LFU GUYANA INC. SEEDLING HOUSE BOOKLET

A step by step guide to building a Seedling House

Table of Contents

Table of Contents

Overview

Since 1999, the NGO Linden Fund USA (LFU) and its locally registered charity, LFU Guyana Inc., have meaningfully served Linden and Region 10 across a wide range of economic development, social, and educational programs.

In 2023, LFU Guyana Inc. was awarded a grant by the Global Environment Facility (GEF) Small Grants Programme (SGP) implemented by the United Nations Development. The 'Grow UP Internship through Sustainable Agricultural Practices in Region 10' project is a highly commendable initiative that aims to tackle several pressing issues of our time: climate change, food security, and skills development for young students. By providing technical and labour support to local farmers, the project helped improve their farming practices, enhance their knowledge and techniques, and increase their crop yields. The internship brought together students of Linden Technical Institute, Guyana School of Agriculture, and University of Guyana who were involved in basic farm activities intended to greatly enhance their exposure and interest in climate-smart agriculture.

A tangible component of the six-month GEF SGP-funded project was the construction and management of a 20 ft x 10 ft x 10 ft seedling house on the LFU Guyana Inc. property in Mackenzie, Linden. The purpose of the seedling house is to produce healthy, vigorous lower-cost seedlings that would be readily available for purchase by commercial farmers and kitchen gardeners alike.

A large goal of the project was to help farmers and community members grow in their knowledge and techniques as it relates to climate-smart practices, help second- and third-year tertiary students based in Region 10 grow their practical knowledge, and to increase food production in the region.

Introduction

Welcome to the Seedling House Construction Booklet – your gateway to fostering sustainability and enhancing food security in Guyana! The Seedling House Initiative, led by LFU Guyana Inc., serves as a ray of hope in Region 10, where we are dedicated to cultivating seeds for local farmers and kitchen gardeners in a world facing the challenges of climate change and economic uncertainties..

At the heart of our mission is the seedling house, a revolutionary concept that not only slashes seedling costs by 25% - 40% but also achieves self-sustainability through seedling sales.

This booklet will be your step-by-step guide to constructing your very own seedling house, a nurturing sanctuary for young plants. It offers a controlled environment, speeding up seedling development, extending growing seasons, and providing protection to ensure the successful growth and development of the seedlings. Enjoy benefits like enhanced growth, cost-efficiency, and personalized control, all while contributing to sustainability by reducing the need to buy plants from distant sources.

As you embark on this journey, we'll lead you through every stage, from selecting the perfect location and materials to creating an ideal micro-environment for your seedlings. Prepare to harvest the rewards of a thriving, controlled space for nurturing life, from tiny seeds to flourishing seedlings.

Join us on this exciting journey! In the following sections, LFU Guyana Inc. will guide you through the construction of your own seedling house and introduce you to an array of plants that will thrive within. By participating, you're not only creating a hub for sustainable growth but also contributing to the resilience and prosperity of Region 10. Let's take the first step together and sow the seeds of a brighter, more sustainable future, one step at a time.

Credits

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The Regional Agriculture Department, and the Inter-American Institute for Cooperation on Agriculture (IICA)

Benefits of a Seedling House

Imagine stepping into your own little haven, shielded from the scorching sun and heavy rains, where the conditions are perfect for cultivating a thriving garden year-round. A seedling house offers numerous advantages:

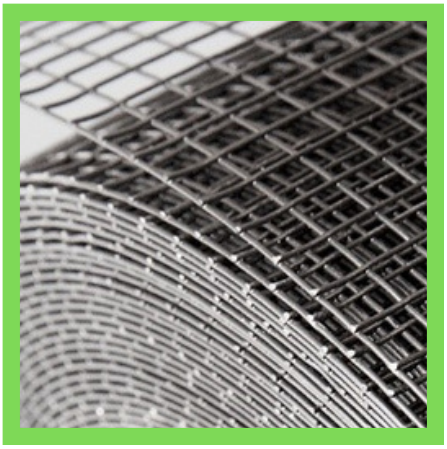
Protection: A seedling house safeguards your plants from extreme weather conditions, leading to healthier and more productive yields by shielding them from factors like excessive heat, or heavy rainfall.

Extended Growing Season: With a seedling house, you can grow a variety of fruits, vegetables, and herbs beyond their typical season, enabling you to enjoy fresh, home-grown produce all year round, even when the weather outside is unfavorable.

Increased Crop Yield: Seedling houses help maximize plant growth and yield by creating optimal conditions for photosynthesis while minimizing the negative effects of excessive heat and harmful radiation, resulting in larger and more bountiful crops.

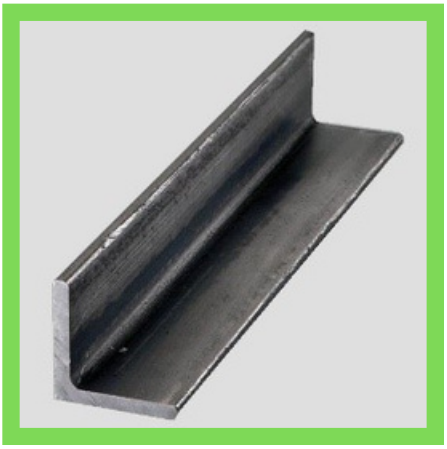
Pest Management: A seedling house offers pest protection by maintaining controlled conditions that deter insects and rodents. This controlled environment also reduces the risk of common garden pests and airborne diseases, minimizing the need for interventions and chemicals, saving time, and promoting eco-friendly gardening.

Materials needed for the construction of the Seedling House



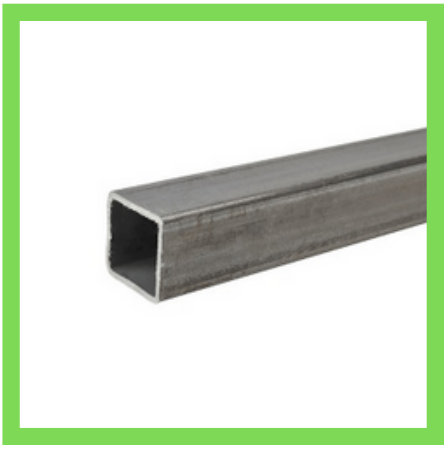
Aluminum mesh sheets

Anchor bolts



L-shaped Iron rod

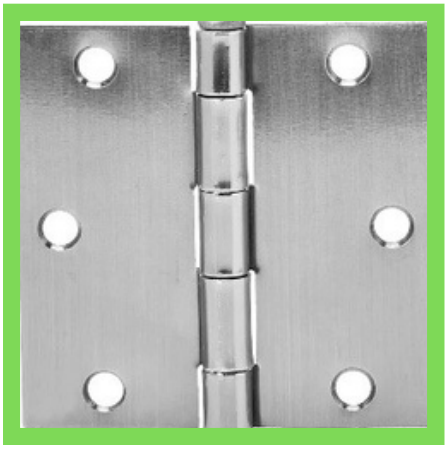
Nylon cable ties



Aluminum steel pipes

Plastic sheeting

Silicone sealants



Door hinges

Welding equipment

Shovel

Level

Hand drill

Safety glasses

Welding shield

Wheelbarrow

Measuring tape

C-clamps

Concrete Mixer

Welding gloves

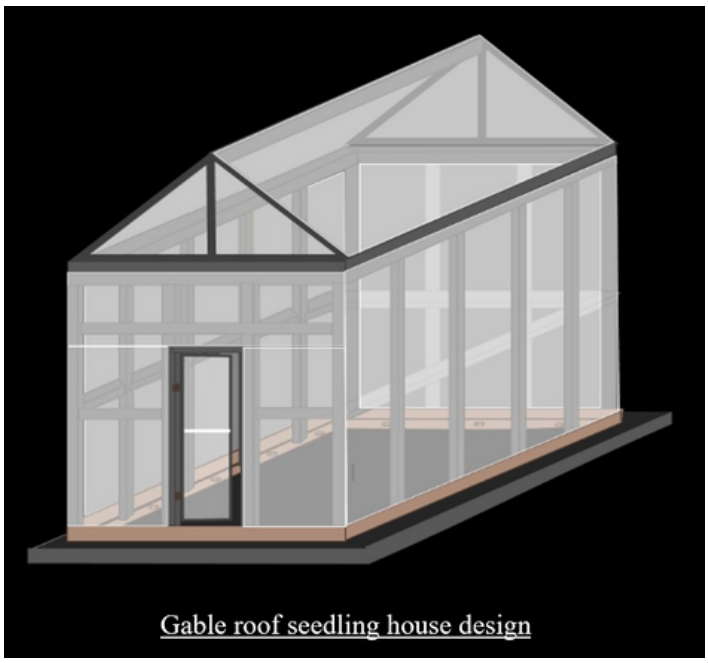
Angle grinder

Disclaimer: The above listed materials were utilized to construct the chosen Seedling House design, However the type of materials may vary based on the type of seedling house being constructed.

Planning and Design Considerations for a Seedling House

Embarking on the construction of a 10 ft by 20 ft gable-roof seedling house requires careful planning. To create an optimal seedling house structure, it's crucial to factor in the specific crop you intend to cultivate, the availability of local materials, and the unique climatic conditions of your area. Moreover, it's wise to incorporate provisions for potential expansion, ensuring adaptability for future needs.

Opting for a gable-roof design is a popular choice, as it’s renowned for maximizing sunlight exposure and offering a spacious interior for a bountiful array of plants.



Gable roof seedling house design

The initial step in this project is to select a suitable area for your seedling house. This decision should be guided by various crucial considerations. These include the abundant presence of sunlight, measures to control wind exposure, ensuring easy accessibility for maintenance and supply transportation, proper orientation of the structure to capture the sun's rays, choosing an elevated location to reduce flood risks, and ensuring the land is level.

Planning and Design Considerations for a Seedling House

1.Construct the seedling house in an area sheltered from strong winds, as excessive wind can damage young plants.

