Brainstorming, Ideation, and design

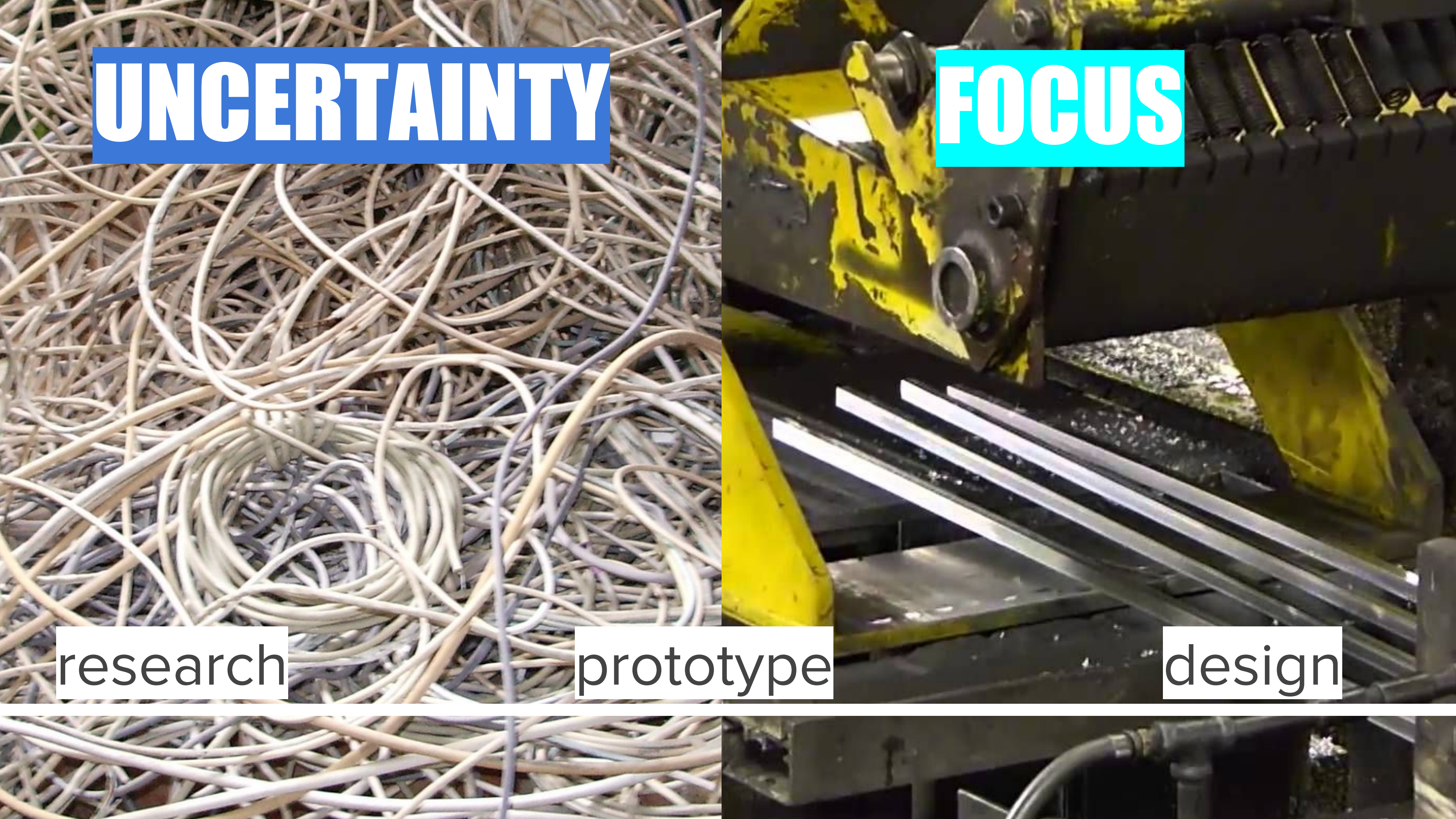
BASE
DESIGN STUDIO

Elijah Wiegmann

Founder Base Design Studio
4moms Design Director
Michael Graves Design Group

BASE
DESIGN STUDIO

WHAT IS
"DESIGN THINKING" ?



UNCERTAINTY

FOCUS

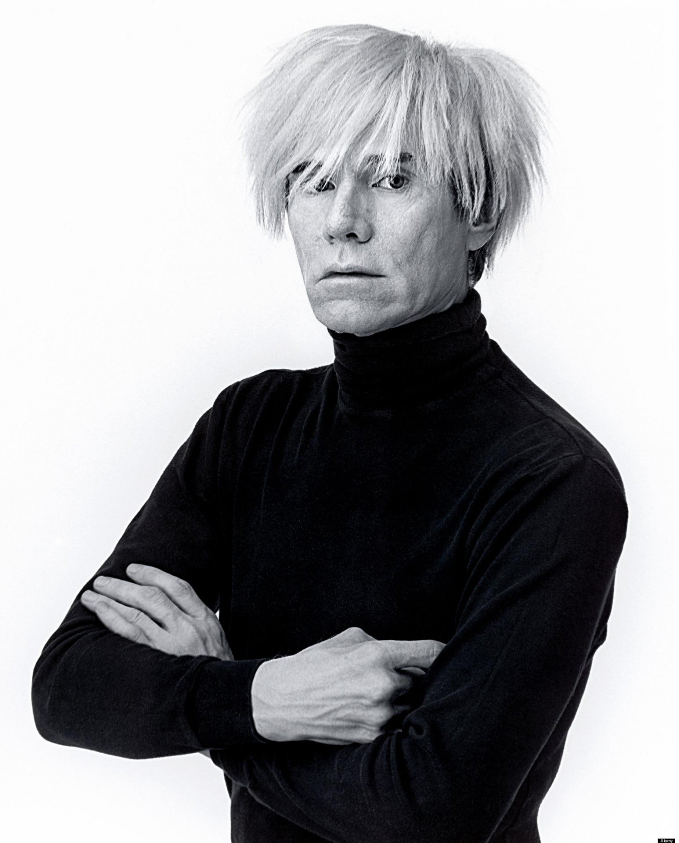
research

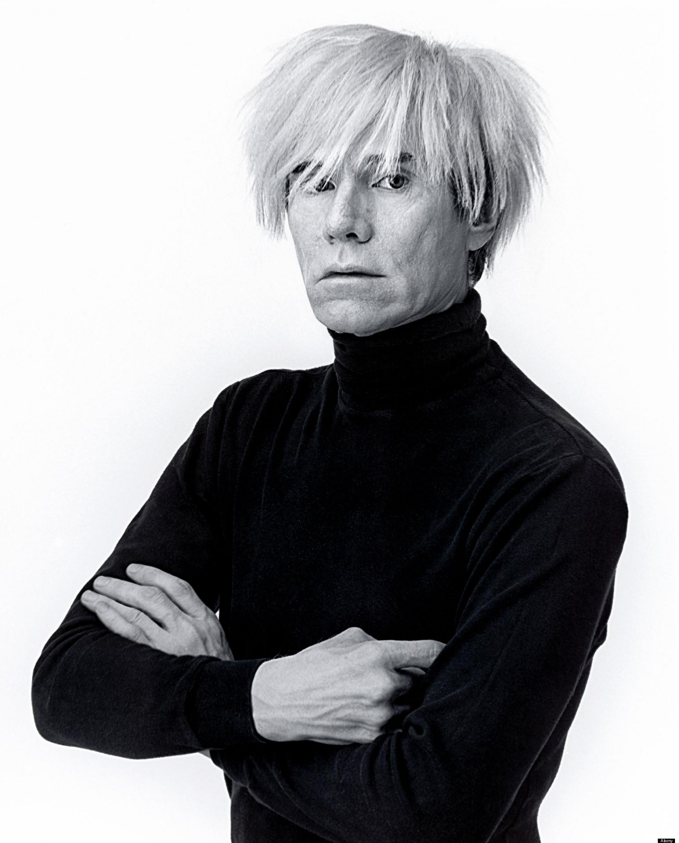
prototype

design

Designers like ambiguity

We're sensitive artists





WE’RE SENSITIVE ARTISTS

“That Blue isn’t blue enough”
It’s actually a bit more Cerulean than Teal

“What if it wasn’t?”
Blow it up! Get it out of my face!

“Does it have to be like that?”
I just, like... don’t get it

BUT WE'RE ALSO CANARIES

This is the part where you get sensitive...

Have you actually tested?
Do you want the truth?
Are your costs in-line?
What's it made out of?
Who can help us?
Does it work?
Does anyone even want it?

The Process

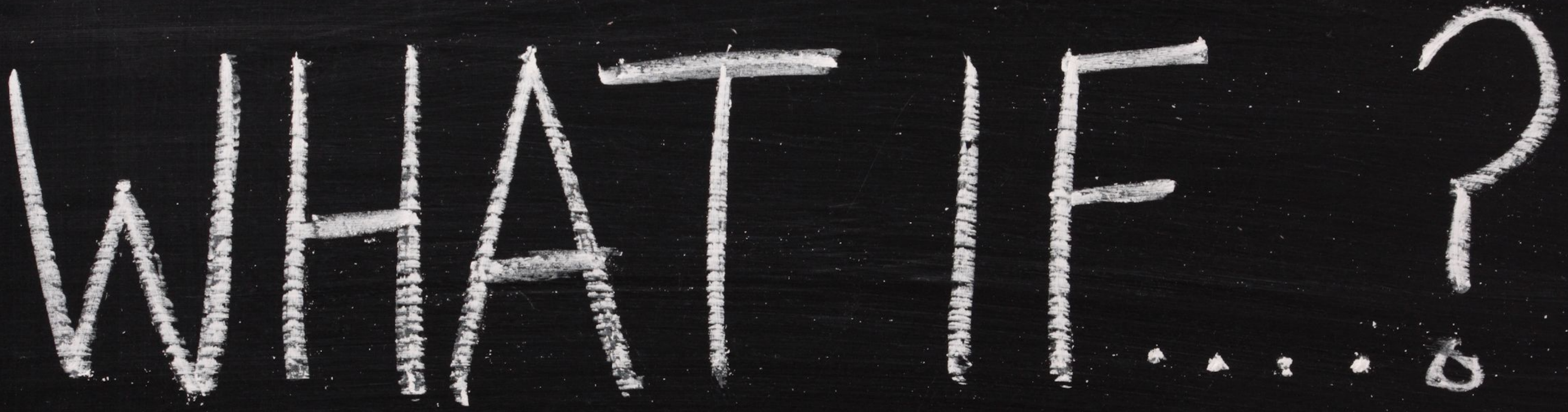
I.
EMPATHIZE
Develop a deep understanding of the challenge

II.
DEFINE
Clearly articulate the problem you want to solve

III.
IDEATE
Brainstorm potential solutions
Select and develop your solution

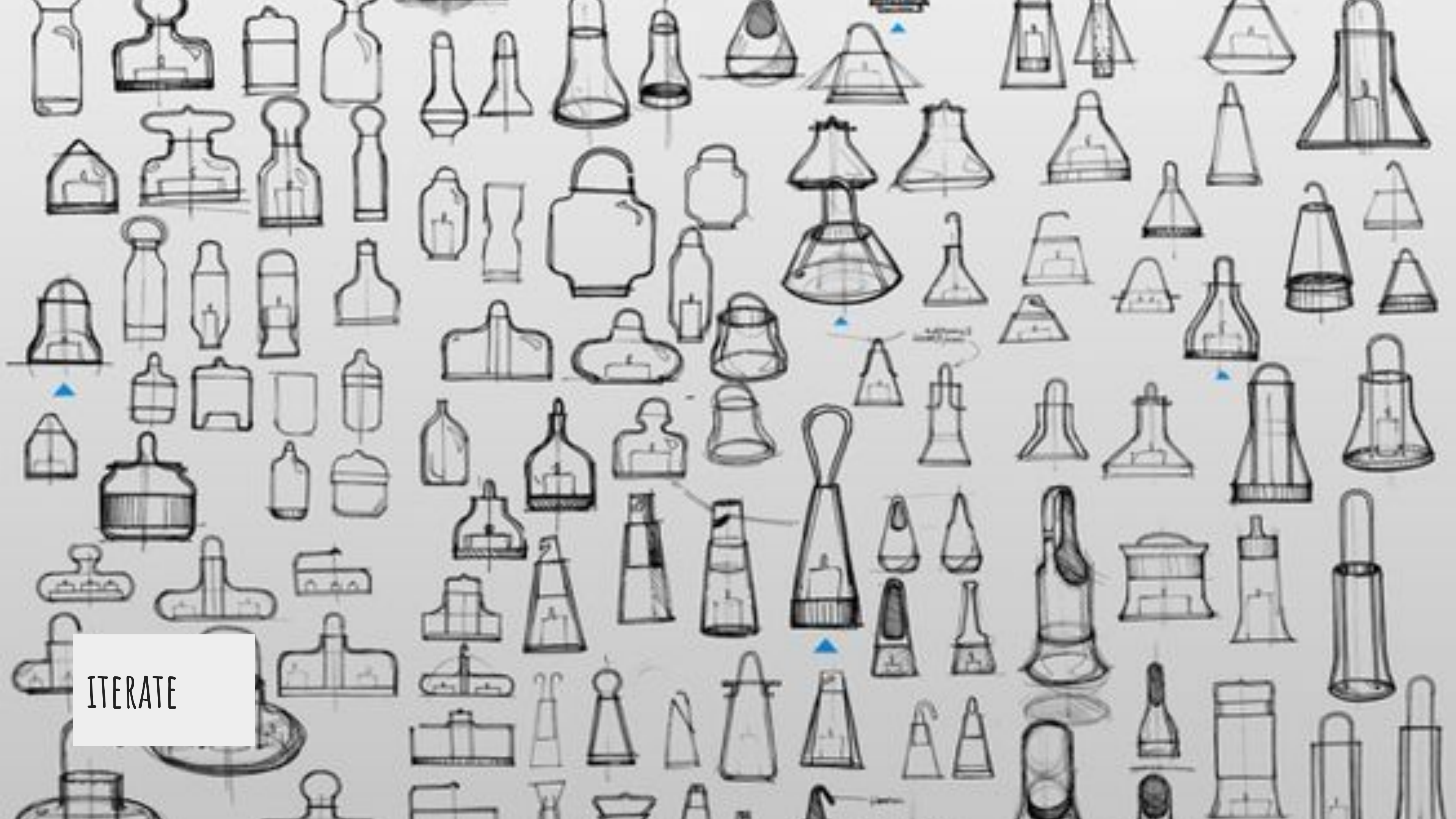
IV.
PROTOTYPE
Design a prototype (or series of prototypes) to test all or part of your solution

V.
TEST
Engage in a continuous short-cycle innovation process to continually improve your design



QUESTION/HYPOTHESIS

Test quickly



ITERATE

FOCUS

Exercises

question/hypothesis

STORYBOARDING

THAT MAKES ME THINK OF...

