PA Trout In the Classroom:

Aquarium set-up, cycling, salt treatments

AQUARIUM SET-UP

Trout in the Classroom (TIC) aquariums have a variety of set-ups. The photo above is an ideal Aquarium setup for ease of maintenance and stable water quality. The key is to establish a TIC learning space best suited for the classroom layout and available resources.

Using a cabinet-style stand better protects equipment and provides safe storage. Locked lids protect from spills and water damage, and metal stands withstand water and condensation damage more effectively than wood.

Equipment must be plugged in above floor level to avoid electrical plugs/cords from becoming wet and posting an electrocution or fire hazard. Surge protection and/or outlet boxes are recommended for power outages that could threaten equipment vital to trout survival. Signage to show the critical importance of the efficient running of Aquarium equipment is helpful.

Equipment is key to successfully raising trout. PA Fish and Boat Commission does not provide Aquarium equipment. The participating classroom is responsible for securing the equipment. The following information will assist in research and selection. Networking with other TIC instructors and connecting with local and regional partners such as Trout Unlimited chapters, watershed alliances, and sportsmen's clubs are excellent sources of advice and counsel. Funding opportunities are available through environmental education grants such as PFBC's R3

WHEN TO SET-UP

Set-up your TIC aquarium at the end of September. This allows you to see if the aquarium equipment is working properly. Once you determine the chiller works, turn it off for the time being.

Make sure you begin your aquarium pre-cycling, by mid to late October. So it is cycled by the time your trout arrive in mid-January. The health of the trout could be compromised if water conditions are not stable, or equipment is malfunctioning. Visit the "Nitrogen Cycle" section to review optimal water conditions.

AQUARIUM

Trout requires a 55-gallon aquarium or larger for best results. Larger aquariums efficiently buffer water quality variability. When reusing the aquarium, wash it thoroughly with ten percent bleach and water solution. Rinse with water repeatedly to remove all the bleach residue. Aquariums and filters should be consistently running, and water temperatures should be maintained at 54 F for two (2) days prior to egg delivery.

CHILLER UNIT

Trout are a cold-water fish. Aquarium chillers are necessary to keep water temperatures cold enough for fish survival. Coil coolers, or drop-in chillers, are internal chillers that cool the water as it encounters the copper tubing that rests on the back of the aquarium. For maintenance, vacuum the intake screen to remove dust and debris that may collect with use.

CHILLER TROUBLESHOOTING

If the chiller is not maintaining the recommended temperature, or stops working, take these initial steps:

- Float ice packets or ice-filled baggies in the aquarium to maintain temperatures until the chiller is in working order.
- Vacuum intake screens, check for blown fuses or faulty outlets, and backflush if needed.
- Add an additional air stone to oxygen exchange. Remember, warmer water retains less oxygen.
- Contact TIC program partners, other TIC instructors, and/or contact the PFBC's TIC email ra-troutclass@pa.gov for advice and support.
- Contact the chiller unit manufacturer for troubleshooting support.

FILTER SYSTEMS

To efficiently filter 125-150 trout, the following filter system components are recommended:

- Fluval 407 canister filter
- Aquarium Tech filter max pre-filter to place on the filter in-take
- Marineland foam pre-filter for powerhead
- Seachem Tidal 75 matrix bio media
- Aqua Clear 20 Power Head-Old 201
- Five (5) ounces Chemi-Pure

GRAVEL

In a natural cold-water stream, trout eggs are protected by a redd built in the gravel of the streambed. The gravel protects the eggs from predators and allows cool water to flow through the pore spaces to oxygenate the incubating eggs. Too much gravel in the Aquarium can generate a buildup of waste and contribute to water quality issues. Use just enough gravel to cover ¾ of the bottom of the aquarium and provide a few larger stones for cover. Five (5) pounds of shallow Creek Pebbles is sufficient to encourage beneficial bacteria growth for improved nitrogen cycling.

SUPPLIES

Supplies can be found at most Aquarium supply stores, such as *That Fish Place, That Pet Place and Tradewind Chillers*. It is recommended to purchase well in advance to ensure items, especially chillers, are available.

