

Marshall Classroom



MARSHALL
ELEMENTARY SCHOOL
SCIENCE FAIR PROJECTS
DUE FEB. 2
IN-AREA KINDERGARTEN
REGISTRATION FEB. 23

850

ME 476C-5

Team F5

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Abdullah Ali Almutairi

Yousef Alkatan

Taha Alansari

Mohammad Alkatan

Abdullah Almutairi

Project Description

- Marshall Classroom
- Create a device
- We do not want them to feel they are different

Sponsor:

W.L. Gore

Background

- Children with disabilities face many challenges
- Normal desks and tables make them feel uncomfortable
- They need special designs

Benchmarking

- The team seeks to come up with a new universal design.
- Furthermore, we are trying to come up with new ideas.
- As a team we are interested in developing a wheelchair.

Existing Designs

1. Walgreens Ultra weight transport:

- Can Support up to 300lbs
- Has removable foot rests
- Seat belt and Wheel locks for extra safety



<https://www.walgreens.com/store/c/karman-19-inch-aluminum-lightweight-transport-chair-19-lbs./>

2. Viscco wheelchair:

- Removable eating and writing board
- Special sealed bearings used for smooth movement



<https://www.pinterest.com/pin/446700856772576426/>

3. Wheelchair with a lap hugger



<https://www.medicalproductsdirect.com/whpaezrelaph.html>

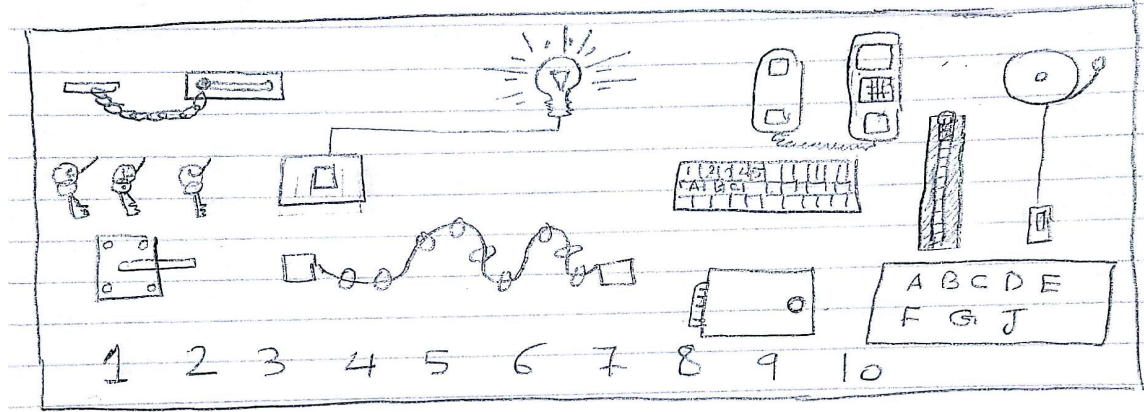
Customer Needs:

- Durability
- Flexibility
- Improve the original design
- No sharp edges
- Strength of the device
- Educated device
- Cost

Engineering Requirements:

Engineering requirements	Targets
Flexible design	Adjustable to a length from 5cm to 15cm
Strength of the device	Yield strength of at least 6Mpa.
Soft material	Low pulling force of below 5 Pascal
Containment	It should have an entertainment-teaching feature
Sensory board	Should have instructional lights and a voice prompt

Design Considered



1. Sensory Board:

It is a board that we can attach on to learn from it life's skills.

Advantages:

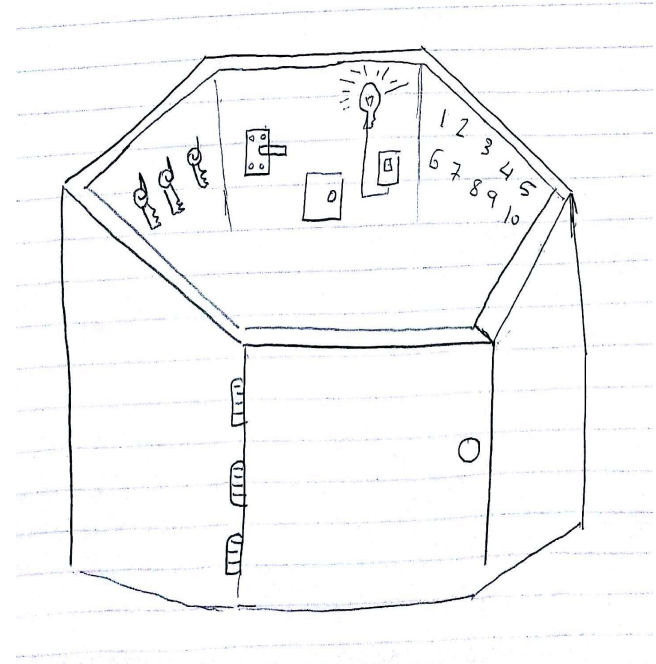
- Make their lives' easier as normal people
- It works for the all disabilities

2. Containment with a sensory board:

We put borders around the disabled child who likes to play so much, so he is surrounded by learning materials.