2.Ensure there is easy access to the seedling house for watering, maintenance, and transportation of supplies.

3.Orient the seedling house with its long side facing south (in the Northern Hemisphere) to maximize sunlight exposure.

4.Choose a location at a higher elevation (at least 6 inches above ground level), if possible, to reduce the risk of floodwater reaching your nursery.

5.Make sure the area is level; if not, level it by either digging to remove extra soil or adding soil to fill in low places.

By adhering to these principles, your 10 ft by 20 ft gable roof seedling house will be primed for success and growth.

How to construct a 10ft * 20ft Gable-roof Seedling House

Construction of a seedling house is a gradual process. To make this easier, the process can be divided into specific sections: the front wall, back wall, sidewall, and, of course, the roof.

The journey begins with the foundation and following that is the front wall. The front wall step entails constructing the door and its frame, securing the door, and installing both vertical and horizontal components.

Foundation

Let's create a foundation. Start by clearing the area of shrubs and bushes. Measure the foundation area to be 10 ft 4 inches by 20 ft 4 inches.

With the use of 1 ft long wooden sticks, mark the four end points for the foundation area. After marking the area, wrap polythene string around the 1 ft long wooden stakes, to create a rectangular shape. This will be used as a guide or an outline.

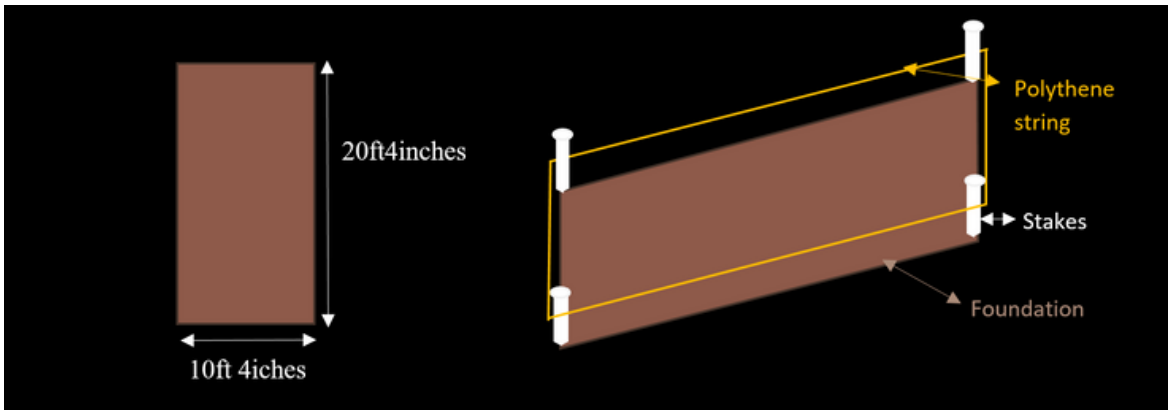


Diagram 1 illustrates long wooden stakes, at the 4 end points for the foundation area.

Measure and cut four pieces of 1 x 4 wood. Two of which should be 20 ft 4 inches long and the other two should be 10 ft 4 inches long. These pieces will be used to form a wooden rectangular mold for your concrete foundation. Arrange the wooden pieces to form a rectangular frame on the marked area. Use 1 ft wooden stakes to hold the 1 x 4 wood pieces upright, creating a sturdy frame.

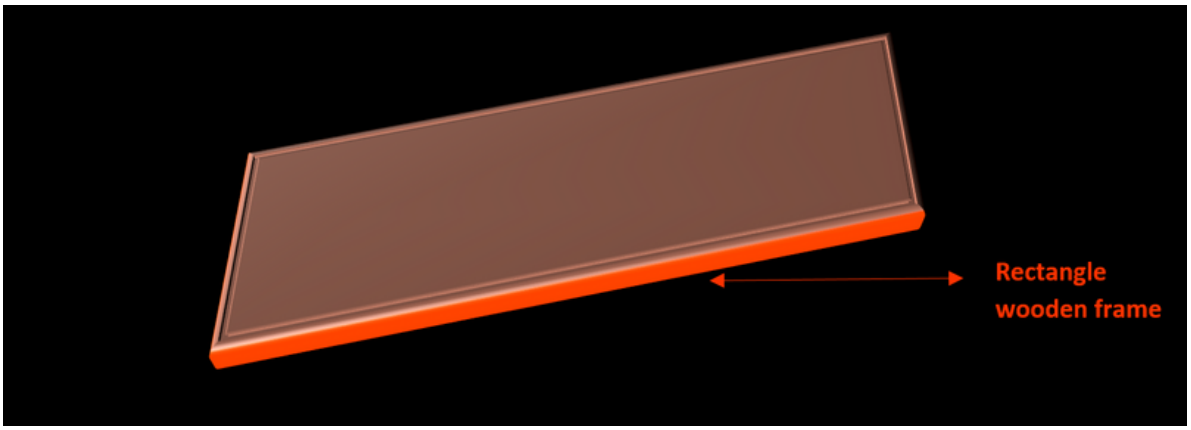


Diagram 2 illustrates a rectangular frame for the concrete foundation (base or flooring).

Cut a 10 ft x 20 ft piece of BRC (Binding Reinforcement Concrete) roll to fit inside the frame. This will help to reinforce the concrete mixture.

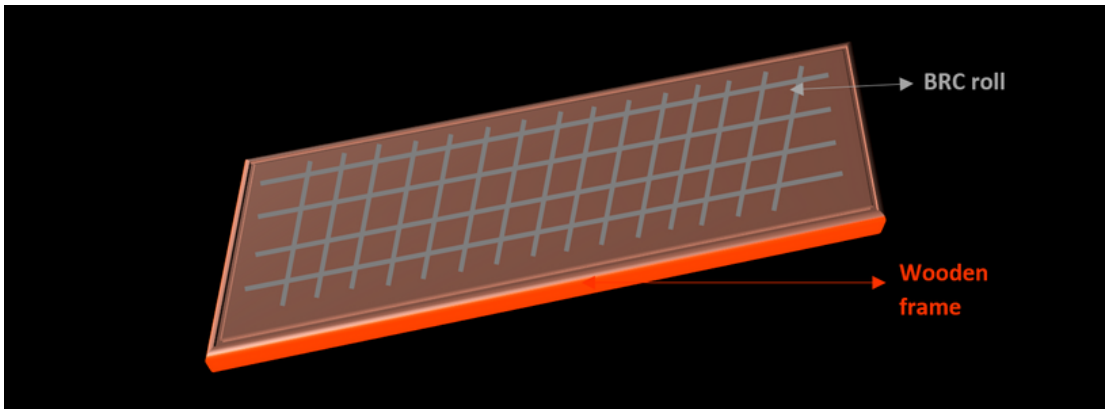


Diagram 3 illustrates intrastate binding reinforcement concrete rolls into the rectangular wooden frame.

To prepare the concrete mixture, you will need 1.5 tons of sand, 2.5 tons of stone, and 15 sacks of cement.

Note: The safest cement mix ratio for all kinds of concrete used for different construction purposes is 4:2:1. It means 4 parts crushed stones mixed with 2 parts sand and 1 part cement.

Taking this ratio into consideration, combine 5 buckets of sand, 10 buckets of stone, 1 sack of cement, and 1.5 buckets of water to create a stable mixture for the foundation. A ransom can be used to aid in this process. Continue until all the materials have been used.

Pour the cement mixture into the wooden frame, not allowing any to flow over the wooden frame. With the use of a rod, concrete float, and trowel, smooth and flatten the surface, then allow it to dry or cure for seven days.

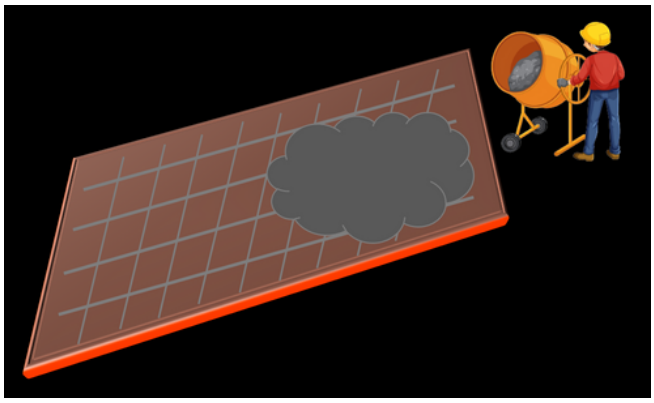


Diagram 4 illustrates the concrete mixture being poured into the rectangular wooden frame.

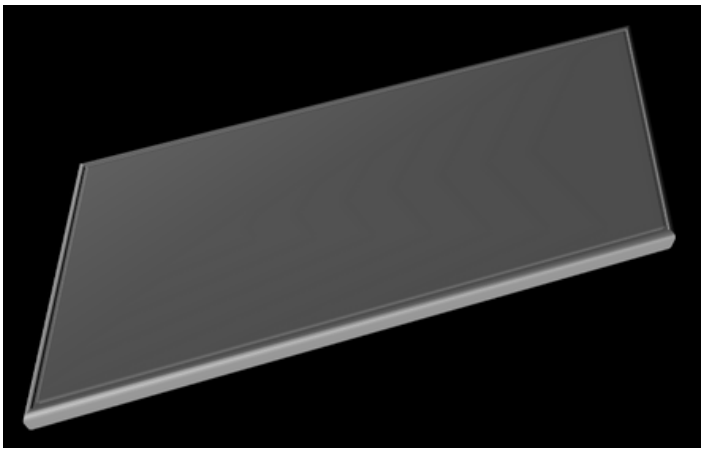


Diagram 5 illustrates the concrete mixture cured into a solid foundation over several days.

Front Wall

The construction of the front wall is a gradual process. This process entails constructing **the door** and its frame, securing the door, and installing both **vertical** and **horizontal** components.

