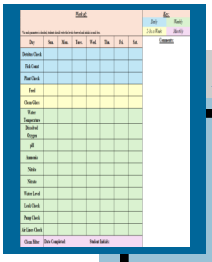

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Navigating the "Aquaculture System Checklist" for Educators

Each element of an aquaculture system requires specific conditions for a healthy habitat. This publication outlines some important parameters to consider for freshwater systems while navigating the "Aquaculture System Checklist" created by the Florida Department of Agriculture and Consumer Services (FDACS). The Checklist is intended to be used by educators to encourage student participation and accountability in the care of an aquaculture system.

Caring for an aquaculture system requires consistent maintenance. Maintenance frequency can be broken down into four categories: daily, 2-3 times a week, weekly and monthly. The key is located in the right hand corner of the "Aquaculture System Checklist" and categorizes these frequencies by color accordingly on the Checklist.

Key:	
Daily	*Weekly*
2-3x a Week	*Monthly*

The Checklist is meant to be refreshed weekly, with student initials and parameter values placed in the boxes as each task is completed. The Checklist was created as a preventative measure to monitor and notify a possible issue within the system before it becomes a larger problem. These are just recommendations, educators should use their best judgment to adjust the checklist to include additional elements suited for their system.

DAILY:

It is recommended to complete a detritus check, live fish count and plant check on a daily basis. In the event that you do not have access to the system on some days, such as during the weekend, it is important to be meticulous during checks on the first and final day of the week to ensure any changes that occur over the weekend are noted quickly before a larger issue may arise.

Detritus check should be done to ensure there is not a build up of uneaten food. Over-feeding or leaving uneaten food in the system creates a build up of ammonia, which can become toxic to the aquatic organisms and promotes the growth of algae. Detritus can become trapped on rocks and gravel and should be removed using a net or agitated to promote collection by the filtration system. A general rule is to remove any remaining food after five minutes.

Fish and other aquatic organisms, such as plants, should be counted and checked daily. Dead fish should be removed immediately to prevent the spread of disease and to maintain water quality. Plants should be visually checked for signs of disease or decay and removed as necessary. Daily checks for live fish and plants allow for continuous monitoring, as a rapid decline in living fish could be indicative of a larger issue.

2-3 TIMES A WEEK:

It is recommended to feed the aquatic organisms and check the cleanliness of the glass at least two to three times a week.

The frequency in which you should feed the fish in the system is dependent on the type, size and quantity of fish being kept. Most species do *not* require daily feeding, therefore this parameter should be adjusted as it applies to the specific species.

Cleaning the glass several times a week not only leaves the tank aesthetically pleasing but will aid in the process of breaking down any algae that begins to develop along the glass. Utilizing a magnet glass cleaner is an easy way to remove algae and detritus from the glass as well as agitating the edges of the gravel to promote collection by the filter.

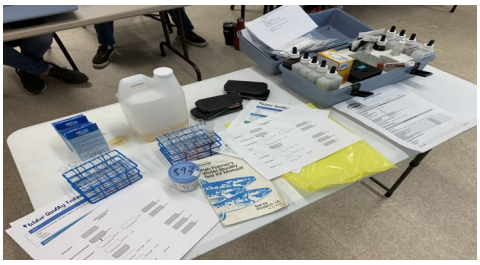
WEEKLY:

There are several parameters recommended for weekly testing/ checking: water temperature, dissolved oxygen, ammonia, nitrite, nitrate and pH. As well as monitoring the water level, air lines, pumps and possible leaks. It is not required for all elements to be checked on the same day and can be spread throughout the week. It is recommended to check each parameter on the same day each week to establish a routine.

Water temperature can be checked using a small suction-cupped thermometer that remains in the tank at all times or by inserting a thermometer when needed. Temperature of the water will vary depending on the species of aquatic organisms kept as they each have their own preferences and needs.

FDACS-P-02258 Rev. 10/25

Dissolved oxygen levels are critical and indicate whether there is the proper amount of oxygen in the water for the organisms to survive. These levels, ideally between 5-10 parts per million (ppm), can be checked using a dissolved oxygen meter. Air lines should be checked weekly for any leaks by monitoring the consistency of dissolved oxygen levels, listening for hissing or unexpected noises or physically feeling the lines for any escaping air.



The ammonia, nitrite, nitrate and pH levels are key elements that should be tested weekly to help determine if the system is safe or toxic. A water quality testing kit can be purchased to simplify these tests. For freshwater aquaculture systems the ideal ammonia, nitrite and nitrate levels should not exceed 0 ppm. A rise in these levels could be an indicator of a deeper problem and are typically resolved by completing a partial water change and carefully monitoring the parameters to ensure they stabilize. The pH in a freshwater system is typically sustained between 6.5-8, but it is important to consider the different aquatic species as they each have their own requirements. A rise or decline in pH is often treated using chemicals such as pH up or pH down.

Be aware of the system's water levels. Evaporation will account for a slight decrease in the water level, but if you begin losing water quickly it could be a sign of a greater issue, such as a water leak. Leaks should be checked on a weekly basis by looking for wet patches, monitoring water levels and conducting a thorough visual inspection of the system.

The filter and pump should also be checked for clogs and flow rates. There should be visible water flowing carrying detritus out of the water and clean water returning into the tank with reasonable force. Indications of a clog could include loss of suction from the filter, visible debris accumulating in the tank or a lack of sound coming from the motor signaling it has shut off.

The fields on the "Aquaculture System Checklist" can be used to input the values for the various water quality tests (water temperature, dissolved oxygen, ammonia, nitrite, nitrate and pH) and marked with the students initials to indicate completion each week. Parameters in which you are only visually confirming an element (e.g., water level, leaks and filtration) can be indicated for completion with just the students initials. If there are any comments regarding the visual checks, they should be noted in the comment section with the date and student initials.

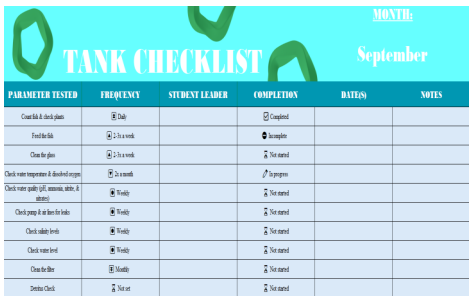
MONTHLY:

It is recommended to clean the filter on a monthly basis. In situations of over-feeding, algae growth or overcrowding of plants or animals, the filter may need to be cleaned more frequently. It is recommended to monitor how often the filter becomes clogged to determine if it should be cleaned more frequently, especially if there is an abundance of detritus in the tank. It is recommended to complete the filter cleaning on the same day of every month to establish a pattern and ensure too much time does not pass between cleanings.

Filters should be cleaned thoroughly with water only. Remember, introducing bleach, soap or other cleaning agents into the system will harm or kill the beneficial organisms in the system.

EDUCATOR CHORE CHART:

The "Educator Chore Chart" is to be used in conjunction with the "Aquaculture System Checklist." The "Educator Chore Chart" is an interactive Excel sheet that aids educators in monitoring student responsibilities and the system checklist all in one place. Meant to be used as a monthly spreadsheet, it allows an overlook for monitoring the student leader in charge of each task, frequency required for task completion, whether the task is in progress or completed and the date each task was completed. While the "Aquaculture System Checklist" was created as a way to encourage student leadership and should be posted on the wall right next to the system. The "Educator Chore Chart" allows the educators to make their own notes behind the scenes.



TANK CHECKLIST — MONTH: September

PARAMETER TESTED	FREQUENCY	STUDENT LEADER	COMPLETION	DATE(S)	NOTES
Count fish & check plants	Daily		Completed		
Feed the fish	2-3x a week		Incomplete		
Clean the glass	2-3x a week		Not started		
Check water temperature & dissolved oxygen	2x a month		In progress		
Check water quality (pH, ammonia, nitrite, & nitrates)	Weekly		Not started		
Check pump & air lines for leaks	Weekly		Not started		
Check salinity levels	Weekly		Not started		
Check water level	Weekly		Not started		
Clean the filter	Monthly		Not started		
Zentina Check	Not set		Not started		

HELPFUL RESOURCES:

- Aquaculture and Aquaponics: Which Is Right for You?
- Benefits of an Aquaculture Certificate of Registration for Educators
- FDACS Aquaculture Educator Resources

This publication and the charts that accompany it were made with freshwater tanks in mind. For more information regarding saltwater tanks and access to the saltwater version of the charts, please email us at Aquaculture_Education@FDACS.gov.

Week of: *As each parameter is checked, students should write the levels observed and initials in each box.							
Day	**Sun.**	**Mon.**	**Tues.**	**Wed.**	**Thu.**	**Fri.**	**Sat.**
Detritus Check							
Fish Count							
Plant Check							
Feed							
Clean Glass							
Water Temperature							
Dissolved Oxygen							
pH							
Ammonia							
Nitrite							
Nitrate							
Water Level							
Leak Check							
Pump Check							
Air Lines Check							
Clean Filter	**Date Completed:**			**Student Initials:**			

Key:	
Daily	*Weekly*
2-3x a Week	*Monthly*

Comments: