Balcony Garden
ASSEMBLY

Notes

Avoid frustration. Take 10 minutes to study these instructions. P.S. Assembly's really quite easy!

Orientation is important and referred to during assembly. The **back end** is an inch taller than the **front end** to allow the nutrient solution to return by gravity to the **Reservoir** (yellow cover above). When the Garden is positioned on a balcony the "outside" receives more sun, wind and rain than the "inside". Try to keep shorter plants e.g. bib lettuce to the outside to avoid shading crops to the inside. Similarly, if you use a lamp(s), install it (them) on the inside leg(s) to minimize crop shading from their posts.

Many pipe/fitting connections are not glued to make it easy to correct alignments during assembly, and for easy disassembly for storage or moving. Removing even unglued pipes from fittings can still be difficult. Hold the pipe firmly while hitting on the fitting with the white rubber mallet (included). If a connection or two loosens and becomes a problem go ahead and glue it (PVC glue not included; cannot be ship in the mail). The only other tool required for assembly is a screwdriver (not included) to tighten hose clamps on the Irrigation System.

FITTINGS: Counterclockwise from top left: cross, elbow, cap, coupling, and tee. Assembly instructions refer to these fittings.

Figure 1. Garden as shipped (assembly looks difficult but it's quite intuitive).

Open the *U-Haul* box (correct side up) and lay out the contents, ideally on a table as in Figure 1 or on a clean floor. The **packing list** will help you. Do not pull anything apart!!!

Standing against the table from left to right:

Reservoir support board
Preassembled **front** and **back end sections**
Preassembled **bottom section**

You'll begin assembly by putting together these three preassembled sections

Atop the table from left to right:

Hefty tote (future **Reservoir)** Don't open it yet
Top side bars (two 1" pipes with small tees at each end)
GroPipes (3-two inch pipes with holes that support the **GroPlugs**)
Irrigation to Reservoir Drain Assembly
Irrigation system vertical component (includes a 3" long rubber hose section)
Irrigation system horizontal component (with small drip manifold and spaghetti tubes)
Plant Support Bars. Install only if/when required for plant support to minimize shading

Gather the **front and back end sections**, **bottom section,** and the two **side bars.** Identify the **back-end** section by its length, 1" taller than the **front-end section**, plus it has an open tee in its outside back leg. Lay this **back end section** flat on the floor (Figure 2). All open tee fittings point upwards.

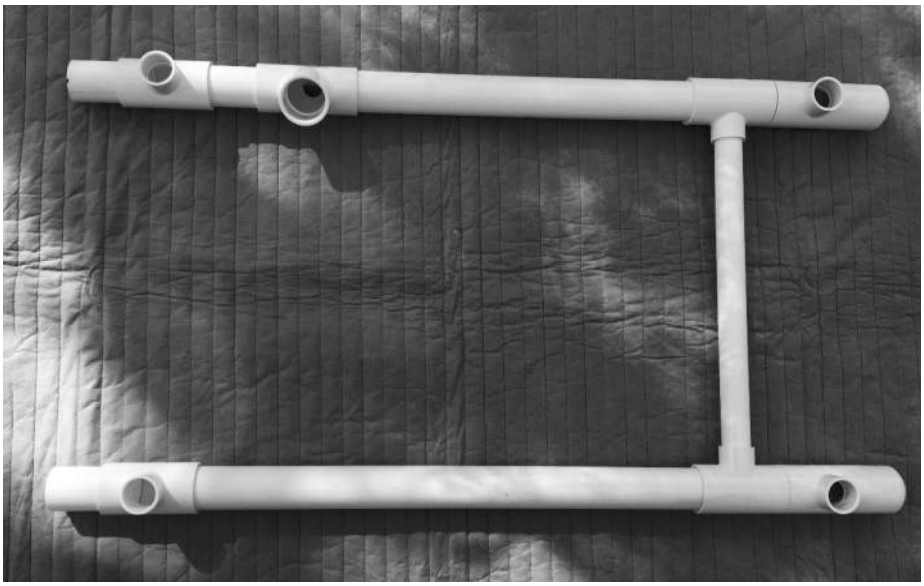

Figure 2. The back end section

Identify the **bottom section** (Figure 3).

