

# Setting up the Blossom Gulch Aquarium, Oct 20, 2007 Richard Emlet

*Please note that each tank design has it's own considerations. Your school tank might have different valves, filters, etc. However, much of the following information is relevant to other school tanks.*

## I. Setting up a tank

Stage 1: Readyng the tank, filling with water, and adjusting air stones, water flow, and tank temperature.

Stage 2: Adding organisms

## II. Choosing organisms

Most Ideal Animals for aquaria (here in southern coastal Oregon)

Short duration organisms

## III. Maintaining the tank and its organisms

Check the tank daily

Food and feeding

Maintaining water quality

Some things that may happen to the tank

## **THINGS YOU WILL NEED:**

### Hardware:

- A functioning, watertight refrigerated tank
- Plexiglas cover – to keep out hands and reduce evaporation
- Aquarium light – fluorescent tube light
- (A timer to turn light on and off)
- Air pump, manifold, tubing & air stones (2 minimum).
- An alcohol or non-mercury thermometer to monitor temperature (seawater in tank should be between 50-55<sup>o</sup> F or 10-12<sup>o</sup> C)
- Zeolite granules and/or activated charcoal
- Filter material (a cheap fiber filled pillow will do)

Seawater (about 35 gallons for the Blossom Gulch tank)

Clean gravel – (a 5 gallon bucket full?) to cover tank bottom and be about ½ to 1 inch deep  
(**DO NOT USE SAND**, it will plug the pumping system)

Rocks and stones (with organisms attached, see below)

### Helpful supplies:

- A sponge with a plastic scrub pad
- A stick about the diameter of a drinking straw, about 15 inches long
- A bucket
- A bowl to break the stream of water when filling the tank
- Several old rags to clean up spills
- Siphon hose
- A dip net
- Silicone sealant (pure, not bath tub silicone sealant with fungicide in it)

## **I. Blossom Gulch Tank Setup**

### **Stage 1: Readyng the tank, filling with water, and adjusting air stones, water flow, and tank temperature.**

1. Clean out all compartments of the tank to remove gravel, dirt, dust, etc. Vacuum it out if possible.
2. Place a cork or plug in the round hole (center, bottom) in white back wall of the tank.
3. Prepare and insert filter bags. There are 6 mesh bags that need to be filled to  $\frac{1}{2}$  their height with zeolite and/or activated charcoal. If they are there, put the rectangular pieces of screen on top of the granular material. Use a handful amount of fibers from a cheap pillow or quilting filler to cover the screen and granular material. Use enough to fill the remaining volume of the mesh bags. These mesh bags are then placed into the back chamber of the tank on top of a Plexiglas board (with holes) and a plastic mesh strip.
4. Put gravel in the main chamber of the tank and arrange it as you wish.
5. Attach manifold to air pump with a short piece of tubing. Attach two tubes to 2 air stones and attach these to the manifold. Place pump and manifold inside tank frame on back left side (when facing the tank). Place 1 air stone into each small side compartment in the back.
6. Make sure the (red) drain faucet inside the back frame of the tank is CLOSED (all the way clockwise). Also check the nearby (black) flow adjustment valve now and make sure it is full open (all the way counterclockwise).
7. Fill the tank with seawater. Place a bowl in the center of the tank on the gravel and pour water into this bowl. The bowl will prevent the water stream from disturbing your gravel. Add water until the level is about  $\frac{3}{4}$  of an inch below the top where the glass meets the metal frame. Water will only start into the back chamber once the water level in the front chamber is high enough to go through the paired holes at the hope of the 6 return tubes. To fill it more rapidly you can pour water into the back chamber, on top of the filters.
8. Plug the air pump into the electrical outlet in the back left corner of the tank. Plug in the tank cord (this operates the AC compressor and the water pump) to the wall socket or a surge protector that is plugged into the wall socket. If the thermostat (back left corner) is low enough the compressor will turn on when this cord is plugged into wall power. The air pump should also start and bubbles should come out of the air stones. If airflow is only out of one stone or is uneven, adjust the valves on the air pump manifold to make bubbling similar between stones.
9. Turn on the switch to the water pump. (Back left corner, it's just above the socket into which you plugged the air pump. Water should start circulating.
10. Adjust the thermostat to about  $12^{\circ}\text{C}$  ( $= 53^{\circ}\text{F}$ )
11. Watch the back middle chamber of the tank, where water is flowing in from the front living area of the tank. If the water level is dropping in this back chamber the water pump is moving

water out faster than gravity can return it to this chamber. Close the (black) flow adjustment valve (mentioned in step 6) until the water in the back chamber comes back up or at least no longer drops.

