



OUR ROOTS RUN DEEP. SINCE 1918

How to Build a Fold-Down Greenhouse



This simple, inexpensive greenhouse folds down to protect your plants during early frosts and cold snaps, then can be raised up on warmer days. Made with PVC pipe and plastic, it's light, yet sturdy enough to withstand winds when placed in a somewhat sheltered location. Cut the pipes yourself, or make it easy by having them pre-cut at your local home improvement store. Choose a spot that gets at least 6 hours of sun per day, then build it in a single afternoon to protect your plants all season long.

DETAILS

Estimated Time: 2 hours*

* *less if you have pipes pre-cut*

Difficulty: Easy (with a helper) to moderate

Approximate Cost (not including plants): \$100

List of Materials:

- 8 – 1-inch x 10-foot-long PVC pipes
- 8 – 1-inch elbow fittings
- 2 – 1-inch tee fittings
- 4 – 1¼-inch elbow fittings
- 2 – ¾-inch x 5-foot-long pieces metal conduit
- 1 box #8 x ¾-inch lath washer head screws
- 2 – ¼-inch x 3-inch bolts
- 25 feet of 12-foot wide 4 mm plastic sheeting (UV-rated will last longer)
- 3 – 2- to 3-foot lengths of coated light-duty utility chain
- 3 spring links
- 2 to 4 – 1¼-inch pipe straps
- 2 to 3 plastic-body spring clamps
- several bricks or paver pieces

List of Tools:

- hacksaw, jigsaw, or miter saw*
- rubber mallet or sledge hammer
- drill/driver
- spring clamps
- ¾-inch soil/garden auger drill attachment (optional)

* *or can have pipes pre-cut at home improvement store per lengths in Parts List*

Parts List:

Part	Quantity	Size
Back frame stiles	2	1 x 72
Back frame rail	1	1 x 96
Bottom frame back rail	1	1 x 94
Bottom frame stiles	2	1 x 60
Bottom frame front rail	1	1 x 92
Middle frame rail	1	1 x 89¼
Middle frame stiles	2	1 x 44

HOW-TO INSTRUCTIONS

Design by Chris Hill

Choosing and Preparing Your Location

Pick a flat, well-drained area along a wall of your home, garage, or out-building with at least 10 feet of uninterrupted length and 6 or more hours of sun exposure. Make sure that no wiring or pipes run within a foot of the wall. You'll need clearance to about 8 feet away from the wall for greenhouse assembly.

Using a rubber mallet or small sledge hammer, drive two 5-foot sections of conduit pipe at least 12 inches into the ground adjacent to the wall, about 8 feet apart. Place them as close to the wall as you can. If you have trouble driving the pipe into the ground, you can use a 3/4- or 1-inch soil auger to create a hole.

Cutting the Pipe

Cut each PVC pipe part as needed using a hacksaw, jigsaw, or miter saw. Double check measurements at each step. (Alternatively, you can have this done at your local home-improvement store.)

Building the Frame

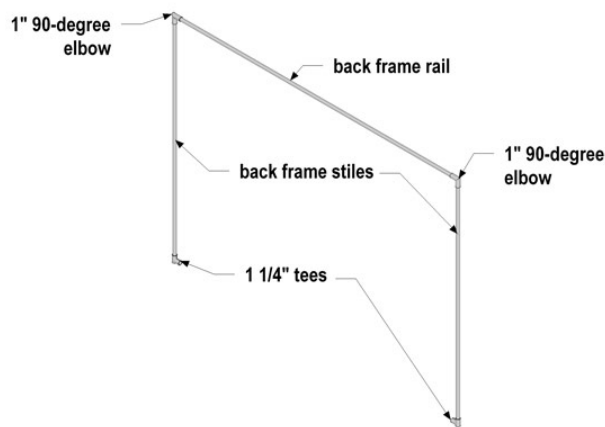


Figure 1

To create the back frame stiles, insert a 72-inch length of PVC pipe over each piece of conduit. Slide a 1 1/4-inch PVC tee over each stile. Press each one into the ground as far as you can, making sure the remaining tee openings are facing each other, parallel to the wall. Place a 1-inch 90-degree elbow on the top end of each back frame stile, again making sure the openings are facing each other, parallel to the wall. Insert the 96-inch length of PVC pipe (the back frame rail) into the elbows at the tops of the back frame stiles, as shown in **Figure 1**.

