

Aquaponics (Growing Plants with Fish Poo)

by [HoboWhisperer](#) on July 11, 2009

Table of Contents

License: Attribution Non-commercial Share Alike (by-nc-sa)	2
Intro: Aquaponics (Growing Plants with Fish Poo)	2
step 1: Gather Materials	2
step 2: Connect Polyflo tubing to the pump	3
step 3: Install drain on the grow tub	4
step 4: Make the Bell	5
step 5: Set up the Grow Bed	5
step 6: Prepare the Hydroton	6
step 7: Set up the Tank	7
step 8: Test the Bell Siphon	7
step 9: Disaster!	8
step 10: Add the Hydroton to the Grow Bed	9
step 11: Nitrogen Cycling	10
step 12: Add Living Stuff	10
step 13: Things to add next	11
Related Instructables	11
Advertisements	12
Comments	12

Intro: Aquaponics (Growing Plants with Fish Poo)

I've been fascinated by Hydroponics for years. When it finally came time to play around with one, I found out about Aquaponics - a sort of symbiotic relationship between the plants and the fish. The fish provide food for the plants, and the plants clean the water for the fish. Let's see how it works!

Please bear with me, this is my first Instructable :)



Image Notes

1. Random pipe fitting.



Image Notes

1. Not the greatest picture - I'll get a better one when the lighting is better, and when there's plants starting to grow

step 1: Gather Materials

I did quite a bit of reading up on Aquaponics systems before deciding on this system design. You may want to look around for ideas on how to proceed.

Materials needed:

- (1) Plastic tote (for plants) \$10 at the grocery store
 - (1) Bulkhead fitting for drain \$12 at a local hardware store
 - (6) ft 3/8" Polyflo tubing \$10 at Lowes
 - Polyflo fittings (all push to connect, or Insta-Tube) 3/8":
 - (2) 90deg elbow \$4
 - (1) Ball valve \$6
 - (1) Submersible Aquarium Pump* \$40 at local Aquarium store (see note below)
 - (1) 10 gallon Aquarium \$free! I've had it since I was 10 - check Craigslist
 - (1) Bag of Hydroton grow media \$32 at a local garden shop
 - (6) inches of 2" PVC pipe \$? This was scrap
 - (1) 2" PVC Pipe Cap \$? Got it from my Dad
 - (16) inches of 1/2 PVC pipe \$ Also from Dad
 - (1) Tube Aquarium Safe Caulking \$10 at local Aquarium store.
 - DO NOT USE NORMAL CAULKING, IT WILL KILL YOUR FISH (which is bad)
 - (1) bunch of shiney rocks
 - (1) Something to put your fishtank on
 - (1) Shelf about 3-4 feet above the fish tank
 - (some) Vinegar
 - (10) gallons of water
 - (some) Fish I'll get to that bit later :)
- Tools Needed:

- Wood Saw
- Cordless Drill
- Drill bits
- Hair Drier
- Pliers
- Scissors
- A small file
- A Sharpie marker

Notes on the pump:

Make sure it can pump water up to where your grow bed will be - the higher you pump the water, the slower the flow rate. My pump is rated for 160gph(gallons per hour) and it works pretty well pumping water 3 feet vertically. Talk to your local Aquarium guy if you have questions.

Extra notes:

Fish don't like copper or Brass. Don't use them anywhere for anything. Use plastic. Seriously.

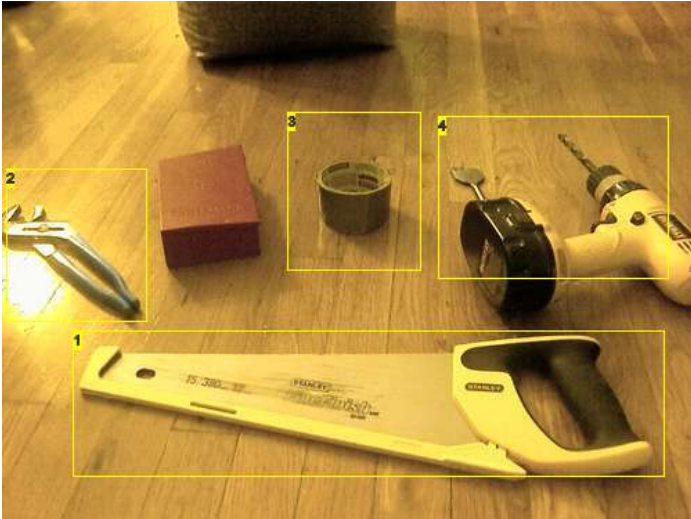


Image Notes

1. Wood saws make short work of PVC
2. Channel Locks to tighten the Bulkhead fitting
3. Duct Tape. Not used, but you never know...
4. Cordless Drill and Auger bit.

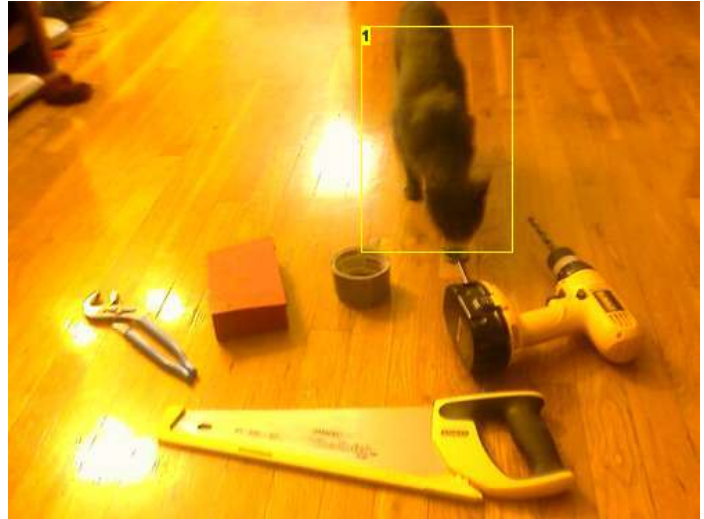


Image Notes

1. Cat. This little kitty is the reason I am adding a lid to my fish tank. That and the Legendary suicidal tendencies of Beta fish. (They like to jump out of their tanks)

step 2: Connect Polyflo tubing to the pump

The pump that I purchased didn't have a good method for attaching a pipe or a tube to its discharge, so I got a bit creative.

