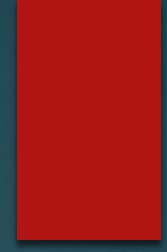


TIC AND TANK TIPS

FOR TIC TEACHERS AND LIAISONS,

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TANK SETUP

- ▶ As in buying real estate, it's all about “location, location, location.”
 - ▶ STURDY ELEVATED PLATFORM:
 - ▶ Away from heat source, like registers.
 - ▶ Close to a reliable, steady electric power outlet.
 - ▶ Use a power strip; you have multiple devices that need power – chiller, filter, pump, aerator
 - ▶ **ALERT CUSTODIAL STAFF: “DO NOT DISCONNECT OR TURN OFF POWER.”**
 - ▶ High enough for students to observe (but not too high so they cannot see in), and not too low (i.e. on the floor) where it is tempting for them to put stuff into the tank.
 - ▶ Away from direct fluorescent lighting.
 - ▶ Close to a sink – if possible (optional)
 - ▶ Easy to access for cleaning.

TANK INSULATION

- ▶ KEEP TANK DARK AT LEAST FOR THE FIRST COUPLE OF WEEKS AFTER EGGS ARE DELIVERED.
 - ▶ Also helps reduce strain on the chiller
- ▶ MATERIALS
 - ▶ 1/4" Foam insulation sheets – hardware store
 - ▶ One 4'x8' sheet should be plenty; easy to cut to fit; easy to tape edges with duct tape; easy to cut a window into so students can observe egg development; easy to cut slots and holes in top for tubes and cords
 - ▶ Butcher paper taped to the sides of the tank and then covered with bubble wrap (you'll need a separate board, however, to cover the top)
 - ▶ Cover all sides and the top

EQUIPMENT LOCATION

- ▶ NEAR THE TANK **AND THE POWER SOURCE**

- ▶ This stuff is connected to the water in the tank via hoses and cords and is powered by electricity, but keep water away from electric outlet and power strip

- ▶ WEIGHT BEARING PLATFORM

- ▶ The chiller is very heavy; it is a mini refrigerator

- ▶ AWAY FROM HIGH TRAFFIC AREAS

- ▶ Avoid tripping over cords and hoses, or accidentally disconnecting them
- ▶ A tank “cabinet” is ideal – tank above, with equipment in the cabinet below – but not necessary

EQUIPMENT INSTALLATION

- ▶ CAREFULLY READ AND FOLLOW THE INSTRUCTIONS THAT COME WITH YOUR GEAR, AND SAVE THE INSTRUCTIONS FOR FUTURE USE
- ▶ WATCH AN INSTRUCTIONAL VIDEO
 - ▶ Note: Various types, brands and models of equipment will work equally well, but you may need to make modifications from what is shown in the videos
- ▶ THE GREAT “GRAVEL DEBATE”:
 - ▶ Do you need gravel?
 - ▶ Yes – helps tiny fish find a safe place to rest
 - ▶ No – collects fish and food waste; harder to clean during and after program
 - ▶ Middle – some is ok, primarily to hold the aerator in place, about 1/3 to 1/2 of the tank bottom, and about 1/2-1” depth.

HELPFUL VIDEOS

- ▶ Tank with coil chiller:
<https://www.youtube.com/watch?v=zhL1Az0N8yg>
- ▶ Tank with flow through chiller:
<https://www.youtube.com/watch?v=1WR8EexEWcY>
- ▶ Tank setup – the tank:
https://www.youtube.com/watch?v=phAfIBN9S_4
- ▶ Tank setup – the filter – part 1:
<https://www.youtube.com/watch?v=Cfnjq9shsh0>
- ▶ Tank setup – the filter – part 2:
https://www.youtube.com/watch?v=j9_fEM-3Sil
- ▶ Tank setup – the chiller:
<https://www.youtube.com/watch?v=xwCjnC2ObNc>