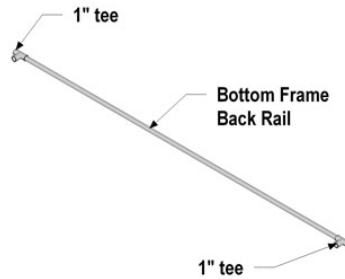


Figure 2

Place a 1-inch tee on each end of the 94-inch length of PVC pipe (bottom frame back rail), so that one point of each tee is perpendicular to the rail, as shown in **Figure 2**. Make sure the tees are parallel to each other.

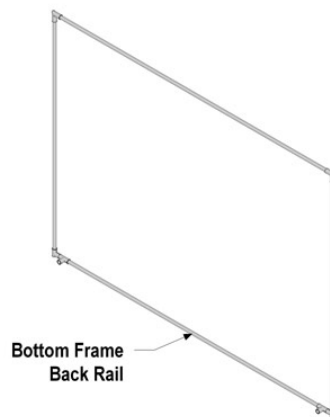


Figure 3

Insert the ends of the rail/tee assembly into the 1¼-inch tees on the back frame stiles, as shown in **Figure 3**.

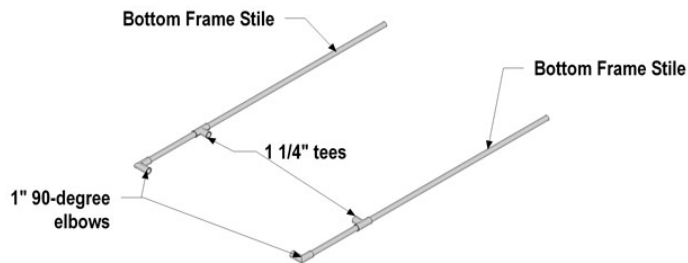


Figure 4

Place a 1-inch 90-degree elbow on one end of each of the two 60-inch lengths of PVC pipe (bottom frame stiles). On the opposite ends, place a 1¼-inch tee on each stile, 45½ inches from the end. Attach tees to the stiles using #8 x ¾-inch lath screws, as shown in **Figure 4**. Insert a 1-inch 90-degree elbow inside the open point of each of the 1¼-inch tees, making sure they are positioned perpendicular to the stile; drill a ¼-inch hole through each tee-and-elbow pair. (Mark a symbol on each of the elbows and tees so they can be matched later.) These holes will be used for inserting a bolt at a later step.

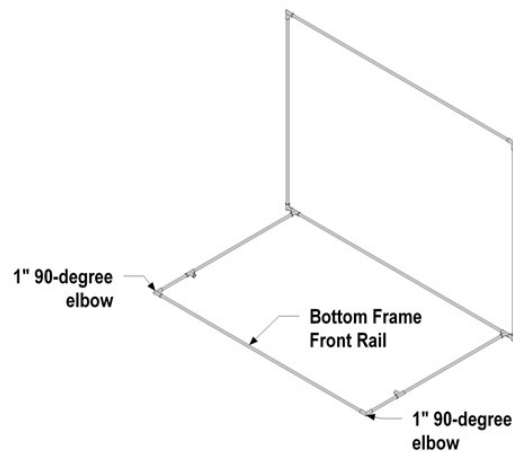


Figure 5

Insert the ends of the stiles without the elbows into the 1-inch tees on the bottom frame back rail. Make sure the elbows are facing each other. Lay the parts flat on the ground. Insert the 92-inch length of PVC pipe (bottom frame front rail) into the elbows on the end of the stiles, as shown in **Figure 5**.

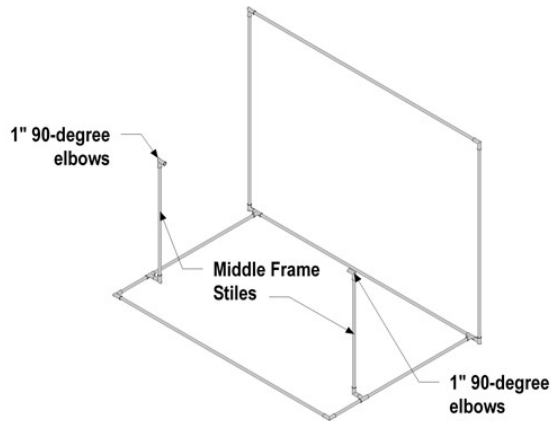


Figure 6

Place one of the 1-inch 90-degree elbows with a $\frac{1}{4}$ -inch hole on one end of each of the two 44-inch lengths of PVC pipe (middle frame stiles). The ends without the holes should go over the stiles. Insert the ends of the elbows into their matching tees on the bottom frame stiles, and insert a $\frac{1}{4}$ -inch x 3-inch bolt into the holes. This should allow the middle frame stiles to remain upright, as shown in **Figure 6**.