Using the hairdrier, I heated the end of about 3 feet of the polyflo tube until it was soft all around.

I used a pen to flare the end of it until it was large enough to slip over the discharge of the pump.

This took a while, and a bunch of patience.

I didn't end up needing the caulking for this bit, but you may need to to make a nice seal. For me, when the tube cooled, it shrank a bit and made a nice seal.

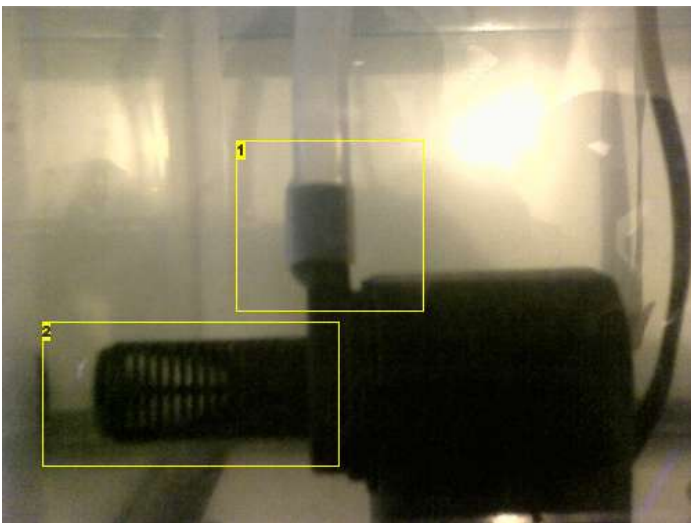


Image Notes

1. A Nice shrink fit to the pump. I suppose it doesn't 'really matter if it leaks, since it is underwater. Though that would decrease the efficiency a bit
2. Intake screen. Important, unless you like to find dead fish in your pump. I may make this into a 'straw' attachment so that it will suck gunk off from the bottom of the tank and send it to the Grow Bed.

step 3: Install drain on the grow tub

This is the bit that took the most research - how do I make a system that is simple and reliable?

Having worked in a factory before, I know that level sensors and valves and timers can find all of these great and interesting ways to fail and make huge messes.

The solution to this is the Bell Siphon. It is incredibly simple, and incredibly reliable. Perfect!

For a neat animation on how they work, check out this link:

<http://www.aquaponics.net.au/Chops.html>

For this system, the bell siphon consists of:

- The standpipe attached to the drain hole on the Grow Tub.
- The 2" pipe and cap acting as a "bell"

First, the toilet bowl assembly needs to be cut apart so that we are left with a 4" pipe on the end of the Bulkhead Fitting (a bulkhead fitting is a fitting that is designed to attach a pipe to a hole in a tank)

Next, a hole has to be drilled in the bottom of the Grow Tub, large enough for the Bulkhead Fitting, but not too big. Assemble the Bulkhead Fitting in the hole as shown.

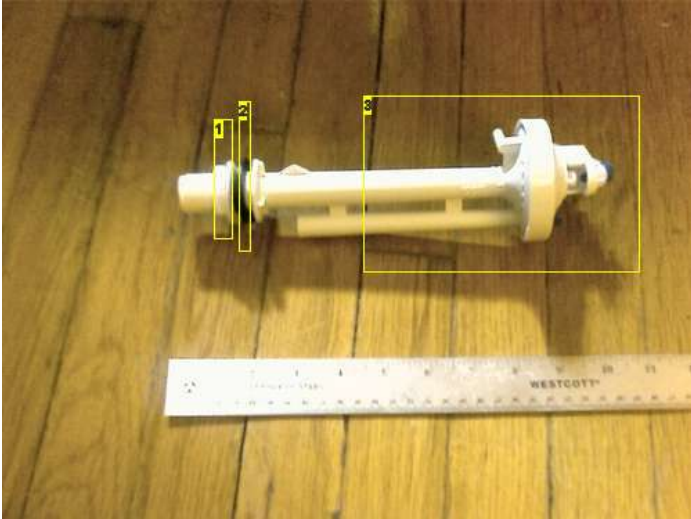


Image Notes

1. Lock Nut - Screwed in from underneath the Grow Bed
2. Gasket - installed on the inside of the Grow Bed
3. Extra stuff that I cut off and threw away



Image Notes

1. If you look at the gasket, it has a raised ridge on one side. When I installed it, I made the hole in the bottom of the Grow Bed large enough to fit this ridge in, like a collar. This may have been a bad idea, since mine leaked on the first try! If I had to do it again, I'd have made the hole just large enough for the threading to fit through.

