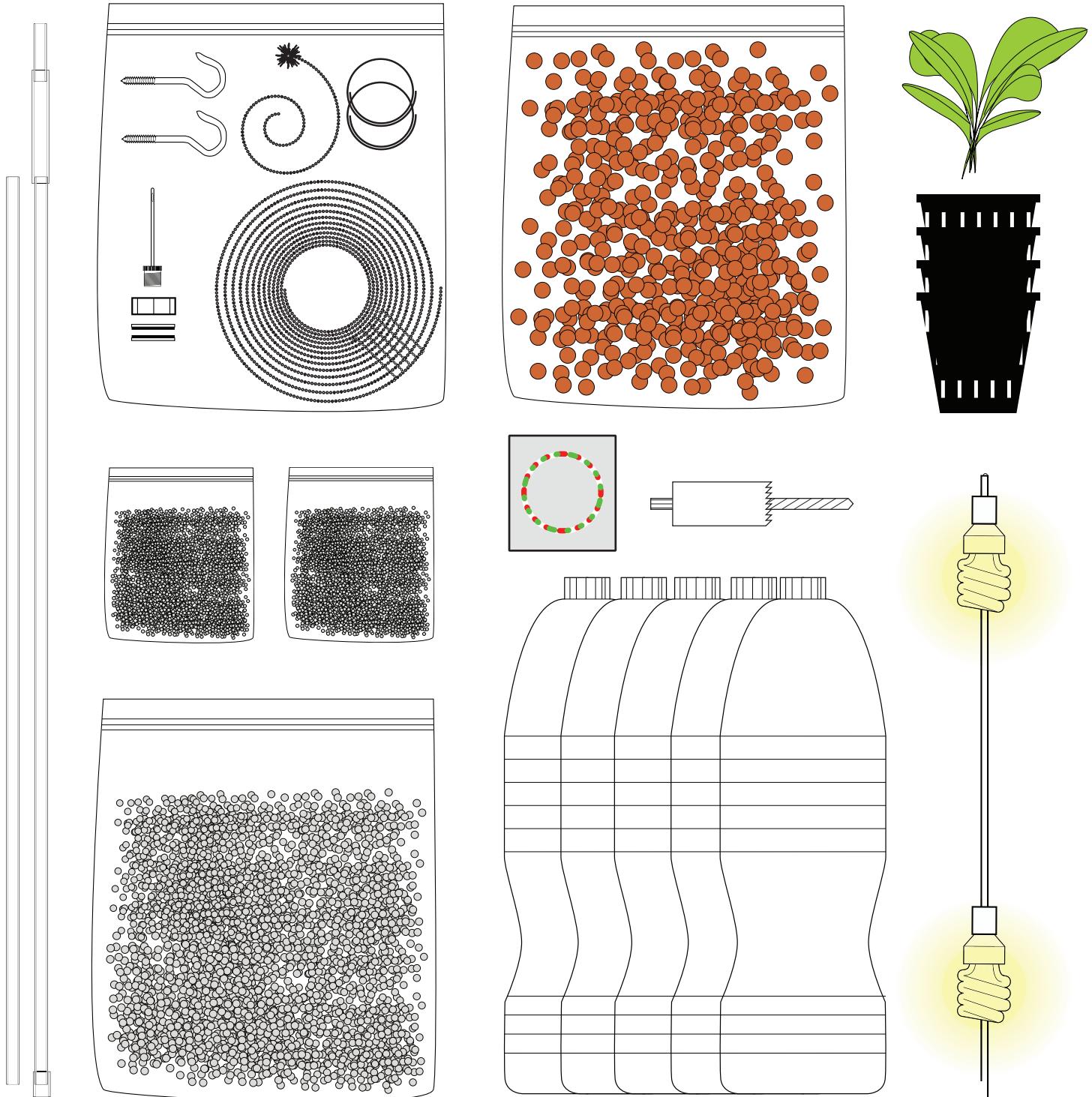


WindowFarms

Version 3.0 - DIY Instruction Book



Introduction

Meet WindowFarms

How To Get Started

- 1) Go to our web community
<http://our.windowfarms.org>
- 2) Register and agree to our Terms of Service to download the newest version of the plans.
- 3) For system troubleshooting during the build process, visit the web community
<http://our.windowfarms.org>

Make your own WindowFarm using this How-To or buy a WindowFarm Kit and support us!

Consider buying a Windowfarms kit. We are getting these supplies for you at group rates and you won't have to buy too much of certain, so it may turn out to be cheaper to buy through your very own Windowfarms core team.

Your money will support the community and give jobs to local youth and disabled veterans in New York. And you can leave it to us to find all the best parts for you without your having to hoof it all over tarnation. However, if you like the idea of doing it yourself locally in the purest sense, please go for it!

What Are WindowFarms?

Window Farms are vertical, hydroponic, modular, low-energy, high-yield edible window gardens built using low-impact or recycled local materials.

Goal 1

To start a Windowfarming craze in New York City and other dense urban areas, helping people grow some of their food year-round in their apartment windows.

Goal 2

Give ordinary folks a means to collaborate on research and development of these vertical hydroponic food-growing curtains through the community site at our.windowfarms.org

The Windowfarms Project operates in what seems a small niche, but we hope it might be what Buckminster Fuller would call a "trim tab," a small part that turns giant ships by being particularly well placed. Growing some of our own food is a simple pleasure that can make a big difference in our relationship with nature. As we choose nutrients to feed plants we hope to eat in turn, we gain experience with a nearly-lost fundamental human art, get a microcosmic view of the food system, develop a stake in the conversation, and come up with new ideas for how to take care of ourselves and our planet in troubled times. Let's make this experience possible for anyone!

How the Windowfarms Project Works

Each participant in the project makes it easier for the next windowfarmer to grow some of his/her own food. The system design and instruction sets evolve as each person comes up with ideas for improvements or points out problems and we collectively test solutions proposed by the group.

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Parts List

Quantities listed on the following pages are the materials to build 1 WindowFarm column.

If building more than one column, not all parts are necessary to multiply. These parts are considered ‘scalable’ and denoted with ♦. Do not multiply these quantities. Multiply all other quantities by the number of columns you want to make. We recommend up to 4 columns to start.

Quantites listed on the following pages for consumable items (e.g. nutrient solutions) are for a 6 month supply for 1 column.

Check valve type and inclusion of lights will influence your final parts list.

Important Footnotes follow the parts list.

Basic Tools ♦

Hutzpah and some brains!

Step ladder

Wire snips

Measuring tape

Hacksaw

Fine grit sand paper

Needle nose pliers

Scissors

Razor blade/X-acto knife with sharp blades

Permanent marker

Power drill

Safety glasses

Wall anchors (optional)

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Aquatic Supplies

Item #	Part	Quantity	Source
1	Air Pump (preferably with control dial)	1 (different configs available) ⚡	Aquarium store or Petco.com #9901, #9902, or #9904
2	Check Valve (included with PetCo pump)	1	Aquarium store or Petco.com
3	Air line Tubing (included with PetCo pump)	(1) 2.5' length	Aquarium store or Petco.com

Recycled Supplies

Item #	Part	Quantity	Source
4	1.5 liter Deer Park, Ice Mountain, Ozarka, Poland Spring, Zephyrhills, Arrowhead, or Calistoga drinking water bottles	5	Recycling bin or trash can
5	Sports drinking cap from one of the same brand of bottles (For use in Bottom Bottle Cap Assembly METHOD A)	1	Recycling bin or trash can
6	Presta Threaded Long Stem Bicycle Inner Tube (with the nut!) (For use in Bottom Bottle Cap Assembly METHOD B)	1	Bike shop

Hydroponics Supplies

Item #	Part	Quantity	Source
7	Hydroton clay pellets	1 liter	Hydroponics store or HomeHarvest.com #HYD5LT
8	3-inch diameter net cups	4	Hydroponics store or HomeHarvest.com #NET3IN
9	Plant tape	3 feet	Hardware store or Hydroponics store
10	Maxsea All Purpose 16-16-16	5 tablespoons	Hydroponics store
11	Maxsea Bloom 3-20-20	5 tablespoons	Hydroponics store
12	Grow cubes (if growing plants from seeds)	> 1 dozen	Hydroponics store

