



Andy Goldsworthy

English sculptor and photographer

1956-present

ideas

must be put to the test.

that's why we

make things!

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English sculptor and photographer

1956-present

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electric scooter

concern: product definition

model focus: scale, usability

type: works-like (kinematics)

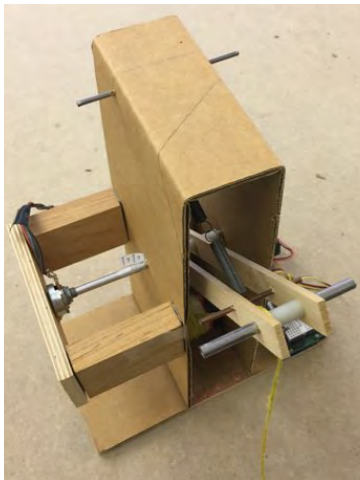


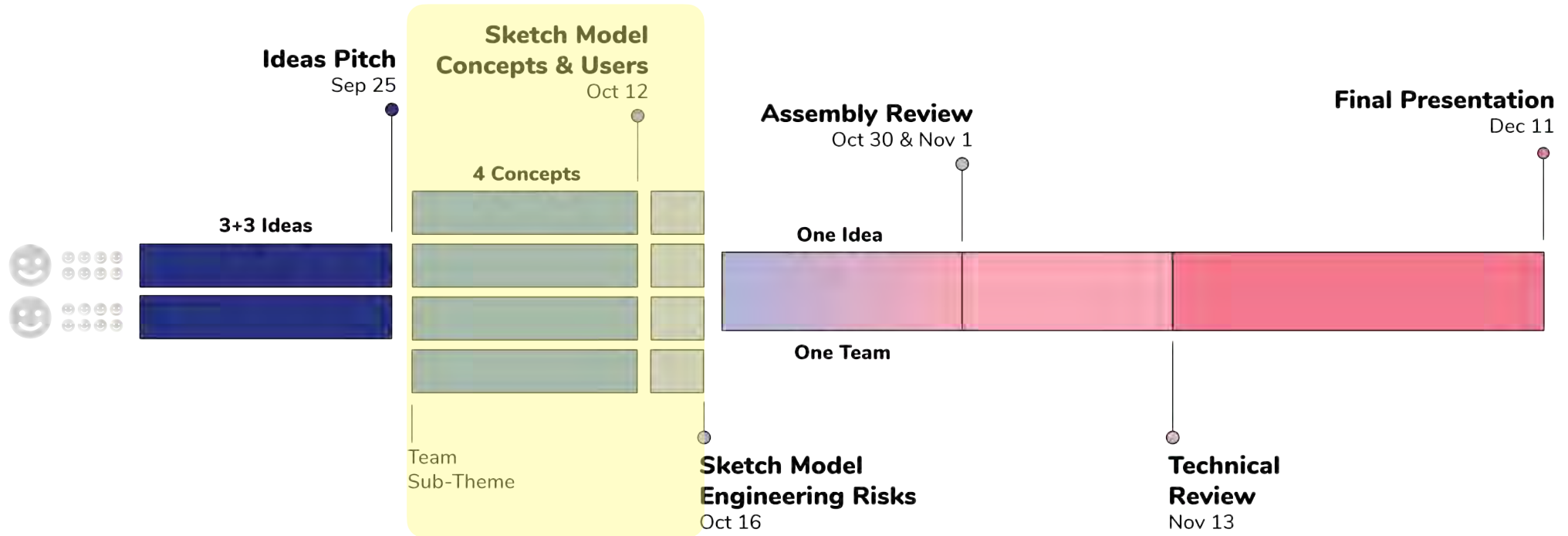
helicopter lift

concern: product definition

focus: visualization, operation

type: works-like (operating principle)





Process

concept generation phase

Ideas Pitch

Sep 25

3+3 Ideas



Process

opportunity phase

2.009

Product
Design
Processes

Dashboard Home

DASHBOARD

Profile Settings

Timesheets

Logout

Ideas Pitch

Sep 25

3+3 Ideas

2.009 Home Dashboard Ideas Presentation Poster Mounting Reservation

Ideas Presentation Poster Mounting
ReservationOn **11:59pm, Fri. Sep 22, 2023**

Hello, **Mildy McWally**! This form is shared by all members **in your section**. This means if a team member in **Red B** submits the form, it will be submitted for everyone on **Red B**. Please work with your section before submitting!

Overview

Please schedule a start time for your section's poster mounting session. At least **two people from your section** should be present, and all of the section's idea posters should be submitted through the dashboard at least **2 hours before your session start time**.

Section members should be ready to:

- Review the plotted posters and make any corrections, if necessary. Please bring the original poster files to the session.
- Mount the posters on the foam core (TAs will provide guidance)

Sessions are in **Pappalardo Lab**.

Reserve a Time

Please select a **Friday or Saturday time** so that you will have your posters ready for your practice session. Sunday sessions are primarily intended for **last-minute reprints**.

Select an available time slot

1:00pm, Fri. Sep 22, 2023

1:30pm, Fri. Sep 22, 2023

2:00pm, Fri. Sep 22, 2023

2:30pm, Fri. Sep 22, 2023

3:00pm, Fri. Sep 22, 2023

3:30pm, Fri. Sep 22, 2023

4:00pm, Fri. Sep 22, 2023

4:30pm, Fri. Sep 22, 2023

1:00pm, Sat. Sep 23, 2023

1:30pm, Sat. Sep 23, 2023

2:00pm, Sat. Sep 23, 2023

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3:00pm, Sat. Sep 23, 2023

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2.009 Product Engineering Processes

INFORMATION SCHEDULE PROJECT INFO TEAMS TEAM MANUAL RESOURCES GALLERY MORNING, MILDY

2.009

Product Design Processes

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Timesheets

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Overview

Each section should sign up for a 30-minute pitch practice. All idea presenters must attend. The communication instructors will be present to give you feedback on your pitches and pitch delivery. Practice sessions are in room 3-370. Please bring your idea posters with you (you should have had them plotted on Friday/Saturday).

Reserve a Time

All times are for Sunday, Sept. 24, 2023.

Select an available time slot

10:00 - 10:30 AM (Slot 1)

10:00 - 10:30 AM (Slot 2)

10:30 - 11:00 AM (Slot 1)

10:30 - 11:00 AM (Slot 2)

11:00 - 11:30 AM (Slot 1)

11:00 - 11:30 AM (Slot 2)

11:30 AM - 12:00 PM (Slot 1)

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Submit

Ideas Pitch

Sep 25

3+3 Ideas

2.009 Product Engineering Processes

INFORMATION SCHEDULE PROJECT INFO TEAMS TEAM MANUAL RESOURCES GALLERY

MORNING, MILDY

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Design
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Ideas Pitch
Sep 25

3+3 Ideas

practice is the best of all instructors



introduce yourself
body language
look at the audience
engage the poster
tell a story
be conversational
have a clear ending

