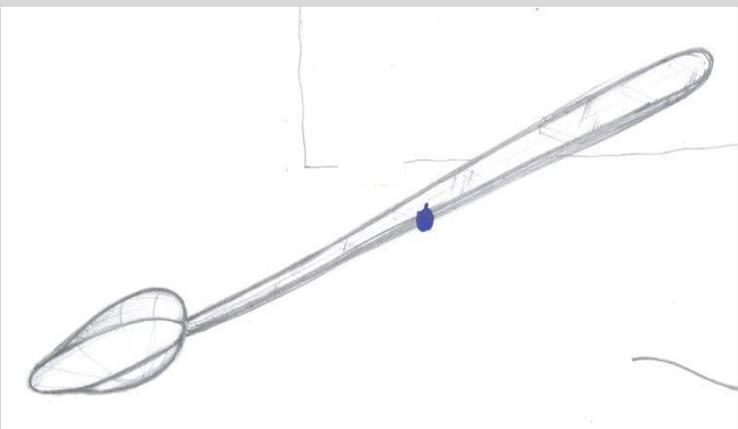
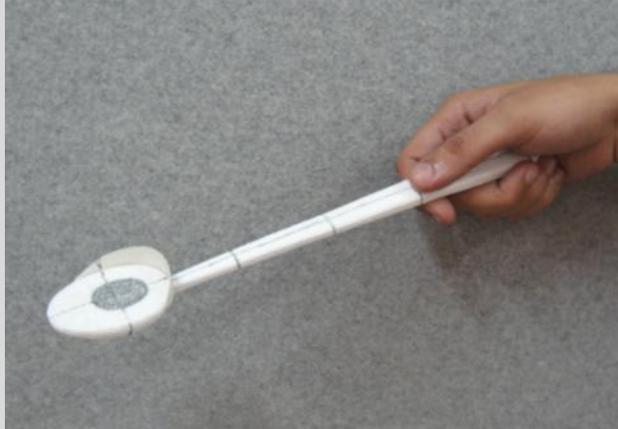
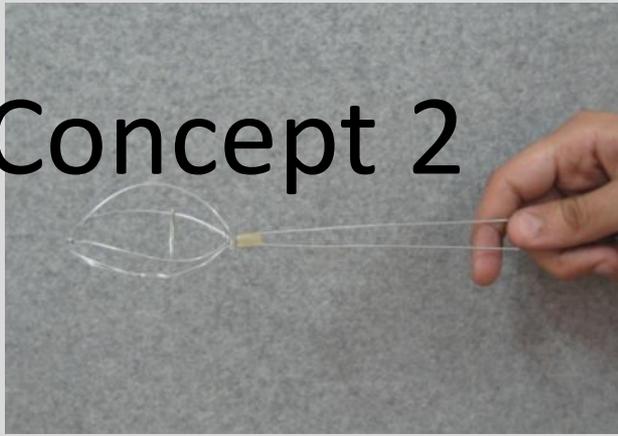
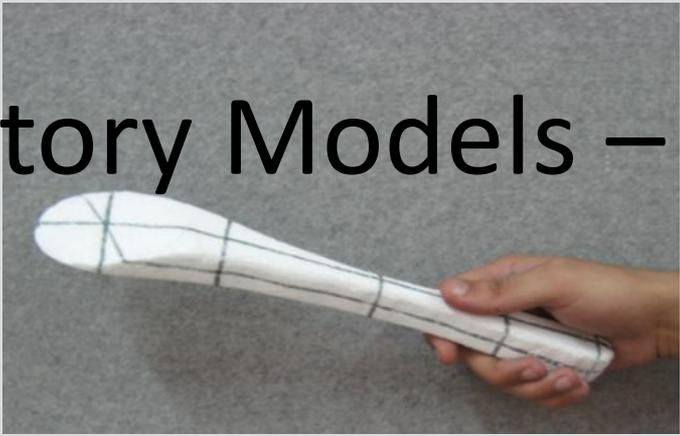
# Concept 3



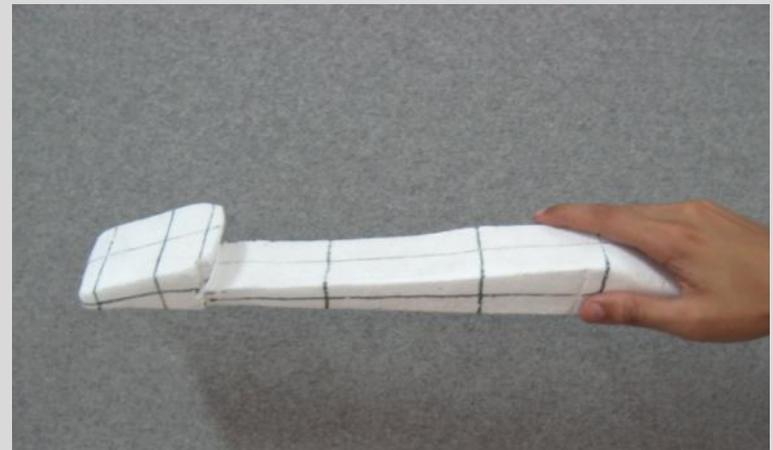
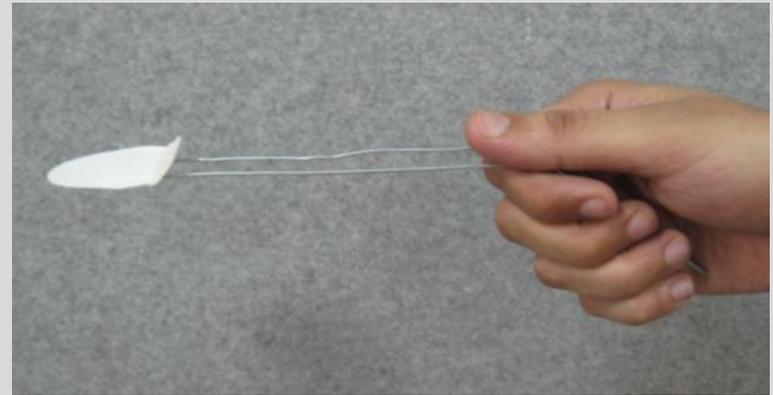
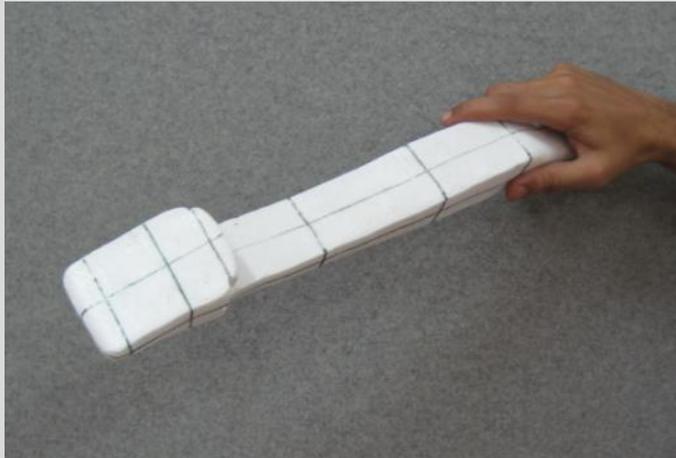
# Exploratory Models – Concept 1



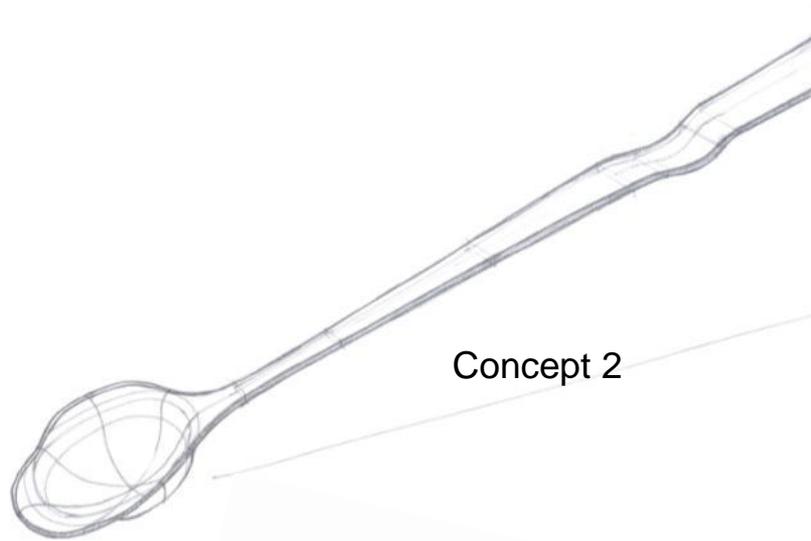
# Exploratory Models – Concept 2



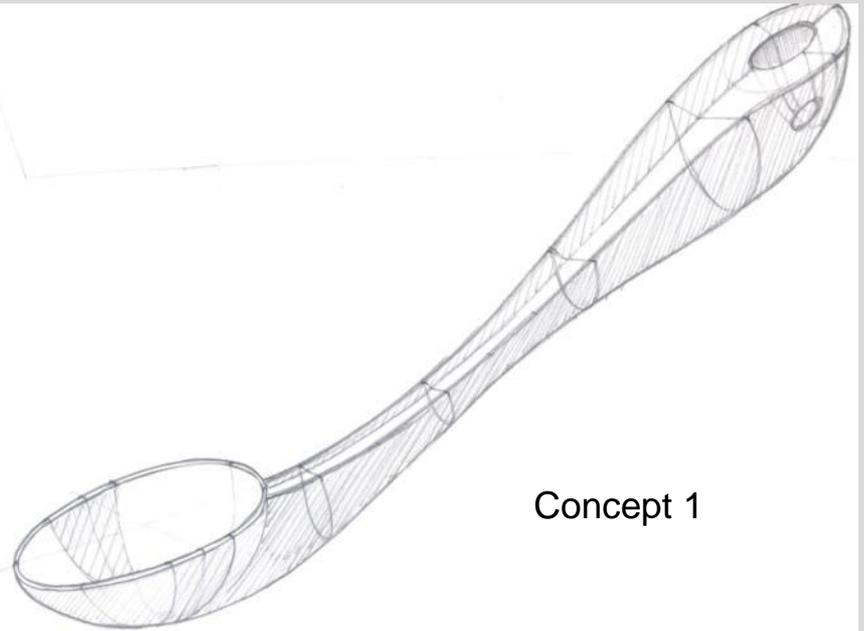
# Exploratory Models – Concept 3



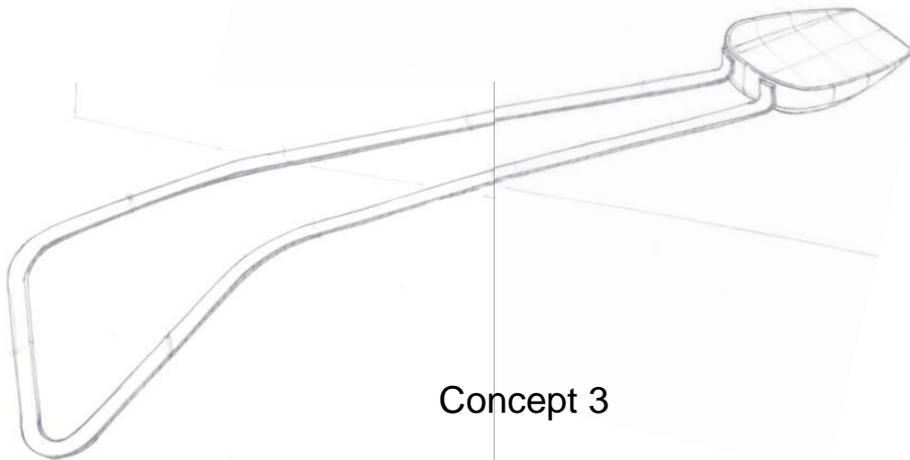
# Refined Concept



Concept 2



Concept 1



Concept 3



Photographs showing the **hand movement** during eating, with the exploratory model of **Concept 3**