Hardware Supplies

Item #	Part	Quantity	Source
13	Printout of bottle templates found in this document	1 each	\$ Your printer or a copy shop
14	2" wide masking tape	1 roll	Hardware store
15	1" wide electrical tape or masking tape	far less than 1 roll	Hardware store
16	White Spray paint	1 can	Hardware store
17	Metal inflation needle with internal threads (metal needle used to inflate a sports ball with a bike pump)	1	Sports equipment store
18	Baking Soda	far less than 1 box	Grocery store
19	Epsom Salts (magnesium sulfate)	3 tablespoons	Grocery store
20	Cotton yarn	2 feet	\$ Hardware store
21	3/8" ID flexible vinyl tubing	1 foot	Hardware store
22	3/8" OD 1/4" ID rigid tubing	6 feet	Hardware store / McMaster.com #9245K17
23	Bead chain	180" (+ 18" per light column)	Hardware store / McMaster.com #3606T16
24	Bead chain couplings (with center hole)	12 (+1 per light column)	Hardware store / McMaster.com #3606T41
25	Screw hooks/cup hooks	2 (+1 per light column)	Hardware store
26	Sealing washers (For use in Bottom Bottle Cap Assembly METHOD A)	2	Hardware store / McMaster.com #94709A214
27	1" diameter carbide grit ceramic hole saw with pilot/arbor	1	\$ Hardware store
28	Electrical timer (capable of 4 on/offs per hour)	1	\$ Hardware store / McMaster.com #7993K42
Item #	Part	Quantity	Source
29	Compact Fluorescent (CFL) light bulbs in Daylight Spectrum (5500+ Kelvin color temperature) 100 watt incandescent equivalent or 27 actual watts	2 (per light column)	Hardware store or Home Depot
30	Clip light or electrical cable with 1 socket end	1 (per light column)	Hardware store or Home Depot
31	Pin lamp socket	1 (per light column)	Hardware store or 1000bulbs.com #CAGE-521WP

Lighting Supplies (optional)

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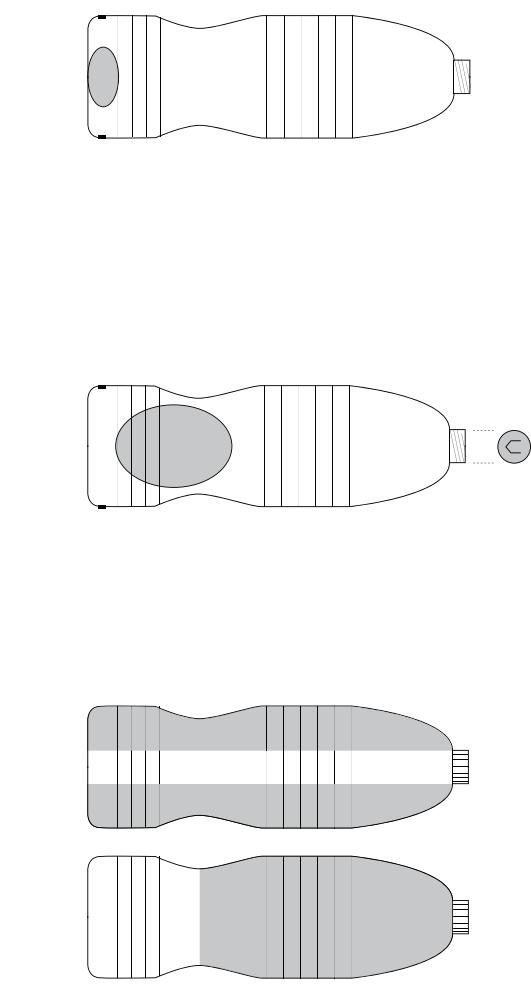
Parts List Footnotes

- 1) Air pump** - We like these pumps from PETCO although similar models are out there. Get the 2-way (item 9902) or 4-way (item 9904) pumps to run multiple columns off a single pump, or get the one-way (item 9901) 13+ gallon pump for a single column windowfarm. The control dial allows you to dial down the pump frequency to save energy or to avoid over-saturating plants that like drier conditions. You can be a better farmer the more control you have. The best part is that the valves are included, which save money and time spent hunting.
- 2) Check valve** - Comes with Petco pump OR use the Presta method and get any kind of check valves at an aquarium store. Warning: Some of the check valves that come with Petco pumps are duds. Also, for the sportscap method on page 27 you need the .8" diameter valve, not the .6" valve.
- 3) Air line tubing** - Comes with Petco pump OR get it at an aquarium store.
- 4) 1.5 liter bottles** - These bottles made by Nestle Waters work best because of their "waist." We're not playing favorites, its just that other bottles take more work and supplies. This is one of those circumstances where being patient and collecting the right bottles will pay off over time for your plants and in three months you will thank yourself because you have less evaporation problems. Find these at your local gym, in the recycling bin at sports events and rest stops along highways. In lots of cities, there are folks who pull recycling out of trash cans. Offer one of them more money than they get per pound and you'll have a win-win!
- 5) Sports drinking cap** - If you have enough working 0.8" PETCO valves, get these. Find a sports cap variety of one of the same brand bottles you got. They are all made by Nestle waters. Other caps will not fit these bottles in our experience.
- 6) Presta threaded long stem cicycle inner tube** - Get a flat one from your local bicycle shop. Get this if you do not have the 0.8" diameter PETCO valves or if they don't work. You are only going to use the stem and the tip. The rest you throw away.
- 7) Hydroton clay pellets** - These are a common hydroponic medium, not just any old rocks. They hold the right amount of nutrients and moisture around roots and prevent disease.
- 8) Net cups** - You can punch a ton of holes in yogurt cups instead.
- 9) Plant tape** - You can use regular tape too. But this stuff is also good for tying down vining plant stems and you can reuse it after you disassemble your system for cleaning.
- 10) Maxsea All Purpose** -We encourage you to develop your own nutrient plan by researching your plants and participating in the community at our.windowfarms.org. Here's an easy way to get started. This seaweed derived nutrient is for plants in the vegetative stage of all plants. Most green veggies where you eat the leaves and branches need this nutrient through harvest. You will need to buy larger quantities than you need due to a minimum order size.
- 11) Maxsea Bloom** - This is an economical seaweed derived nutrient. You need this Bloom kind only when and if your plants bear flowers or fruit, like strawberries, beans, or edible flowers. You will need to buy larger quantities than you need due to a minimum order size.
- 12) Grow cubes** - Plant your seeds in Dixie cups in this stuff and it is easy to transfer the delicate seedling roots into your windowfarm.
- 16) White paint** - Must be suitable for plastic, e.g. primer.
- 17) Metal Inflation Needle** - This MUST be threaded on the inside as well as the outside to work and not all brands have that feature.
- 20) Cotton yarn** - This is the kind of material you find on a mop end but thinner.
- 21) Flexible vinyl tubing** - Some kinds of tubing will kink at the bend at the top and prevent the water from flowing through. Try to find tubing that can bend sharply without kinking.
- 22) Rigid tubing** - This is pretty essential to the reliable functioning of your windowfarm over time. You can try out other tubes but you probably will not get the height of pumping you need or you will have to refill your tank all the time. It's just all about the physics behind the pumping action.
- 23) Bead chain** - You can use other materials like string to hang your windowfarm cheaper. This stuff is very modular and makes a great tube cleaner for algae buildup too.
- 24) Bead chain couplers** - You will have to buy more than you need due to the minimum order quantity.
- 26) Sealing washers** - You will have to buy a whole bag even though you only need two. There is a minimum order quantity.
- 27) 1" hole saw** - Not all stores will carry this so call around. This is the safest hole saw to use for bottle drilling, which can be very dangerous with a traditional hole saw. Please see safety warnings. This bit will be supplied at a wholesale discount in windowfarms kits, if you cannot find it or it's too expensive at your store, consider opting for a windowfarms kit.
- 29) CFL bulbs** - Most people need lights to supplement natural light from their windows because vegetable plants require a lot of light and if you grow off season, the days is not long enough in your window. Growlights need to produce at least 5500 kelvin light to be useful to adult and vegetable plants. Try to get plastic domes for these to protect them from shattering against the window. Domed bulbs are not yet available everywhere, but you can fashion something of your own!
- 30) Clip light** - You don't need the shade, just the socket and cable.
- 31) Pin socket** - You will have to buy more than you need due to the minimum order quantity.

