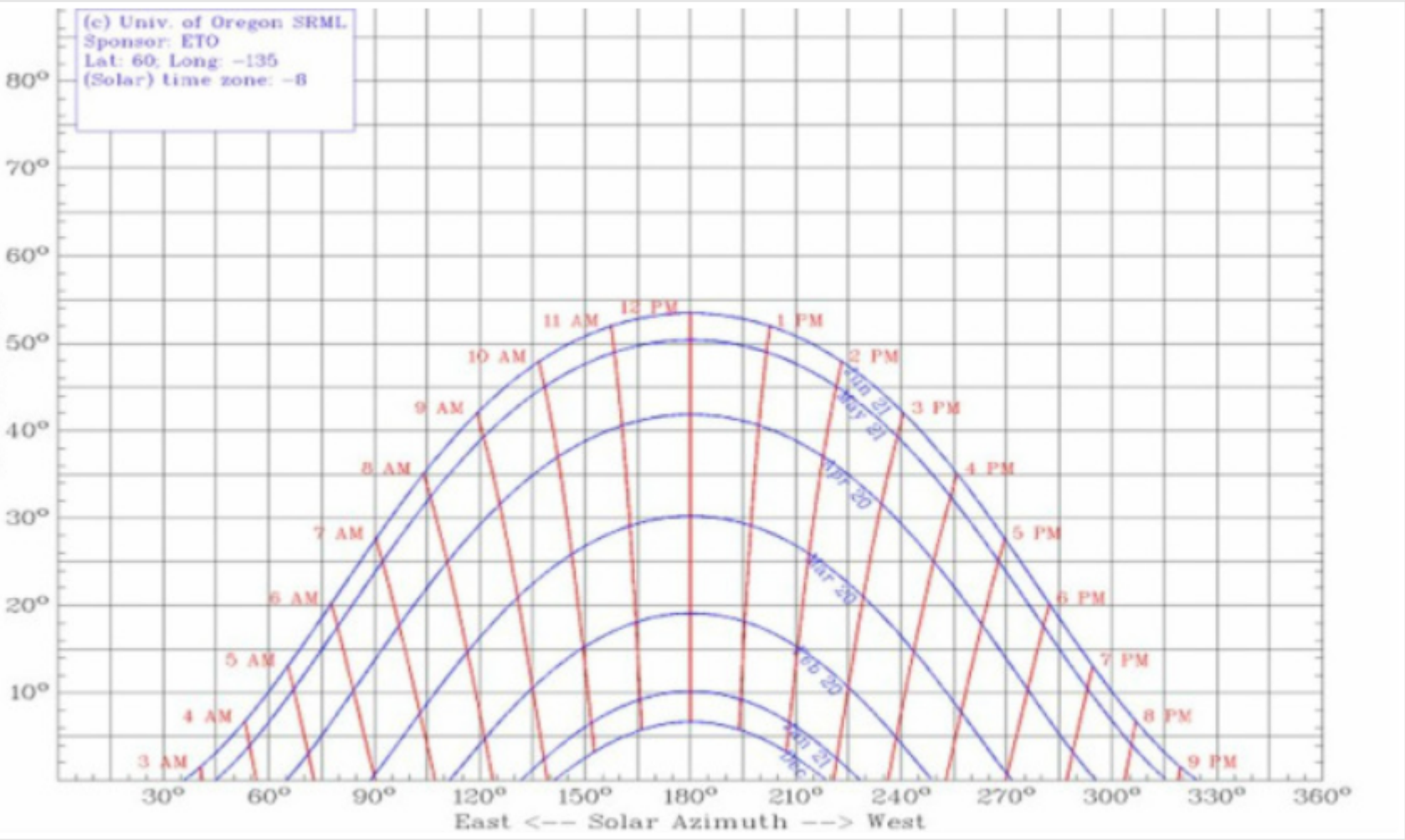
This is about Energy!
Collecting, Saving, Using,
and Expelling as Needed

tehorse sun path (by date)