This movement is less compared to the traditional spoons due to the redesigned handle and scoop which minimizes the possibility of food spilling out of the spoon while its movement from plate to mouth

# Concept Selection

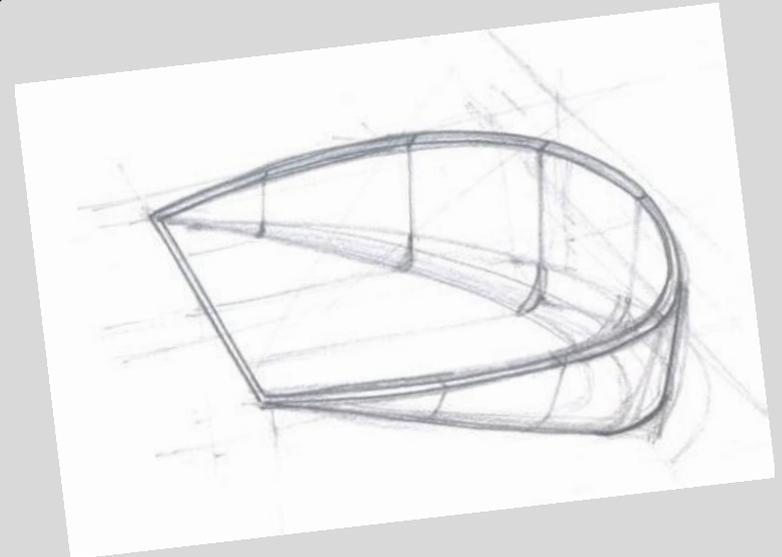
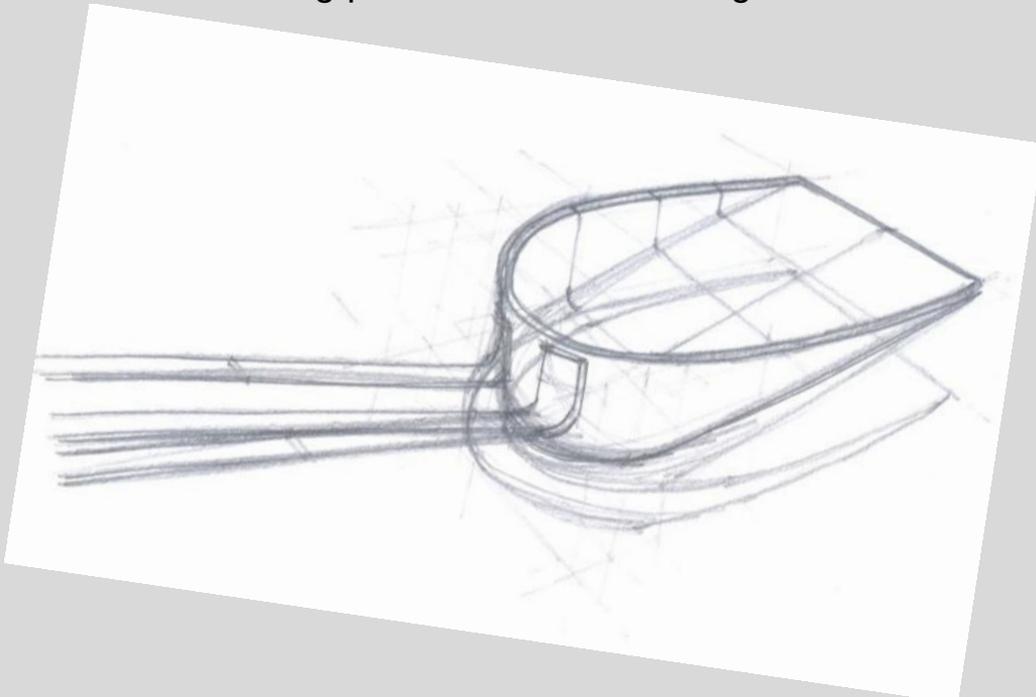
Based on the innovation potential, Concept 3 is selected for further refinements and detailing.

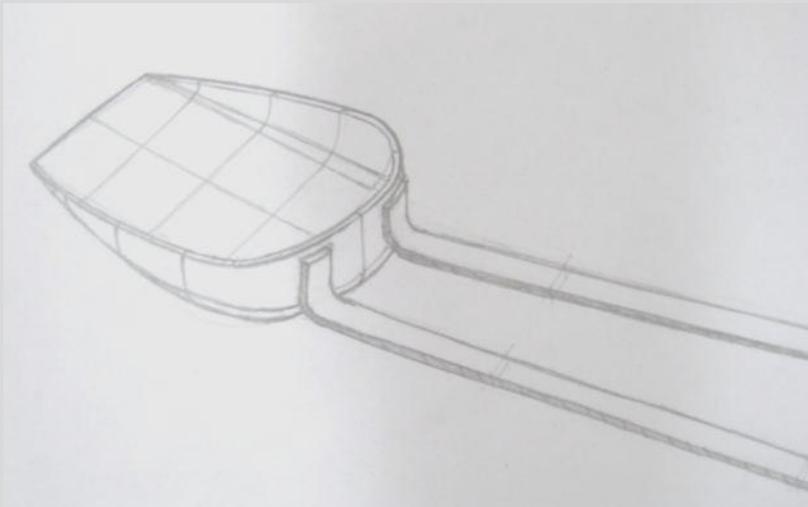
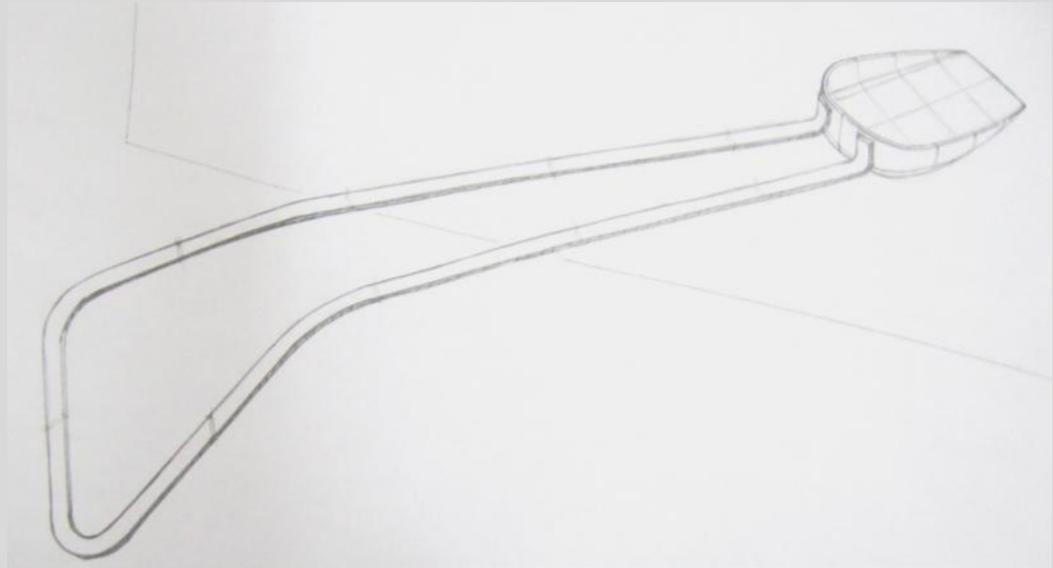
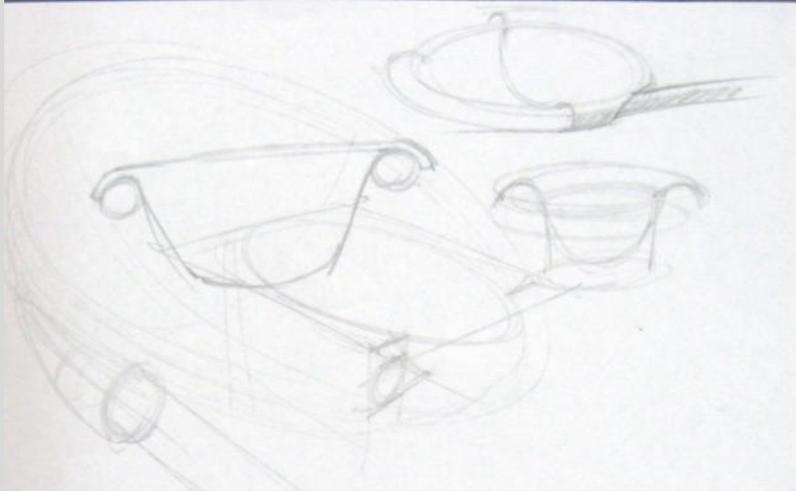
–Form – Slightly widening form at the back with curved edges for proper grip while traveling, properly angled scoop for better pick up from dish and emptying of food in the mouth.

–Material – Stainless steel

–User interaction – Less hand movement, Two handles giving a secured

–Manufacturing process – Press forming and Laser welding

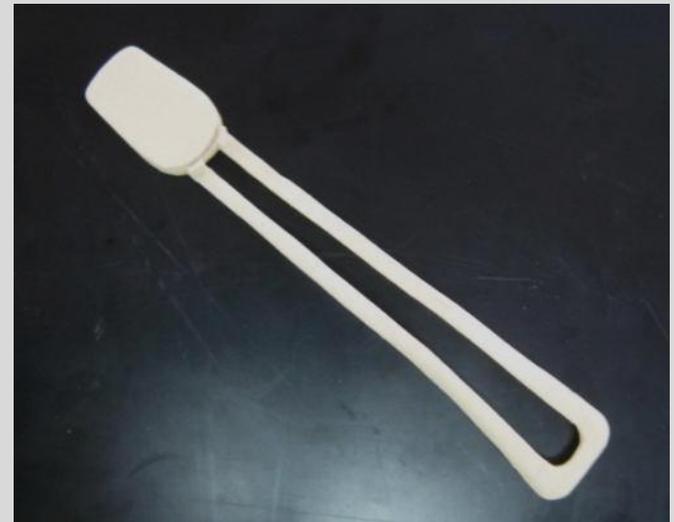
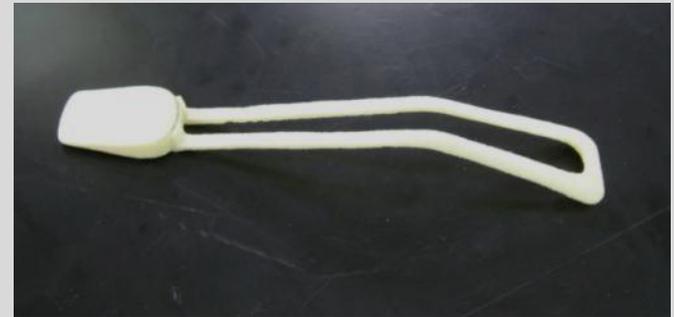
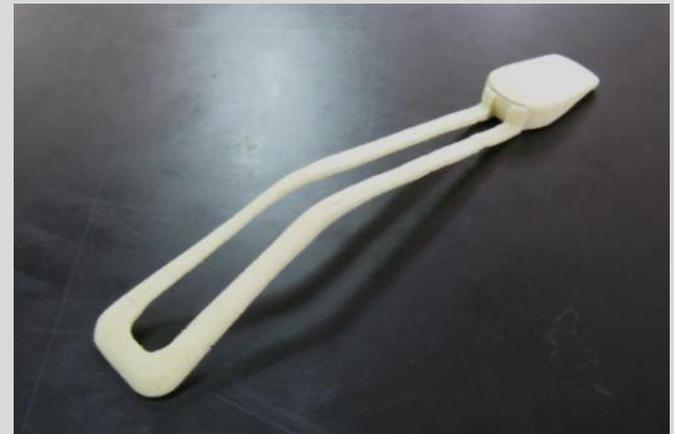




# Mock up Model



Photographs showing the **hand movement** during eating, with the mock up model



# Final Model

Type of hold and edge is very good. The hole further adds to the grip. Balance is very good. Lot of considerations have been given on how the spout of the spoon should be, how the handle of the spoon should connect to the spout of the spoon.