12. Cover the tank with the Plexiglas top and secure the top if necessary.

13. Place the aquarium light on top and plug into power socket; add a timer if you want it to come on and turn off (e.g. 7:30am to 6pm).

### **Stage 2: Adding organisms**

1. Assuming the water is at or near 12 °C you can add a crab or a few mussels. They are your trial animals to see if they remain alive. These animals will inoculate your tank with marine bacteria that can help remove nutrients from the tank. The bacteria will grow in the tank and also on the zeolite and activated charcoal in the back chamber and remove nutrients like ammonia. Wait 3 or 4 days before you add other animals.
2. After 3 or 4 days you can add more organisms; the key is not to add too many, and to introduce them a few at a time. You might want to add 2 or 3 anemones on rocks and a few hermit crabs and then wait another few days before you add more.
3. See the following list of recommended organisms.

**II. Choosing organisms:** *Note that adding rocks provides additional habitat and hiding places. For added interest, choose rocks with attached organisms, such as mussels, barnacles, and anemones.*

**Most Ideal Animals for aquaria (these will live well and for a long time if the system is cared for and animals are fed regularly – e.g. twice a week)**

Anemones and corals (usually best collected attached to cobble or rock, all will eat appropriately sized chunks of mussel placed on tentacles)

Large green surf anemone (*Anthopleura xanthogramica*)

Pink tipped anemone (*Anthopleura elegantissima*)

Painted anemone (*Urticina crassicornis*)

Brooding anemone (*Epiastis* sp.)

Orange cup corals (*Balanophyllia elegans*)

Mollusks

Snails – coiled snails and limpets (eat barnacles and algae)

Keyhole limpets (eat sponges)

Seaslugs or nudibranchs (various – eat sponges and hydroids)

Rock scallops (suspension feeders)

Chitons – (but not big gumboot chitons)

Crustacea

Barnacles (on rocks, suspension feeders)

Hermit crabs (found in tidepools - scavengers)

Small crabs (carapace width up to 2 inches) – red rock, Dungeness, spider, decorator (will eat chunks of mussel) -avoid shore crabs b/c they crawl out

Shrimp

## Echinoderms

- Small purple sea urchins (*Strongylocentrotus purpuratus*) – (algae)
- Small red urchins (*S. franciscanus*) – (algae)
- Small six-armed sea star (*Leptasterias hexactis*) (will eat chunks of mussel)
- Small 5 armed ochre star (*Pisaster ochraceus*) (will eat chunks of mussel)
- Blood star (*Henricia* sp.) – eats sponges and hydroids
- Daisy brittle star (*Ophiopholis aculeata*) – (suspension feeder)
- California sea cucumber (*Parastichopus californicus*) – (mops up tank bottom)
- Red sea cucumber (*Cucumaria miniata*) (suspension feeder)

Tide pool fish (probably not more than 5 to 7 total)

Sculpins, snail fish, clingfish, small (juvenile) rockfish, pipefish.

### **Short duration organisms (cool to see but probably will not last)**

Jellyfish – small, up to 3-inch diameter. (They will not last more than a day or two but are fun to watch.)

Feather Duster worms (from Charleston docks) (suspension feeders)

Hydroids (from Charleston docks) (suspension feeders)

Sponges –only add small amounts at a time, as some sponges may be toxic.

Attached marine algae up to 6 or 8 inches long (not kelps except blades for urchin food). The lighting is not the right kind to have these remain healthy.

### **III. Maintaining the tank and its organisms**

The aquarium you have set up is a very small ecosystem that needs to be managed in order to keep things alive and healthy. The animals are suspension feeders (consuming microscopic stuff out of the water column), grazers (eating micro or macro algae) or predators. If not fed regularly (1-2 x per week), the predators (crabs, sea stars, and fish) will start to eat other animals in the tank. Some predation is likely to happen no matter how well you fed them, but regular feeding will reduce this.