is the best of all instructors

Ideas Pitch

Sep 25

3+3 Ideas



Process

opportunity phase

Ideas Pitch

Sep 25

3+3 Ideas



Process

opportunity phase

Ideas Pitch
Sep 25

independent living elderly

3+3 Ideas



Team
Sub-Theme

Process



Ideas Pitch

Sep 25



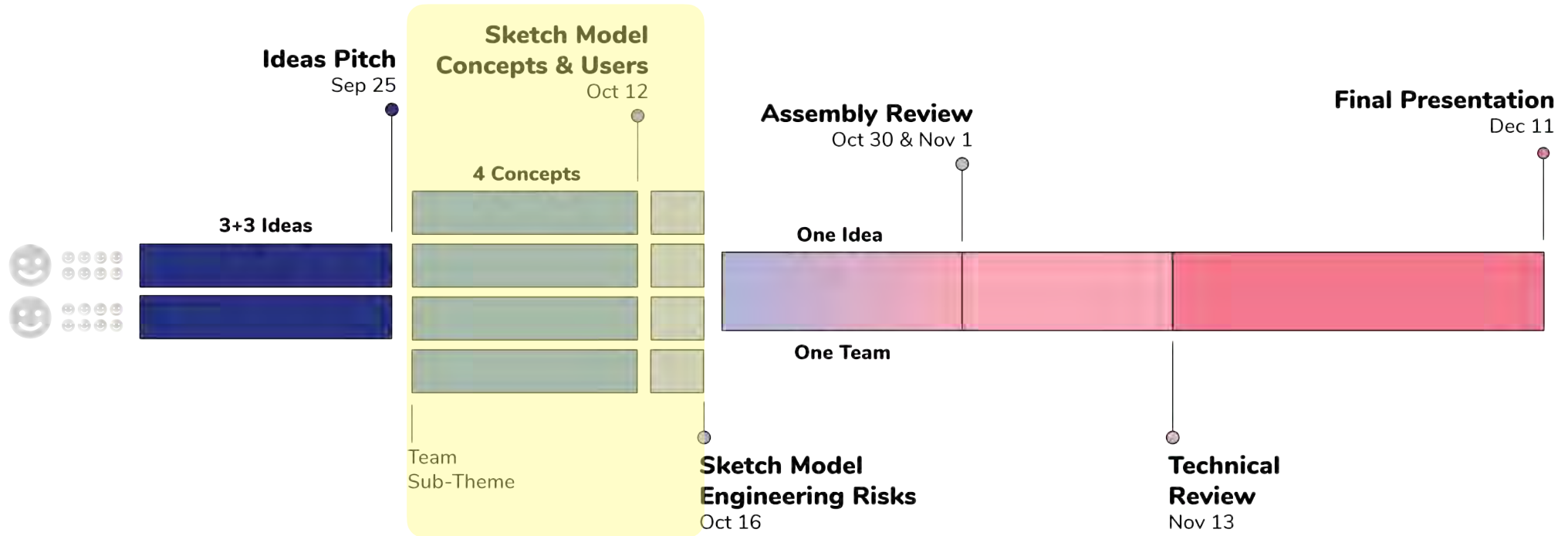
3+3 Ideas



Team
Sub-Theme

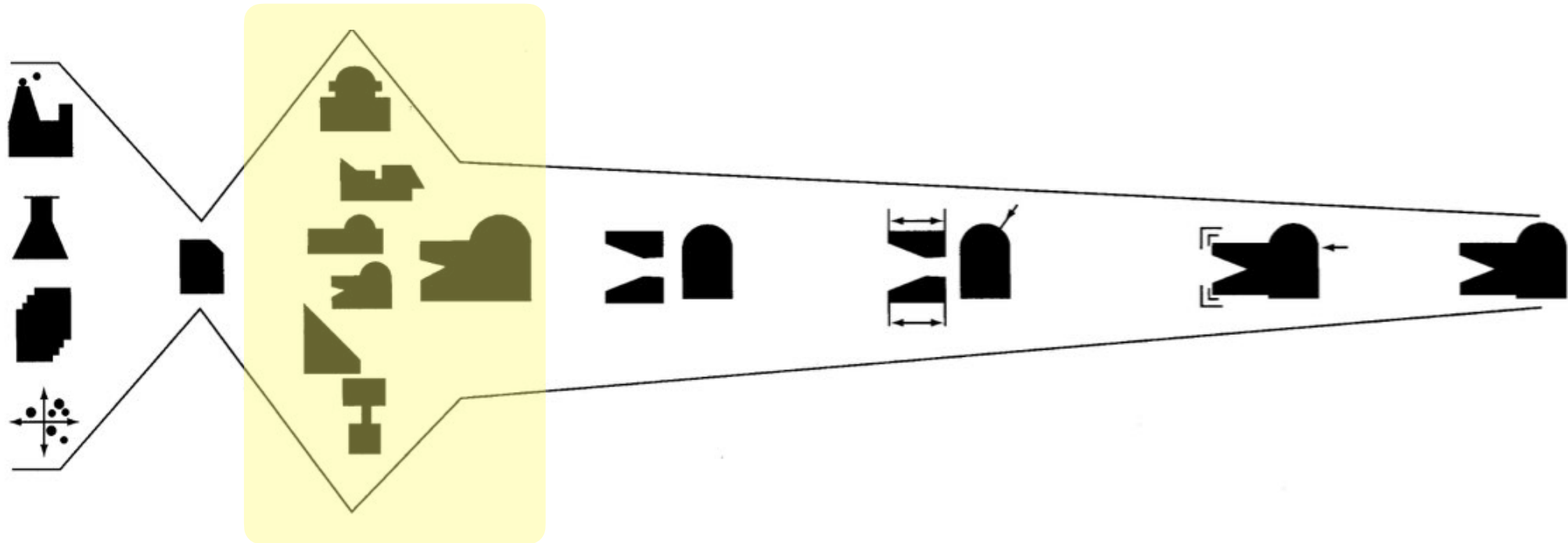
Process

opportunity phase



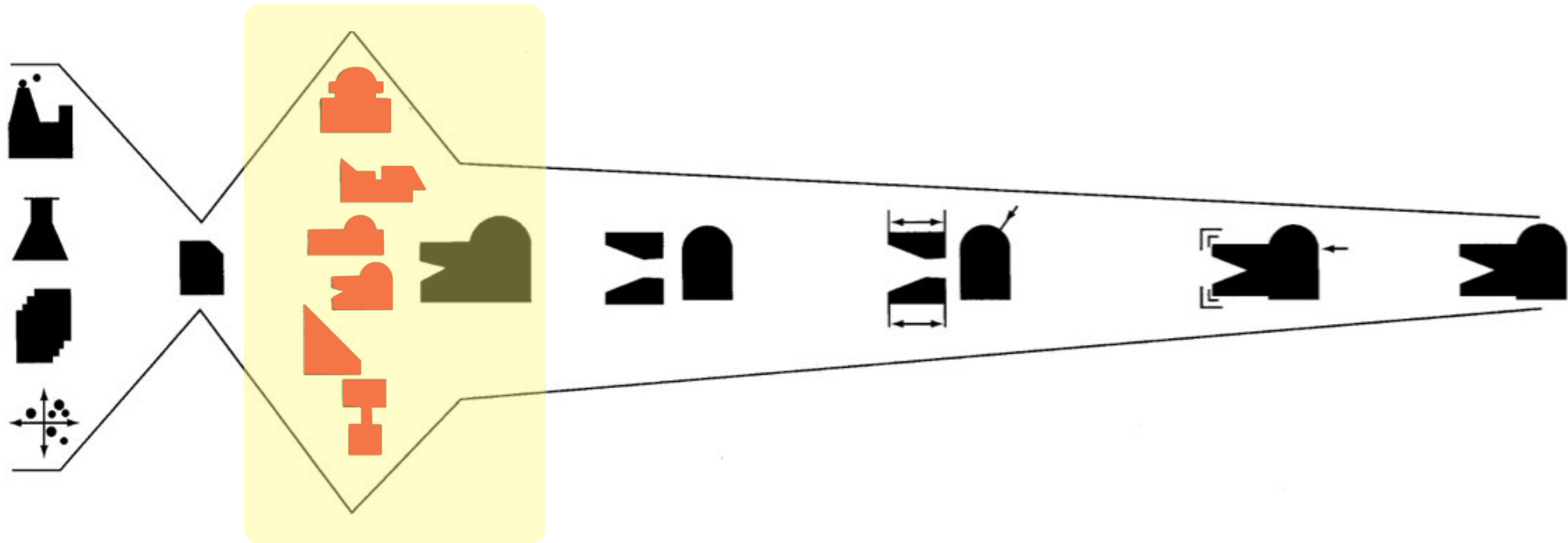
Process

concept generation phase



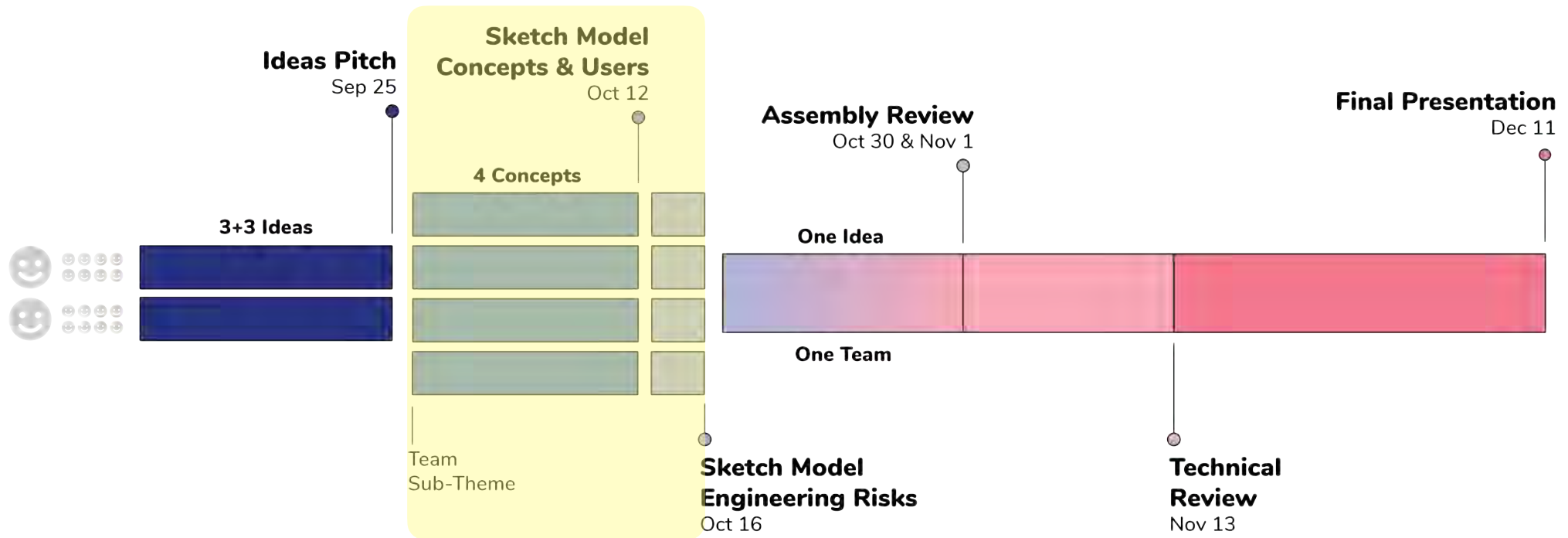
Process

concept generation phase



Process

concept generation phase



Process

concept generation phase

We had an idea!

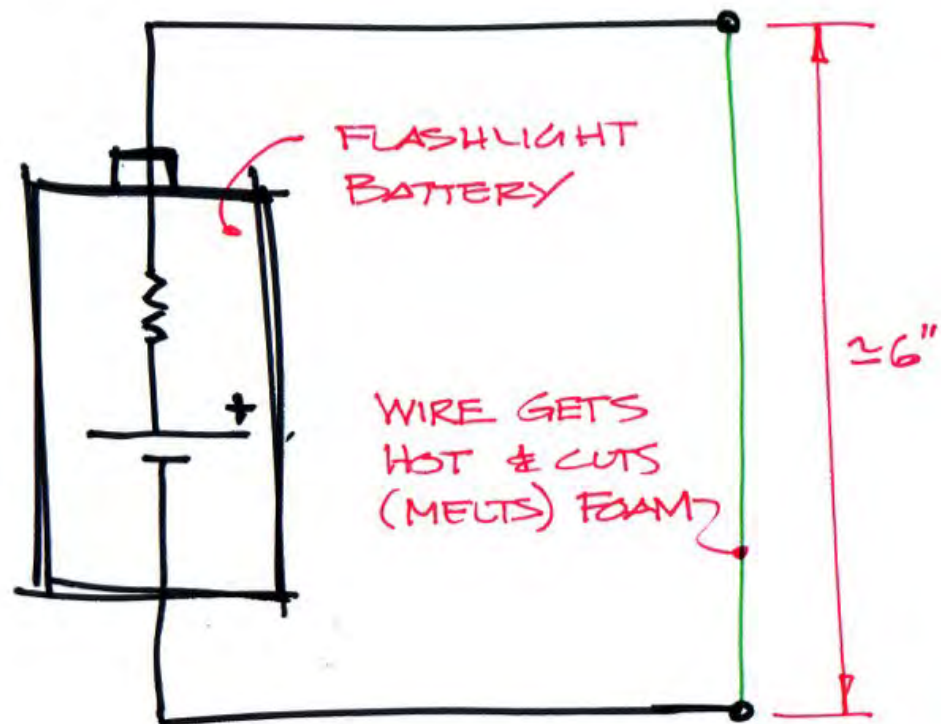




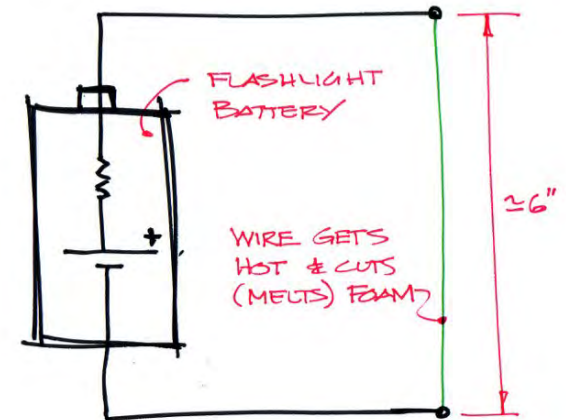
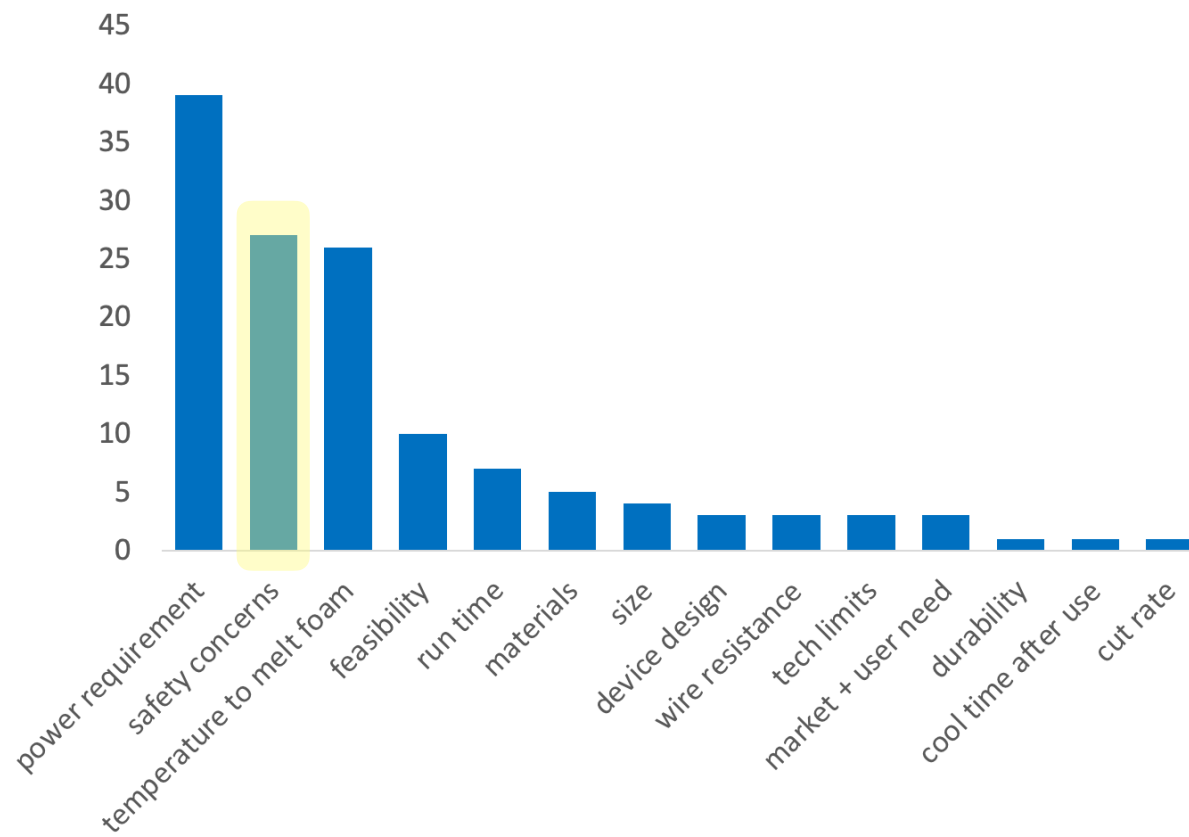
ideate.

model.

