
How to Set Up a GPFF Cold Water Aquarium

This document and others related to Trout in the Classroom can be found on the Grizzly Peak Fly Fishers' website, www.gpff.org, in the "Education" drop-down menu under "Trout in the Classroom Documentation". Included in the documentation is a two-part video showing set up and cleaning of aquaria.

The program coordinator will provide you with all relevant instructions at the beginning of each year's Trout in the Classroom program.

Trout require clean, cold and well aerated water to survive. Properly cleaned and assembled, your aquarium approximates the critical elements of a healthy natural environment.

Before starting to assemble your aquarium make sure you have all its parts (see the components check list in the Appendix) and that everything is clean (see "Aquarium Cleaning and Storage"). If any parts are missing or broken, contact your coach.

Do not attempt to modify any of the components of the aquarium or housing without first consulting with your coach.

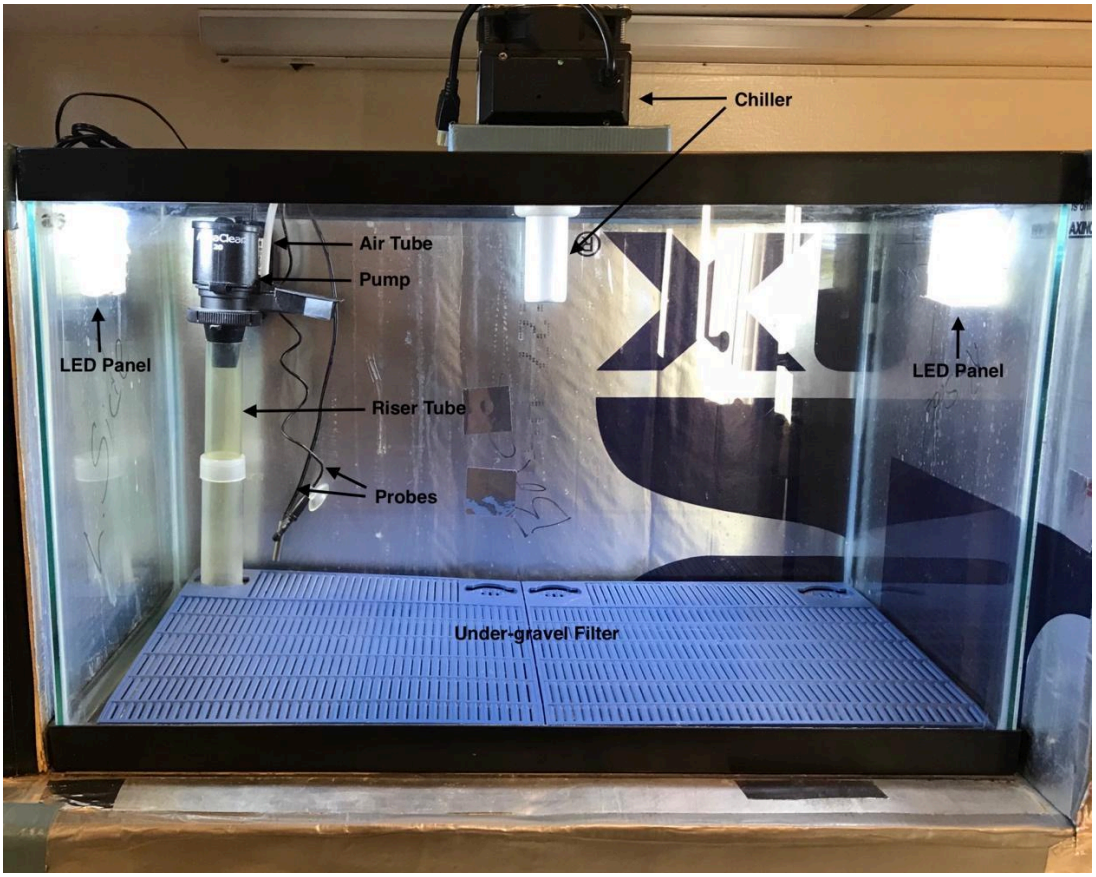
Placement

Before starting to assemble your aquarium spend a little time finding the best place to put it. It must be in a cool part of the classroom away from windows, direct sunlight, and heating vents. Remember that your aquarium chiller will only be able to cool the water to at most 25°F below the ambient temperature of its location in your classroom.