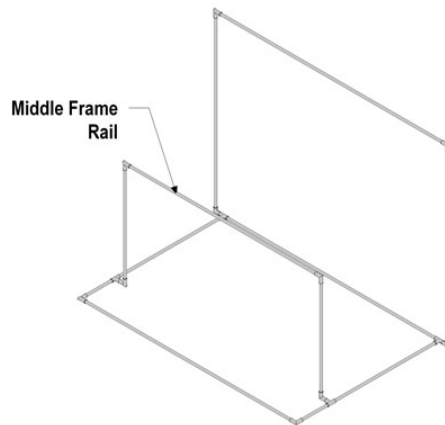


Figure 7

Place a 1-inch 90-degree elbow on the opposite ends of each of the middle frame stiles, making sure the elbows face each other. Insert the $89\frac{1}{4}$ -inch length of PVC pipe (middle frame rail) inside the elbows, as shown in **Figure 7**.

Attaching the Plastic

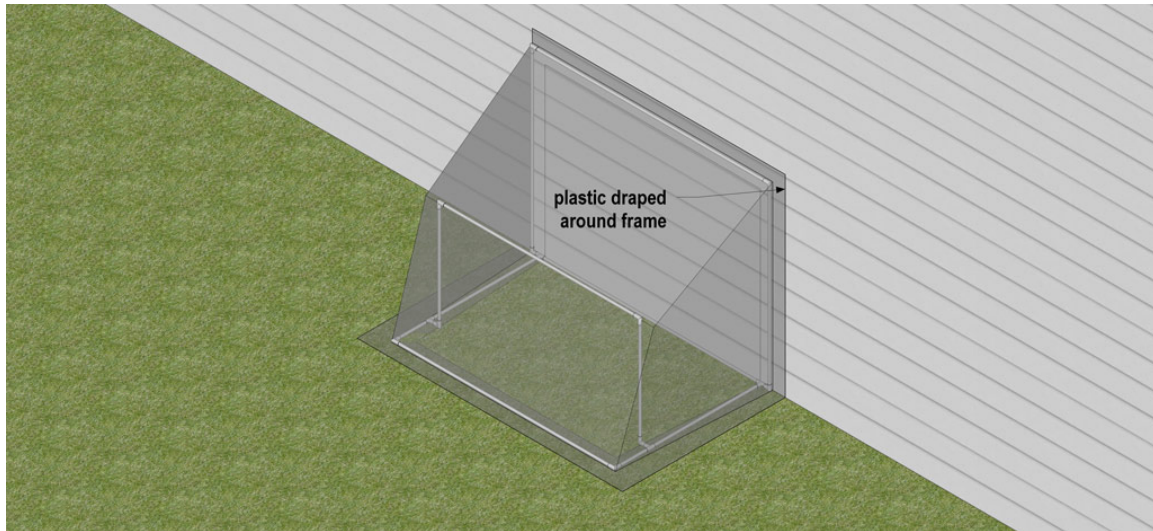


Figure 8

Drape the plastic over the entire assembly so that a few inches of plastic extends beyond the frame in all directions, as shown in **Figure 8**.

