Team AQUA

PRODUCT DEVELOPMENT UPDATE

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Problem Statement

"A user requires a bathtub showering seat for when he travels away from home. The need is to be addressed by designing and manufacturing a durable, portable, retractable, lightweight, and low-cost shower seat that can easily fit into his carry-on luggage bag."

Benchmarking

The PCP Shower Chair
- ✓ Seat channel
- ✓ Rubber ends
- ✓ Backrest

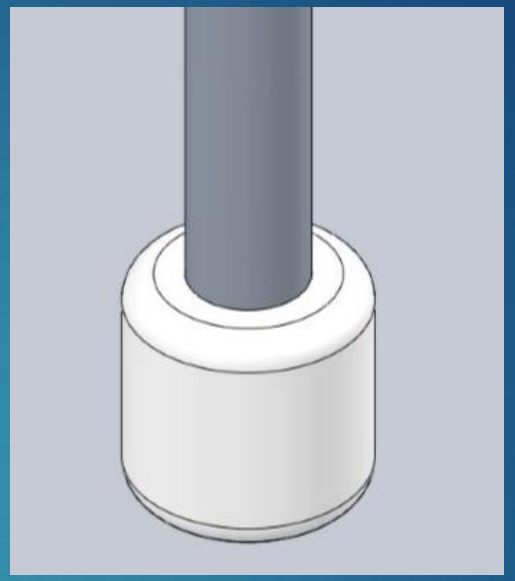
AquaSense
- ✓ Drainage holes
- ✓ Rubber ends

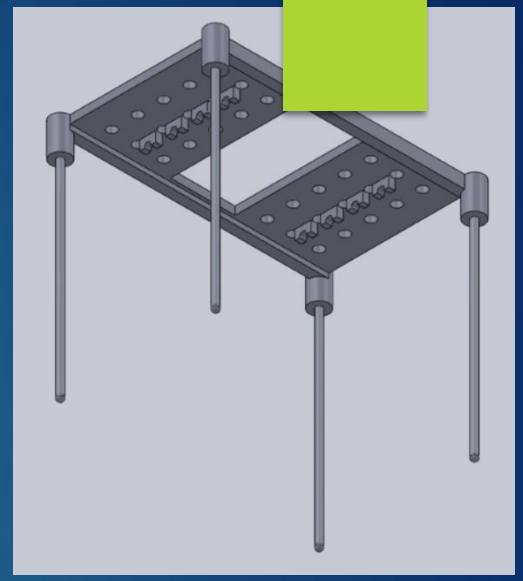
MJM Knockdown Shower Chair
- ✓ Seat channel
- ✓ Easy assembly
- ✓ Backrest