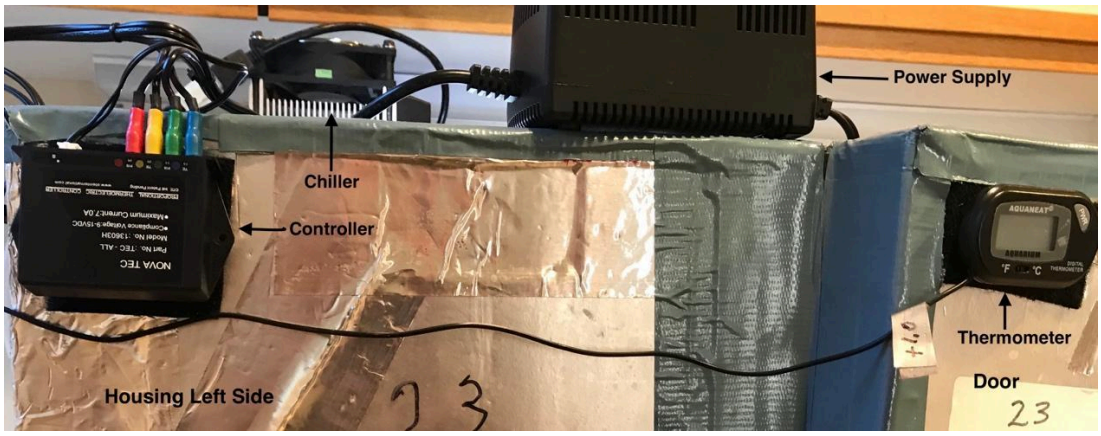
Make sure the aquarium, in its housing, is as level as possible. You can use a long carpenter's level on top of the aquarium housing. You can also put a dinner plate on the housing lid and fill it to the brim with water to indicate level. Level the aquarium by placing cardboard, wood, or plastic strips under the aquarium housing's low side.

Assembly

The two photographs that follow show a front view and a side view of an aquarium. Not shown are the gravel, the *spring water*, and the lid.



A Grizzly Peak Fly Fishers 10-gallon Aquarium. Front view with left-side door open. Shown are the chiller, the pump with air tube, the under-gravel filter, the riser tube, the controller and thermometer probes, and two LED panels. Not shown are the lid, the gravel, *spring* water, and the external controls. The tank takes slightly less than 10 gallons of *spring water*. Printing on the interior foil cladding of the insulating housing was not removed.



A Grizzly Peak Fly Fishers 10-gallon Aquarium. Left side view with door open. Shown are the controller for the chiller, the chiller, the power supply, and the thermometer. The controller and thermometer are attached to the housing with Velcro strips. The power supply normally sits on the bench (some power supplies plug directly into a wall outlet).

Step 1. The under-gravel filter.

Put the **under-gravel** filter with a **riser tube** in the bottom of the aquarium. Most of the GPFF under-gravel filters come in two halves (blue Penn-Plax type). Clip the two halves together. The clip brackets on many of our filter sets are broken off, but the pair of filter plates can still be used. Make sure that the two halves meet tightly at the center of the tank and that there is no space between them for gravel to build up. You can use twist ties to hold the two halves together, but that is not really necessary as long as the two halves are tightly together before you add gravel. Gravel between the two halves of the filter can impede water flow, especially to the right half. Attach the riser tube to the retention socket in the under-gravel filter that is on the *back left side* of the aquarium. The riser tube has two parts to allow for height adjustment.

With some under-gravel filters (black or white Lee type), there is a possibility that fry can get sucked up and into the aerating pump. It is important that gravel be distributed completely and evenly, especially around the riser tube, to help prevent this from happening. Penn-Plax under-gravel filters (blue) have baffles at the bottoms of the riser-tube ports to keep fry from getting pulled in. With the Lee-type under-gravel filters (black or white), there are no baffles, so it is wise to place a piece of nylon stocking, or equivalent, as a screen over the end of the tube before inserting it into the filter plate. See Photo.

Nylon stocking screen in rear left corner. This is a top view from the rear. Not needed with Penn-Plax.

Step 2. The water pump.