Companies that support TIC and are the main suppliers for the program (*They can assist with specific equipment questions.)*	
That Fish Place, That Pet Place **ORDER TIC Kit #1 w/ chiller or #2 without chiller and has 407 Fluval Filter** Website: http://www.thatpetplace.com/ Contact: Stephanie Welsh Phone: 717-299-5691 ext. 1288 Email: Stephanie.welsh@thatpetplace.com	**Tradewind Chillers** ***(1 year warranty)*** Website: http://www.tradewindchillers.com/ Phone: 760-233-8888 Email: twchillers@sbcglobal.net

CONSUMABLES TO INCLUDE IN ANNUAL BUDGET

EQUIPMENT THAT MAY NEED REPLACED ANNUALLY **Some items may need replacement. Foam blocks and Bio Media can be rinsed and dried for reuse. For sustainability, reuse as condition or expiration allows.**		
Chemi-Pure Filter Media 5 oz	*Check Valve-1 pack	*Fluval Media (Foam Block).
Tubing air stone connection	*Fluval BioMax Media-17.63 oz.	*Special Blend (microbe lift & nite out II)
10” Aqua Mist Add-a-stone	*Fluval filter motor seal ring	*Freshwater Master Test Kit

OTHER RECOMMENDED EQUIPMENT

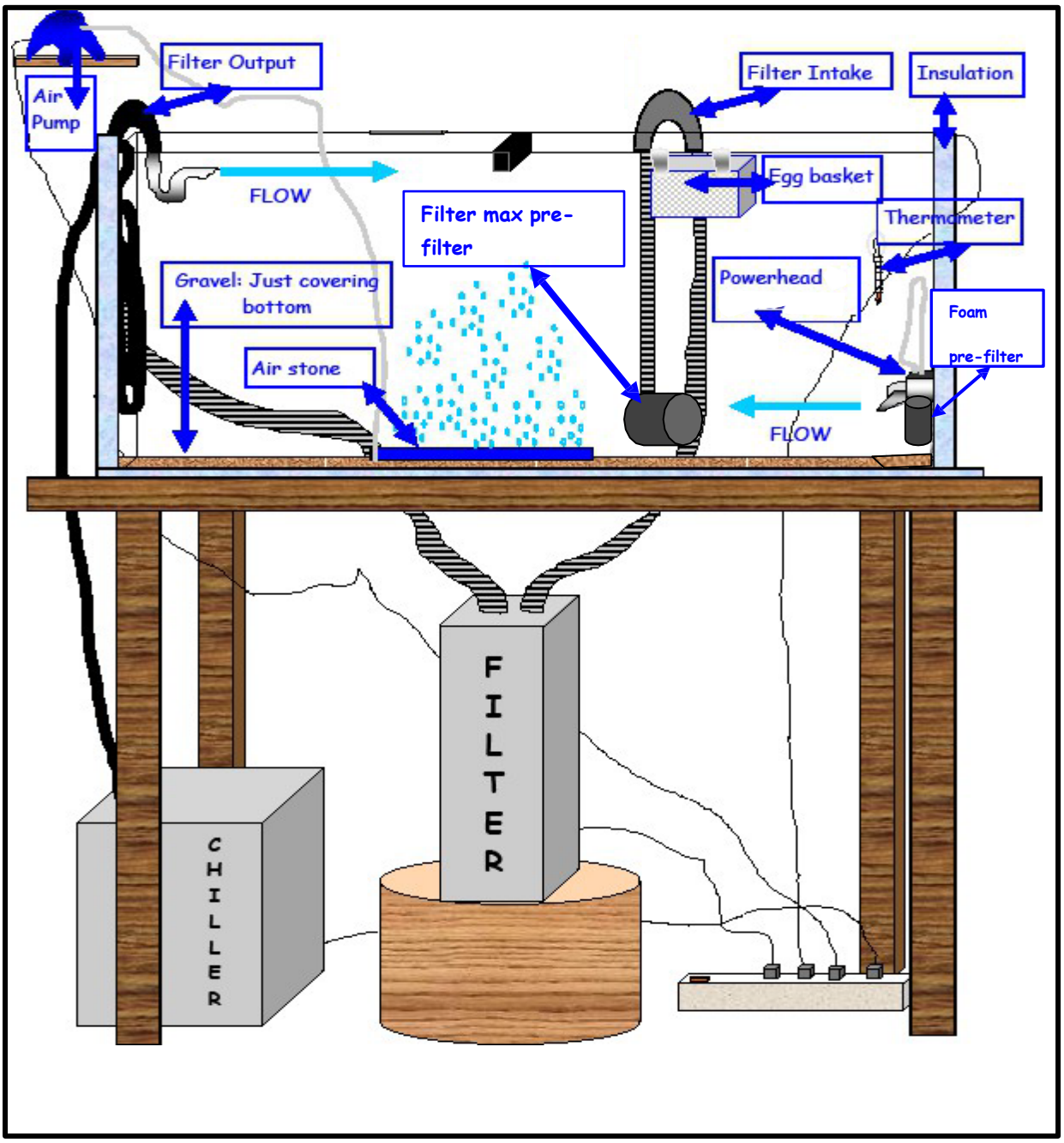
- Battery Air Pump: in case of a power outage, keep a battery back-up air pump always attached to the aquarium. Battery air pumps are also ideal for transporting trout on release day.
- Long-sleeved gloves protect clothing from the cold water in the aquarium.
- Safety goggles are recommended when using chemicals.