CONNECTIONS

WISHING

S.C.A.M.P.E.R

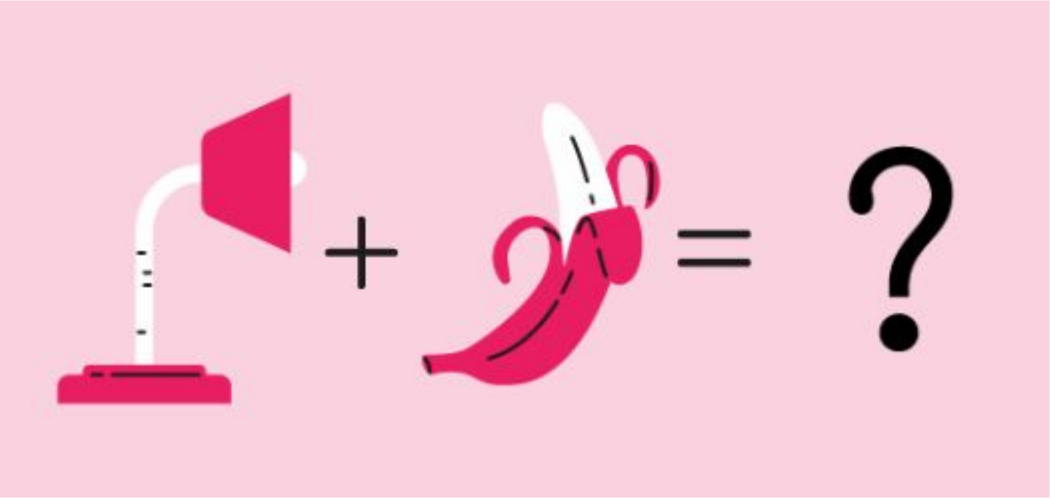
ZERO DRAFT

BRAIN WRITING

QUESTION/HYPOTHESIS

https://blog.hubspot.com/marketing/creative-exercises-better-than-brainstorming

CONNECTIONS



QUESTION/HYPOTHESIS

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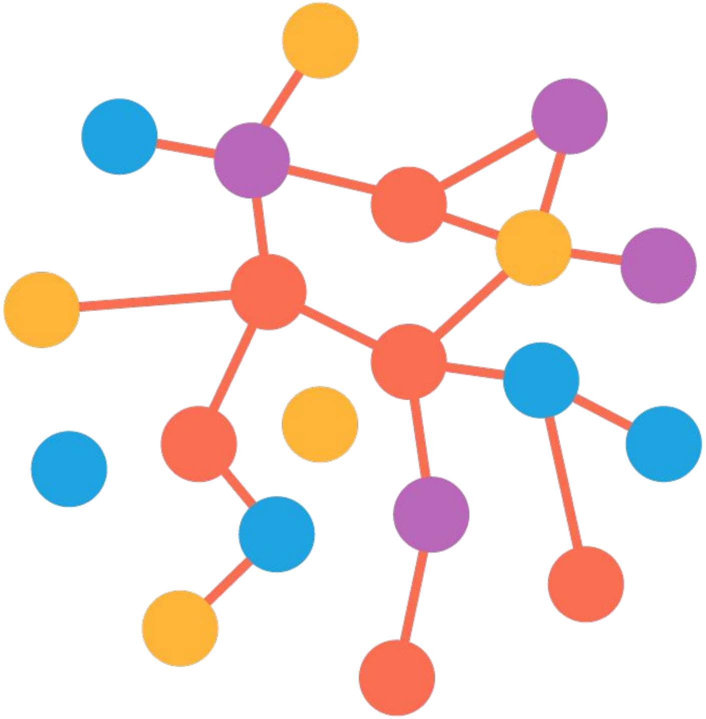
THAT MAKES ME THINK OF...



QUESTION/HYPOTHESIS

https://blog.hubspot.com/marketing/creative-exercises-better-than-brainstorming

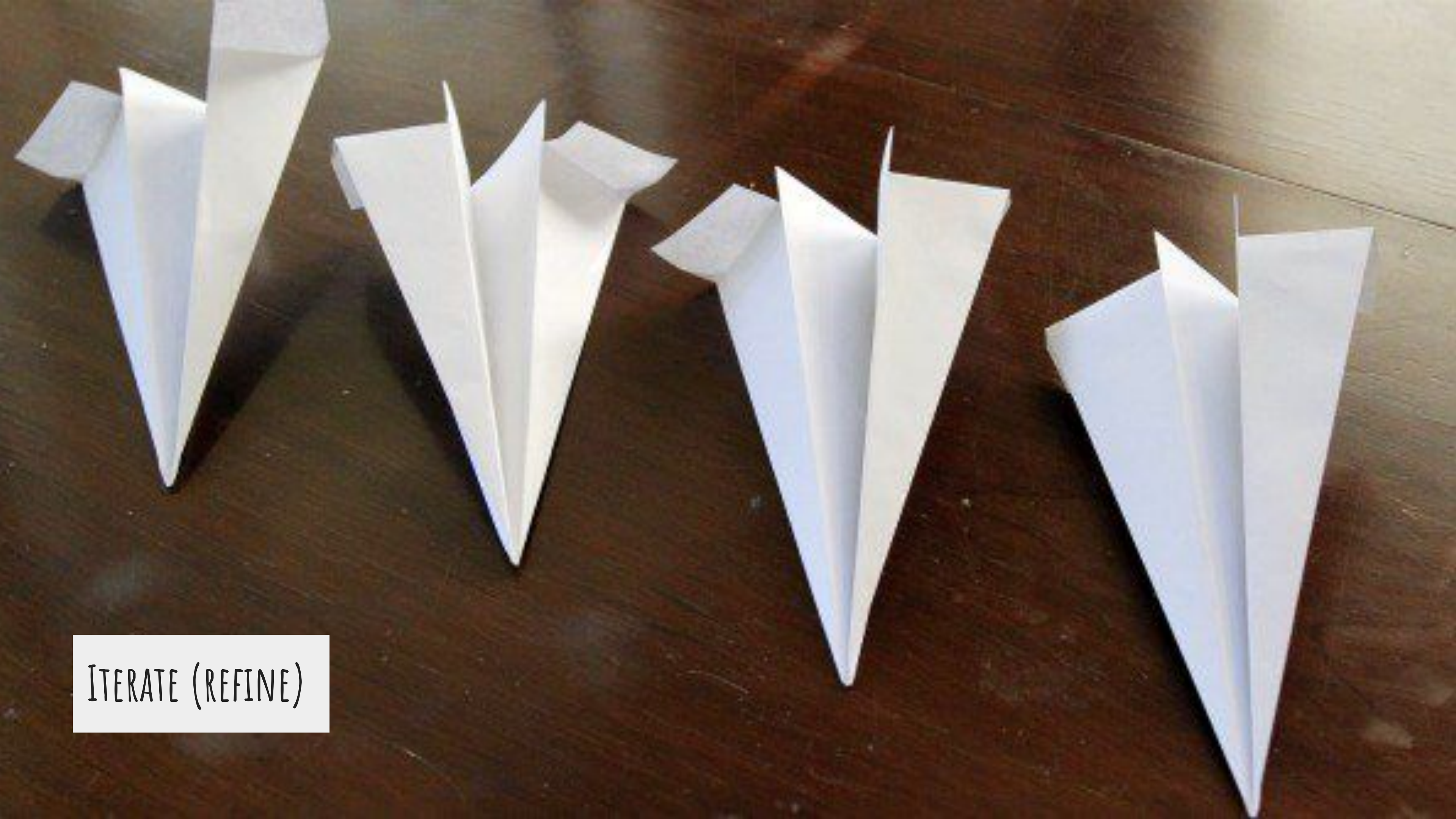
WISHING...

It would be so much easier if we didn't have to worry about (x)...

QUESTION/HYPOTHESIS

https://blog.hubspot.com/marketing/creative-exercises-better-than-brainstorming

Test Quickly



Iterate (refine)

Focus

KNOWING THE CONSTRAINTS!

Charles
Eames

"HERE IS ONE OF THE FEW EFFECTIVE KEYS TO THE DESIGN PROBLEM – THE ABILITY OF THE DESIGNER TO RECOGNIZE AS MANY OF THE **CONSTRAINTS** AS POSSIBLE – HIS WILLINGNESS AND ENTHUSIASM FOR WORKING WITHIN THESE **CONSTRAINTS**. **CONSTRAINTS** OF PRICE, OF SIZE, OF STRENGTH, OF BALANCE, OF SURFACE, OF TIME AND SO FORTH."

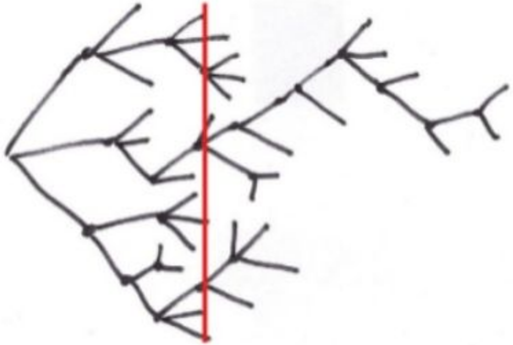
—CHARLES EAMES

Study the Constraints… (and tell them to everyone)

PROTOTYPING TO SORT, ORGANIZE AND FILTER

Without prototyping, you can’t make an educated choice about which ideas to pursue. The purpose of any prototype is to test a concept before committing time and resources.

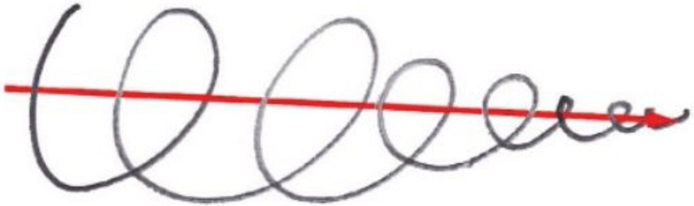
WHY PROTOTYPE?



Design

"Branching Exploration"

