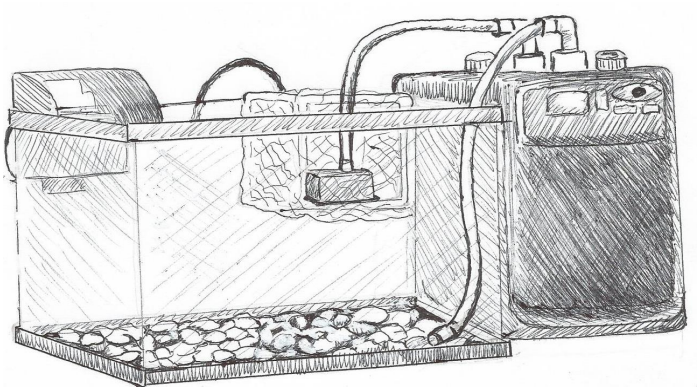
California Department of Fish and Wildlife
Classroom Aquarium Education Program
Lake Tahoe Workshop
(Draft) Fish Rearing Notes

1. Gather the needed equipment. The equipment may be provided by your sponsoring organization if they have enough funds. The types of equipment that local programs use can vary but we will demonstrate one common assembly.



Contents:
Aquarium: *In Tahoe 20 gallon tanks have been used.*
Filter
Water Pump
Hanging basket with netting which holds the pump and screens fish from the intake.
Chiller
Shade Cover
Bottled water
Pebbles and rocks (well rinsed in boiled water, and then sun dried) for substrate.
A few larger rocks so that the fry can seek cover. They also leave less water to cool.
Some rocks, such as granite, naturally decompose in freshwater and in time may affect water chemistry. Ask your sponsor for advice.

Location:

2. Try not to set the tank directly under a light, a window or near a heater so that you don't have to fight the elements.

3. Choose the location before you add the water as the tank gets very, very heavy. Some teachers put it on a rolling cart if they can't claim a permanent location and if they have smooth rolling surfaces. *The cart should be sturdy enough to hold a 200 lb tank.*
Remember most tanks are made of glass which can injure people if broken.

4. Inform and consult the janitors and others that use the classroom.

Water:

5. It helps to set up your tank in advance to allow time for chilling and troubleshooting.

6. We recommend bottled spring water. Avoid distilled water which seems to be less beneficial for fish rearing.

7. Do not use river water which may come with unseen organisms.

8. Let the water sit over night or longer to dissipate any unwanted chemicals. You should not add any chemicals to the water for any reason.

9. The trout should not share the tank with any other types of live fish, invertebrates or plants. The tank should be clean and only used for the CAEP trout program.

Set-up: The directions for set up will vary with different kinds of equipment.

10. For temperature control, some chillers will use a water pump and water tubes that help circulate the water through the chiller and back to the tank. The water pump may be immersed in a hanging basket that is covered with mesh to keep young fish out of the pump intake. *Keep the return line well above the bottom of the tank so that it doesn't wash the eggs out of place.*

11. In some systems the filter hangs on the side of the tank. *Worn filter pads with excess build-up can be changed. The tank water can also be changed if it gets too cloudy.* Some systems may have an air pump which increases oxygen for the fish and filters water in the process.

12. Add pebbles, rocks and the water to the tank in the order you prefer. Connect all tubes and keep all tubes clear to maximize flow. It may be good to pretest the tubes in water early during set-up. Plug the pump and chiller into proper electrical outlets and then set the temperature gauge on the chiller. If you like, place a thermometer in the tank where desired. If students are setting up the tank, you may want to divide the tasks into enough steps for all.

Temperature:

13. *The chiller can be set to reach the precise temperature within a few hours.*

14. Try to keep the tank between 50 and 60 degrees (55F average + or – 5 degrees) for best results. A few degrees warmer will speed egg/fry development and a few degrees colder will slow development. There are some lessons on "thermal units" that can help you weave mathematics into your fish rearing activity. They can also help you time the rate of fish development to align with your preferred release date.

15. The tank should be able to survive over a weekend without attention as long as there is no loss of power.

Darkness:

16. Eggs and alevins are somewhat light sensitive. Lower the lights and window shades during egg delivery.

17. Custom-fit insulation can help control the temperature and light. Keep the insulation tightly in place when the class is not actively viewing the eggs. Align covers to avoid gaps that let the light in.