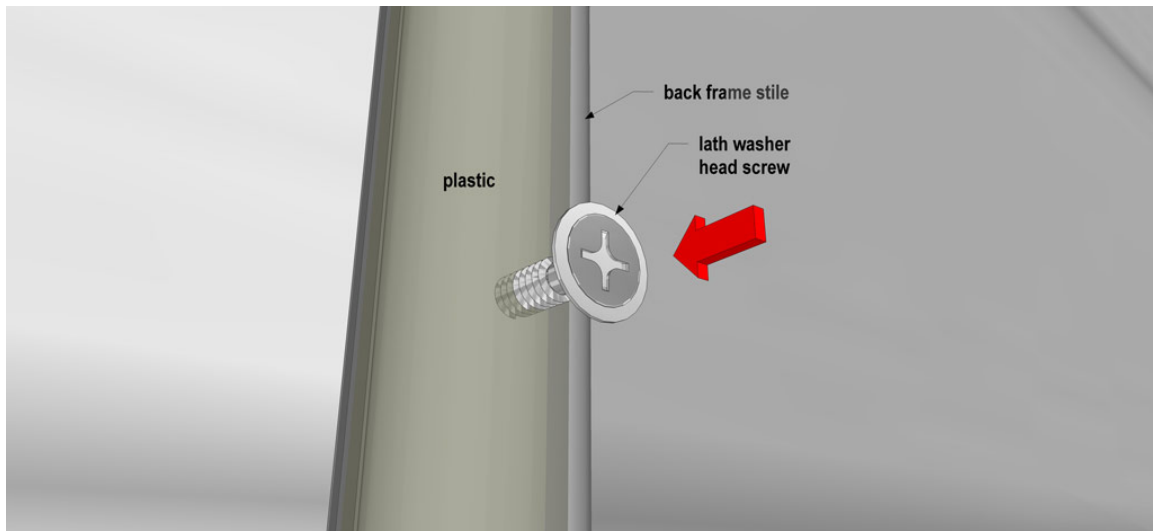


Figure 9

Hold the plastic in place against the back frame rail and back frame stiles using spring clamps. Starting at the center of the back frame rail, begin driving #8 x $\frac{3}{4}$ -inch lath screws through the plastic and into the pipe, as shown in **Figure 9**. The washer heads of the screws will hold the plastic in place. Work out from the center of the rail to one back frame stile, tucking and attaching the plastic as you go, adding a screw every few inches. Work all the way down to the bottom frame stile.

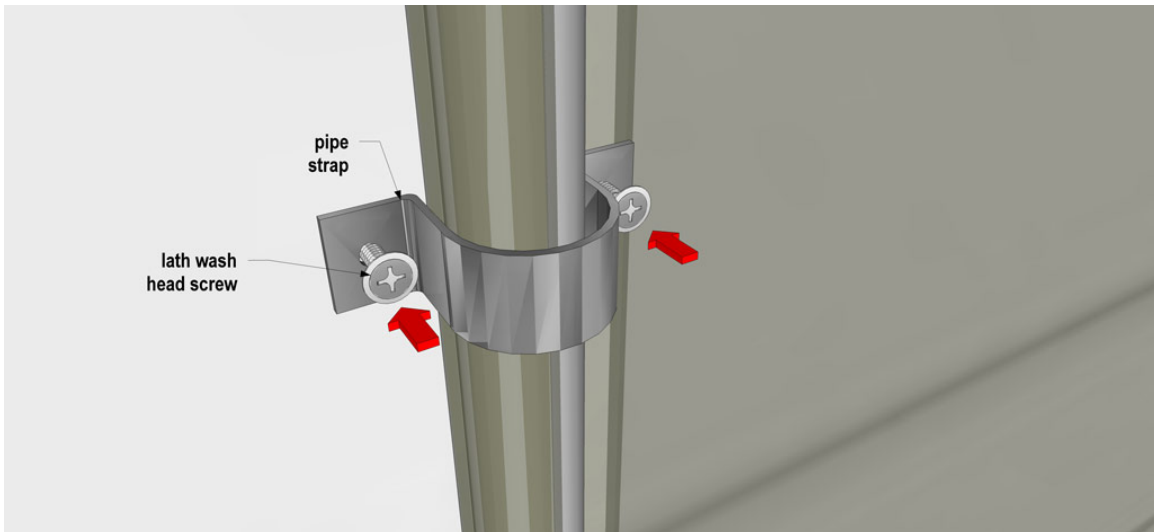


Figure 10

For added stability, attach the 1¼-inch galvanized pipe straps over the back frame stiles and/or the back frame rail, screwing them into the wall with #8 x ¾-inch lath screws, as shown in **Figure 10**.

