How to Grow Spirulina at Home

Below you will find lists of the exact nutrients and tools you need followed by instructions for each step of the process.

Nutrient List

To decide the amounts of each nutrient to order you will need to refer to the charts for mixing nutrients and consider the size of your tank. You will probably be ordering much more ammonium phosphate and potassium sulfate than you need, but you will want to make sure to order enough saltpeter for both making the growing mix as well as the feeding mix.

Sodium Bicarbonate (Baking Soda)
Sea Salt
Your local grocery store!

Epsom Salt
You can find this at any pharmacy, they also often have it at the dollar store.

Potassium Nitrate (Saltpeter) MAKE SURE YOU BUY FOOD GRADE
http://shop2.chemassociates.com/ggcs.html
http://store.theingredientstore.com/saltpetre-food-gradepotassiumnitrate.asp

Ammonium Phosphate (when you are ordering this you may find there is monoammonium phosphate (NH2)H2PO4 and diammonium phosphate (NH4)2HPO4, both are ok! You also can use monopotassium phosphate KH2PO4
Best source for this is Ebay!
search sellers: flatfenderbrewing or barrelsundries or midwestbrewwine
the easiest of these is to find is diammonium phosphate it is a homebrew item

Potassium Sulfate also known as “Sulfate of Potash” Go with “organic” when ordering this and get the small granules
Best source for this is also Ebay
search these sellers: alphachem08 kelp4less

Chelated Iron (Brightwell Aquatics Ferrion)
This is an iron supplement that comes in liquid form. It comes in a big bottle that will last a long long time, for using it is best to pour some into a 1 or 2oz dropper bottle, like for tinctures, as one dropper squeeze is the measurement you will use. A dropper squeeze is equal to about ⅛ teaspoon. I know “a squeeze” is a general measurement but most droppers don't have markings. So just squeeze the top once and pull a medium amount into the dropper. Just note that a “squeeze” does not mean a squeeze from the big bottle. Make sure to shake your bottle previous to each use.
You may be able to find this at a local pet store. If not the place below has the cheapest price combined with the cheapest shipping.

If you will be using distilled water, reverse osmosis water, rainwater or have “soft” water you need to add some extra minerals to your mixes. The amount is shown in the tables. Do not add these if you are using filtered tapwater or springwater.

(optional)Pickling Lime
You can get lime at any place that sells canning supplies, including Walmart, if necessary. Some grocery stores will also have this. You also can use Calcium Chloride in place of lime. Both lime and calcium chloride are available cheaply on ebay, make sure you get Food Grade.
Equipment List

Tank
10 gallons is good for 1-2 people, 15 gallons good for about 2 people and 20 gallons for 2-3 people. Of course this all depends on how much spirulina you want to consume and the amount of light your tank will receive. Just be aware that the more gallons of water you use the more nutrients you need to provide. Also with a deeper tank your spirulina is getting less light due to depth and surface area, so 20 gallons doesn't necessarily provide double the amount of 10 gallons.

Heater
Match the size of your heater to the size of your tank, 100W is good for a 10 gallon tank. It is best to have a heater that is adjustable. Heaters that are not adjustable are often set at a temp that is lower than you want. Also you may want to be able to turn it down if you go away for some time. So if you are buying one new make sure it has knob with heat measurements on it.

Aquarium thermometer
Get the kind that is in the water with a suction cup. The stick-on kind on the outside of the tank doesn't work for this use.

Plug-In timer
You are going to have your heater hooked up to this timer. Spirulina like to cool off at night so the heater gets turned off.

Air Pump
If you are buying one of these make sure you match it to your size of tank.
We have tried different types of these and have found the cheapest ones at Walmart are quieter than the expensive ones which are advertised as “extra quiet.” Go figure.