FRESH START

- ▶ MAKE SURE YOUR TANK AND HOSES ARE CLEAN
 - ▶ For previously used equipment only:
 - ▶ See TIC manual for “End of Year Cleanup,” at pg. 18, and follow these procedures now if you did not do so at the end of last year.
 - ▶ Unnecessary for new, not previously used equipment.
 - ▶ Note: if you use chlorine to clean your gear, make sure that there is no residual chlorine in the tank, chiller, filter and other gear before you “season” the tank. Bacteria, eggs and fish hate chlorine.
- ▶ FILL THE TANK WITH CLEAN, **DECHLORINATED** WATER.
 - ▶ Tap water usually contains chlorine; use a chemical to take out the chlorine or let the water stand exposed to the air for at least 72 hours, stirring occasionally

TESTING

- ▶ MAKE SURE EVERYTHING IS PROPERLY CONNECTED AND DOES NOT LEAK
- ▶ COMMON MISTAKES:
 - ▶ Hoses not properly connected, or in the wrong direction – note “input” and “output” ports, especially when connecting the pump to the chiller; water “cycles” through the equipment in a loop.
 - ▶ Incompatible sizing – mismatched gallons per hour) (GPH) specifications
 - ▶ Incorrect filter layer installation or not replacing the filter material with new material
 - ▶ Failure to cover intake ports that draw water out of the tank with mesh to prevent small fish from being sucked into the equipment.

SEASONING OR “CYCLING” THE TANK

- ▶ HELPFUL BACTERIA MUST BE ADDED TO THE TANK WATER BEFORE THE EGGS ARE DELIVERED.
- ▶ PROVIDES A FOOD SOURCE FOR THE DEVELOPING FISH BEFORE THEY ARE BIG ENOUGH TO EAT FISH FOOD
- ▶ BUY THE BACTERIAL AGENT AT A PET STORE
- ▶ CYCLING SHOULD BE DONE WITH THE WATER AT ROOM TEMPERATURE AND BEFORE CHILLED
- ▶ CYCLE FOR AT LEAST A WEEK BEFORE THE CHILLER IS TURNED ON
- ▶ SEE SEPARATE INSTRUCTIONS

CHILLER ACTIVATION

- ▶ AFTER SEASONING, WATER TEMPERATURE NEEDS TO BE REDUCED FROM ROOM TEMPERATURE TO BETWEEN 50-55 DEGREES FARENHEIT **BEFORE THE EGGS ARE DELIVERED**, AND MAINTAINED AT THIS TEMPERATURE FOR THE **DURATION OF THE PROGRAM**.
 - ▶ Student lesson: warm water kills trout – hopefully, not by example in the classroom
- ▶ NOTE: Eggs will be delivered in early January, right after the Holiday recess, so start chilling immediately upon return from the recess or before the recess. The chilling process may take 24-72 hours depending on the size of the tank and the chilling capacity of your chiller.

EGG BASKETS

- ▶ YOU NEED A BASKET TO HOLD THE EGGS
 - ▶ The eggs are heavier than water, and they will settle on the bottom of the basket. Spawning Salmon video:
<https://www.youtube.com/watch?v=YZPHrI4ICm0>
 - ▶ Commercially available at a pet store
 - ▶ DIY baskets are inexpensive, easy to make, fun for the students, sturdy and, in many ways, better than the commercial baskets.
 - ▶ See separate instructions on how to make one.
 - ▶ Suspend basket in the tank with the top about ½ - 1" above the water level
 - ▶ Place aerator (bubbler) below the basket to provide a steady source of oxygen to the eggs and to mimic a stream flow in the wild

READY, SET “HERE COME THE EGGS”

▶ EGG DELIVERY PROCEDURES:

- ▶ Liaisons, teachers or other volunteers pick up the eggs at a pre-arranged DWR location and at a pre-arranged date and time. DWR will announce these locations in December.
- ▶ About 150-300 eggs will be delivered per tank. Success by May of the school year is usually a release of 40-80 fish @ 2-3” each.
- ▶ Fish food also will be delivered, and should be enough to last the entire program
- ▶ Eggs must be kept cool during transportation to the classrooms – **USE A COOLER WITH SOME WATER AND AN ICE PACK FOR TRANSPORT.**
- ▶ Exciting time for students. Make it an “event.” Liaisons can make a presentation or answer questions. Let the students help put the eggs into the basket.