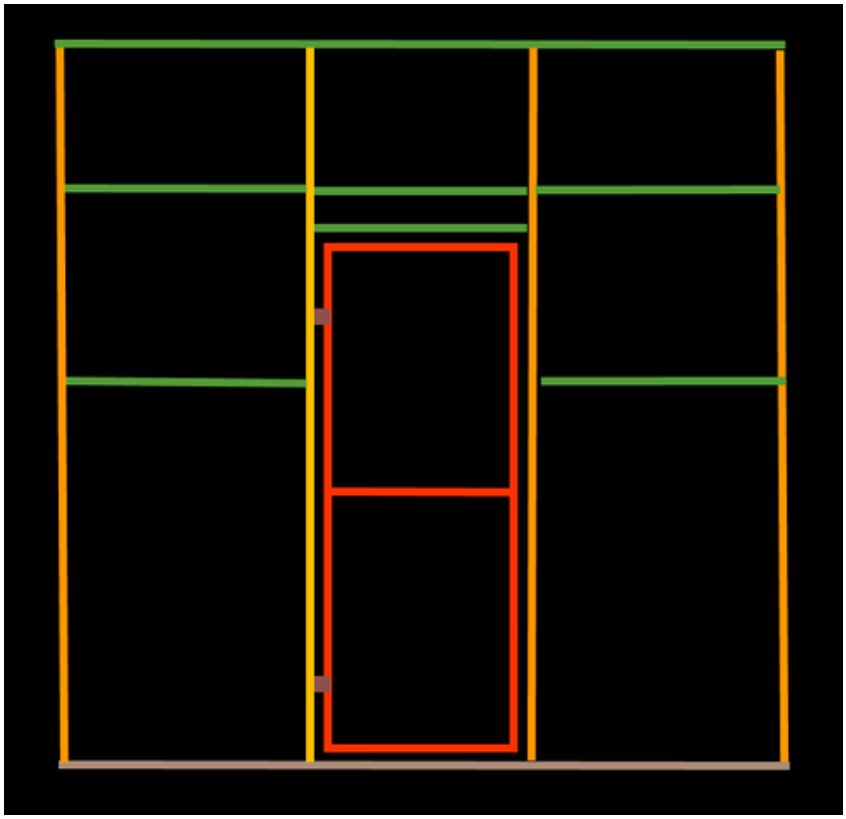


Diagram 6 illustrates the front wall layout.

To construct the front wall (first section), you will have to cut (3) 10 ft. pieces of hollow section and (1) 10 ft. piece of angle iron with the use of an angle grinder.

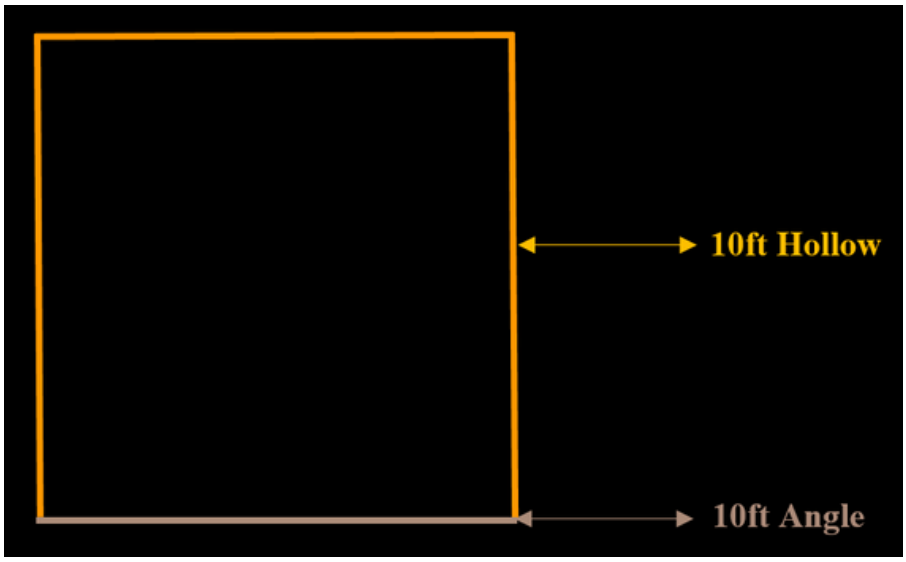


Diagram 7 illustrates three pieces of hollow sections attached to one angle iron.

.After cutting the pieces, arrange them as shown in the diagram above. With the use of a welding machine, weld the piece together, creating a square, as shown in diagram 2.

Next, cut (2) 10 ft. pieces of hollow section with the use of an angle grinder and arrange them **3 ft. 5 inches**, **3 ft. 2 inches**, and **3 ft. 5 inches** apart, as shown in Diagram 3, and weld them to the angle iron at the bottom and the hollow section at the bottom.

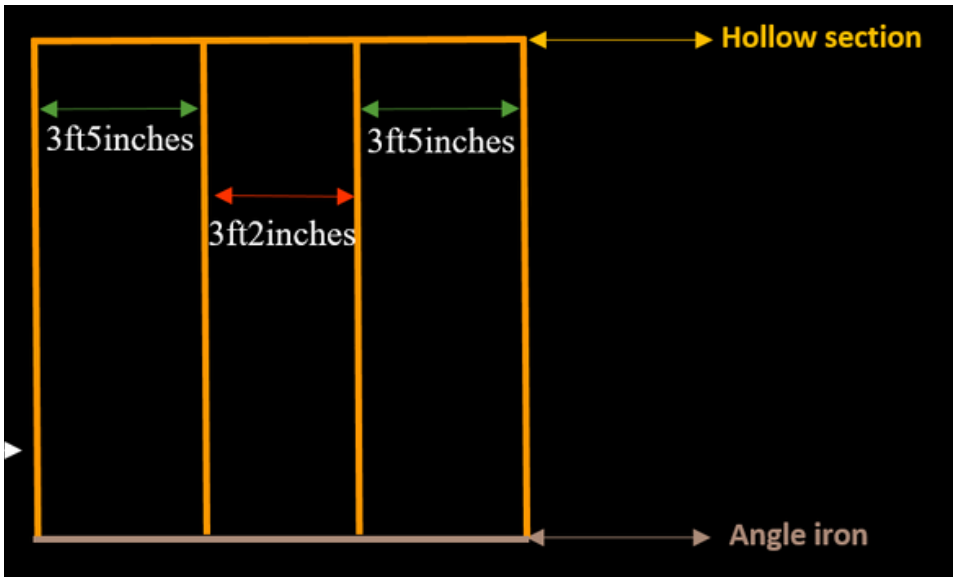


Diagram 8

Next, let's install the horizontal pieces. With the use of an angle grinder, cut **(4) 3 ft 5 inches** pieces and **(2) 3 ft 2 inches** pieces of hollow section. After which, arrange and weld them to the vertical pieces as shown in Diagram 4.

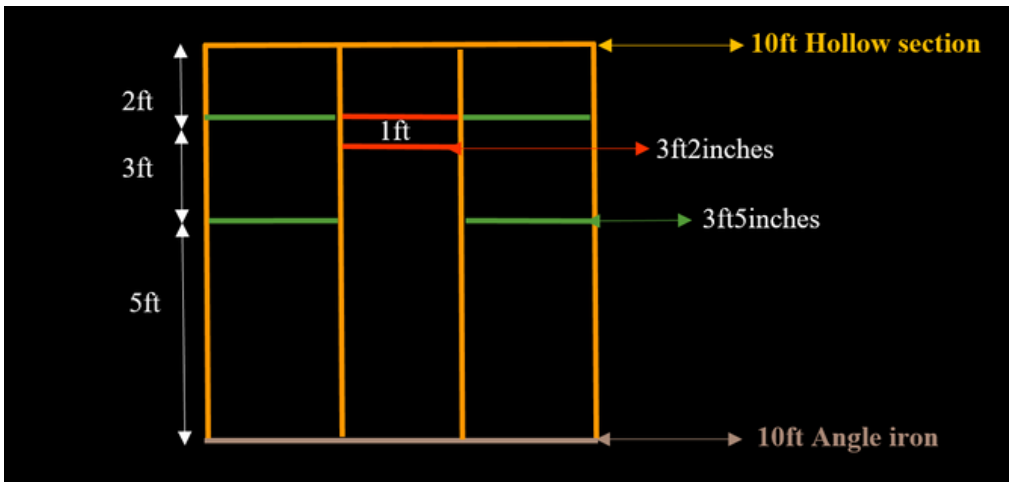


Diagram 9 illustrates the placement of the horizontal pieces.

Next up, let's create the door frame. Begin by cutting (3) 3 ft. pieces and (2) 6 ft 10 inches pieces of hollow section. Arrange and weld them together to create the door frame. After which, attach the door hinges to the door frame, then attach the door frame to the vertical hollow section as shown in the diagram below.

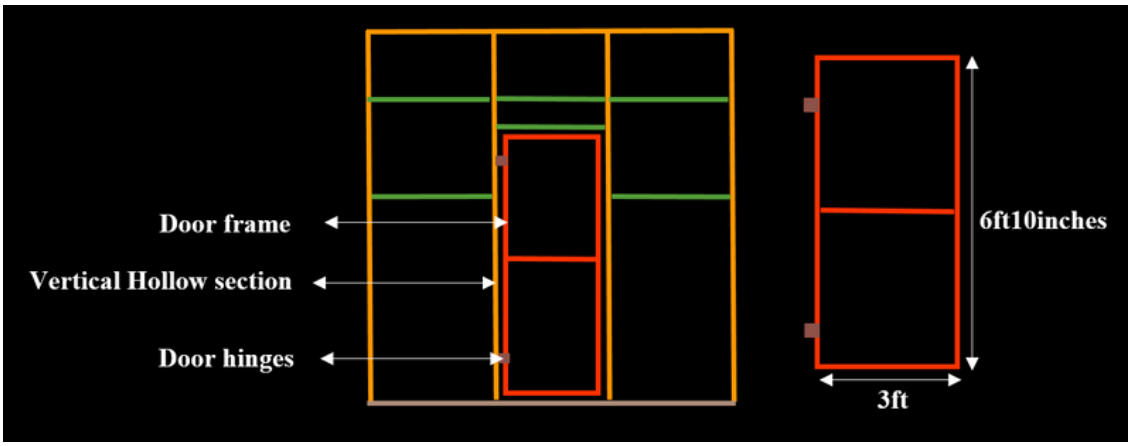


Diagram 10 illustrates the placement of the door frame.