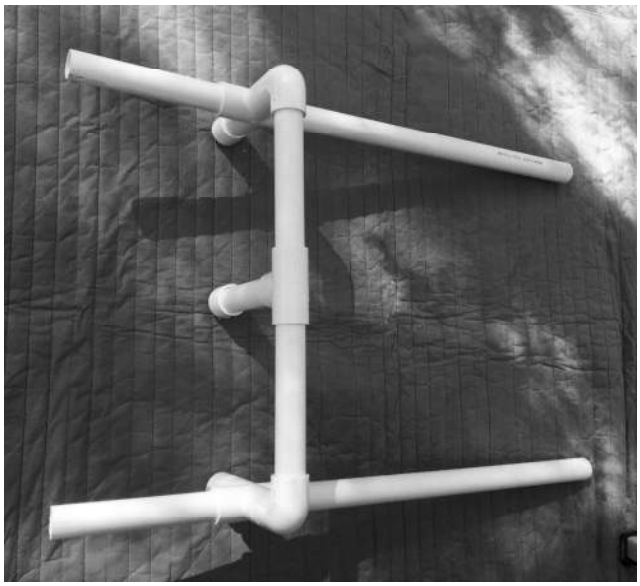

Figure 3. Bottom section

Attach the **bottom section** to the **back end section** as illustrated in Figure 4.

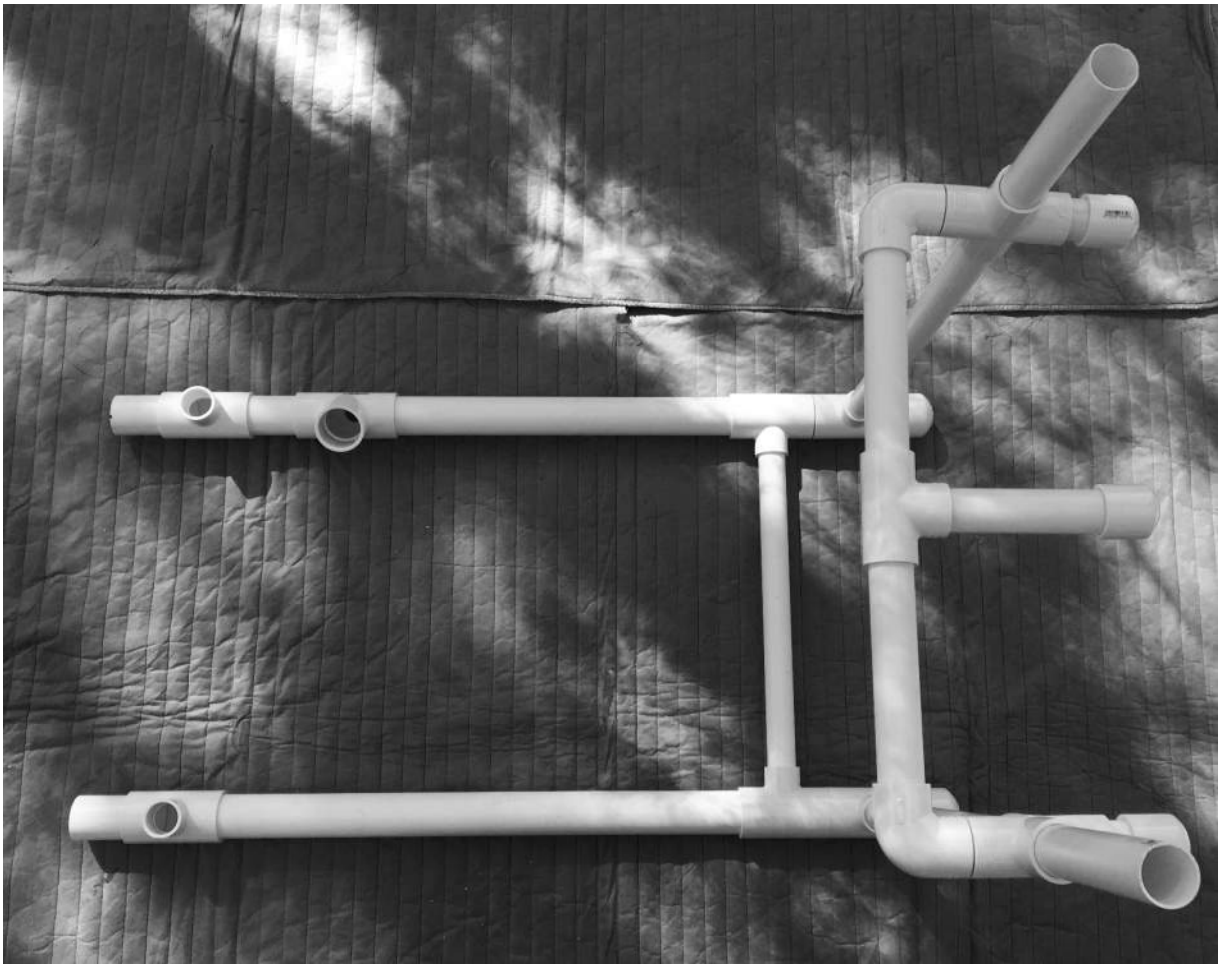

Figure 4. Attaching the bottom section to the back section.