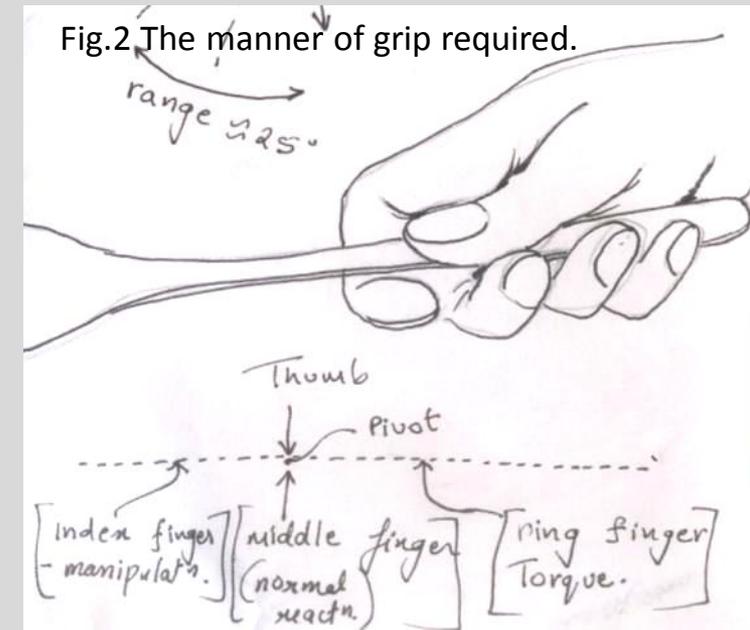
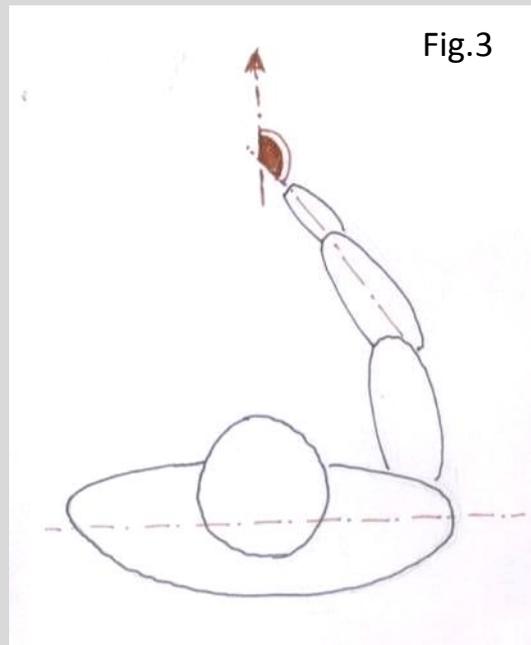
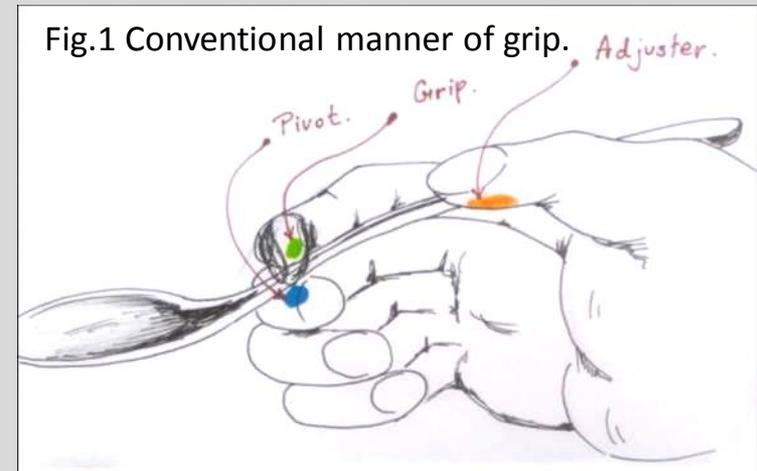


# Feeder Spoon for Pet Dogs when they are Sick

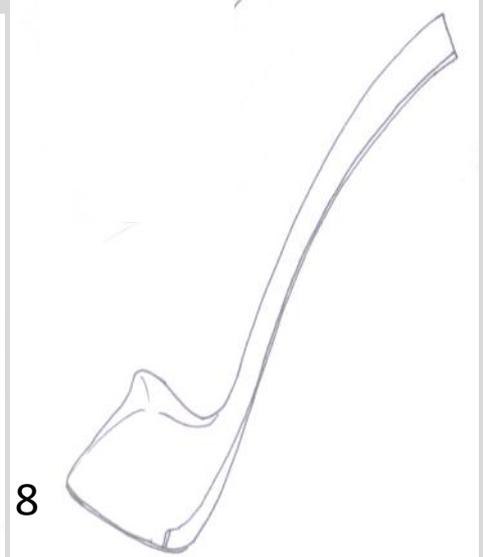
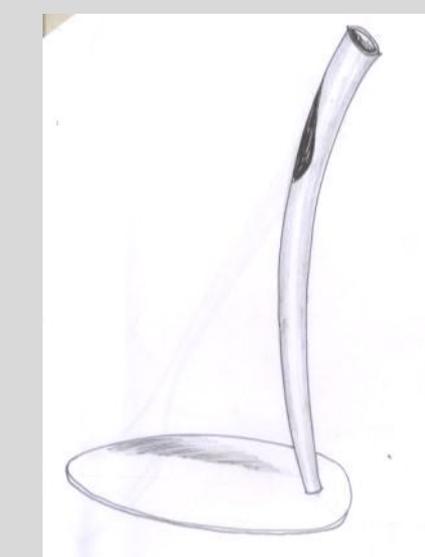
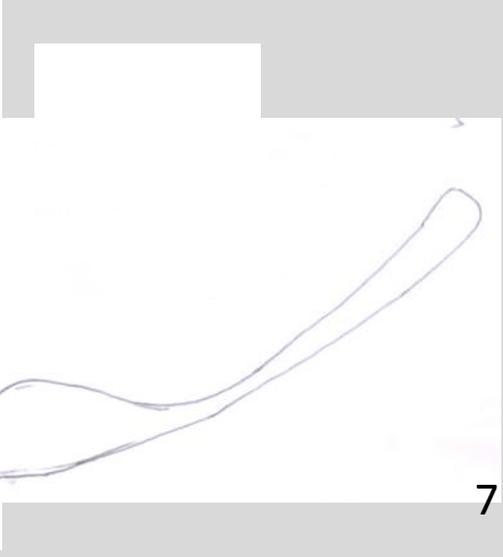
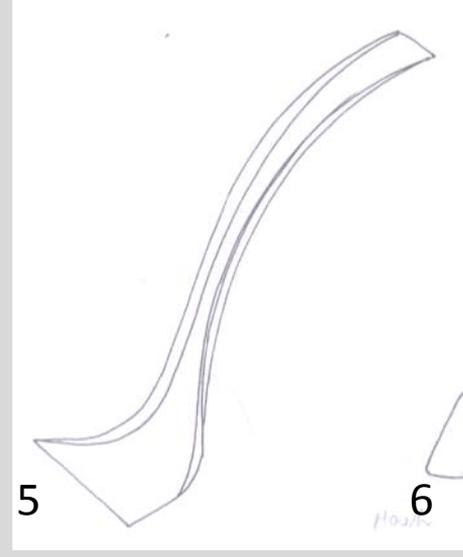
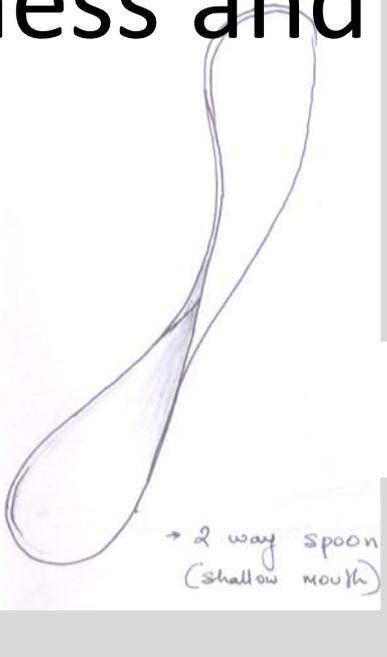
Yohan. S. Engineer

# Design Considerations

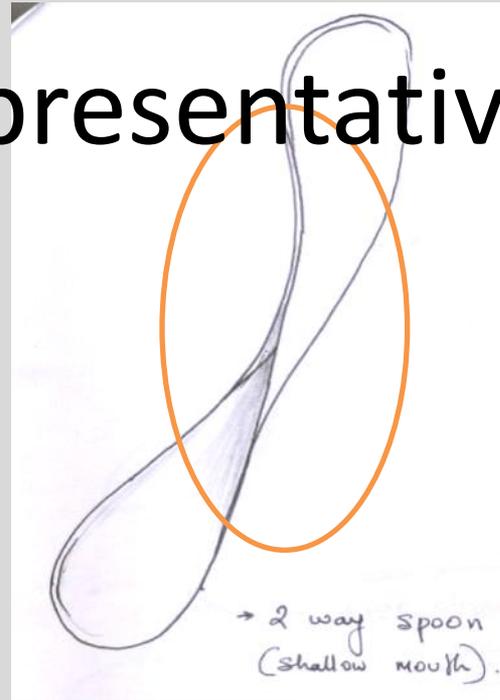
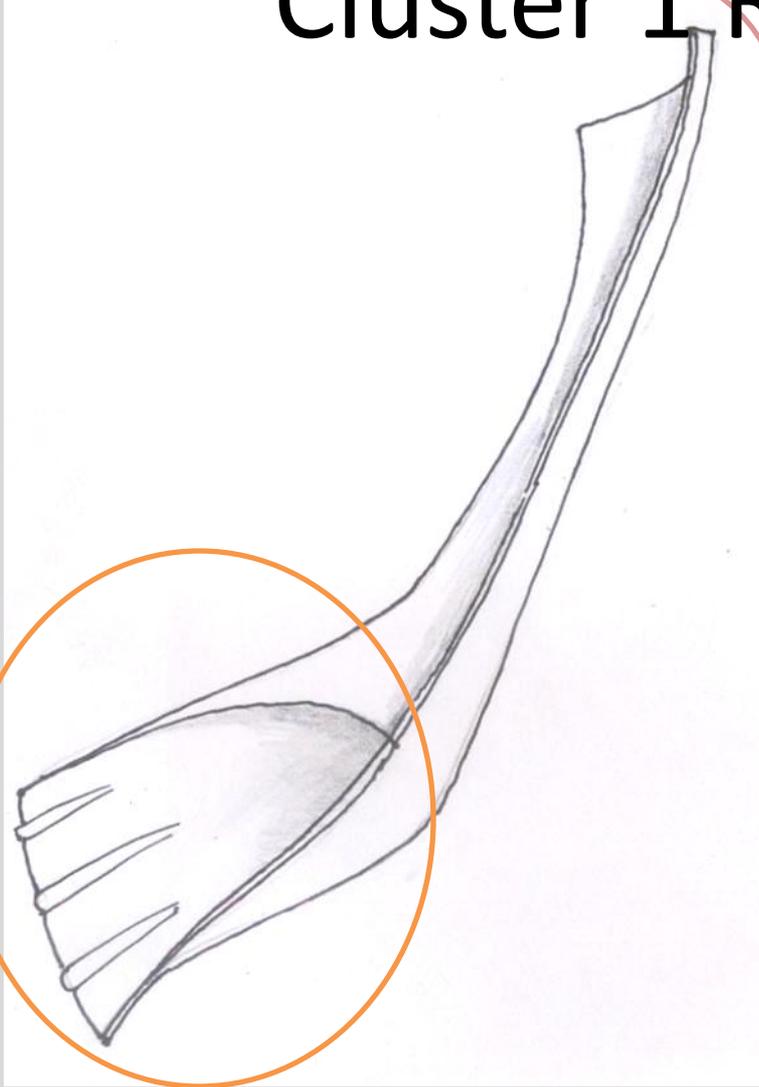
- Angle Of grip: As the dog is positioned in the opposite direction and the human hand has abduction. (see fig.3)
- Height : Natural heights of the two users vary.
- Strength : As the secondary user is an animal.



