



# Aquarium Cycle

The “cycle” or “new tank syndrome,” refers to the biological process that occurs in both freshwater and saltwater systems when bacteria break down toxic by-products of fish waste (**ammonia** and **nitrite**) into a less dangerous form (**nitrate**).

When an aquarium is first set up, it is relatively sterile – there are almost no bacteria present. Putting fish into the tank introduces the first bacteria, then the nitrogen cycle (or nitrification) begins. We recommend adding a few very hardy “starter fish” (such as tetras, barbs, or danios). Once the cycle is complete, we’ll help you safely introduce other, more delicate fish into your tank.

Here’s how the cycle works:

## WEEKS 1 to 3

During the first one to three weeks, fish waste, fish respiration, and other decaying organic matter (including decaying food from overfeeding) are broken down into ammonia by the bacteria. Ammonia is extremely toxic to fish. Even small quantities of ammonia can cause fish to die. Ammonia acts as an irritant and can damage the gill area. *What do you do about it at this point?* Almost nothing.

Bacteria called *nitrosomonas* will begin to change the ammonia into nitrite. It will take several weeks for enough of this bacteria to grow in order to remove the amount of waste your fish produce. During this period, feed your fish very lightly, once a day. Feed only what the fish will consume in 2 – 3 minutes. If pieces of food float to the bottom of the tank, you have over fed – feed less next time! Less food = less waste = less chance of over-feeding. If you start to lose fish during this process, you could use an ammonia-removing product such as API Ammo Lock or Seachem Prime.

Expect the water to be cloudy. There are biological processes taking place in the tank. Do not add new fish during this time. The initial cloudiness will usually go away within the week or so.

The time it takes for the aquarium to cycle may be considerably shortened by using any of the following approaches for safe and rapid growth of bacteria.

- “seeding” a new aquarium with gravel or filter media from an older, well-established aquarium
- using an additive containing live bacteria (Such as Microbe-Lift Special Blend or Fluval Cycle for freshwater or saltwater; or Continuum Bacter Gen-M for saltwater)
- adding live rock and live sand (in adequate quantities) to a saltwater aquarium

## WEEKS 2 to 4

**Nitrites** are approximately 100 times less toxic than ammonia but they can also cause fish to die. Nitrites interfere with the blood’s ability to carry oxygen. *What do you do about it at this point?* Almost nothing!

During this time period, another type of bacteria (*nitrobacter*) will change these nitrites into nitrates. (If the fish aren’t doing well, adding another dose of Fluval Cycle or API Stress-Zyme will usually help).

**Nitrates** are relatively harmless, but in high quantities they can also cause fish to die. *What do you do about it at this point?* Almost nothing!

Live plants and algae will use up some nitrates but most must be physically removed from the tank. Water changes are the most economical way to do this. Once your tank is established, you should use a gravel washer for regular tank maintenance every

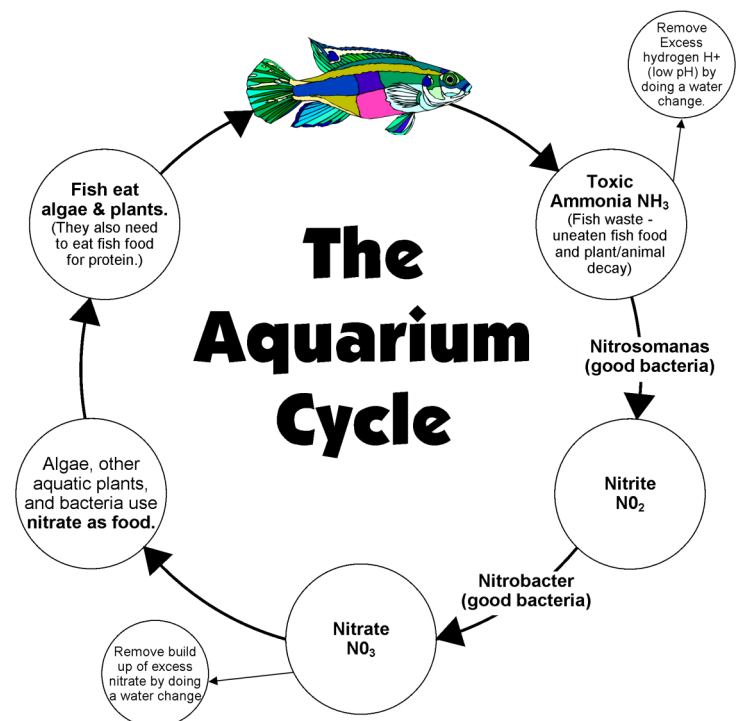
two to four weeks. As you vacuum up the detritus (fish waste, uneaten fish food, and decaying plant matter), you will also be siphoning out some of your aquarium water (about 25%). Replace the water with dechlorinated water of the same temperature or slightly warmer. If you have a saltwater tank, be sure to add saltwater back to keep your water at the correct specific gravity. *(For more info, see our “Water and Water Changes” handout.)*

## WEEK 4

Test your water – or bring a sample to us, and we’ll test it. The absence of ammonia and nitrite signals the completion of the “new tank syndrome”. The “cycle” is actually an ongoing, never-ending process. The fish produce waste, waste becomes ammonia, ammonia is converted to nitrites, and nitrites are converted to nitrates.

Once the tank is established, the conversions will be so quick that a test kit will not be able to track them. Even in an established aquarium, adding new fish occasionally produces a slight increase in ammonia and nitrite. The bacteria present in the tank normally build up quickly to accommodate the increased load on the system. This is the reason you should not add too many fish at one time – add new fish slowly.

**Remember:** Don’t over-feed or over-crowd your aquarium. This will destabilize the balance and cause a rise in ammonia, which you now know is toxic to fish. Keeping the pH of your freshwater aquarium at neutral (7.0), or slightly less, will greatly reduce the stress that “new tank syndrome” puts on your fish. Unfortunately, the pH of a saltwater tank must be kept much higher (8.4), so this stress reducing tip is basically impossible to accomplish in a marine situation.



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