EQUIPMENT CHECKLIST:

WATER QUALITY TESTING and CLEANUP	
Freshwater Master Test Kit	Microbe Lift Special Blend and Microbe Lift NITE-OUT II
Lees Squeeze Bulb Ultra Gravel Vac with on/off valve	Turkey baster *(for water quality testing & egg removal)*
5–6-gallon buckets *(for water changes)*	16.9 oz. Seachem Prime Water Conditioner
25ft Python Water Change Kit (*for teachers with access to sink in classroom*)	Poly Bio Marine-Poly Filter 4"x8" Sheet
TEMPERATURE	
Battery Operated Digital Thermometer	Floating Thermometer
Tradewinds Drop-in Chiller DI-25 (1/4 HP)	Foam board pieces for insulation: 2 @ 48 ¼" X21"; 2 @ 12 ¾" X 21"; 1 @ 12 ¾" X48 ¼"
WATER FILTRATION and CIRCULATION	
Fluval 407 Canister Filter	Filter max pre filter (Aquarium Tech) (to place on your filter in-take)
Foam pre filter (Marineland) (for power head)	Aqua Clear 20 Power Head-Old 201
Chemi-Pure 5oz	Seachem Tidal 75 matrix Bio Media
OXYGEN	
Whisper 60 Aquarium Air Pump	Flexible airline tubing-25 feet
Lee's Check Valve-1 pack	10" Aqua Mist Add-a-stone
TROUT HABITAT and FEEDING	
55-gallon, glass Aquarium *(48 ¼" x 12 ¾" x 21")*	Lid for 55-gallon Aquarium *(Plexi glass, glass, plastic, etc.)*
Shallow Creek Pebbles-5 lb.	8-inch net with long handle (16" handle length)
Measuring spoons (1/8th; 1/4th; ½ tsp)	
GENERAL	
Power strip, towels/rags	VELCRO fasteners of tape *(for adhering foam to Aquarium)*

AQUARIUM SET UP

- **RESOURCE:** [Aquarium Set-Up - PENNSYLVANIA TROUT IN THE CLASSROOM]



Setting up the aquarium will familiarize the classroom with the equipment and build confidence in maintaining it properly. Remember, it is best to set up the aquarium four (4) to six (6) weeks in advance of egg delivery.

TOOLS FOR SET UP		
Screwdriver	Pair of scissors or utility knife	Pliers to tighten any connections
Two clean 5-gallon buckets to fill aquarium with water	Wash cloth to wipe down the aquarium inside and out	Towels to dry any spills
Bucket to soak and rinse gravel	5-gallon bucket to place your filter base into *(if your filter leaks the water will stay in the bucket)*	Velcro strips with sticky back to connect foam board to aquarium

STEPS TO SET UP

A. AQUARIUM

Location Considerations

- Easy accessibility
- Away from direct, natural light and heat sources
- Within proximity to an electrical outlet
- Near a water source
- In a location accessible to staff and students but not in a high traffic area

Aquarium Set Up

- Position the aquarium on an insulation board pre-cut to fit the bottom of the aquarium and an additional 1/2 -inch overhang on all sides. Insulation board can be purchased at home improvement stores.
- Size, cut and place the remaining insulation board on all sides of the aquarium. Use Velcro to attach the insulation board to the aquarium. The insulation board aids in maintaining water temperatures.