Side Walls

After creating the front wall, it's time to create the side walls. This involves attaching 4 vertical pieces to 7 horizontal pieces.

Let's start by cutting a **20 ft piece of hollow section** and a **20 ft piece of angle iron**. Then cut **(4) 10 ft. hollow section pieces** and arrange them to be 4 ft apart, as shown in the diagram. Weld the 10 ft hollow section pieces to the angle iron at the bottom and the hollow section at the top.

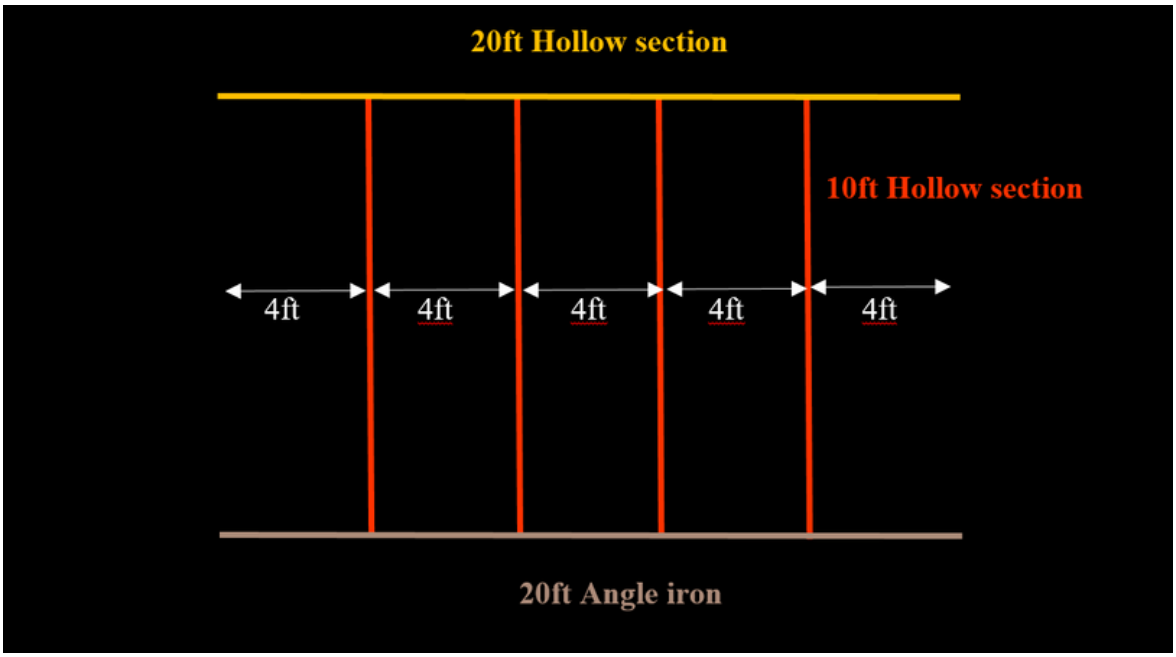


Diagram 11 illustrates the positioning of the angle iron and the hollow section pieces.

Now let's create some horizontal pieces. Start by cutting **(5) 4 ft. pieces of hollow section** and arranging and welding them to the **10 ft. hollow sections** as shown in the diagram below.

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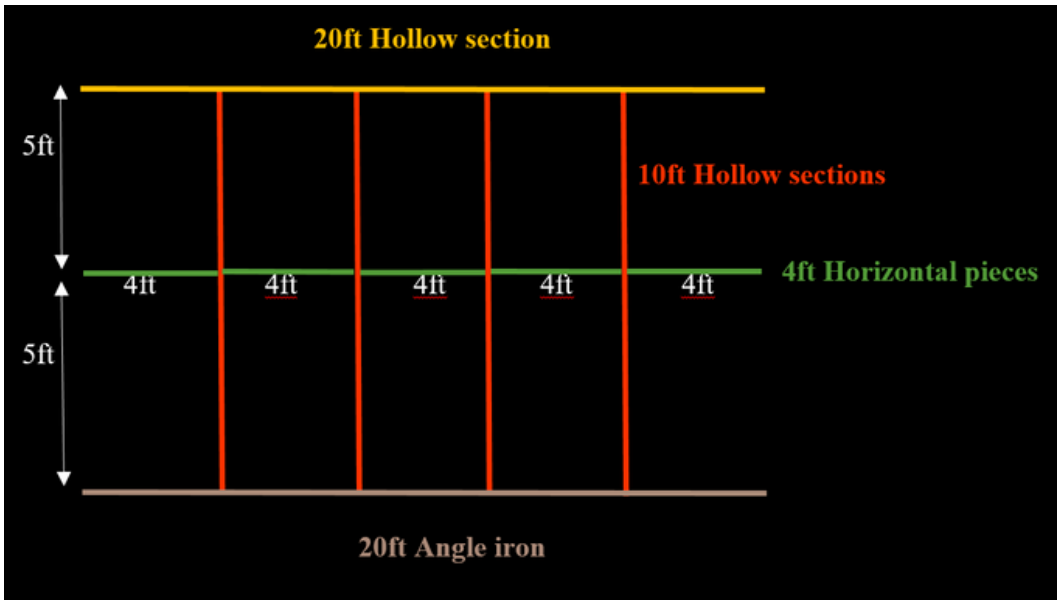

Diagram 12 illustrates the positioning of the 4 ft. horizontal pieces.

Repeat these steps and create one more side wall.

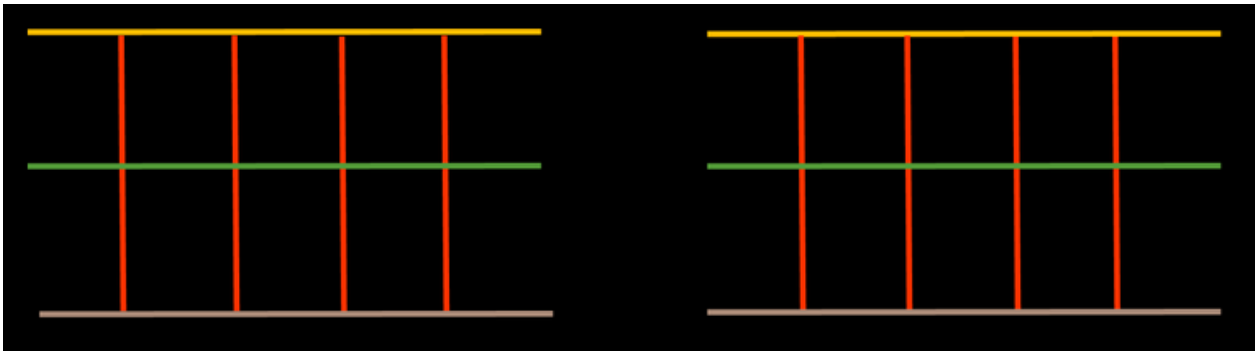

Diagram 13 illustrates the two side walls needed to contrast the seedling house

Back Wall

After creating the side walls, it's time to create the back wall. Start by cutting **(3) 10 ft. pieces** of **hollow section** and a **10 ft piece of angle iron**. Arrange the pieces as shown in diagram 9, and then weld them together.

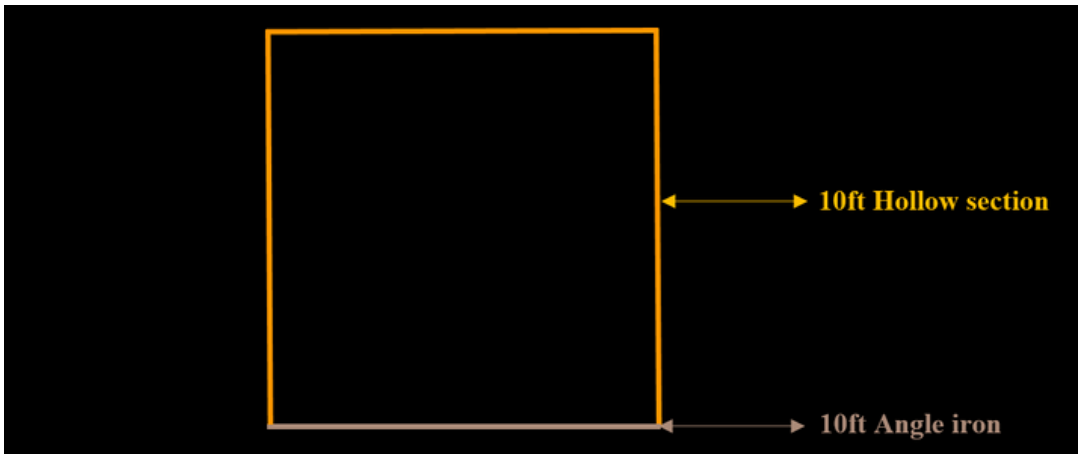

Diagram 14 illustrates 3 pieces of hollow sections attached to 1 angle iron.

Next, cut (2) 10 ft pieces and arrange them to be 3 ft 4 inches apart from each other. This can be seen in the diagram below, then weld the 10 ft hollow section pieces to the angle iron at the bottom and the hollow section at the top.