**Check the tank daily (5 min or less)** --Get into the habit of checking the tank each day.

1. Scan for sick or dead animals and remove them. Remove any rotting algae or other material that has gotten in but does not belong.

2. Make sure the temperature is okay (Water temp. should be between 50-55<sup>o</sup>F or 10-12<sup>o</sup>C). Make sure the air stones are bubbling and the water pump is working.

3. Check the water level in the living area, and look for leaks or spills.

4. Check to see if water is flowing from the living chamber into the middle back chamber. At the top of each of the 6 return tubes on the white back wall there are paired, smallish holes that let water run into the middle back chamber. These need to be open and unclogged (use small diameter stick or whatever to clear). The slits at the bottom of these return tubes may also get plugged with debris.

### **Food and feeding (30 minutes or less, once you have the food; 2 x week)**

Suspension feeders need plankton or brine shrimp. One plankton/brine shrimp feeding per week would be ideal. One every other week is probably ok and the minimum. Brine shrimp can be raised in the classroom. Plankton tows can be taken from the Charleston docks.

Algae (probably kelp) is best for the urchins. Put in a blade (1 or 2 feet long). Add more only when that is gone and remove it if it begins to rot. Grazing snails will feed on the algal films that start to grow on the glass and are already on the rocks.

Predators will consume minced clam or mussel. Hand feeding the anemones, crabs and fish is fun and goes quickly. Drop a piece or two near the sea stars that feed on meat (see list above). Don't overfeed the tank. You have overfed if you feed in the morning and at the end of the day there are still pieces of the clam or mussel on the tank bottom. The hermit crabs are in the tank to help scavenge most of the leftovers.

### **Maintaining water quality**

The organisms release urine and feces and the filtration system helps abate some of this nutrient enrichment. Over time –weeks to months, nutrients will build up and some organism may become unhappy (e.g. anemones won't open out and show their tentacles).

**Replacing some of the seawater or changing it completely can help slow or reverse the process of nutrient enrichment.** Remove ¼ of the seawater and replace it with new seawater each month. This will help remove ammonia and nitrates and replace minerals and ions the animals utilize.

If **water clarity** is an issue, check the filters and change the fiber wads in each of the six mesh bags in the back chamber. Sometimes it takes a day or two for the water clarity to improve after this procedure.

### **Routine servicing**

Every term (e.g. before Christmas break and before spring break it is a good idea to do the following if it has not been done already.

**Replace the fibrous filter material** in the six bags in the middle back chamber.

**Vacuum the radiator in the right bottom front of the tank frame.** Look through those black holes in the front right below the tank and see if dust is clogging the radiator. Dust is best removed with a vacuum cleaner.

### **Some things that may happen to the tank (from past experience)**

#### **Plugs or flow issues**

**Small slits in the bottom** of the water return tubes on the white back wall can become **plugged** with algae or other debris.

The **paired holes at the top** of the same return tubes can become **blocked** with debris.

If the **stopper comes out** of the round hole on the white back wall, mobile animals will

move into that back chamber. Filtration will also cease, as water will be pulled through that hole and bypass the filters.

**Low flow out of the side chambers into the living area** may occur after the tank has been running for a while. If this happens, try opening the (black) flow adjustment valve (mentioned in Tank Setup, stage I; step 6). If flow increases that is fine. If flow does not increase with a fully opened valve, then something is plugging the water pump lines. Please let OIMB know.

**Silicone peel** - Children love the tank, but in the past when (lunch?) lines have waited along and passed by the tank, the **silicone along the glass metal edges gets pulled and picked away**. Keep an eye out for this and replace it before leaks occur.

**The inflow side chambers.** Some **mobile animals**, especially snails and seaslugs, but also small seastars, **will crawl into the side chambers** where water is flowing from the pump into the living chamber. Just pick them out and return them to the living area.

**Mysterious disappearances** – occasionally (usually smallish) organisms vanish. They may be hiding; they may have been eaten; or they may have died and changed form so you don't recognize them. Assuming they have not gotten into the inflow side chambers or disappeared into the hole from a missing stopper (see plugs and flow issues, just above), just keep checking on following days.