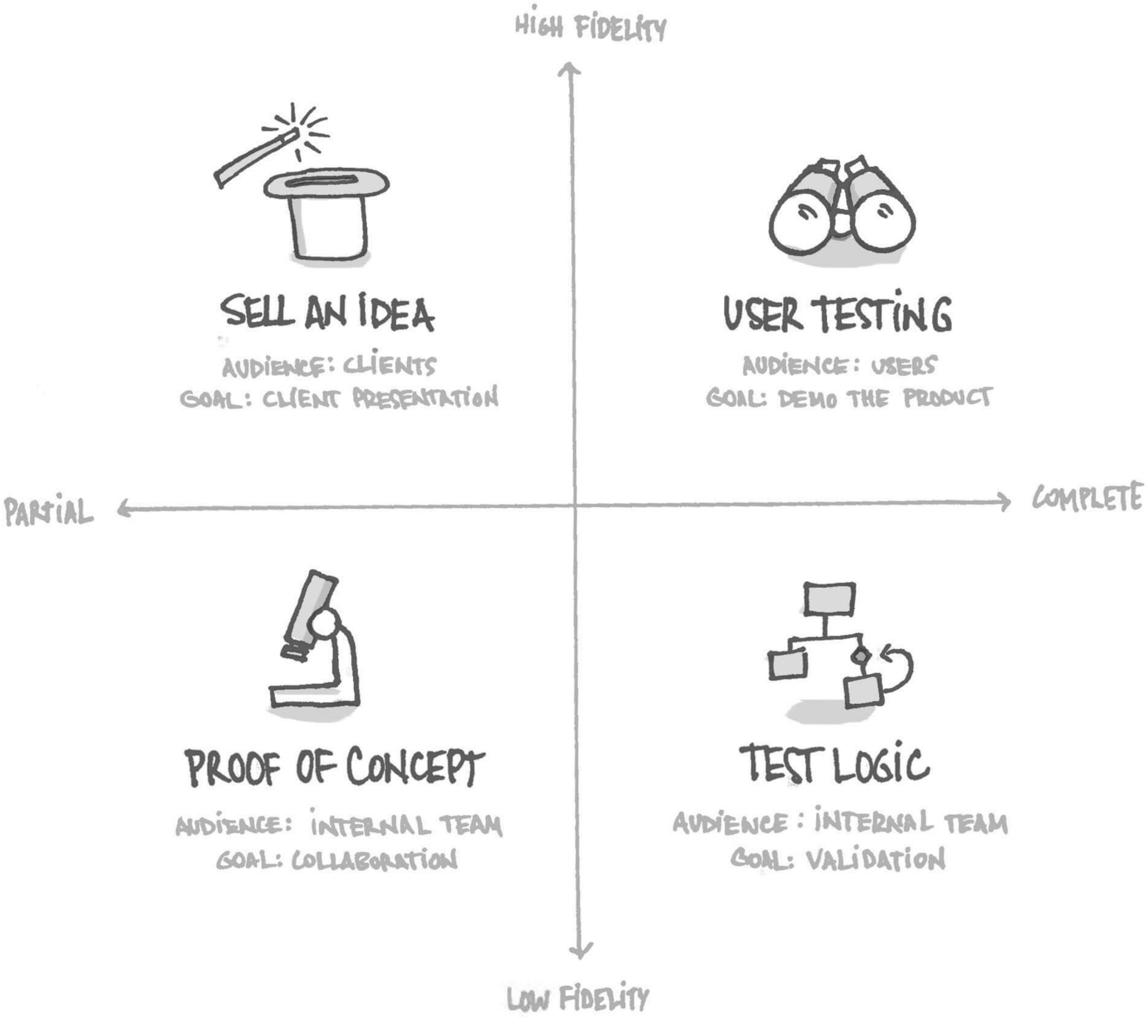
v

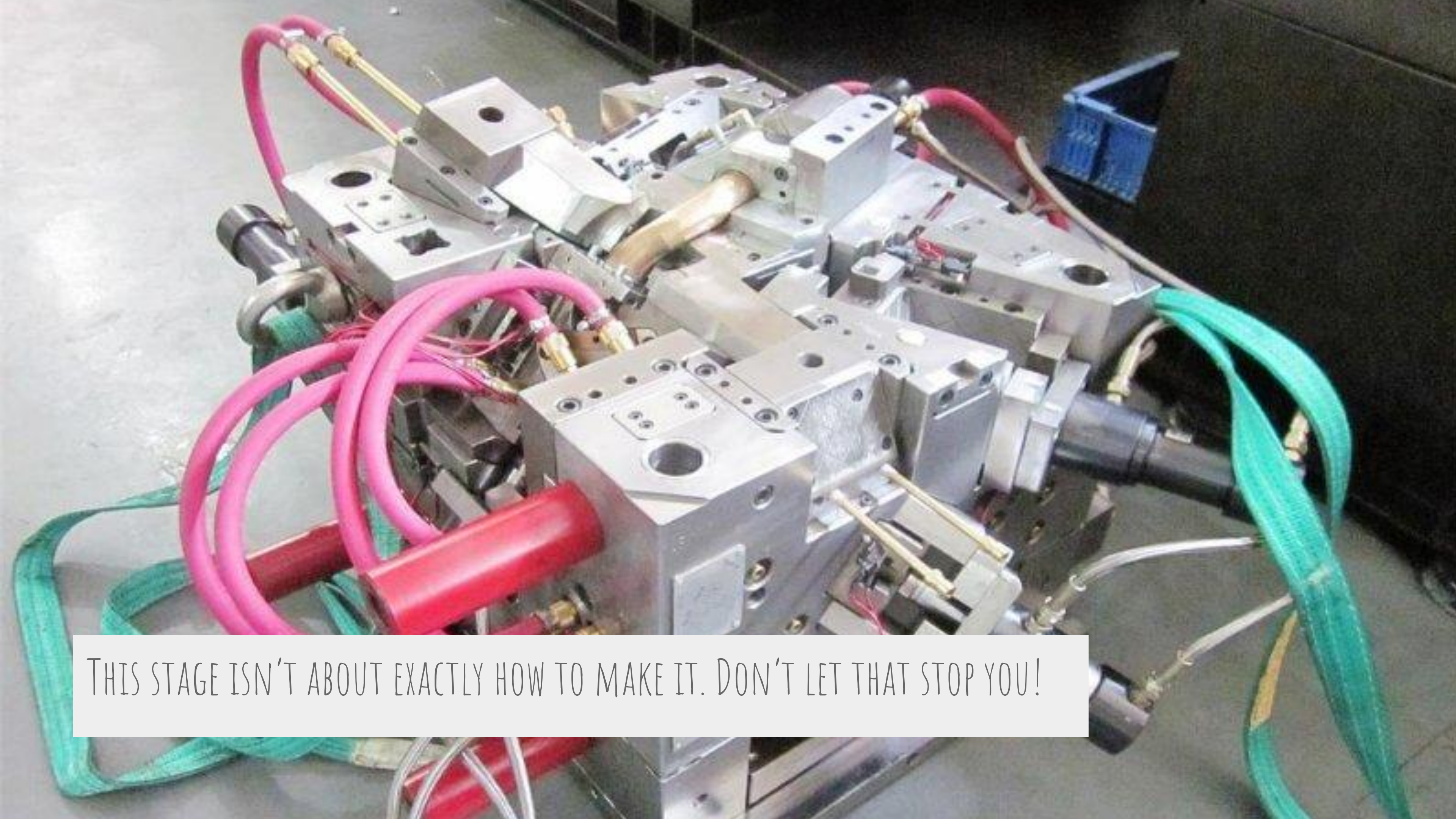


Prototyping

"Incremental iterative refinement"

Bill Buxton, Sketching User Experiences


HIGH FIDELITY
SELL AN IDEA
AUDIENCE: CLIENTS
GOAL: CLIENT PRESENTATION
USER TESTING
AUDIENCE: USERS
GOAL: DEMO THE PRODUCT
PARTIAL
COMPLETE
PROOF OF CONCEPT
AUDIENCE: INTERNAL TEAM
GOAL: COLLABORATION
TEST LOGIC
AUDIENCE: INTERNAL TEAM
GOAL: VALIDATION
LOW FIDELITY



This stage isn't about exactly how to make it. Don't let that stop you!

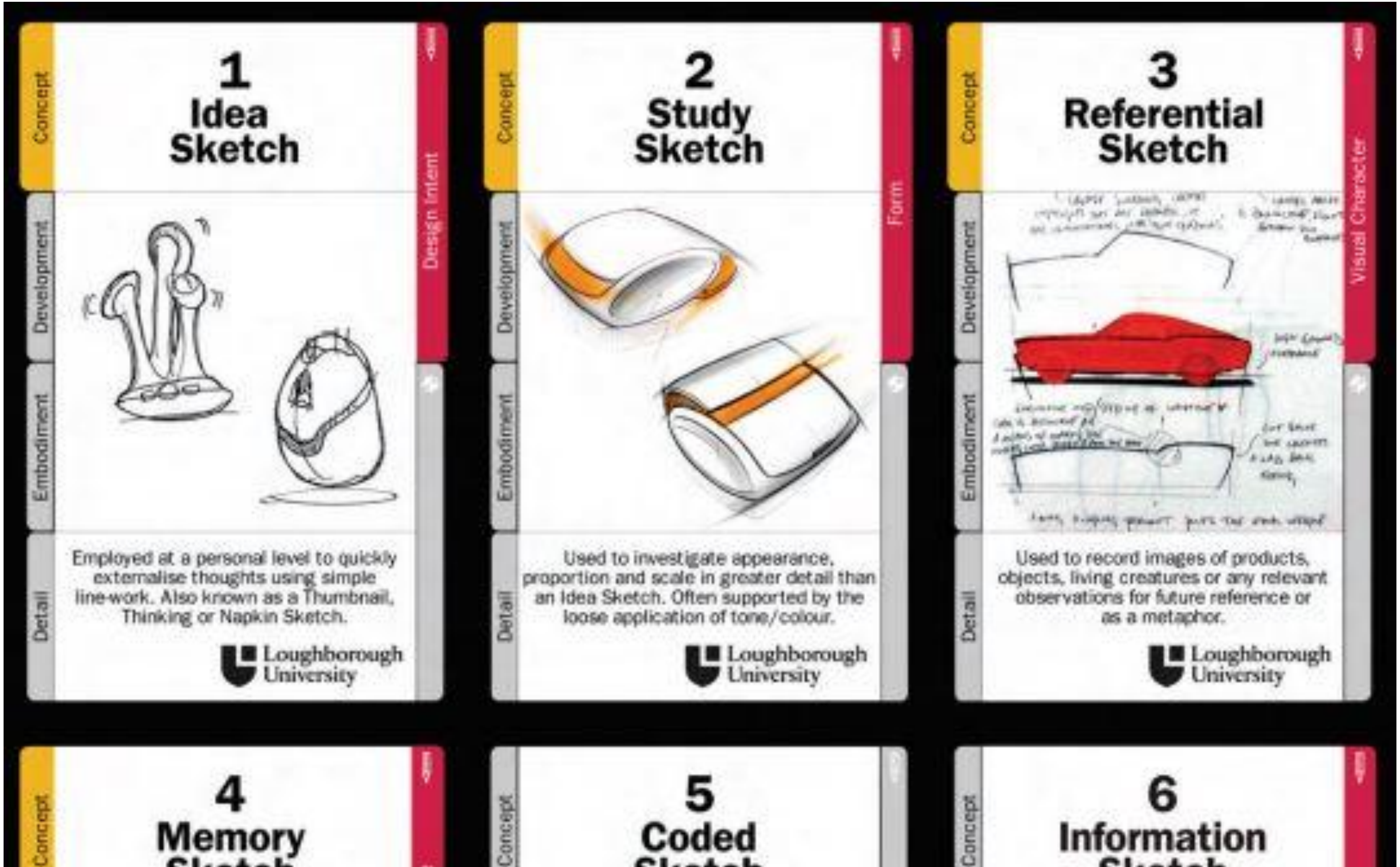
1 Idea Sketch
2 Study Sketch
3 Referential Sketch
4 Memory Sketch
5 Coded Sketch
6 Information Sketch
7 Sketch Rendering
8 Prescriptive Sketch
9 Scenario & Storyboard
10 Layout Rendering
11 Presentation Rendering
12 Diagram
13 Perspective Drawing
14 General Arrangement Drawing
15 Detail Drawing
16 Technical Illustration
Loughborough Design School
iD CARDS
www.lboro.ac.uk/ids

THE BEST OVERVIEW OF PROTOTYPES EVER

iD Cards- Loughborough University, 2009

Download the pdf and app

http://www.lboro.ac.uk/media/wwwlboroacuk/external/content/schoolsanddepartments/designschool/downloads/id-cards%20(1).pdf



1
Idea Sketch

Employed at a personal level to quickly externalise thoughts using simple line-work. Also known as a Thumbnail, Thinking or Napkin Sketch.

2
Study Sketch

Used to investigate appearance, proportion and scale in greater detail than an Idea Sketch. Often supported by the loose application of tone/colour.

3
Referential Sketch

Used to record images of products, objects, living creatures or any relevant observations for future reference or as a metaphor.

4
Memory

5
Coded

6
Information

Concept
Development
Embodiment
Detail
Design Intent
Form
Visual Character
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Concept

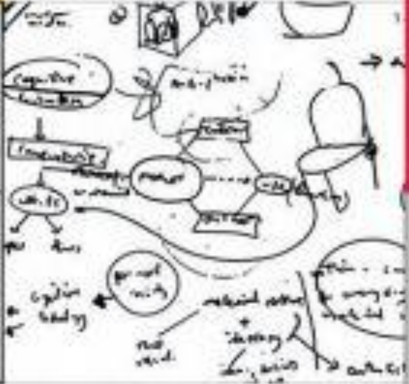
Development

Embodiment

Detail

4
Memory Sketch

Scenario of Use



Helps expand thoughts during the design process using mind maps, notes and annotations.

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Concept

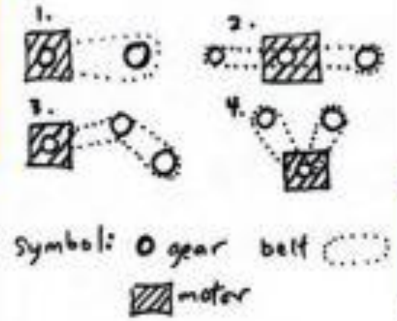
Development

Embodiment

Detail

5
Coded Sketch

Components



Informal coded representation that categorises information to demonstrate an underlying principle or scheme.

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Concept

Development

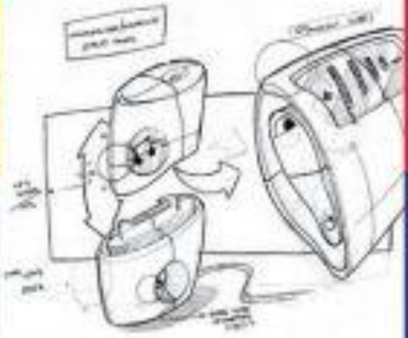
Embodiment

Detail

6
Information Sketch

Design Intent

Construction



Quickly and effectively communicates features through the use of annotation and supporting graphics. Also known as an Explanatory or Talking Sketch.

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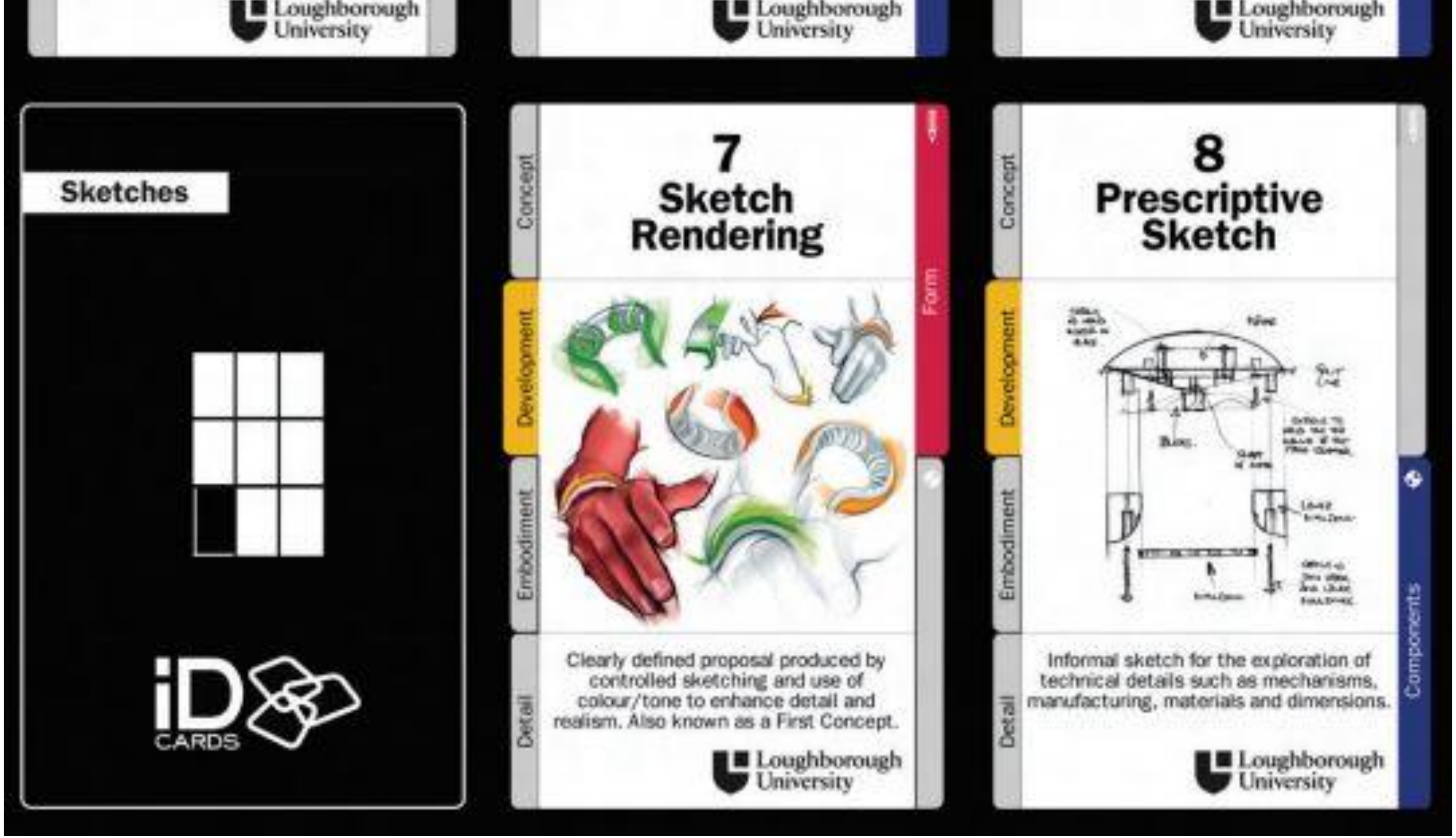
Sketches