Attach the **water pump** to the *inside top left* of the aquarium using the suction cup bracket. The whole pump should be slightly lower than the top of the aquarium and below the water level so that it will be submerged. The cone of the water pump should be directly above the riser tube. Adjust the cone and riser tube so that the cone of the water pump fits snugly into the top tube. Rotating the knurled ring on the pump shifts the orientation of the cone for this adjustment. Make sure the output diverter plate is on the pump and that the plastic air-supply tube is inserted firmly into its socket on the water pump. An unobstructed air intake tube is very important. The air tube brings in air to oxygenate the water in the tank. Note the water flow adjustment lever that extends from the knurled ring just above the cone. You can use this lever to regulate the flow of recirculating water and the amount of aeration.

Pump attached to left rear corner of aquarium. The deflector plate is the flap on the right side of the pump. The air intake tube comes out of a socket near it. The photo shows the air intake tubing, the pump electrical cord, and the controller probe taped to the housing. The undergravel filter and riser tube are not shown.

Step 3. The controller and thermometer.

Attach the **controller** to the Velcro patch on the *back-left* side of the aquarium housing. Bring its controller probe around the back of the aquarium and over the stripe on the housing marked for the wiring; let the probe dangle into mid tank.

Attach the **digital thermometer** to the Velcro patch in the *upper-left* part of the aquarium's front door. Move the thermometer probe outside and in back of the housing, then over the marked stripe and into the tank. Attach the thermometer probe to the *back wall* near the gravel bed with its suction cup (which probably won't stay stuck). Use duct tape to hold down the pump power cord, the air supply tubing, the controller probe, and the thermometer probe in the stripe area on the aquarium housing. There is a slot cut out in the underside of the housing lid that should match the placement of the stripe. This slot enables the aquarium cover to slide over the wiring and tubing.

Step 4. The gravel.

Distribute the **sterilized gravel** all over the undergravel filter making sure that it covers the entire aquarium bottom to the glass walls. Gravel should not be allowed to fall between the sections of two-part filters. Rocks are used only when requested.

If your aquarium kit contains a circular tube of plastic or glass about 6 inches by 1 inch, place it in the middle of your aquarium on top of the gravel. You should deposit your eggs inside this tube. This "corral" will sequester your eggs and alevins where you can readily count them and discover dead eggs or alevins.

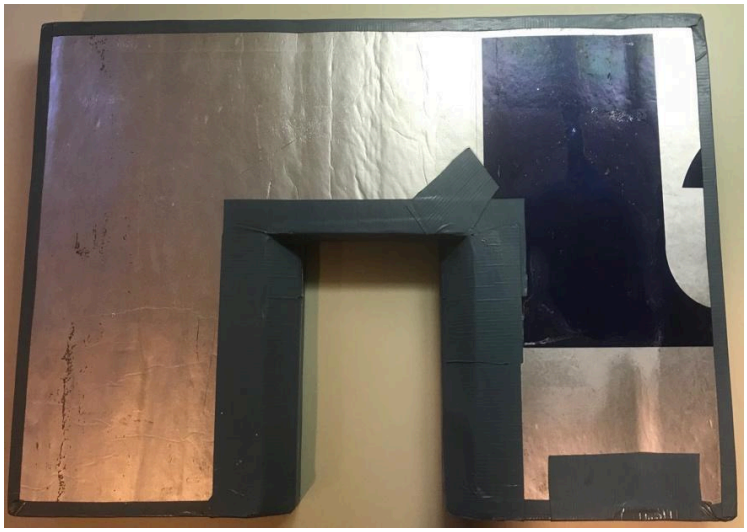
Step 5. The spring water.

Slowly add *10 gal* of **spring water** to the tank taking care to not disrupt the gravel. (Do not use tap water, deionized water, or distilled water.) It will take slightly less than 10 gallons to fill the tank. When the water is near the top, place the **chiller assembly** on top of the aquarium tank. Add more water until it just touches the underside of the Plexiglas chiller support plate.

Step 6. The controller connections.

Connect the **long wire** from the *controller* to the *chiller* and the **short wire** to the *power supply*. (The power supply will sit on the bench or be plugged into an outlet.) Slide the lid on top of the housing and around the chiller with the bevels upward and pointing toward the back of the

aquarium. Adjust the lid and chiller sideways so that the wiring and tubing enter the slot in the lid and the lid is centered on the aquarium housing. (We recommend that you remove the lid at this time and Scotch tape the Plexiglas plate to the front of the glass aquarium. This will help prevent the chiller from falling into the water if curious unauthorized people lift the lid off the aquarium instead of sliding it off.)