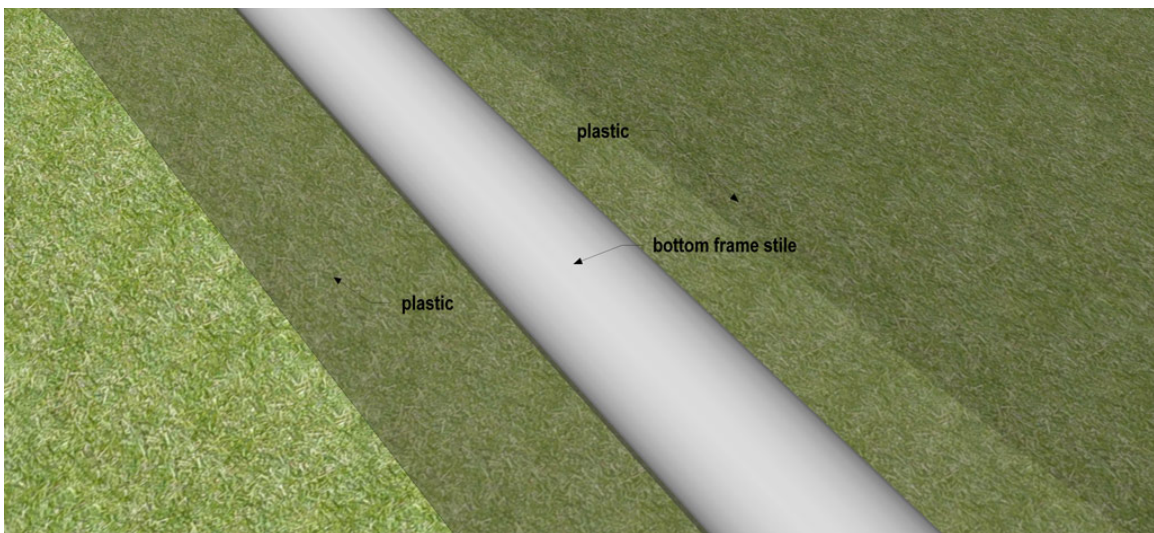


Figure 11

At the bottom frame stile, start pulling the plastic underneath and inside the entire bottom frame, as shown in **Figure 11**, working from back to front.. (Do not attach the plastic to the bottom frame yet.)

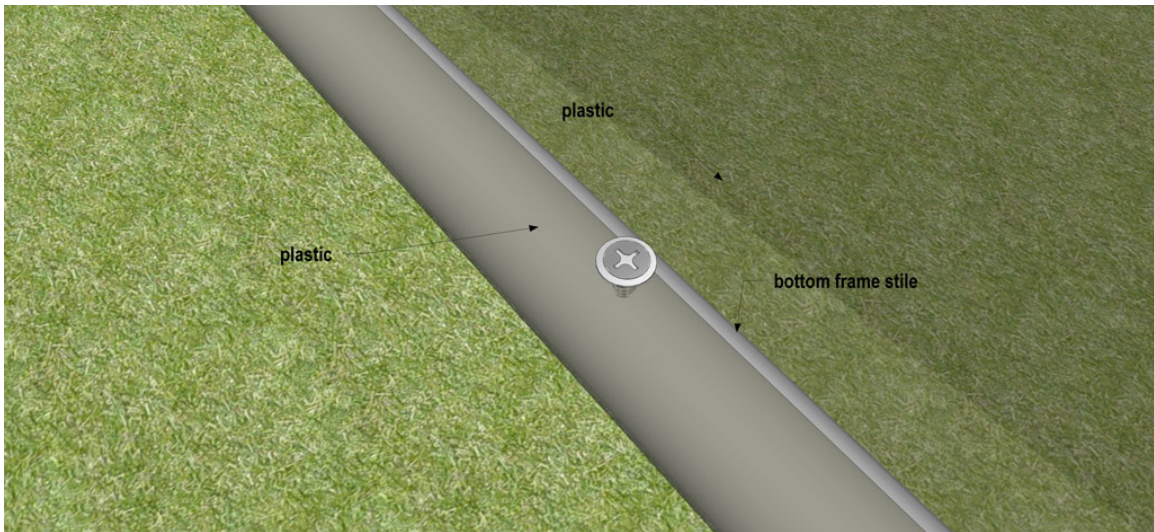


Figure 12

Return to the center of the back frame rail and attach the plastic to this rail, working in the opposite direction from where you started until you reach the back frame stile. Go back to the first bottom frame stile and begin attaching the plastic, as shown in **Figure 12**, continuing to pull and tuck the plastic to bring it taut. (As you will be working from the inside of the assembly at this point, it's useful to have an assistant on the outside who can guide the process and help spot and smooth wrinkles.) Work your way around the frame until you come within 24 inches of the back frame stile opposite from where you began. Do not attach the plastic within this 24-inch space, or to the adjacent back frame stile, as you want to leave a gap that will allow you to enter and exit the greenhouse. You will keep this flap closed using a couple of plastic-body spring clamps. To hold the frame in place when it's down, weight the bottom edges with bricks or paver pieces.

Folding Up the Frame



Attach one spring link to the end of each length of chain. From inside the assembly, remove the bolts holding the middle frame upright (to release tension, lift up the bottom frame a few inches) and lower the middle frame toward the back frame, making sure the elbows stay in the 1¼-inch tees on the bottom frame stiles. Lift up the entire assembly, rotating the 1-inch tees of the bottom frame inside the 1¼-inch tees of the back frame stiles. Push the assembly against the wall, loop the chain around the back frame rail, bottom frame front rail (which is now upright) and the plastic, and connect the ends of the chain using the spring link. Position one chain near each end of the assembly, and one in the center, as shown above.

Finished Dimensions

Height: 73 inches (at the back)

Width: 99 inches

Depth: 61 inches