## 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	8	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	Elevated off the ground
Shape	Triangle Roof	Triangle Roof	Triangle Roof	2	3	and bugs	Floor built
Cost	\$242.99	\$599.99	\$99.99	4	3	Air ventilation	Rotating window Fans to push air Vent that can close
Size		6 ft by 4.1ft by 6.8ft	6.5 ft H x 4.6 ft L x 2.5 ft W	2	2		
-	D		May be negatively affected by snow		4	Growing plants	Enough sunlight for crops, good temperature, use of nutrient solution
Weather resistance	yes	"Virtually unbreakable"		5	3-1		
					5	Ground is quite sandy	Rectangular base
Pest resistance	bad	good	bad	4			Floor or off ground
Size disassembled	Poratable	Disassemble into panels	Very Portable	1	6	Rainfall can be varied during the year.	Waterproof polyethylene
Materials	Frame Material: Steel Panel Material: Polyethylene film	Polycarbonate panels Aluminium frame	Steel Plastic	3	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

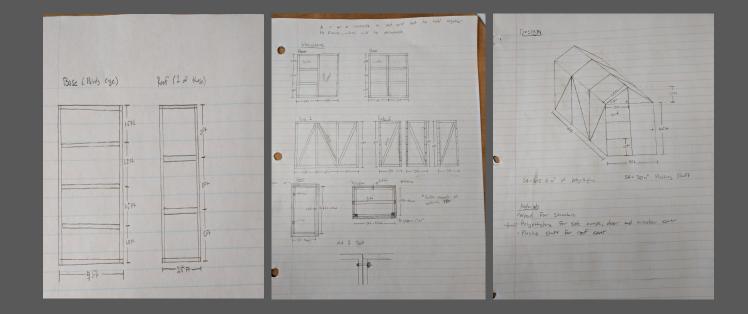
Door

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

		1	'18 Oct 21 '18 Oct 28 '18 Nov 04 '18 Nov 11 '18 Nov 18 '18 Nov 25 '18 Dec 02							
		▼ Task Name	V T F S S M T W T F S S M T W T F S S M T W T F S S M T W T F S S M T W T F S S M T W T F S S M T W T F S							
	1	Building base (Prototype 3)	Anujan, Dylan, Reza, Dawson, Terry, Ren							
	2	Building Back section (Prototype 3)	📷 Anujan, Dawson, Dylan, Ren, Reza, Terry							
	3	* Build side panel (6 by 4 Split) (Build second prototyr	🗽 Anujan,Dawson,Dylan							
	4	Build side panel (6 by 4 One piece) (Prototype 3)	🗽 Ren,Reza,Terry							
	5	Build Front panel (Prototype 3)	📊 Anujan, Dawson, Terry							
_	6	🖈 Build Door (Prototype 3)	Dylan, Ren, Reza							
AK	7	Build Roof panels (Prototype 3)	📊 Anujan, Dawson, Reza							
5	8	* Incorporate nuts and bolts into walls	🗾 Dylan, Ren, Terry							
-	9	✤ Finish Drilling holes for walls	📘 Dylan, Ren, Terry							
IPD	10	Finsih Building Roof (Prototype 3)	📊 Anujan, Dawson, Reza							
	11	* Build Window(s) (Prototype 3)	🗽 Reza, Terry, Anujan, Dawson, Dylan, Ren							
	12	Drill holes for nuts and bolts in roof and base	Dylan,Ren,Terry,Dawson							
	13	* Attach corrugated panels to roof	Dawson, Dylan, Ren, Terry							
	14	★ All the Window everything	Anujan,Dawson,Reza							
	15	Finish the last bit of roof and finish corrugated	Dawson, Dylan, Ren, Reza, Terry, Anujan							
	16	* Attach poly to walls	📊 Anujan, Dawson, Dylan, Ren, Reza, Te							
	17	* Incorporate all the Hydroponics Stuff	📊 Anujan, Dawson, Dylan, Ren, Reza, Te							
	18	✓ Paint Greenhouse Super Fly	Anujan,Dawson,Dylan,Ren,Reza,							
	4	• • •								

### Nuts and Bolts

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





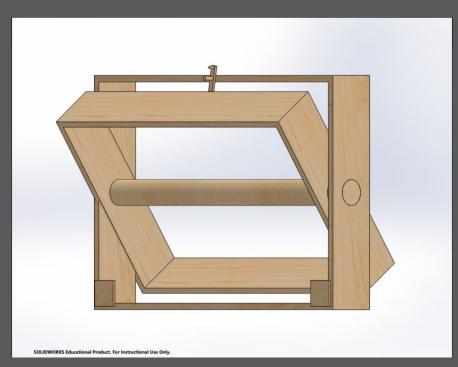
### Nuts and Bolts Cont.

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



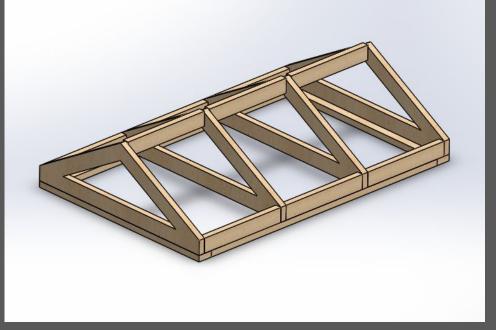




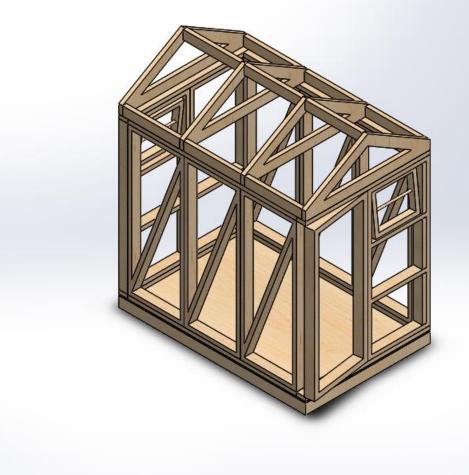
## Roof

#### 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