**Air tubing/diffuser w/ check valve**
The idea with putting air into your tank is that you want a curtain of air that goes all around the edge of the tank. This is to keep the spirulina moving, but also to prevent it from growing on the glass, which would mean less sunlight for the spirulina inside. We know of two good ways to do this. One is to buy a bunch of plastic air tubing, put holes in it and suction it down all around the edge of your tank. Another option is to buy flexible air diffusers which bend easily. Get the longest one you can find, you may need more than one if you have a big tank. AVOID air stones and stone curtains. We have found that these stones put a strange chemical smell into the water that does not seem to go away with time. Also probably the spirulina would grow into the stone. Here is a link to a flexible air diffuser, you can buy these at your local pet store but this one is cheaper & you will already be paying shipping if you are getting the liquid iron.


The check valve is inserted in the tubing near the air pump to prevent culture from running back into the air pump. When you insert it just blow into it to make sure the air is running the right way.

**Tank Cover**
You don’t want a normal aquarium tank cover as these are usually black and block the light. You do want your tank covered to prevent evaporation and anything entering the tank, but you need the cover to be clear. If you’d like you can just use some saran wrap and clips to cover your tank. You’ll need to change it pretty regularly. You also can cut a piece of clear plexi or glass for a sturdier and easier to clean cover. The growing medium will often leave a mineral residue as it evaporates, so wipe your cover down regularly to allow light to shine through,
Suction Cups
For fixing air tubing to glass

Clothespins or clips
For fixing fabric onto harvest bucket.

¾ plastic tubing
For siphoning during harvesting

5 gallon bucket

Harvest Cloth
Screenprinting fabric with a 300 mesh. This can be expensive if you are buying it new because you have to buy it by the yard. You only need a piece big enough to clip to the top of a 5 gallon bucket. Ask your friends if they have any ripped screens that you can take the screen off.
http://www.silkscreeningsupplies.com/silk-screen-printing-mesh

pH strips
Very important for safety precautions and for knowing when to harvest. Full scale pH strips will not work, you need strips that are detailed on the alkaline scale, most importantly between 9-11. Here are the strips to order: Keep your roll away from you other equipment and tank- if it gets wet you will ruin the whole roll!
Micro Essential Lab 367 Hydrion Short Range pH Test Paper Dispenser, 9.0 - 12.0 pH
http://www.amazon.com/gp/product/B0045l6IRM/ref=oh_details_o01_s01_i00
Keep your roll away from you other equipment and tank- if it gets wet you will ruin the whole roll!

Scale
Hopefully you already have one of these. You need a scale that measures in grams and in a minimum of 1 gram increments. If you don't have one already there are all different kinds on ebay. It helps to be able to measure as high as 500g, though you can get scales that measure much higher.

(Optional)

**Microscope.** It is good for safety to check out your spirulina and make sure that is all that is growing in your tank. Most algae and bacteria cannot grow in such an alkaline environment, but you can't be too safe. We found this great microscope the Eyeclops Bionic Eye by chance at the thrift store and recommend it for it's cheapness and quality. This microscope works at 200x and outputs directly to your tv. It will provide you and your friends with hours of fun once you get it going. It is also recommended if you can look at your spirulina with a stronger microscope of 400x or more.


(check out the “collectible” used ones for 10.00)

Setting up your Aquarium

If you do not already have an aquarium then you will want to consider your size closely before getting one. You might immediately want to go for a bigger aquarium but really consider it first. A bigger aquarium takes up more space, costs more in nutrients, electricity and upkeep. Of course one option is to have a bigger tank and not fill it all the way up. Then you can work your way up if you choose. Also remember that the amount of surface area receiving sun directly affects output, a bigger 20 gallon aquarium does not always mean double the amount of a 10 gallon if there
will be deeper and darker areas.

Many people have old aquariums in their basement. Before investing in new equipment check with your friends and family to see if they have an unused tank. Craigslist is also another resource and thrift stores also often have tanks. If you get a used tank make sure to check that it holds water before starting your culture in it. Also note that you do not need any sort of filter or black or lit aquarium cover.