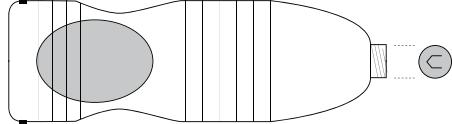
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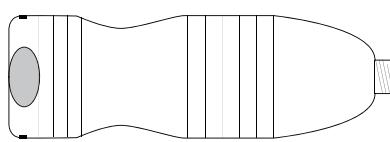
1 Bottle Covering



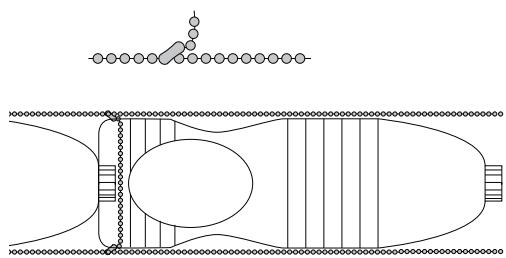
2 Plant Bottles



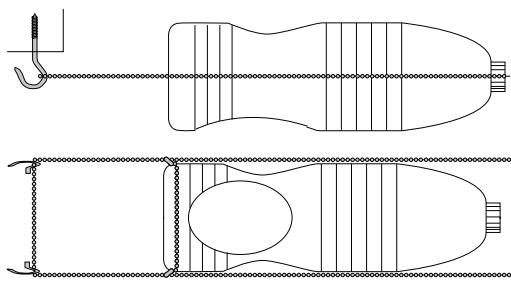
3 Reservoir Bottle



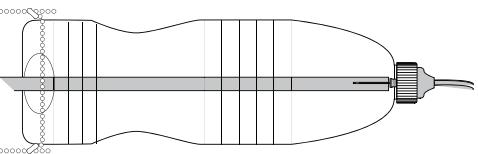
4 Suspension System



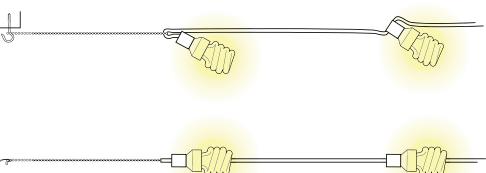
5 Mounting & Installation



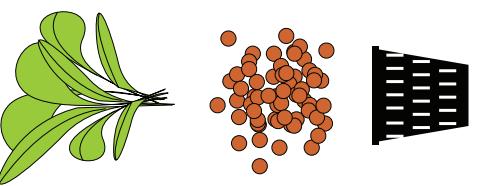
6 Plumbing System



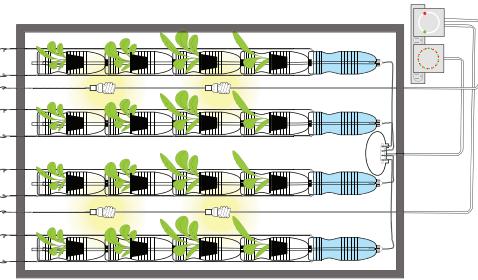
7 Lighting



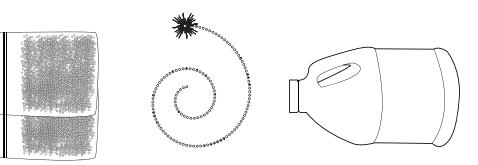
8 Plants



9 Full Assembly



10 Launch & Maintenance



Section 1

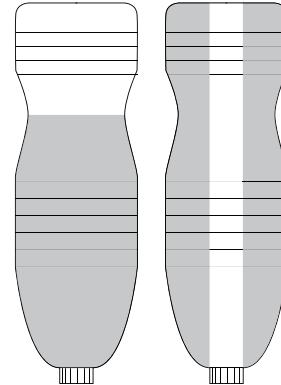
Bottle Covering

(5) 1.5 liter bottles, white paint, masking tape

Tools: painter's masking tape, scissors

Each Windowfarm v3.0 column is comprised of 5 bottles: 4 plant bottles and 1 bottom reservoir bottle. Each type of bottle is fabricated differently. This how-to addresses how to fabricate the bottles for one column.

We encourage reusing bottles from the trash.



Dump or drink most of the water from the bottles, leaving about 2" of water in the bottle.

Remove label with scissors without scratching the bottle. Remove as much glue/paper residue as is possible.



Using painter's masking tape, mask **4 of the bottles from the 'waist' to the base.**



Using 1" wide masking tape, mask the 5th bottle with one ribbon from the cap to the base.



Paint bottles with spray paint, providing even coverage. It will take 2-3 coats to create a layer of paint that will not let sunlight penetrate.

Once dry, remove the masking tape from all bottles.



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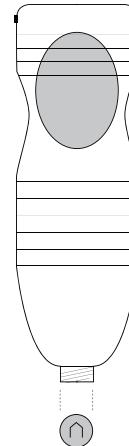
Section 2

Plant Bottles

(4) 1.5 liter bottles

Tools: 1" diameter hole saw, marker, razor blade with fresh blade(s)

4 of the 5 bottles for each column are Plant Bottles. Use the steps in this section for 4 of the 5 bottles.



Gather the 4 bottles that were masked from the waist to the base. These are your Plant Bottles.

Using 1" diameter drill bit, drill a hole in the bottom of each bottle.

Go slow and steady when drilling so that the bottle will not collapse. It will take approximately 20-30 seconds before the bit will pierce the plastic.



Print the following page unscaled on a letter-sized piece of paper. It is a pattern for the Plant Bottles. Follow the directions on the sheet as to how to mount it to the bottle.

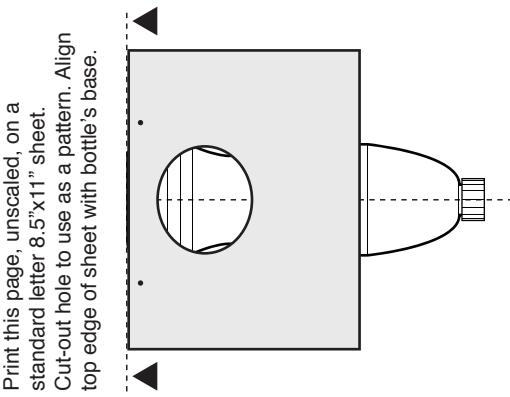


O
Suspension
Hole

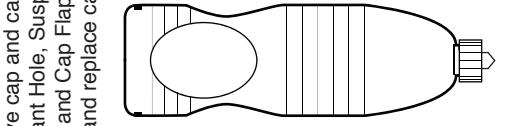
Plant Hole

PLANT BOTTLE TEMPLATE

Print this page, unscaled, on a standard letter 8.5" x 11" sheet. Cut-out hole to use as a pattern. Align top edge of sheet with bottle's base.

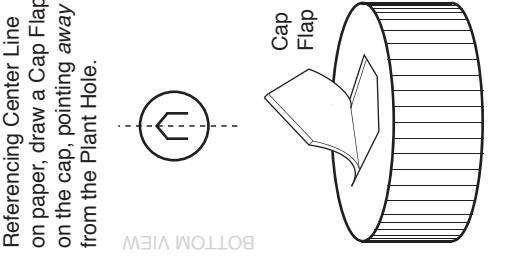


Remove cap and cap lock ring. Cut Plant Hole, Suspension Holes, and Cap Flap. Wash bottle and replace cap.

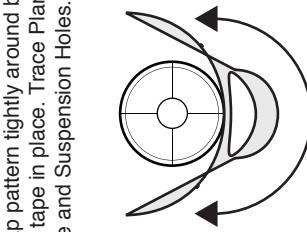


USE THIS FOR 4 BOTTLES PER COLUMN

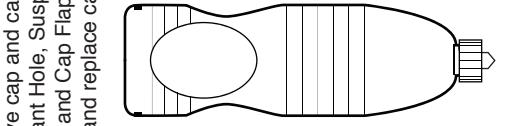
Referencing Center Line on paper, draw a Cap Flap on the cap, pointing away from the Plant Hole.



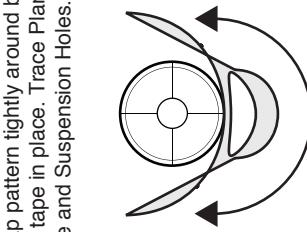
Wrap pattern tightly around bottle, and tape in place. Trace Plant Hole and Suspension Holes.



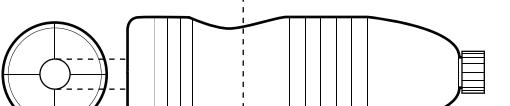
Remove cap and cap lock ring. Cut Plant Hole, Suspension Holes, and Cap Flap. Wash bottle and replace cap.



Wrap pattern tightly around bottle, and tape in place. Trace Plant Hole and Suspension Holes.



Drill 1" diameter hole in bottle base. When drilling, don't push too hard or else bottle will collapse. Hold steady until plastic wears away.



Paint or cover with material below the waist.

Trace the Plant Hole onto the bottle.



While the paper pattern is still on the bottle, mark and poke the Suspension Holes in the side of each bottle near its base using a sharp razor.



