

Nitrogen Cycle *(aquarium cycling)*

Every aquarium goes through a process of establishing beneficial bacterial colonies known as the “Nitrogen Cycle” or aquarium cycling. The nitrogen cycle converts trout waste and uneaten food to safe by-products. Water quality fluctuations are a direct result of this cycle.

Definition:

The biological process that converts ammonia and nitrite (*toxic to fish*) into relatively harmless nitrogen compounds (*nitrites*).

Nitrogen cycle (aquarium cycle) stages, what to expect:

NOTE: To assist with aquarium cycling, add StressZyme once week throughout the school year to ensure good bacteria colonies flourish in your mini “coldwater ecosystem”. Your filter should be OFF before you add StressZyme. Leave it OFF for at least two hours. Then turn it back ON.

When does it begin:

The aquarium cycle will not begin until your trout hatch from their eggs and begin to excrete waste.

Stage 1 (ammonia spike)	
When	Late November – early/mid December; When trout begin to excrete waste (<i>sac fry and/or swim-up fry stage</i>)
Trout mortality/stress	Yes. You will experience trout mortality/stress during this stage not only because of the ammonia spikes, but also because trout that do not learn to feed will also be dying off.
What happens	Ammonia levels increase and will stay elevated for 2 weeks until stage 2 begins.
Explanation	The cycle begins when your fish begin to excrete waste in your aquarium system. All waste and uneaten/decaying food breaks down to form ionized/unionized ammonia. The freshwater master test kits ammonia test gives a combined reading of Ammonium (NH ₄) and Ammonia (NH ₃).
Stage 2 (Ammonia decreases and nitrites spike)	
When	Late December – early/mid January
Trout mortality/stress	Yes. This is the stage when there will be another trout “die off” because of the nitrite spikes.
What happens	Ammonia levels should begin to decrease and nitrite levels will begin to increase. Nitrites will remain high for at least 2 weeks.
Explanation	Bacteria called “nitrosomonas” grow to sufficient quantities in the filter and then convert the ammonia to toxic nitrite. IF your monitoring results show high nitrite levels the “nitrobacters” are still trying to get established in the aquarium.
Stage 3 (nitrite decreases and nitrate spikes)	
When	January – early February (usually about 5-8 weeks after your trout hatched)
Trout mortality/stress	Very few if any. There is usually no die off at this time because the toxic nitrite is begin converted to less toxic nitrates
What happens	Nitrite levels begin to decrease and nitrate levels (not toxic) begin to increase.
Explanation	Nitrobacters convert the toxic nitrites to less toxic nitrates. Once your aquarium reaches this point it is said to have “cycled”.

[\(back to table of contents\)](#)

Nitrogen Cycle

How it works in your aquarium

Make sure you add StressZyme at least once a week according to directions throughout the school year.

What NOT to do during the nitrogen cycle:

- Do not change your aquarium water too often. Changing your aquarium water too often will delay your aquarium cycling process and STRESS your trout. Only change water if your parameters (i.e. ammonia and nitrites) are off the charts. Your aquarium needs to go through the initial ammonia and nitrite spike in order to cycle through completely.
- Don't change filter media in the beginning – beneficial bacteria are growing there. Remember they are needed to convert ammonia to nitrites and then nitrites to nitrates.
- Don't overfeed– when in doubt underfeed your trout.
- Remember that anything going into the aquarium will produce waste one way or another.

If your nitrite and nitrate levels are good, continue to observe the trout and record any abnormalities (e.g. consistent swimming on their sides, swimming in circles, not eating for several days).

Weekly or once every other day water testing, not overfeeding your trout and conducting water changes based on your water quality test results, s, will keep your aquarium healthy!

