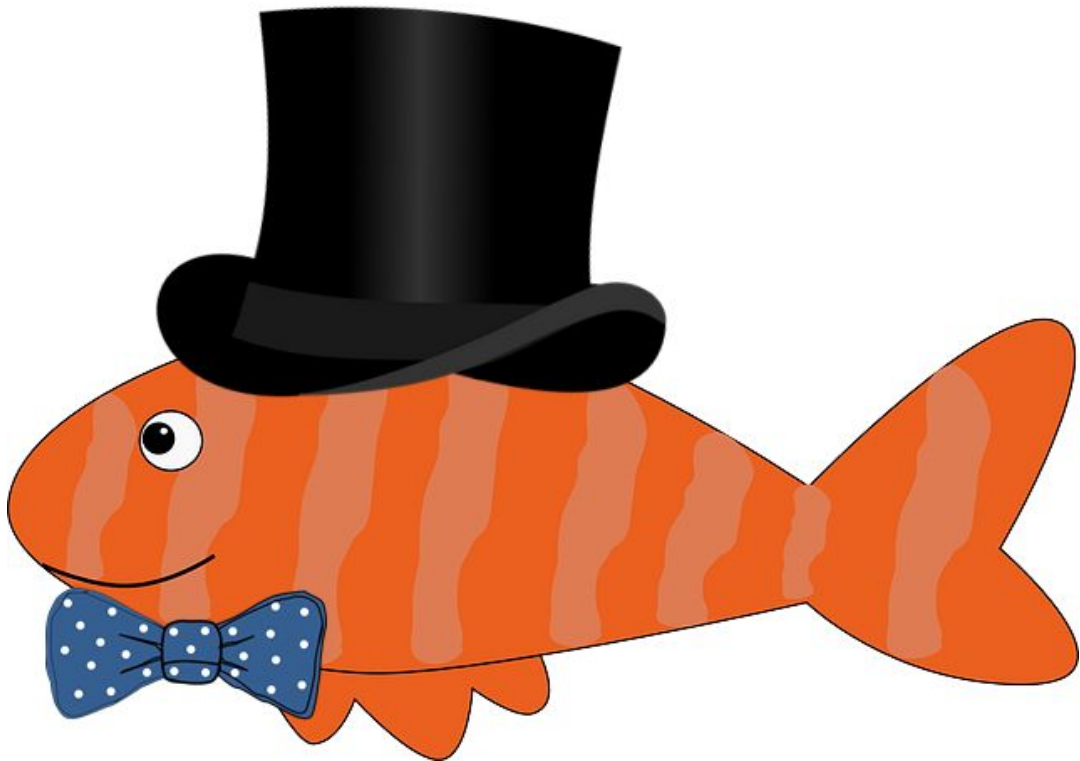


Lil' Fish Tanks

Installation and User Instructions

Sofishticated



December 2019
Version 1.00

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1. Introduction

This User Manual (UM) provides the information necessary for fish owners to effectively use the Sofishticated product, version 1.00 released December 2019. This document describes the setup and use of the Sofishticated product and app.

2. Overview

Fish are common household pets, both for beginning pet owners and long-time enthusiasts. Obtaining fish is simple, however, keeping them alive can prove challenging. Different breeds of fish require different environments, so it is crucial to monitor water temperature, acidity, and other chemical levels. Monitoring these levels can be tedious, time-consuming, and confusing, so the task is easily ignored, especially by beginner fish owners. As a result, fish oftentimes live in improper environments, experiencing sickness and in some cases even death. The effects of the most important chemical levels are outlined below:

Table 1: Effect of ecosystem levels on fish. These values are monitored by the Sofishticated product to make fish care easier.

Data	Effect on Fish	Ideal Level
Temperature	Increase stress and damage immune system	70-80 °F
pH	Low pH: acidic water causes chemical burns and chaps High pH: basic water reacts to form ammonia	7
Ammonia	Highly poisonous	0 ppm
Nitrite	Highly poisonous	0 ppm
Nitrate	Stunts growth and compromises immune system	< 50 ppm

Sofishticated is a product designed to help with the monitoring of the fish tank ecosystem. It has sensors to monitor temperature, pH, and concentrations of ammonia, nitrite, and nitrate. Information about these chemical levels are customizable in and reported to the Sofishticated app. The app also provides reminders for fish feeding, and ammonia, nitrite, and nitrate testing. The product can be set up in any home, as it connects to a 120V outlet, controls a standard fish tank heater to adjust tank temperature, attaches to a fish tank using hooks, and is waterproof. A high-level outline of Sofishticated is shown below.