Advantage: Small place help them to learn easier from the sensory board.

Disadvantage: It only works for special kinds of disabilities.

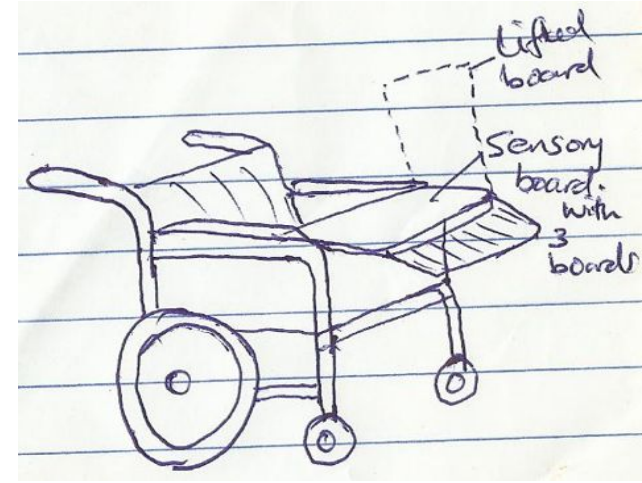


3. Wheelchair with Sensory Board:

It is a wheelchair with a folding sensory board.

Advantage: It helps the paralyzed children to learn from the sensory board.

Disadvantage: It works only for the paralyzed children.

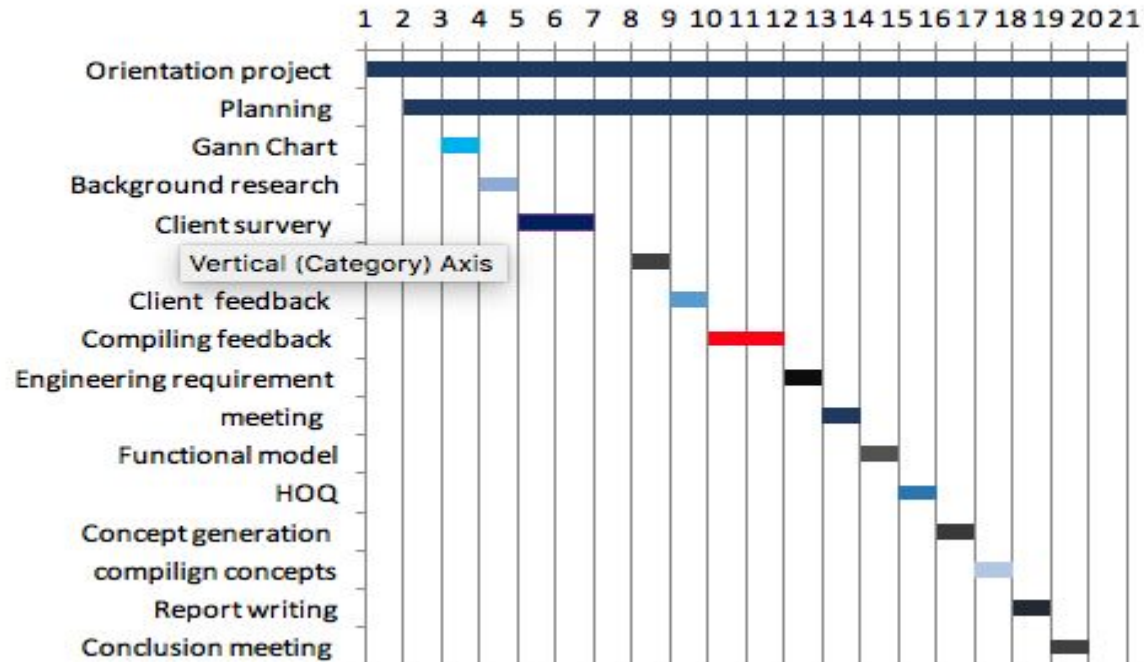


Budget

- Our Budget in \$ for this project is 2,000,00
- Funding Source: Gore
- Estimated Cost:
 - * Materials (35%)
 - * Advertisement (25%)
 - * Manufacturing (25%)
 - * Prototyping (15%)



Schedule



References

- [1] Chang, Yao-Jen, Shu-Fang Chen, and Jun-Da Huang. "A Kinect-based system for physical rehabilitation: A pilot study for young adults with motor disabilities." *Research in developmental disabilities* 32.6 (2011): 2566-2570.
- [2] Fichten, Catherine S., and Claudia V. Bourdon. "Social skill deficit or response inhibition: Interaction between disabled and nondisabled college students." *Journal of College Student Personnel* 27.4 (1986): 326-333.
- [3] Goode, Jackie. "'Managing' disability: Early experiences of university students with disabilities." *Disability & Society* 22.1 (2007): 35-48.
- [4] Knight, Diane, and Donna Wadsworth. "Inclusion Classrooms: Physically Challenged Students." *Childhood Education* 69.4 (1993): 211-215.