Concept

7
Sketch

Concept

8
Prescriptive

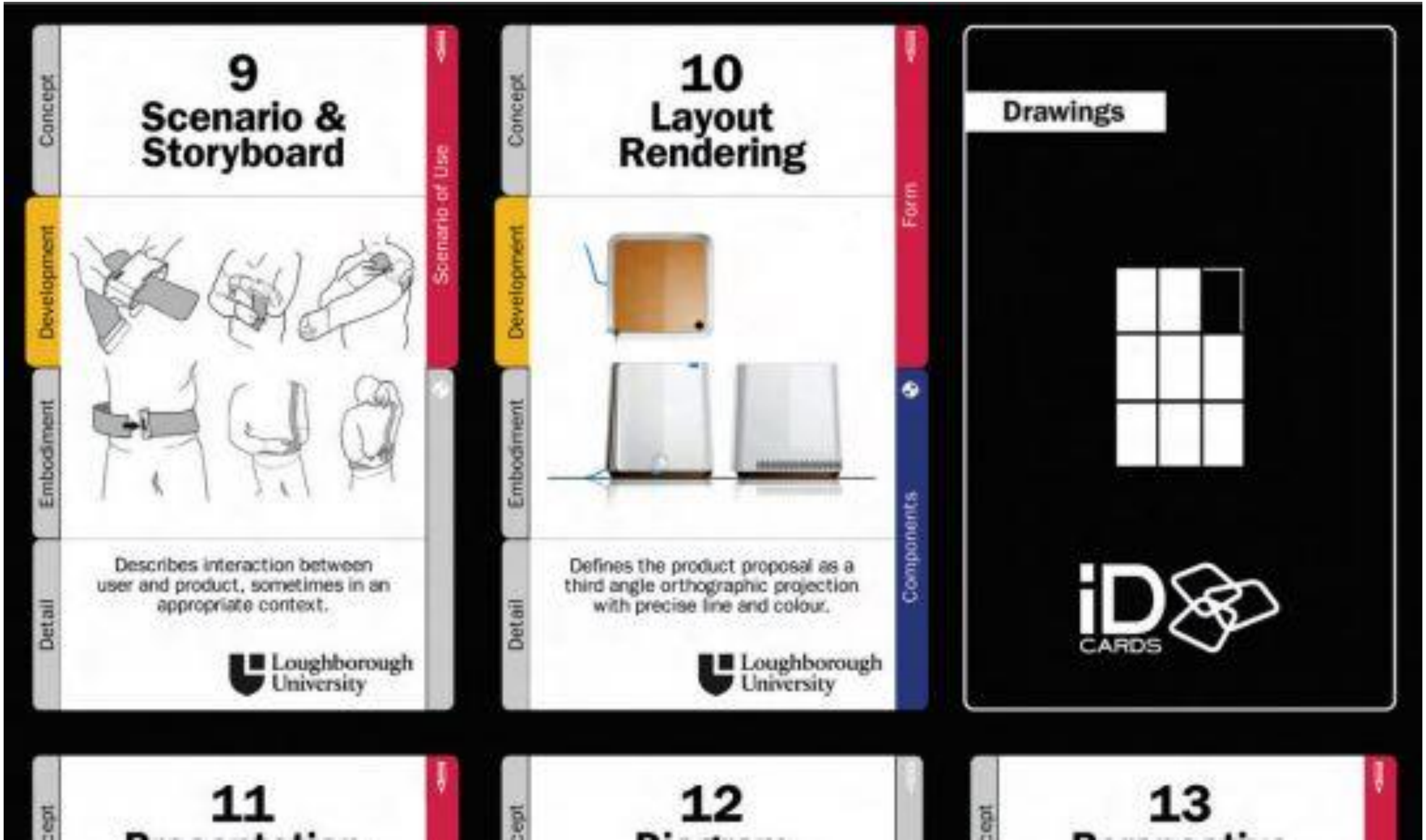

Sketches
iD CARDS
Concept
Development
Embodiment
Detail
Form
Components

7
Sketch Rendering

Clearly defined proposal produced by controlled sketching and use of colour/tone to enhance detail and realism. Also known as a First Concept.

8
Prescriptive Sketch

Informal sketch for the exploration of technical details such as mechanisms, manufacturing, materials and dimensions.



9

Scenario & Storyboard

Describes interaction between user and product, sometimes in an appropriate context.

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10

Layout Rendering

Defines the product proposal as a third angle orthographic projection with precise line and colour.

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Drawings

iD CARDS

11

12

13

Concept
Development
Embodiment
Detail
Scenario of Use
Concept
Development
Embodiment
Detail
Form
Components

appropriate content.

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with precise line and colour.

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ID CARDS

Concept
Development
Embodiment
Detail

Form

11
Presentation Rendering

Contains a high level of realism to fully define product appearance as a perspective view. Particularly useful for decision making by non-designers.

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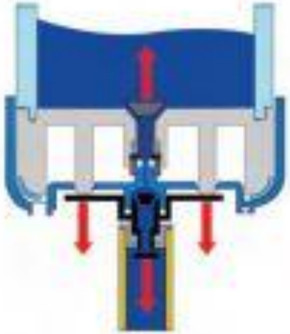
Concept
Development
Embodiment
Detail

Components

12
Diagram



Schematic representation of the operating principle or relationship between components. Also known as a Schematic or Diagrammatic Drawing.

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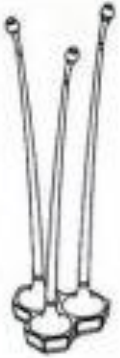
Concept
Development
Embodiment
Detail

Form

13
Perspective Drawing



Descriptive three-quarter view produced using a perspective drawing technique. Created using line only without the application of colour or tone.

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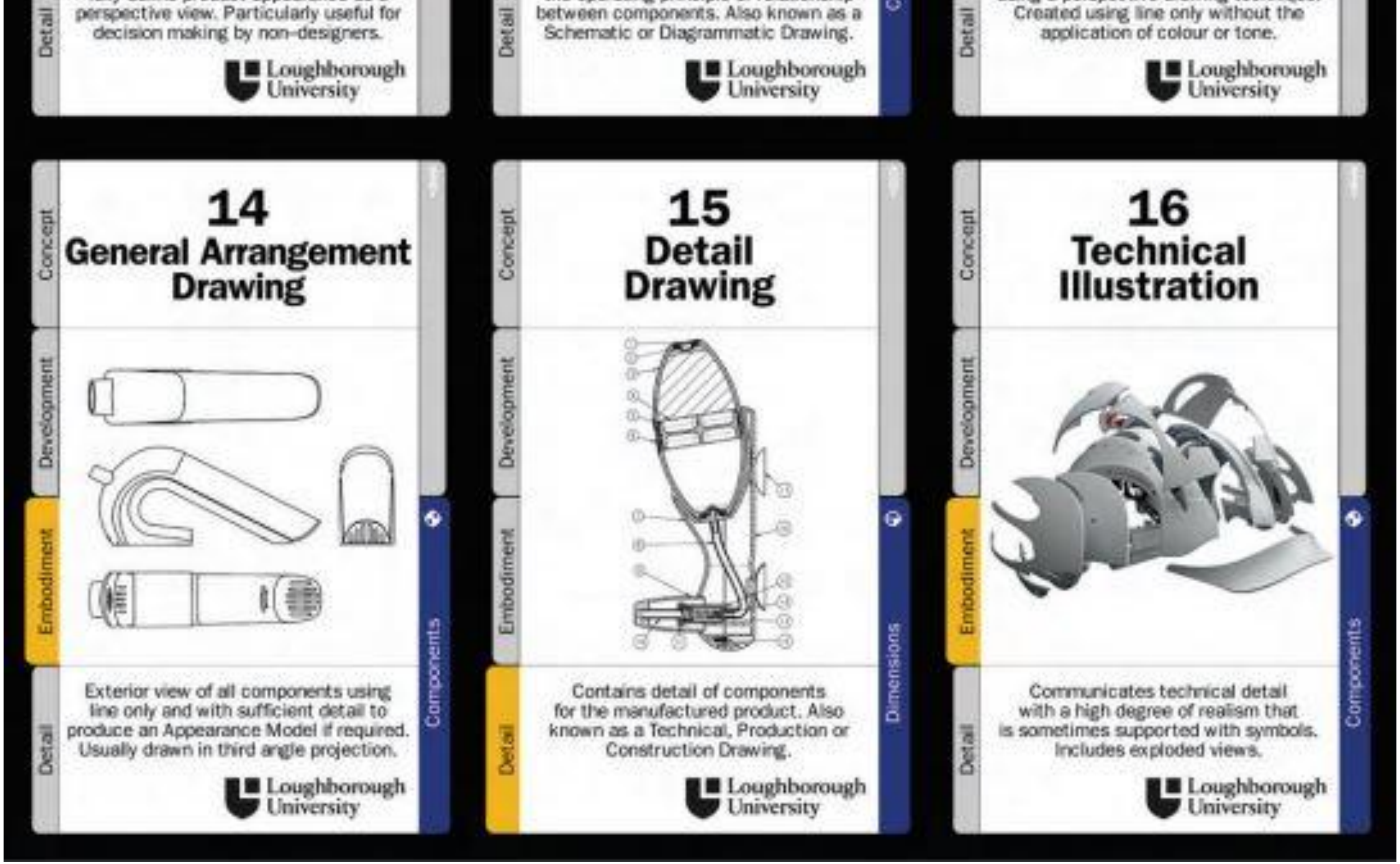
14
General Arrangement

15
Detail

16
Technical


perspective view. Particularly useful for decision making by non-designers.

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between components. Also known as a Schematic or Diagrammatic Drawing.

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Created using line only without the application of colour or tone.

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14

General Arrangement Drawing

Exterior view of all components using line only and with sufficient detail to produce an Appearance Model if required. Usually drawn in third angle projection.

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15

Detail Drawing

Contains detail of components for the manufactured product. Also known as a Technical, Production or Construction Drawing.

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16

Technical Illustration

Communicates technical detail with a high degree of realism that is sometimes supported with symbols. Includes exploded views.

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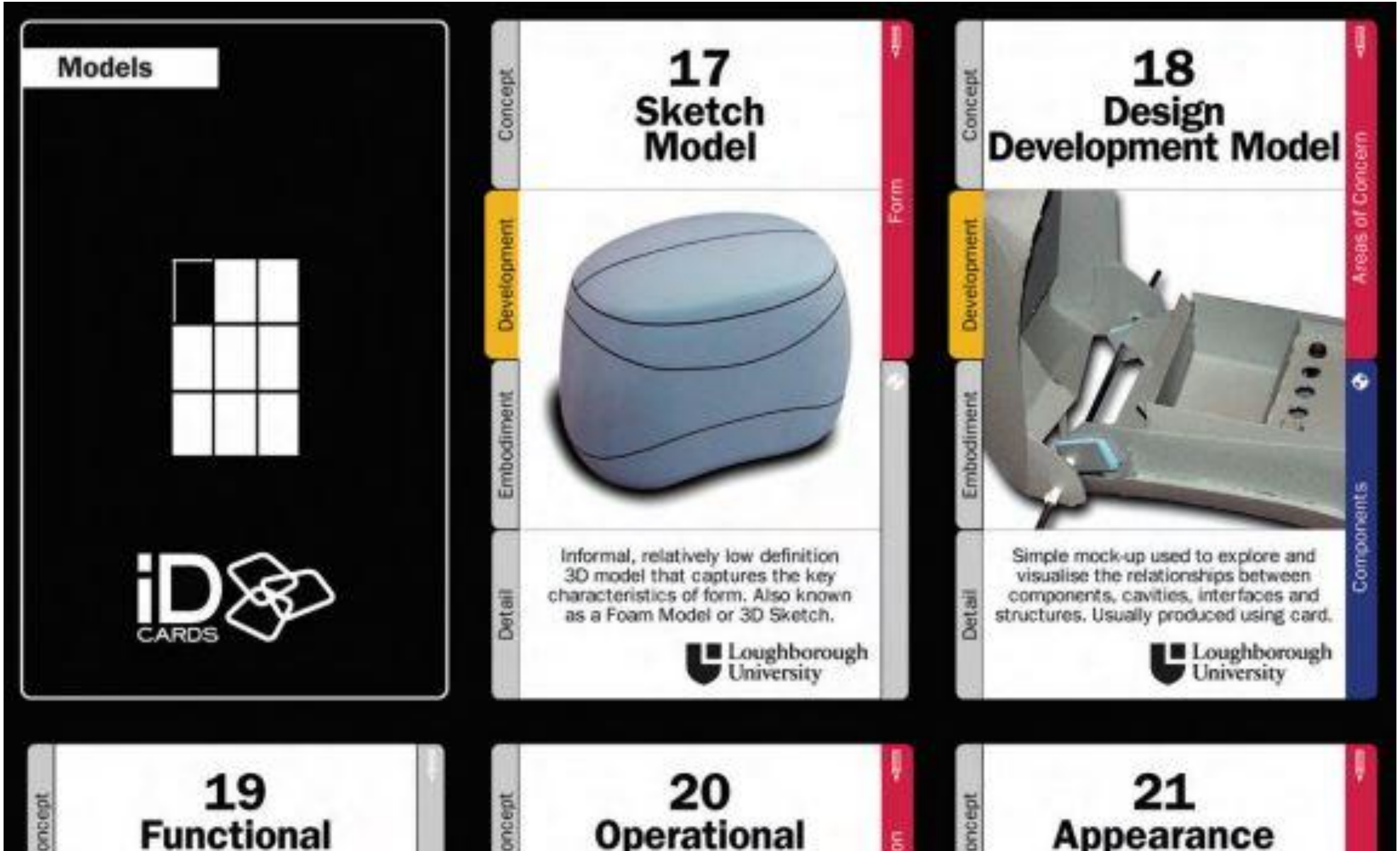


Models
iD
CARDS
Concept
Development
Embodiment
Detail
Form
Areas of Concern
Components
Loughborough University

17
Sketch Model

Informal, relatively low definition 3D model that captures the key characteristics of form. Also known as a Foam Model or 3D Sketch.