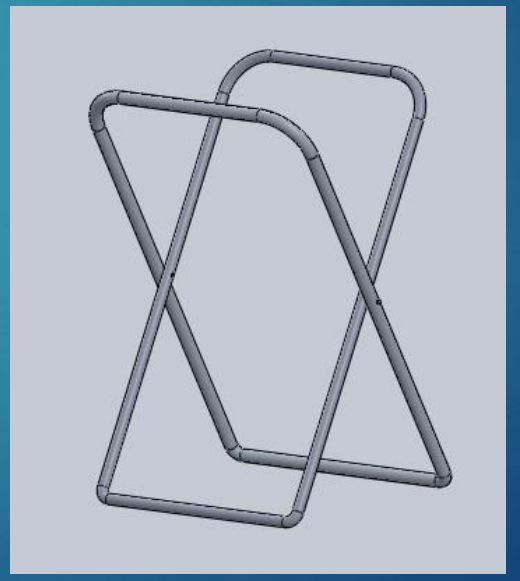
Images retrieved from Deliverable B

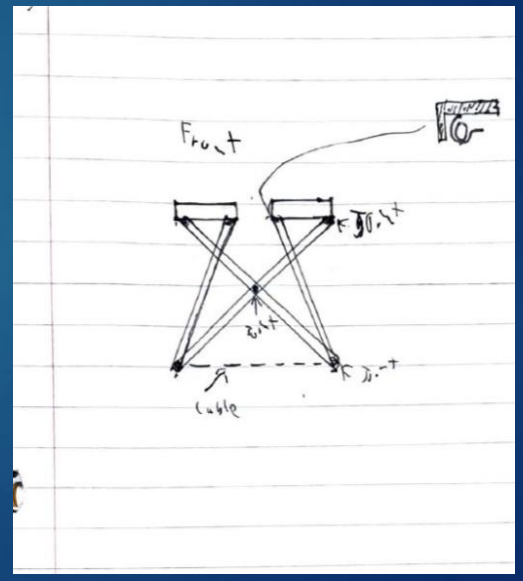
Conceptual Designs

The Ideation Process









Weighted Decision Matrix

Table 3.1: Weighted Matrix of Leg Sub-Assembly

Concepts	Slip-resistant		Lightweight		Low-cost		Durable		Fits into luggage		Aesthetically Pleasing		Total
Weighting factor	16%		16%		16%		8%		40%		4%		%100
Amelia-3	4.5	0.72	5	0.8	4	0.72	4	0.32	5	2	4	0.16	4.72
Ethan-3	4.5	0.72	4	0.72	4	0.72	3	0.24	5	2	5	0.2	4.6
David-2	3	0.48	3	0.78	3	0.48	1	0.08	5	2	4	0.16	3.98
Omar-1	5	0.8	4	0.72	3	0.48	4	0.32	5	2	4	0.16	4.48

Table 3.2: Weighted Matrix of Seat Sub-Assembly

Concepts	Water proof		Durable		Low-cost		Lightweight		Fits into luggage		Drain System		Cleaning channel		Detachable Backrest		Aesthetically Pleasing		Total
Weighting factor	20%		10%		10%		12%		20%		10%		8%		8%		2%		100%
Amelia-2	5	1	4	0.4	5	0.5	3.5	0.42	4	0.8	5	0.5	2.5	0.2	2.5	0.2	4	0.08	4.1
Ethan-3	4	0.8	4	0.4	4.5	0.45	5	0.6	2.5	0.5	2.5	0.25	2.5	0.2	2.5	0.2	4	0.08	3.48
Owen-1	2.5	0.5	3.5	0.35	4	0.4	2	0.24	4	0.8	4	0.4	2.5	0.2	2.5	0.2	3.5	0.07	3.16
Owen-2	4	0.8	3.5	0.35	4	0.4	2	0.24	4	0.8	4	0.4	5	0.4	5	0.4	3.5	0.07	3.86
Owen-3	2.5	0.5	3.5	0.35	5	0.5	3	0.36	4	0.8	4	0.4	5	0.4	2.5	0.2	3.5	0.07	3.58
Samuel-1	2.5	0.5	3.5	0.35	4	0.4	3.5	0.42	4	0.8	4	0.4	2.5	0.2	5	0.4	3.5	0.07	3.57

Table 3.3: Weighted Matrix of Folding Mechanisms

Concepts	Lasts 10 years		Low-cost		Lightweight		Fits into luggage		Fast to assemble		Aesthetically Pleasing		Total
Weighting factor	8%		20%		20%		36%		12%		4%		100%
Amelia-1	3.5	0.28	4	0.8	4	0.8	4	1.44	5	0.6	5	0.2	3.2
Ethan-1	4	0.32	3	0.6	4	0.8	5	1.8	4	0.48	4	0.16	4.16
David-1	3	0.24	3	0.6	4	0.8	4	1.44	5	0.6	4	0.16	3.84
David-3	4	0.32	3	0.6	3	0.6	4	1.44	5	0.6	4	0.16	3.72
Omar-2	3	0.24	2.5	0.5	3	0.6	4	1.44	5	0.6	5	0.2	3.58
Samuel-1	3.5	0.28	4	0.8	3.5	0.7	4	1.44	5	0.6	5	0.2	4.02
Samuel-3	3.5	0.28	4	0.8	4	0.8	4	1.44	5	0.6	4	0.16	4.08
Owen-1	3	0.24	4	0.8	4	0.8	4	1.44	5	0.6	4	0.16	4.04

Simplified Wrike Gantt Chart

#	Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Leader
1	Team contract & Client meet Plan	3							David
2	Specifications and problem statement	1	3						Sam
3	Conceptual design & Project plan		2	3					Owen
4	Prototype 1 & BOM			1	3				Ethan
5	Project Progress Presentation				2				Amelia
6	Prototype 2				1				Ethan
7	Business model & Economics report								Omar