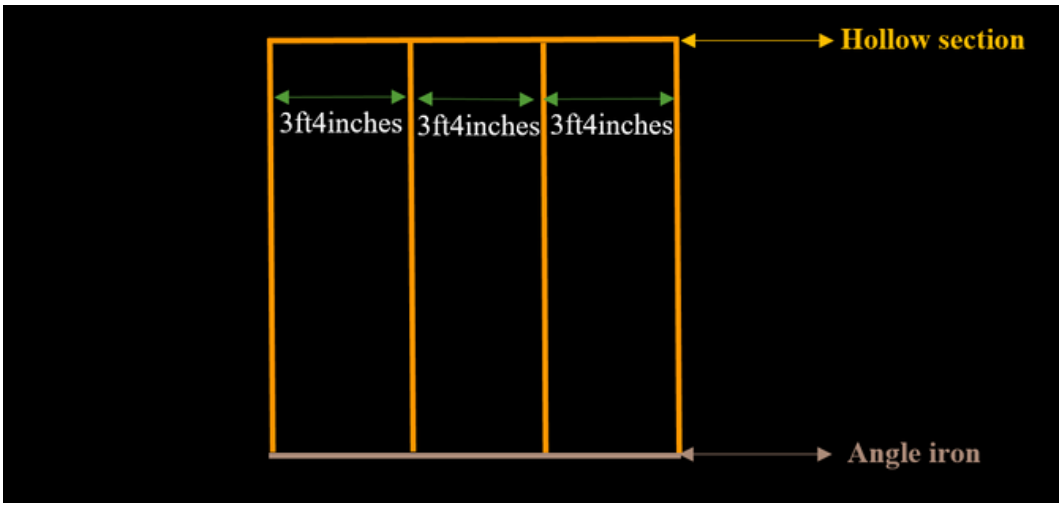

Diagram 15 illustrates the positioning of the 10 ft hollow section pieces.

Next, let's install the horizontal pieces. Cut **(3) 3 ft 4inches pieces of hollow section**. After which, arrange and weld them to the vertical pieces, as shown in Diagram 11.

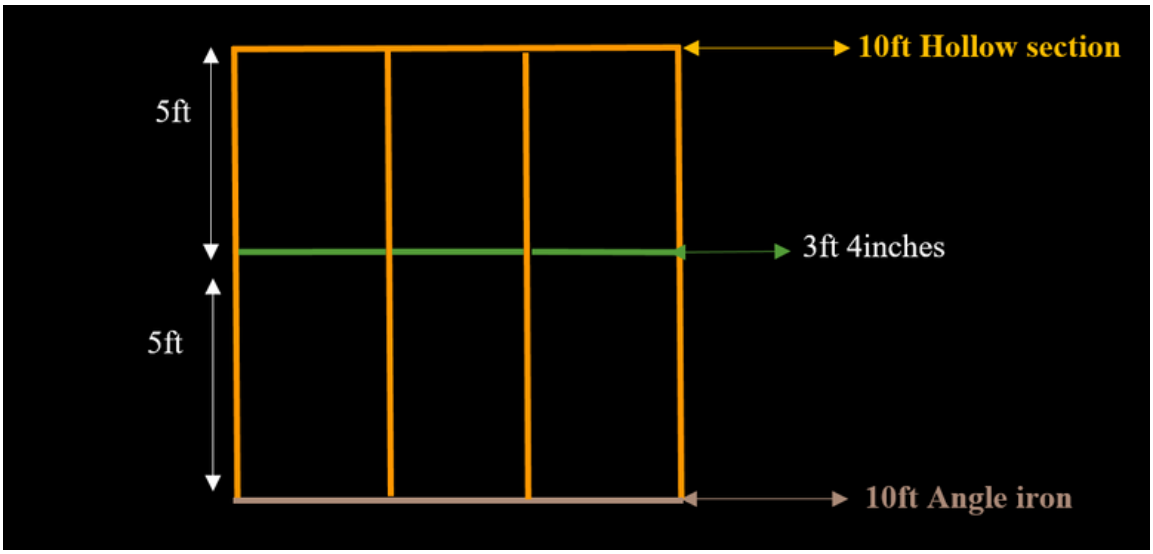

Diagram 16 illustrates the placement of the horizontal pieces.

Roof

Last but not least, let's create the last section (the roof). Begin by constructing two triangles with a vertical hollow section piece in the middle.

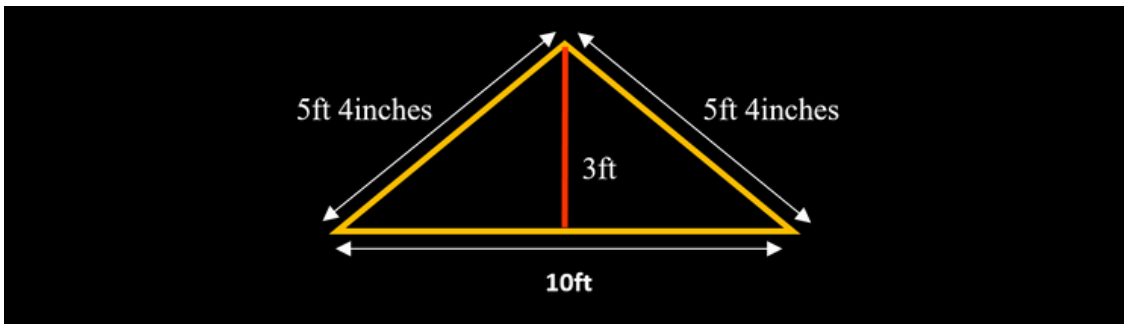

Diagram 17 illustrates a triangle with a vertical hollow section piece in the middle.

Cut (2) 5 ft 4 inches and a 10 ft pieces of hollow section and cut the ends at a 45 degree angle. Then cut a 3 ft long piece of angle iron for the middle. Weld the (2) 5 ft 4 inches pieces of hollow section as shown in diagram 12, then weld the 10 ft piece to the bottom. Next, weld the 3 ft hollow section piece in the middle as shown in the diagram above.

Now repeat these steps and create another triangle.

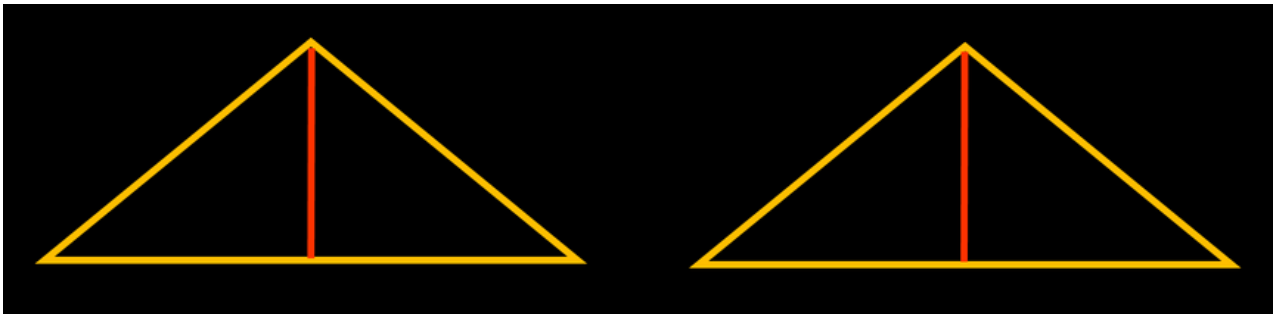

Diagram 18 illustrates the 2 triangles needed to create the roof.

Now let's connect the two triangles with horizontal pieces. Cut (3) 20 ft pieces of hollow section, arrange them, and weld them perpendicularly to the **(3) three points of the triangles**.

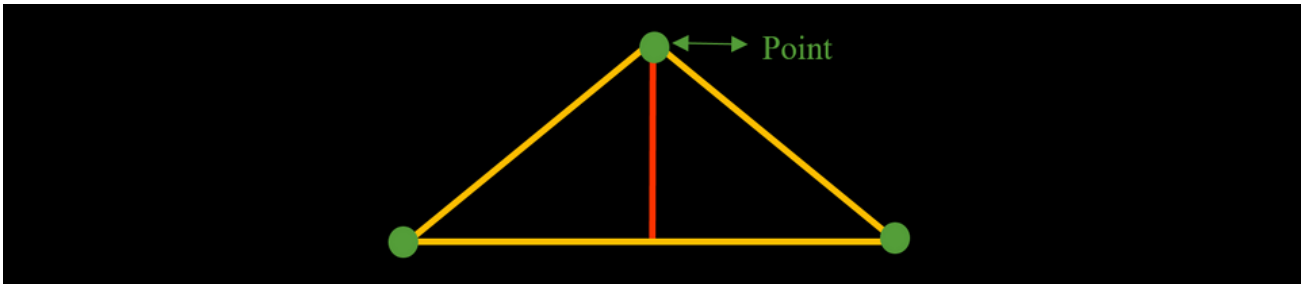

Diagram 19 illustrates the (3) three points where the 20 ft angle iron should be welded to.

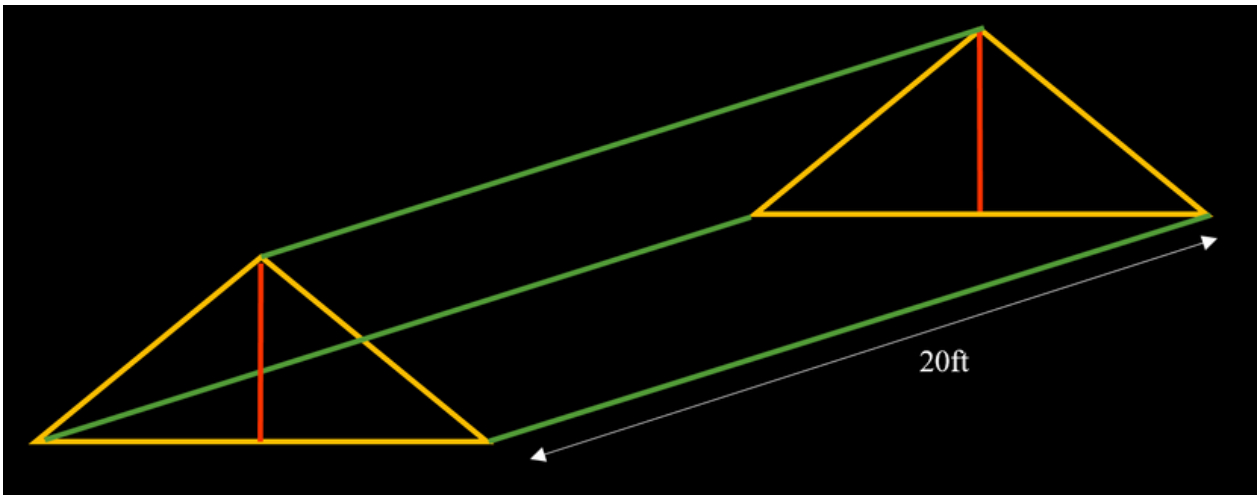

Diagram 20 illustrates the 20 ft pieces connected perpendicularly to the three points of the triangles.