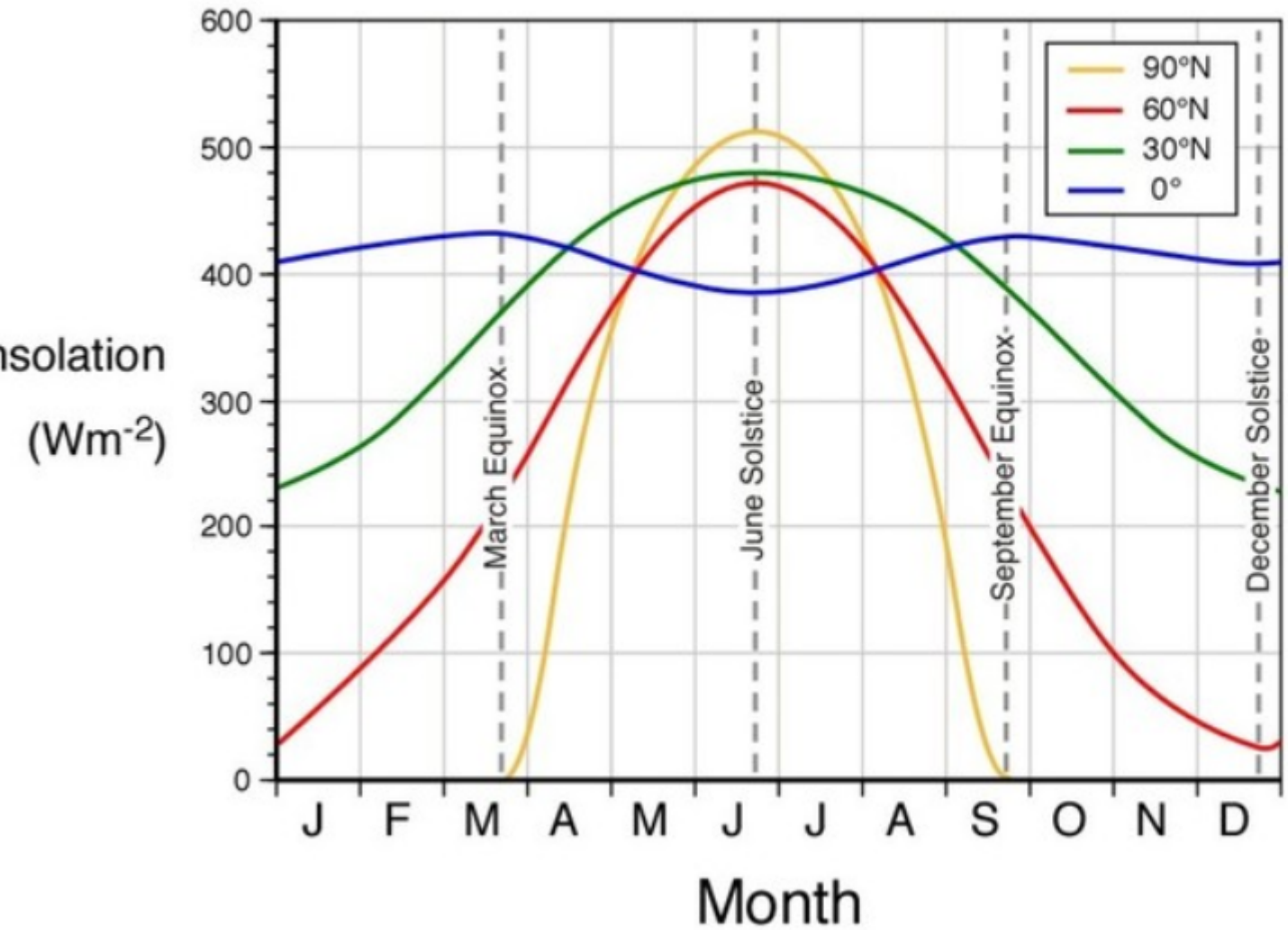


This graph shows the elevation and azimuth o the sun at different mo of the year in Whitehors This information should taken into consideration when designing a greenhouse. The angle the glazing, the directio the greenhouse faces, glazing materials and th length of time you wish operate your greenhous are all affected by this information.