The longer pipes of the **bottom section** insert into the **back section's** bottom tees. In every case Caps (see fittings picture on the cover page) are the Garden's "feet" and will always go down when the Garden stands upright. For now the caps on both the **back end** and **bottom sections** point in the same direction as shown (Figure 4).

Next insert the **top side bars** (Figure 5) into the **back-end section** upper tees. The small reducing tees on the **top side bars** point away from the bottom section so they will point up when the Garden is turned upright on its feet (caps) Figure 6.

Figure 5. The top side bars. The tees are reducing tees that will support an optional ½" Frost Protection Overhead Rack

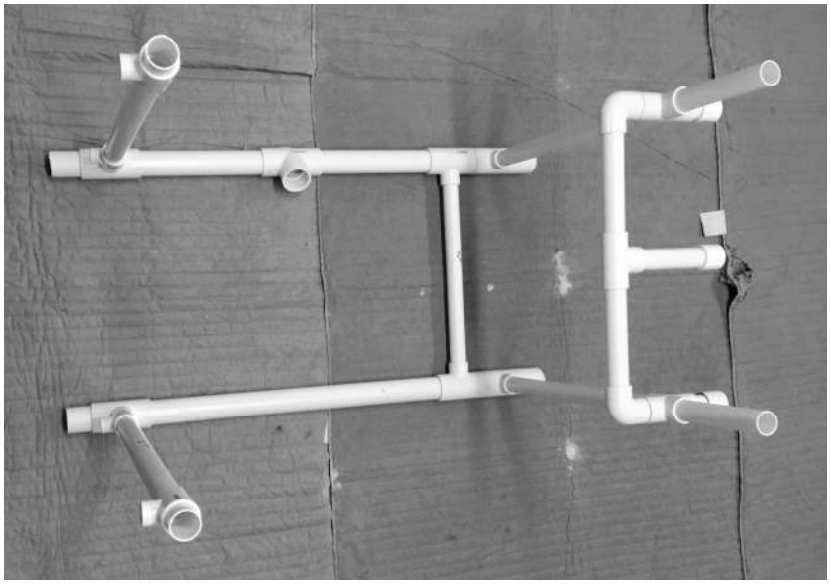

Figure 6. Inserting the top side bars into the back section. Note that the side bar's four tees will point upward when the Garden stands.

Take the **front-end section** and lay it over top of the assembly (Figure 7). Insert the front section's four open tees into the pipes on the **bottom section** and the **top side bars.** Fit the joints together but don't press them too tightly yet. Joints will need to rotate freely for final adjustments.