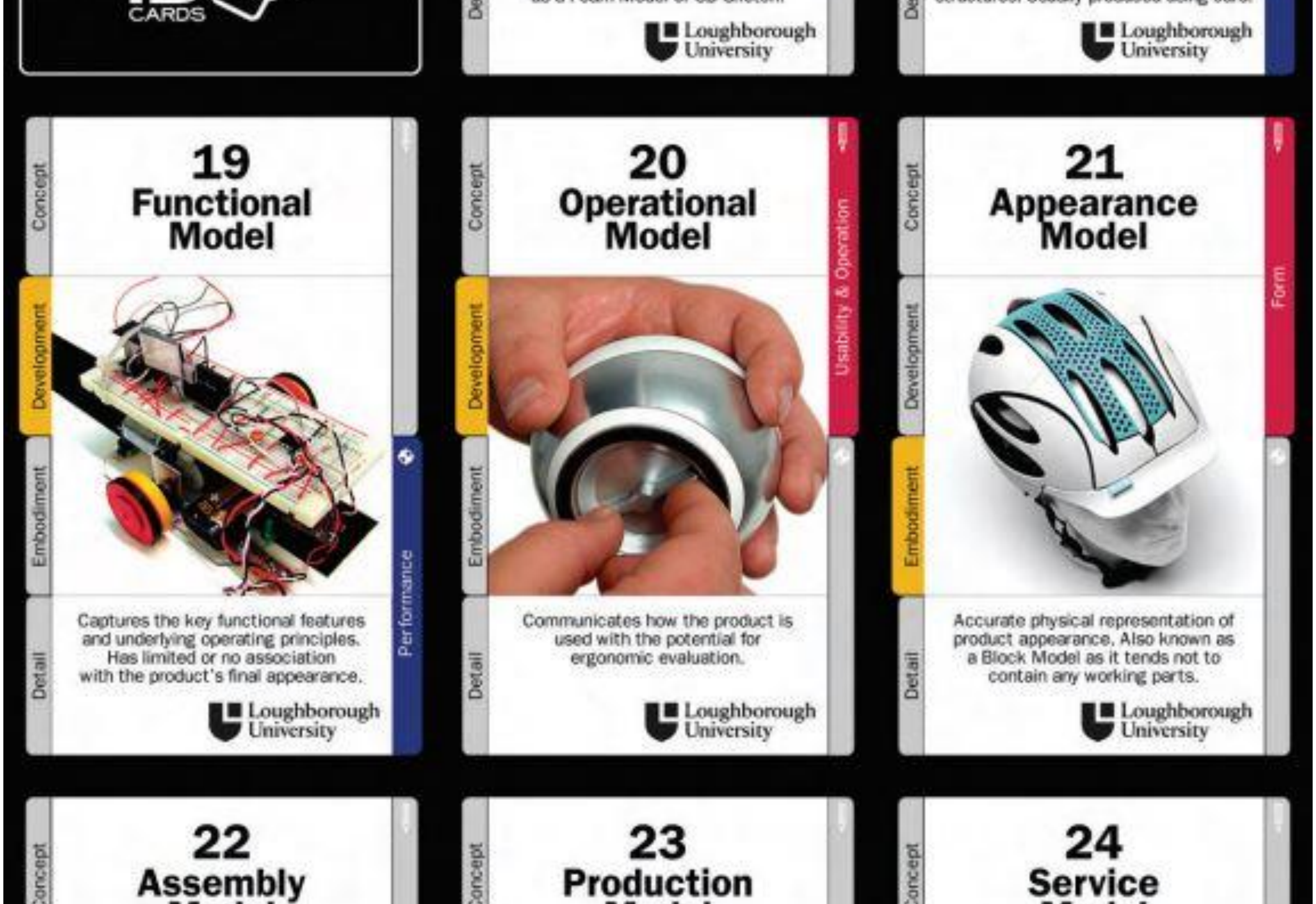
18
Design Development Model

Simple mock-up used to explore and visualise the relationships between components, cavities, interfaces and structures. Usually produced using card.

19
Functional

20
Operational

21
Appearance


CARDS
Loughborough University
Loughborough University
Concept
Development
Embodiment
Detail
Performance
Usability & Operation
Form

19
Functional Model

Captures the key functional features and underlying operating principles. Has limited or no association with the product's final appearance.

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20
Operational Model

Communicates how the product is used with the potential for ergonomic evaluation.

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21
Appearance Model

Accurate physical representation of product appearance. Also known as a Block Model as it tends not to contain any working parts.

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22
Assembly

23
Production

24
Service

and underlying operating principles. Has limited or no association with the product's final appearance.

Detail

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used with the potential for ergonomic evaluation.

Detail

Loughborough University

product appearance. Also known as a Block Model as it tends not to contain any working parts.

Detail

Loughborough University

22
Assembly Model

Concept

Development

Embodiment

Assembly

Enables the evaluation and development of the methods and tools required to assemble product components.

Detail

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23
Production Model

Concept

Development

Embodiment

Construction

Used to evaluate and develop the location and fit of individual components and sub-assemblies.

Detail

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24
Service Model

Concept

Development

Embodiment

Assembly

Supports the development and demonstration of how a product is serviced and maintained.

Detail

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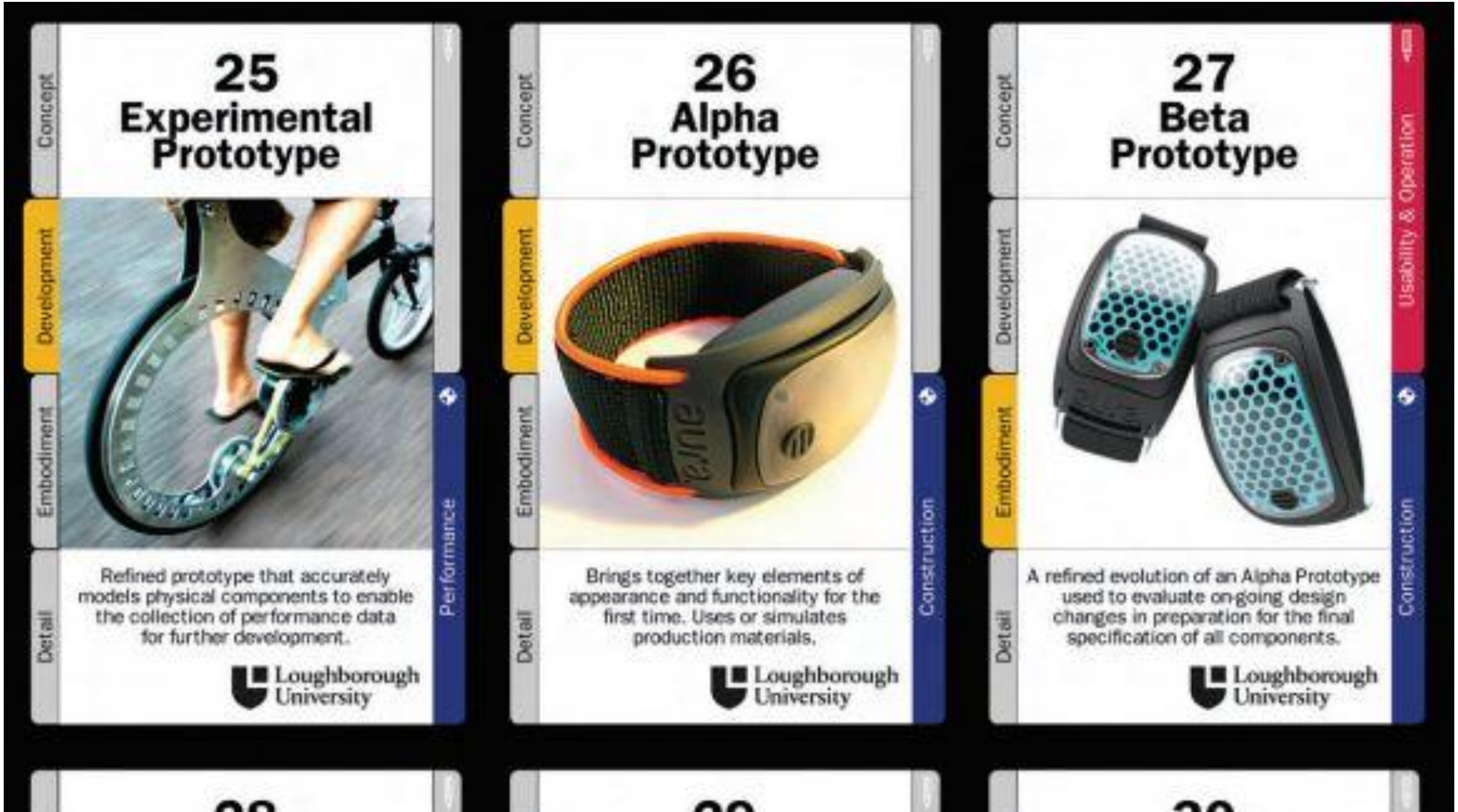
Concept
Development
Embodiment
Detail
Performance
Construction
Usability & Operation
Loughborough University

25
Experimental Prototype

Refined prototype that accurately models physical components to enable the collection of performance data for further development.

26
Alpha Prototype

Brings together key elements of appearance and functionality for the first time. Uses or simulates production materials.

27
Beta Prototype

A refined evolution of an Alpha Prototype used to evaluate on-going design changes in preparation for the final specification of all components.

Detail

models physical components to enable the collection of performance data for further development.

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Detail

appearance and functionality for the first time. Uses or simulates production materials.

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Detail

used to evaluate on-going design changes in preparation for the final specification of all components.

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28
System Prototype

Concept
Development
Embodiment
Detail
Performance

Integrates components specified for the production item without consideration of appearance. Used to evaluate electronic and mechanical performance.

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29
Final Hardware Prototype

Concept
Development
Embodiment
Detail
Performance

Developed from the System Prototype as a final representation of the product's functional elements.

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30
Off-Tool Component

Concept
Development
Embodiment
Detail
Materials

Produced using the tooling and materials intended for production to enable the evaluation of material properties and appearance of components.

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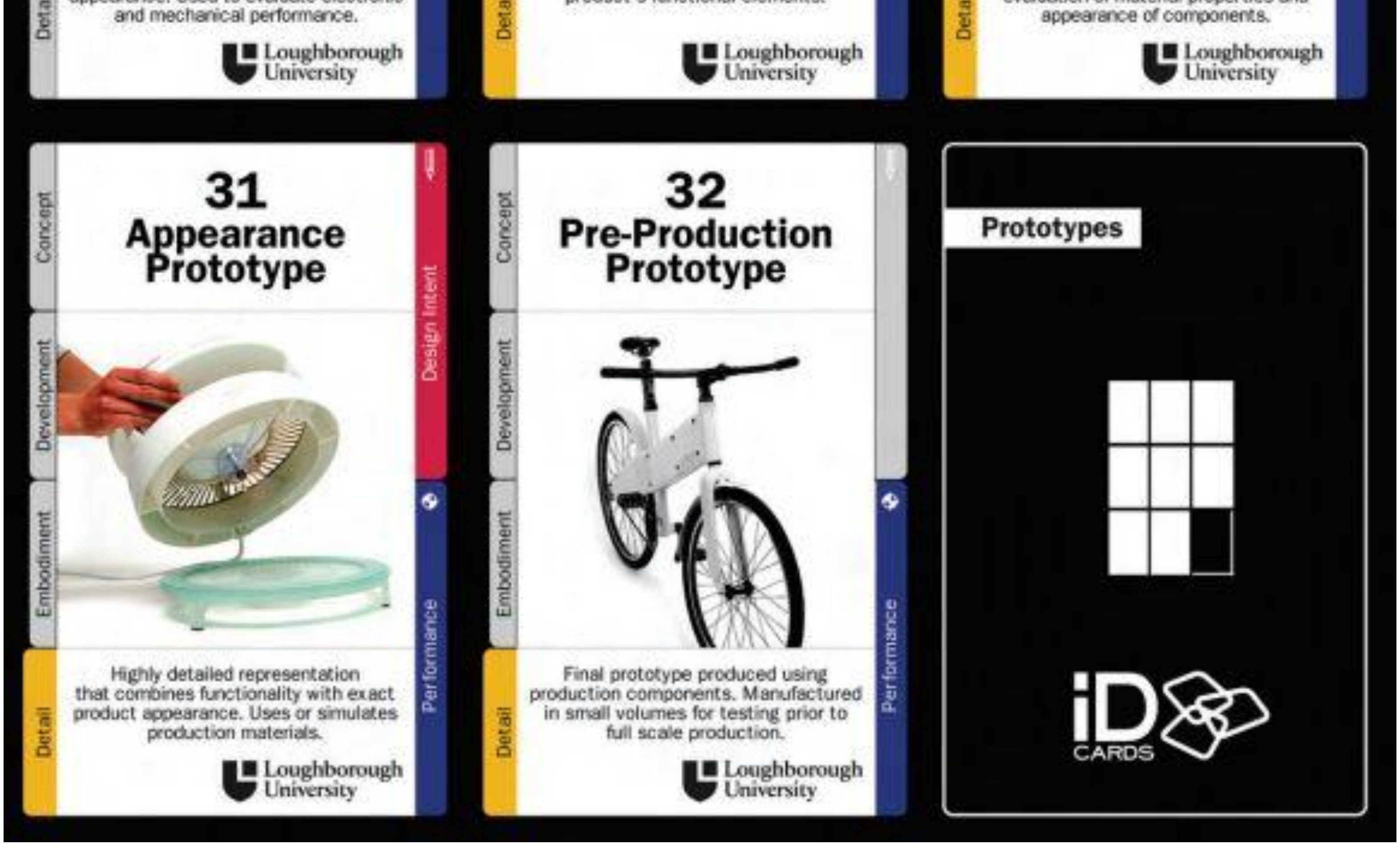
31

32


Detail
Concept
Development
Embodiment
Design Intent
Performance

and mechanical performance.

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Loughborough University

appearance of components.

Loughborough University

31
Appearance Prototype

Highly detailed representation that combines functionality with exact product appearance. Uses or simulates production materials.

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32
Pre-Production Prototype

Final prototype produced using production components. Manufactured in small volumes for testing prior to full scale production.