Some people grow spirulina in clear tubes. We have not done this here at Grow Spirulina, but you might want to consider it. Tubes allow for more surface area for sunlight. If you want to consider a tube aquarium start by reading this webpage. He details exactly how he built his tubes. 
For the science minded you may also want to consider a photobioreactor. More info here: http://web.biosci.utexas.edu/utex/photobioreactor.aspx

There are a number of things to consider about placement of your aquarium. The most important consideration is sunlight. If you are putting your aquarium in a window then you want to place it where it receives the best light. Before you begin to fill your aquarium and grow your culture place the aquarium in your prospective setting and notice the light it receives throughout the day.
If you don’t have alot of window space you may think about building a shelf toward the top of your window for the aquarium. You can do this if necessary, but be aware of the angle of the sunlight and the depth of your window, often the tops of windows do not actually receive many rays of direct light.
If you are in a very low light environment you may want to consider placing mirrors around your aquarium to direct more light into it at different times of day.
If you live in a warm environment you can consider placing your aquarium
outside. If you can do this- go for it! The more sunlight the culture receives the more you can harvest. Just be sure to have a good tank cover to prevent contamination and be especially vigilant about temperatures. You never want your water temp to go below 60 or above 102.

**So the basic set-up of your aquarium should be like this:**
An air pump connected to tubing that reaches around the bottom perimeter of your aquarium.
A heater connected to a timer.
A thermometer on the inside wall of the aquarium.
A clear tank cover.

That’s it! Your good to go!

**Spirulina Basics**

**Light**

When spirulina are good and strong the rule of thumb with light is the more the better. Sunlight is best and will provide the most growth for your spirulina. The more surface area of your growing medium that is exposed to sunlight, the better.

If you have a lot of sunlight you need to be aware of how much heat is added to your tank during the sunniest times of day. You may be surprised at how the temperature will rise. Be sure to monitor this as you are learning to grow your spirulina and as the seasons change. Your spirulina will die at a temp of 102 degrees, which is pretty close to the temps they like to grow at. So be careful!
Notice above that we said that the more sunlight the better is for when the spirulina are established and strong. When you are first growing your spirulina too much sunshine can hurt them. When you are in the process of doubling the amount of your growing medium you want to shade the spirulina. Do this by placing a sheer fabric over your tank. See through white fabric is best, but if you don't have that experiment with what you do have. The rule of thumb is that if you can see through your medium then it is a good idea to shade it. Once the green spirulina has grown thick enough that you can't see through the tank then take off the fabric.

If you are interested in growing spirulina with artificial light it might be a good idea to do some research on the internet. We have not grown spirulina this way before, but as we understand it normal plant grow lights do not appeal to spirulina because they are in the blue-green spectrum. Spirulina prefers light which is in the orange-red spectrum for growth. Some florescent lights provide this and you can also find specialty led lights. We would love to hear about anything that works (or doesn't work) for you, please let us know by email or on the forum!

**Temperature**

Spirulina like to have a fluctuating temperature cycle. They like it warm and sunny during the day and cool at night. The optimal temps during the day are 86-97 degrees. Anything around 102 degrees and over and they will start to die. This is the most common cause for culture loss. It won't happen all at once, so don't panic if the temp climbs too high, but do something to change the environment.

Spirulina like to cool down quite a bit, but they don't like to go below 60 degrees. This generally won't happen if you are operating your tank normally, but if you are leaving your tank for any amount of time you want to make sure it won't go below this temp. More about this later
The way to keep your spirulina happy is to have your heater connected to a timer. Have your timer set to turn on two hours before sunrise and turn off around sunset. Be aware of the change of seasons and adjust accordingly. If it is the middle of summer you may want to have your heater turn off again during the sunniest part of the day so that the temp doesn't rise too high.