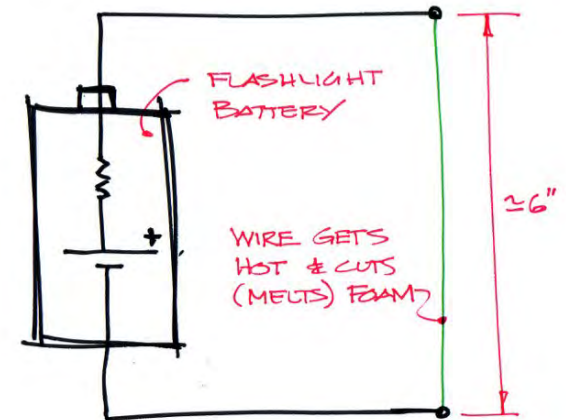
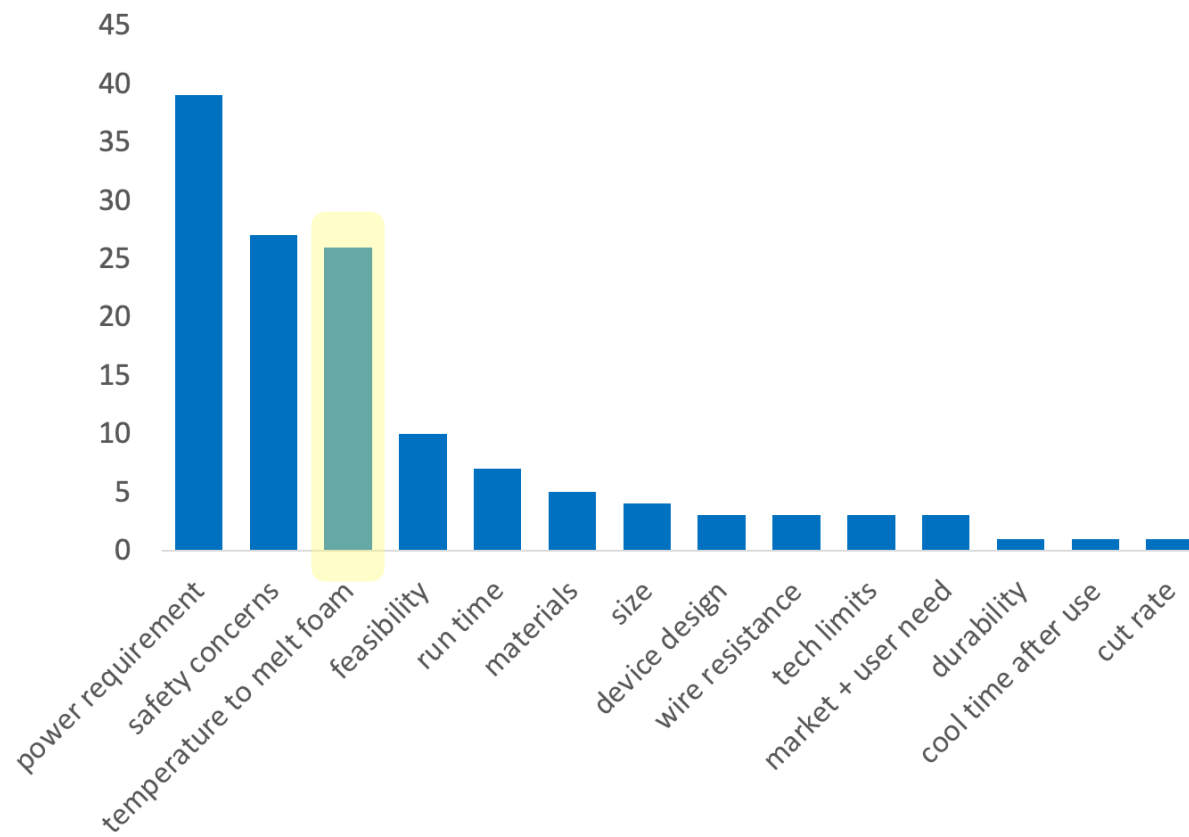
test!



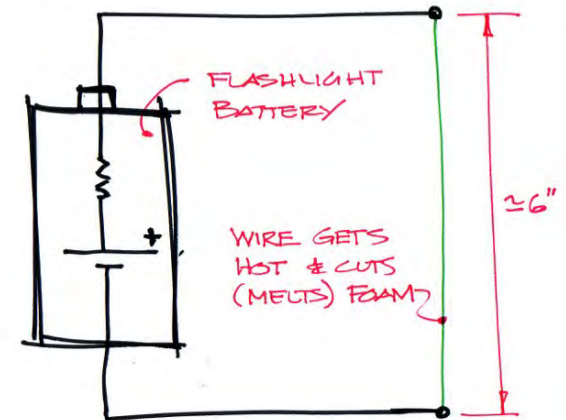
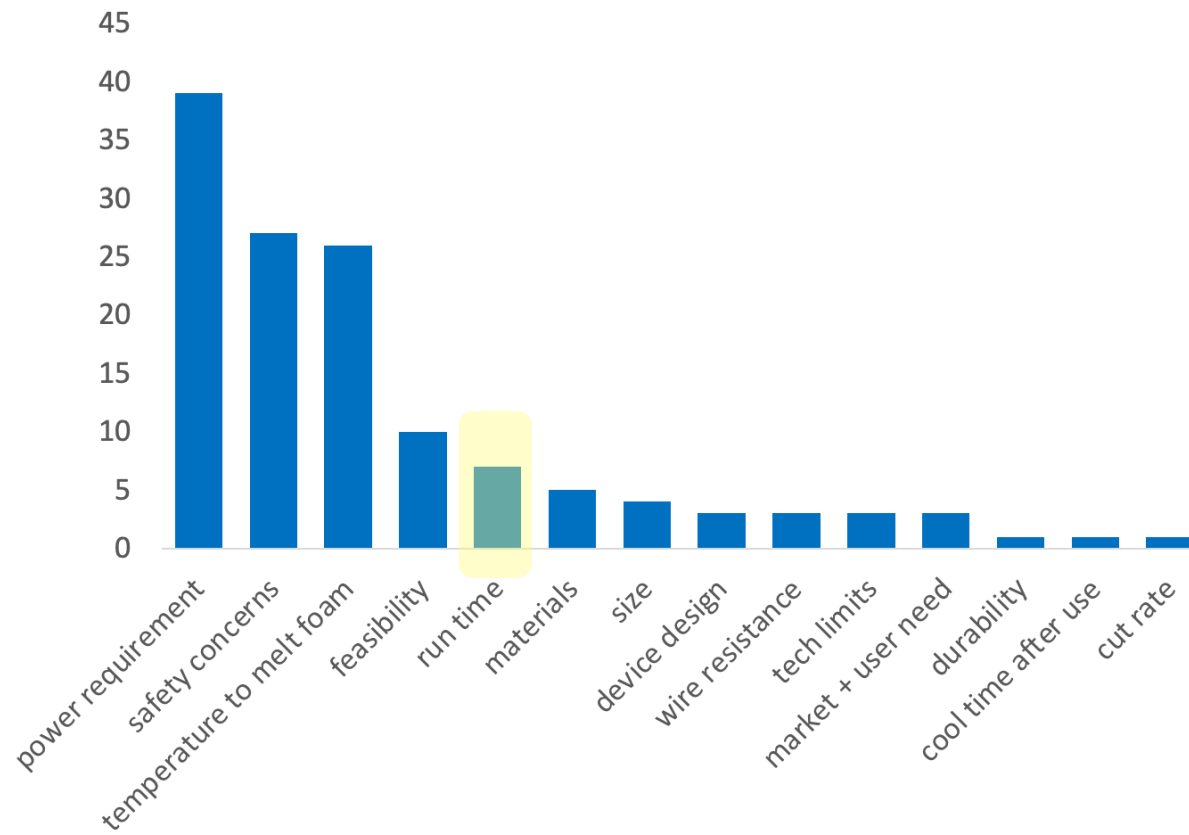
critical question



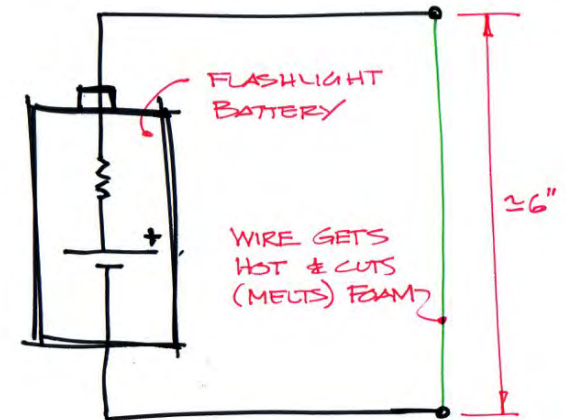
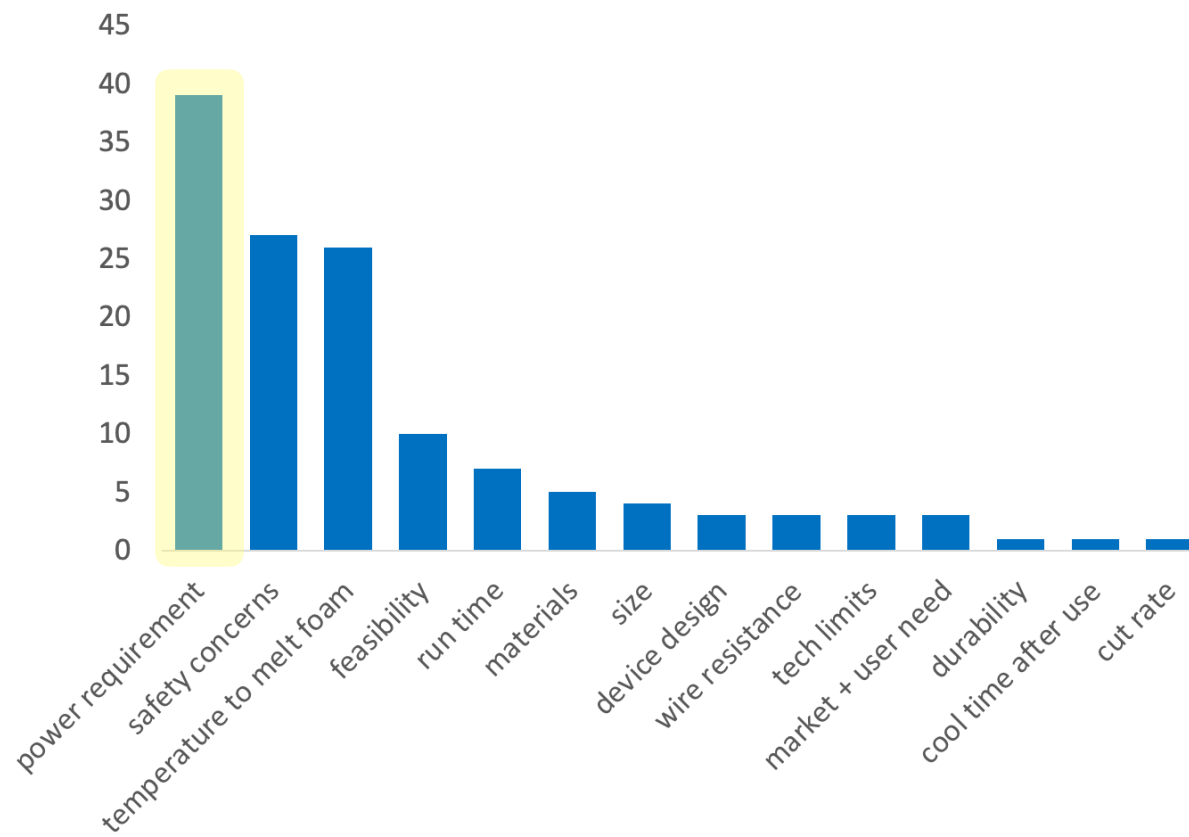
critical question