[*\(back to table of contents\)*](#)

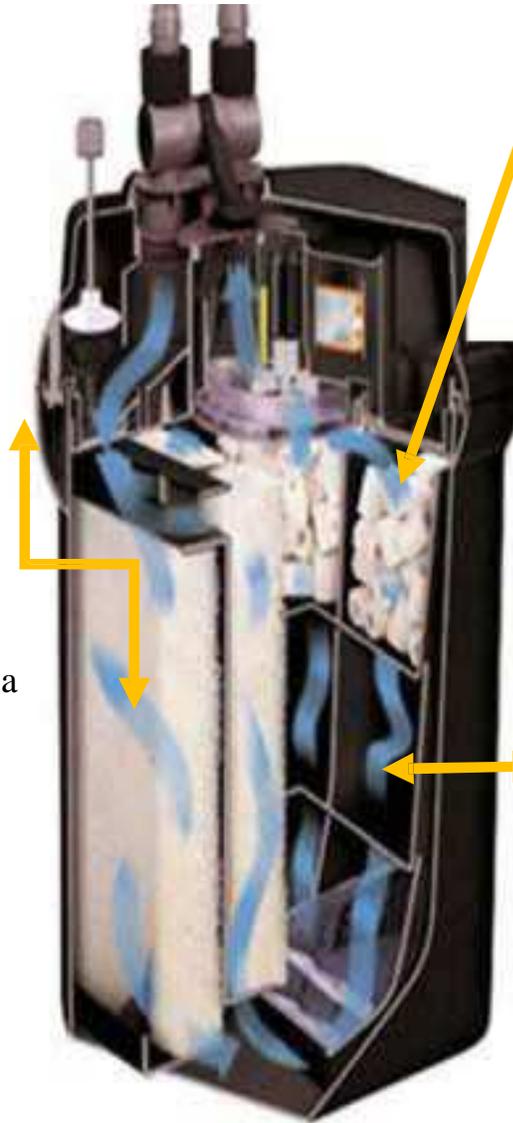
Nitrogen Cycle

Filter components that aid in the nitrogen cycle

405 Fluval Canister Filter

Foam Insert:

Inserts that capture large particles for effective mechanical filtration. It helps reduce ammonia and nitrites by providing a large surface area for bacteria growth.



BioMax:

Ceramic rings that have a complex pore system where beneficial bacteria can thrive. It helps reduce ammonia and nitrite. Also, the rings allow for ideal water movement, which ensures optimal contact time for biological filtration.

Fluval Carbon:

A premium, low-ash carbon that improves water clarity and color, while also removing odors. It provides a great amount of surface area for absorption of impurities.

[\(back to table of contents\)](#)