**Water**

It is very important to use the right water! If you add unfiltered tap water to your spirulina it could kill them due to chlorine content! The easiest and often best source of water is FILTERED tapwater. You can filter tapwater through a carbon filter or a ceramic filter and this will clean out the chlorine content. Brita, Pur and Berkey filters work well for this. If you are using a filter that is connected to the tap make sure it has been changed and updated according to it's instructions. An old, clogged or overused filter may not clean out all of the chlorine.

If you have tapwater but choose not to filter it you can also get a dechlorination kit at your local pet store.

Treat springwater just like tapwater. It shouldn't be chlorinated when you get it, but it is a good idea to filter it just to be safe.

If you want to use distilled water, rainwater, “soft” water or water that has been filtered using reverse-osmosis then you will need to add extra minerals. All of these waters lack the mineral content necessary for happy spirulina. Refer to the mixing charts for the amounts and types of extra minerals needed.

DO NOT USE “alkalized” water, such as from a Kangen filter, the pH is totally wrong for spirulina.
Clumps

It is normal for the algae to coagulate in clumps as they grow. This is one of the reasons for keeping the medium moving along the edges of the tank, to inhibit clump growth. You will find that as you maintain and harvest your algae that clumps will detach and float at the top of the water. It is okay to filter and consume clumps that are very dark blue green. DO NOT EAT ANY CLUMPS OR ALGAE WHICH ARE CLEAR, WHITE OR YELLOWISH. These clumps are a normal part of the spirulina process. Just remove them from the medium using a small strainer or spoon and dispose of them. Remember to add 1 tsp of feeding mix and a small squeeze of iron to every 2 tbs of clumps removed. As you get to know your spirulina you will understand what is a normal amount of clumping for your tank. If your tank is suddenly producing too many clumps something is wrong. Before you become alarmed think if you have recently poured an extra heavy stream of water into your tank which simply loosened a bunch of clumps which may have been on the floor or elsewhere. If you have been operating as normal then either your tank is too hot, the mineral content is off, or it has become contaminated. Monitor your temps, check your pH often and perhaps add some extra nutrients or iron, or less if you may have added too much. If the over-abundance of clumping continues renew your growing medium. If you are concerned about contamination (there is a strange smell or more discoloration or other colors) check your culture under a microscope. If in doubt use throw it out. Use your safety culture to regrow a new batch of safe spirulina. Here are some photos of normal clumps that you simply remove from the water and dispose of:
Nutrients

There are two types of nutrients that you will be adding to your spirulina. The growing mix will be added to water to create the growing medium. This mix contains nutrients for changing the pH of the water as well as mineral content. The feeding mix is used once you have begun harvesting spirulina. This mix replaces the nutrients you remove when you harvest. You mix this in with the water left in your bucket after you have harvested.

The basic recipe for creating growing medium is 7 ½ tablespoons of grow mix and one squeeze of iron to every 5 liters of water.

The basic recipe for feeding mix is 1 teaspoon of mix and a small squeeze of iron per tablespoon of harvested algae.

The basic recipe for maintenance is 1 teaspoon of feeding mix and a small squeeze of iron per 2 tablespoons of clumps removed.

Safety

Obviously it is important to keep your tank free of contamination. Most other algae and bacteria cannot live in a high alkaline environment like spirulina, but it is still good to play it safe.

1. Keep your hands clean. Wash your hands before handling spirulina equipment and previous to harvesting. You could also keep some latex gloves next to your tank.
2. Keep your equipment clean. Wash your siphon tube, bucket, cloth and tools frequently. It is not necessary to do so after every harvest, but
the cleaner the better.

3. **Check you pH often.** Never eat your spirulina if the pH is below 10 or above 11. If pH is below 10 but looks thick give it a couple of days and the pH should rise and you can harvest. If this doesn’t happen consider adding more nutrients. If you pH has risen to 11 or above it is time to change your growing medium. Refer to maintenance section.

