Project Deliverable I: **Final Presentation**

GNG 1103 – Engineering Design

ALPACA

(Construction 4)

Dylan Fewer, Dawson Link, Yan Kwun, Reza Fetanat, Anujan Thayaalan, Terry He

Needs Identification & Problem Statement

Needs:

- Greenhouse to grow hardy crops all year
- Lots of snow and rain
- Poor quality soil
- Pests and Small animals
- $250 budget
- Disassemblable

Problem Statement: The Algonquins of Lac Barrieres problem is that they need a greenhouse to grow crops because they don't have easy access to food in their area, and are unable to grow enough food for the year conventionally due to a short growing season, harsh winters with temperatures that reach -40, unsatisfactory soil and pests.

Design Criteria

Specifications	GrowIT 6x8 ft D Greenhouse	Palram Mythos 6 x 4 Greenhouse Twin Wall Green	Outsunny Portable 4-Tier Warm Pop up Plants And Flower Greenhouse with Shelves	Importance
Shape	Triangle Roof	Triangle Roof	Triangle Roof	2
Cost	$242.99	$599.99	$99.99	4
Size	6'H by 6' 11/16" W by 8' D	6 ft by 4.1ft by 6.8ft	6.5 ft H x 4.6 ft L x 2.5 ft W	2
Weather resistance	yes	"Virtually unbreakable"	May be negatively affected by snow	5
Pest resistance	bad	good	bad	4
Size disassembled	Poratable	Disassemble into panels	Very Portable	1
Materials	Frame Material: Steel Panel Material: Polyethylene film	Polycarbonate panels Aluminium frame	Steel Plastic	3

	Need	Design Criteria
1	Last through the winter (-30 to -40 Celsius)	Strong structure made of wood insulated with transparent wrap Sloped roof to have snow fall off
2	Wild animals like chipmunks, squirrels and bugs	Elevated off the ground Floor built
3	Air ventilation	Rotating window Fans to push air Vent that can close
4	Growing plants	Enough sunlight for crops, good temperature, use of nutrient solution
5	Ground is quite sandy	Rectangular base Floor or off ground
6	Rainfall can be varied during the year.	Waterproof polyethylene
7	Transporting the greenhouse	Built in panels that can be easily disassembled for transportation
8	Low cost	Wood for frame, polyethylene for walls, bubble wrap for insulation

Conceptual Design

Joining of panels with nuts and bolts

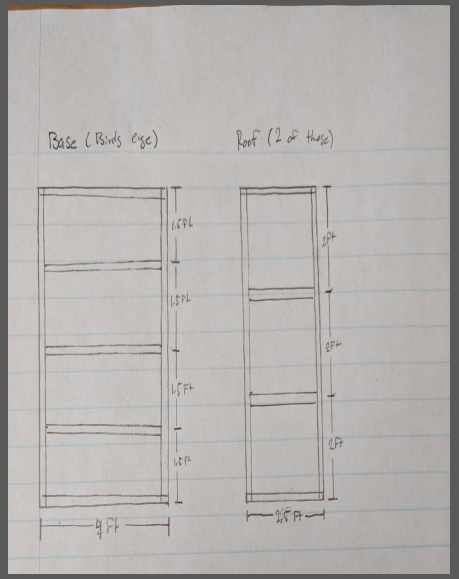
Door

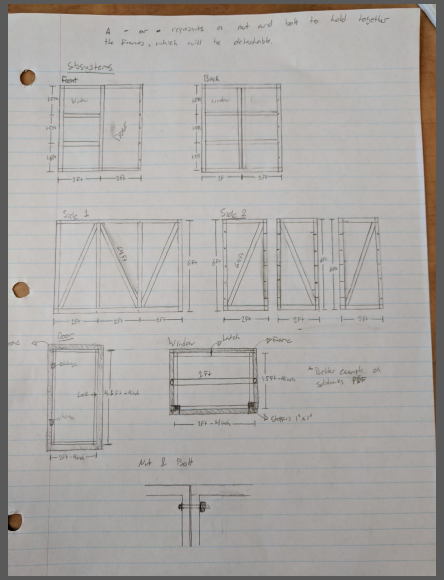
Supports

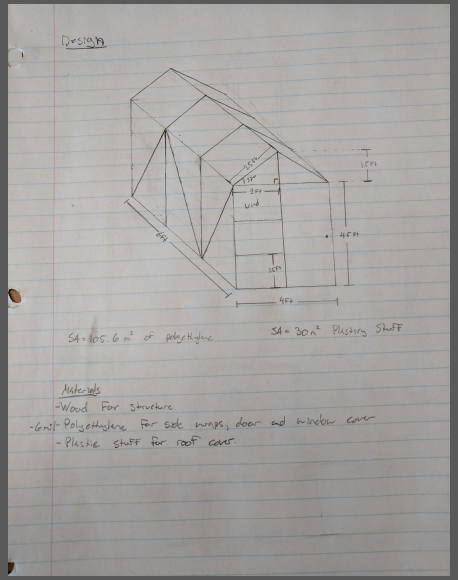
Base

Roof

Window







Cost Estimate

Wood (saved money by using old wood for some parts)