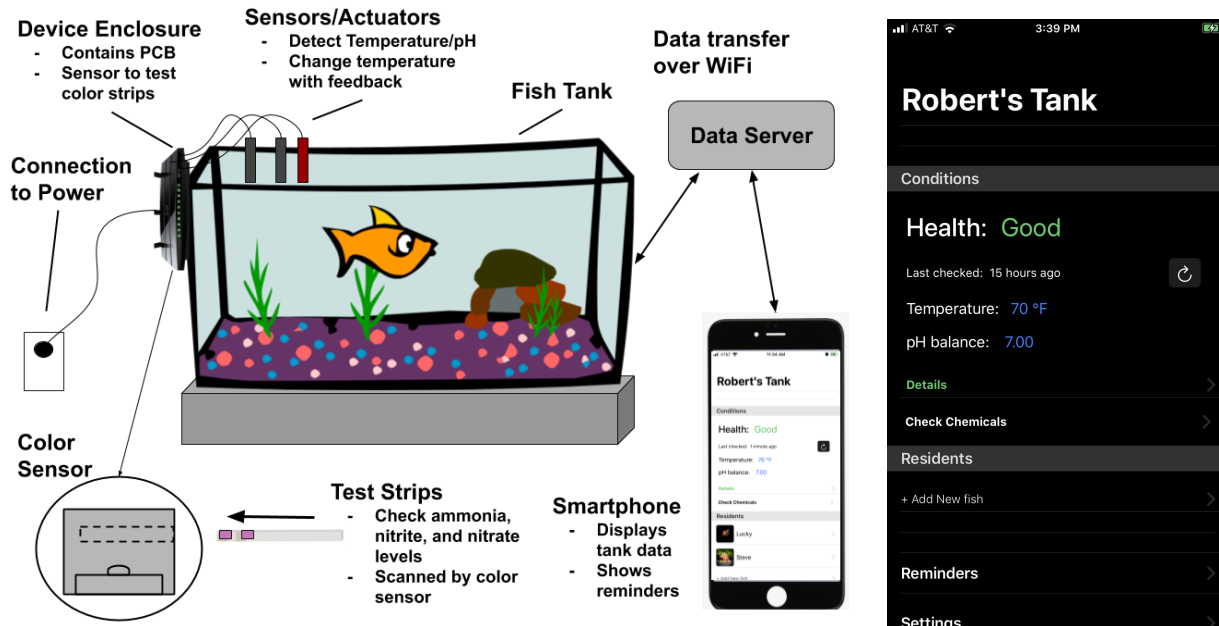


Figure 1. Design of Sofishticated setup (left) and app interface (right). Sofishticated attaches to the fish tank and uses temperature and pH sensors and a heater that extend into the tank. Sofishticated is also equipped with a color sensor to analyze nitrite, nitrate, and ammonia test strips that are inserted by the user. It then communicates with a mobile app over a local data server using Wifi. In this app, a user can input their various animals, see current and past tank health, and schedule and receive reminders for fish care.

2.1 Conventions

This document provides diagrams of the setup and use of Sofishticated product and app, along with bulleted instructions.

Note: The term ‘tank’ is used throughout this document to refer to the fish tank for which Sofishticated is being used.

2.2 Cautions & Warnings

- Warning: Product requires connection to 120V outlet
- Warning: Using ecosystem values for temperature, pH, and nitrate that vary from those suggested can harm fish. Thorough research is required before changing the tank ecosystem.
- Caution: The 120V outlet for the heater is **NOT** waterproof. Contact with water can cause shock and electrocution.
- Caution: For user with **freshwater** tanks only! Product has not been approved for use in saltwater environments

3. Getting Started

Sofishticated can be used with any standard freshwater tank. The first step of setup is to attach Sofishticated to the tank and insert the temperature and pH sensors to the water. Next, the Sofishticated app is installed, and finally, the app is connected to the physical product over Wifi.