4. **Always pay attention to the color and smell of your spirulina.** Do not eat anything that is clear, yellowish or stinky. Spirulina should be very dark green and have a neutral seaweed smell and taste.

5. **Eat your spirulina within 2 days** after harvesting unless you dry* or freeze it. Always keep it refridgerated if you are not consuming it immediately.

6. **Get a microscope and monitor your culture** to make sure nothing else is growing. This is optional but recommended. 200x is minimum, 400x or more is even better.

7. **Keep a bottle of safety culture.** All you need to do is keep a bottle of culture (growing medium with spirulina in it) separate from your tank. This can be any clear or slightly opaque plastic or glass bottle or jar that has a fabric cover to let air in but no contaminants. This safety bottle does not need to be aerated or heated. Keep it in the sunlight. It will grow slowly, but that is fine. It is just there in case anything happens to your main tank of spirulina. Swirl this bottle as often as you remember, once a day is best. Change it out if you notice any discoloration, or about every couple of weeks or month. It is good to keep one or two of these as a back up plan in case anything happens to your main tank.
Safety Bottles

Also remember that spirulina is not always beneficial for every body. People with autoimmune conditions such as HIV or rheumatoid arthritis should avoid consuming spirulina. If you have not taken spirulina previously make sure to notice your responses within the first weeks of taking it to make sure it is right for you.

Measuring Growth

The easiest way to measure growth is through the use of a Secchi Disk. Assemble the disk provided and lower it into the medium. As it descends look at the disk from directly above, looking down into the water from the top. As you lower it you will see the black and white disappear, when you can no longer see the difference between black and white and your disc is almost completely disappeared this is your reading. You want a secchi reading of 4 cm or less before harvesting or doubling. Generally the reading should be done in the shade rather than in direct sunlight. As you get to know your culture more and more you will be able to tell the density just by looking without the disk.
Time to Grow Spirulina!

Growing your Culture

Growing your culture is easy. The basic concept is that when your culture gets dense enough you double the amount of medium and let it grow. Depending on the bottle it was sent in (your secchi may be too big to fit through the hole) you made need to transfer it to a clean jar or glass to do this. If it is more than 4cm then let it continue growing in the bottle until it reaches 4cm density. Then it is time to put it into your tank.

The first time you are adding your culture into the tank you are doing more than doubling the medium. So this stage takes longer and you should be extra careful here. Mix up 10 liters of growing medium using the chart as reference for how much nutrients to add. Pour your medium into your tank. Before adding the culture make sure to check that your heater can be fully immersed in the water, to go below the water surface it will need to be angled with the top sticking out. This should work fine in a 10 and 15 gallon tank. A larger tank may be too shallow depending on its’ shape. If your tank is too large for the heater to angle in there below the water you may need to do this first step in a different container. If that is the case you can just run your airtube into that container without worrying about it being along the perimeter.

Turn your air on to make sure the tubing is placed correctly and doesn’t become detached. There should be bubbles floating up along the walls of the tank.

Now you are ready to add your spirulina! We recommend that you do not add your entire bottle. Pour in about ¾ of the bottle and leave ¼ undisturbed. It is ok for it to be in the bottle without bubbling air, this is
your safety spirulina in case anything goes wrong. Just swirl it once a day while you grow the rest in your tank.

Once you have poured in your spirulina cover the tank with your tank cover and then cover the entire thing with thin white fabric. As you can see the spirulina is very thin in the growing medium. This means it is stressed. It needs to be protected from direct sunlight during this time. Each time you double the medium you will cover it during the first days of thinness. As the density grows thicker and thicker you can expose it to more and more direct sunlight.

During this first stage of growth the density is thinner than any other time. Monitor the temperature closely, especially during the hottest part of the day. You can check the pH if you want, it should start around 8.5 and slowly rise as the days go by. Be sure to encourage the little guys to grow by talking to them or just spending some time with them each day. This stage is going to take longer than any other stage, maybe a few weeks, so be patient.