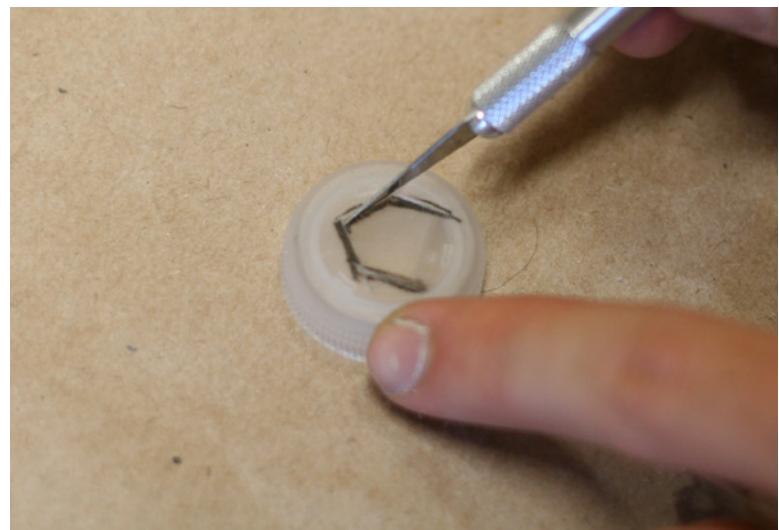
Mark the Cap Flap with its direction facing away from each Plant Hole, towards the rear of the bottle. Use the paper template to help align the direction of the Cap Flap.



Remove the cap and remove cap lock ring with scissors, razor blade, or snips.



Cut the Cap Flap with a sharp razor. Replace the cap on the bottle.



Using a sharp razor blade, cutout the Plant Hole.



**Repeat the prior steps on the other bottles:
Marking and cutting the Plant Hole, poking
the Suspension Holes, removing the cap
lock ring, and cutting the Cap Flap.**



Flush all bottles with water.



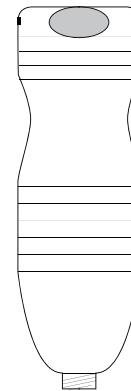
Section 3

Reservoir Bottle

(1) 1.5 liter bottle

Tools: 1" diameter hole saw, marker, razor blade with fresh blade(s)

1 of the 5 bottles for each column is the Bottom Reservoir Bottle. Use the steps in this section for 1 of the 5 bottles.



Find the bottle that was masked from the bottom to top with a 1" band. This is your Bottom Reservoir Bottle.

Using 1" diameter drill bit, drill a hole in the bottom of the bottle.

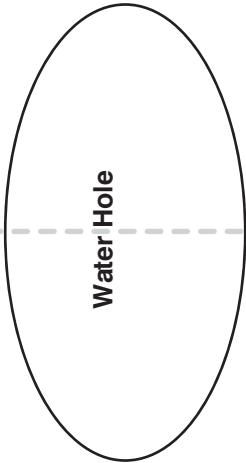
Go slow and steady when drilling so that the bottle will not collapse. It will take approximately 20-30 seconds before the bit will pierce the plastic.



Print the following page unscaled on a letter-sized piece of paper. It is a pattern for the Bottom Reservoir Bottle. Follow the directions on the sheet as to how to mount it to the bottle.



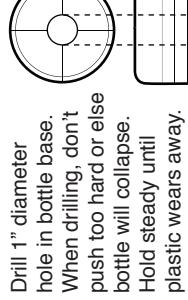
O
Suspension
Hole



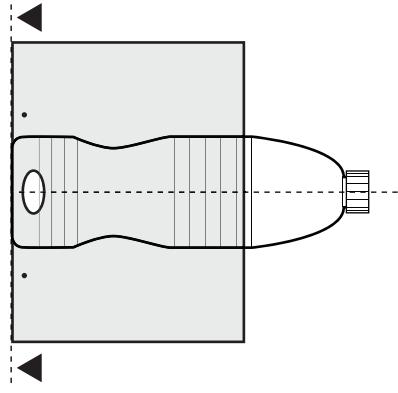
O
Suspension
Hole

BOTTOM RESERVOIR BOTTLE TEMPLATE

Center
Line

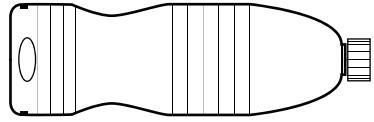


Print this page, unscaled, on a standard letter 8.5" x 11" sheet. Cut-out hole to use as a pattern. Align top edge of sheet with bottle's base.

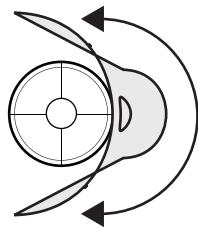


USE THIS FOR 1 BOTTLE PER COLUMN

Cut Water Hole and Suspension Holes. Wash bottle.

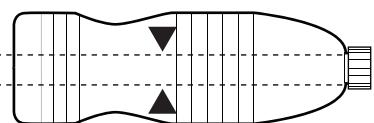


Wrap pattern tightly around bottle, and tape in place. Trace Water Hole and Suspension Holes.



TOP VIEW

Drill 1" diameter hole in bottle base. When drilling, don't push too hard or else bottle will collapse. Hold steady until plastic wears away.



Paint entire bottle leaving 1" vertical band unpainted.

Trace the Water Hole onto the bottle.



While the paper pattern is still on the bottle, mark and poke the Suspension Holes in the side of each bottle near its base using a sharp razor.



Using a sharp razor blade, cutout the Water Hole.



Flush the bottle with water.



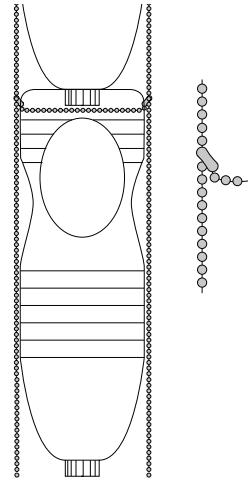
Section 4

Suspension System

Bead Chain, Bead Chain Couplers

Tools: measuring tape, wire snips

You can use other materials like string to hang your windowfarm cheaper. This stuff is very modular and makes a great tube cleaner for algae buildup too.



Daisy-chain all 5 bottles by removing each cap and screwing the mouth through the hole drilled in the base of the one below it.

Align all the Plant Holes and Water Hole (in the bottom reservoir bottle) in one direction.



Re-attach the caps to the bottles, making sure the Cap Flap is pointing away from each Plant Hole.

The idea of the Cap Flap is to direct the dripping water away from the Plant Hole of the bottle below.

Set aside the column of bottles.



Measure and cut one 126" length of bead chain.



Measure and cut 5 (five) 4.75" lengths of bead chain.

Add a bead chain coupler to each end



Gather all 4.75" pieces with bead chain couplers on the ends.

Take one end of the 126" chain, and thread it through the center holes of the bead chain couplers on one side of the 4.75" pieces. The seams of the bead chain couplers should be facing away from the end of the chain.



Repeat the process for the other side of the 126" chain and the couplers on the other side of the 4.75" pieces.



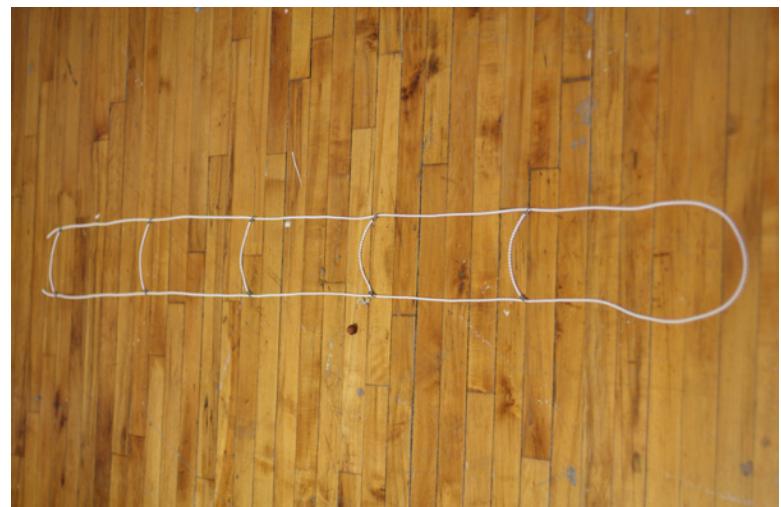
Starting a few inches from the ends of the 126" chain, space and snap-in-place the end couplers at 11.5" intervals.



Do this on both sides of the 126" chain.



You will end with a ladder effect.