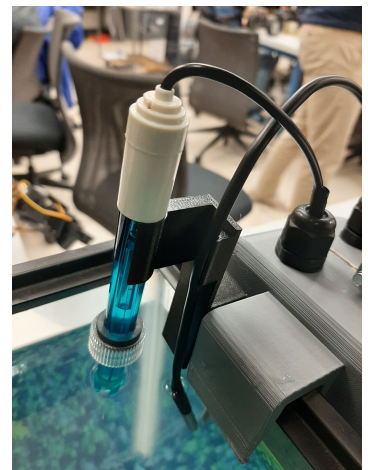
3.1 Set-up Considerations

The Sofishticated product has a few environment restrictions:

1. Sofishticated requires connection to a 120V outlet.
2. Sofishticated requires access to Wifi.
3. There must be space on the outside of the fish tank for Sofishticated to attach. While the Sofishticated product is waterproof, it must not be submerged under water. The plug for the heater ([3.2 Installing the Product](#)) cannot come in contact with water ([caution](#)). Analysis of ammonia, nitrite, and nitrate test strips is also affected by water and will become inaccurate.

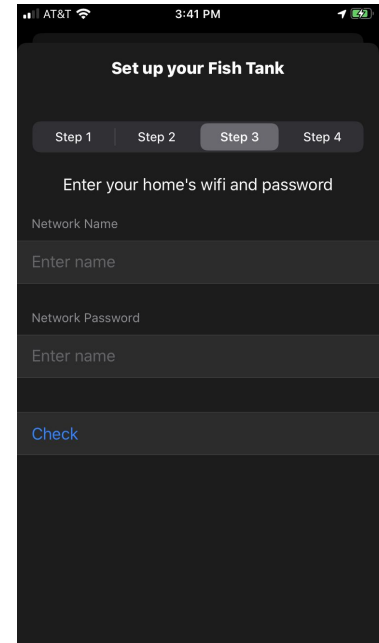
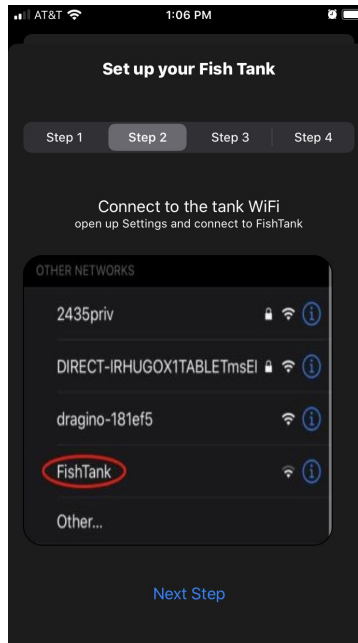
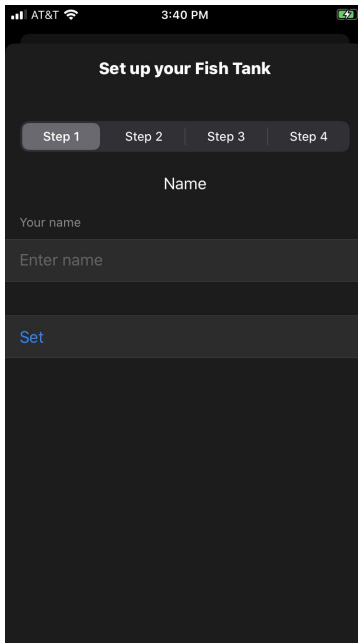
3.2 Installing the Product

1. Plug heater into outlet at bottom of product.
2. Clean pH sensor using deionized/clean water.
3. Hang product on side of tank.
4. Attach pH and temperature sensors to the provided holder and attach to fish tank (right).
5. Plug Sofishticated into 120V outlet.



3.3 Installing and Setting up the App

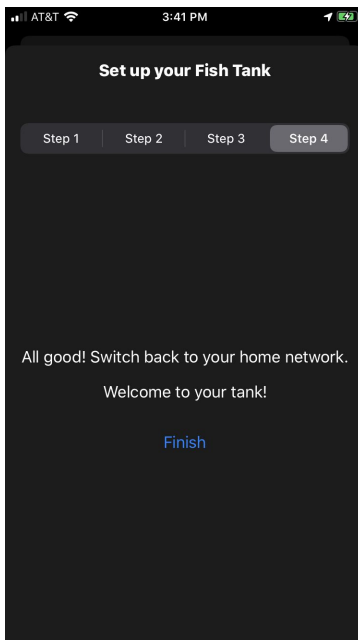
1. Download Sofishticated app from the App Store and open the app