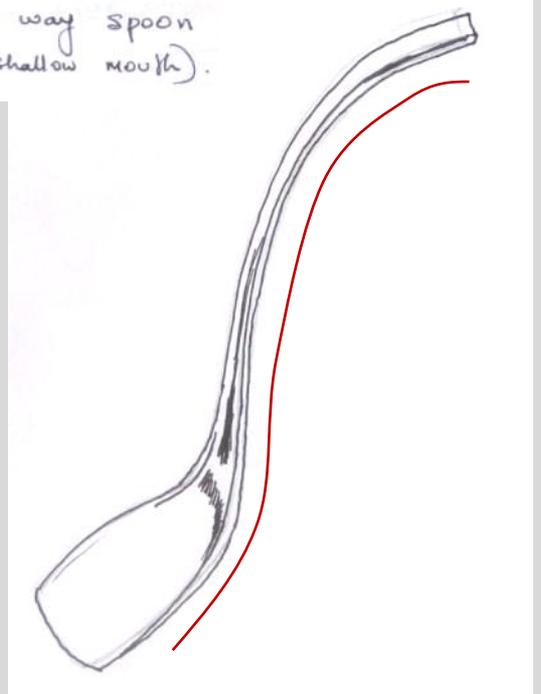
# Cluster 1 : Flatness and fragility



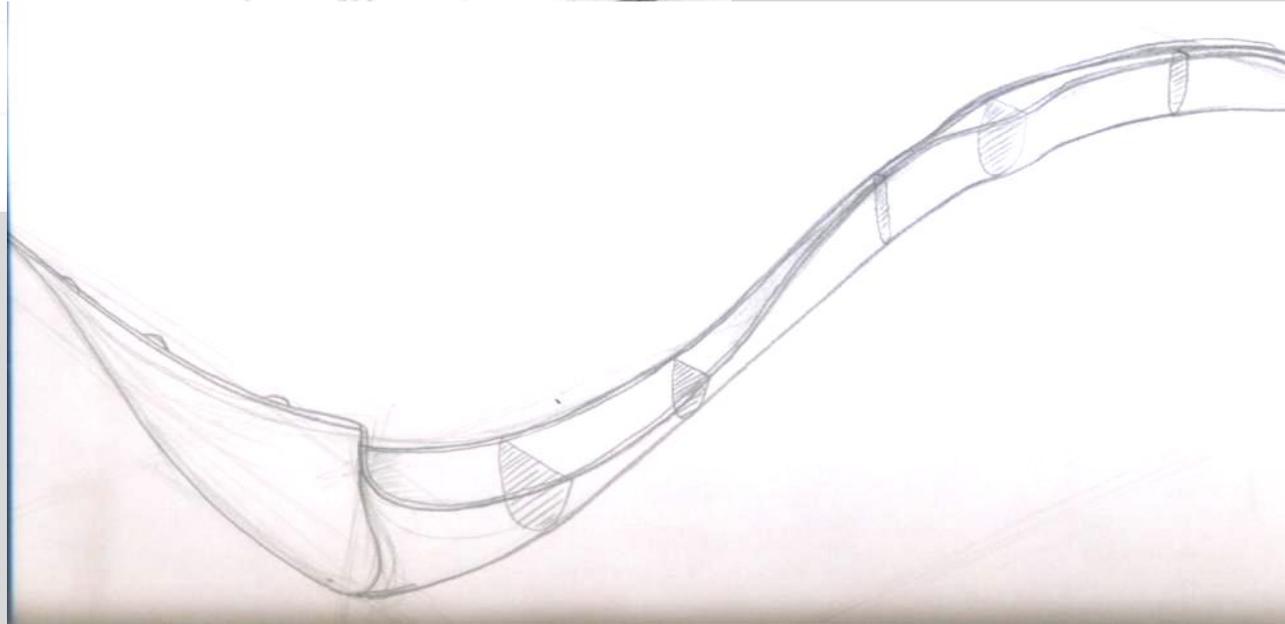
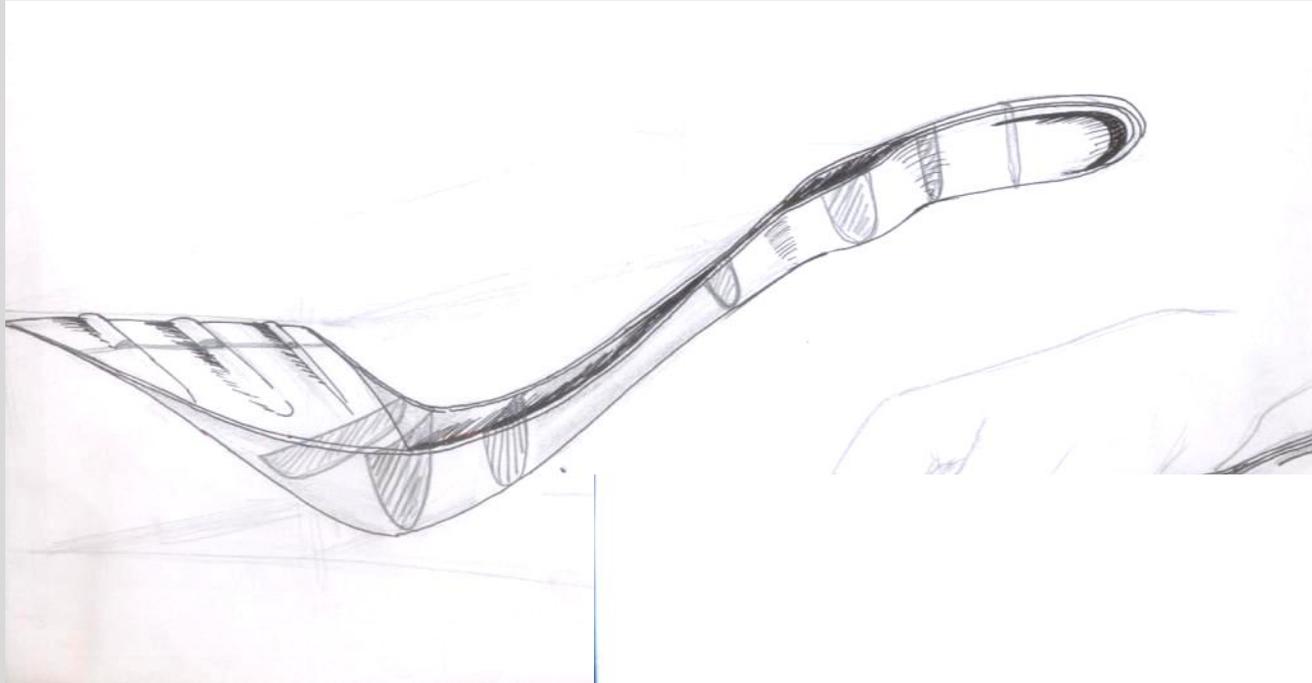
# Cluster 1 Representative



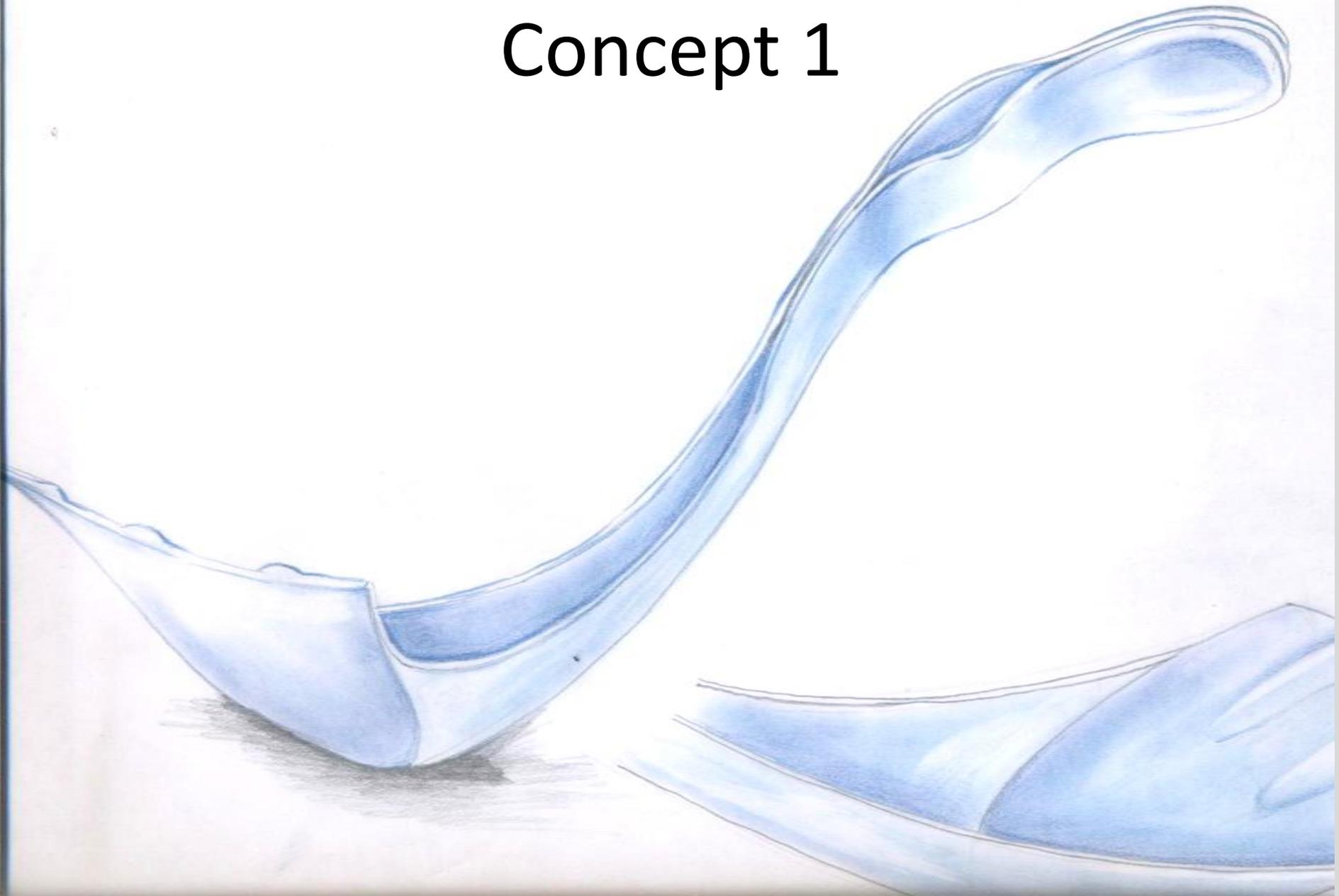
→ 2 way spoon  
(shallow mouth).