Dowels

Polyethylene

Corrugated Roof Panels

Corner Brackets

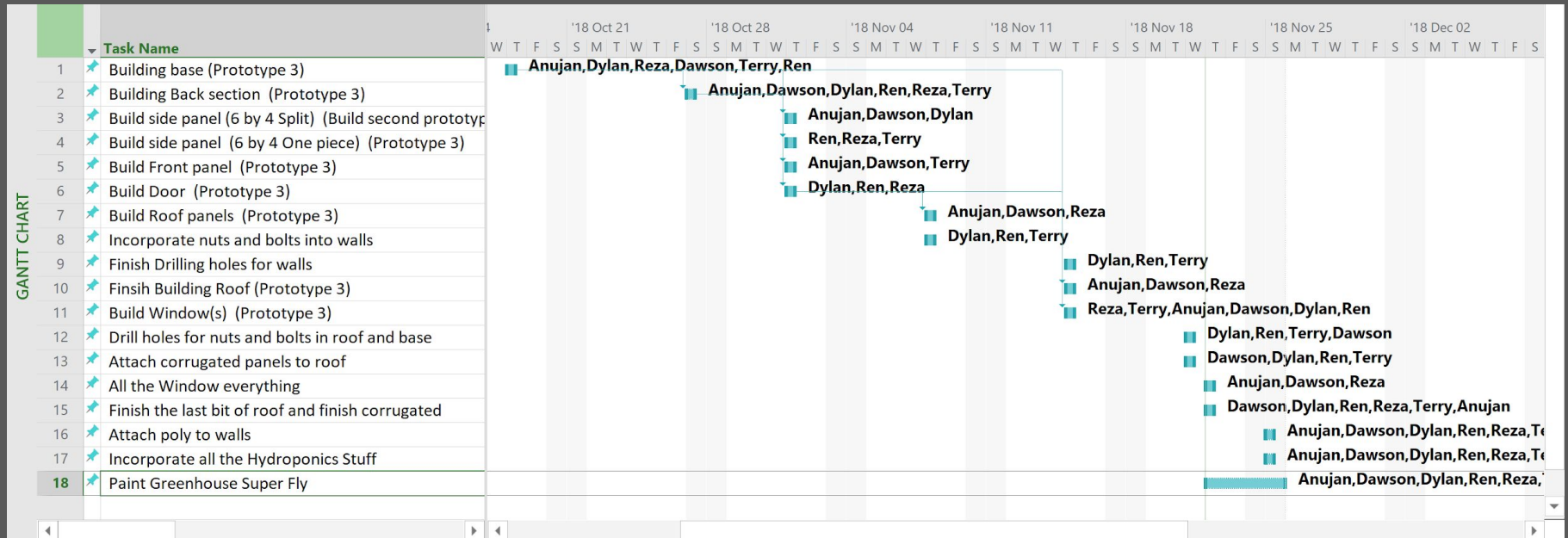
Mending plate 4pk

Saved money by 3D printing parts

Estimated Total Before Construction (taxes in) = $299.28

Project Plan

- A gantt chart was used to track progress by assigning each team member to different tasks.
- A Projected timeline was set and updated weekly



Nuts and Bolts

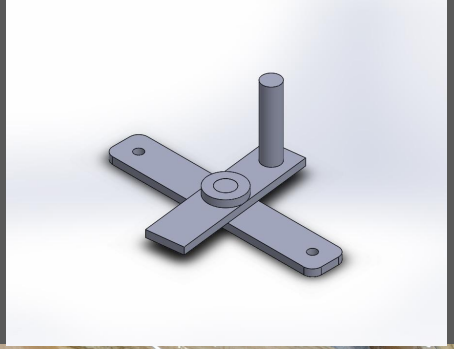
Bolts connect each panel together and attach the roof to the tops of the walls

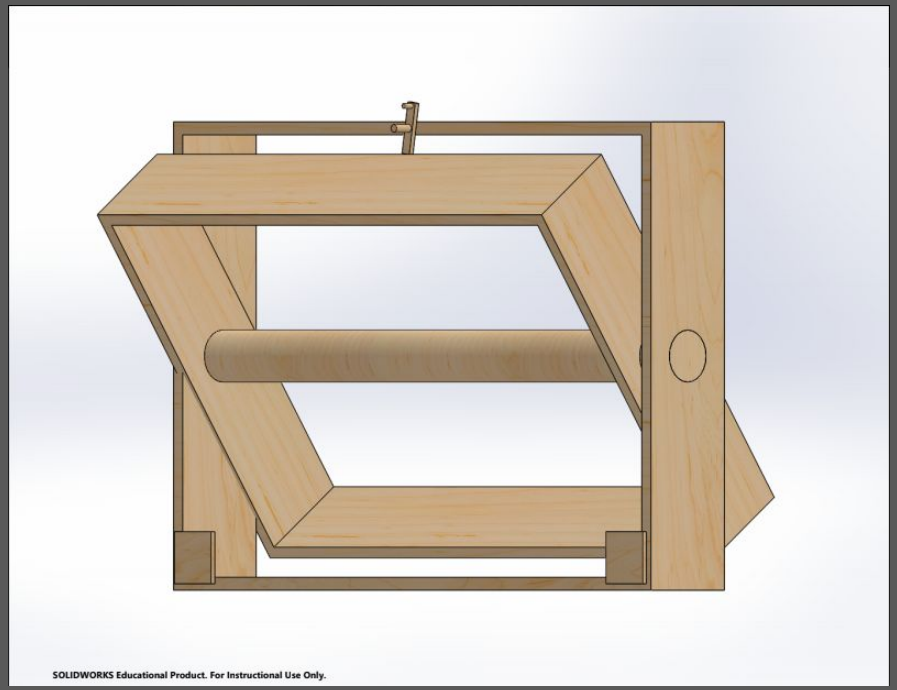
Nuts and Bolts Cont.