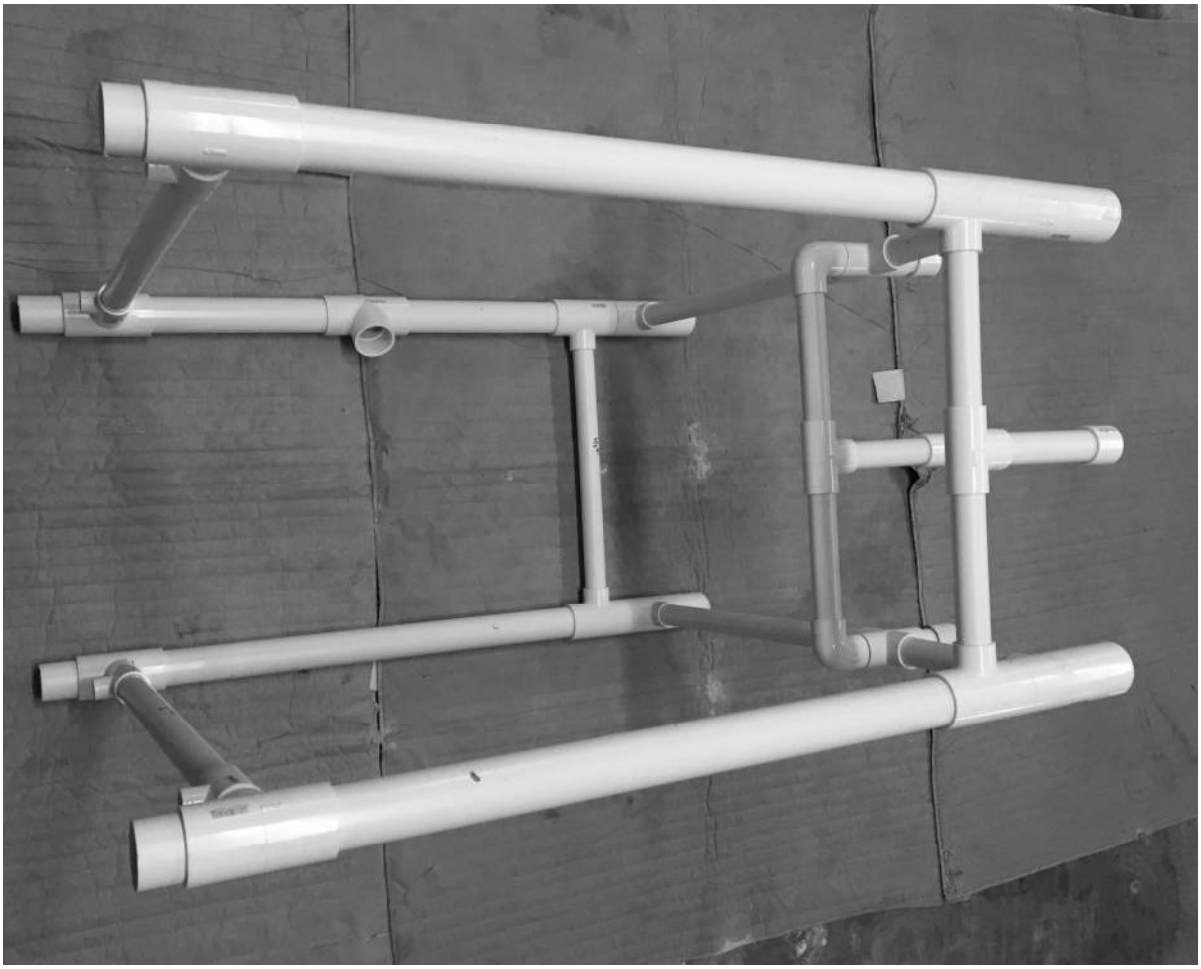

Figure 7. Lay on the Front Section. You have almost assembly

Turn the Garden up on its feet and now open the **reservoir**. Locate the **top bars** (Figure 8).

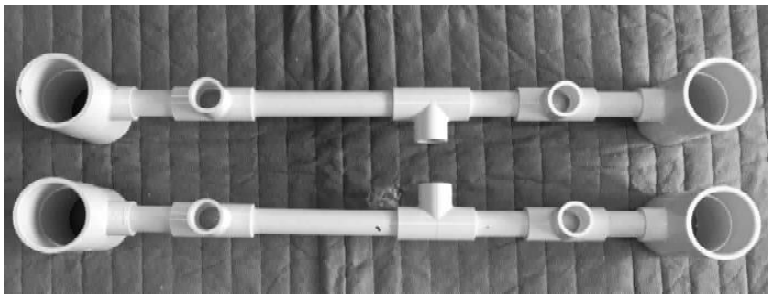

Figure 8. The top bars. Note that one of the small ½" horizontal pipes is longer than the others.

The **top bars** clamp down on the front and back legs locking the structure together (Figure 9). Both front and back end **top bars** are identical. Orientation is important. The top bar's longer horizontal sections go to your left side as you face the front section as shown in Figure 9.

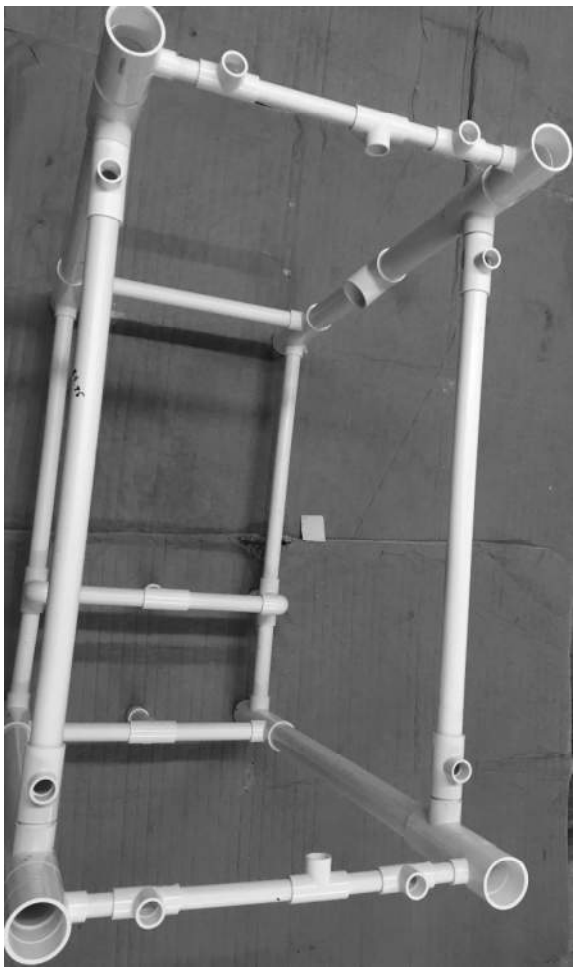

Figure 9. The top bars lock down firmly onto the front and back sections. Pay attention that the longer ½" horizontal pipe segment is to the left when looking from the Front End as illustrated above.