# Concept 1



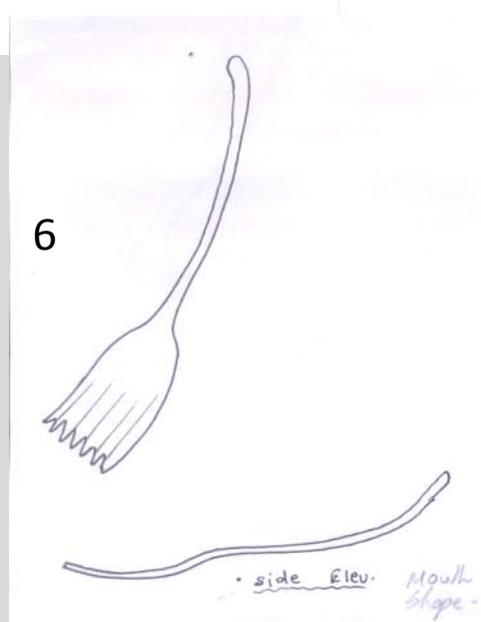
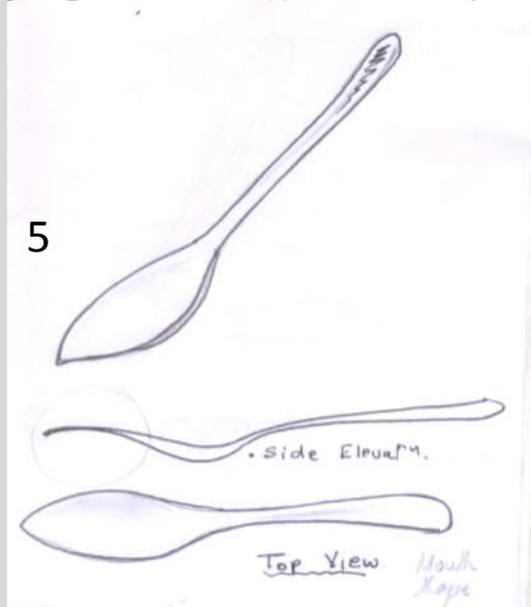
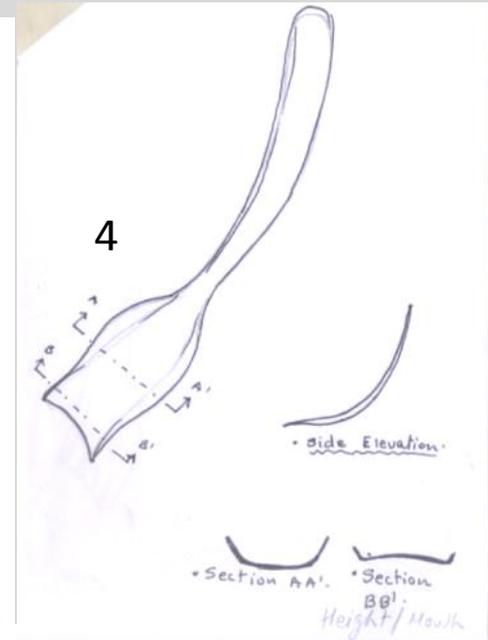
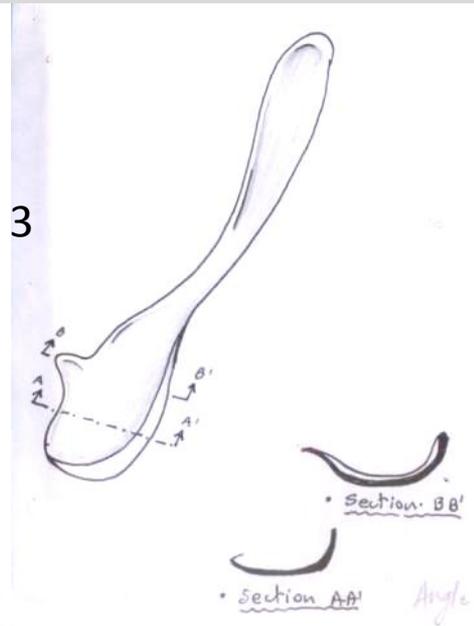
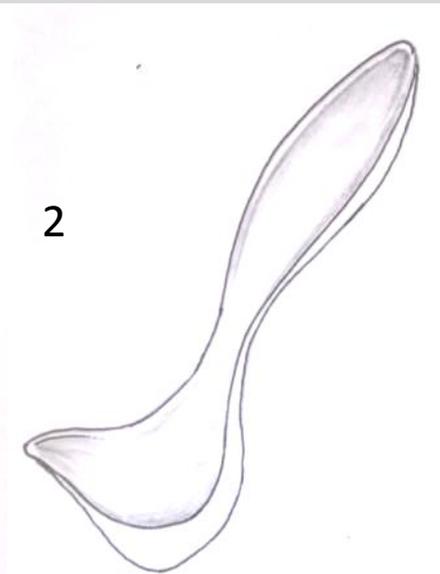
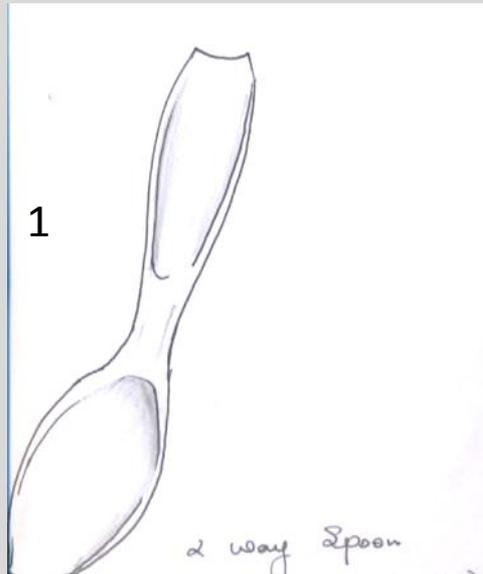
# Concept 1



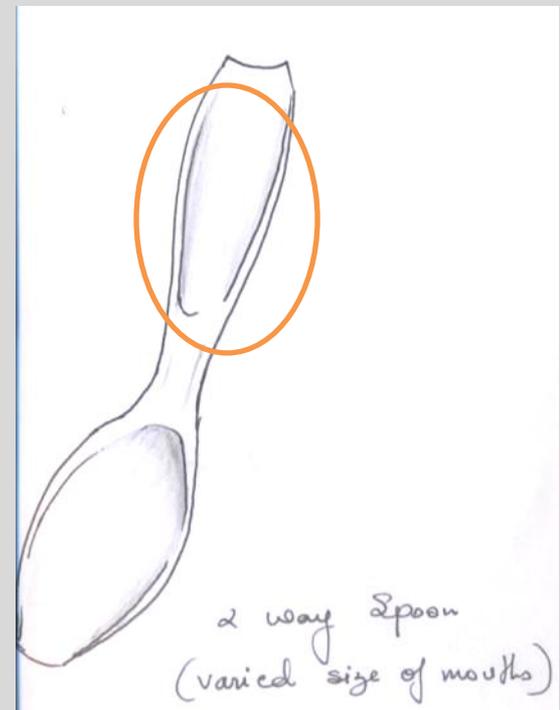
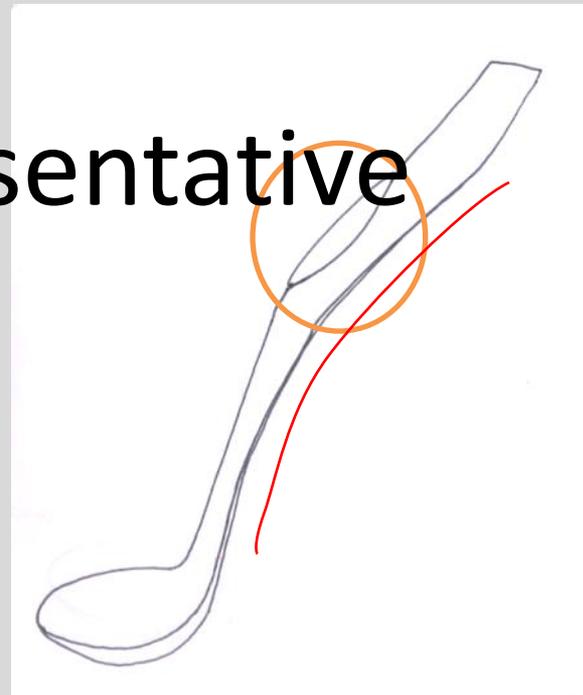
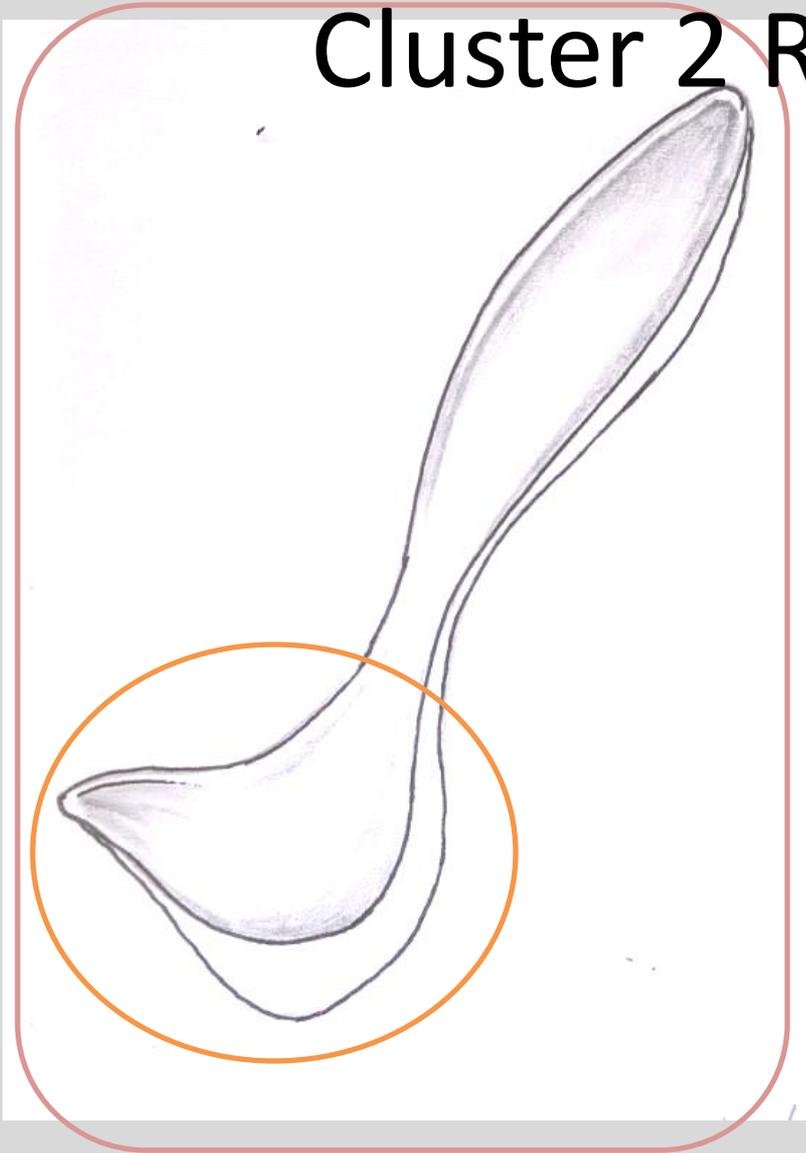
# Final Model – Concept 1