Use a non-permanent marker to mark the water level on the side of the tank. During these stages the water evaporates more quickly than usual. As the water level goes down just add more filtered water to bring up the level to where your mark is. You do not need to add nutrients to this added water, you are simply replacing evaporated water. You will do this same process at each stage of the culture growth.

Once the culture has reached 4cm or less density it is time to double it. Mix up 10 liters of medium, adjust the heater and thermometer, remark the water level and cover it again with thin fabric. Let it grow until 4cm density. Then you will do the same with 20 liters of water and so on, doubling the medium each time until your tank is full.
Harvesting Spirulina

You can begin to harvest when your density is 4cm or less and your pH is 10 or above. Before you get started make sure to wash your hands or put on plastic gloves. It is best if you can place your bucket lower than your tank. Below are pictures showing the siphon method. You also could scoop out the spirulina with a bowl instead of siphoning it, or use an aquarium pump, but we find this is the fastest, cleanest and easiest method.

Clip your fabric on top of your bucket leaving a droop in the middle for the water to collect in
To get the siphon to start suctioning place the entire tube below water, let it fill up and put one thumb over an end and lift it out while leaving the other end in the water. Direct the tube over your bucket and remove your thumb.

Let the water flow through your fabric. You may have to stop the flow with
your thumb if the water begins to filter more slowly. When you are finished cover the end with your thumb, hold the tube above the tank, release and let the tube empty back into the water.

The spirulina will cover a wide swath of fabric. Direct it to a smaller area using a spoon.
Slowly unclip each clip being careful to direct the spirulina into a small area in the middle of the fabric.

Unclip all ends and hold over water in bucket.
Gently squeeze out excess liquids (we like to pretend we are milking a goat here) until the spirulina feels pretty dry.

Here is your spirulina
Scrape off as much as you can with a spoon

Rinse out your harvesting fabric completely. This is also the time to add feeding nutrients if necessary.
Pour liquid back into tank.

Eat or refrigerate immediately. Treat it like raw meat or eggs. It is good for two days unless you dry or freeze it. Never consume spirulina that is anything other than dark blue-green or smells funky.
Please note: drying spirulina doesn’t just mean leaving it out to dry up (which will happen quickly). It means raising the temperature with a dehydrator up to at least 120 degrees so that it is no longer active.

How much spirulina you harvest is up to you. You can repeat this process for a larger harvest, but never process more than half of the liquid from the tank. Other than that, it is to your preference. Some people like to do a little every day whereas others do more liquid and wait longer until the next harvest.

As you harvest keep track of how much you get. You will be putting one teaspoon of feed mix and a squeeze of iron for every tablespoon you harvest. Stir this into your bucket before you return the medium to the tank. If you choose to harvest a little every day you may only add feed mix every 2 or 3 harvests. If you harvest a lot at once then you may get more than one tablespoon and need to add more mix.

Maintaining Spirulina

To maintain your spirulina simply keep your equipment clean, clean out floating clumps and feed as needed. It is normal for clumps to grow along the bottom of your tank and on your equipment. It is recommended, but not necessary, to siphon out your medium and clean out your tank every few months. Another idea is to stir your tank with a spoon and scrape along the bottom and your equipment helping clumps to break free and then scooping them out.

Check you pH frequently, to harvest it should be between 10 and 11. You will find that you pH will continually rise and after about 4 to 8 months the pH will reach 11. This means it is time to renew your growing medium.
Renewing your Growing Medium

You will do this when your pH reaches 11, or if you suspect that your chemistry is off because your color is yellowish or the spirulina isn't growing well. You are going to need more than one bucket for this process. Make sure to do this process when your culture is at a nice thick density rather than right after harvesting.