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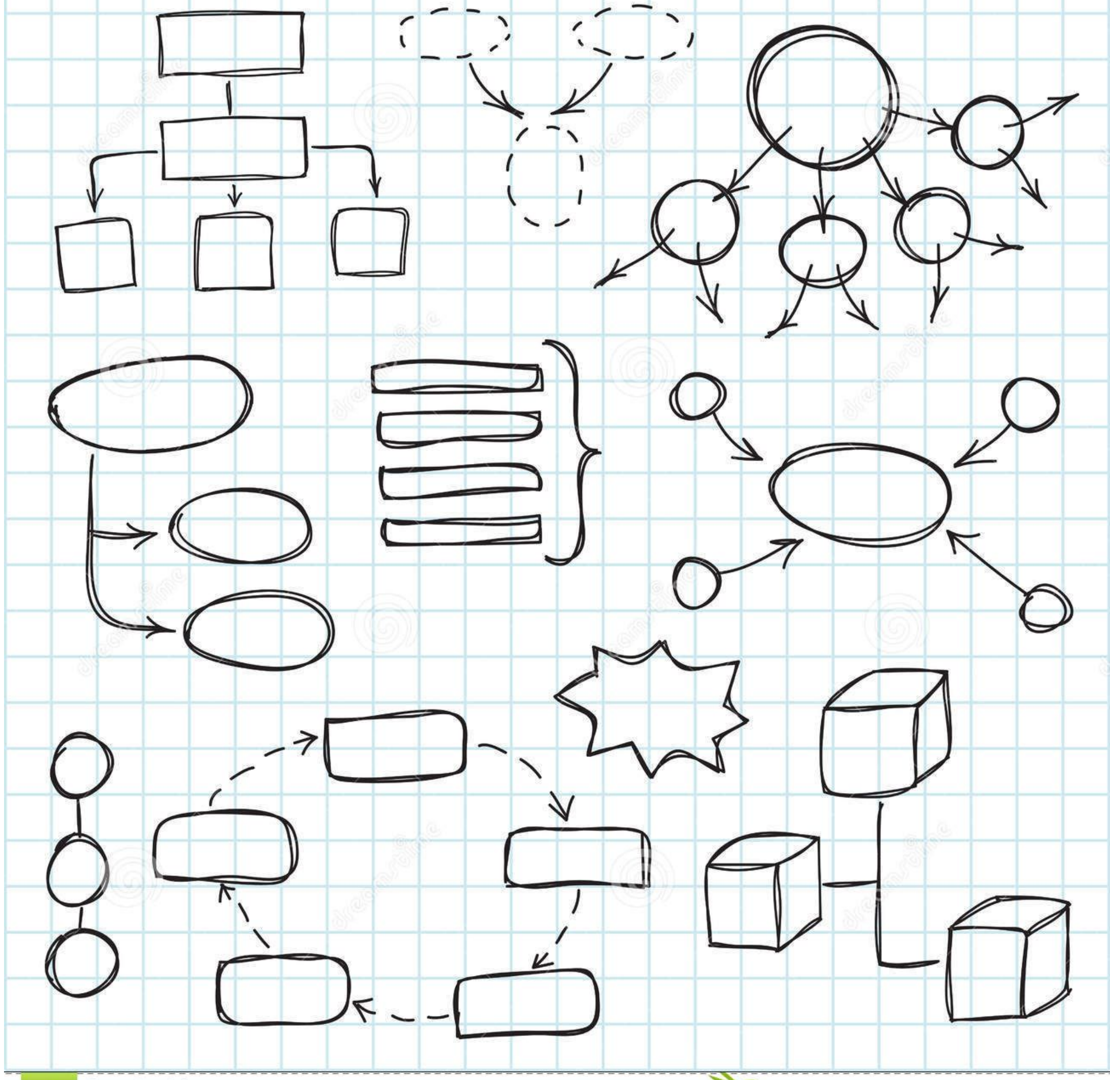
Prototypes

iD CARDS

Drawing

START DRAWING

MIND MAPS, FLOW CHARTS, IDEA SKETCHES,



Physical Prototypes

Build it (craft Time)

Hex Nut
Carriage Bolt
Lag Screw
Eye Bolt with Nut
5/16" x 1-1/2" 70¢
1/4" 26¢
1/4" x 1" 63¢
1/4" x 1-1/2" 71¢
5/16" x 1" 90¢
5/16" x 2" $1.05
1/4" x 1" 56¢
5/16" x 2" $1.36
3/8" x 1-1/2" $1.40
1/4" x 4" 48¢

Off-The-Shelf

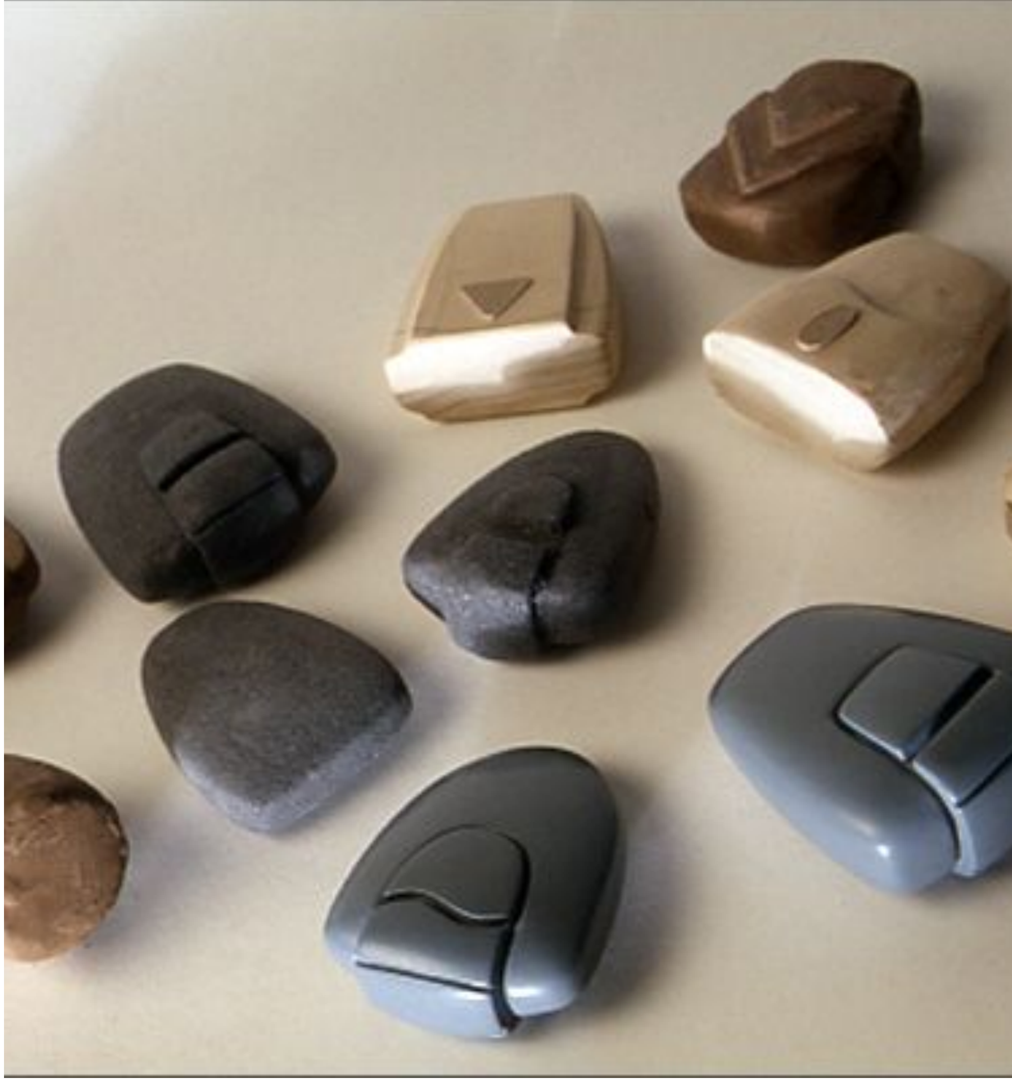
Buy Things that are similar and take them apart!

CARDBOARD

PAPER, TAPE, STAPLES, SCISSORS

Sculpey, Clay, Play-doh

Model the whole shape, or just use to refine curves

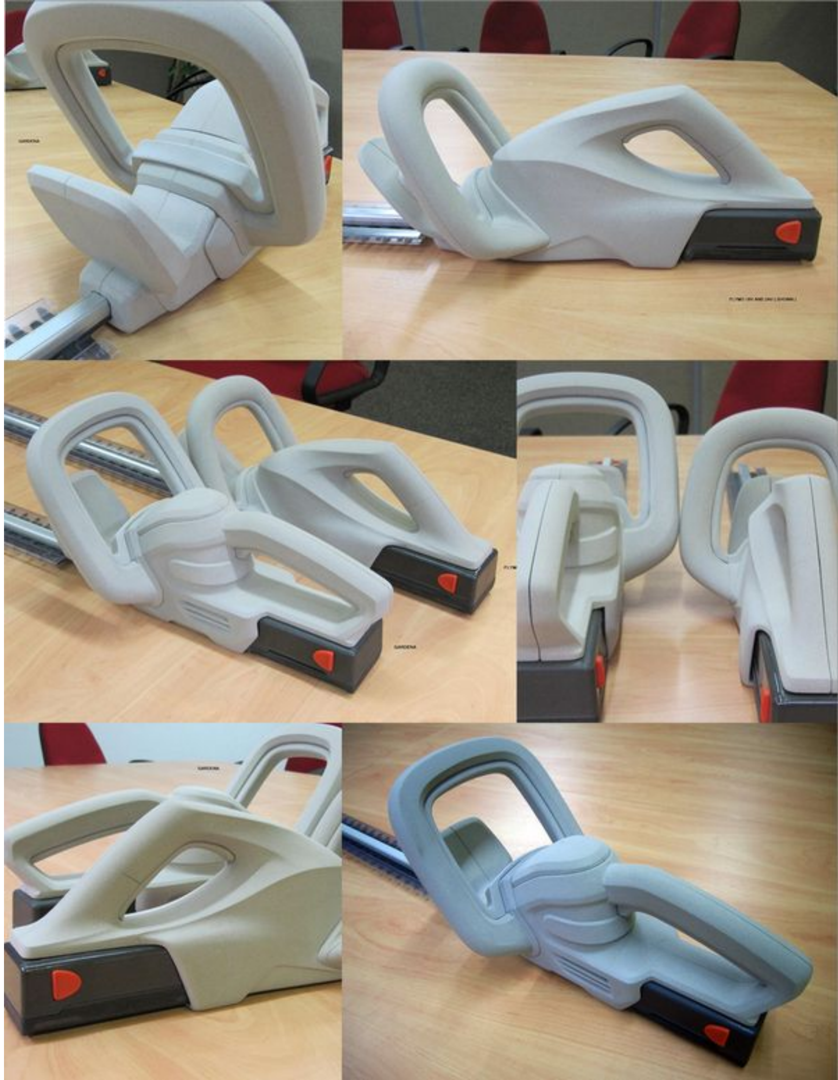


They even design cars in clay!

FOAM

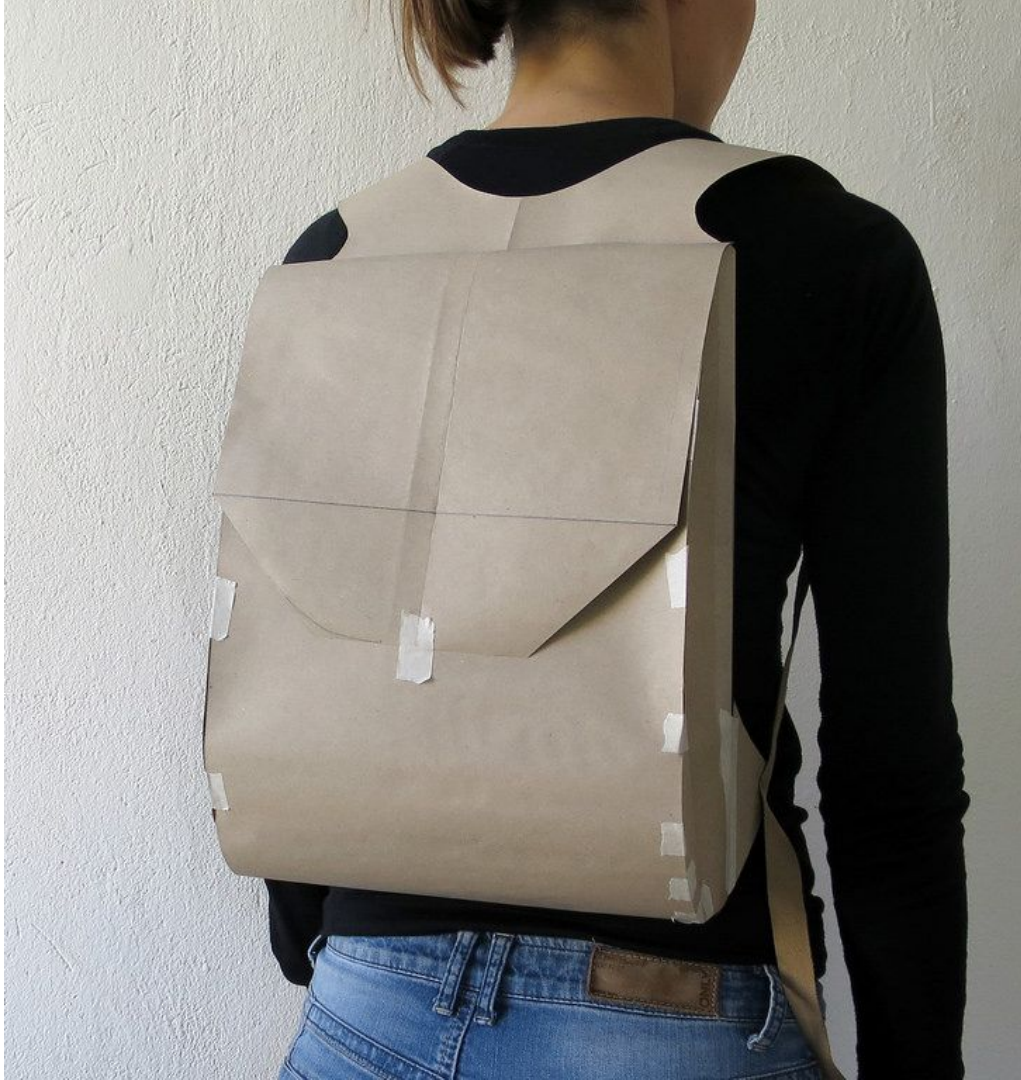
Green or pink foam insulation at home Depot