critical question

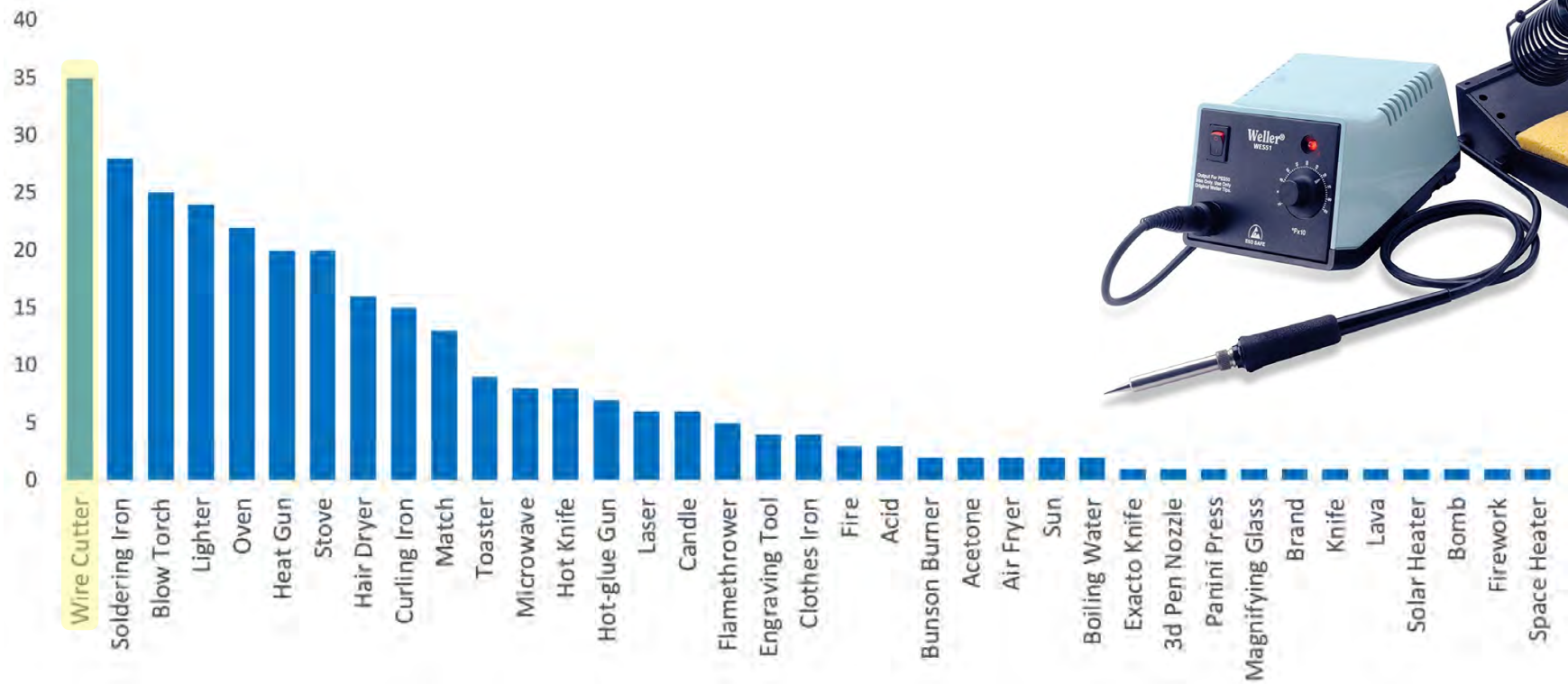


critical question

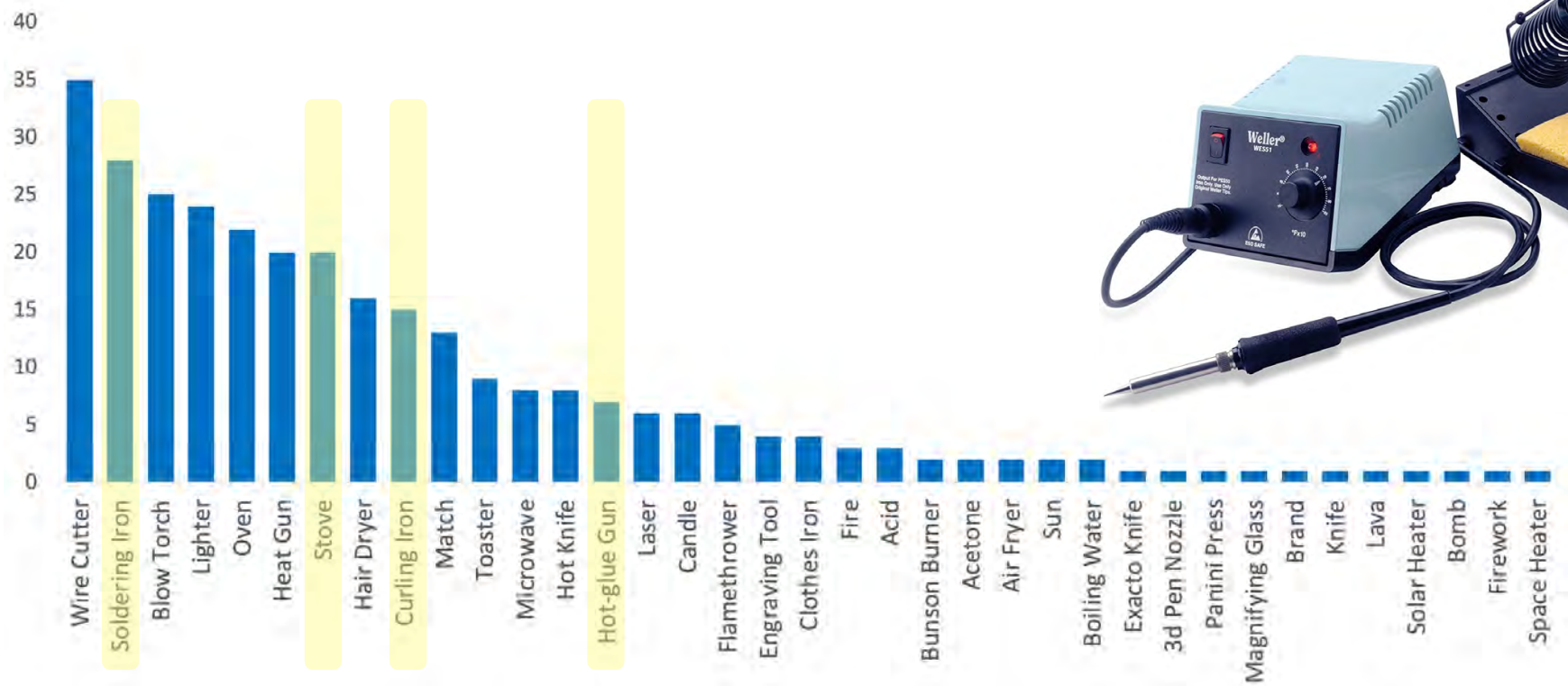




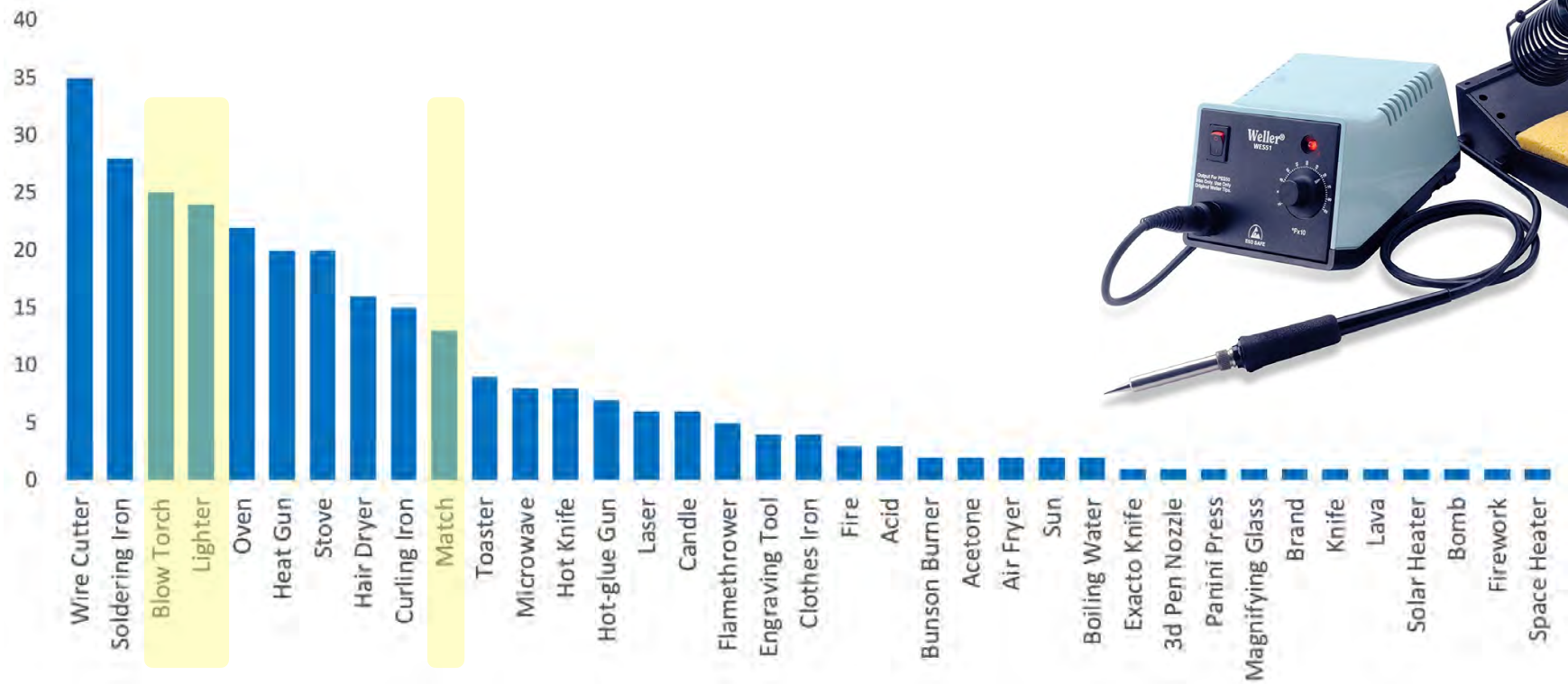
analogous models

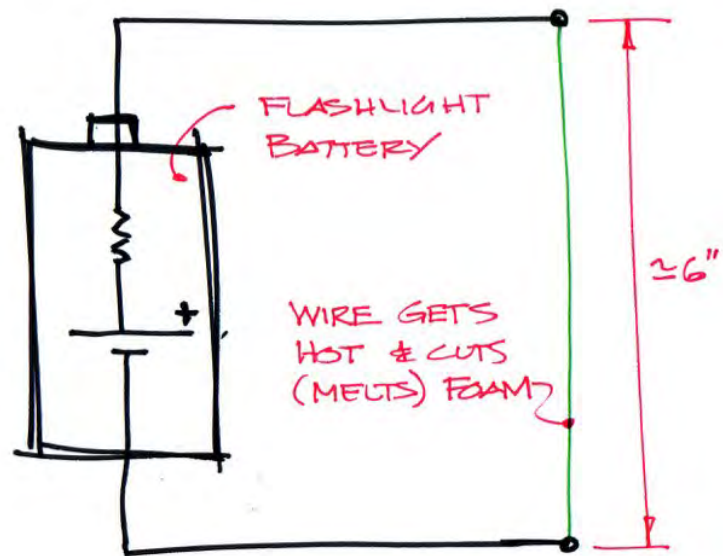


analogous models



analogous models

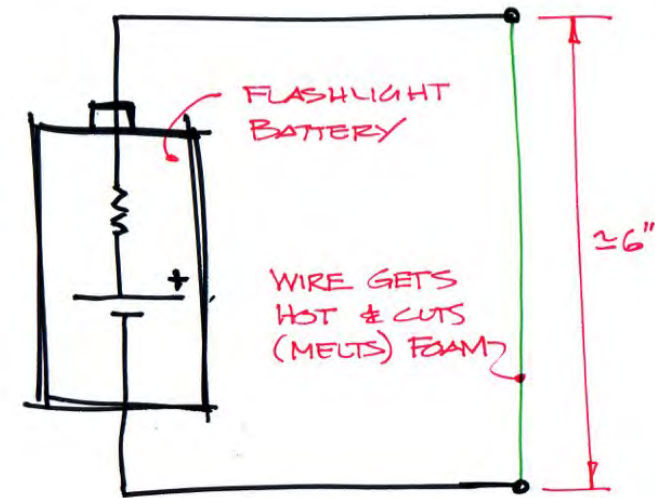
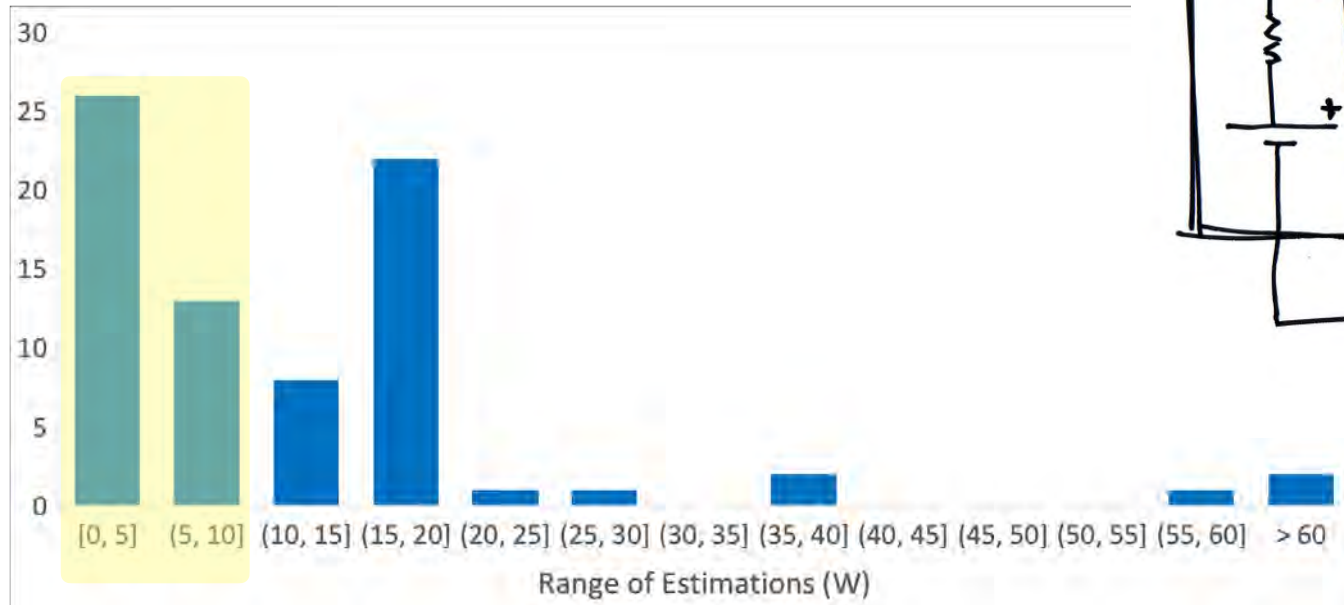




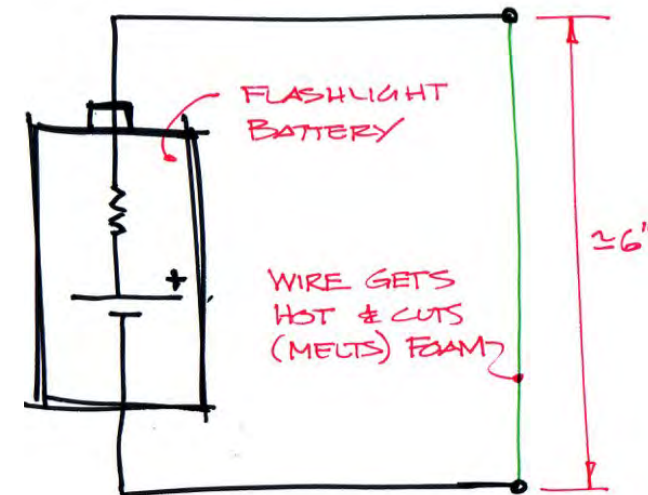
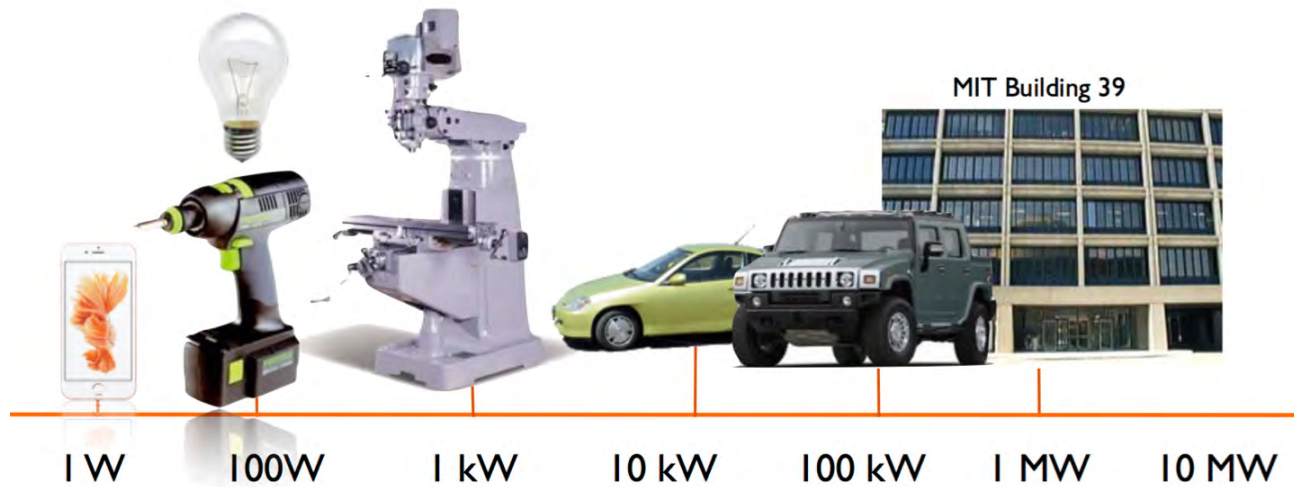
power?
3 w



power estimate



power benchmarks





it's a mini quiz!

write your name on the top of your index card

list 2 factors **positively** correlated
