Chapter 4 Pre-cycling the Tank and Preparing for the Eggs

Fertilized brook trout eggs and food will be delivered to all schools during the first full week of January. The actual date for your delivery will be confirmed by the regional TIC coordinator.

Pre-cycling introduction
Last year for the first time we urged teachers to "pre-cycle" their tanks. Pre-cycling is a process designed to put your tank through the nitrogen cycle (see page 30) *before* the arrival of your eggs. When this works, it establishes a colony of good bacteria in your filter that can (a) convert ammonia (from fish waste and decomposing excess food) to nitrite and (b) convert nitrite to the less harmful nitrate.

Pre-cycling worked extremely well for more than half of the teachers who tried it; but, for reasons we can't fully explain, some teachers who pre-cycled found that they still had high nitrogen levels even very close to the date when eggs were going to be delivered. As a result of these mixed outcomes, not all regional TIC coordinators are committed to having all of their schools pre-cycle. **So, the bottom line:** when it comes to pre-cycling, especially if you're a first-time TIC teacher, **check with your regional coordinator.**

INSTRUCTIONS FOR TEACHERS WHO PLAN TO PRE-CYCLE
An important note about pre-cycling, and biology in general. We have done our best to provide a standard protocol for pre-cycling below, however, each tank set up is ultimately unique. There are many variables we cannot control such as your classroom temperature, water quality, sources of bacteria, etc. For the protocol below to be successful, water quality monitorings are critical and you may (likely will) need to adjust the protocol based on those readings. In other words, this is an active, living protocol, not a "dump and walk away" protocol ☺.

A. START THE PRE-CYCLE PROCESS ON THE FIRST MONDAY OF DECEMBER.
- Your tank water should be at room temperature. "Room temperature" is not 65 or 67 degrees, even though that's what many of our rooms are these days. Pre-cycling would proceed much better if the tank water was 75 degrees. Consider using an aquarium heater to maintain your tank at that temperature. I found one on Amazon for $16.99. Search for the "Orlushy Submersible Heater."
- Run your filter 24-7 during this time.
- DO NOT run the chiller.

Day 1:
- Test the water chemistry of your tank—pH, ammonia, nitrite, nitrate—and record the values you get. It is **unlikely** that you will have any readings for ammonia, nitrite, and nitrate at this point, but it is nonetheless important to check. (High readings could indicate a problem with your water source that needs to be addressed before moving forward.)
- For proper pre-cycling, the pH of the tank needs to stay above 7.0.
- Following water testing, add the appropriate amount of Ammonium Chloride Solution to the tank based on your tank volume. Using Dr. Tim's Ammonium Chloride Solution, you would add 4 drops per gallon of water (read the bottle for instructions). For a 55-gallon tank, adding *two teaspoons* of Dr. Tim's Ammonium

Chloride Solution should introduce approximately the right amount of ammonium chloride. But this is critically important to test and adjust if needed. Add the Dr. Tim's and measure ammonia levels. You need to get above 1 ppm but below 5 ppm to start the cycling process. If you are below, add more Dr. Tim's and adjust accordingly. If you go over, remove water from the tank and add fresh water.

- Take a pH and ammonia measurement **after** adding the ammonium chloride solution. Make sure you get a pH reading between 7.0 and 8.5 and an ammonia reading above 1 ppm but DO NOT allow ammonia to exceed 5 ppm; this will kill the bacteria.
- Add the appropriate amount of Nite-Out II bacteria solution per the instructions on the bottle.

Day 2:

- Measure and record pH, ammonia, and nitrite readings.
- If pH drops below 7.0, perform a 25% water change with fresh water to bring pH back above 7.0.

Day 3:

- Measure and record pH, ammonia, and nitrite readings.
- **If** ammonia and nitrite readings are *below* 1 ppm, add more Dr. Tim's Ammonium Chloride Solution (same as Day 1). If readings are *above* 1 ppm, do nothing.
- If pH drops below 7.0, perform a 25% water change with fresh water to bring pH back above 7.0.

Day 4 & 5:

- Measure and record pH, ammonia, and nitrite readings.

Day 6:

- Measure and record pH, ammonia, and nitrite readings.
- **If** ammonia and nitrite readings are *below* 1 ppm, add more Dr. Tim's Ammonium Chloride Solution (same as Day 1). If readings are *above* 1 ppm, do nothing.
- If pH drops below 7.0, perform a 25% water change with fresh water to bring pH back above 7.0.

Days 7 & 8:

- Measure and record pH, ammonia, and nitrite readings.
  a. On the first measurement day that **BOTH** ammonia and nitrite are *below* 0.5 ppm, after you have observed spikes in both ammonia and nitrite levels, your tank is close to being cycled!
  b. If at this point you have high ammonia or nitrite levels:
     i. Add a 2nd dose of Nite-Out II per instructions on the bottle.
     ii. Double check pH and water temperature. Make sure pH is above 7.0 and that water temperatures are above 65 degrees Fahrenheit.
     iii. If all of the above check out, your tank may just be cycling more slowly. Continue to monitor the pH, ammonia, and nitrite levels on days 9 and 10.
  c. Proceed to "Until Fish Arrive" (below).

Until Eggs Arrive:

You need to feed the bacteria you've now established in your tank.

- Add a small pinch of fish food *every other day* and
- Once a week measure and record pH, ammonia, nitrite, and nitrate readings.

When you're adding fish food and the ammonia and nitrite stay below ~1 ppm, you know you have a cycled fish tank ready for fish!

Additional Notes:
- IMPORTANT - **Never let ammonia OR nitrite get above 5 ppm.**[1]
- If either ammonia or nitrite concentration gets above 5 ppm, immediately do water changes to lower the concentration. Add fresh Nite-Out II after the water change to re-kick-start the cycle.
- Do not let the pH drop below 7. If it does, do a partial water change (25% or more, as needed) to bring the pH back above 7.0.

B. FIVE DAYS BEFORE EGG DELIVERY

1. Turn on the chiller, setting the temperature to the temperature of the hatchery water. (You'll receive an e-mail informing you what that temperature is.)
2. Test the water for pH, ammonia, nitrite, nitrate, and carbonate hardness (KH). The pH of the tank should be stable within a range of 7.0 - 7.6 for optimum biology.
3. Make sure the KH (carbonate hardness) of your tank's water is 150 or more. Refer to Chapter 7 for guidance regarding KH and to Appendix E for instructions on how to use baking soda to correct low KH.

C. ONE DAY BEFORE EGG DELIVERY

1. Using the digital thermometer, check to see that the water temperature is at the desired level.
2. Place the air stone near but not underneath the breeder basket.
3. Check the breeder basket. Make sure that water flowing from the filter and bubbles flowing from the aerator will not disturb the resting eggs. If necessary, redirect one or both of these flows or reposition the basket.

D. EGG DELIVERY PROTOCOL

1. Be sure the filter is operating at its highest flow rate.
2. Eggs will arrive in a container of hatchery water at a temperature approximately the same as your tank. (The eggs will be transported from the state hatchery in coolers to keep the temperature as stable as possible.)
3. When the eggs arrive, place the closed container in the tank and allow it to float on the surface of the water for 20 or 30 minutes. This will gradually sync the temperature of the water in the container with your tank's temperature.
4. Gently pour the eggs into the breeder basket.
5. Add Nite-Out II to the tank after the eggs are in the basket. See appendix E for directions for adding bacterial solutions to the tank. (The filter represents 80% of the system's biological oxidation processes.)

---

[1] Ammonia and nitrite levels of 5 ppm would be **highly toxic** if there were fish in the tank.