Solar Insolation Energy from the

next

n's energy in Whitehorse



Insolation (Incoming Solar Radiatio the amount of solar radiation incide on any surface.. The amount of insolation received at the surface o Earth is controlled by the angle of t sun, the state of the atmosphere, altitude, and geographic location. T graph to the left shows average sol insolation at different latitudes. The Whitehorse graph, in red, shows energy above 300 watts per square meter occours between mid-April to early September. Lags in the earth cooling creates a growing season t lasts beyond September 1.

back

ehorse weather conditions

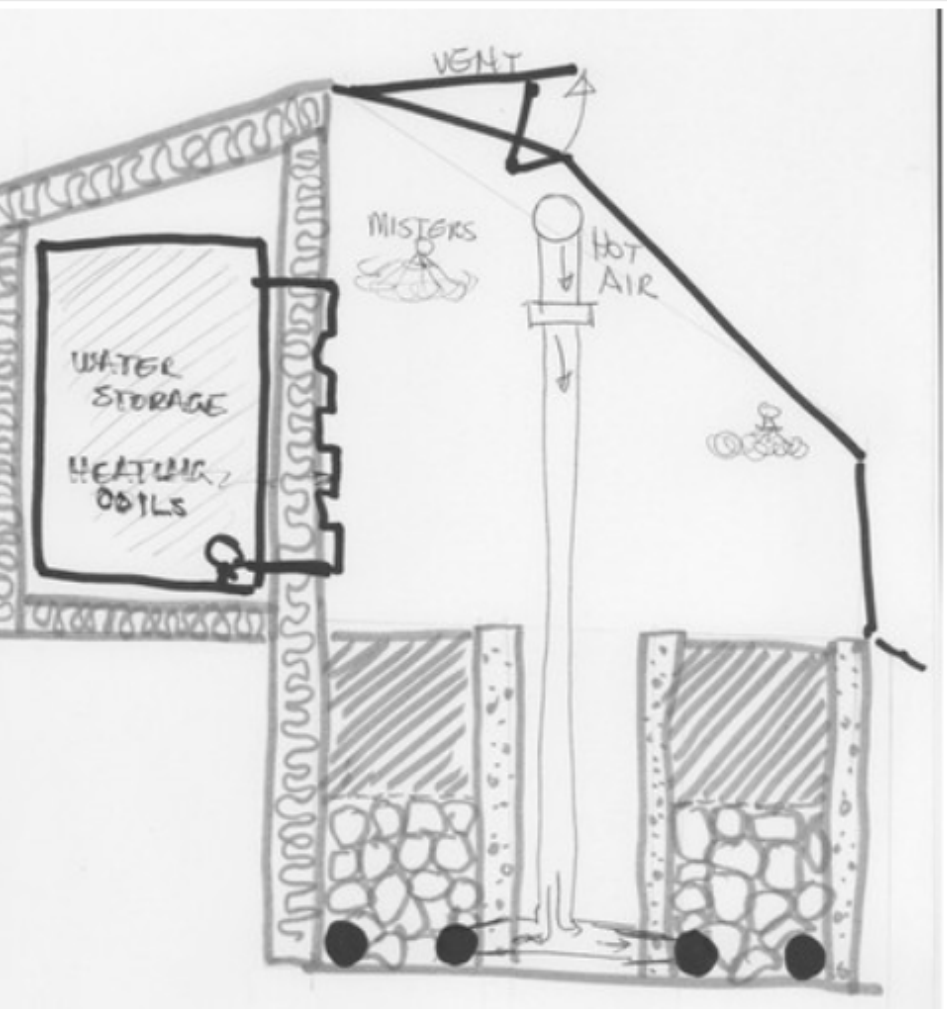
itehorse Airport Weather averages 1987 to 2012 Min temp shown with 85% confidence