 ***CARE TIP:*** **The insulation board covering the front of the aquarium may be removed once the trout hatch. To maintain water temperatures, do not remove the insulation boards covering the sides and back. If trout present as stressed, return the front panel of insulation board.**

- Rinse any dirt from the aquarium. Do not use soap or cleaning agents as the residue will harm the trout.
- Rinse gravel two or three times to remove dust and add to the aquarium
- Ensure the aquarium is level and stable
- Fill the aquarium ¾ full of tap water using only clean containers and tubing. Using a hose is not recommended unless there is confidence the hose is firmly attached. Chlorinated tap water can be used at the initial setup because the chlorine will have ample time to dissipate before the egg delivery.
- Monitor the aquarium for leaks

Filter Installation

- Follow the manufacturer's instructions to install the filter.
- Place the canister filter next to or beneath the aquarium in a 5-gallon bucket to prevent spills in the case of a leak.
- Position the filter intake ¾ down from the aquarium side and a few inches from the bottom. This position ensures the toxic water accumulated at the bottom of the aquarium is filtered.
- Place the filter max pre-filter on the filter intake. The pre-filter prevents trout from being entrapped in the filter system.

Powerhead Installation to generate flow at the bottom of the aquarium

- Follow the manufacturer's instructions to install.
- On the opposite end of the aquarium from the filter input, place the powerhead ¾ from the top of and along the side of the aquarium.

Note: To create water circulation throughout the aquarium, place the filter output at the opposite end of the aquarium from the powerhead. The filter output will create surface circulation while the powerhead will circulate water at the bottom of the aquarium.

Air Stone and Air Pump Installation

- Fully submerge and soak the air stone in water for one-two hours prior to turning it on
- Attach one end of the airline tubing to the air stone and the other to the air pump. Place the air pump near or above the aquarium six to 12 inches.
- If the air pump is below water level, use a check valve to prevent backflow of water into the air stone and air pump.
    - To utilize a check valve, make a cut in the air tubing and use the check valve to connect the two (2) pieces. Air should push the flap and compress the spring in the valve. Insert the airline tubing into the air stone.
- Place the air stone away from the filter intake tube and in the center/back of the aquarium.

Chiller Installation

- Follow manufacturer's instructions to install the chiller
- Place the chiller at the opposite end of the aquarium from the filter intake and powerhead
- Add the chiller to the aquarium and run it to confirm it is functioning. Once confirmed, turn the chiller off until one (1) week prior to egg delivery.
- Five (5) days prior to egg delivery, turn on and set the chiller to 65 F
- Two (2) days prior to egg delivery, set the chiller for 54 F

Prime 407 Fluval Canister Filter

- Fill the canister up with water and secure the lid. Pump the silver key on the top marked "start". Continue pumping the water until water comes out of the filter outflow.

 **Troubleshooting Tip:** When turned on, the filter will make a "chugging" sound if improperly filled. Immediately unplug and resume priming until the water is fully circulated through.

 **Troubleshooting Tip:** To eliminate air in the tubing, volunteers and two small cups are needed. One volunteer will detach the pre-filter at the intake and pour water into the tube until the water overflows from the tube. The second volunteer will do the same with the outflow tubing. Once filled with water, both volunteers will submerge the tubes simultaneously into the aquarium while the third volunteer plugs in the filter.

Electric Secured

- Doublecheck that equipment is well ventilated to avoid overheating
- Ensure cords and plugs are protected from exposure to water spills and accidental tripping and unplugging
- Include "DO NOT UNPLUG" signage. Turn off powerstrip.
- Doublecheck connections.
- Confirm the output tube is secure.