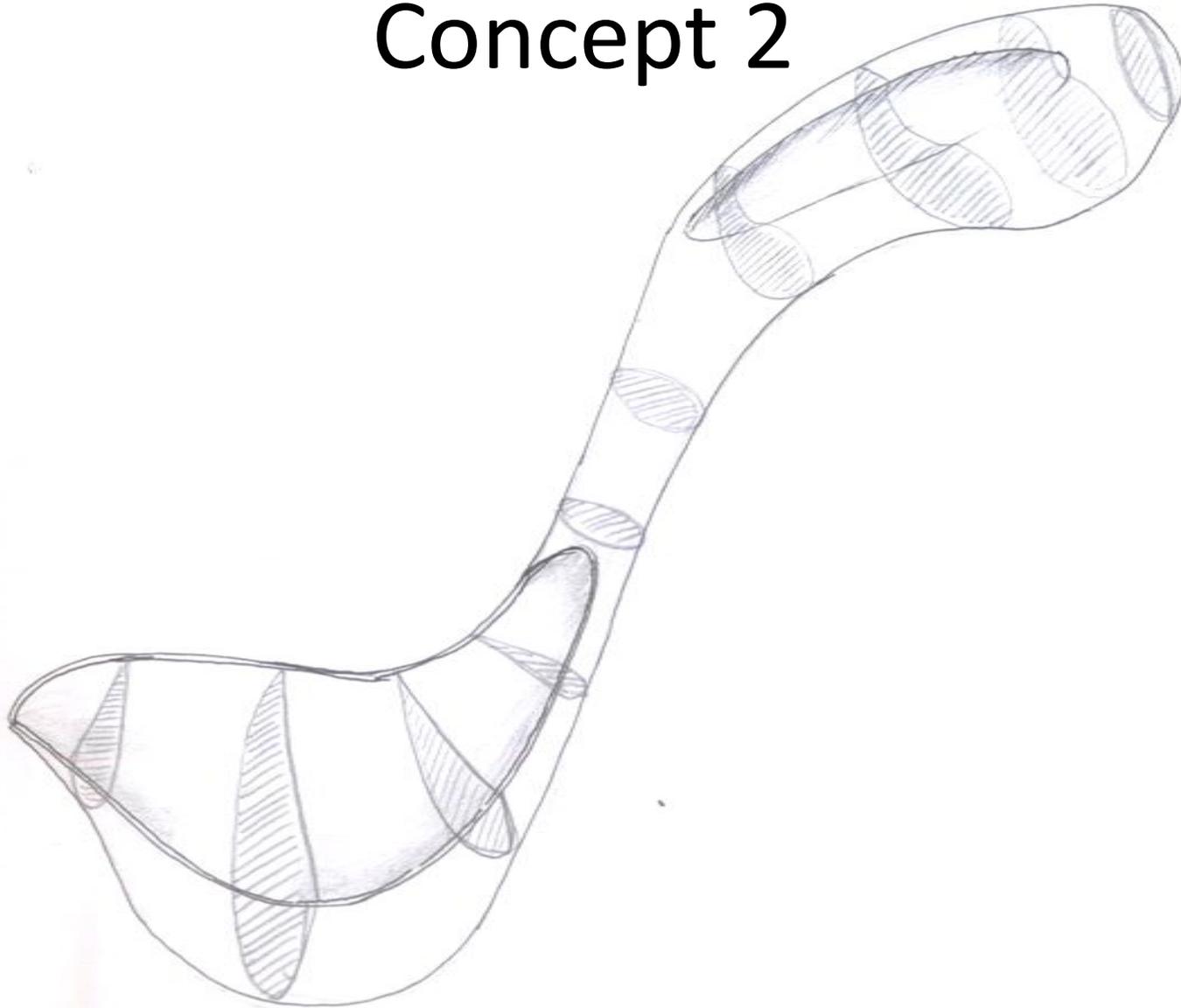
# Cluster 2 : Mouth Variations



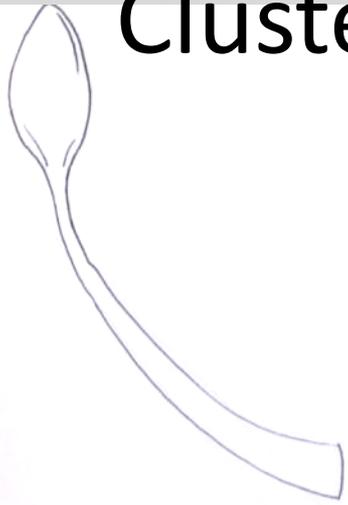
# Cluster 2 Representative



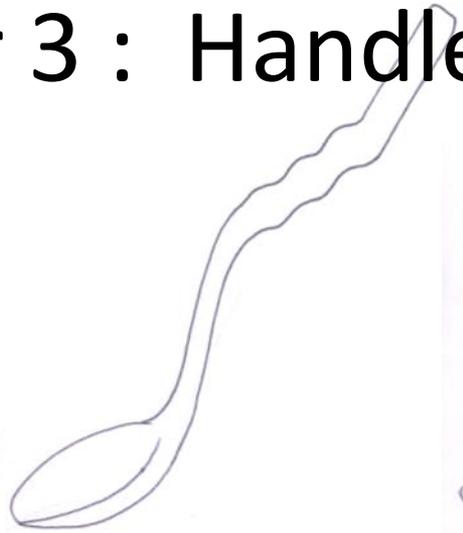
# Concept 2



# Cluster 3 : Handle variation and Grip



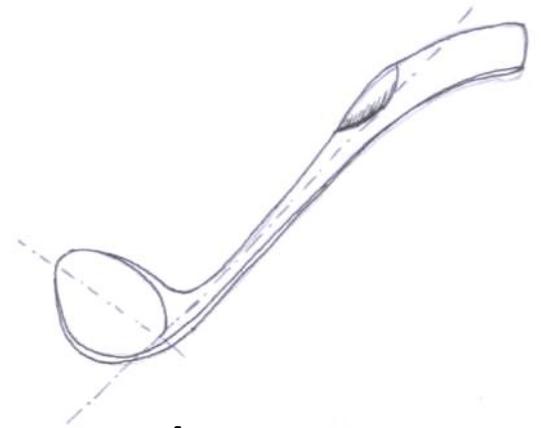
1



2



3



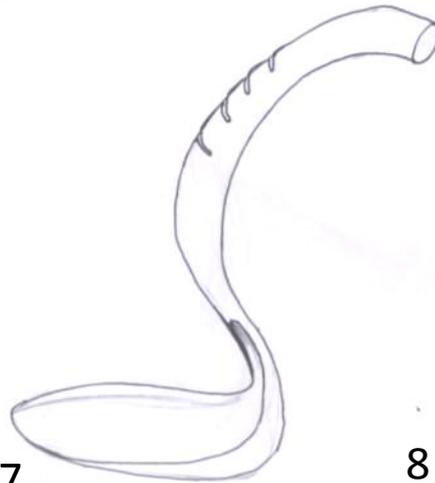
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5



6

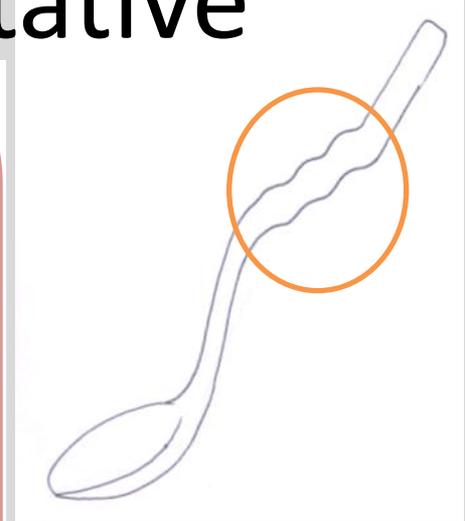
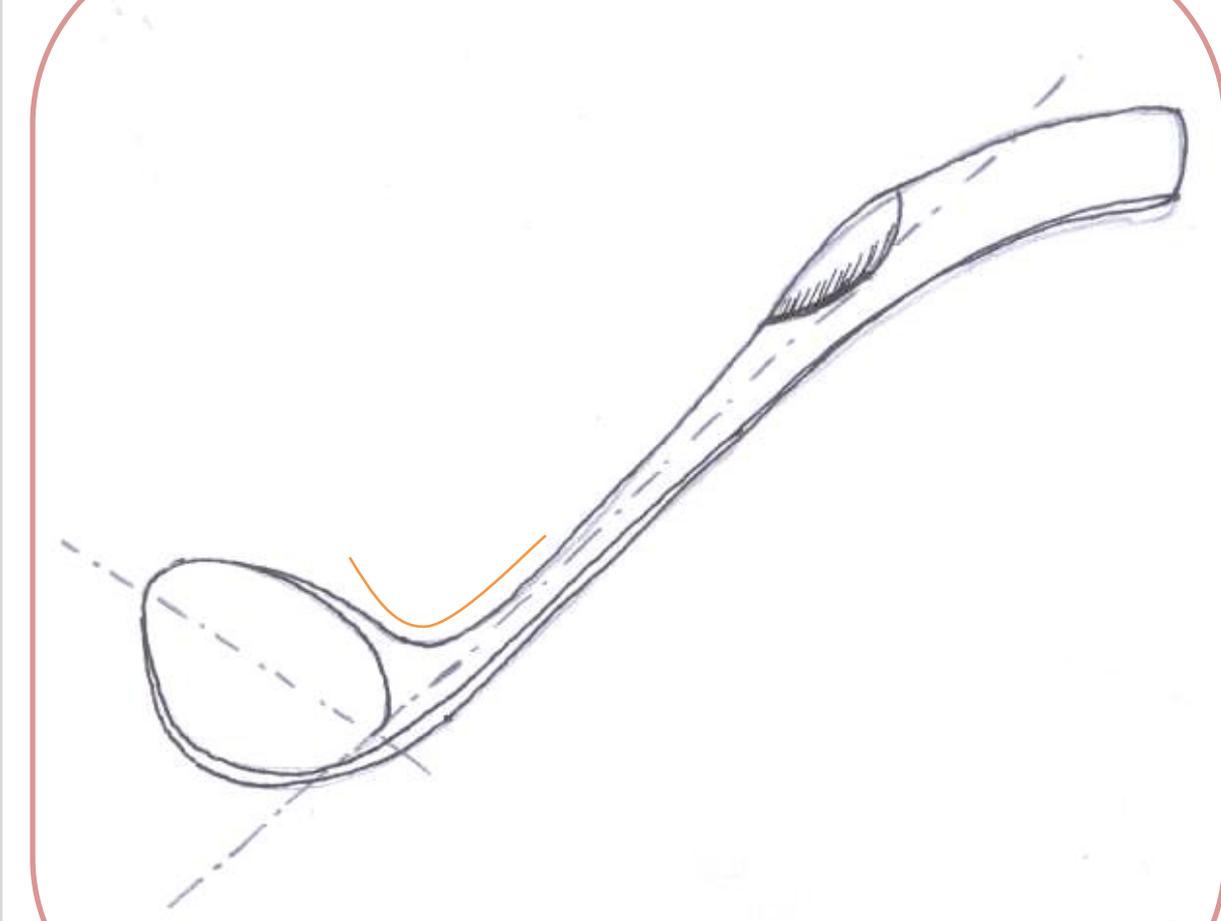