Key:
1 – Task has been discussed between group

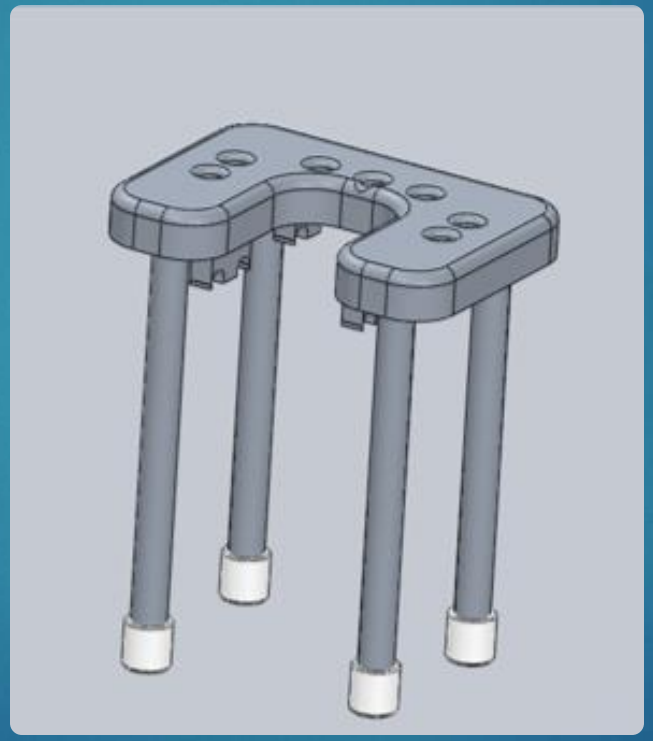
2 – Task has been started

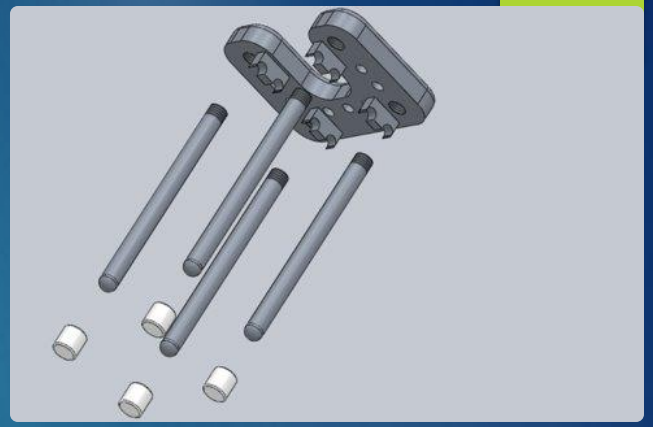
3 – Task competed

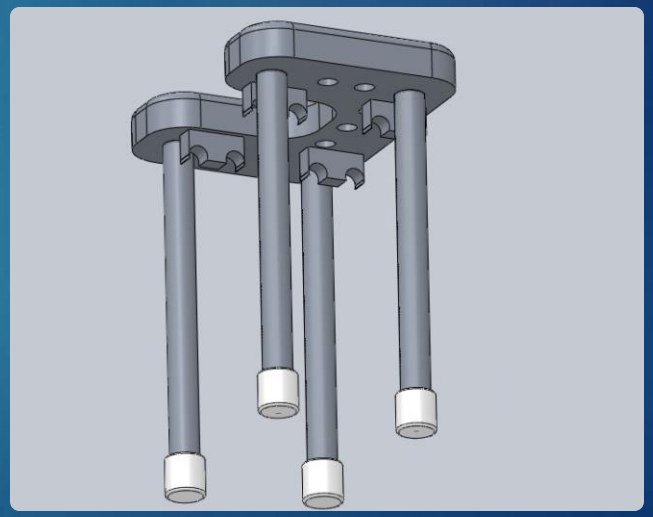
Plan for Future Prototypes

- Test failure modes using simulation software
- Use parts from Kijiji and Facebook marketplace
- Add braces and ribs to provide stronger support
- Centroid and moment of inertia testing