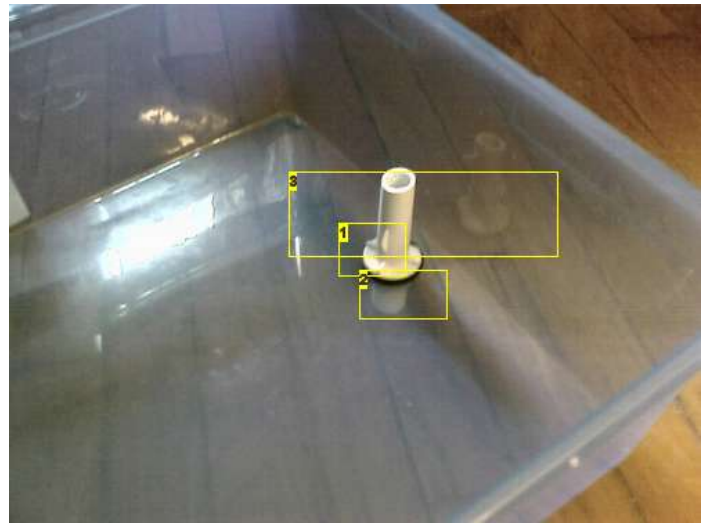


Image Notes

1. I just left these little tabs on there. Makes it easier to grab onto
2. Notice - gasket on the INSIDE. This is pretty important unless you like puddles.
3. To cut this hole, I used the biggest standard drill bit I had and carefully drilled a hole. I did it not so carefully once and cracked the Grow Bed. \$10 mistake. To custom fit the hole, I used the fluting on the sides of the drill bit to chew away at the material. It took some time, but I got a mostly circular hole in not too much time. I wouldn't use an auger bit for this, I think it might be too aggressive. But

maybe you are more adventurous?

step 4: Make the Bell

How it works:

The pump is constantly filling the Grow Tub with water, but adding water slower than the drain can suck it out.

When the tub fills with water, it gets to the top of the standpipe, and starts to flow back into the Aquarium. When this happens, it sucks all of the air out of the space between the standpipe and the bell. The Bell over the standpipe maintains the siphon until the Grow Tub is empty of water.

To Make the Bell:

With the wood saw, make 8 cuts equally spaced on one end of the 2" pipe. The saw can make cuts on opposite sides of the pipe at the same time, so make one cut, then one 90deg from that, then cut each 'tooth' in half. (Too detailed?)

with the plier, grab a hold of a 'tooth' as close to the base as possible, and bend it back and forth until it snaps off. Do this to every other 'tooth' and you will be left with something that looks like the top of a castle turret. Use the file to smooth things out and make them pretty, if you'd like.

The purpose of these gaps is to let water flow into the Bell easily when the siphon starts. This will make sure that the Grow Bed drains quickly.

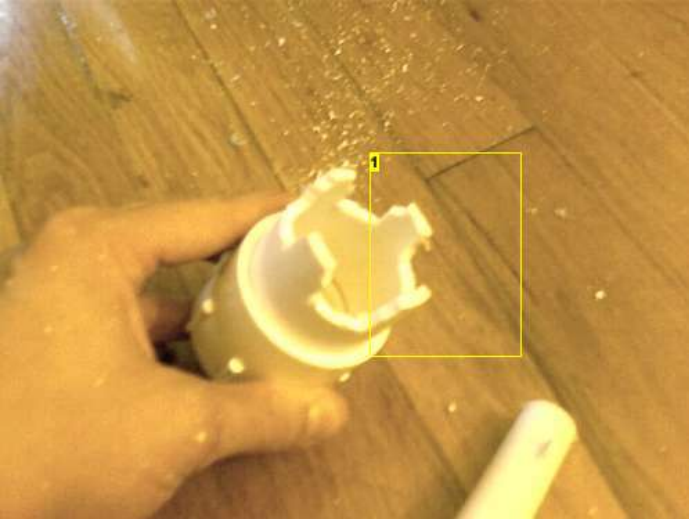


Image Notes

1. Such beautiful craftsmanship! I'd like to think I'll clean it up with a file at some point, but I tested it. Ugly as it is, it works.

step 5: Set up the Grow Bed

I used a 1" drill bit to cut a hole in my shelf for the drain. This let me put the Grow Bed in the center of the shelf, where the weight of it would be distributed more evenly amongst the wall brackets. Don't want it falling off the wall!

To mark the location of the hole, put the Grow Bed on the shelf where you'd like it, and put the sharpie marker inside the stand pipe, tip down. Wiggle it a bit and it will mark where you should drill your hole.

Make sure that the bottom of the Bulkhead Fitting fits through the hole, and that the Grow Bed fits in place nicely.

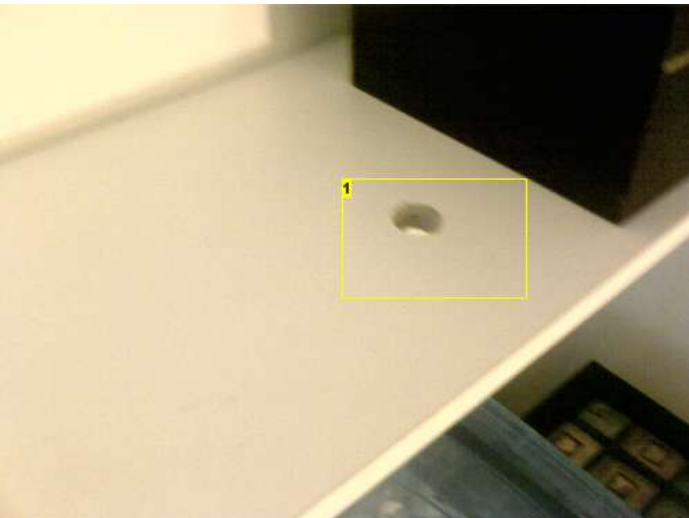


Image Notes

<http://www.instructables.com/id/Aquaponics-Growing-Plants-with-Fish-Poo/>

1. A quick note - it is RIDICULOUSLY difficult to make a hole larger using an auger drill bit. I know this, because I had to make this hole larger after I switched to the Bulkhead fitting that is described here. When in doubt, make a larger hole than you think you'll need.

step 6: Prepare the Hydroton

After doing some research on the matter, I decided to use Hydroton grow media. It is clay balls, about 1/4" in diameter. They are pH neutral and inert, which is nice, because they won't leach stuff into the water and make me adjust the pH all the time like some gravels will. It is more expensive than gravel though. In the bag, it looks just a bit like dog food. I find it a bit odd...