	April		May		September		October	
e	85% con	Mean Temp	85% conf	Mean Temp	85% con	Mean Temp	85% con	Mean Ten
1	-8.58	-2.85	-1.30	5.11	0.68	9.34	-2.57	6.06
2	-7.87	-2.30	-2.15	4.24	0.25	8.41	-3.00	4.97
3	-7.05	-1.97	-1.22	4.79	0.29	8.99	-3.80	4.38
4	-5.73	-1.11	-0.69	5.11	1.33	9.47	-5.49	3.79
5	-7.88	-2.06	-1.86	4.77	-0.07	9.40	-3.21	4.40
6	-7.75	-1.76	0.14	5.72	1.77	9.64	-0.85	5.21
7	-7.03	-1.41	0.57	6.24	1.04	9.23	-2.52	3.90
8	-6.08	-0.60	-0.83	5.78	-0.60	8.86	-2.80	3.59
9	-5.82	-0.20	-0.47	5.76	-0.58	8.79	-2.99	3.28
10	-5.60	-0.12	0.08	6.32	-0.64	8.60	-4.49	2.96
11	-4.74	0.27	0.89	6.76	-0.08	8.49	-4.00	2.47
12	-3.94	0.83	0.43	6.48	0.05	8.22	-5.23	1.51
13	-4.48	0.89	0.48	6.39	0.27	8.46	-6.52	1.21
14	-3.76	1.27	1.32	6.99	-0.75	7.40	-9.31	0.65
15	-3.33	1.70	0.99	7.10	-1.75	6.94	-8.70	-0.16
16	-3.23	2.03	-0.07	6.31	-3.16	6.43	-8.91	-0.08
17	-3.33	1.82	0.84	7.25	-3.17	6.89	-9.35	-0.31
18	-2.86	2.69	0.86	7.72	-1.14	6.68	-7.94	0.83
19	-2.92	2.96	1.83	7.93	-1.62	6.83	-8.25	1.52
20	-1.92	3.71	1.69	8.60	-1.26	7.30	-6.26	1.54
21	-1.42	3.73	1.43	8.74	-1.75	7.34	-7.85	0.30
22	-1.92	3.40	2.42	8.90	-1.31	7.49	-7.95	0.13
23	-2.50	3.69	2.39	9.39	-1.58	6.47	-8.16	0.28
24	-2.41	3.84	3.95	10.67	-1.38	6.20	-7.85	-0.07
25	-1.45	4.63	3.54	10.57	-2.51	5.47	-8.61	-0.51
26	-1.27	4.90	3.88	10.70	-2.72	5.74	-10.07	-1.25
27	-0.92	5.59	4.18	10.68	-4.20	4.48	-11.80	-2.50
28	-0.48	5.99	4.11	10.37	-2.48	5.07	-11.37	-2.50
29	-1.03	5.36	4.17	10.23	-3.85	4.02	-13.30	-3.34
30	-0.10	6.06	4.60	10.75	-2.72	4.66	-12.82	-4.32
31			3.89	10.45			-12.78	-5.40

This graph shows the average Whitehorse weather conditions for growing months. The killing frosts, shown as one standard deviation below the average daily minimums represents a 85% probability of temperatures below this point. Growing plants in our environment means that we nee to realize and work around these factors.