The basic structure is now complete. Make certain everything is correctly assembled because it's more difficult to disassemble to make changes once everything is pressed tightly together. When you're satisfied, press down firmly on all fittings rotating the Garden to make certain you press everything tightly together.

Take the Ziplock box out of the **reservoir** and remove the **manifold** (Figure 10). The 3 threaded 1" ports will accept the **GroPipes**, while the smaller ¾" tee (shown in Figure 10 pointing upward on an upside down manifold) returns the recirculating nutrient solution to the **reservoir**. The **manifold** is not glued so the ports can rotate to allow the **GroPipe**s to lay flat on the structure. Instead fittings are sealed with Teflon tape because manifold cannot leak during operation!

Stand the manifold on its vertical axis and press down hard to ensure that all fittings are tight.

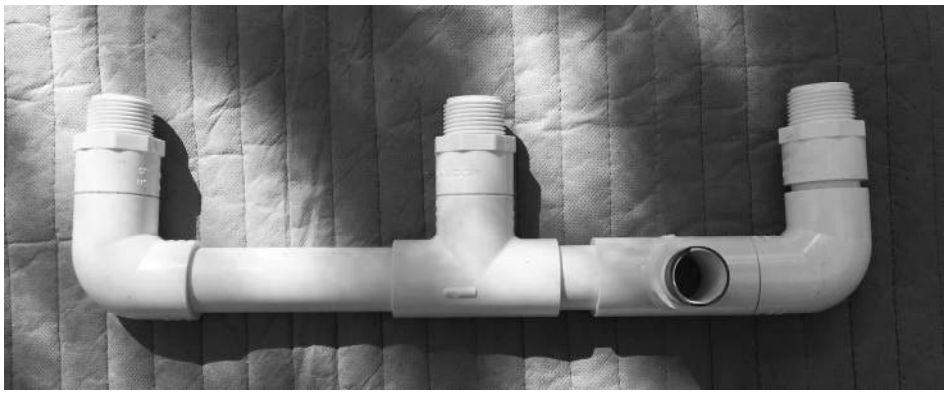

Figure 10. The manifold, shown upside down (In its operating position the open tee points down and to the left as you face the Garden from the Front End)

The manifold sits atop the **front-end section's top bar** held in place by at one or more **GroPipes** (Figure 11). Thread the Pipes onto their Teflon taped ports. Tighten securely but don't over tighten or you'll damage the plastic threads. **GroHoles** point up.

Figure 11. Note the arrangement of top bars, manifold, and GroPipes

Figure 12. Reservoir positioned correctly on the reservoir support board

Stand the Garden up and lay in the **reservoir support board** and the r**eservoir** (Figure 12). Note the correct positioning of the two holes in the **reservoir**.