with successful product development teams

list 2 factors **negatively** correlated
with successful product development teams



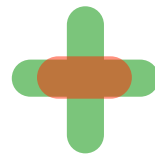
positively correlated



taking initiative
results orientation
attention to detail
clear guiding philosophy
effective communication
management support
involvement of all relevant parties



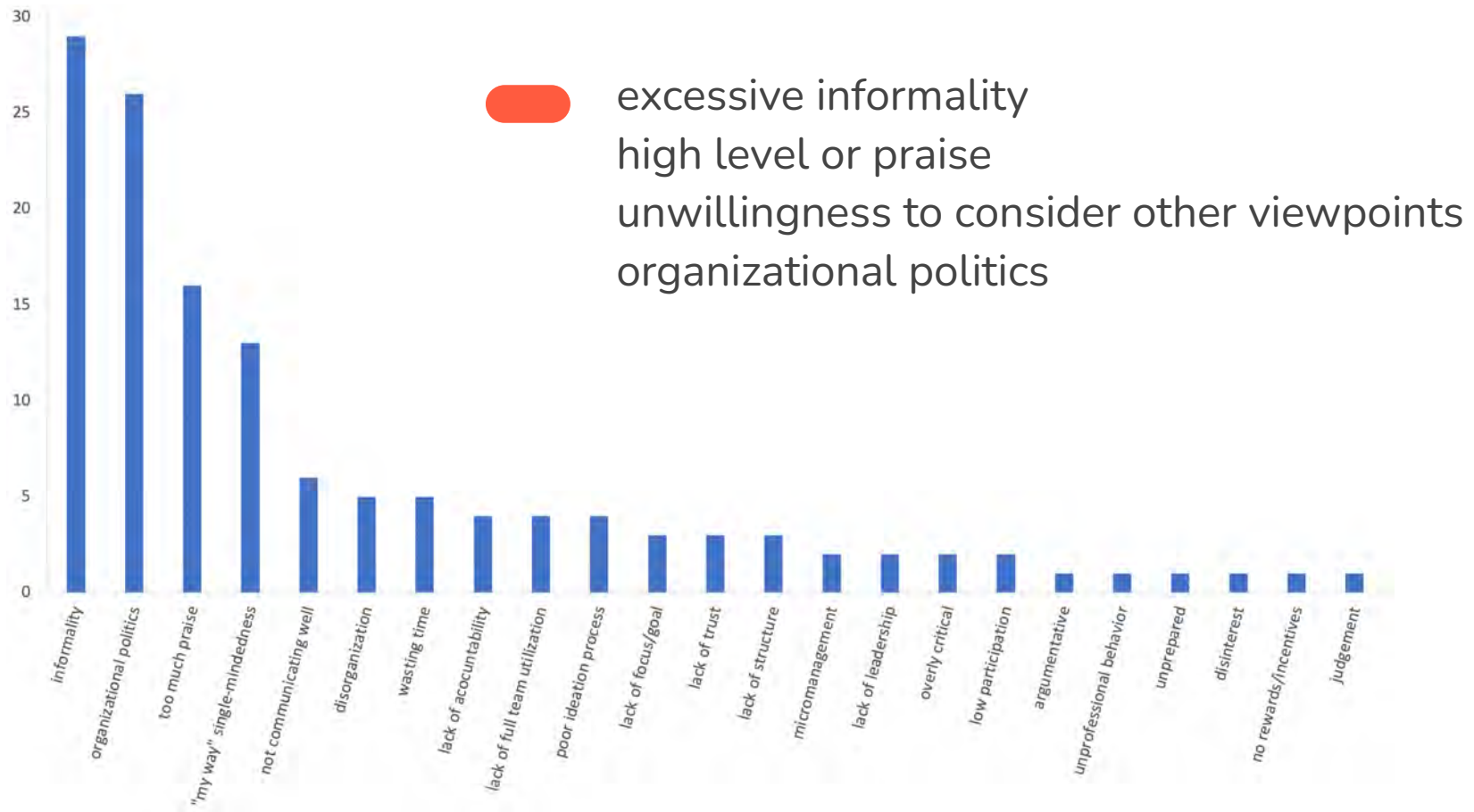
negatively correlated

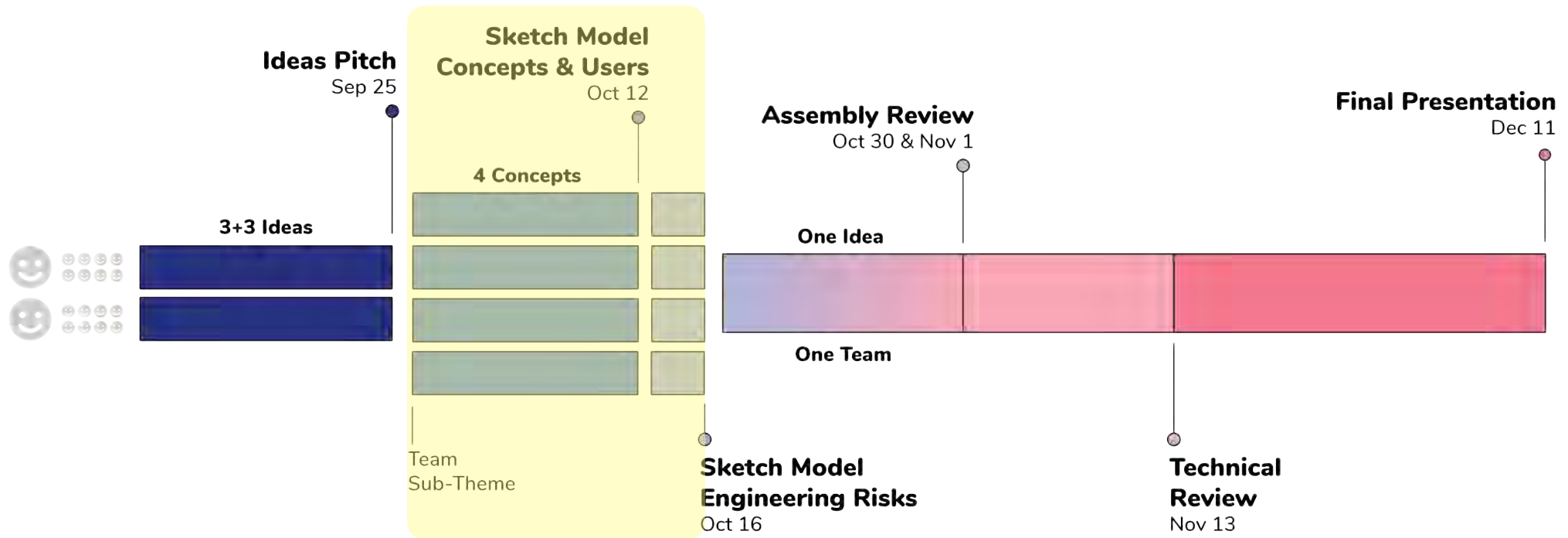


taking initiative
results orientation
attention to detail
clear guiding philosophy
effective communication
management support
involvement of all relevant parties