Hydroton has to be washed before you use it. Nothing dangerous, it is just to get rid of the dust that inevitably is generated when thousands of clay balls get jostled around during shipment. Use a pot and a strainer, clean them in the sink (or tub). I used a solution of a splash of vinegar per wash them, and rinsed them with clean water. If you don't do this, you'll get brownish gunk in your fish tank. Who needs that?

Another tip - put a strainer in your drain hole before you start. You will spill some rocks, you will have to reach down the drain to get them.

Oh, and rinse twice. There's a lot of dust. I used the 2nd rinse water from the last batch to rinse the next, but my stones still dumped a lot of dirt into the tank. Use fresh water each time.

Luckily, beta fish are quite difficult to kill in my experience, I've heard they don't mind murky water that much. Either way, I'm still doing a water change soon.

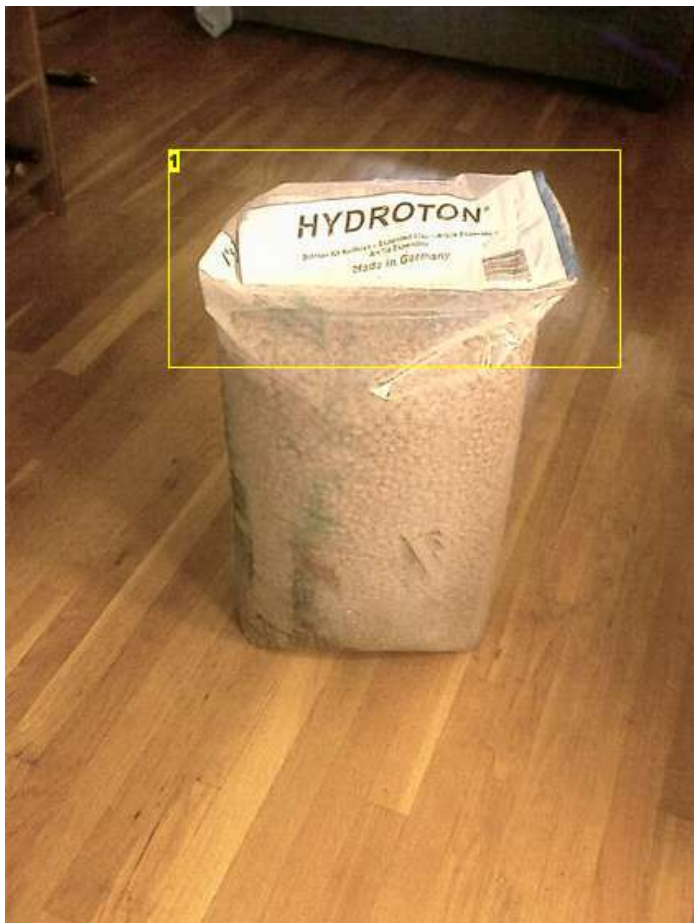


Image Notes

1. This is a big bag, probably more than I will need for a while. There's really no medium sized bags that I could find. Just 10 liter bags, and 50 liter. Oh well.



Image Notes

1. Vinegar - this part may be optional, but as long as you rinse well, it shouldn't hurt anything
2. Strainer
3. Fill the bowl with water and swish the Hydroton around a bit to get the dust off.
4. Drain cover. The inside of my garbage disposal is icky.

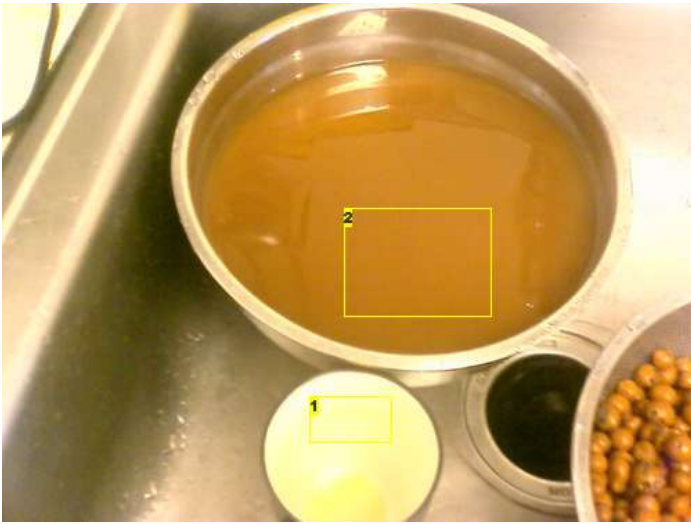


Image Notes

1. Something white colored, for reference
2. After the first rinse, the water is pretty murky

step 7: Set up the Tank

Locate the fish tank where you want it. It will be tough to move once you fill it with water - water is 8.34 pounds per gallon, and there will be several gallons of water used here!

My pump has suction cups on the bottom of it to keep it in place. I stuck it where the intake was as close as possible to the bottom of the tank, with the discharge facing up (it rotates!) I connected my ball valve to the end of the Polyflo that is attached to the pump. This valve is all the way open. With the Grow Bed on its shelf, two 90deg fittings make sure that I don't have to bend the Polyflo to get it into the Grow Bed. You can bend it with a hairdrier, and it'll take a bend ok, but it is irritating, and I am lazy.