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Section 5

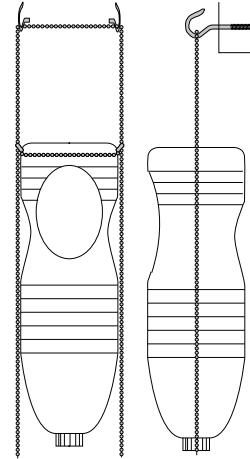
Mounting & Installation

(2) Cup Hooks

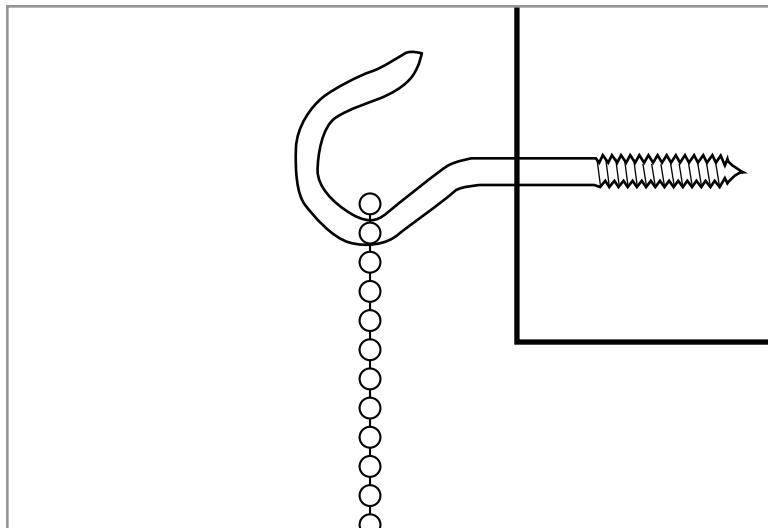
Tools: measuring tape, drill

Windows come in different sizes and orientations. Some adaptation may be required.

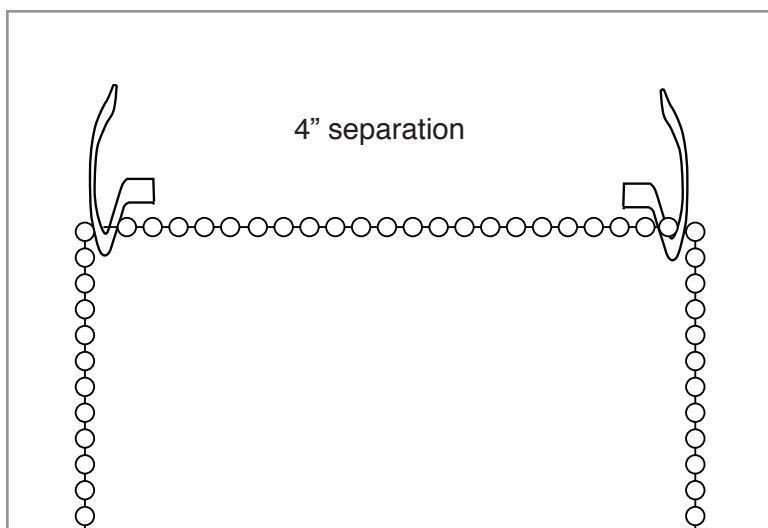
If your wall type requires wall anchors, please consider using them.



For each column of bottles, put two cuphooks into the wall above the window, spaced 4" apart.



Hang the bead chain ladder on the hooks, with the looped end at the top.



Merge the bottle column with the suspended chain by uncoupling one side of each of the horizontal 4.75" pieces and feeding it through each bottle's Suspension Holes.



Once fed through, recouple the horizontal bead chain piece.

You may have to spend some time adjusting the system to get it straight. Your system should now be suspended.



Section 6

Plumbing System

Rigid Tubing, Flexible Vinyl Tubing, Check Valve, Poland Springs 'sports' drinking cap, Metal inflation needle, Presta stem, Sealing washers, Plant tape

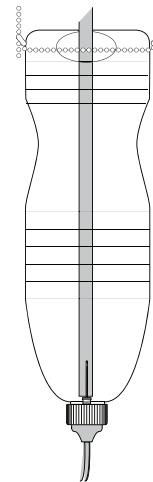
Tools: tape measure, marker, scissors, needle nose pliers, hacksaw or razor blade, fine grit sand paper

Bottom Cap Assembly

The configuration of the bottom cap assembly for the bottom reservoir bottle will vary based on the type of **check valve** you have.



We have provided two configuration options to account for this. Please take note of these options within this section.

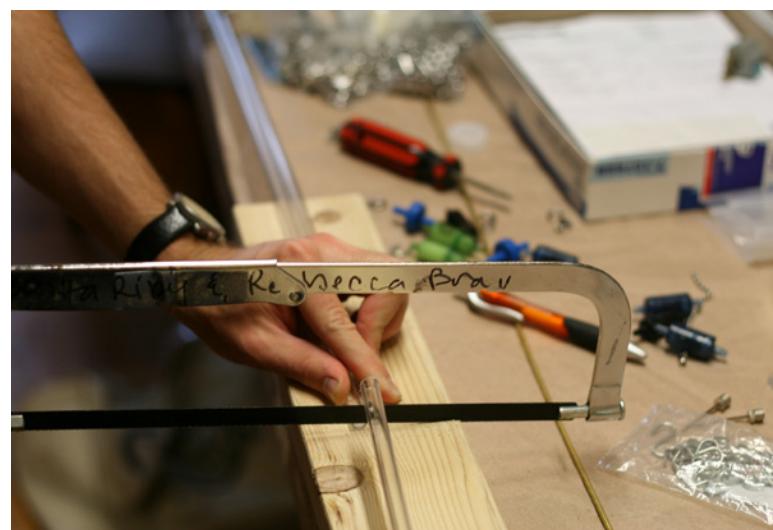


Mark the **rigid** tube with a marker to create three lengths:

28.5 inches
28.5 inches
3 inches



Score the rigid tube at the marks with a razor blade and snap, or use hacksaw to cut at the marks.



If necessary, lightly sand ends of tubes to remove debris from sawing.



Mark **flexible** tube with a marker to create two lengths:

1 inch
7 inches



Cut the flexible tube at the marks with scissors.



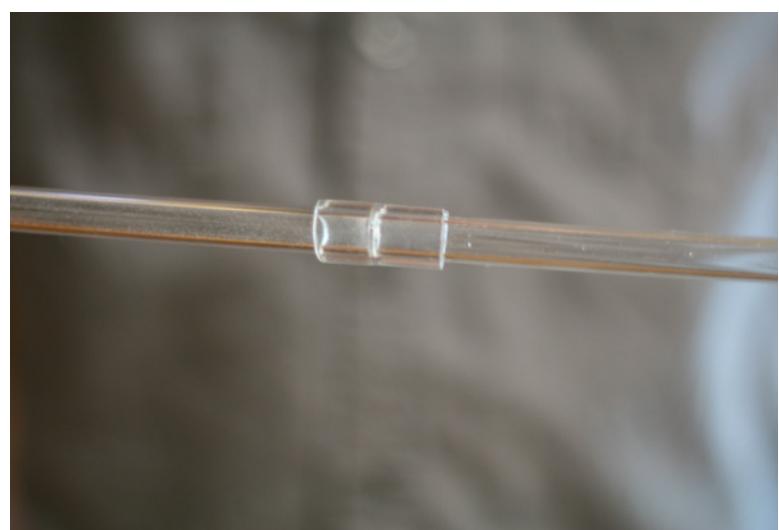
Attach the 3" **rigid** tube piece to one end of the 7" **flexible** tube. Overlap the pieces by 1/2".



Attach the other end of the 7" **flexible** tube to one end of one 28.5" **rigid** tube. Overlap pieces by 1/2".



Use the 1" **flexible** tube join the two 28.5" **rigid** tubes.



Measure and cut 2 (two) 12" pieces of plant tape.



Stick one end of the tube assembly into the Water Hole of the bottom bottle in the suspended system.



Stick the flexible end of the tube assembly into the hole of the top bottle.

Use the plant tape to wrap the top bottle near the waist, capturing and securing the water tube to the top bottle.

Use a zip-tie through the back side of the bottle to point the outlet of the tube towards the rear of the bottle.

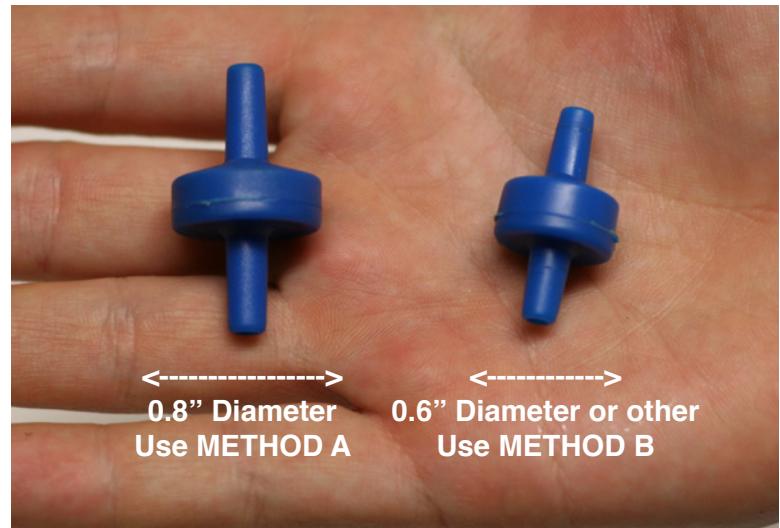


Use the second piece of plant tape to secure the tube assembly to the middle bottle near the tube assembly's midway joint.