Putting all the sections together

You have successfully completed the construction of each section. Now let's put all the pieces together on the foundation with the use of anchor bolts and a welding machine.

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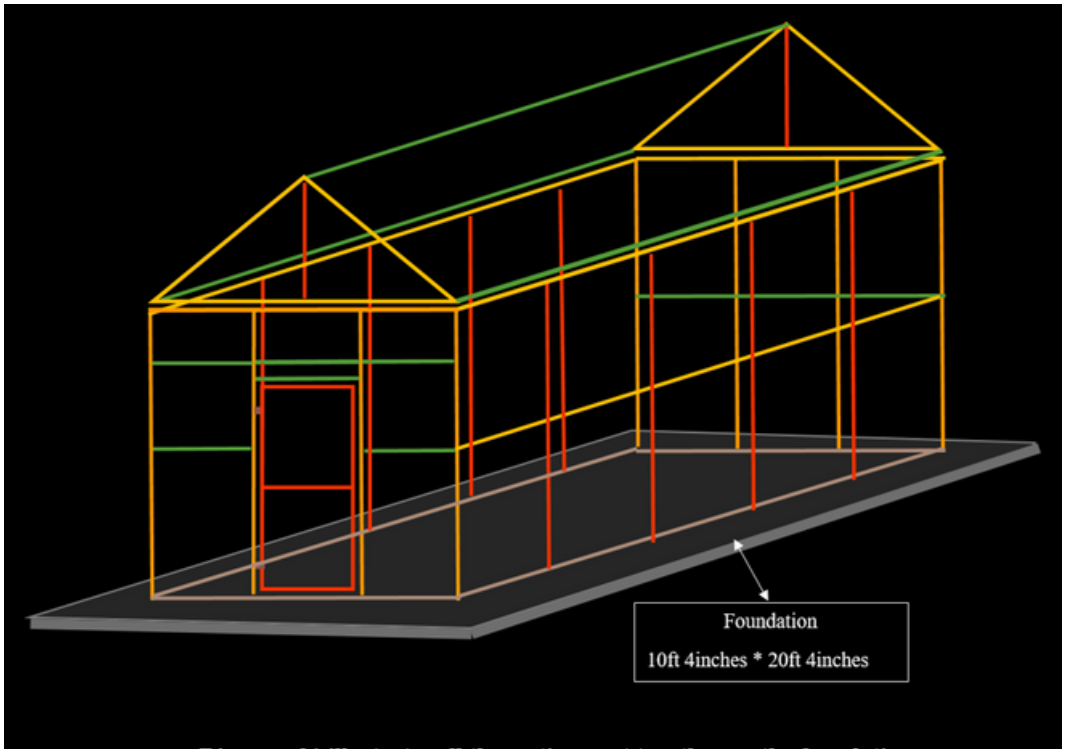


Diagram 21 illustrates all the sections put together on the foundation.

First, start by positioning the side wall on the concrete foundation, 4 inches away from the edge.

After positioning the first section, create 5 holes with the use of a hand drill; they should pass through the angle iron and through the foundation. Then put the anchor bolts into the holes to secure the side wall.

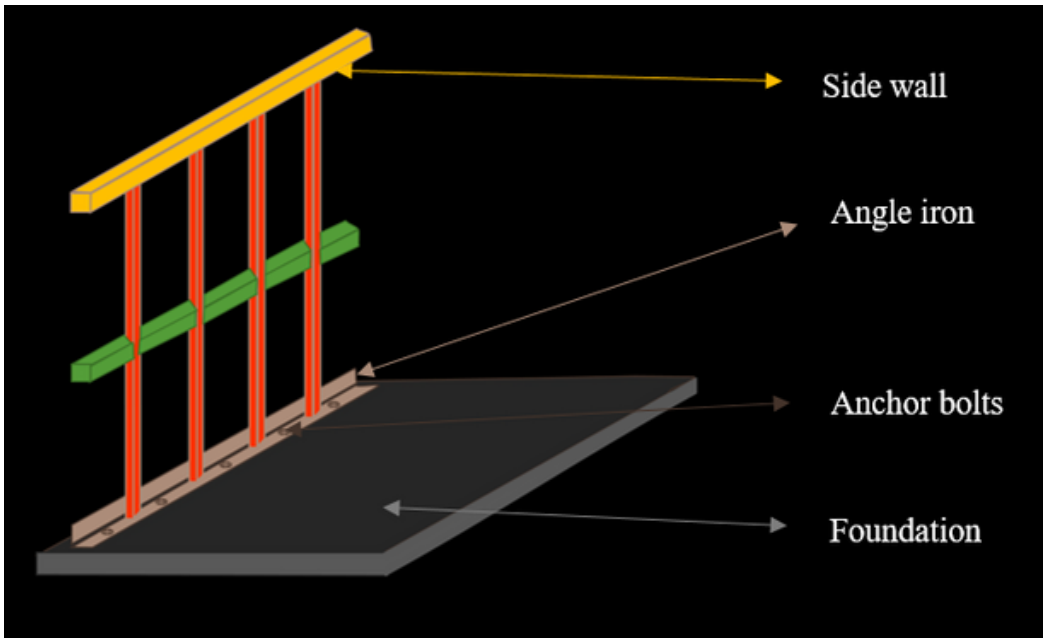


Diagram 22 illustrates the side wall secured with anchor bolts.

Repeat these steps on the other side, the back wall, and the front wall. After securing all the sides to the foundation and to each other via welding.

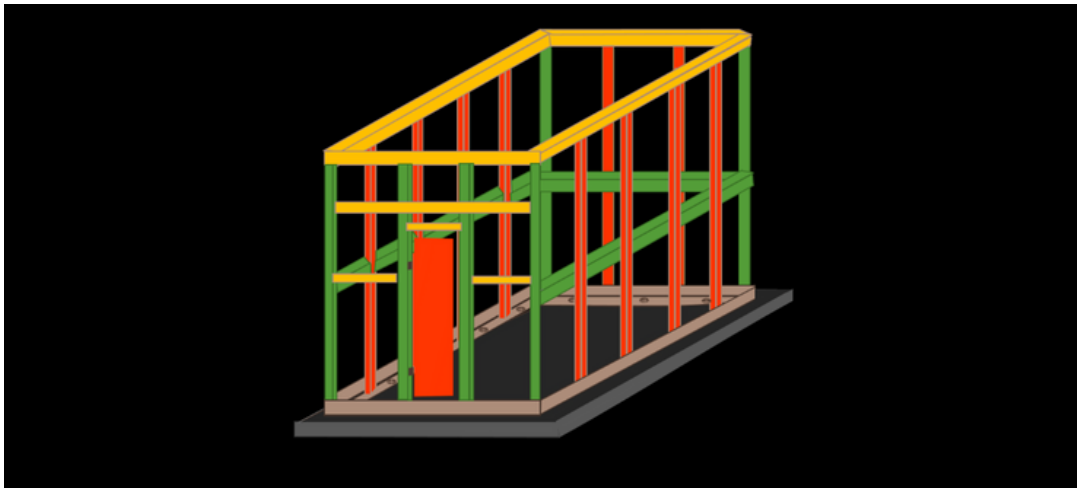


Diagram 23 illustrates the side walls, the back wall, and the front wall secured to the foundation with anchor bolts.

After securing the sides of the foundation—the side walls, the back wall, and the front wall—it's time to attach the roof. Hoist the roof frame on top of the box structure seen in Diagram 23, then secure the roof by welding it down to the box structure.