2. Enter name for fish tank and select **Set**.

3. In your Wifi settings, connect to the FishTank network. Then select **Next Step**.

4. Enter Wifi information and select **Check** to test the network connection from your product.

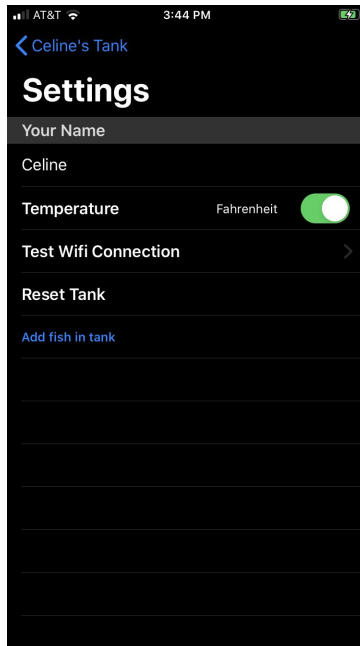


5. This screen will appear if the app setup was successful and a Wifi connection was established. Otherwise, return to the previous step and review the Wifi information.

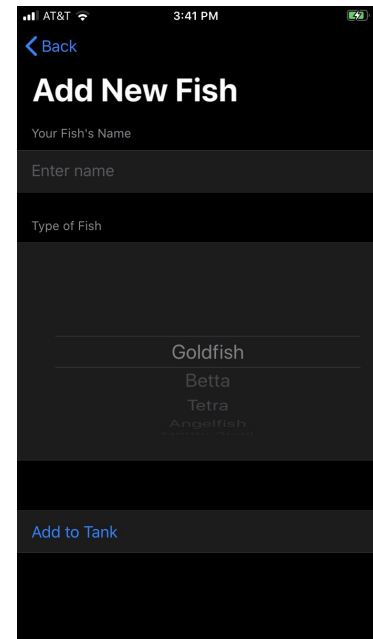
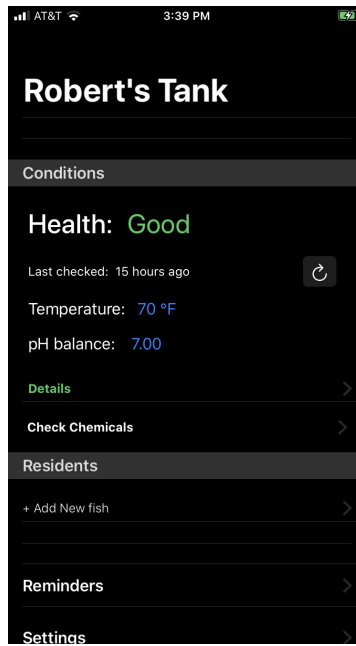
4. Using the System

Sofishticated assists in the management of multiple regular tasks - temperature control, pH, ammonia, and nitrite monitoring, feeding schedule, and power control.

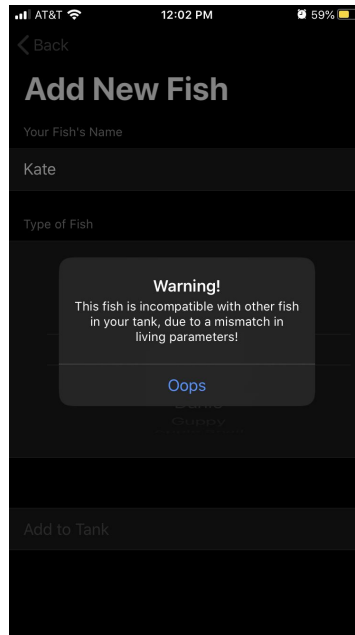
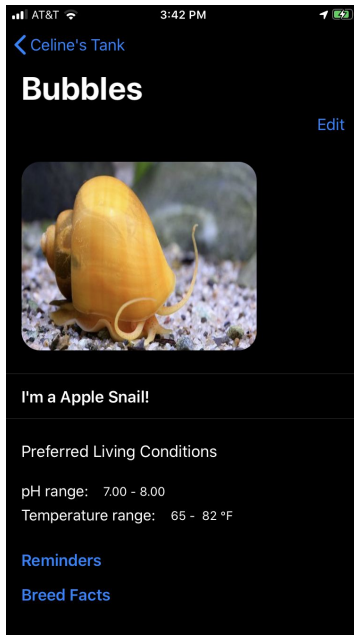
4.1 Adding Species to a Tank



1. Under Settings, select **Add fish in tank** or select **+ Add New fish** under Residents.



2. Enter a name, select a species of fish, and then select **Add to Tank**.



3. To view information on your pets, select them under the Residents category. Preferred living conditions, reminders, and breed facts can be found.