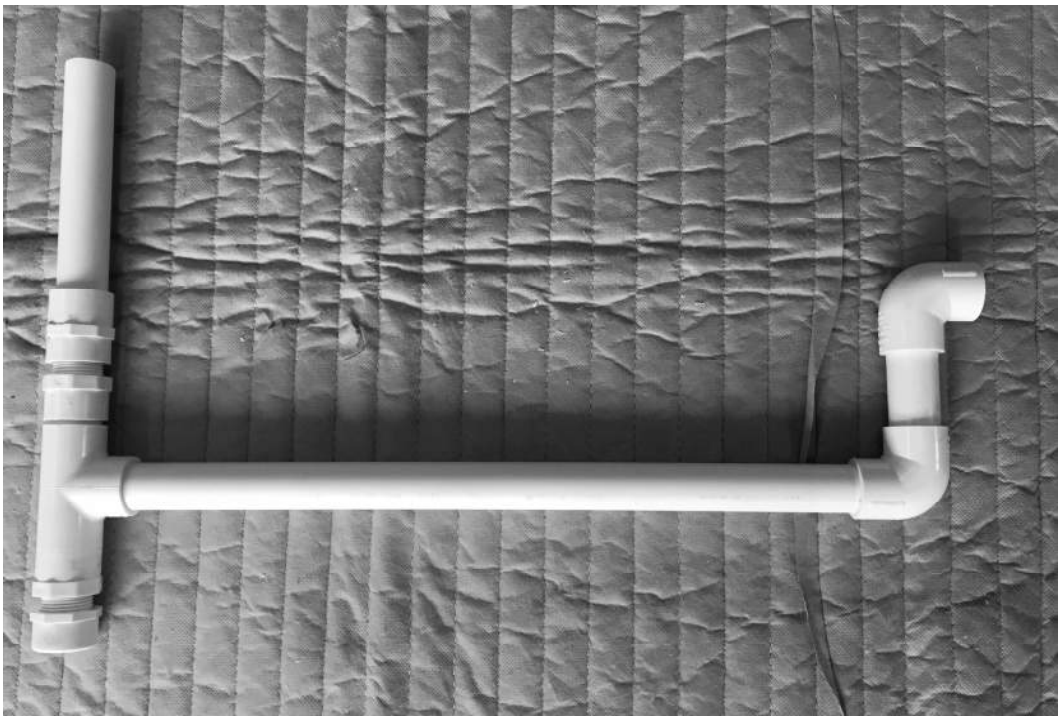

Figure 13. Irrigation to reservoir drain assembly

Locate the **irrigation to reservoir drain assembly** (Figure 13). Like most of the irrigation system this assembly is glued to ensure no leaks. It's top elbow inserts into the ¾" upside down drain tee in the **manifold**. This connection is not glued to allow for slight up and down fine adjustment on the finished Garden. In place of glue it's sealed with several wraps of Teflon tape. Insert it very firmly into its tee. Additional tape is included with the Garden if it later leaks on you. If you can't seal it with tape, make sure its perfectly positioned and go ahead glue it. (PVC cement could not be included but small cans are available at all hardware stores).

Note the left side of Figure 13 and bottom of Figure 14. The long vertical pipe ends in a tee. One side of that tee is capped, while the other side has an 8" long pipe that extends into the **reservoir**. Both connections are threaded. In operation the recirculating nutrient solution returns to the **reservoir**. When its time to change out the nutrient solution reverse the cap and 8" long pipe and let the solution drain into a bucket. That way your can change our your solution without disturbing the **reservoir**.

Figure 14. The irrigation to reservoir drain assembly installed. Note its Teflon tape slip connection to the underneath tee on the manifold to allow perfect vertical positioning, and the easy way to drain the nutrient solution by reversing the lower pipe segment (right, into reservoir) and cap (lower left).

The irrigation system is composed of two components: a vertical section with 3" of black rubber at the upper end which connects to the pump in the **reservoir** at the lower end, and a horizontal black rubber section tied to the irrigation support bar that terminates in the drip irrigation manifold (Figures 15 and 18). The two are connected with a grey "L" that fits snugly into the rubber tubes on each component. This design allows for several degrees of motion for an easy, perfect fit. The fit is snug, and leaking rare, but since leaking must be zero hose clamps are provided for insurance. Tighten the two clamps with a screwdriver (not provided).