Electric Powered On

- Turn on the power strip and check for any leaks in your equipment.
    - The bubbler produces a large volume of small bubbles.
    - The powerhead and filter output produce good water flow.
    - The filter intake takes in water.
    - The chiller is efficiently maintaining 54 F two (2) days prior to egg delivery.

AQUARIUM PRE-CYCLING

 **See instructional video**

Pre-cycle the aquarium four six (6) weeks before egg delivery. Pre-cycling will establish healthy bacterial community and chemistry before introducing the trout eggs.

To begin

- To ensure the water is dechlorinated, add the Seachem Prime water conditioner to the aquarium at the recommended manufacturer dosage for the aquarium capacity.
- Add old trout food or Dr. Tims Ammonium Chloride or other organic matter to your room temperature water. This will add ammonia for the bacteria to feed off of and begin your aquarium cycling.
- To promote bacterial growth, add the Microbe Lift Special Blend to the aquarium at the recommended manufacturer dosage for the aquarium capacity.
  Note: Having water at room temperature will promote beneficial bacteria growth so refrain from plugging in the chiller. Do not add chemicals.
- Test for ammonia and nitrate levels regularly. The levels will be elevated while the nitrogen cycle is establishing. Do not change water or add additional chemicals while the aquarium is cycling.

Note: Typically, ammonia levels will peak in five (5) to ten (10) days. As ammonia is decomposed nitrites will appear and peak at 14 to 21 days. Decomposing nitrites become nitrates. At approximately 28 days, ammonia and nitrates will be nearly zero depending on the level of your initial ammonia spiked levels. Water at room temperature is important during cycling because the length of the cycle will vary depending on water temperature. A small amount of food added maintains the bacterial colonies until the egg delivery arrives. Conduct water testing to ensure ammonia and nitrites stay at zero.

- If ammonia and nitrite levels exceed five (5) ppm, stop adding food and monitor water conditions.

AQUARIUM SALT TREATMENT

Prior to egg delivery, treating the aquarium with non-iodized salt, aquarium salt, as a general tonic is recommended. Benefits include ease of stress, reducing osmotic pressure, inhibition of nitrite uptake, promoting the slime coat, and helping to heal wounds.

Add the salt directly to the aquarium at the recommended rate.

- As a rule, add one tablespoon of salt per five (5) gallons of water.
  *Do not add salt to the aquarium all at once.

Aquarium Capacity	Total Dose	Application Rate
35-gallon aquarium	7 tablespoons	2 tablespoons for 3 days and 1 tablespoon on day 4
55-gallon aquarium	11 tablespoons	3 tablespoons for 3 days and 2 tablespoons on day 4
75-gallon aquarium	15 tablespoons	3 tablespoons for 3 days

- Add salt to the recommended application rate until the total dose is reached for the aquarium.

- Salt does not evaporate out of the water, so do not continue to add salt with water additions. If you top off your aquarium there is no need to add salt to that water, only add salt when water is removed from your aquarium during water changes, spills, or leaks. Adding salt to the water used for water changes follows the same rate as listed above.

  CARE TIP: Salt can be used in conjunction with water conditioner. For example, for a 10- gallon water change, two (2) tablespoons of salt can be added to the water along with your water conditioner (if you use one).

  Salt is a disease preventative, a general tonic, and stress reducer. If all trout are healthy, salt application reduced to one (1) tablespoon per ten (10) gallons to conserve supplies.

EGG NURSERIES

Make A Hatching Basket

- Making a hatching basket is a meaningful project for students preparing for egg delivery. The benefits of making a hatching basket are:
  - It is larger than commercially purchased baskets to allow more water flow and room for the eggs.
  - Decreases crowding issues such as fungus spread, and egg die offs

Create a Redd (Trout Nest) in Aquarium

- Create a "redd" at the bottom of the aquarium by making a small dome in the gravel. Create an oval depression in the center of the dome. Use a turkey baster to place the eggs individually into the oval depression.
- Spread the eggs out. If space is needed, create additional depression or use a homemade hatching basket.

Commercial Hatching Basket

- Purchase at least two (2) of them to avoid overcrowding.
- Stretch the net over the outside of the plastic frame. Hang the basket on the aquarium wall by bending the metal clips. A Vibert box will be placed on the floor of the aquarium rather than on the sidewall.