4. If two species are incompatible, the app will notify you and will not allow you to combine these species in one ecosystem.


4.2 Temperature

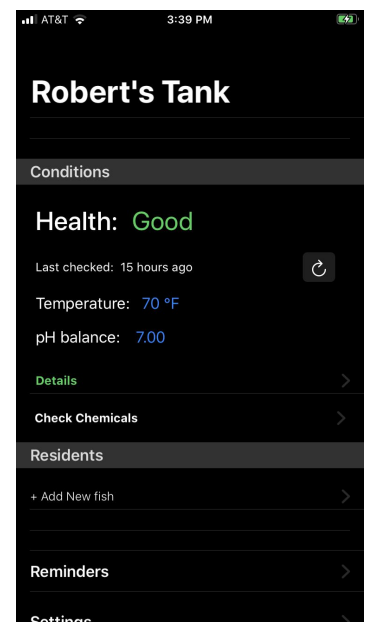
General temperature values for various species have been stored in the app's database, and a temperature will be suggested based on the species selected for the tank.

4.2.1 Configuration

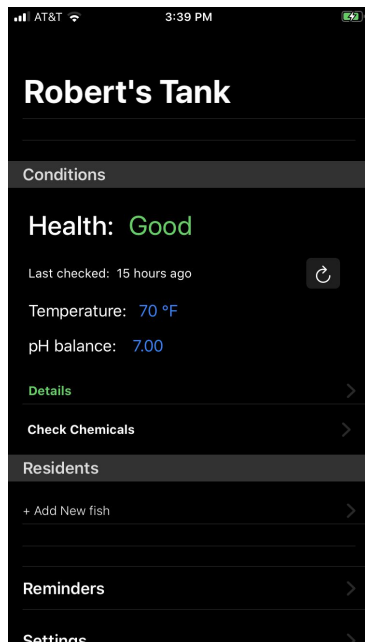
1. The appropriate temperature will be calculated based on the types of pets in the fish tank.

4.2.2 Measurements

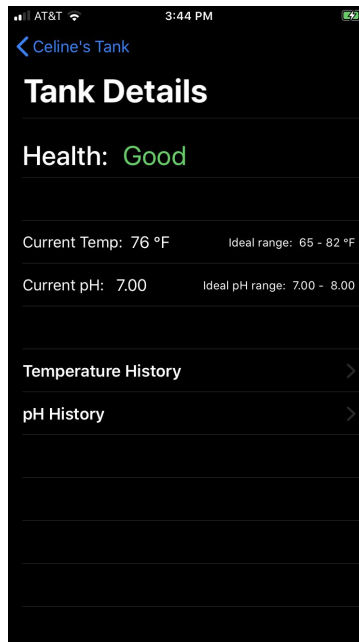
1. Temperature measurements are automatically taken every 5 sec.
2. To update temperature readings, select the refresh  icon on the main screen (right).



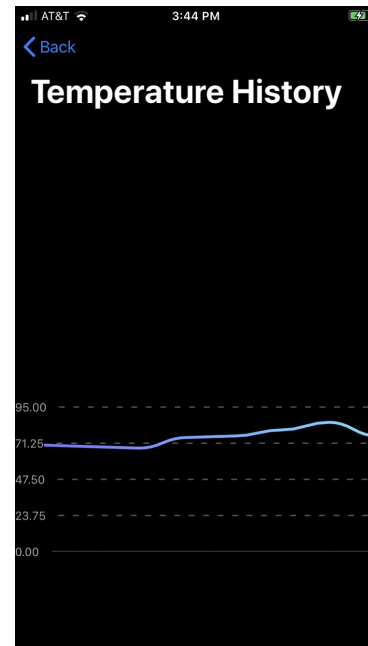
4.2.3 History



1. Select the temperature and pH values on the main screen.



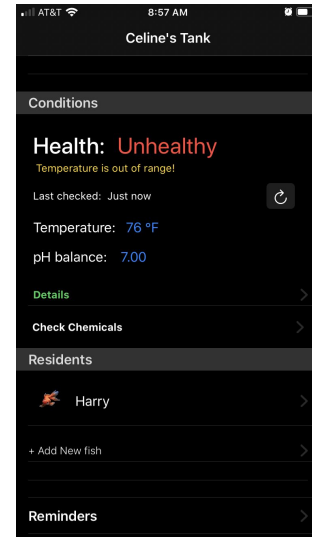
2. Select **Temperature History**.