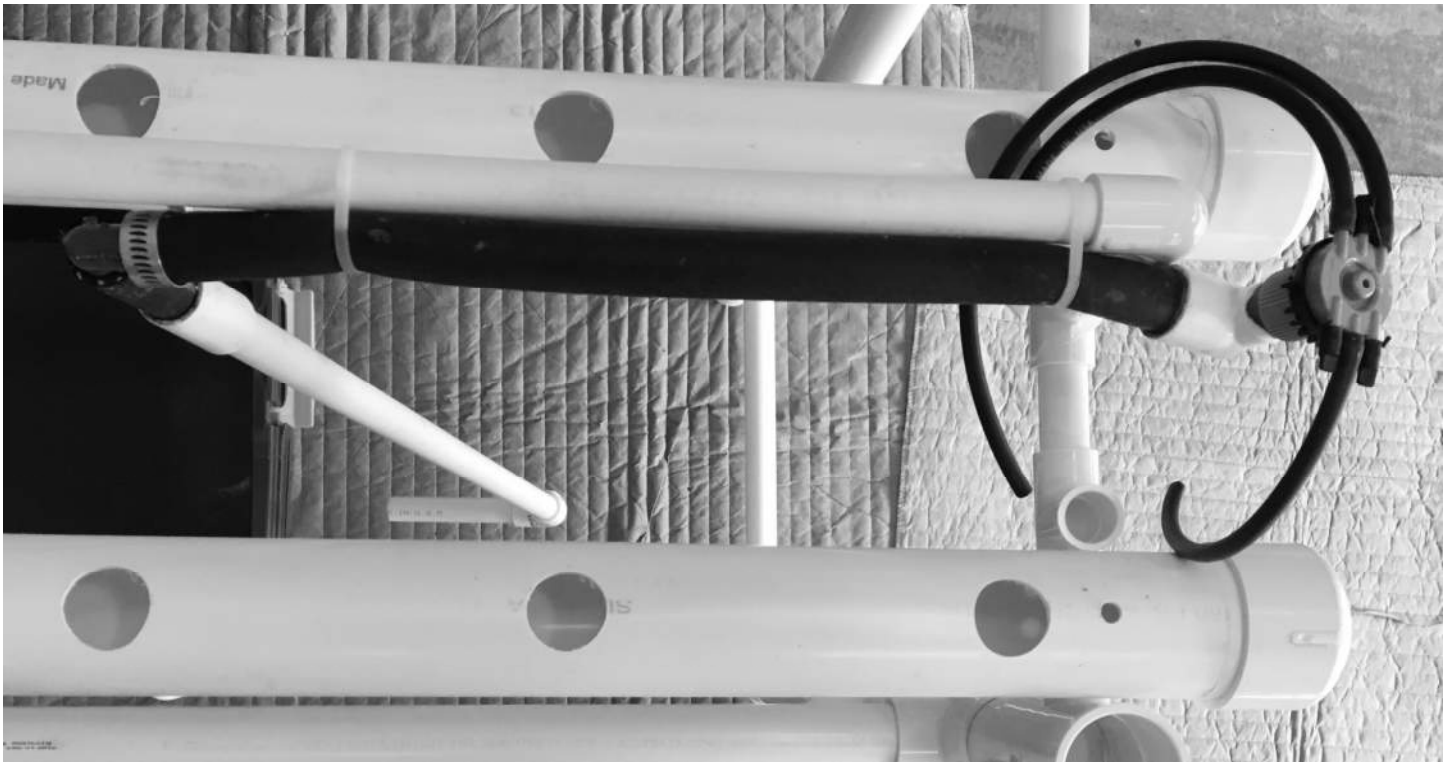

Figure 15. The drip irrigation system. Left, white, and vertical: the connection from reservoir to drip system. Top, black, and horizontal: the connection to the drip manifold. The two connect with an L and hose clamps.