Prototype I







Client Feedback

Praises

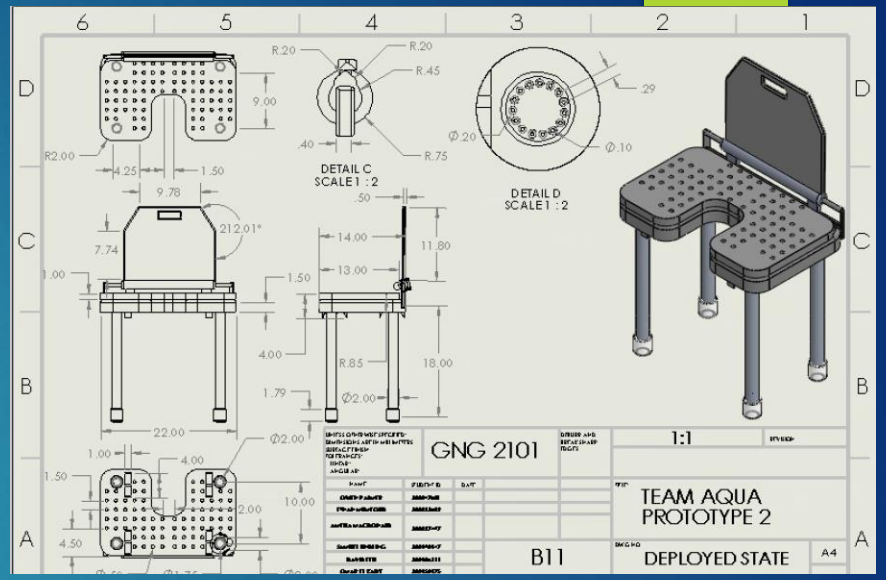
- Simple design
- Cleaning channel
- Removable legs and plastics clips

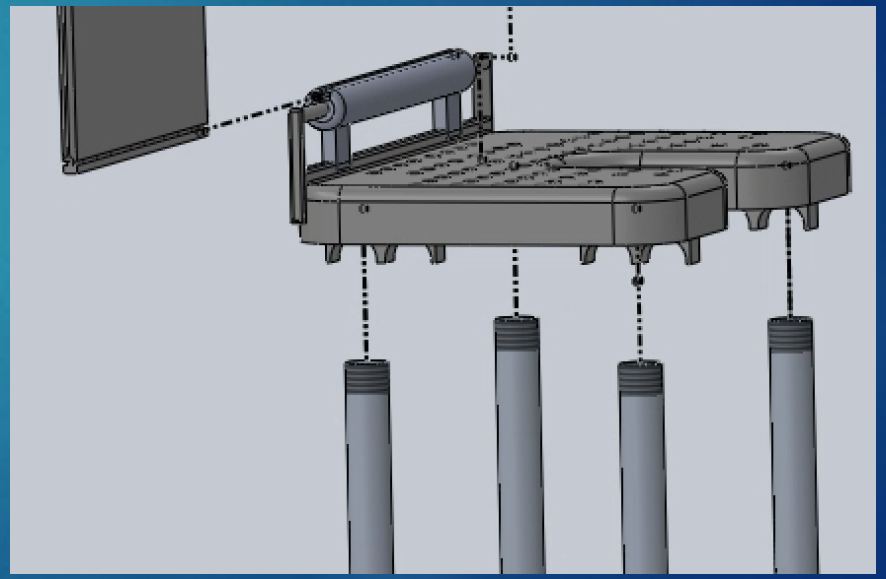
Concerns:

- Size of the seat
- Size of the holes may cause pressure sores
- Seat thickness may add too much weight

Prototype II Deployed

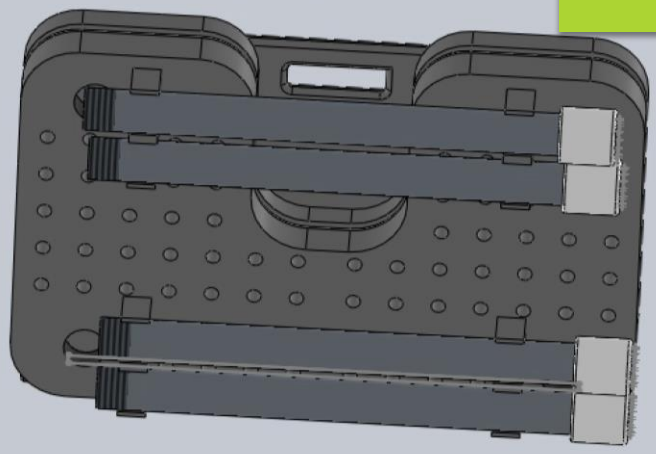
- Deployable ✓
- Weight Capacity (TBT)
- Slip Resistance ✓
- Water Drainage ✓
- Cleaning Channel ✓
- Detachable Backrest ✓