REMOVING DEAD OR DISEASED EGGS

- ▶ HEALTHY EGGS ARE SALMON COLOR (PINK-ORANGE) AND HAVE TWO DARK SPOTS (FISH EYES).
- ▶ UNHEALTHY EGGS ARE WHITE, GRAY OR TRANSLUCENT
- ▶ **REMOVE THE UNHEALTHY EGGS FROM THE BASKET WITH THE TURKEY BASTER AND DISCARD.** They can infect and kill the healthy eggs.

RAISING FISH IN YOUR TANK

- ▶ Maintain water temperature and quality.
 - ▶ Monitor and test regularly (about once per week)
 - ▶ Use an internal tank thermometer (don't rely on the chiller temp reading) and use your PH testing strips
 - ▶ Perform regular cleaning (about once per week)
 - ▶ Use the syphon to remove waste material and remove about 10% of the water. TIP: extend the handle of the syphon with a yardstick taped to the handle so you can keep your hand out of the cold water. Wear rubber gloves.
 - ▶ Use your two 5-gallon buckets – one for the waste water and the other for clean water treated to remove the chlorine.
 - ▶ See separate PH guide for tips.
 - ▶ Student lesson: pollution kills fish.

FISH FEEDING

- ▶ FISH WILL SURVIVE INITIALLY ON THEIR EGG SACKS AND ON THE BACTERIA IN THE WATER. NO NEED TO FEED
- ▶ WHEN FISH START TO “SWIM UP” AND START LOOKING FOR FOOD ON THE SURFACE OF THE WATER, THEN START TO FEED THEM FISH FOOD
 - ▶ **START SLOW WITH SMALL AMOUNTS OF FOOD:** A “pinch” goes a long way; overfeeding leads to extra waste and excess nitrates in the tank. Monitor carefully to make sure all of the food is being consumed. As fish grow, **GRADUALLY** add more food, making sure it is all consumed.
- ▶ ONCE ALL FISH ARE SWIMMING REMOVE THE BASKET AND CLEAN IT.
- ▶ PREDATION: If fish are underfed, the bigger fish will eat the smaller fish. Natural behavior. Monitor this and slightly increase the food.
- ▶ Student Lesson: Fish are carnivores. Natural selection.

LESSON PLANS AND HELP

- ▶ USE THE TU TIC WEBSITE AS A RESOURCE:
 - ▶ <https://www.troutintheclassroom.org/>
- ▶ JOIN THE TIC LIST SERVE AND EMAIL GROUP
- ▶ ASK QUESTIONS

RELEASING FISH

- ▶ EXCITING FOR STUDENTS. MAKE IT AN “EVENT.” PERFECT FOR A FIELD TRIP.
 - ▶ Can be a bit sad for some students. They can get really attached to the fish, often naming them. Be prepared and use it as a lesson in growth and biology.
 - ▶ Let the students participate in netting the fish from the tank. Lots of fun. Harder than it sounds. Can be a bit sloppy. Be prepared.
 - ▶ Fish need to be kept cool during transportation. AGAIN, USE A COOLER WITH WATER FROM THE TANK AND AN ICE PACK.
 - ▶ RELEASE ONLY AT AN APPROVED DWR RELEASE SITE. REPORT DATE AND LOCATION.
 - ▶ Let the students participate.

EQUIPMENT CLEANUP AND STORAGE

- ▶ CLEAN AND STORE YOUR EQUIPMENT BEFORE THE SUMMER RECESS TO HAVE IT READY FOR NEXT YEAR.
 - ▶ Doing this NOW will save time and aggravation next year.
 - ▶ Preserves the life of the equipment.
- ▶ EQUIPMENT THAT IS PROPERLY CLEANED AND MAINTAINED SHOULD LAST MANY YEARS.