

Aquarium Maintenance: water changes

Water changes are a crucial part of fishkeeping. In nature, fish live in constant water changes, so ammonia and nitrates rarely have time to build up. In the closed system of our aquarium, large amounts of waste, dissolved gases, debris, and algae will build up so we need to manually remove the toxic ammonia, nitrite, and nitrates. Neglecting to do so will not only leave the tank unsightly, but may also gravely affect the long-term health of the fish.



Two factors determine how effective the water change will be: the regularity of the water change and the percentage of water changed each time. We typically recommend removing 30% of the tank water once a week. Large (50% & up) and occasional water changes will shock the fish and may cause stress related diseases due to drastic water chemistry changes. In addition the aquarium's nitrogen cycle may become offset. If it's been a while, and your tank's water parameters are bad, do several 20% water changes each week to get the numbers back in healthy ranges without stressing the fish.

Equipment you'll need – algae pad, chemical-free bucket, thermometer, gravel vacuum, water conditioner, aquarium salt (optional)



It is recommended to replace 30% of the aquarium water every week to keep safe levels of ammonia, nitrite, nitrates and phosphates. Follow these steps:

- 1) Unplug or submerge the heater below the predicted water line.
- 2) Using the algae pad, scrub the sides of the aquarium to remove the algae.
- 3) Submerge the wide end of the gravel vacuum beneath the water and point the narrow end into the empty chemical-free bucket located below the aquarium. Start by shaking the wider end up and down rapidly, until the water starts draining into the bucket. While draining insert the wide end of the vacuum into the gravel and spot clean to remove trapped detritus. Some gravel vacuums are not equipped with a self-starting flapper and may require submerging the entire vacuum. If this is the case, submerge until all the air is void from the tubing and with one hand place your thumb over the narrow end and lead out of the aquarium and into the bucket; leave the wide end inside the tank.



If you have trouble getting your gravel vacuum started, stop by the store, at any time, for a demonstration!

4) Dig the wide end of the gravel vacuum into the gravel; it'll get sucked up and will tumble in the vacuum as the waste matter is pulled out with the water; this is the source of continued spikes of ammonia in tank. Take care around plants so that you don't damage sensitive root systems. Once you've cleaned about 1/3 of the gravel, you've removed close to 1/3 of the water. If the gravel gets too high in the vacuum, pull it up and let the gravel fall out so that it does not get sucked up into and clog the vacuum.



5) Throw away the water or use it to water your garden and house plants; the high ammonia and nitrates make excellent fertilizer.
6) Prepare the replacement water by filling up a bucket & adding the proper amounts of conditioner; do not add these unmixed to the tank.

- Tap water is the best to use for aquariums, as it contains natural minerals that are not only needed by fish and plants, but that will also help buffer the pH and prevent drastic changes in acidity. It does contain chemicals to keep it clean which will harm your fish and the ecosystem (the beneficial bacteria that naturally grow in your tank), so we have to remove these with tap water conditioners. RO/distilled water have had the useful minerals/electrolytes removed, so they must be replaced with additives and supplements.
- Aquarium salt, while optional, is a useful treatment for sores, infections, parasites, and functions as a precautionary measure against disease organisms as it stimulates the fish's production of slime coating. The recommended dosage of aquarium salt for freshwater is ½ teaspoon per gallon. Mix the water thoroughly before adding to the aquarium.

7) Check that the prepared water is the same temperature as the aquarium water.

8) Pour the water in slowly and carefully as to not shock or scare your fish.

9) Occasionally rearrange large rocks, plants, or any decor to create new territories.

10) For the outside of the aquarium, a soft cloth dipped in water should do the job. For stubborn stains use vinegar or rubbing alcohol, as they are much safer than household glass cleaners.

11) Check levels of ammonia, nitrite, nitrate, and phosphate with test kit or bring a sample to Wilmette Pet Center to determine how effective water change was and frequency of future water changes.

12) Every 4-6 weeks replace the carbon package in the filter, check the effectiveness of the fluorescent lighting, heater, air pumps, etc. and replace accordingly.



- For planted substrates, do not disturb the plants as moving them will damage the roots, vacuum around them.
- For sand substrates, hold the gravel vacuum far enough that it won't pick up the grains, but close enough that it will pick up any debris.
- For newly set up tanks, 20% biweekly water changes will do as you want to promote beneficial bacteria and doing too many water changes will inhibit bacterial growth. During this critical period, water quality tests must be done frequently to be well informed of the development of the nitrogen cycle. Remember to not add too many fish too quickly to give your tank time to build up beneficial bacteria. Check out our care sheet here to learn more about the cycling process.
- For bowls and tanks of less than 5 gallons without a filter, 20% water changes every day is recommended.

- Soap and other harsh chemicals must *never* be used to clean the tank or equipment. Unless the packaging explicitly states “aquarium safe”, do not use chemicals to aid in cleaning. Warm water and an algae pad should be used to clean the tank or equipment.

“Old Tank Syndrome”: OTS refers to when new fish are added to a fully mature tank (10 –14 months after initial cycling is complete) with clear water and “healthy” fish, but die within 24 hours of being introduced. The problem is acidic water with a low pH and high nitrates. The drop in pH then affects the growth of beneficial bacteria, which then leads to a sharp increase in ammonia. While the resident fish have slowly acclimated to the water conditions, the new fish could not handle the systemic shock of vastly different water conditions. The best way to remedy OTS is to return to weekly 30% water changes, add live plants to improve water quality, hold off on introducing any new inhabitants to the aquarium, and to routinely test water quality, particularly ammonia, nitrites, and pH.

“Green Tank Syndrome”: GTS is when algae overruns a tank and the water has a greenish/yellowish hue. The problem is a high level of nitrates and phosphates in the aquarium. Algae is not a bad thing in itself, since it absorbs nutrients, improving the water quality and it provides a source of food for some fish; however GTS is a problem as it indicates a lax attitude towards aquarium maintenance. There are several things one can do to rid the aquarium of GTS; return to weekly 30% water changes, add live plants (since they compete with algae for the same nutrients), reduce the total time of light exposure, feed less food, routinely test water quality, or introduce algae-eating fish/snails.



Water changes are an easy but vital process in keeping our aquariums both looking beautiful and healthy for our fish.