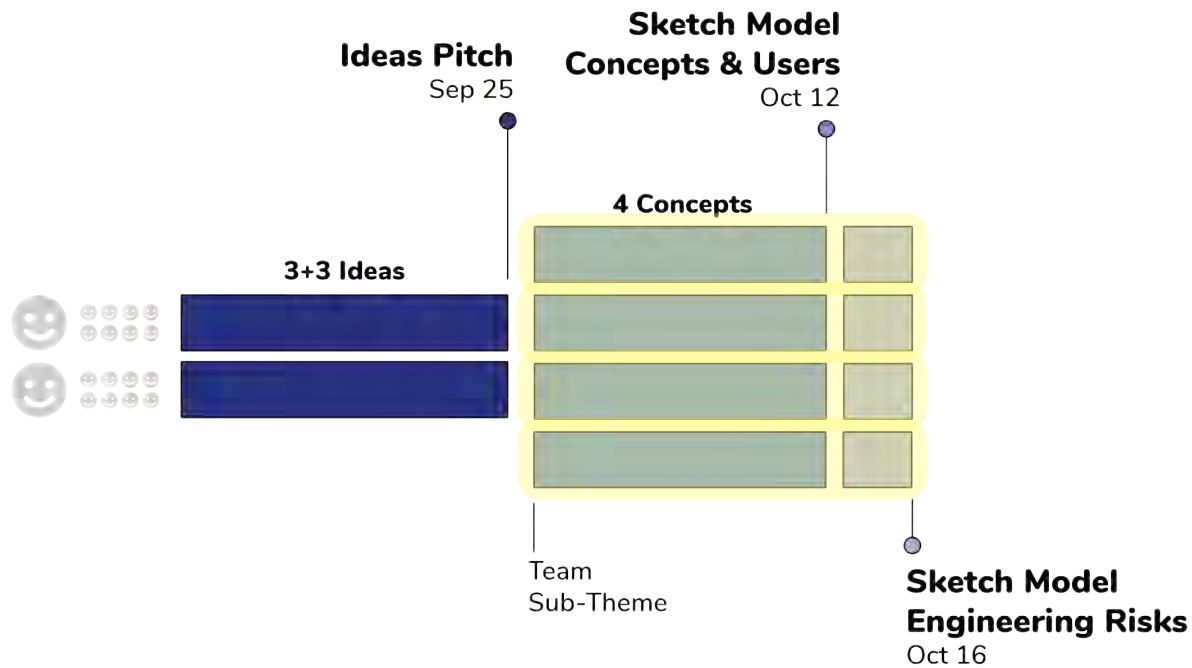
negatively correlated





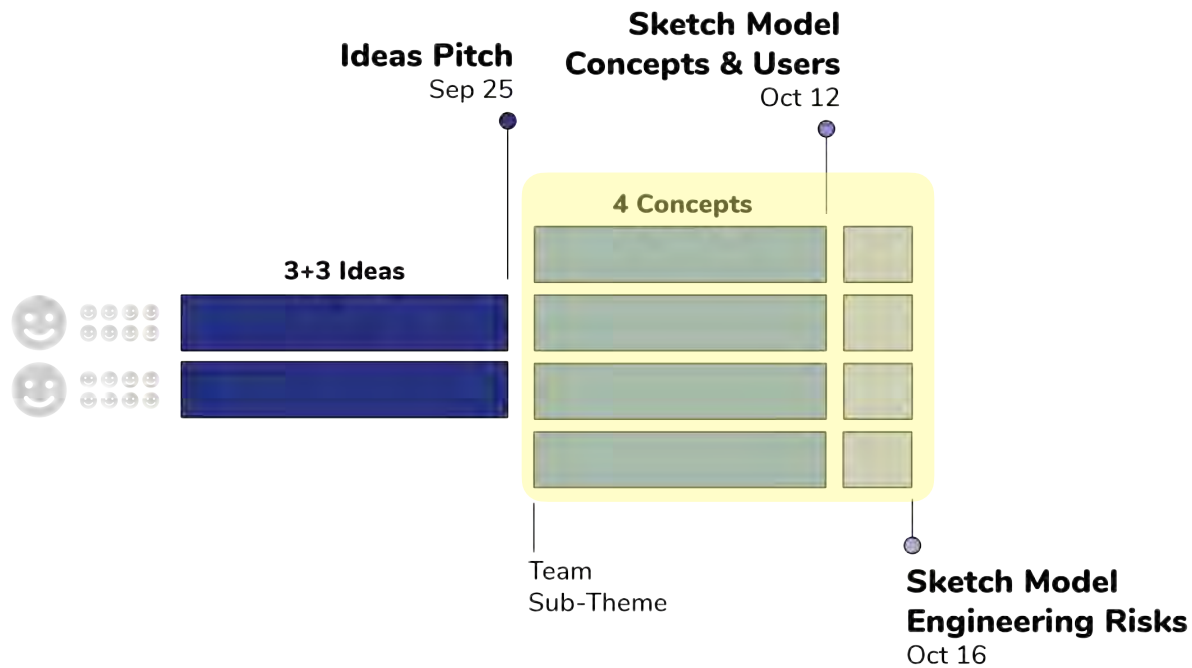
Process

concept generation phase



Process

concept generation phase

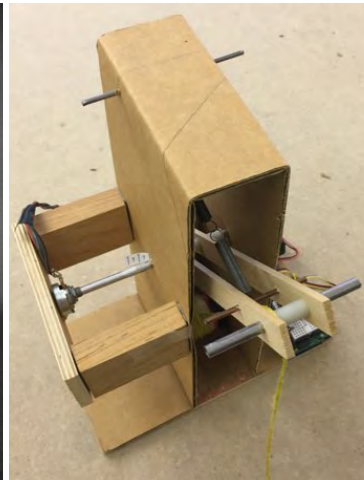


Process

concept generation phase

electric scooter

concern: product definition
model focus: scale, usability
type: works-like (kinematics)



helicopter lift

concern: product definition
focus: visualization, operation
type: works-like (operating principle)

Process

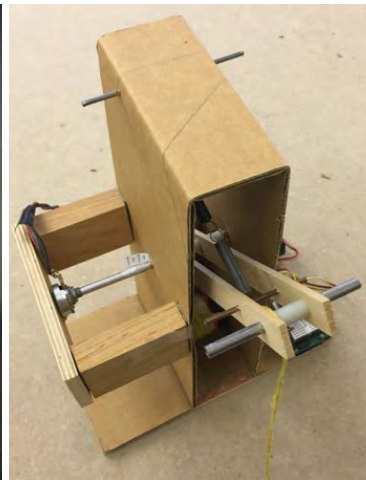
concept generation phase

sketch models

simple models made of soft, low cost, easy-to-work materials

electric scooter

concern: product definition
model focus: scale, usability
type: works-like (kinematics)



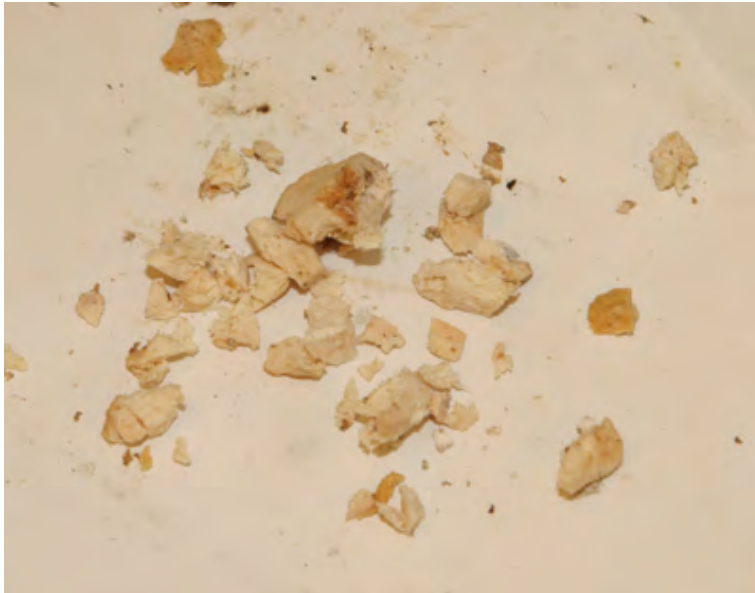
helicopter lift

concern: product definition
focus: visualization, operation
type: works-like (operating principle)

like sketches in 3D

sketch models

appropriateness of models

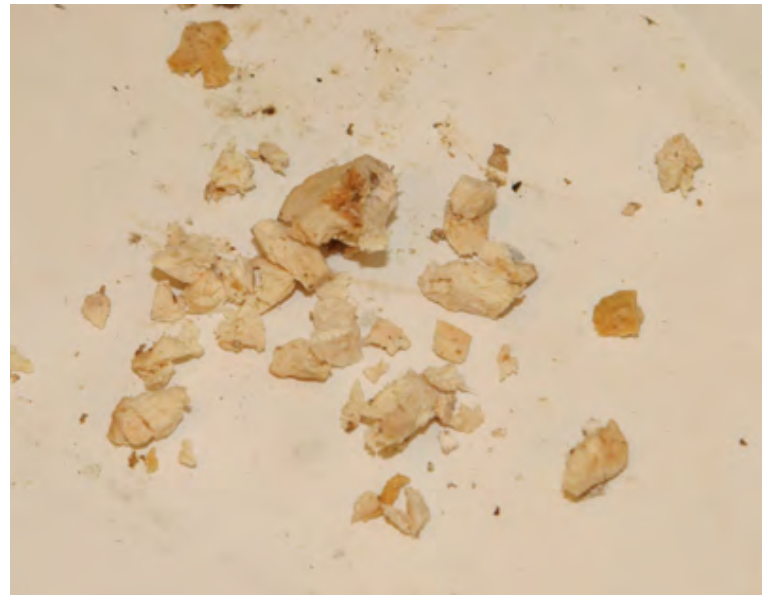


sketch models

appropriateness of models

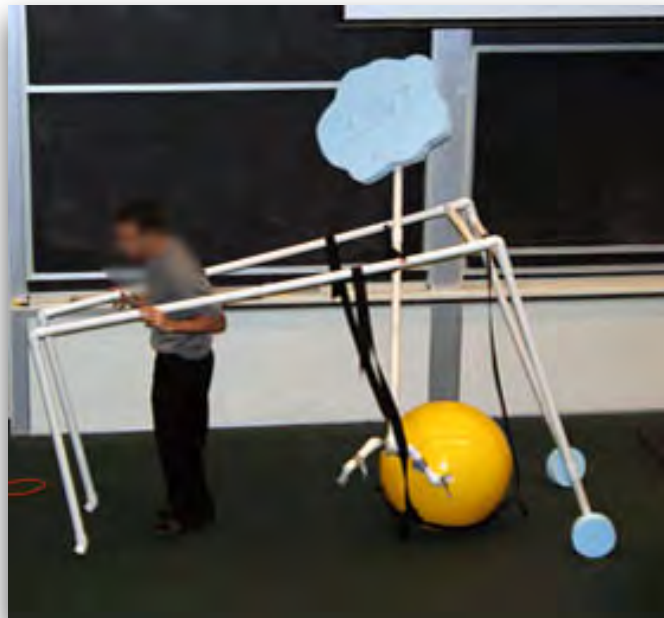
made to learn and test

- articulate an idea
- understand product scale
- explore user interaction issues
- assess operational issues
- establish common shared view



sketch models

in appropriateness of models



no new learning!

not looks-like, not works-like—it's nothing like!

sketch model review

in appropriateness of models

simple models that answer no questions
and are **made of soft, low cost, easy-to-work materials**

bad models







step 1

critical questions

definition: what is the idea?

feasibility: does core technology exist and do we understand it?

user need: do we understand the user and our value proposition?