Nitrogen Cycle

Diagram

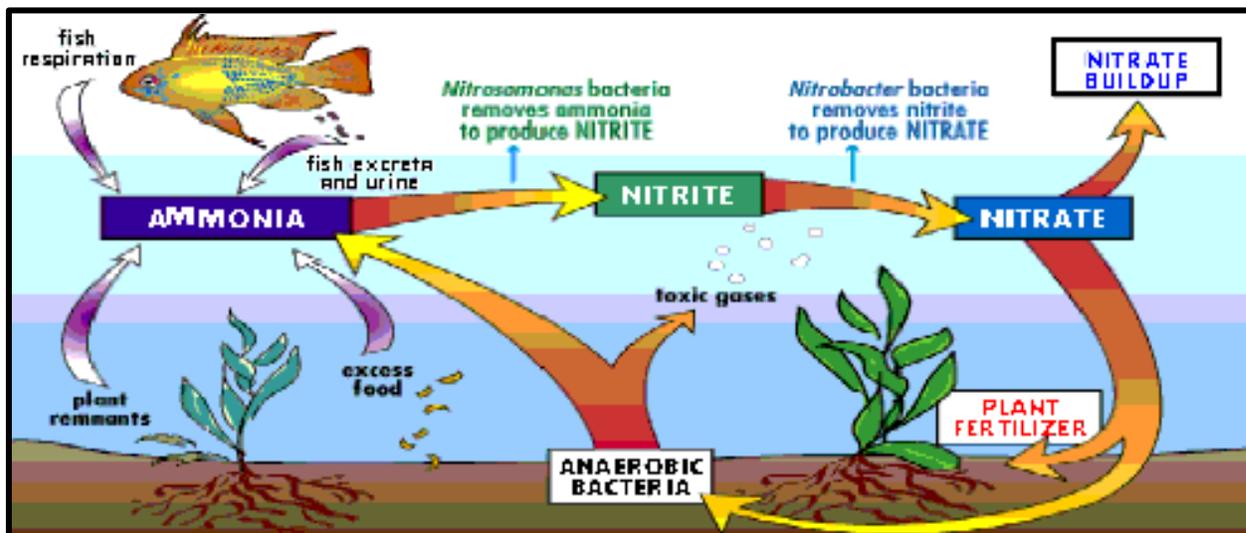


Diagram found at: *Puffer Net*. N.p., n.d. Web. 23 June 2010
<http://puffernet.tripod.com/nitrogencycle.html>.

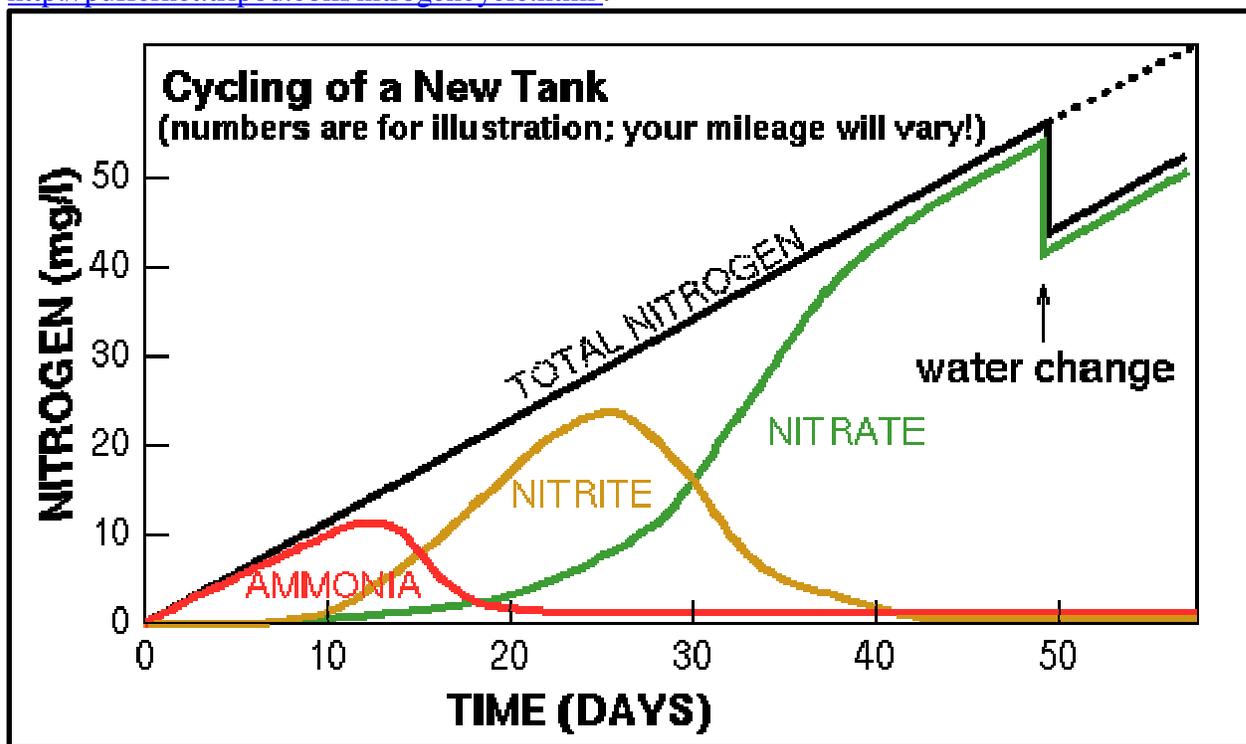


Diagram found at: Narten, Thomas. *Biginning Fishkeeping*. N.p., n.d. Web. 23 June 2010.
<http://faq.thekrib.com/begin-cycling.html#cycle>
 ([back to table of contents](#))