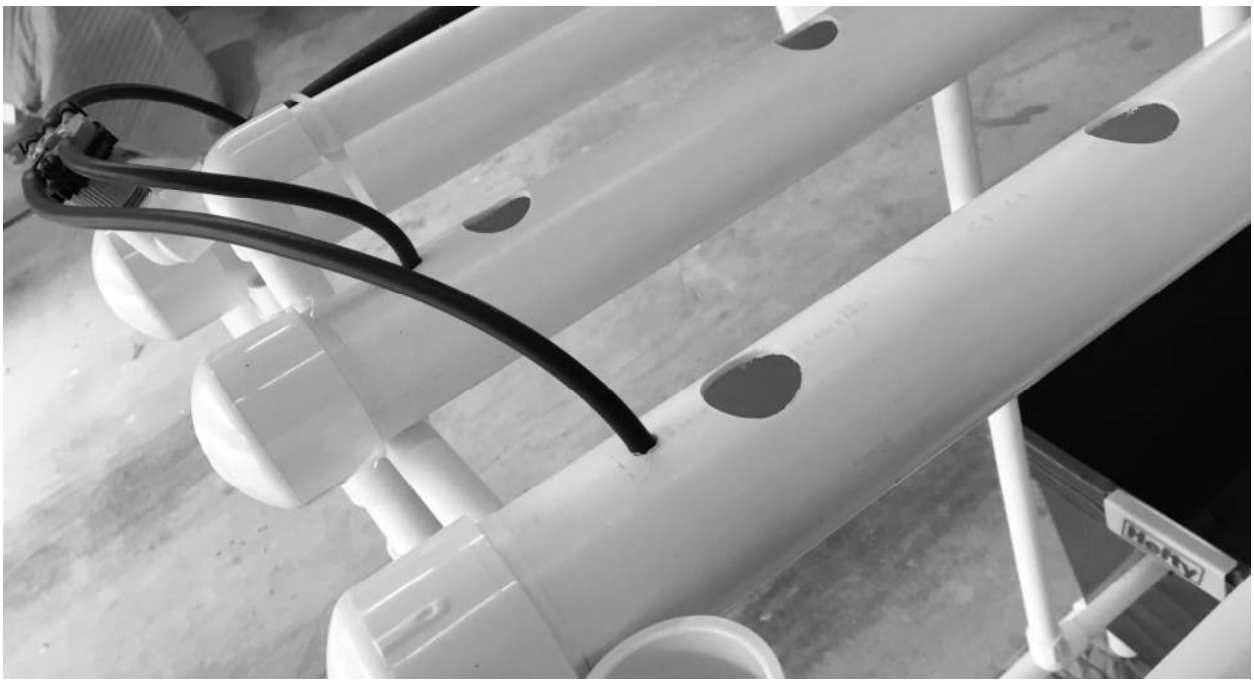

Figure 16. Spaghetti tubes connect the drip manifold to each GroPipe

Figure 17. Pump and filter assembly. The assembly screws right into the pump. Parts are not glued to allow easy access to the filter. Filter should be checked with each nutrient change-out because particles escaping the filter will clog the spaghetti tubes. This assembly inside the reservoir connects with the drip irrigation system vertical component through the hole in the forward end of the reservoir. Some pumps have a built-in filter that's easy to check and clean. See your pump instructions.

Remove the **pump assembly** from the Ziplock box and place it in the **reservoir** with the pump's suction cups down and the open elbow up and pointing to the hole in the **reservoir** forward wall. Bring the vertical component of the **drip irrigation system** through that hole and into the **reservoir** and connect it to the **pump assembly** elbow (Figure 18). Nothing inside the reservoir is glued since a little leaking there does no harm [however major leaking will reduce solution flow rate to the plants].

Working with the pump takes some practice. It's strong suction cups slide easily on the reservoir floor. Simply slide it into position instead of trying to pick it up to move it around. The pump wire passes through the same hole as the **irrigation assembly** pipe (Figure 19). Let out enough wire to make an easy connection with the timer inside the electrical box leaving the remainder inside the reservoir

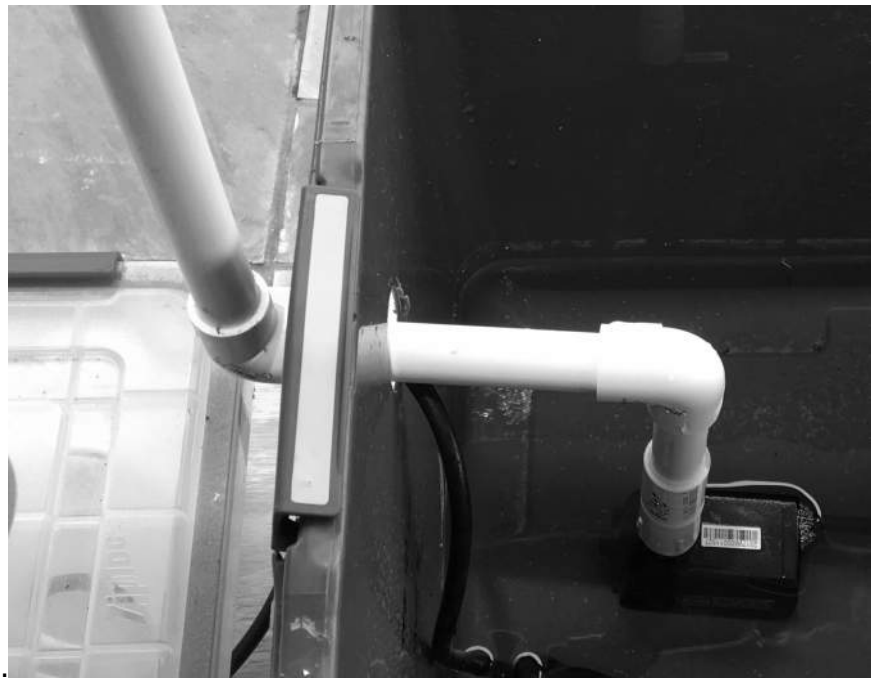
Figure 18. Note the connection between the pump and the drip irrigation system.

Short and simple but important instructions come with your pump. Read and follow them carefully. If your pump has a filter check it periodically.

Figure 19. The pump (black) and lamp (white) cords enter the electrical box.

The emptied moisture proof Ziploc box is the Garden's **electrical box** with holes at each end for wire entry and exit. It sits adjacent to the **reservoir**. Lamp and pump wires plug into the time clock and operate together. See operating instructions for detail.

Locate the plant support bars (banded together two 31", four 6" pipes and four elbows (Figures 1 & 20). Do not install them until plants require support in order to minimize shading small seedlings.

Figure 20. The plant support bars installed. To minimize unnecessary shading its not recommended installing them until plants require their support

Assembly is complete. To improve the appearance of your Garden temporarily cover open tees with the caps provided (place 1" and 2" caps respectively over ½" and 1 ½" open tees respectively).

Depending on the location of your new Garden you may need at least supplementary lighting. Please check our outdoor Garden lighting options.

Growing Healthy and Tasty Fresh Food
IT'S GREAT FUN
ENJOY!