High Density Carving Foam



Softgoods prototyping

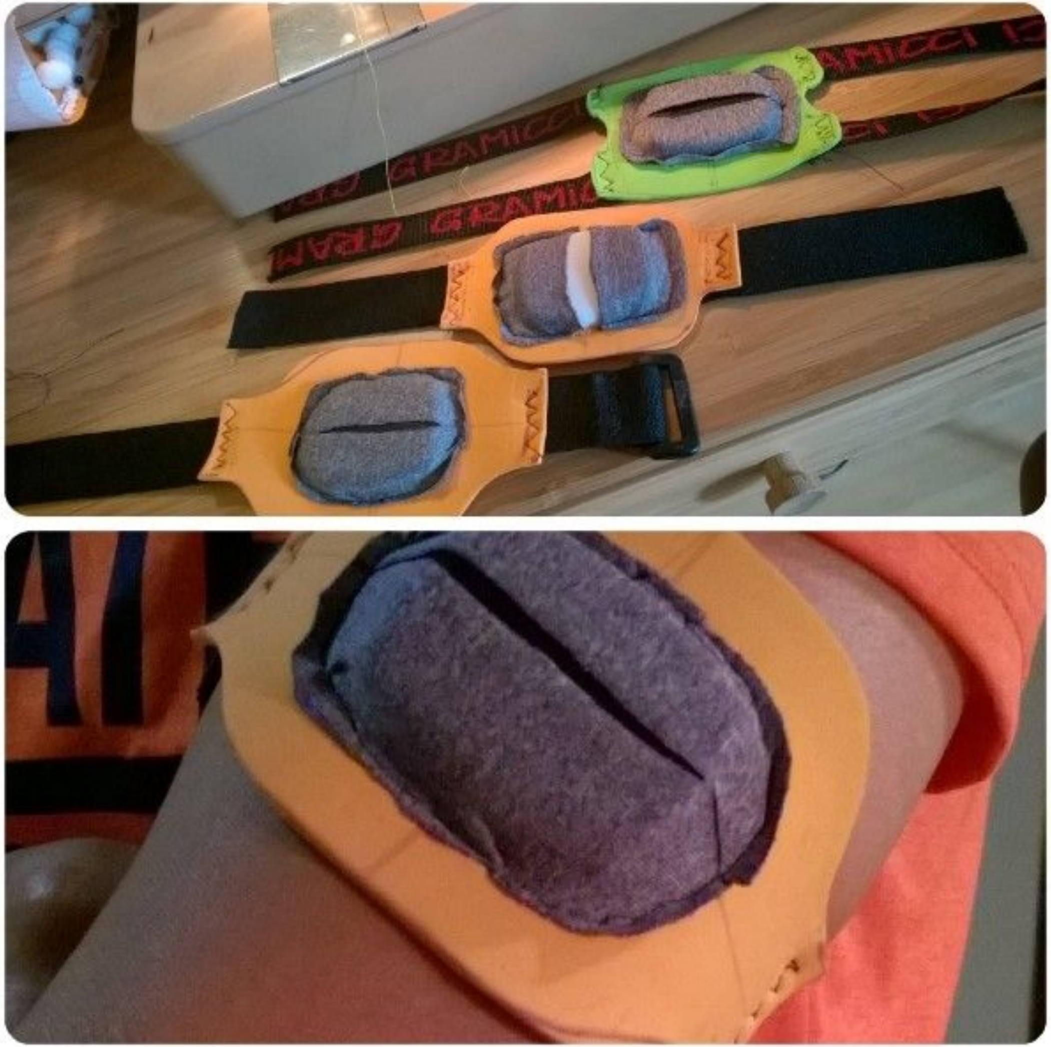
Paper, Tape, Staples, scissors



Softgoods prototyping

Fabric

If you can't sew, use staples or tape



Next Level Prototypes

CAD Model

Computer Assisted Design

Solidworks, pro E, Rhino

50 hrs + Specialized expertise

Computer Renderings

Photorealistic models

Agree on Colors, materials, textures.

Logo Placement
branding

3D PRINTING

AMAZING RESOLUTION

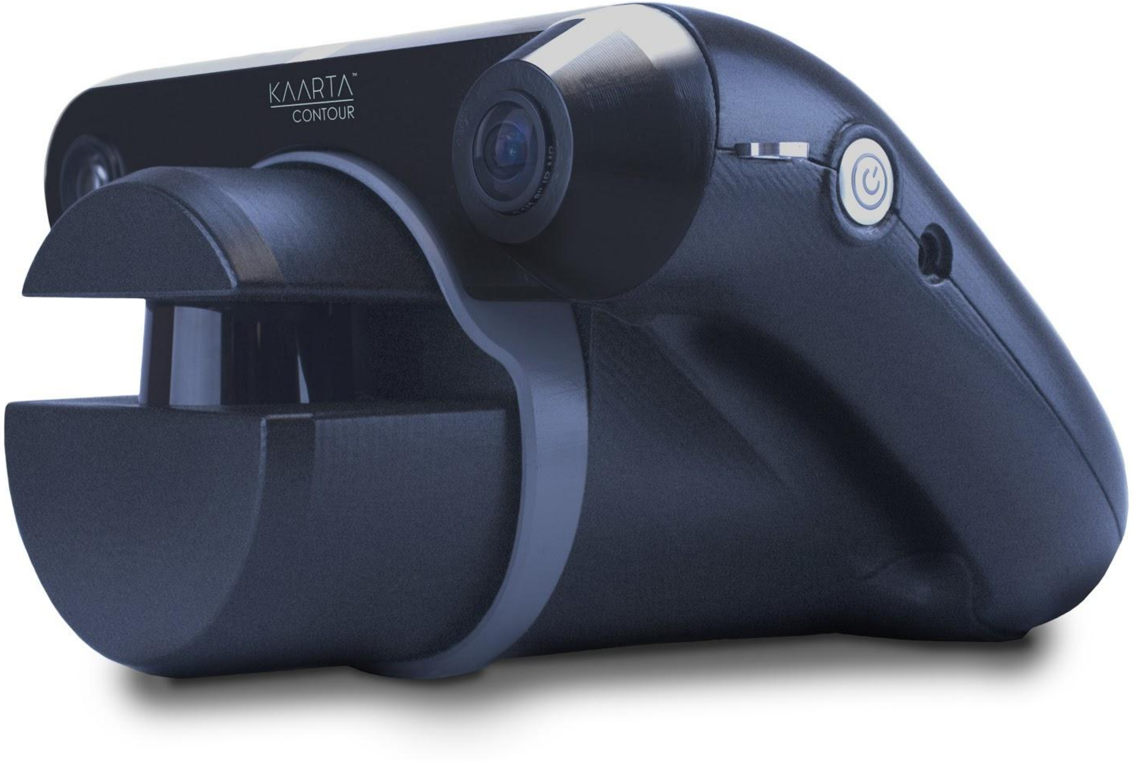
SHOULD BE LATE IN THE PROCESS

Painted appearance model

Complete model

Size, shape, color

Sometimes working


KAARTA™
CONTOUR

Invisible Prototypes

Acting it out

Great for services, processes, and interactions

7-14-28

Make a peanut butter sandwich in 7 steps.
Then make it in 14.
Then in 28.

Continue to delve deeper to understand connections and get new insights

SCALE!

SCALE

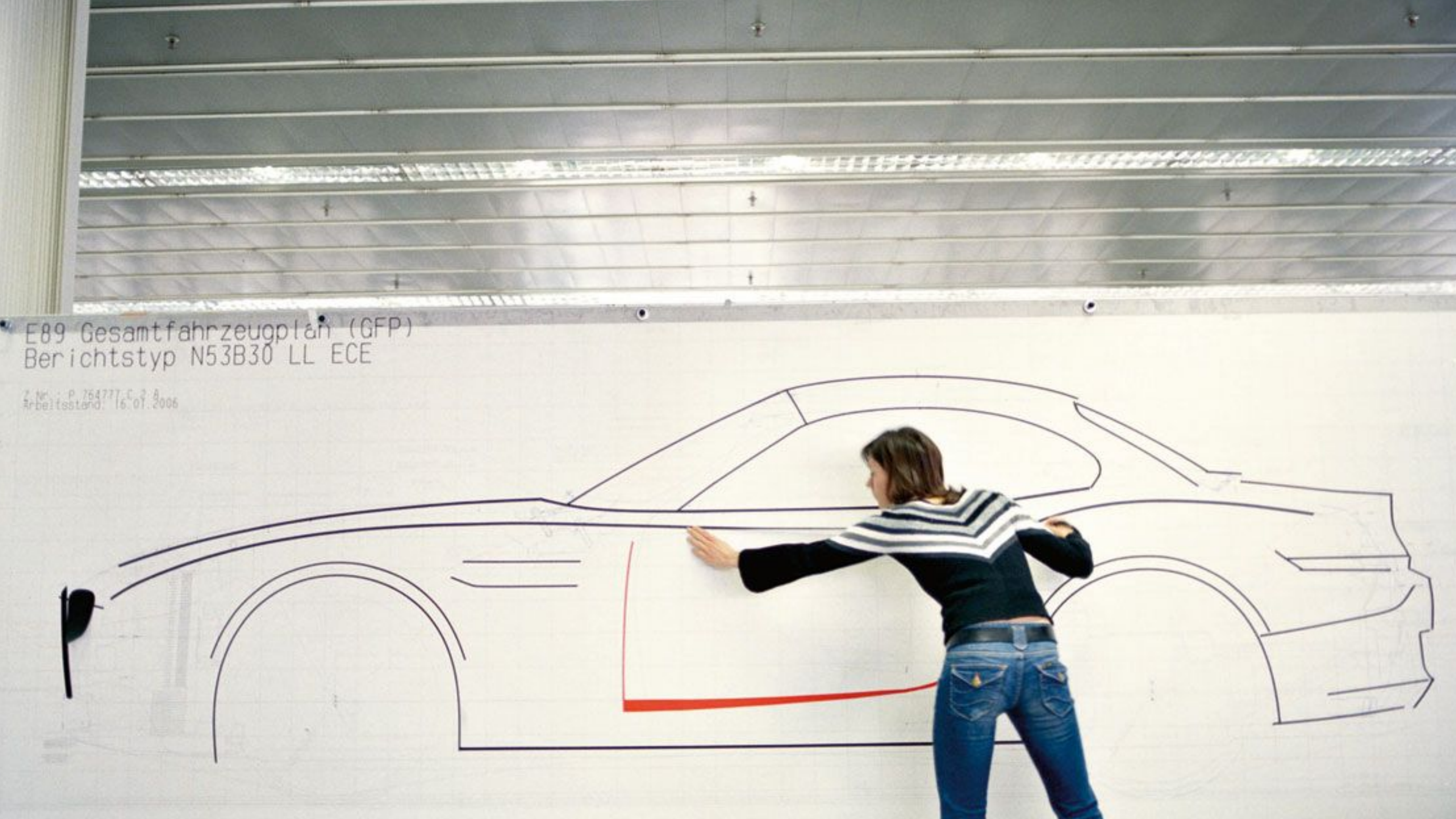
PROTOTYPES DON'T ALWAYS HAVE TO BE IN SCALE.

wORKING 1:1 DOES HELP UNDERSTANDING MUCH DEEPER THOUGH

SCALE

If your concept is a display, stand, or area, tape it off.

Live in it…
Act out interactions…


E89 Gesamtfahrzeugplan (GFP)
Berichtstyp N53B30 LL ECE
Z.Nr.: P 764777 C 2 A
Arbeitsstand: 16.01.2006

Human Scale

Humans will use your product so start making them hold it.

Tape it to them!

Put it in a box and have them open it and assemble

RAVPOWER
ENSURE DC OUTPUT IS SET TO 19 VDC BEFORE CONNECTING TO STENCIL
PITTSBURGH

Get it in people's hands

You know who knows how to Break stuff?

Have hard conversations. Be Honest.

Talk to the Vendor

You know who knows how to make stuff?

2 ABSOLUTES OF PROTOTYPES

1. There is no set number of prototypes you should make… **But it is definitely more than one.**

2 ABSOLUTES OF PROTOTYPES

1. There is no set number of prototypes you should make… But it is definitely more than one.

2. Each prototype will teach you something…usually it will make your design better.

LEFT TURN!

Elijah's guide to making things Real

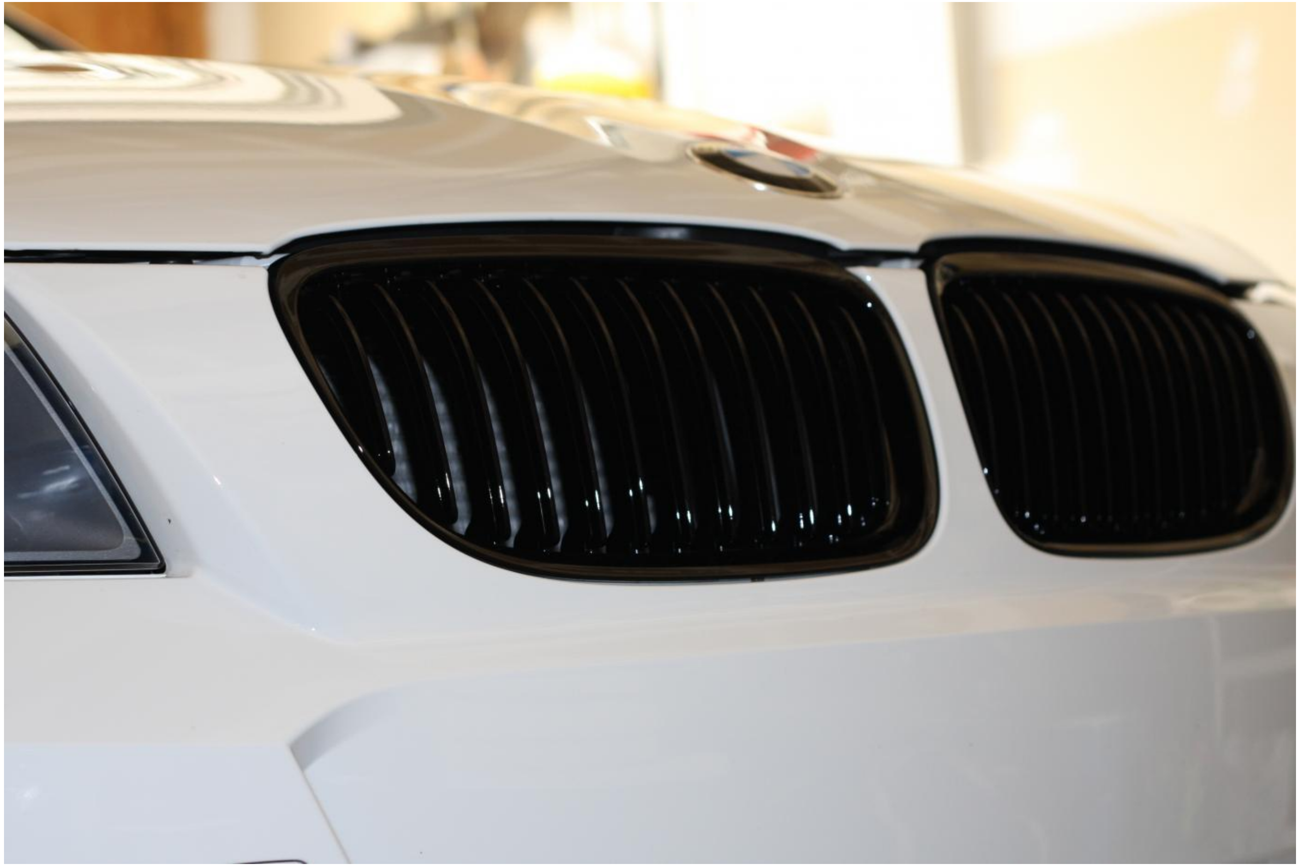
(and real good)