View of a lid from top back.

Chiller Assembly. Position the Green LED and power cord toward the front and the 2” insulation overhang toward the rear of of the aquarium.

Rear view of a chiller assembly showing an old-style controller (no longer used). Note the bevel and cable cutout in the lid.

Operation

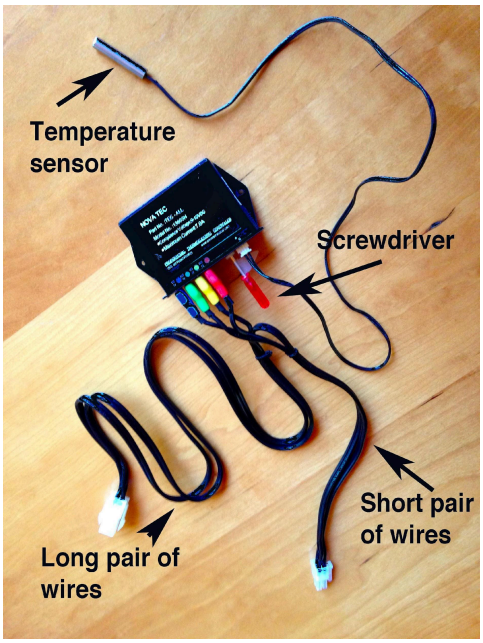
Plug the **power supply** and the **water pump** into *outlets that can't be turned off* when school is not in session. If these outlets are on a wall switch, put a sign on the switch warning against turning them off. If your outlets are accessible wall outlets, put a sign on both power cords warning janitorial services not to disconnect either of them.

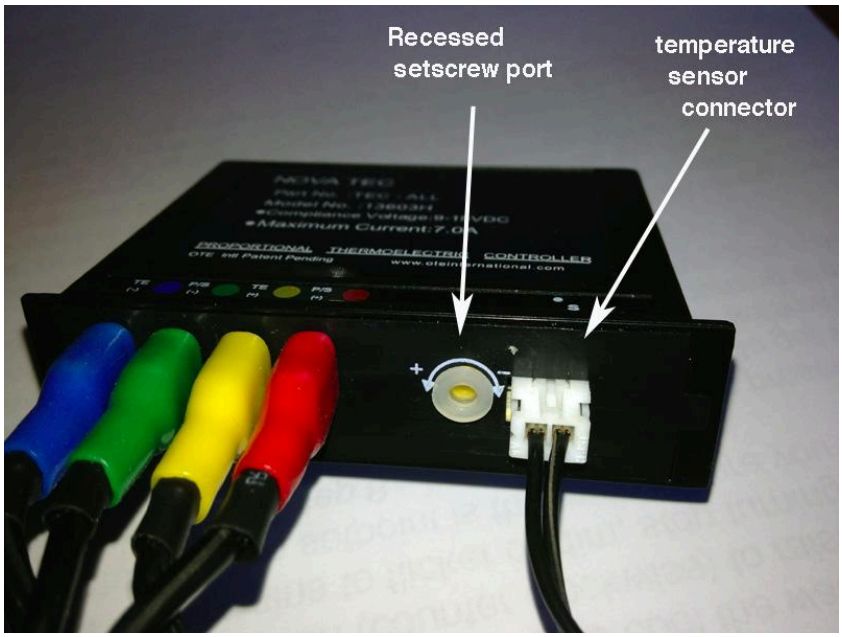
Bubbles should be coming out of the **water pump**. Adjust the deflector and flow adjustment lever so that the bubbles flow near the top of the water toward the right wall of the aquarium; not too deep. The bubbles make a constant sound. If at any time, you don't hear the sound, find out why. Either the pump is not working or the air inlet tube has come off the pump. If bubbling stops, eggs will not get enough oxygen to survive. If the intake tube has come off, reinsert it into the pump. If you can't get the pump to operate correctly, either the unit has lost power or it needs replacement. Contact your coach or the GPFF TIC coordinator for a replacement.

It may be necessary to put your hands in the water when adjusting the flow from the pump. In that case, make sure that your hands are well rinsed if you have used disinfectant hand soap or hand sanitizer. **The chemicals in disinfectants and sanitizers are toxic to eggs and alevins.**

The green LED on the **chiller** will turn on when the water is being actively cooled and will be off when the water is not being cooled. (The temperature at which cooling stops is called the *set point* and is adjusted with the controller.) The **controller** setting determines the set-point temperature by means of an adjustment screw. *See the file "Using and Understanding the Controller" on the GPFF website*. Remove the controller from the Velcro and observe the

position of the slot in the adjustment screw that is at the bottom of the small hole in the controller's upper edge.