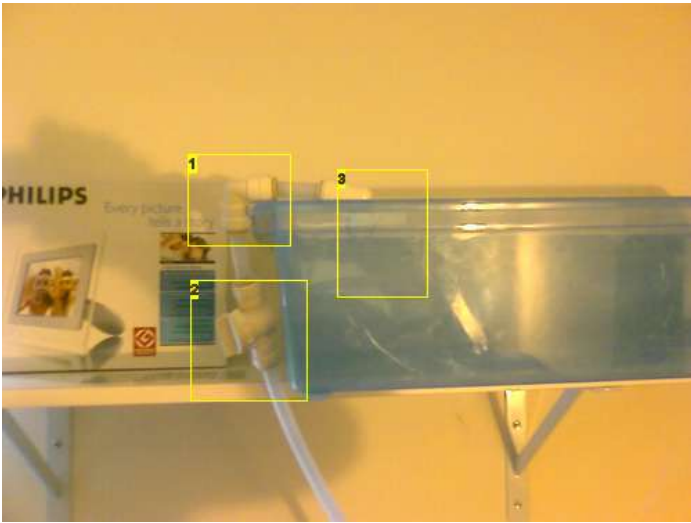


Image Notes

1. Push to connect or Insta-Tube Fittings. Gotta Love em.
2. Ball valve. Turned out it wasn't really necessary, but it is always nice to be able to adjust the flow.
3. Probably ought to install this feed through a hole in the side of the tank, so that it doesn't fall out and spew water on the floor. Honestly, I'll get around to that soon.

step 8: Test the Bell Siphon

To make sure everything works properly before adding rocks, set up the system for a quick test. Attach the long 1/2" PVC pipe to the discharge of the Bulkhead Fitting. This long discharge will help to keep the siphon going. Put the Bell over the standpipe.

Running pumps dry is bad. They use the water they pump to keep themselves cool. Put enough water in the bottom of the tank to cover the pump. Turn on the pump and make sure it pumps water into the Grow Bed. If not, you may need a bigger pump. Now that you know the pump works, Add more water to the tank and turn on the pump. Fill the grow bed, and look for leaks on the Bulkhead Fitting. Also check to make sure that the shelf isn't going to break. That would be bad. Once the water level gets above the standpipe, water will start flowing through this siphon. It will be slow at first, and then SLURP! speed up as the air is sucked out of the Bell. Make sure that when the Grow Bed is empty, the siphon action stops. If the pump is going too fast, it may be adding water just as fast as it is draining. If this happens, close the ball valve a bit. Mark the maximum level of the water.

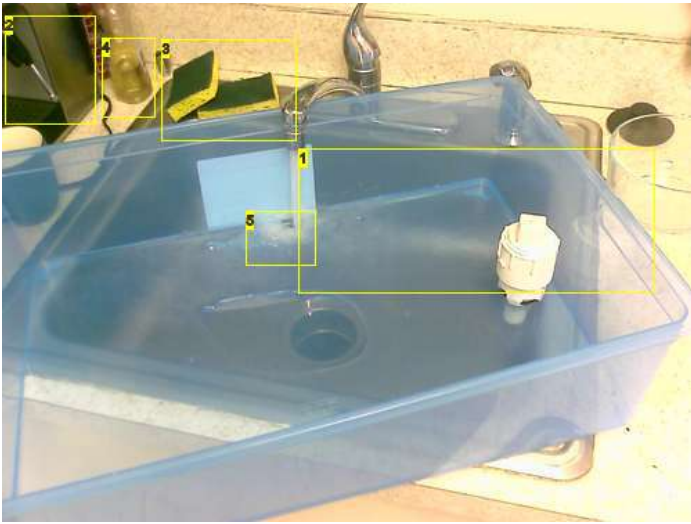


Image Notes

1. Highly Advanced Leak Testing Stand - HALTS. I'm sure there are other more clever acronyms names to describe this.
2. Espresso Machine
3. Sponges
4. Soap
5. Water

step 9: Disaster!

The Grow Bed leaks! A little investigating, and I discover that the flange at the base of the standpipe has a little flat on it. I'm guessing that this is compressing the gasket non-uniformly, and when the Bell is placed over the standpipe, it squishes the gasket just a little more - making it leak.

My solution - O rings. I bought a pack of #18 O Rings at Lowes, for \$2. Placed one between the standpipe flange and the gasket, and one between the bottom of the Grow Bed and the locknut.

Why #18? Because they fit nice and snug over the threads of the standpipe.

Re-assemble, test, success!

No leaks.

One note of caution - if you find this necessary, don't over-tighten the locknut - it can 'extrude' the O-ring: The spinning action distorts the Oring, making part of it squish out. This can damage the O-ring and make a bad seal.



Image Notes

1. O Ring!

step 10: Add the Hydroton to the Grow Bed

Put a screen around the bell, an inch or so off. Little rocks clogging the intake will cause a flood. Or they get sucked down into the fish tank. Fill the Grow Bed with Hydroton, 1/2" above the maximum water level.

Do another fill test while watching. Rocks are heavier than water, though Hydroton is pretty close to neutrally buoyant. The grow bed may be heavier this time. Try to notice if it falls off the wall or not. Also, make sure that the siphon starts up and stops like it is supposed to.

If the Siphon starts slurping at the end, but does not stop, use the ball valve to slow the water addition into the Grow Bed until the Siphon breaks. Monitor the system for a few hours to make sure this doesn't happen to your system.

My initial testing was done without a screen around the Bell - as a result, smaller Hydroton bits were sucked through the siphon and dropped into the fish tank. Eventually, of course, a larger one made the journey, and clogged the standpipe, resulting in a failure to begin or end the siphon.

Use a screen. Mine was pretty easy to make - I used a tall 'fill it yourself' Deli container for olives (about 6" tall, 5" across at the rim, 4" across at the bottom). I drilled a lot of 1/8" holes as close to the rim as possible, to allow water to flow in from the bottom. I cut a hole out of the bottom of the cup large enough to remove the bell, in case the drain pipe gets clogged. It would be MUCH easier to get this in place before you fill the Grow Bed with Hydroton. There can't be any Hydroton inside the screen, or it will eventually get sucked into the Bell and clog the standpipe.



Image Notes

1. The fill line marked during initial testing. Add a bit more Hydroton than I have showed here - it floats (at least when it is new. I don't know if it gets waterlogged)



Image Notes

1. Big enough to take the bell out without removing the screen. This is important, because putting a screen into the Grow Bed when it is filled with Hydroton is not fun. I know this, because I have done it.

step 11: Nitrogen Cycling

Biology lesson! This is sort of important, unless you hate your fish.