3. Recent temperature values will be displayed.

4.2.4 Alarms

1. If the temperature is out of range, the main screen will show a notification, and the heater will be turned on/off to correct this issue (right).

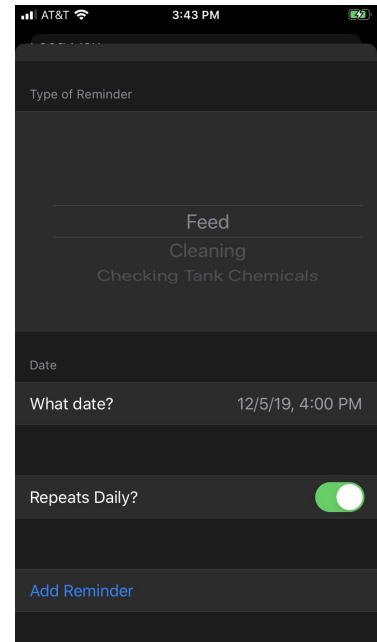
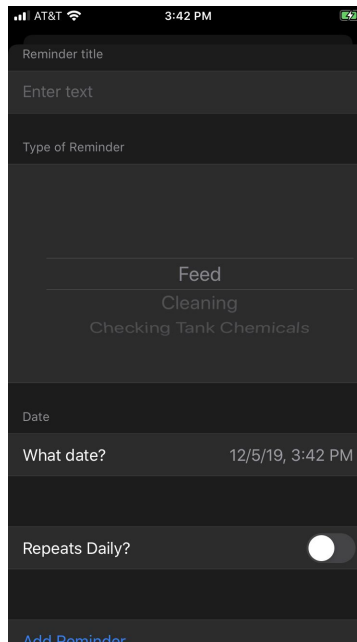
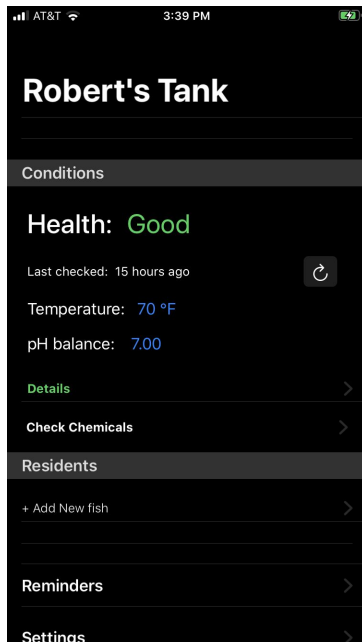


4.3 pH

General pH values for various species have been stored in the app's database, and a pH level will be suggested based on the species selected for the tank. The pH sensor must be cleaned/sterilized every 2 weeks. The app issues a reminder at a specified time for the user to clean the pH sensor.

4.3.1 Configuration

1. The appropriate pH will be calculated based on the types of pets in the fish tank.




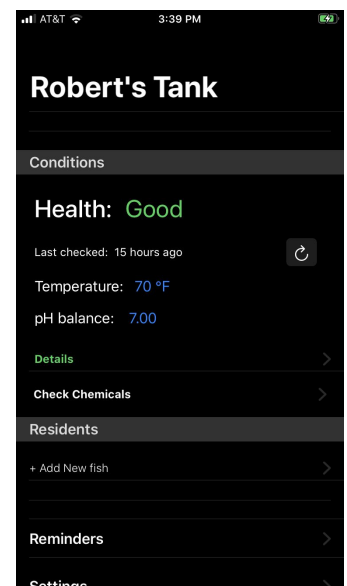
2. On the main screen navigate to **Reminders** to add a reminder to clean the pH sensor

