

Building a 14-plant soda bottle hydroponics setup with bottle bushings

Part 1 of 2 emailable size file.



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This system will support 14 plants in an area less than 2 feet wide and 4 feet long. At 4 feet long the system is easily lit with either 4-foot fluorescent grow lights or LED grow lights for indoor growing. The centers of each plant site are spaced approximately 10" away from each other.

The system is built from standard 1" white schedule 40 PVC pipe and all fittings are slip except where noted.

The fittings required are as follows.

8 pieces of 1" slip fit 90° elbows. (2 of these are for a second overflow to drain the system. If you are making more than 1 system, each additional system needs only 6, 90° elbows)

20 pieces of 1" slip tees

1 piece 1" slip bushing by ½" FPT thread

1 piece ½" MPT by hose barb fitting

12 feet of 1" schedule 40 PVC pipe

1 small can of PVC cement

14 pieces bottle adapters

Apart from the bottle adapters, the pipe and fittings are available from any plumbing supply, Home Depot, or Loews. The bottle adapters are available from www.teachersource.com. They are called bottle bushings. (They are also available directly from the manufacturer at www.bottlebushing.com.)

The PVC pipe needs to be cut into the following lengths

1 piece 10"

16 pieces 4"

1 piece 6"

6 pieces 6 ½"

5 pieces 2 9/16"

Lightly sand the inside and outside of all cuts to de-burr the pipe so it seats completely in the fittings.

Do not dry fit the pieces together as it is too easy to think a fitting is glued because they don't always come apart easily from dry fitting. But if you forget to glue the fittings, they may come apart later or leak. If all the pieces are cut to the dimensions listed, the parts will go together with the proper spacing. There is always a chance that a glued fitting does not seat all the way down in the fitting so to assure they do; I like to tap the freshly glued fittings with a rubber mallet.

Begin the assembly

Start by setting out 2 elbows, 7 tees, and 8, 4" sections of pipe to make one side of the 2 identical sides you will make.

The 2 elbows and 3 of the tee's will be facing upwards to support the plant sites in the system and 4 tees will be facing 90° from them as in this photo.

Glue the 8 4" pieces into the tees and elbows as shown in the photo. You will make 2 of these pieces exactly the same way.

Elbow facing up

4" piece — — — — —

4" piece — — — — —

Tee facing up

4" piece — — — — —

4" piece — — — — —

Tee facing up

4" piece — — — — —

4" piece — — — — —

Tee facing up

4" piece — — — — —

4" piece — — — — —

Elbow facing up

Tee lying flat

Tee lying flat

Tee lying flat

Tee lying flat



Once you have made the 2 sidepieces the next pieces are the 4 cross pipes which will connect the sides together.

3 of the cross pipes are identical. Install one 6-½" piece of pipe in one end of a tee and another 6 ½" piece of pipe in the opposite side of the tee making a straight length of pipe with a tee in the center. Use the rubber mallet to make sure the pipes seated in the fittings. Make 3 identical cross pieces. The tees in these cross pieces will support plant sites.

The 4th cross pipe has 3 tees in it and 4 sections of 2 9/16" pipe. The center tee of this piece also supports a bottle site, and one supports the overflow pipe, and the third tee is where the pump flow enters the pipe. The tee where the pump connects needs to face down so the pipes drain completely and the other 2 tees need to face up. When this piece is complete it will be the same length as the 3 cross pipes you made in the previous step.

Glue the reducer bushing into the single down facing tee of the piece you just made.

Now lay out the first of the two sidepieces with the elbows and 3 tees facing up and the 4 connecting tees facing the other side piece laying about 2' away with its 4 connecting tees facing the first side piece. You will now connect the 2 sides by gluing the cross pieces in. First glue one of the 3 identical cross pipes into the first flat lying tee with the tee pointing up. Now glue the cross pipe with the 3 tees into the second flat lying tee making sure 2 tee's face up and one faces down. Next glue the third and fourth cross pieces into the two remaining flat lying tees with the tee's pointing up.

You can now see the remaining sidepiece will line up so the 4 cross pieces sticking out of the sidepiece you just glued the 4 cross pieces into. These all have to be glued at the same time. Add glue to the inside of the 4 flat lying tee's and quickly align all 4 ends of the cross pieces into the corresponding tee. Use the rubber mallet to be sure they are fully seated.

Glue the remaining 2 elbows together with the last section of 2-9/16" pipe to form a U and glue the 10" piece into one side of the U. Glue the 6" piece into the other side of the U and you will have made the overflow pipe. One leg will be 4" longer than the other and this is what drains back into the reservoir. Drill a 3/8 hole in the top of the overflow to allow air to prevent siphoning.



It will be useful to make a second overflow pipe with one very short leg, which will allow the nutrient solution to begin flowing out at a very low level in the bottles. The horizontal leg should extend out over the reservoir and drop down to a bucket. This will serve to empty the system when nutrients are changed out by using the existing pump to displace the flow into the bucket rather than returning it to the reservoir. It can be easily interchanged with the normal overflow when you need to drain the reservoir. This overflow, and the normal overflow are never glued into the system so they can be interchanged as needed. Don't forget to drill the 3/8" hole in the top so it doesn't siphon when the pump goes off.

The overflow pipe is fit into the cross pipe with 3 tees on the end tee opposite the down facing tee with the bushing. The center tee of this cross pipe is for a plant site. The overflow pipe is not glued into the tee, just a friction fit. This will allow you to remove it to shorten the overflow height if the liquid is too high in the soda bottles.