ALIGNMENT
(LINE THINGS UP)

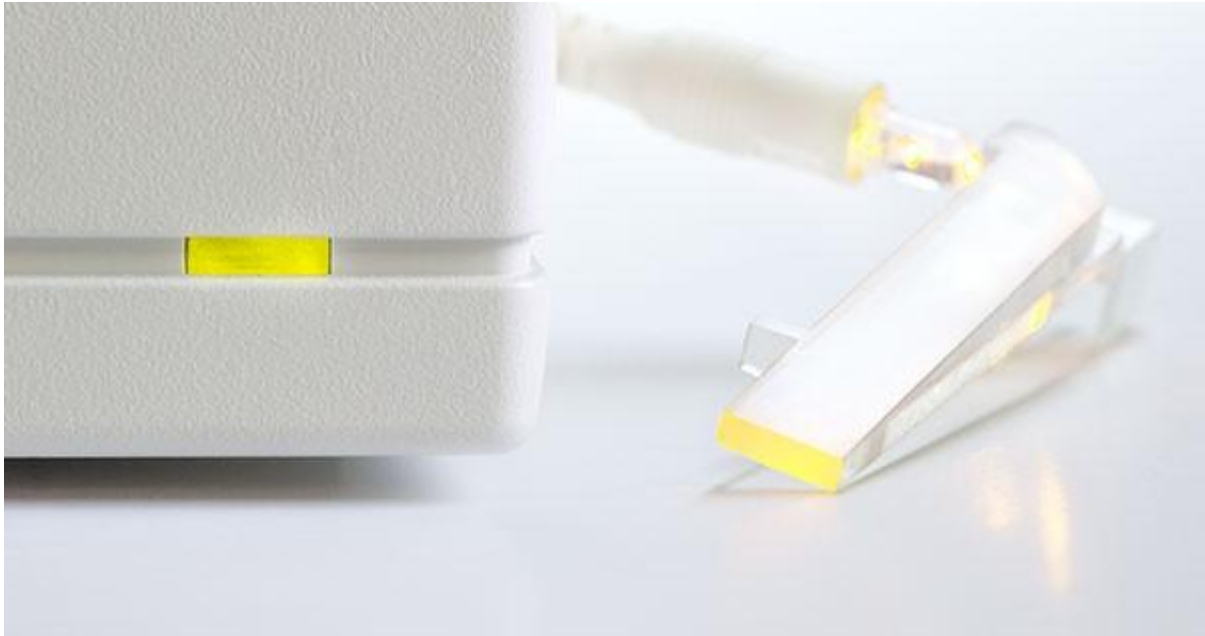
LINCOLN
MKZ
3.7

Alignment (Line Things up)

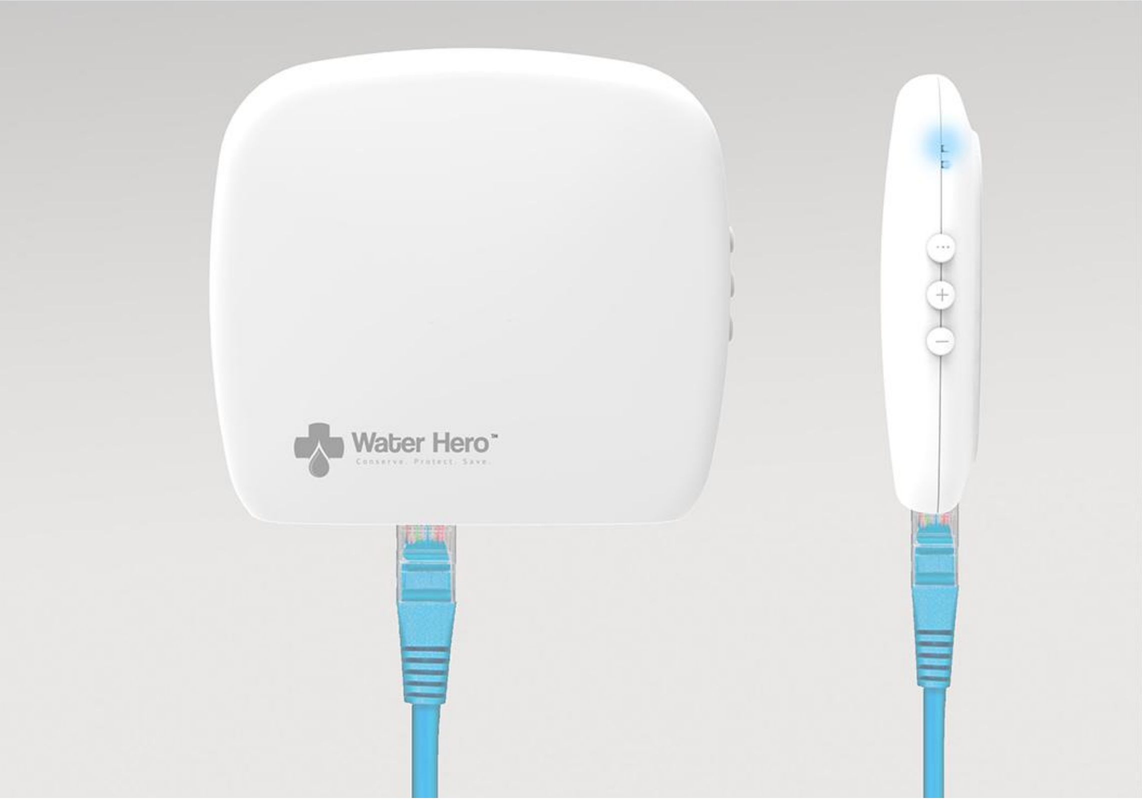
BEAUTY GAP



Beauty Gap

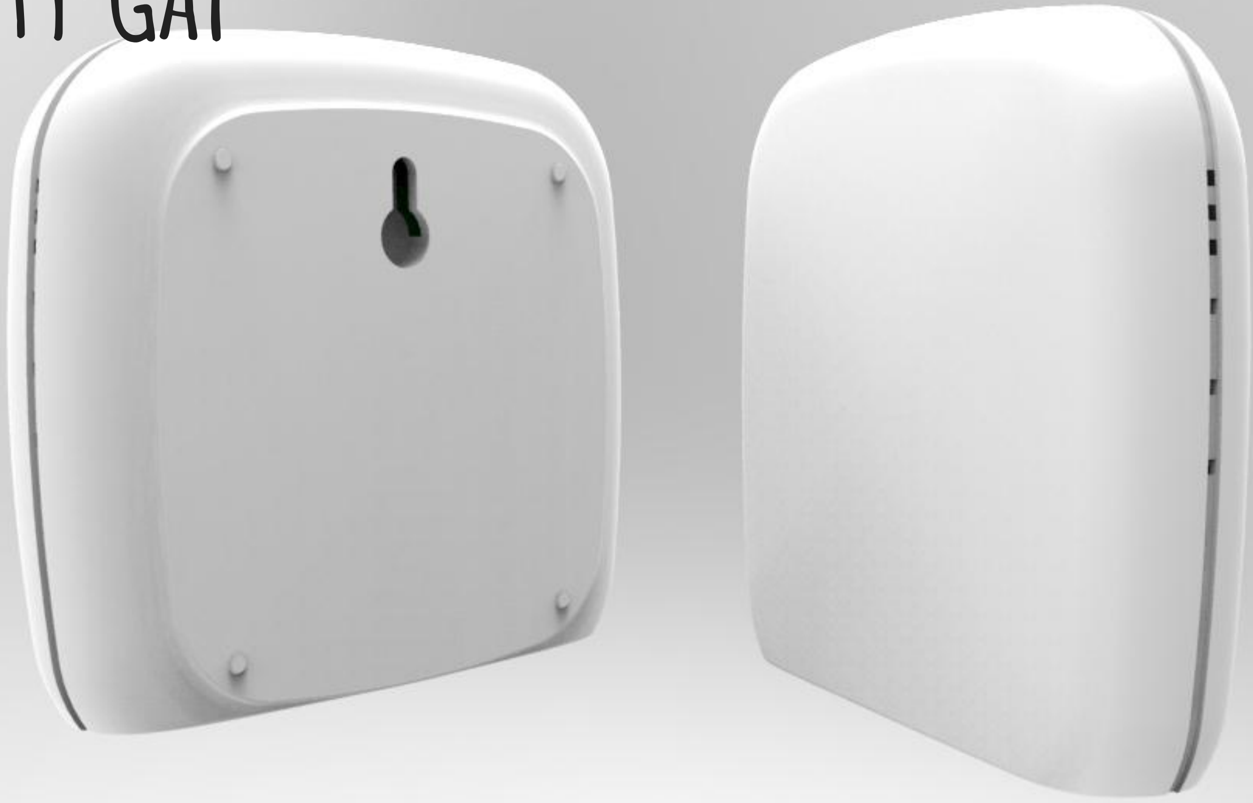


BEAUTY GAP



Water Hero™
Conserve. Protect. Save.

Beauty Gap

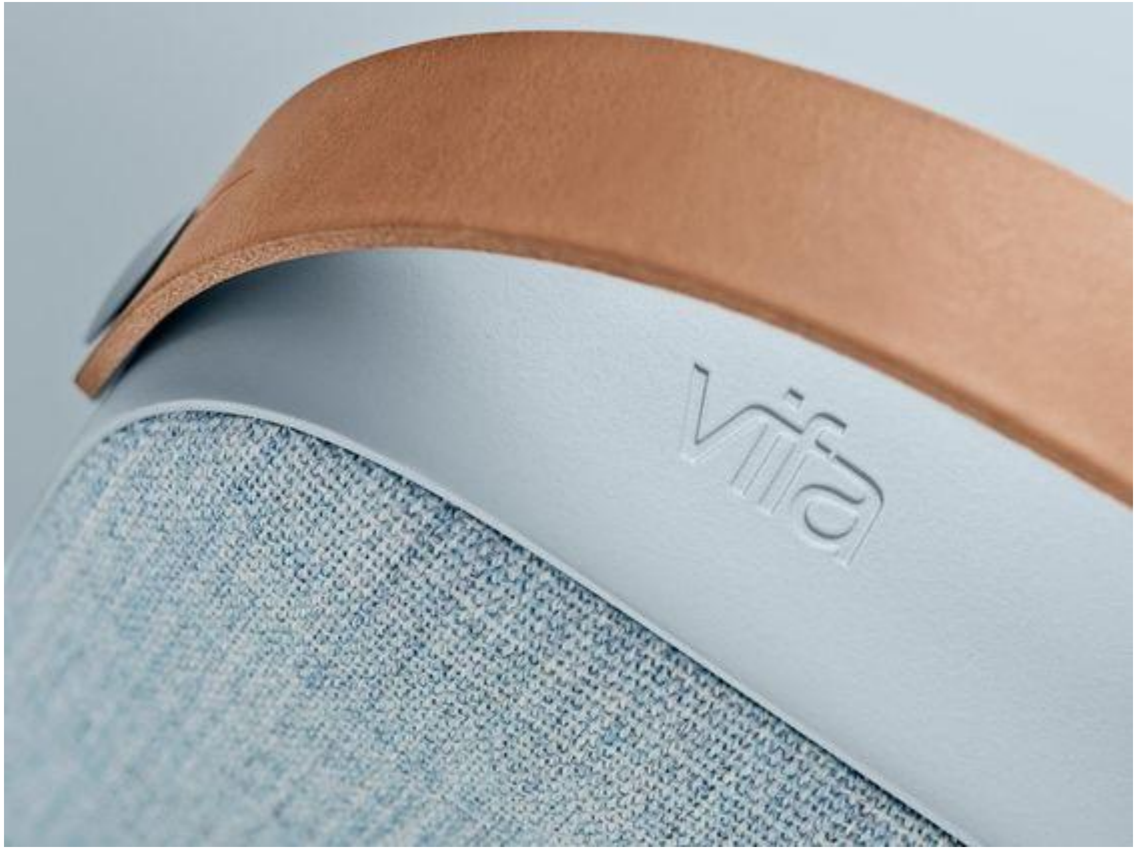


Pick one thing to celebrate

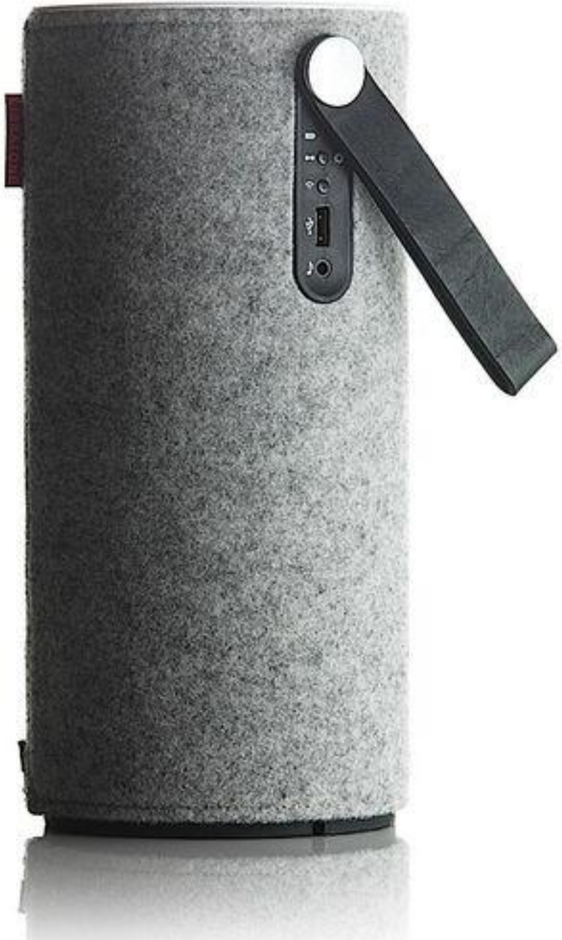
Combine Pieces

VOLVO
C30
XPY 076

Use Multiple Materials



Use Softgoods



Play with Scale

I.
EMPATHIZE
Develop a deep understanding of the challenge

II.
DEFINE
Clearly articulate the problem you want to solve

III.
IDEATE
Brainstorm potential solutions
Select and develop your solution

IV.
PROTOTYPE
Design a prototype (or series of prototypes) to test all or part of your solution

V.
TEST
Engage in a continuous short-cycle innovation process to continually improve your design

BASE
DESIGN STUDIO

Thank You!

Go Make something great!

BASE

DESIGN STUDIO

Questions?

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