3. Enter a name, select the type of reminder, the date and time of occurrence, and when it should repeat.

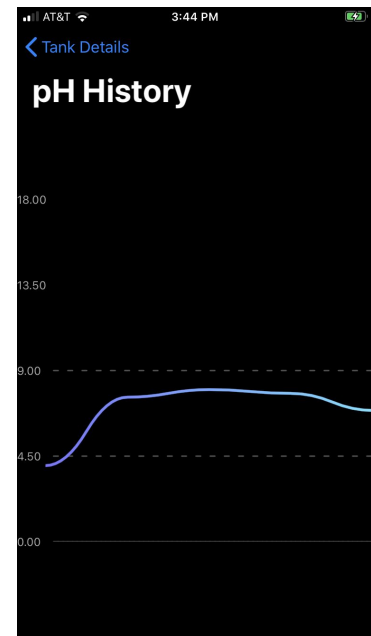
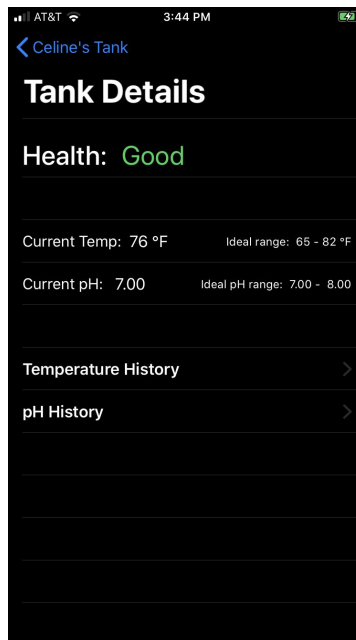
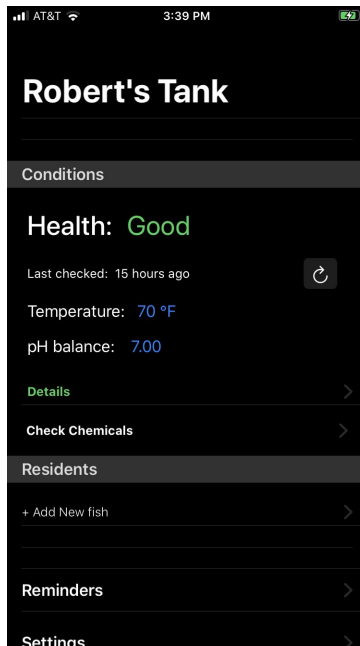
4. When finished, select **Add Reminder**

4.3.2 Measurements

1. pH measurements are automatically taken every 5 sec.
2. To update pH readings, select the refresh  icon on the main screen (right).



4.3.3 History



1. Select the temperature and pH values on the main screen.

2. Select **pH History**.

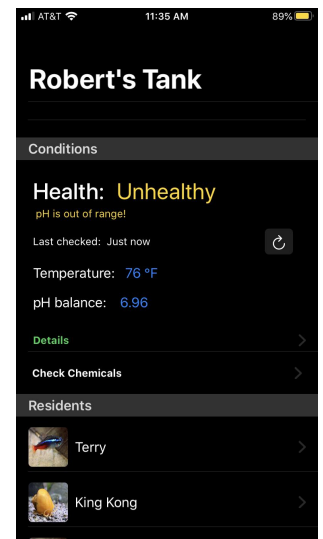
3. Recent pH values will be displayed.

4.3.4 Cleaning

1. App issues reminder to clean pH sensor
2. Remove pH sensor from water.
3. Use clean, distilled water to clean the tip of pH sensor.
4. Place pH sensor back into tank.