Fish excrete ammonium through their gills as they breathe (this is all according to my research so far - feel free to leave messages to correct me). If this builds up too much in the water, it will poison the fish. Luckily for us, there are some helpful bacteria available that like to eat ammonium. They will grow on the surface of the Hydroton. They turn the Ammonium into Nitrites. That's not very helpful by itself, since Nitrites are also not good for fish. Another bacteria will eat these Nitrites and turn them into Nitrates. Plants like Nitrates, fish don't mind Nitrates. Plants feed on Nitrates and other stuff and give us yummy food.

All of this does take some time to occur though, so if you just throw fish into this system now, they will probably get poisoned before the Ammonium-Nitrites-Nitrates cycle can establish itself. To establish this cycle, you can add 5 drops of Ammonia to your water, and turn on the system. The Ammonia will spread through the system, soak into the Hydroton, and encourage these helpful bacterial colonies to establish themselves. This does take some time though, a week or two. An aquarium store should have supplies that allow you to check these Nitrate/Nitrite levels. Be patient. Unless you hate your fish.

If you want to learn more about this stuff, check out this link:

<http://fins.actwin.com/mirror/begin-cycling.html>

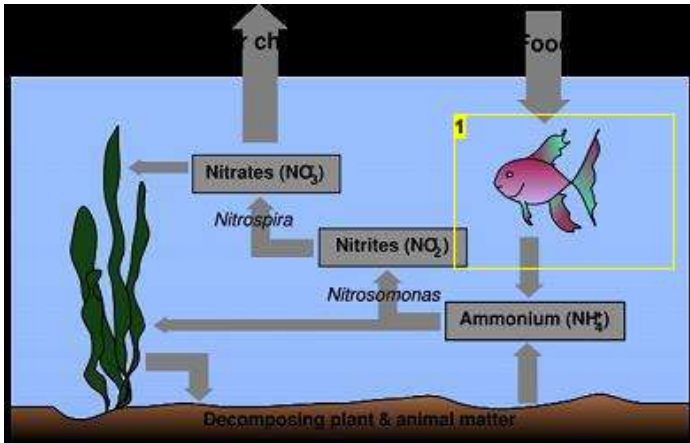


Image Notes

1. I got this Image from Google Image Search. Credit for making it should (apparently) go to Ilmari Karonen

step 12: Add Living Stuff

You can add fish and plants now.

Commercial Aquaponics systems are sized for a ridiculous amount of fish (Almost 1lb of fish per gallon of water). To do this, they have to optimize their Grow Bed size to ensure that the water is being properly filtered. They usually also use air stones to add oxygen to the water. This extreme system is not necessary, you can get away with a lot less. I'm using a betafish for my system to begin with, I'll add some goldfish in a few weeks. The amount of oxygen added by the Auto Siphon cycling constantly should be enough to oxygenate the water. Add fish to the system slowly, so that you don't upset the Nitrogen Cycle in the tank.

For plants, you can start them in Rockwool, and then transplant them into the Hydroton, or you can try to start the seeds directly in the Hydroton. The rockwool may promote root rot later on, so I'm going to try direct sowing, but I hear it is more difficult.

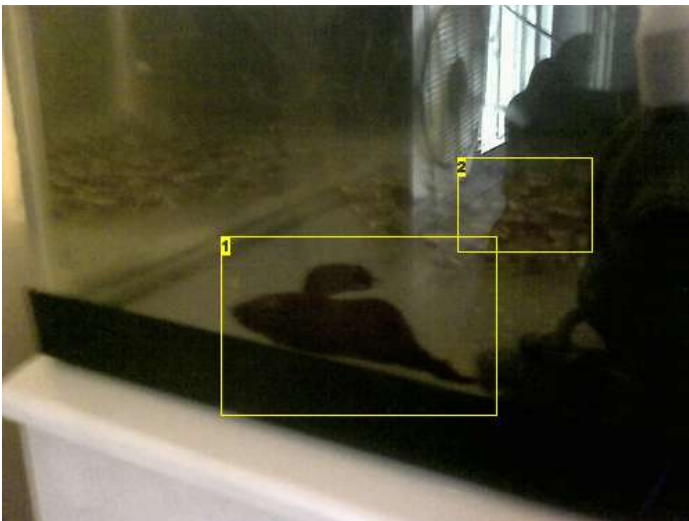


Image Notes

1. Beta Fish.
2. Some rocks from his original container

step 13: Things to add next

1. An Overflow

In case of a clog in the drain, I really ought to add an overflow to the Grow Bed. It would require another Bulkhead fitting, installed above the Hydroton, on the sidewall of the Grow Bed. Polyflo tubing would direct any water back to the tank. The plants will get flooded for a while, but the pump won't run dry, I don't get 5 gallons of water on my floor, and the fish get to stay wet.

2. A lid for the tank.

I think my cat is going to either:

- a. Accidentally go swimming
- b. Eat Se?or Fish-Fish (his actual name, by the way)



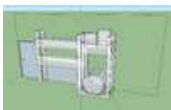
Image Notes

1. Random pipe fitting.

Related Instructables



Small Aquaponic Unit
by leja1965



Building an Aquaponic System by fox45



Organic Hydroponics / Aquaponics by bhsx



Simple aquaponics by ittibittirainbow



Dirty Tank? Let's Clean It Up! by jtvreeland



aquaponics the cheap easy way!! by slamfist




Build an Easy Aquaponics Grow System & Winter Over Pond Plants by PondPlantGirl





Begginer Fish tank by Mr. M


Comments


31 comments [Add Comment](#)

 **fouddah** says: Aug 5, 2010. 7:04 PM [REPLY](#)
in my aquaponic aquarium filter, i cut holes in the sides of the toat the plants grow in, and have that toat sitting inside a slightly larger one, with a hole in the bottom. it drains directly out the hole in the bottom back into the aquarium, through a hole i cut in the lid. it saved on buying parts and there are fewer moving parts that could fail and flood my apartment


 **jgrove1975** says: Mar 24, 2010. 6:45 PM [REPLY](#)
great instructable, I definately have to try this since I have an empty tank in my closet and an already established fish tank in my living room. The ammonia in the fish tank comes from the fish excrement (urine and feces). Now a thought on your process, since I have an already established fish tank, and some out there might, it would be a great idea to use the water from that fish tank that you take out during a water change to get your healthy bacteria started. also to clear up the water a bit maybe try having the water from the plant container actually run through a fish tank filter to clear the water up a bit so you keep your fish happy. using a carbon filter shouldn't affect your plants and it would sure help to be able to see your fish more clearly.