The idea here is to strain out all of your culture and put it in fresh clean medium. To do this mix up 20 liters of growing medium using the chart. Remember to use filtered water! Put this medium in a bucket and move your heater in there to equalize the temperature with whatever the temp is in your tank. Once this has happened strain out your entire culture from your tank. Do it just like you do when you harvest, though you do not need to squeeze the spirulina completely dry like for harvesting. Each time you strain a bucket of old medium empty the strained spirulina from your fabric into the new bucket with fresh growing medium. Repeat this process until your tank is empty. Pour out the old medium and clean your tank. Pour the new medium with spirulina into your spiffy clean tank. Mix more growing medium and add until your tank is full, doing this slow enough that the temperature can continue to equalize.

Now you have a happy tank of spirulina that are ready to grow and multiply for the next 4-8 months!

This is the entire process used for growing and maintaining spirulina. As you can see it is quite easy and takes very little time. Enjoy!
## Mixing Charts

This chart is for making your dry mix of Growing Medium:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>To make 50L of mix</th>
<th>To make 100L of mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Bicarbonate (baking soda)</td>
<td>800g</td>
<td>1.6kg</td>
</tr>
<tr>
<td>Potassium Nitrate (saltpeter)</td>
<td>100g</td>
<td>200g</td>
</tr>
<tr>
<td>Sea Salt</td>
<td>50g</td>
<td>100g</td>
</tr>
<tr>
<td>Ammonium Phosphate</td>
<td>5g</td>
<td>10g</td>
</tr>
<tr>
<td>Extra minerals if you are using distilled, soft, reverse-osmosis or rainwater. <strong>Do not add if you are using filtered tapwater or spring water</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnesium Sulfate (Epsom Salt)</td>
<td>5g</td>
<td>10g</td>
</tr>
<tr>
<td>Potassium Sulfate</td>
<td>25g</td>
<td>50g</td>
</tr>
<tr>
<td>Lime or Calcium Chloride</td>
<td>5g</td>
<td>10g</td>
</tr>
</tbody>
</table>
This chart is for mixing your dry mix into water for Growing Medium

<table>
<thead>
<tr>
<th></th>
<th>5L</th>
<th>10L</th>
<th>20L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>5L</td>
<td>10L</td>
<td>20L</td>
</tr>
<tr>
<td>Grow Mix</td>
<td>7 ½ tablespoons</td>
<td>15 tablespoons</td>
<td>30 tablespoons</td>
</tr>
<tr>
<td>Iron</td>
<td>1 squeeze (1/8 tsp)</td>
<td>2 squeezes (1/4 tsp)</td>
<td>4 squeezes (1/2 tsp)</td>
</tr>
</tbody>
</table>

This chart is for making your Feeding Mix to use when you harvest. How much you will use depends upon how big your tank is and how much you harvest.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>for 750g</th>
<th>for 1.5 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium Nitrate (saltpeter)</td>
<td>700g</td>
<td>1.4kg</td>
</tr>
<tr>
<td>Ammonium Phosphate</td>
<td>25g</td>
<td>50g</td>
</tr>
<tr>
<td>Potassium Sulfate</td>
<td>15g</td>
<td>30g</td>
</tr>
<tr>
<td>Magnesium Sulfate (Epsom Salt)</td>
<td>10g</td>
<td>20g</td>
</tr>
<tr>
<td>If you are using distilled, etc water Lime or Calcium Chloride</td>
<td>5g</td>
<td>10g</td>
</tr>
</tbody>
</table>
Assemble your Secchi Disk
1. Print and then cut out the circle below and the centimeter ruler.
2. Laminate them using clear tape. You could also really laminate them.
3. Find a wire that is stiff enough to bend but maintain it’s shape in water.
4. Create a straight piece of wire with a loop on the bottom
5. Attach the loop through the disk so that the disk lays at a 90 degree angle to the wire. There should be two holes through the disk that the wire loops through so that the disk maintains it’s angle.
6. Tape the ruler to the wire directly above the disk so the bottom of the ruler is just touching the disk.
This is your secchi measuring device.

example: