

AQUARIUM MAINTENANCE: WATER CHANGES

Water changes are a crucial part of fishkeeping. Over time, large amounts of waste, dissolved gases, debris, and algae will build up in the aquarium and must be removed by the owner. Neglecting to do so will not only leave the tank unsightly, but may also gravely affect the long-term health of the fish. Water changes prevent toxic build-ups of ammonia, nitrite, and nitrates. Since fish continually excrete these chemicals, harmful levels can rapidly accumulate; changing water essentially reduces the total amount of waste concentration. Two factors determine how effective the water change will be: the regularity of the water change and the percentage of water changed each time. If weekly water changes of 20% cannot be done, then bi-weekly changes of 33% must be done. 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.

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

It is recommended to replace 20% of the aquarium water every week to keep safe levels of ammonia, nitrite, nitrates and phosphates.

- 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.
- 4) Throw away the water or use it to water your garden, as it is an excellent fertilizer (freshwater only).

- 5) Prepare the replacement water by filling up a bucket & adding the proper amounts of conditioner and aquarium salt. The recommended dosage of aquarium salt for freshwater is ½ teaspoon per gallon. Mix the water thoroughly.
 - Tap water can be used for freshwater/brackish tanks, but it requires a water conditioner that removes and neutralizes the chlorine and chloramines in it. If using RO/distilled water for freshwater many of the useful minerals/electrolytes will be absent and should be replaced. For marine tanks RO/distilled water is the best way to go, as the water will be devoid of harmful substances like phosphate and copper.
 - For saltwater/brackish aquariums, add marine salt and check the level of salinity by means of a hydrometer. 1.022 g/mL at 75°F is optimum for most saltwater tanks, 1.000 g/mL at 75°F is optimum for most brackish tanks.
 - 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.
- 6) Check that the prepared water is the same temperature as the aquarium water.
- 7) Pour the water in slowly and carefully as to not shock or scare your fish.
- 8) Occasionally rearrange large rocks, plants, or any decor to create new territories.
- 9) 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.
- 10) Check levels of ammonia, nitrite, nitrate, and phosphate with test kit or at Wilmette Pet Center to determine how effective water change was and frequency of future water changes.
- 11) 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 setup 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 weekly to be well informed of the development of the nitrogen cycle.
 - For bowls and tanks of less than 5 gallons without a filter, 15% water changes every day is recommended.
 - For breeding tanks up to one month old, 10% water changes every day should be done.
 - 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 20% 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, nitrates, 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 20% 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.