The “EcO Closet”

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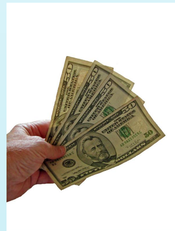
PROJECT MISSION

To create a sturdy, unique well-designed and well-engineered free-standing closet constructed of sustainable eco-friendly products.

PROJECT GOALS

Create a product that:

- is esthetically pleasing;
- has maximized volumetric result;
- is constructed of sturdy light weight material;
- is ergonomically optimized for easy use by both males and females;
- meets all state and Federal manufacturing and use requirements
- Is cost effective
- is largely composed of eco-friendly, longitudinally sustainable, and biodegradable materials

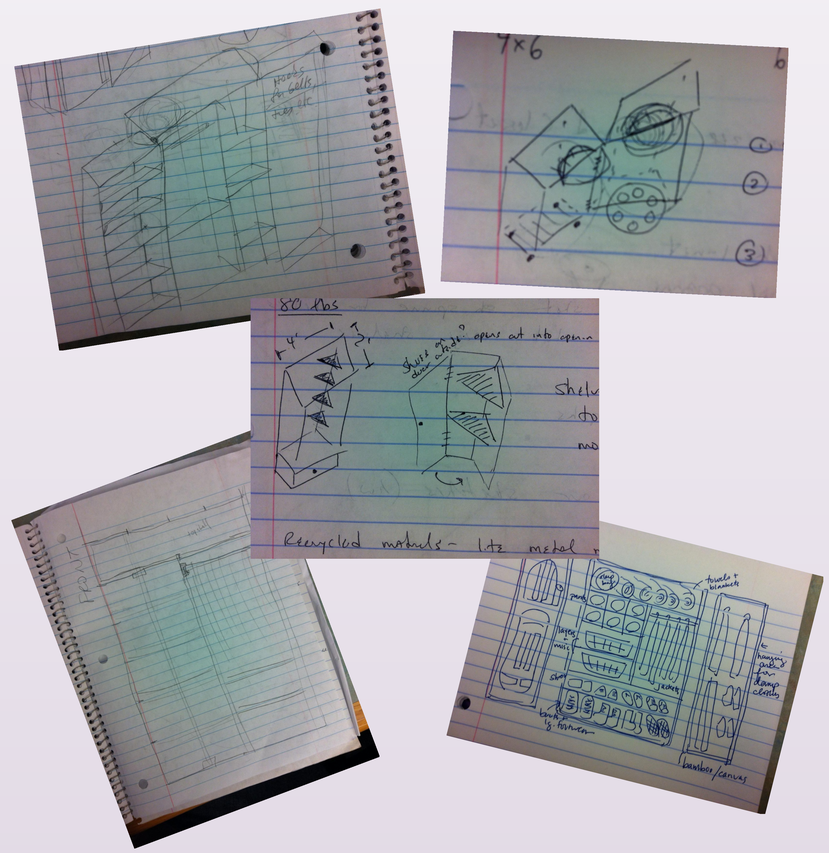


PROJECT PLAN

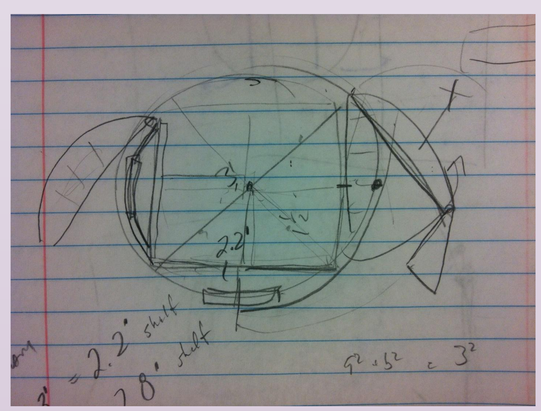
Step 1 – Identify need or problem.
Problem defined is a need for light-weight, inexpensive free-standing storage space:
Step 2 – Research the need or problem.
Problem researched by gathering images of similar products from various vendors.
Step 3 – Develop possible solutions.
Possible solutions were sketched and discussed by team members. Each team member presented three possible solutions.
Step 4 – Select best possible solution.
The best possible solution was a synthesis of ideas from each team member. Selected concepts were reviewed and revised several times.
Step 5 – Construct a prototype.
A 3D prototype was created in SolidWorks.
Step 6 – Test and evaluate solution.
Evaluations considering weight, stability, and loading were performed via SolidWorks simulations.
Step 7 – Communicate the solution.
Poster & presentation

POSSIBLE SOLUTIONS

Various internal and external geometries were considered.
Materials were researched for environmental consideration – bamboo was selected for the structural framework and grass cloth was selected to cover exterior surfaces.



FINAL SOLUTION



PROJECT EVALUATION

Project will be evaluated on the following criteria:

- Dimensions = 48” x 48” x 72”
- Esthetics = unique hexagonal design useful in corners
- Weight = 43.29 pounds
- Sustainability = bamboo & pine
- Cost = $17.76 for 74 lf of bamboo & $55.94 for 64 sq. ft. of pine = $73.70!
- Storage space = ~75 cubic feet
- Center of gravity/stability
- Load carrying capacity/safety factor

Also considered:

- build vs. buy cost analysis
- ease of manufacture
- product life expectancy
- overall ergonomics
- environmental impact from manufacturing to disposal
- competitive analysis

LESSONS LEARNED

McMaster-Carr supplies SolidWorks files for many useful parts.
Materials research using SolidWorks is limited – 21st century materials – e.g. bamboo, grass cloth, etc. were not a part of the provided database.
Not all committees create camels and elephants.