Bottom Cap Assembly

We have provided two methods for the assembly of the bottom cap depending on the size of check valve you received with your pump. Use the image on the right as a reference to find out which Method to use to construct the bottom cap.



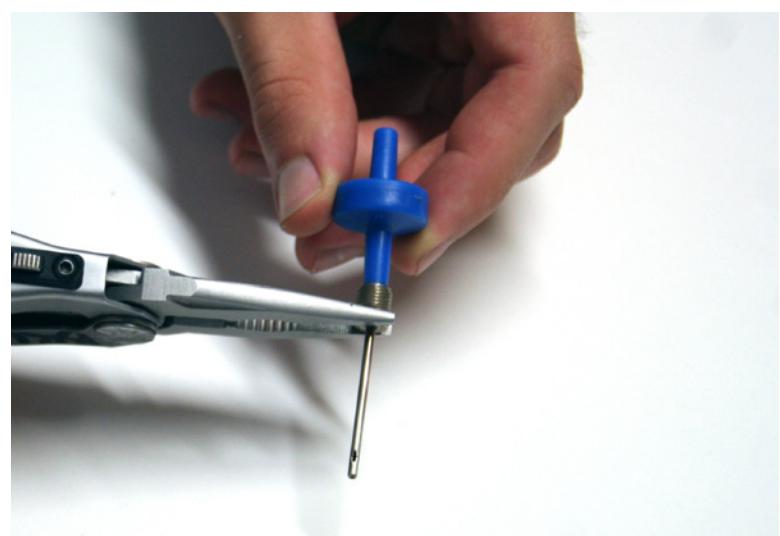
METHOD A

With needle nose pliers, remove the filter in the hole of the sports cap, making an unobstructed hole.

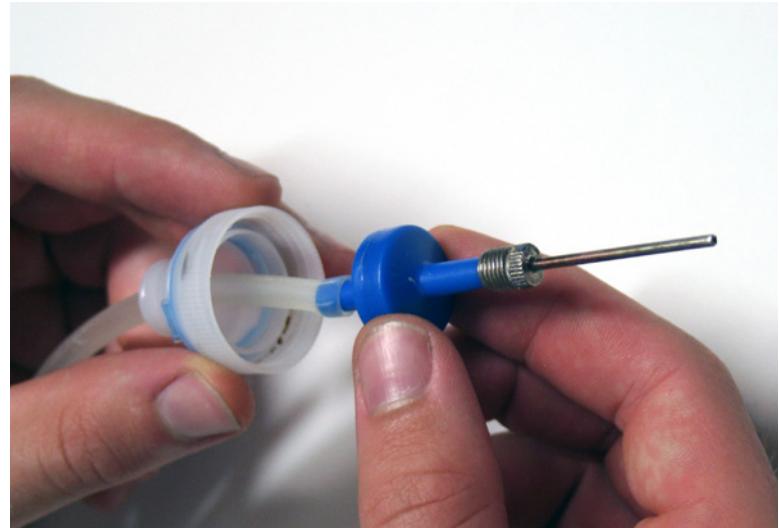


Check to make sure the check valve is operational. Blow through one end, then the other. It should only allow air to pass through in one direction. If air can pass through in both or no directions, PetCo has provided you with a faulty valve. Please contact them to get a replacement check valve.

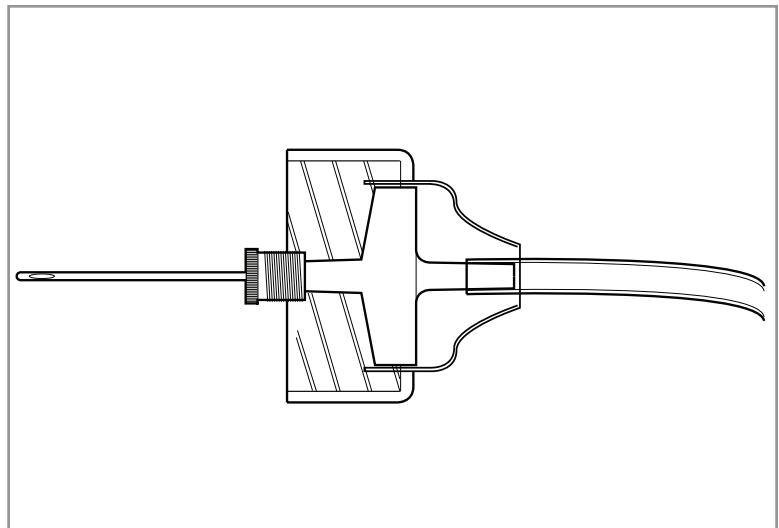
Attach a metal inflation needle to the **outlet** stem of the check valve. (It says "OUT" on the valve). Align it first with your fingers, then use pliers to screw down the valve with hard pressure. The threads inside the metal inflations needle should dig into the plastic of the check valve's stem.



Stick the air hose included with the PetCo pump through the end of the cap and attach with the inlet end of the check valve.



Seat the check valve securely inside the cap.



With even, firm pressure, screw the cap into the bottle with your hand. Insert the water tube assembly over the top of the air needle.

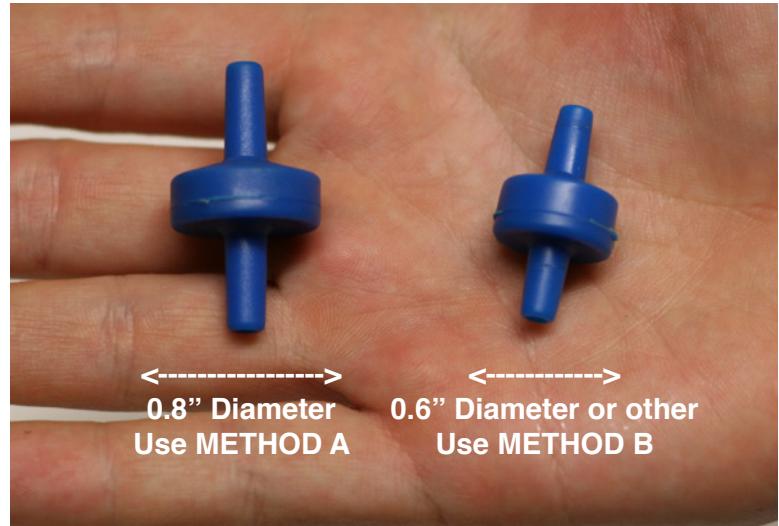
Screw the cap assembly onto the bottle with your hand. Insert the water tube assembly over the top of the air needle. The water tube should be seated as far down over the metal inflation needle as possible, and will be at an angle. This angle creates a very important gap to allow water to enter the tube.

Attach the other end of the air hose to the pump's outlets.



Bottom Cap Assembly

We have provided two methods for the assembly of the bottom cap depending on the size of check valve you received with your pump. Use the image on the right as a reference to find out which Method to use to construct the bottom cap.



METHOD B

This method requires additional parts: a Presta threaded longstem bicycle inner tube (with stem washer), and two 1/4" ID 1/2" OD sealing washers.

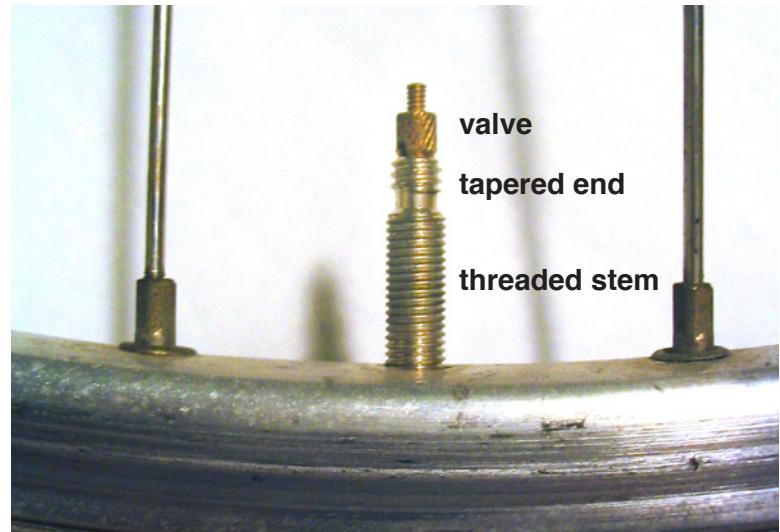
Drill a 1/4" hole in the center of the bottom bottle's cap.



With a hacksaw, cut the valve off of the rubber tube near its base.