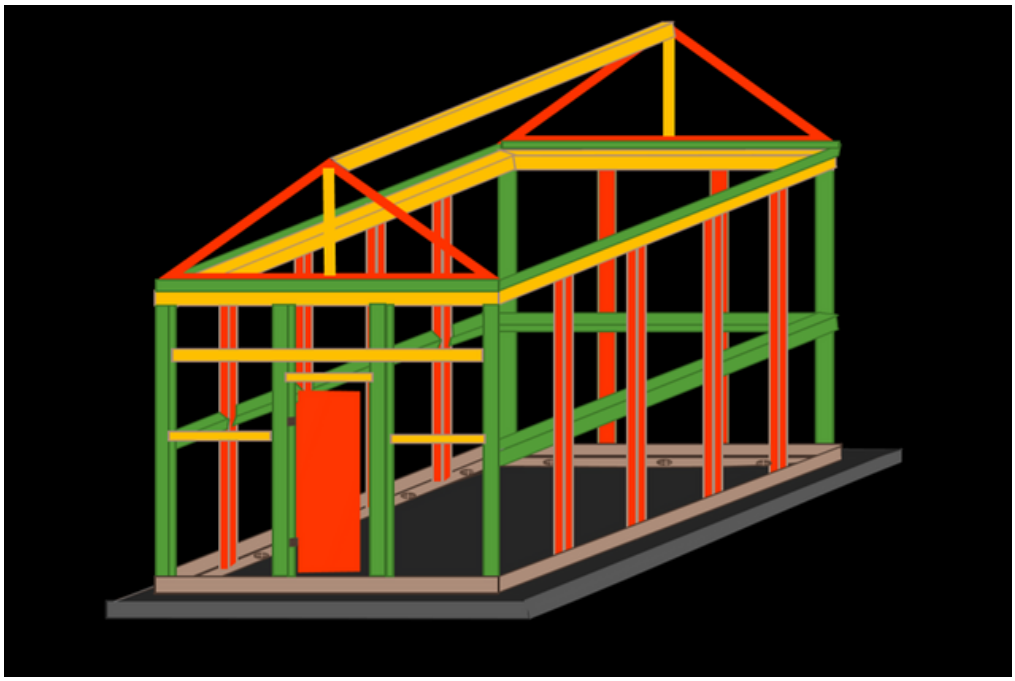
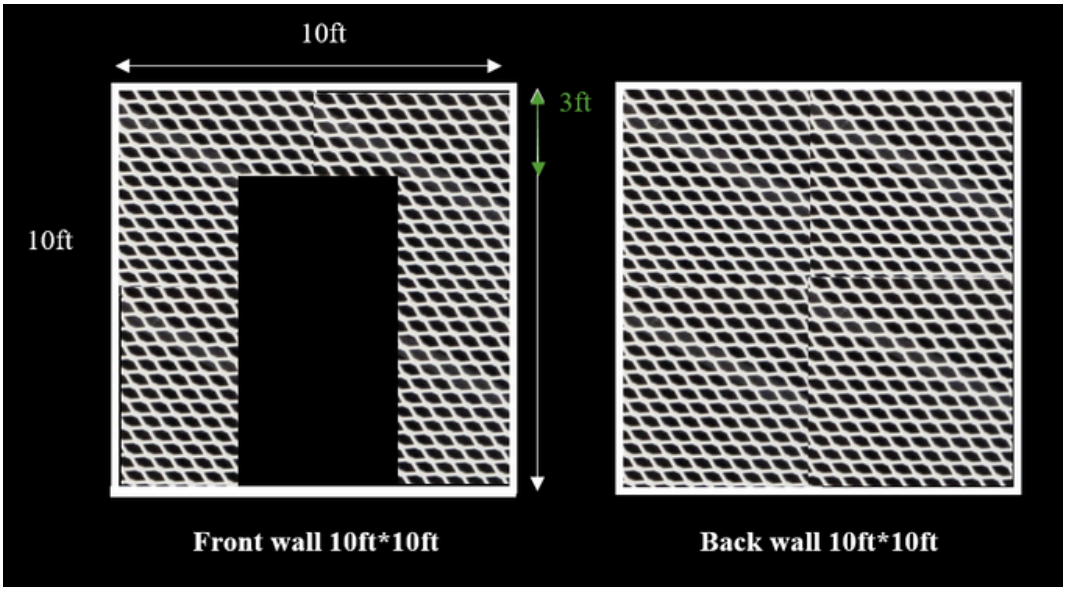
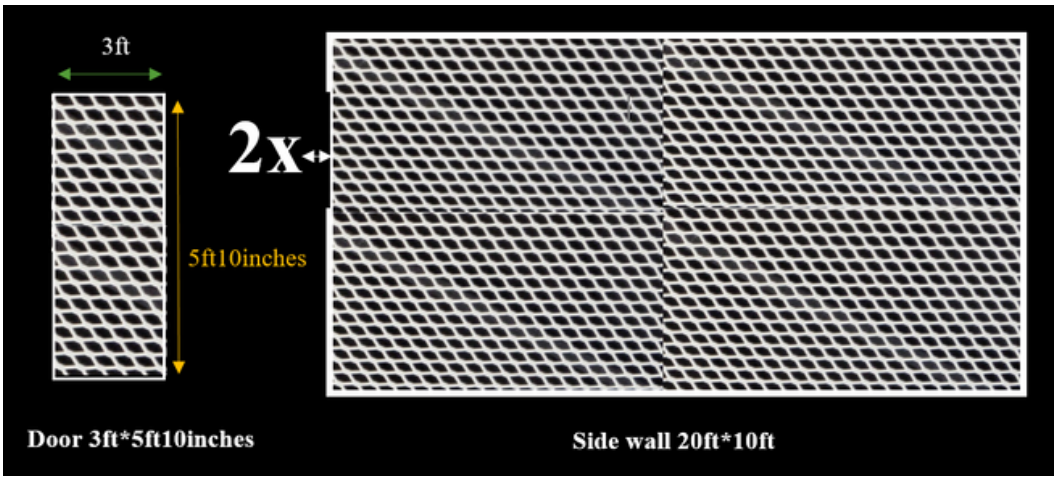


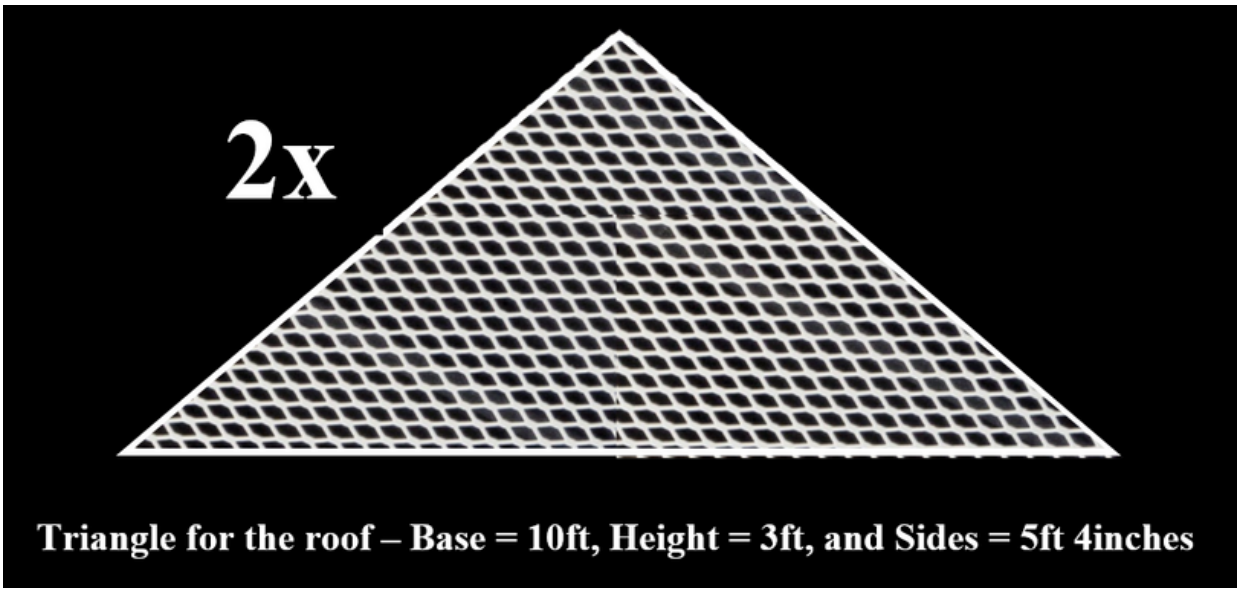
Diagram 24 illustrates all the components secured to form a stable structure.

Installing Mesh and Green House Plastic

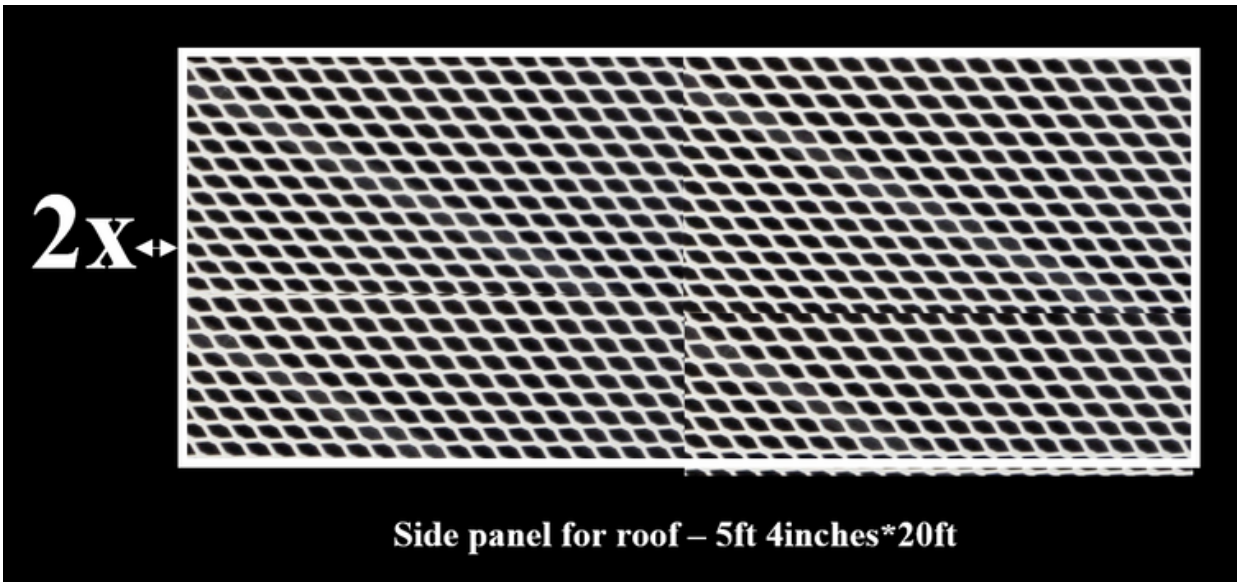
Let us complete the final steps. Cut nine pieces of mesh as shown in the diagram below.







Triangle for the roof – Base = 10ft, Height = 3ft, and Sides = 5ft 4inches



Side panel for roof – 5ft 4inches*20ft

After cutting these nine pieces of mesh, attach them to the side walls and roof of the seedling house frame with the use of zip ties.