reenhouse heat management design

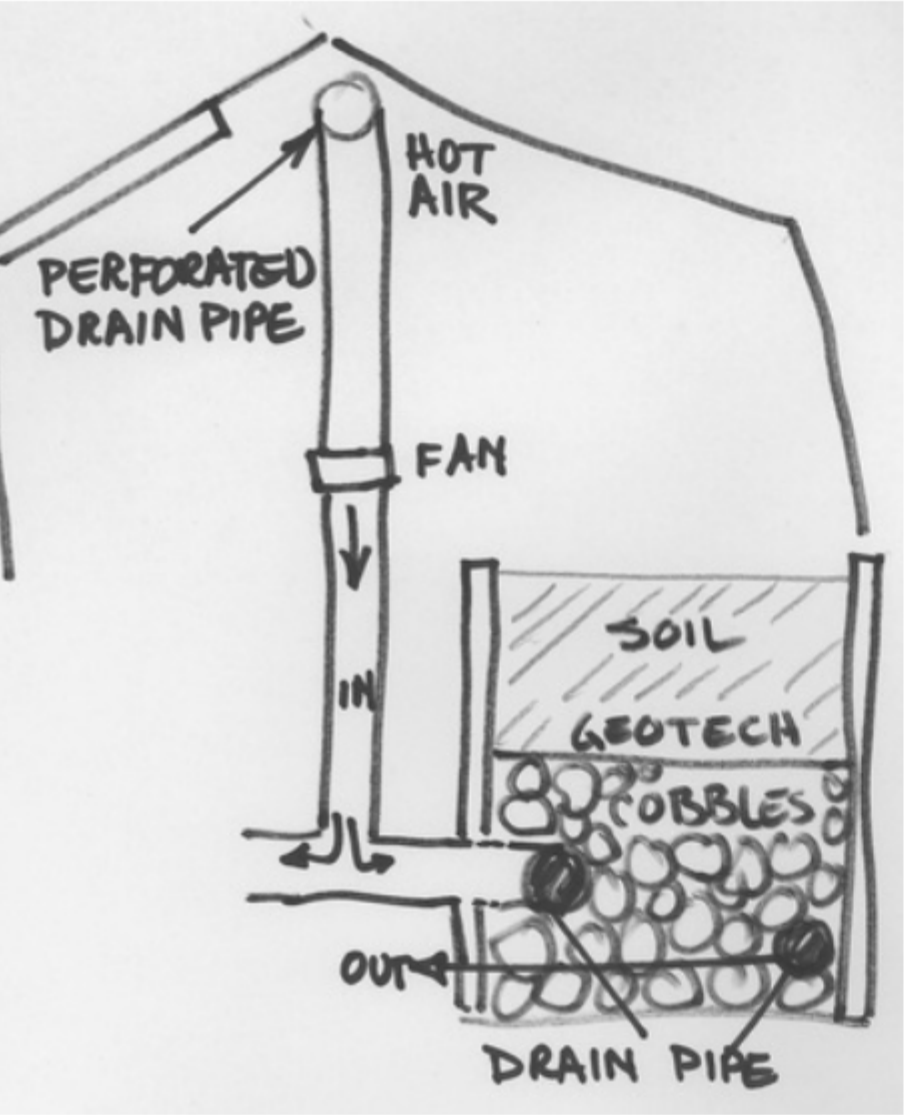
oss section of solar greenhouse design



This greenhouse was designed to manage heat and watering as inter-related processes with a minimum of cost and effort.