The controller. Important parts are labeled.

Insert the screwdriver (supplied) into the adjustment screw's hole and engage it in the adjustment screw's slot. Make sure that the screwdriver is actually in the screw's slot by gently rotating it back and forth; you will feel the slot's edges. Turn the screw gently ***clockwise*** **(−)** to **cool** the water in the tank and ***counter clockwise*** **(+)** to **stop cooling**. You should feel only slight resistance to turning as the screw moves. If there is great resistance to the turning of the screwdriver, it is likely encountering the plastic walls of the adjustment screw's hole and not turning the screw. Look into the hole and verify that the slot has actually moved following an adjustment. After making an adjustment, replace the controller on its Velcro patch.

The **thermometer** on the front of the tank gives water temperatures. As the temperature of the water drops, it will enter the range of the controller and the chiller's light will dim or go off. When the chiller is first turned on, adjust the water temperature to maximum cold (a few quarter turns of the adjustment screw clockwise (-) past the room temperature set point) and let the chiller run for a few days. If the green LED on the chiller is off it is not cooling the water. Turn the adjustment screw clockwise (-) until the light turns on and then turn the screw about ¼ turn further. Repeat this process until the light stays on. Next, incrementally adjust the controller set point by turning the adjustment screw clockwise (-) or counterclockwise (+) until the water temperature stabilizes at 50°F. It will take some time for the water temperature to change.

We recommend that your aquarium water be at 50°F when you first put eggs into it.

You can always tell if your water temperature is in equilibrium with the chiller by moving the controller's adjustment screw very slightly clockwise (-) (the green light goes on) or counterclockwise (+) (the green light goes off). After changing the controller's set point, always wait a day to record your equilibrium temperature. Try to record your daily temperature measurements at roughly the same time each day. Daily room temperature fluctuations usually will not affect the aquarium temperatures greatly because the controller will maintain aquarium temperatures in its range to within 1°F even with a 15°F room temperature swing.

An Excel spreadsheet has been developed that will suggest temperature settings to make the hatching and swim-up (button-up) dates fit your schedule. The Excel spreadsheet and all our documentation can be found on the GPFF website. We suggest that you try to learn the program. Or, contact the program coordinator who will use the program for you and advise you via email about the temperature we recommend to achieve hatch and swim-up to match your schedule. The temperatures we will advise should all be within the range of the chiller and controller. If your set up cannot reach the recommended temperature, your coach can recommend solutions to the problem.

The GPFF aquariums have been fitted with **LED lighting panels** – one on each side. The light panels are attached to a USB plug. An AC-to-USB charger is provided. Insert the USB plug into the charger and the charger into an electric outlet. The lights should come on. If not, make sure that the plug has been inserted in the charger in the correct orientation. Unplug the charger to turn off the lights.

The added light from the LED panels can help viewing activity in the tank. The bright light also makes it easier to see dead eggs on the gravel bed. Dead eggs turn white inside their shells. They eventually break and contaminate the water, which contributes to fish die off. The best way to remove dead eggs is to aspirate them into the 6" plastic tubing attached to the **baster** (both of which are supplied). See the video "Removing Dead Eggs" on the GPFF website. This short video shows a teacher aspirating dead eggs.

The LED lights should not be left on continuously. Use them only when needed for visibility of the developing fish and for locating dead eggs.

Appendix

Aquarium Components Checklist

Aquarium and Housing: _____
LED lamps _____, USB Charger _____

In Aquarium

Under-gravel Filter: _____
Riser Tube: _____
Water Pump/Aerator: _____
Suction cup holder _____, air deflector _____, cone _____ tubing _____
Chiller Assembly: _____
Plastic support _____, Foam insulation _____
Controller _____
Screwdriver _____
Power Supply _____
Thermometer _____
Corral (optional) _____

In 5-Gallon Bucket

Gravel (~10 lbs) _____
Baster _____
Baster Tubing (2 ft) _____
Tubing (6 ft) _____
Gravel Cleaning Device (optional) _____
Bucket Aerator _____
Net Small _____ or Large _____