 **jimmiel** says: Mar 21, 2010. 8:06 PM [REPLY](#)
Good info, you can learn more for your aquaponics system at DIYAquaponics.com . It's a forum where you can discuss your system. I'd be careful about using goldies though, I prefer Guppies unless you intend to have some eating fish like tilapia in the future. the guppies have fry, the betta and the larger guppies will eat the fry, and you'll save on fish food ;) A lot less cleanup on the bottom of the tank that way, You've got a 10 gallon tank from the looks of it, you could have a few guppies in there without a problem and if the guppies end up overwhelming you, you can always give some of them away to the neighbor kids and drive their parents nuts! lol


 **PaulTrudeau** says: Nov 23, 2009. 10:40 AM [REPLY](#)
Great set-up and nice detail in your instructions, thanks! Question: how do you keep the screen in place? I have a similar set-up (see youtube.com/joezbrosac) and needed to secure the screen to the bottom of the grow bed to keep it from being dislodged whenever I bump it accidentally. Do the pebbles weigh down on the tapered sides of the deli container to hold it in place? I would love to use your deli container design next time, if dislodging is not a problem.


 **HoboWhisperer** says: Nov 23, 2009. 2:57 PM [REPLY](#)
To be honest I hadn't really thought it through when I chose that for my screen, though I have not had a single issue with it coming loose, so I suspect that you are correct - the taper keeps it in place.


I checked out your system - looks pretty good! Thanks for the comments.


 **PaulTrudeau** says: Nov 23, 2009. 8:43 PM [REPLY](#)
Thanks, and congratulations on your success. I'll try the ol' deli container next time! Certainly cheaper/easier than what I came up with...

 **Uncle Kudzu** says: Jul 20, 2009. 7:33 PM [REPLY](#)
following your example, i found part of a toilet flush mechanism to serve as the bulkhead fitting, only the piece turned out to already be a pipe within a pipe with an inlet at the base - effectively a bell siphon already! i had to find a cap for it, then i made a hole in a five gallon bucket, put it all together, added water, and... voila! it worked! i can see that the flow of a pump will have to be matched to the effect of the siphon, but with some slight alterations i'm on my way to a Flood-and-Drain aquaponics set-up from junk i had laying around thanks to your instructable, HoboWhisperer!

 **HoboWhisperer** says: Jul 21, 2009. 9:37 AM [REPLY](#)
Nice! It's always great when you can use stuff that you already have laying around :) As far as matching the pump speed to the Siphon speed goes, I timed my cycle today - the grow bed fills about once every 4 minutes, and it takes about 1 minute to siphon the water out - the Siphon is pretty fast. The drain tube sticking out of the bottom of the standpipe definitely speeds up the siphon effect too - I think the falling water in the tube creates a bigger suction on the siphon, speeding things up. Good luck!

 **arafurae** says: Nov 1, 2009. 3:54 AM [REPLY](#)
hey great instructable very detailed. i was just wondering does it matter how long the cycle takes to fill and empty the grow bed ..

 **HoboWhisperer** says: Nov 1, 2009. 7:03 AM [REPLY](#)
It takes 4-5 minutes to fill, and about 30 seconds to drain. I'm not sure what the ideal cycle would be - the pump I bought is probably a bit oversized for the application, but I haven't seen any down sides to it so far.

 **erfonz** says: Jul 30, 2009. 8:26 PM [REPLY](#)
I've actually been meaning to make a good step by step instructable on a home aquaponic system like this. I've run 3 systems, a micro (3 gallons) continuous flow, a small (20 gallon) continuous flow, and my current one which is a small (20 gallon) ebb and flow / flood and drain. From what I've done it seems the continuous flow was much more efficient than the ebb and flow, however the current system I have is in the kitchen so a continuous flow would get very annoying to listen to 24/7 which is why I have the ebb and flow (only runs 4 times a day for 3 minutes each). It is running a traditional hydroponic style ebb and flow on a timer instead of a bell siphon. Currently in the system is a bunch of parsley, a few clones of my basil plant (3rd generation clones), and a huge cherry tomato plant. The only problem I am having is putting the tomato in a 12/12 light cycle to make it bloom because the system is in my window and gets ambient light from the house. This is a picture that I took of the overall system awhile ago, but I'll have to take another picture of the current growth because it's crazy.



HoboWhisperer says:

Nice setup :) I notice that you are using a clear container for your growbed too - have you had any problems with algae growth? I was wondering if my system would run into that as an issue. Thanks for the post!

Aug 9, 2009. 7:26 AM [REPLY](#)



erfonz says:

There is a tiny bit of algae on the side, but it's a pretty insignificant amount. The biggest problem I have run into is that the growbed is slowly bowing out so I have been trying to find a new, more sturdy container. I will most likely end up building one of plywood though.