7

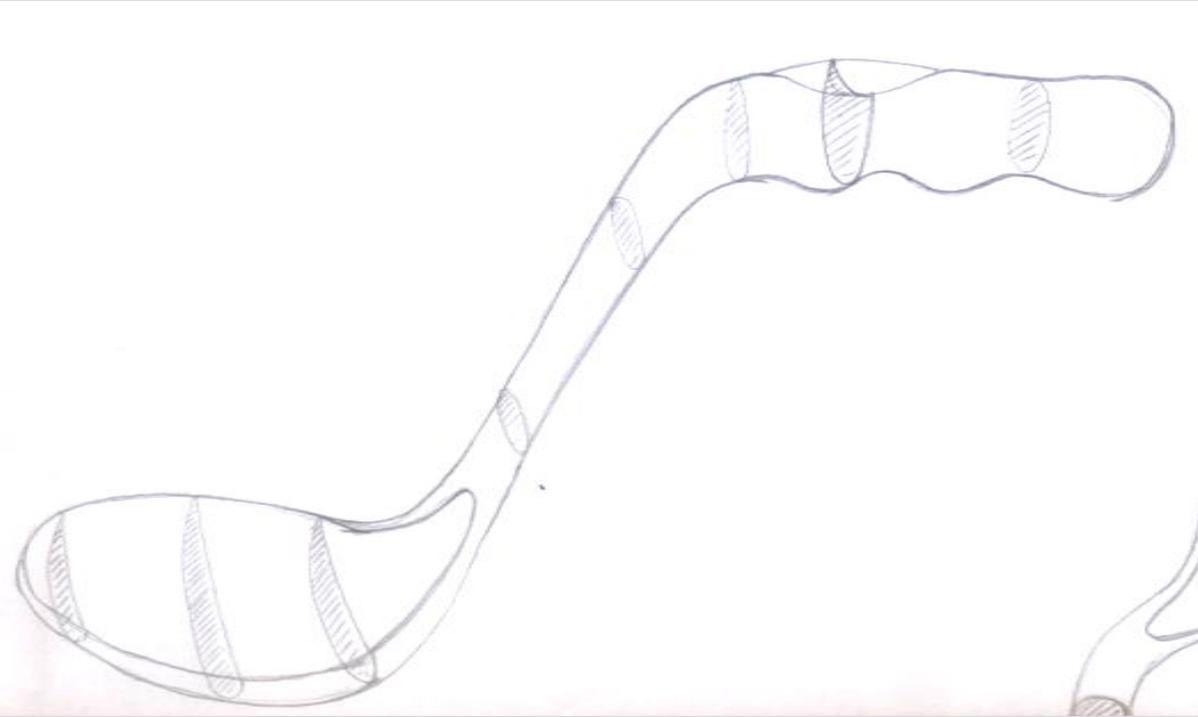


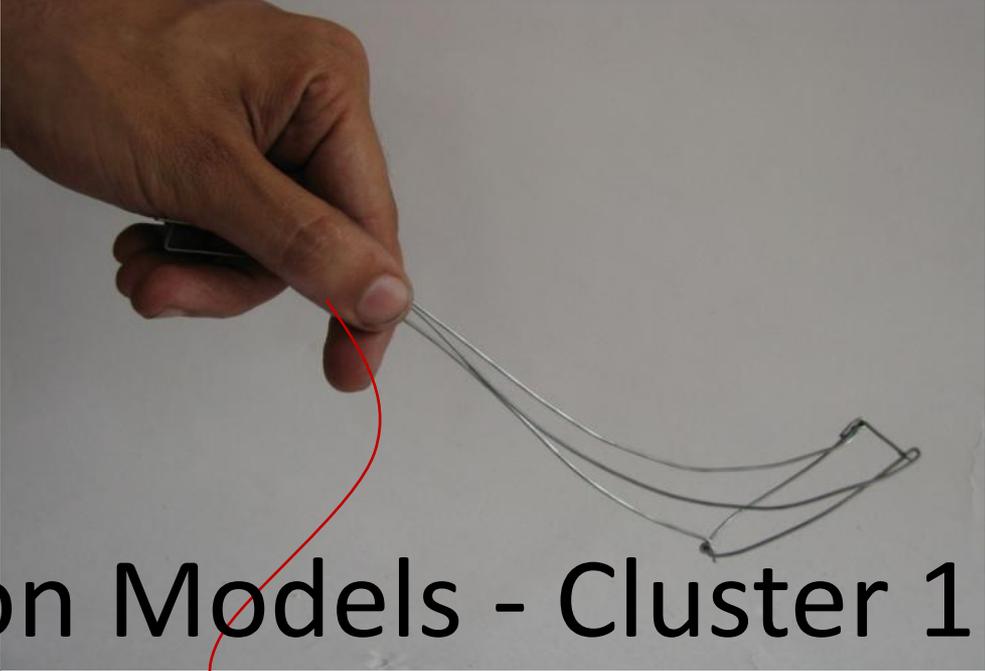
8

# Cluster 3 Representative



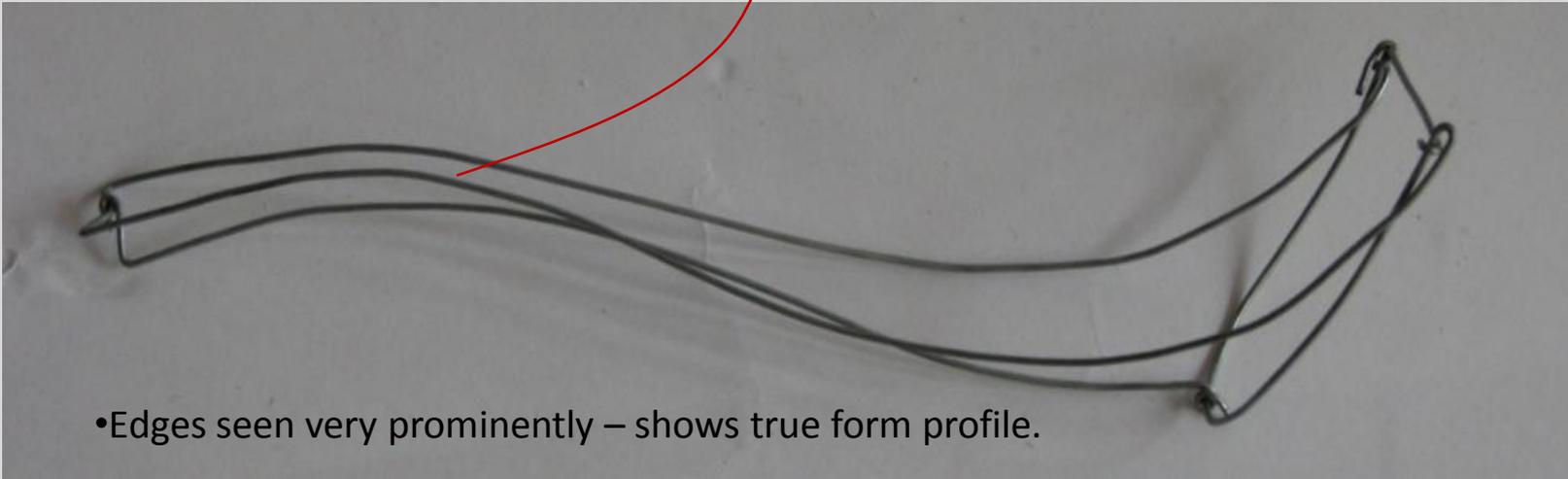
# Concept 3





# Exploration Models - Cluster 1

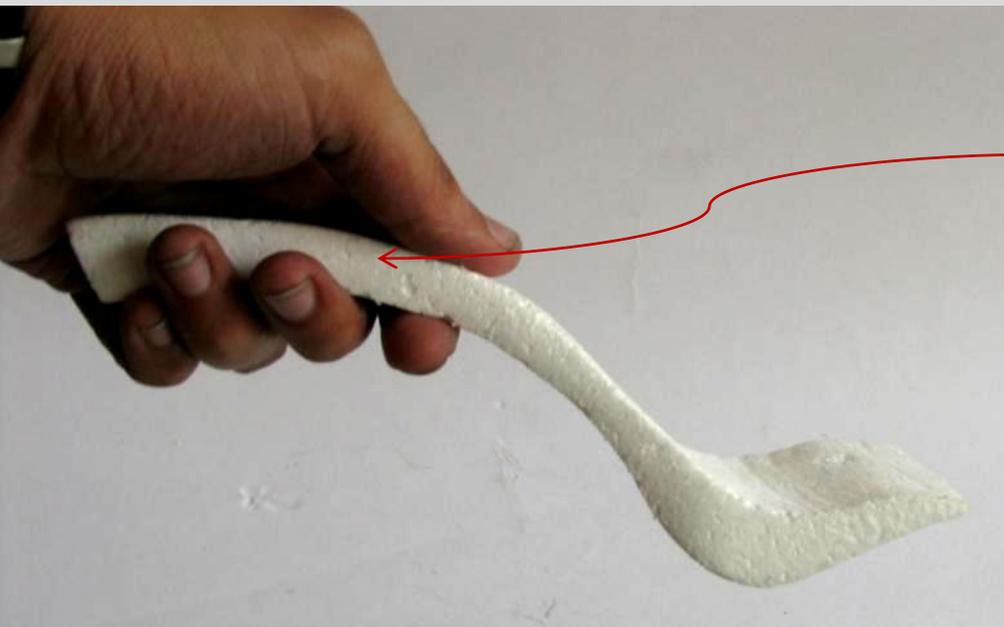
•Flatness felt and required for convenient grip.



•Edges seen very prominently – shows true form profile.



- Due to material property, more mass is seen in the spoon handle.



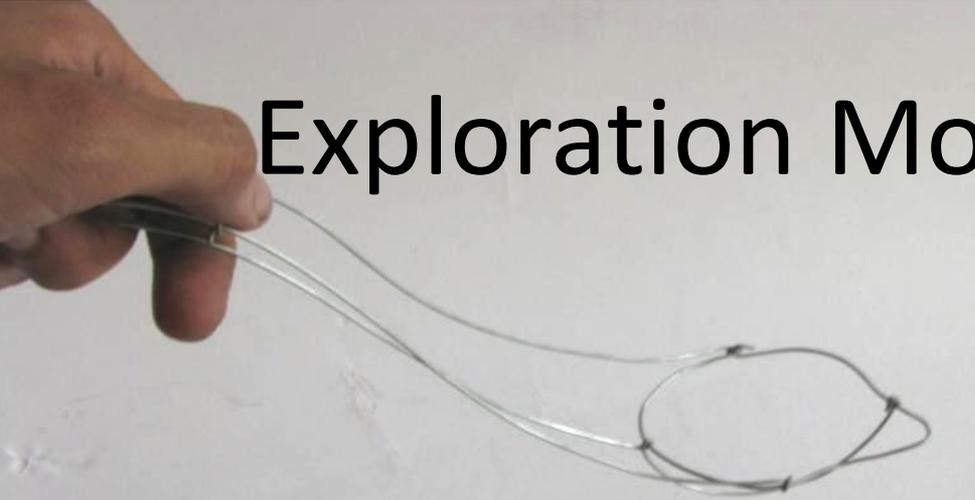
- Handle gives an uncomfortable feel – too broad.



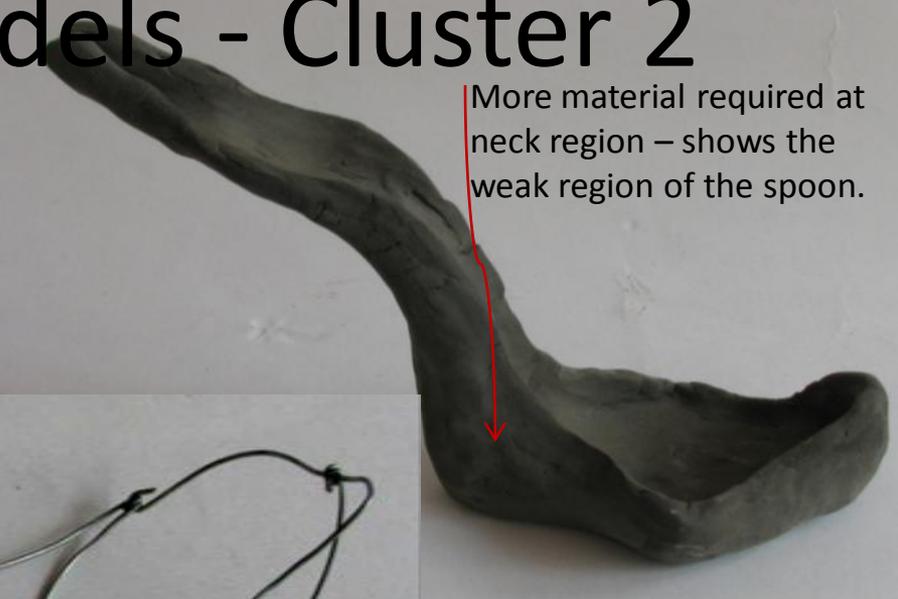
More material required at neck region – shows the weak region of the spoon.



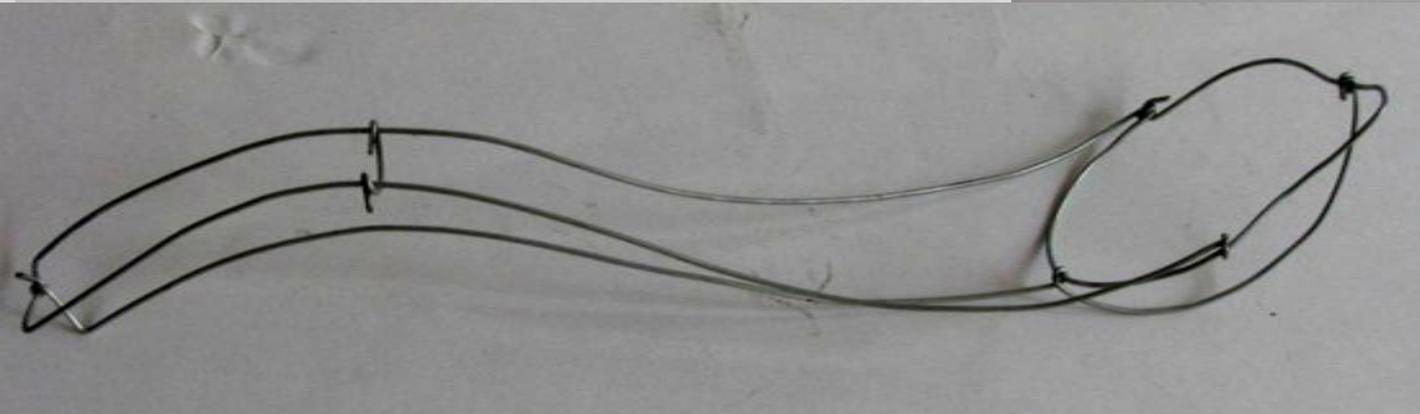
Strength is lost as the section is flat –unlike plastic.