Brackets were placed on either side of the base at the bottom to hold the walls in place

Windows

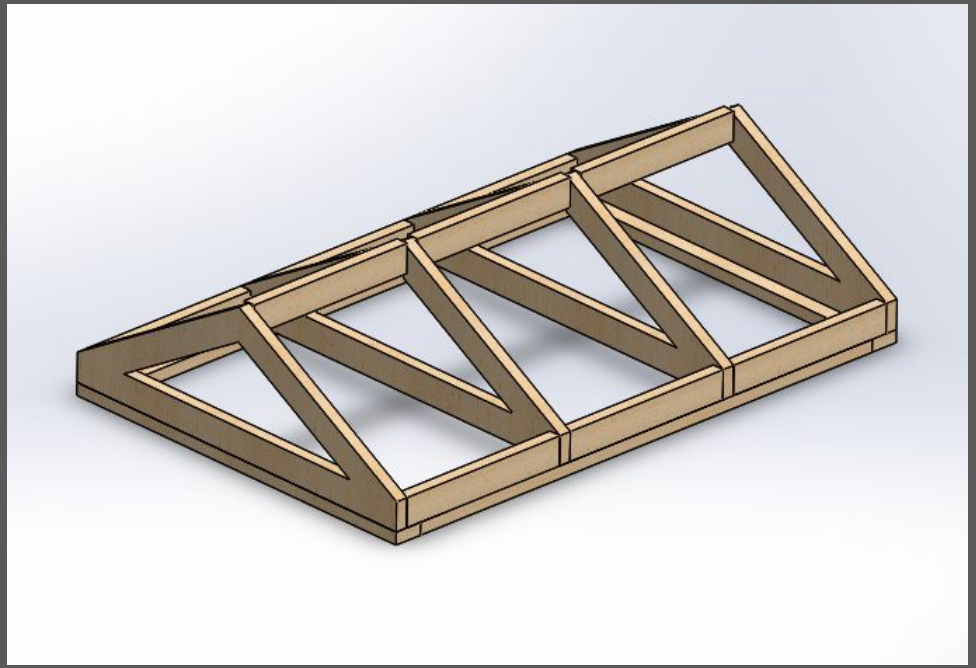
Designed to add air flow and coolness



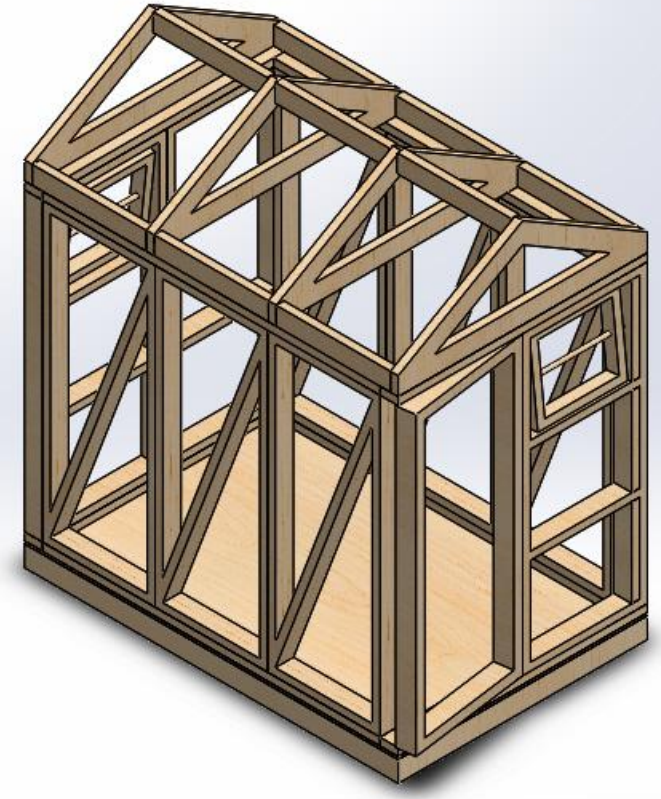


Roof

The roof design



Final Design



A stupendous Greenhouse ;)

Not this one!

Lessons Learned

Construction is hard

Concepts can be difficult to incorporate into final design.

Communication is important