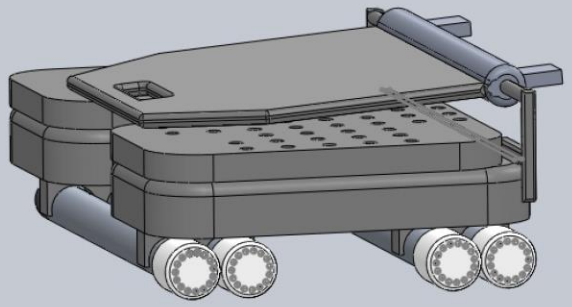




Prototype II Compact

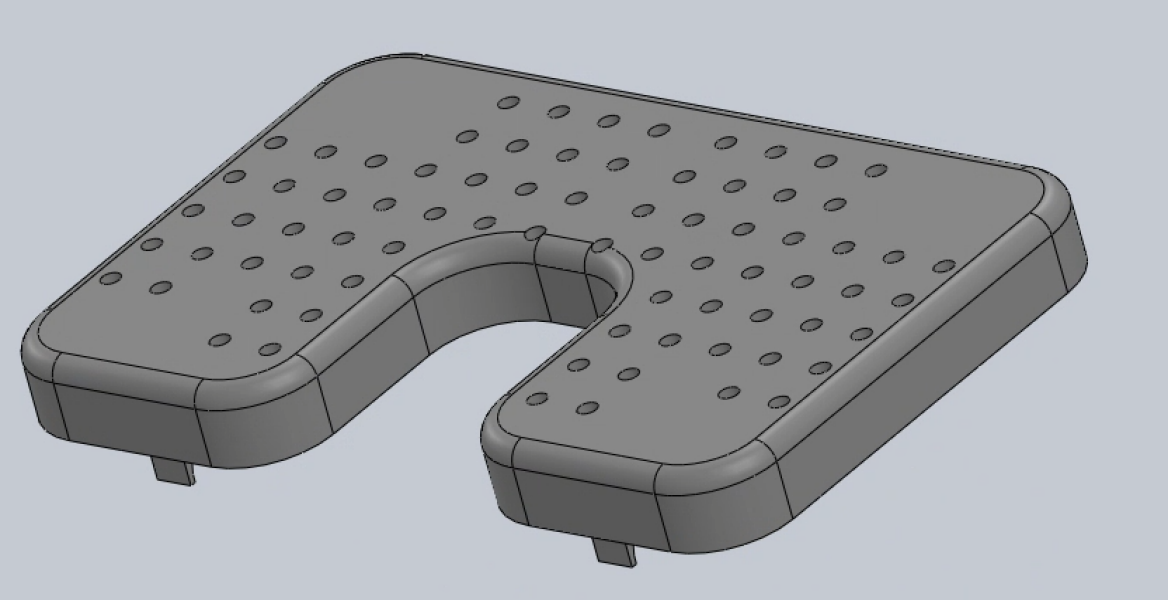
- Retractability ✓
- Storability (TBT)
- Easy Handling ✓