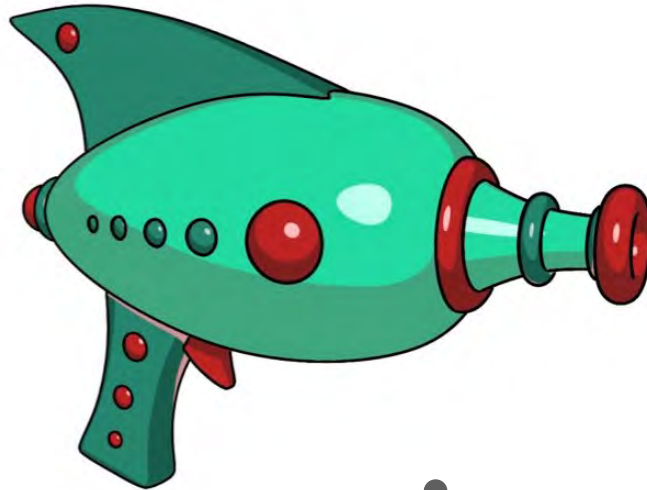
market: who is our customer and how interested are they?

scope: do we have the needed resources and skills?

step 1

critical questions





risks!

level of uncertainty

criticality

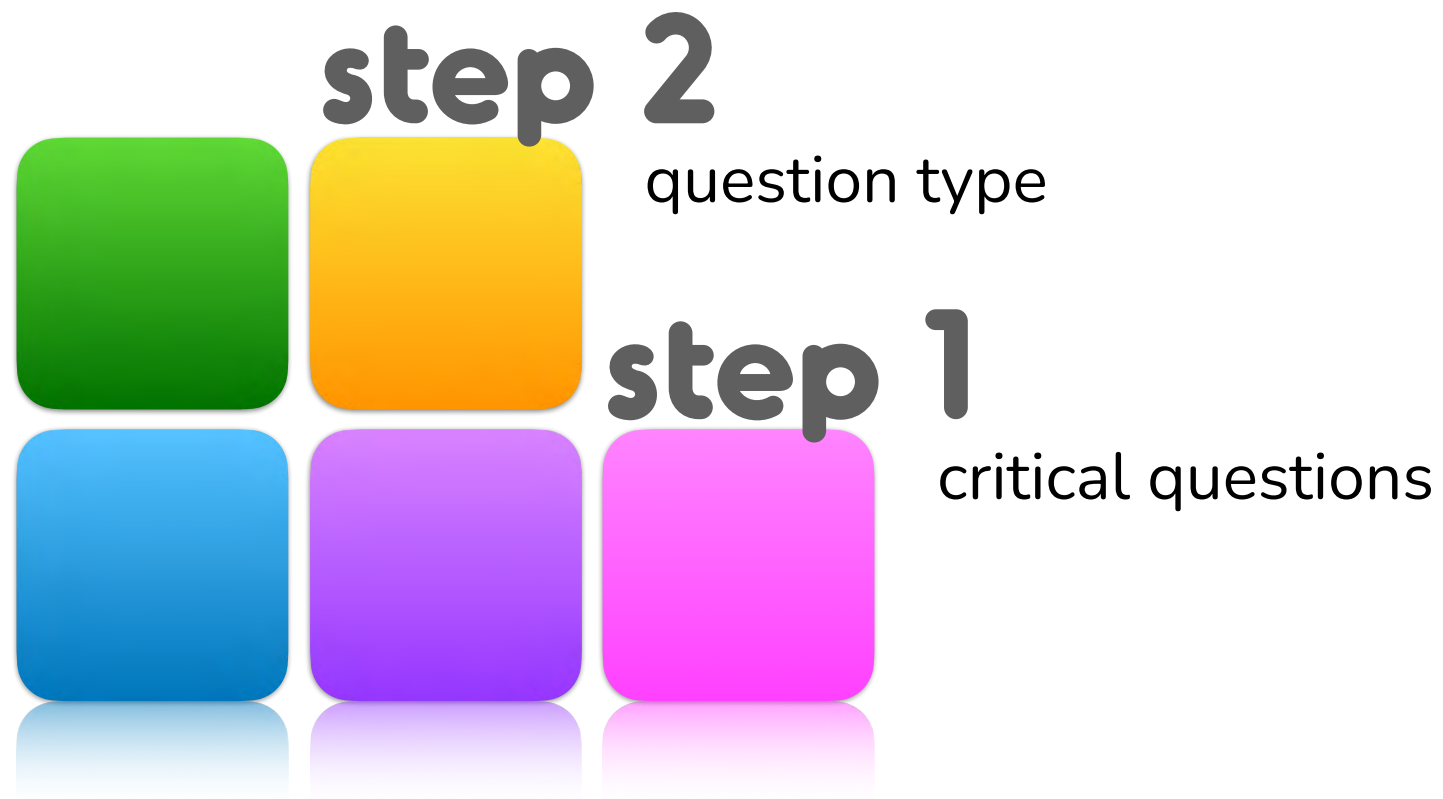
learning outcome

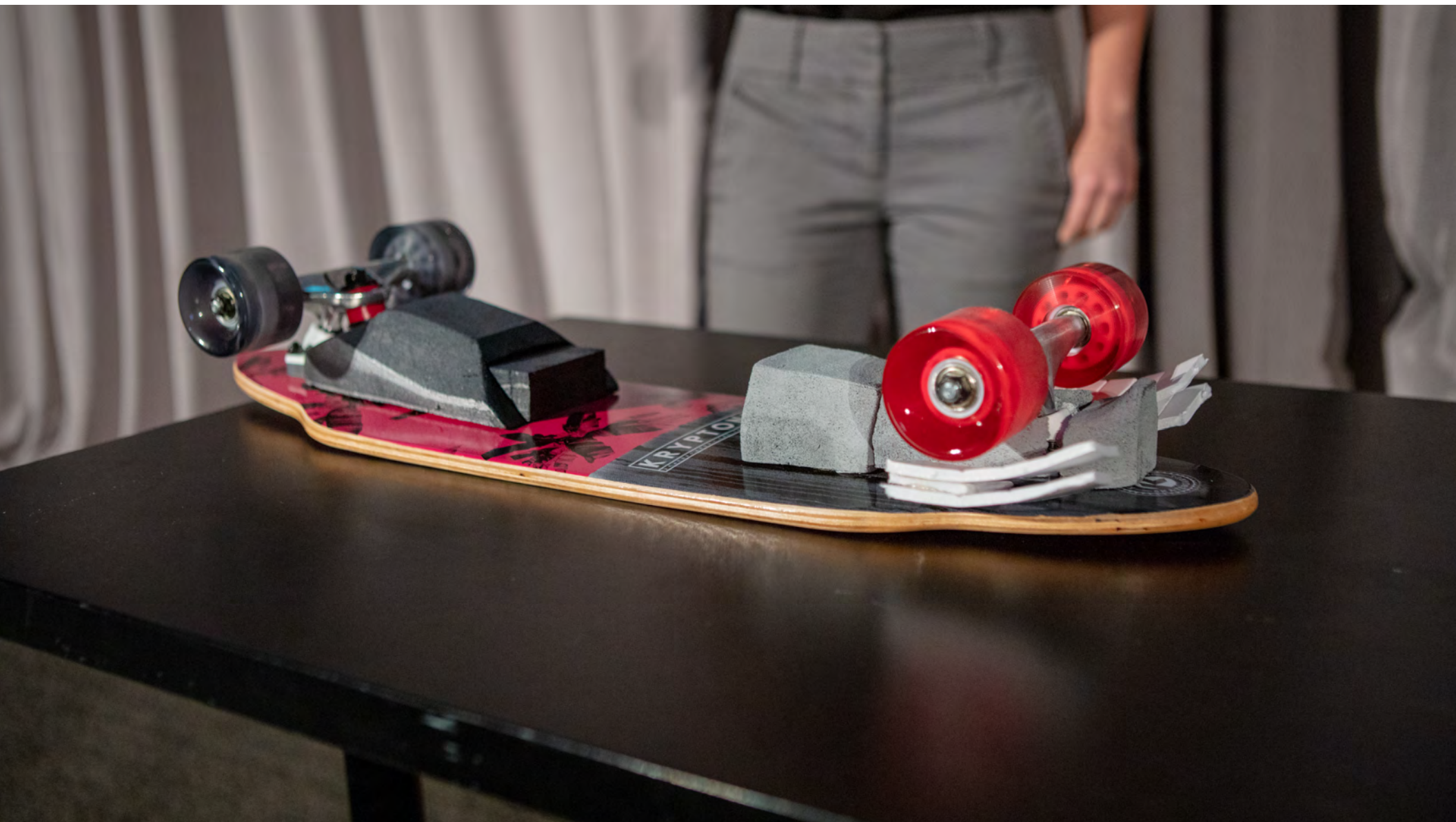
time

step 1

critical questions

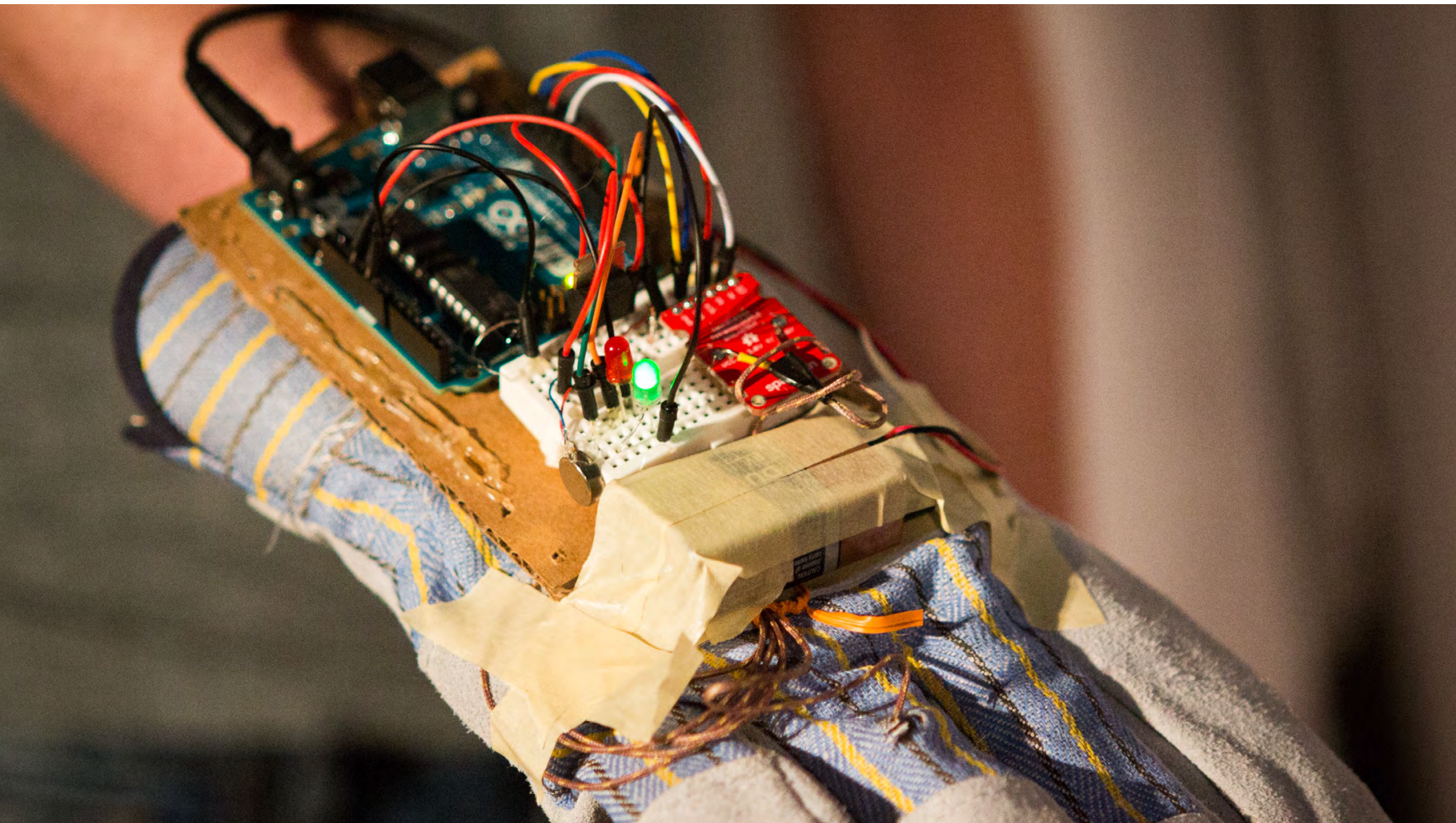


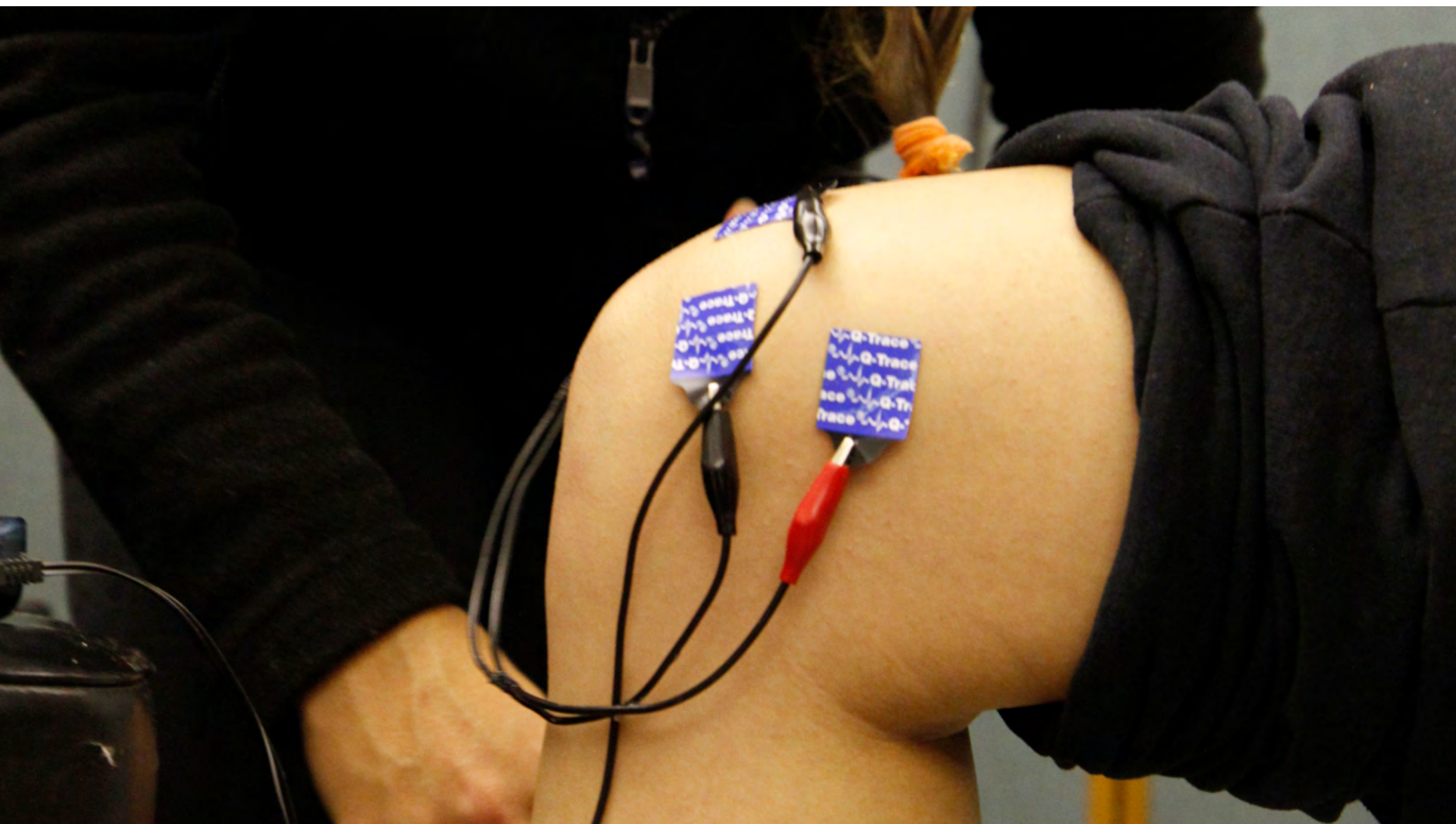














question type

form: focus on shape embodiment

scale: focus on properties such as size or mass

visualization: focus on communication

operational principles: focus on tech and physical behavior

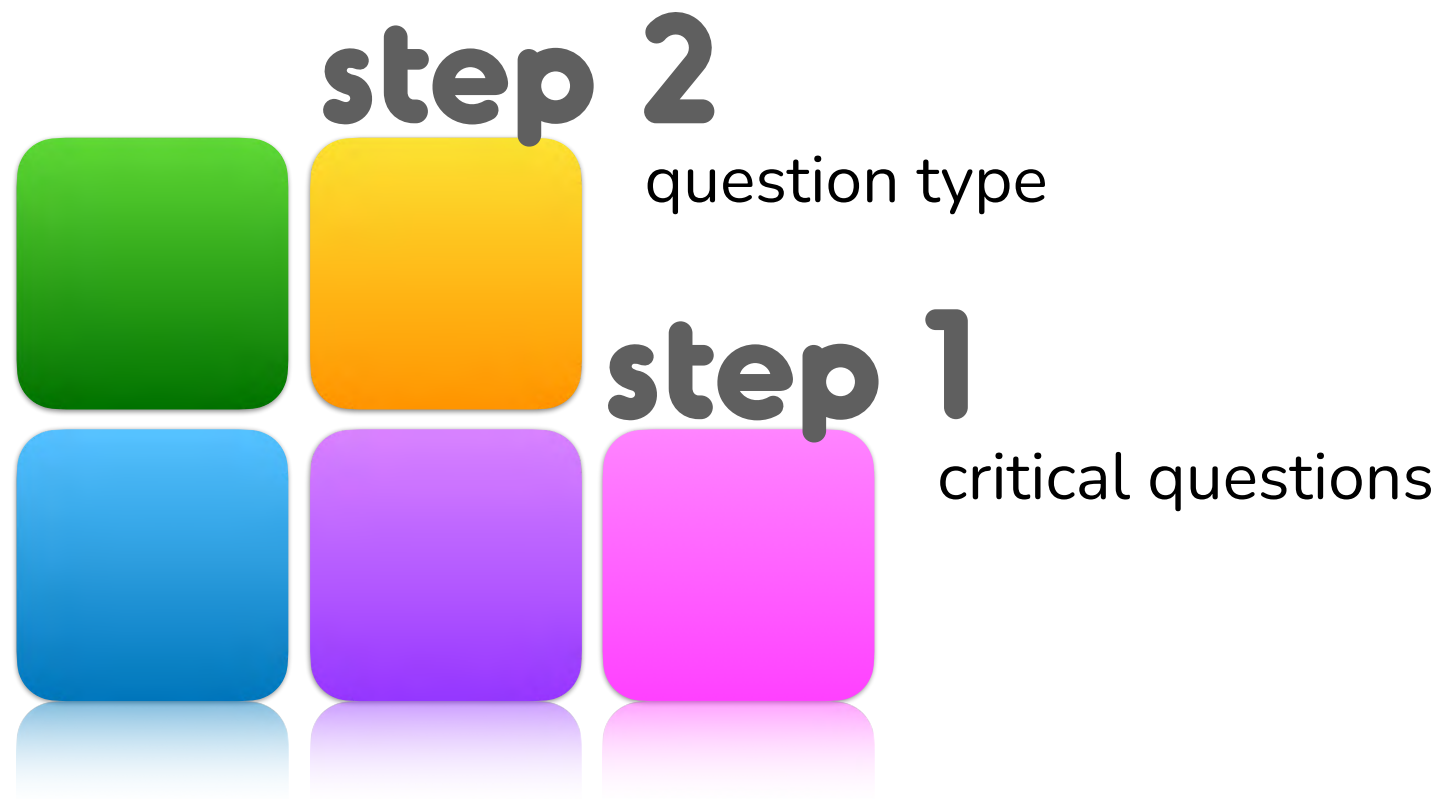
system configuration: focus on “what are the bits?”

integration: focus on “do these bits play well together?”

interaction: a focus on the use model

usability: a focus on user understanding

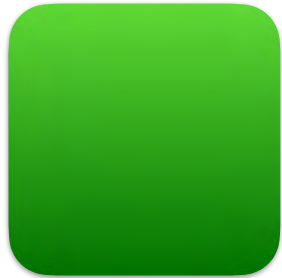
experience: a focus on the user’s feeling



step 3
model type



step 2
question type



step 1
critical questions



step 3



model type

based the question type, where is fidelity needed?

looks-like: fidelity in appearance

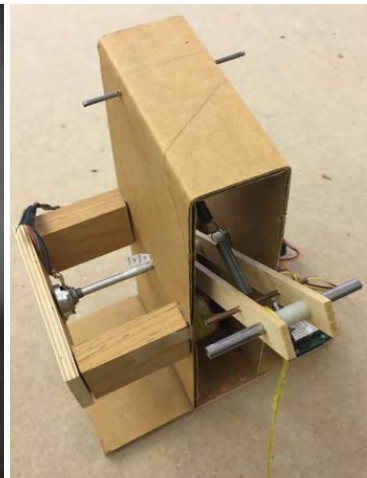
works-like: fidelity in behavior

electric scooter

concern: product definition

focus: scale, usability

type: looks-like (+kinematics)



helicopter lift

concern: product definition

focus: visualization, operation