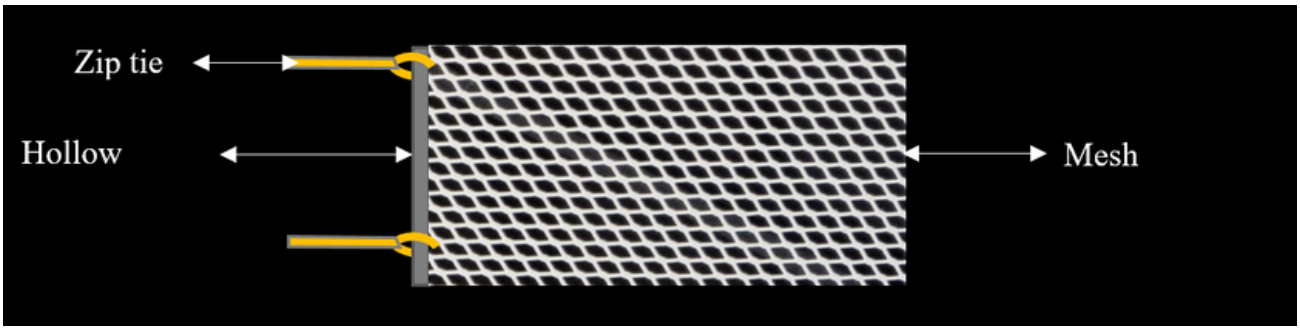


Diagram 25 illustrates the mesh being attached to the seedling house with zip ties.

Repeat these steps (cut the same pattern) for the seedling house plastic, then attach the seedling house frame. After placing the mesh and the seedling house plastic on your seedling house structure, which can be seen in figure 25, you can say that you have successfully created your very own seedling house.

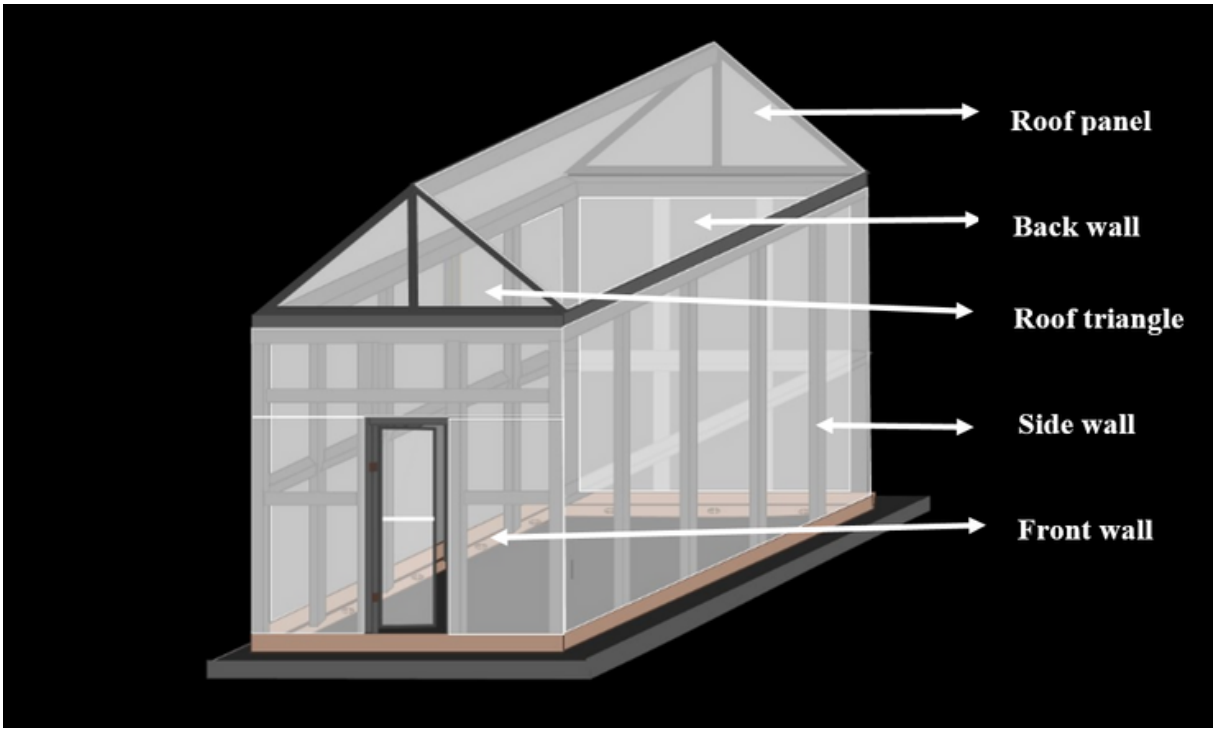


Diagram 26 illustrates a fully constructed 10 ft gable roof seedling house.

Suggested Fruits and Vegetables for Your Seedling House

Once your seedling house is constructed, it's time to explore the wide range of plant options. Here are some popular choices that will guarantee a satisfying and diverse harvest

Mouth-Watering Fruits:
- Watermelons and passion fruits for indulging in sweet treats.

Succulent Herbs:
- Basil and mint for adding fresh flavors to your dishes.
- Thyme, rosemary, and oregano for aromatic culinary creations.

Suggested Fruits and Vegetables for Your Seedling House

Vibrant Vegetables:

- Tomatoes, peppers, and boulanger for a rainbow of colours and delicious flavors.

- Cucumbers and squashes for refreshing salads.

Leafy Greens:

- Lettuce and cabbage for nutritious greens.

By cultivating these plants in your Seedling House, you will experience the joy of nurturing and enjoying the fruits (and vegetables) of your labour!

NOTE: The fruits and vegetables listed above are some popular suggestions. You are not limited to those choices when considering what to cultivate in your seedling house.

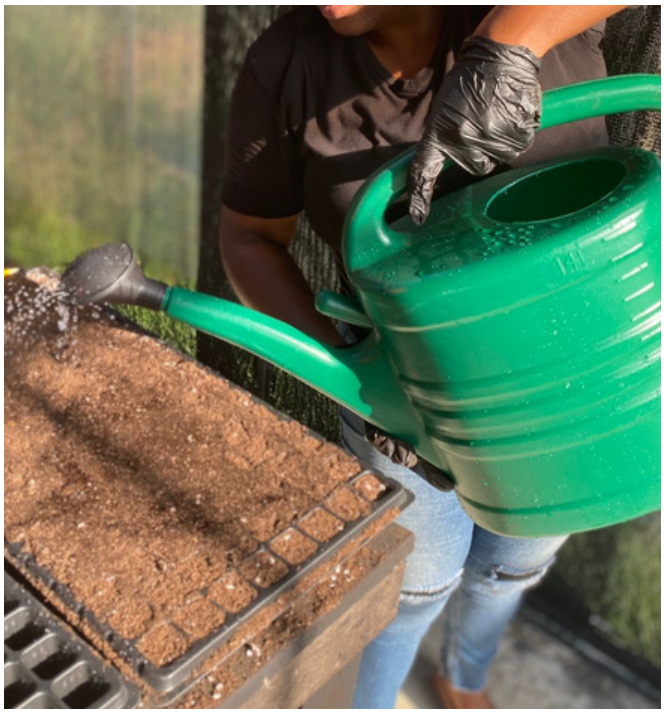
LFU Guyana Inc.'s Seedling House Construction

LFU Guyana Inc.'s Seedling House Construction

Constructed by: McPherson & Sons Welding and Fabrication

LFU Guyana Inc.'s Seedling House Construction

LFU Guyana Inc.'s Seedling House production



LFU Guyana Inc.'s Seedling House production

Key Practices to keep in mind

Congratulations on embarking on the journey to create your very own seedling house for gardening in Region 10! By doing so, you are not only enriching your own life but also contributing to the broader goal of promoting food security in the region.

Your newfound knowledge empowers you to create a valuable asset in the battle against the adverse effects of climate change on agriculture. With a seedling house, you will extend your growing season, ensuring a continuous harvest of delicious fruits and vegetables.

Managing and maintaining your seedling house effectively is crucial to the successful growth of your plants. Here are some key practices to keep in mind:

Pest and Disease Monitoring
Pests and diseases can severely impact the growth and productivity of your plants. Regularly inspect your seedlings for signs of pests and diseases such as chewed leaves or yellow spots. Take preventive measures and implement control methods when necessary, such as removing infested or diseased plants.

Watering
Consistent watering is vital for seedling growth, but avoid over-watering or under-watering. Monitor soil moisture levels regularly to determine the right watering frequency. Proper watering promotes healthy plant growth and prevents water-logging or drought.

Sanitation Protocols:
A clean and hygienic environment is important to prevent harmful pathogens and molds from building up. Keep the area surrounding the seedling house clean and sanitize containers, equipment, and surfaces regularly to keep pathogens at bay.

Key Practices to keep in mind

Record Keeping:
Keeping detailed records of planting dates, plant varieties, and any issues encountered helps you make informed decisions in the future. Use these records as references for planning and decision-making, and track the growth of your plants over time.

Structural Maintenance:
Regularly inspect the structural elements of your seedling house, such as frames and coverings, to ensure their integrity. Address any damage or wear and tear promptly to elongate the lifespan of your facility. This will help protect your plants from harsh weather conditions and other external factors, and help them flourish for longer periods of time.

By following these key practices, you will be able to provide a healthy growing environment for your plants, ensuring healthy growth and productivity in your seedling house. Let's work together to create a more sustainable and secure food future for Guyana.

ABOUT THE ORGANIZATION

Linden Fund USA (LFU) was launched in 1999 as a registered charitable organization in the state of New York to mobilize former residents of Linden now living in the U.S. LFU owns and maintains a stand-alone office in Guyana, under the management of LFU Guyana Inc., a locally registered charitable company since 2018.

This NGO has meaningfully served Linden and Region 10 across a wide range of economic development, social, and educational programmes.

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