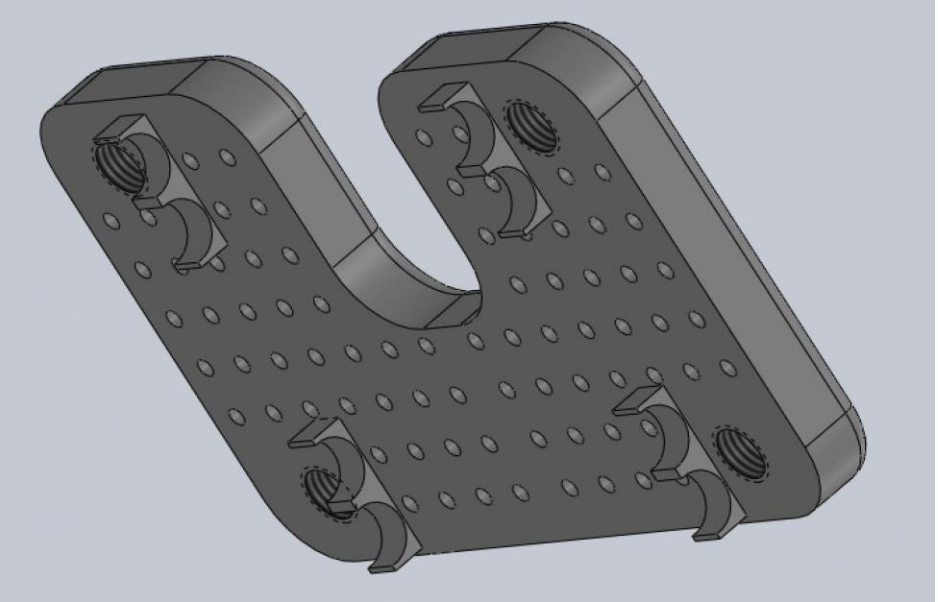




Seat Prototype

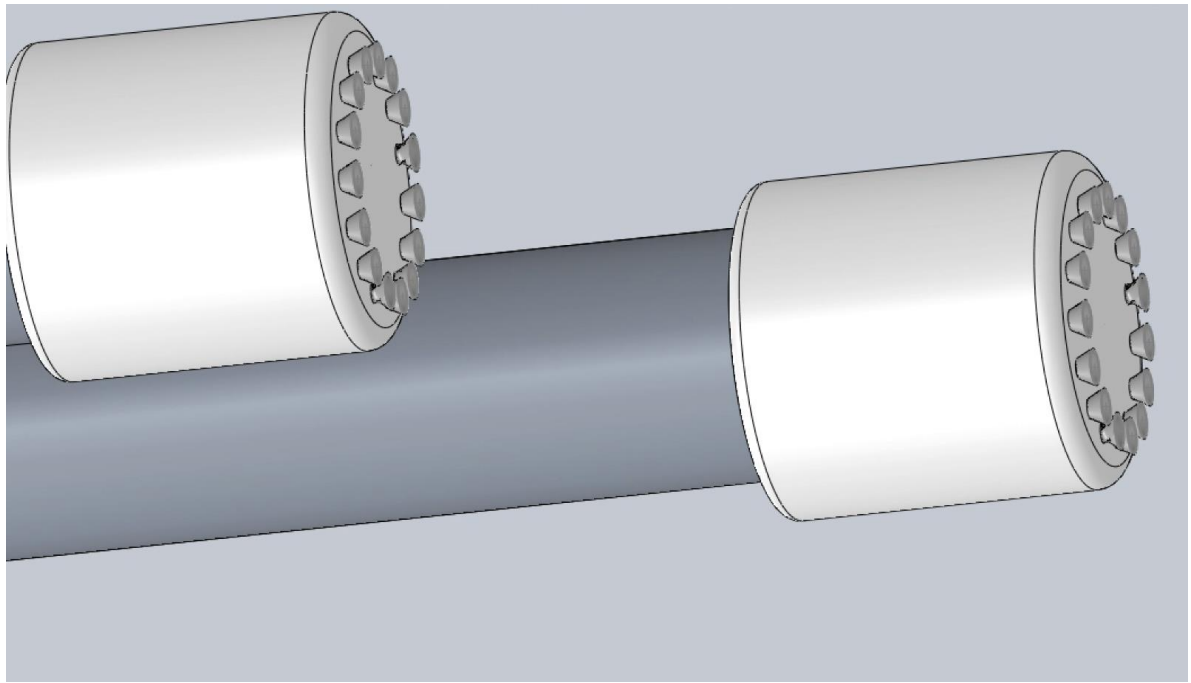
- This prototype will test if the seat can hold enough weight
- The current target specification is 250 lbs.





Feet Prototype

- This prototype will test ability of the feet to grip the bottom of the shower



Client Meeting 3 Plan

1. Present the current prototype made in Solid works
2. Present the plans for future prototypes

Presentation of Prototype

- What do think about our current prototype?
- Is there anything that you particularly like about our prototype?
- Is there anything that you particularly don't like about our prototype?
- Is there anything that you don't understand about our current prototype?
- Is there anything that needs to be changed about our current prototype?

Presentation of Future Prototypes

- Is there any other part that you would like to see prototyped?
- Do you have any concerns about the current prototypes that you would like us to test?
- We have been debating the seat height as a team. Originally you said that the seat height would be 21 inches tall. Where does this measurement come from, and can it be a little shorter?