type: works-like (operating principle)

it's a mini quiz!

write your name on the top of your index card

list 5 steps that were discussed for feasibility estimation

2 minutes



feasibility estimation

approach

- 1 have an idea!
- 2 what worries you?
- 3 develop/ideate analogous models
- 4 work the numbers, check units
- 5 decide if your estimate is reasonable

it's a mini quiz!

write your name on the top of your index card

estimate the usable energy in a C size cell?



3 minutes

no computers or mobile devices



In search of opportunities

Thu, 9/21, 12-1 PM: [RFP training for financial officers](#) (Zoom)

Thu, 9/21, 7-8 PM: [Story Officer training](#) (Pappalardo Conference Room - South)

Thu, 9/21, 7-8 PM: [SI team communication training](#) (Pappalardo Conference Room - North)

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To-dos

- sign up for a [poster mounting session](#)
- sign up for an [ideas presentation practice session](#)

Resources

Lecture 6: [1st Order Modelling and a Challenge](#)

[Frankenpitch generator](#)

Lecture 5: [Observation, and Making a Pitch](#)

Note: Prior lecture notes and materials can be found under the [SCHEDULE](#) menu.

If you miss a class, please request a recording from 2009recordings@mit.edu



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estimation challenge!



how fast will your vehicle travel?
200W per person

3 minutes