Delivery:

18. Most sponsors are willing to provide short classroom presentations on "egg-delivery-day". You may want to drop eggs along the front edge for better viewing.

Tank Health Care:

19. Remove all the white, dead eggs and dead fry immediately before a fuzzy-looking white fungus has a chance to grow. Fungus on a dead egg will spread to adjacent live eggs and consume them as well. A turkey baster will suck up dead eggs and can shoot them into your small dip net for removal and disposal. Other than dead egg removal, it is not necessary to clean the tank during its short period of use.

20. Feed the fry lightly each day. You can skip weekends. Don't overfeed. The water should never get cloudy. Start with as much feed as will cling to a wet finger tip and then dip it into the water. To allow a shared the experience, you may have to schedule a different student to feed *at a few different times* in *spaced intervals throughout the school day.*

21. Trout and steelhead eggs and alevins are smaller than salmon eggs/alevins. Sometimes the smaller alevins hide under the pebbles and may seem to have disappeared. If so, they will eventually reappear as free swimming fry at a later date.

Release:

23. The trained and permitted teacher must be present at the release of the fry. The release can be part of a class fieldtrip. It can also be done by the teacher alone or with just a few helpers.

24. You can add other creative class and fieldtrip activities to connect trout studies with math, reading, art, science, history, recreation and cultural studies etc. See the various teachers' guidebooks.

25. You are not supposed to release any deformed fish. Call your sponsor for advice.

26. On release day, you can net the fry into a bucket which holds some of the tank water. If it is too hard to catch the fish, it may help to lower the water level and remove the larger rocks and other hiding places.

27. To add oxygen during transport, use a cup to scoop up and pour water back into the bucket. The falling water will take on more oxygen.

28. Release fish only where authorized by your permit. It's the law. Violations could also jeopardize the program for future teachers.

29. At the release site look for an edge or backwater that would be safe for your group to approach. A gentle flowing backwater might also be better habitat for your newly swimming fry. During times of dangerous swift water, wait until storms subside or call DFW for alternatives.

30. If you have a large group of children at the release site, you can put each fish into a clear cup so that they all get to share the action of releasing the fry. Most fourth graders, however, can cup their hands tight enough to hold water long enough to release a fish.

31. It is best if the temperature difference between the bucket and the new waterway is no more than 5 degrees. Bring a thermometer if you want to teach students to check the temperature. You can temporarily, add an ice bag to the bucket if needed.

32. Try not to have your equipment come in contact with the waterway. Boots and equipment should be cleaned before any trips to other waters. This helps prevent the spread of invasive species or fish diseases between the waterways.

33. If you have each field participant sign or initial the margin of the permit, they will be aware of the permit and be more aware that releasing fish into streams is done only under the guidance of a permit. It is not an activity that they can do on their own. (Releasing

pets into the wild or moving fish between waterways is unlawful and can be a threat to the entire ecosystem.)

34. Fill out the bottom of the permit and return the whole original permit and its valuable data to the address on the back. It is good to have you permit pre-stamped for immediate mailing.

35. The assemblage of equipment is often purchased and fabricated by the sponsoring groups. In the event that you need to discontinue CAEP, the equipment should be returned to the sponsoring organization.

Clean-up (for next time):

36. Wipe and clean the tank and supplies by soaking in a dilute solution of one eighth cup of household vinegar in each ten gallon tank of water. Rinse the equipment well with a garden hose after soaking. The tank should be sterile and chemical free while in use and you shouldn't use any other chemicals for cleaning. Leftover chemical residue from soaps or chlorine can be lethal to the fish in the following season. Take apart the air and filter parts to rinse and air dry. New or used rocks can be boiled for sterilization and then dried in the sun. You can dip used gravel in the dilute vinegar solution with a colander and then rinse and spread them on a tray in the sun to completely air dry before they are packed in a storage container. If you wrap the cleaned, rinsed and dried tank and supplies in a garbage bag it will keep it dust free until next time. Do not use the tank for other purposes or organisms in the off season.

Enjoy!