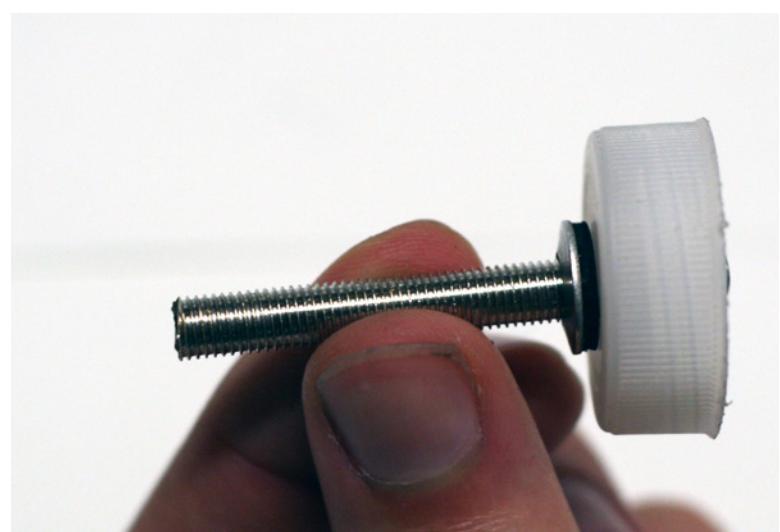
With pliers, remove the valve at the top of the stem.



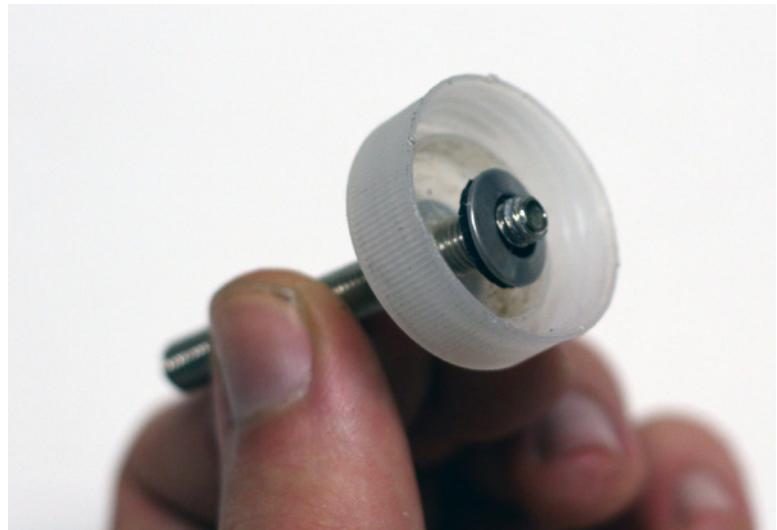
Take the presta stem and face the tapered end to the right. Slide one sealing washer on to it with the rubber side facing to the right.



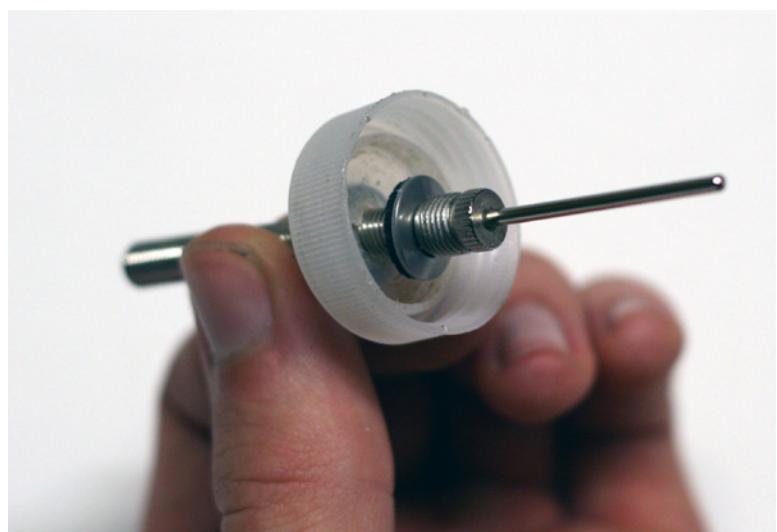
Next slide on the cap, with the inside facing to the right.



Next, slide on another sealing washer, with the rubber side facing to the left.

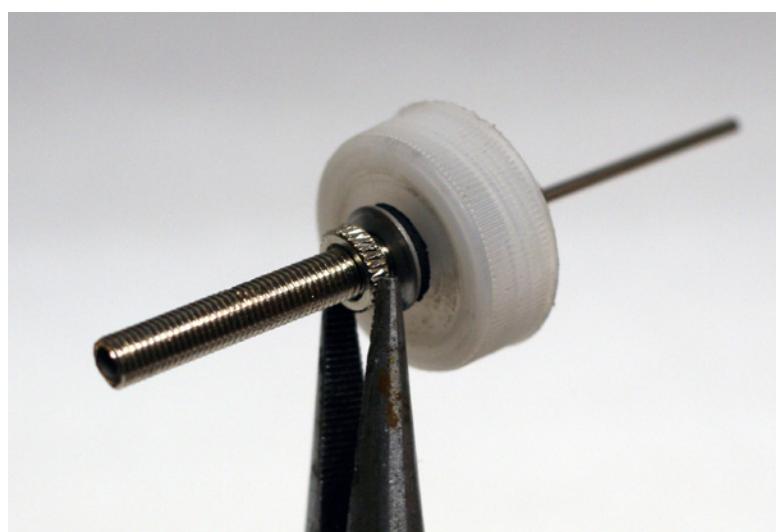


Next, attach the metal inflation needle to the threaded tapered end of the presta stem. Using pliers, tighten as tight as possible.



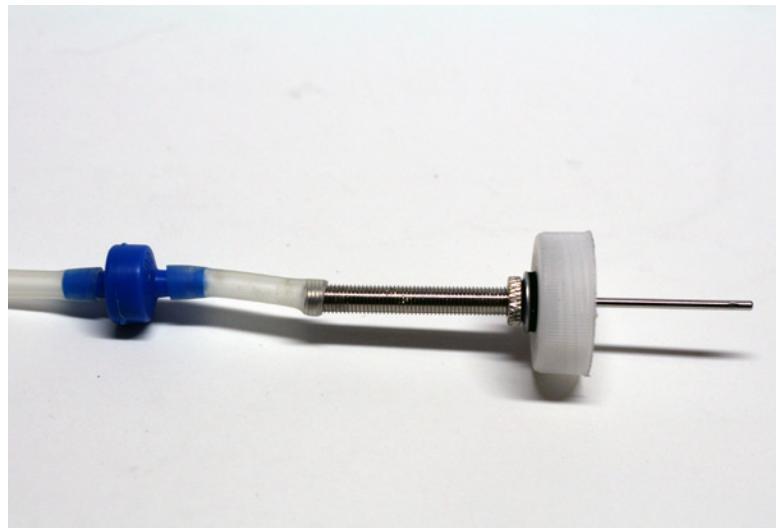
Next, thread-on the presta stem washer from the opposite end, and use it to tighten the entire assembly.

Use pliers to tighten the assembly as tight as possible.



Attach a 1" length of air hose included with the PetCo pump to the end of the threaded Presta stem, followed by the check valve.

Attach the other end of the air hose to the PetCo pump's outlets.



Screw the cap assembly onto the bottle with your hand. Insert the water tube assembly over the top of the air needle.

The water tube should be seated as far down over the metal inflation needle as possible, and will be at an angle. This angle creates a very important gap to allow water to enter the tube.

Attach the other end of the air hose to the pump's outlets.



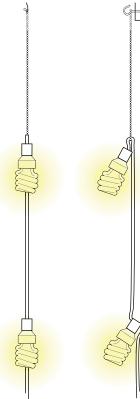
Section 7

Lighting

(2) CFL bulbs (full color spectrum), (1) cup hook, (1) lamp socket on wire, (1) lamp pin socket, 18" bead chain Tools: measuring tape, snips, drill

You probably will need to supplement your plants' natural light, or else they will grow spindly indoors.

If you have extremely sunny windows, you may be able to get away without lights.



Start with a corded clip light and remove the shade.

Consider using CFL bulbs with plastic domes to help prevent shattering of the bulb against your window.



Next, mount the pin socket to the cord, 2 feet down from the light socket end.



Screw a cup hook at the center of two WindowFarms columns.

If your window sill has depth, mount the lights as close to the glass pane as possible.

Using 18" of bead chain coupler, loop the bead chain around the lamp cord near the base of the lamp socket.

Suspend the light column assembly from the cup hook.



Section 8

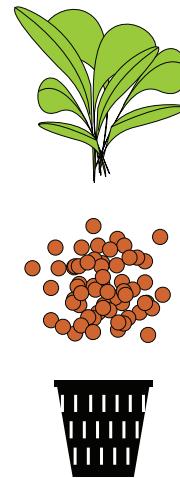
Plants

Hydroton clay pellets, Plastic net cups, Plants

First, make a plan of what you will grow.