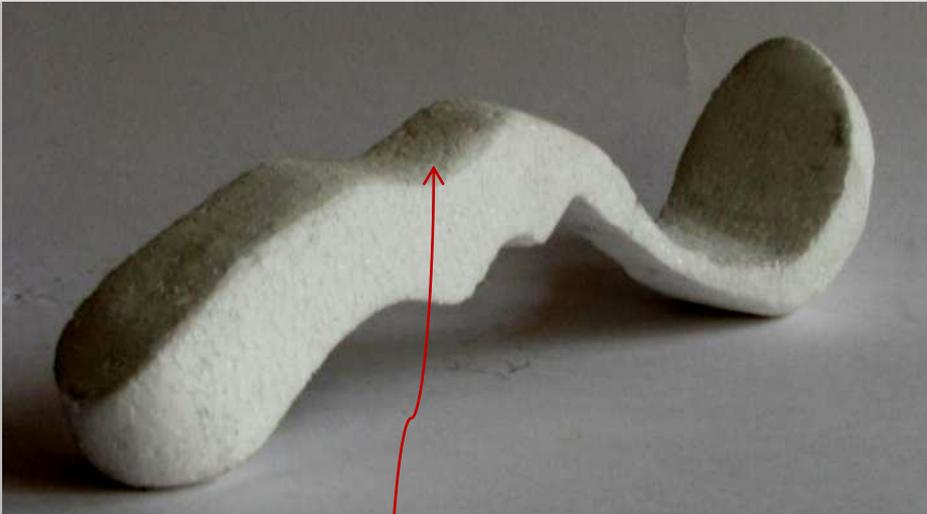
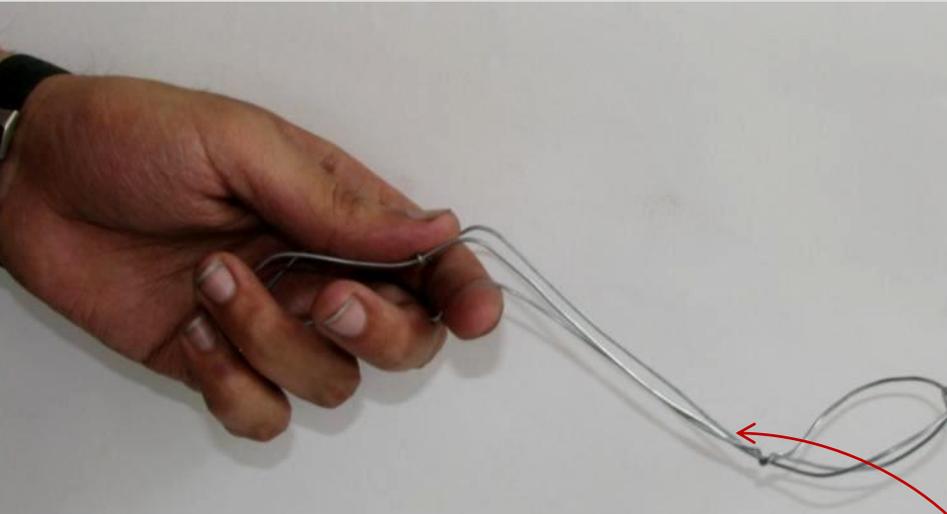
## Exploration Models - Cluster 2



More material required at neck region – shows the weak region of the spoon.



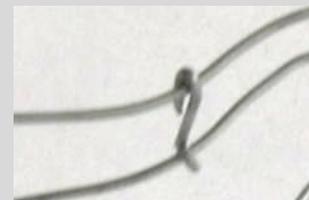
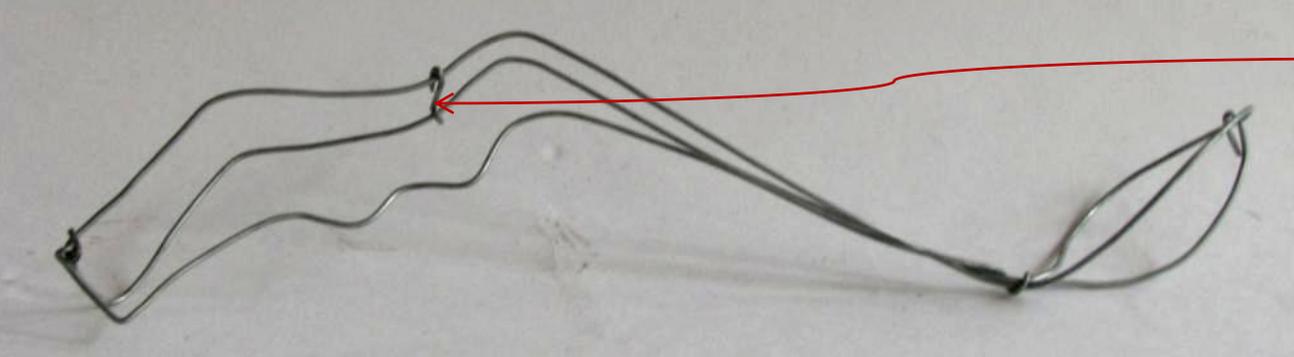
# Exploration Models - Cluster 3



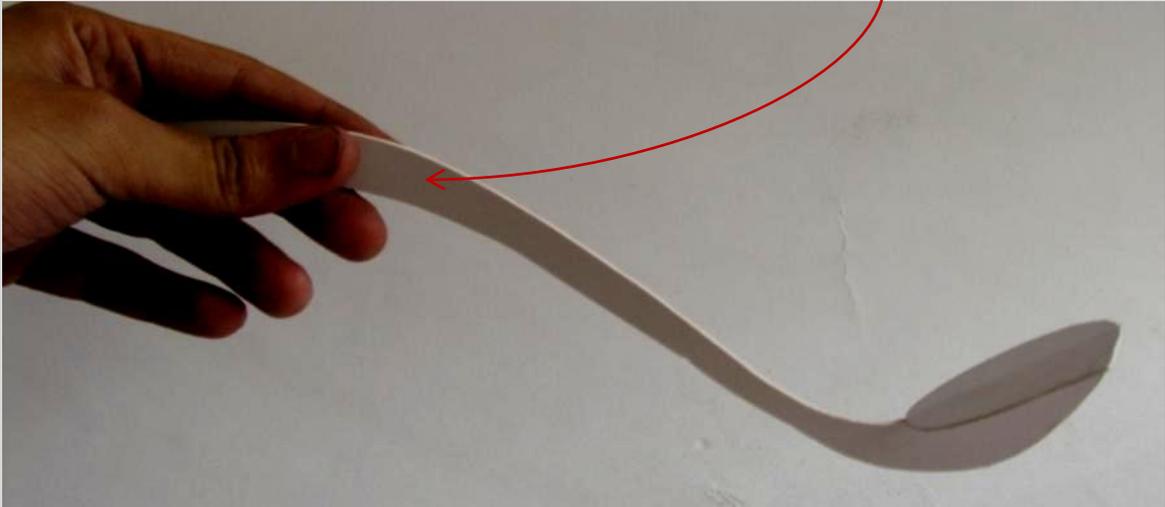
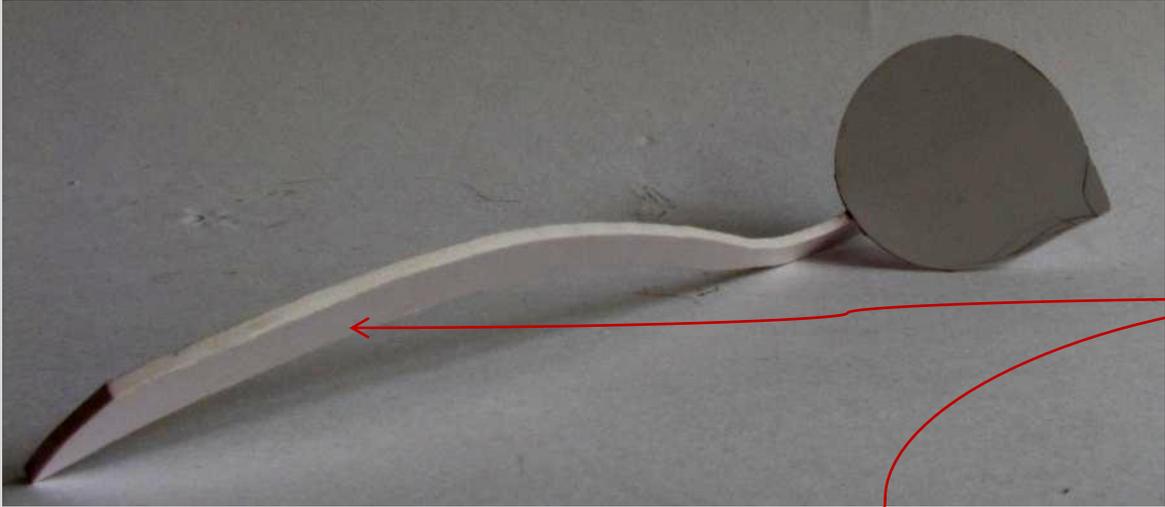
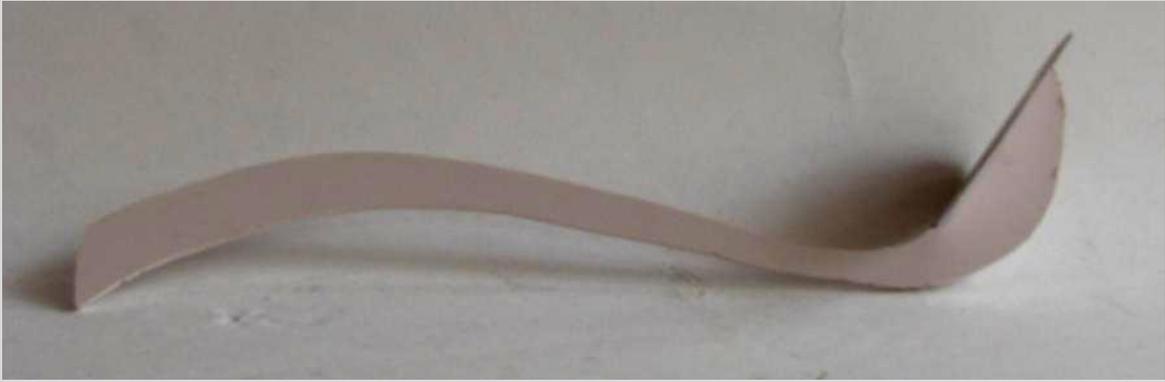
- Soft curves takes the shape of the finger contours.



- As wire is strong, thin sections at neck area were possible. It gives the spoon a fragile feeling.



- Wire used as spacer is uncomfortable and ugly.



- Vertical sections give better grip and strength to the handle.

- Thin material used creates sleek form

# Final Model



SOME MORE SPOON DESIGNS...



It will be in two part. one is metallic & other is made of wood

## SPOON FOR SPICES



**SPOON FOR SEMI-LIQUID FOOD**



SPOON WHILE HAVING TEA/COFFEE



SPOON FOR LONG JARS



**SPOON FOR RASOGULLA**



SPOON FOR KIDS