Aug 9, 2009. 3:44 PM [REPLY](#)



clone 452326 says:

you could always use scrap metal or plastic to brace it

Aug 25, 2009. 8:47 PM [REPLY](#)



nolte919 says:

I notice your bell siphon doesn't have a smaller air tube to help break the siphon when the water gets low enough. I don't have an aquaponics system myself but I've done a lot of research and I've always thought that extra tube was unnecessary. It adds complexity without really adding anything useful. The siphon will break just fine when the water drops below bell. So now that you have a functioning system without that tube do you wish you had it?

Jul 21, 2009. 7:36 AM [REPLY](#)



HoboWhisperer says:

I just installed a siphon-break tube a few minutes ago - I have to say, I like it. Originally, the level in my system would reach the top of the water inlet 'teeth' on the bell, and then the system would start this 'slurping' sound, and continue to do it for 30-45 seconds. It got a bit irritating, to be honest. With the siphon-break installed, it takes somewhere around 2-3 seconds to break the siphon, and it is almost perfectly silent. Also, by sneaking the end up and down, you can adjust the low level point (although the lowest it can get and still be silent is about 1cm above the original 'slurping' point). The last major benefit is that the discharge back to the tank can be under the surface of the water! This means no cascading sound as the water returns to the tank. Though to be honest, it could be a bad thing, since the cascading water is supposed to be one of the ways that O2 is added to the system. I couldn't move the discharge point too far below the surface though, because it seems to push the level 'high limit' up at about a 1:1 ratio - every 1cm I discharge below the water level, the 'high limit' goes up by 1cm. I'm guessing this is because of hydrostatic backpressure on the discharge pipe not allowing air from the pipe to bleed out at the start of the siphon.

Aug 1, 2009. 1:10 PM [REPLY](#)



nolte919 says:

Wow! What a great response to my question. Thank you. That's really good information, you ought to cut and paste it into the Instructable. Not everybody reads comments.

Aug 1, 2009. 4:36 PM [REPLY](#)



HoboWhisperer says:

I have been debating that recently - it seemed like an unneeded accessory when I was building the system to begin with. I am thinking about adding it now though, because I am not 100% confident that the system will always break siphon at the end of the drain cycle - it seems like it is pretty close to not breaking. It 'slurps' for 10-20 seconds at the end of the drain, waiting to pull in enough air to break the siphon. I'll keep you posted about whether the siphon-break tube improves the behavior.

Jul 21, 2009. 9:40 AM [REPLY](#)



bhsx says:

I like the bell siphon in yours, and was planning on adding it to mine for the garden contest; but alas never got around to it. In case you haven't seen it, my 'ible is about 6 months old...
http://www.instructables.com/id/Organic_Hydroponics_Aquaponics/
Almost step by step the same 'ible, minus the bell siphon.
Great 'ible!

Jul 21, 2009. 1:20 PM [REPLY](#)



HoboWhisperer says:

I've read so many websites and Instructables on Aquaponics over the last several months, that I'd lost track of where I found what information. But I'm pretty sure that your Instructable was the first reference to Aquaponics that I ever read! I guess you could say that it was my inspiration to give it a go. Glad you liked mine!

Jul 21, 2009. 2:50 PM [REPLY](#)



Tonyisme says:

Really cool instructable, top marks mate. Just a thought but do you reckon you could put some airstone in the grow tub to add more o2 to the feeding process?

Jul 18, 2009. 3:28 PM [REPLY](#)



HoboWhisperer says:

Jul 18, 2009. 7:21 PM [REPLY](#)

Good question - I've seen references to that in certain larger scale systems. I don't have any way of measuring dissolved O2, so I'm not sure if it'd be necessary for me. I have read that the flood-drain cycle in the media, as well as the splashing of the water back into the tank during a drain cycle add a sizable amount of O2. I wasn't too concerned about it at this stage (since Beta fish can live in O2 poor water). I can't imagine it'd hurt though!



Uncle Kudzu says:

Jul 18, 2009. 2:38 PM [REPLY](#)

now i see the wisdom of using the toilet parts for the standpipe - bulkhead fittings are not so easy to locate. that was a good idea!



Uncle Kudzu says:

Jul 17, 2009. 8:51 PM [REPLY](#)

this bell siphon thingy appears to be the missing link to my attempts at this kind of project. i can grow fish, and i can grow plants with wet feet, but i haven't been able to successfully marry the two into the awesome bio-filter that this potentially could be. BTW, be aware that some of those clay balls never become saturated like you might expect and some of them will float. please keep us updated on your project!



HoboWhisperer says:

Jul 18, 2009. 5:15 AM [REPLY](#)

Thanks for the tip on the clay balls - to keep them from floating, I've just added another inch of them above the top fill level. This keeps the lot of them weighed down. Also, I'm still working on the Bell to tweak it. I'm not 100% confident in its reliability so far, so I've only been running it while I'm in the room. I'll keep you posted!



corksean14 says:

Jul 17, 2009. 2:27 PM [REPLY](#)

would brine shrimp (sea monkeys) be a suitable substitute to the fish?



HoboWhisperer says:

Jul 18, 2009. 5:11 AM [REPLY](#)

Hmmm, It looks like brine shrimp live in salt water - I imagine you could do something similar to this if you could find plants that grow in salt water. If you try to do it, make sure to use some sort of net to keep them from getting sucked into the pump!



flothmann says:

Jul 17, 2009. 6:48 PM [REPLY](#)

hi guys! please check this link out:

<http://www.diyaquaponics.info/how-aquaponics-works.html>

it's the magic working very good link to understand and built up these stuff

regards



Weissensteinburg says:

Jul 16, 2009. 4:53 PM [REPLY](#)

Cool setup! Do you have any photos of the system with the plants growing?



HoboWhisperer says:

Jul 17, 2009. 4:41 AM [REPLY](#)

Thanks! I just set it up yesterday :) Once I figure out what I am going to grow (most likely lettuce and basil) I'll post pictures of the progress.



sedition says:

Jul 16, 2009. 5:51 PM [REPLY](#)

Awesome instructable. I was just looking for exactly this kind of stuff.