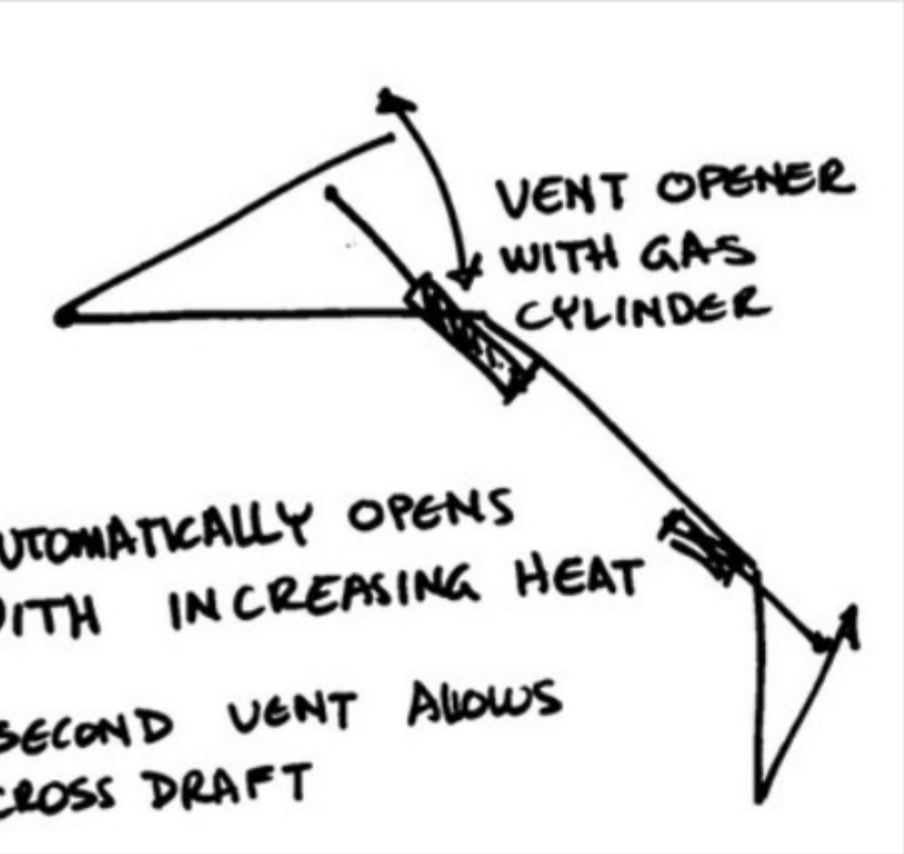
It uses four systems to regulate heat, water and costs about $6.0 year and needs little management.

ble heat sink and heat exchange



This system is made up from 4 inch perforated PVC pipe, a 6 watt large cobbles under the beds, geotech fibre above the cobbles and two perforated pipes within the cobbles. The warm air from the top the greenhouse is pushed through the rocks, heating them during t day, warming the beds and readmitting some of the heat during the night period. The net effect is to moderate the greenhouse temperatures.

omatic vent openers



This system uses gas or paraffin vent openers. This system in the override arrangement kicks in when overheating occurs. These cylinders automatically open and close the ridge vent depending on the temperature. The vents should be arranged to take advantage o convection and any possible cross drafts. These openers open wid as it gets hotter, allowing increased cooling. Don't forget to bring th in before the winter cold weather. They don't like -40 deg C.

Back

Why special greenhouses for cold climates?

Growing warm weather vegetables in colder climates requires protection for the plants. Plants like tomatoes, cucumbers, squash and many others need warm growing conditions, but we can grow these plants if we manage temperature changes, avoid frosts, freezing and extremes in heat. Greenhouses are supposed to provide that protection, at reasonable costs, but many fail.

When writing about cold climate gardening, I am referring to zones 1a 1b, 2a a
2b in the Canadian Plant Hardiness classifications zones. Click here for more
information on these zones. They are typically found in the northern parts of
the provinces and in the southern parts of the Territories. These areas requir
different style of gardening in warmer zones.

Four broad topics are addressed in this section:

- The types of garden structures you will need to grow a variety of plants, some of which require much warmer environments
- The types of plants you may want to select for gardening success
- How to keep food over the colder period
- How to develop soils in cold climates.

These Greenhouse Kits:

- Store heat, cooling and warming when needed
- Vents excessive heat automatically.
- Low cost yearly operation
- Aesthetically pleasing design
- Withstands snow loads, no special winter treatment
- Polycarbonate glazing not easily damaged and has a long life.
- Raised beds are easy to work with
- Available in eight or sixteen foot lengths
- Range of exterior finishes available
- Delivery and assembly assistance available
- Outperforms other greenhouses at similar costs and size
- Can be disassembled and moved with you