Please visit our web community for recommendations on what plants work best, how to grow plants from seed or transplant soil-based seedlings:

<http://our.windowfarms.org>



If using plants that were grown in soil, start by shaking-out the soil thoroughly.



Put each plant in a netcup with clay pellets.



Install your plants into the WindowFarm by sliding it through the plant hole.

Please visit our web community for recommendations on plant placement:

<http://our.windowfarms.org>



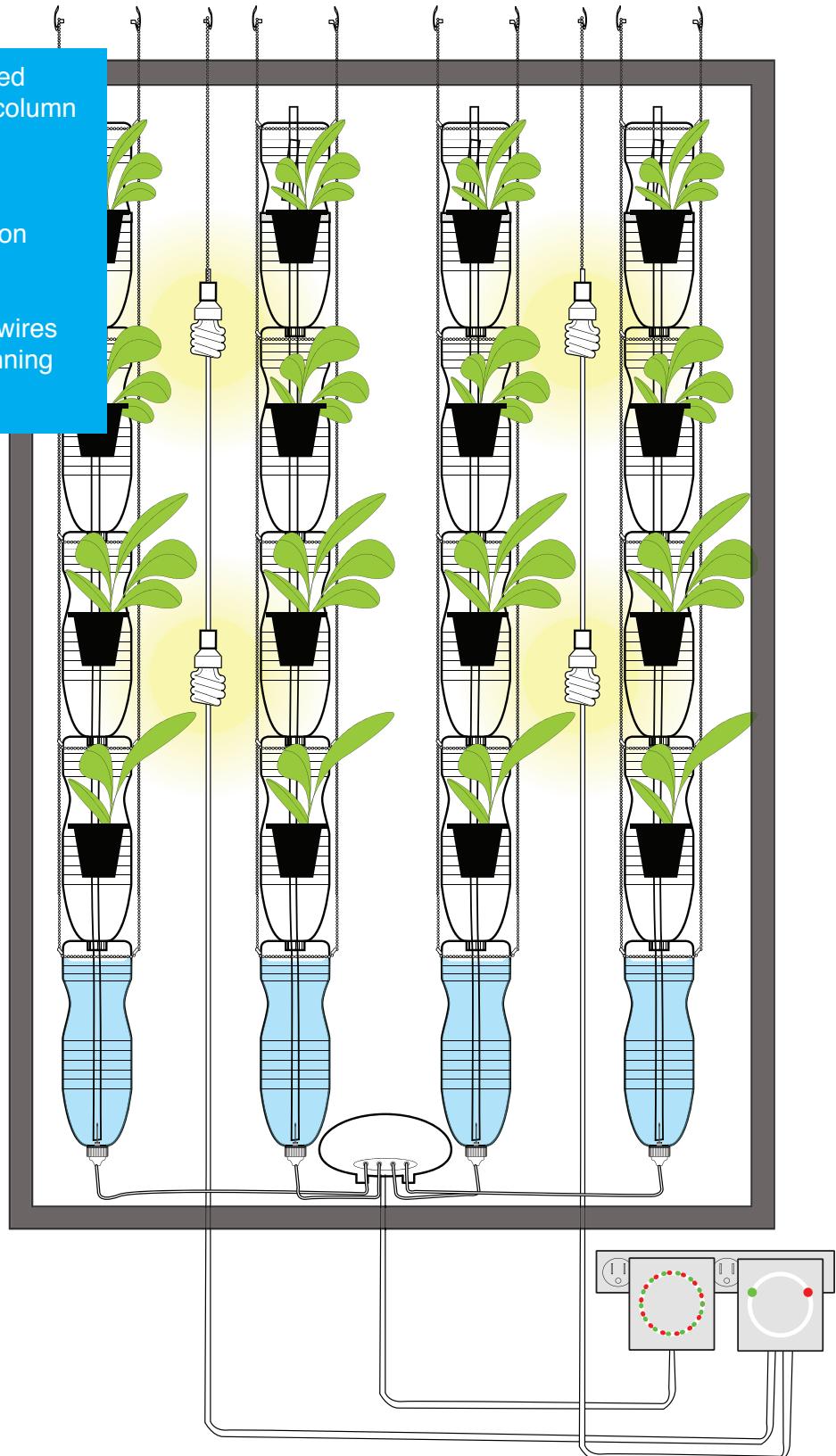
Section 9

Full Assembly

WindowFarm columns can be mounted side-by-side in a window. Each light column can supply light to two WindowFarm columns.

Both the lights and the pump can be on different timers.

Create a 'drip loop' with all electrical wires to prevent any leaking water from running into the electrical outlets.

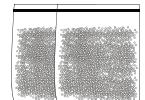


Section 10

Launch & Maintenance

Plant Nutrient Solution or Powder, Bead Chain, Bead Chain Coupler, Cotton String
Tools: measuring tape, scissors, snips

Some of these procedures are one-time actions performed at the time of launching your WindowFarm, while others are repetitive tasks to be performed throughout the operation of the WindowFarm.



Adding Water

Fill the reservoir bottle with enough water to reach just below the hole.

Water will evaporate from your system and will need replacement. Expect to top-off the system 2-3 times per week. However, conditions will vary effecting the rate at which more water is needed. Winter seasons and dry environments will require more frequent watering.



Adjusting the pump

Use the dial on the air pump to adjust the flow rate of the water through your system. The flow should be just enough to create a steady drip of water through the system.

A flow that is too high will create unnecessary power consumption and noise. A flow that is too little will create wilted plants. However, some plants like wetter conditions than others.



Setting the timers

At first, set the timer on a 15 minute interval as pictured. Adjust as you observe plant response.

Consult the web community for recommendations on pump and lighting (optional) schedules for the different life stages of your plants. Consult the timer's package for directions on setting the timer.



Adding Nutrients

Phase 1- First ten days after plants develop roots) 1 teaspoon per gallon 3-20-20 (+ pinch=0.1 teaspoon epsom)= 1/2 teaspoon per bottle twice a week for 6 weeks= 4.75 teaspoons;

Phase 2- Seedling through vegetative phase) .396 teaspoon Maxsea 16-16-16 twice a week (+ pinch=0.1 teaspoon epsom) for 6 weeks= 4.75 Maxsea 16-16-16;

Phase 3- Transition, last 2 weeks before flowering) 0.198 each of both kinds of Maxsea twice a week (+ pinch=0.1 teaspoon epsom) for approximately 2 weeks= 3/4 teaspoons of each Maxsea;

Phase 4- Flowering and fruiting) 2 teaspoons per gallon of 3-20-20 (+ pinch=0.1 teaspoon epsom) = 3/4 twice per week for 4 weeks= 6.25 teaspoons

Phase 5- Last 10-15 days before harvest)
Feed your plants only water to flush the system



Pollination

Using a small paint brush, mimic a bee's action and dust the pollen from one flower to the other, addressing each flower on the plant.



Flushing the system

Place a bucket beneath the column to catch the draining water. Unscrew the bottom cap to flush the system. Start by flushing twice per week and adjust the frequency based on your plants' response.

Consult the web community to troubleshoot issues with your plants.



Trellising plants

As plants grow taller, use plant tape or fishing wire secured to the suspension system to create an adjustable support structure.



Cleaning tubes and bottles

The tubes and the reservoir bottle will slowly accumulate algae growth on the inner walls. While not harmful to the plants, the algae reduces water flow efficiency.



Start by measuring and cutting one 30" piece of bead chain.



Measure and cut an 18" piece of cotton cord. Loop the cord back and forth in 3" lengths in your hand.



Measure and cut one 4" piece of cotton cord.

Tie it with a double knot around the center of the 3" looped cotton cord bundle.



Thread one end of the 4" cotton cord piece through the center hole of a bead chain end coupler.

You have created a small mop head. Snap the mop head assembly to one end of the 30" bead chain.



You now have a cleaning device for your water tubes. If the walls of the water tube accumulates algae, remove the tubes from the system and pull them apart at the connection joints. Use this tool to clean the tubes by feeding the beaded end of the chain down the tube, and pull-through. The mop head will drag algae with it. Rinse the mop head with water after each pull and repeat as many times as is needed.



WindowFarms

Version 3.0 - Instruction Book

Please Consider Donating

The WindowFarms team needs your help to keep this project going. Running the web community, testing designs from the community, making how-to's, developing educational cirriculaa and putting together kits takes time.

Please make a donation to support our work, on our main web community:

<http://windowfarms.org>

Thank you,
Britta Riley, Ted Ullrich, and the rest of the
WindowFarms team.