4.3.5 Alarms

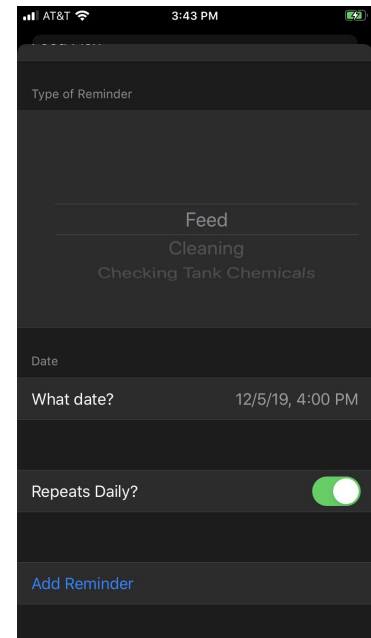
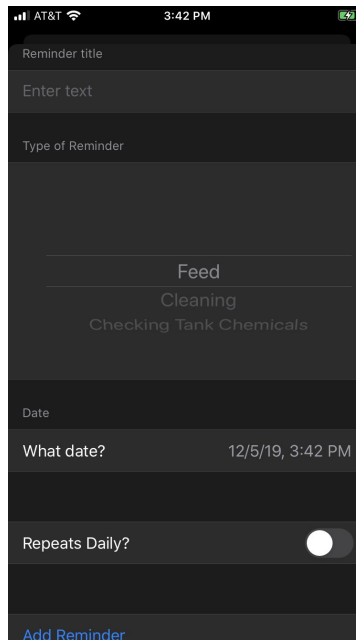
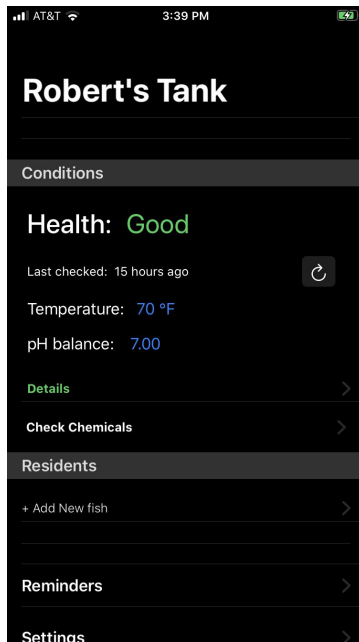
1. If the pH is out of range, the main screen will show a notification (right).
2. If the pH is too low, add crushed coral or limestone to the tank.
3. If the pH is too high, add an acid buffer to the tank.



4.4 Ammonia

Sofishticated will raise an alarm if the ammonia level is above 0 ppm. Testing for ammonia requires assistance from the user. A daily reminder notifies the user to sample the tank water using an ammonia test strip and sample it through Sofishticated.

4.4.1 Configuration

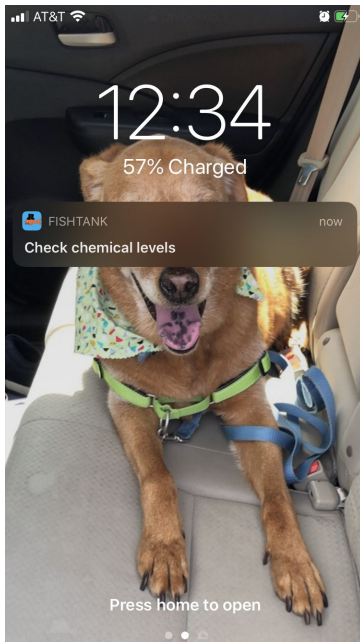


1. On the main screen navigate to **Reminders** to add a reminder to check the ammonia level.
2. Enter a name, select the type of reminder, the date and time of occurrence, and when it should repeat.
3. When finished, select **Add Reminder**.
4. The ammonia test also requires specific test strips: Tetra Easy Strips. These test strips can be found on Amazon, and at other standard pet supplies retailers.

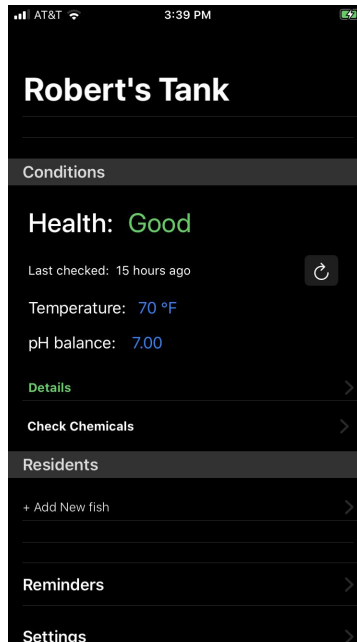


Figure 2: Appropriate ammonia test strips for Sofishticated product

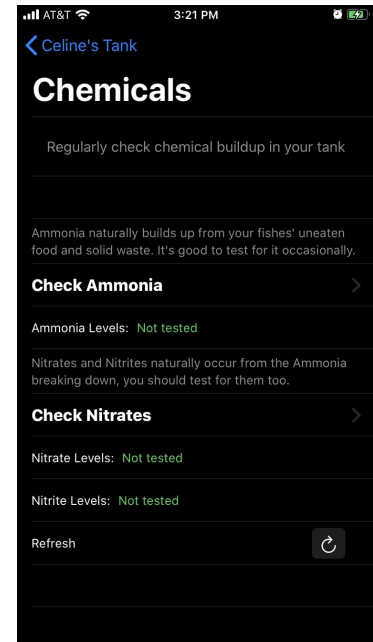
4.4.2 Measurements



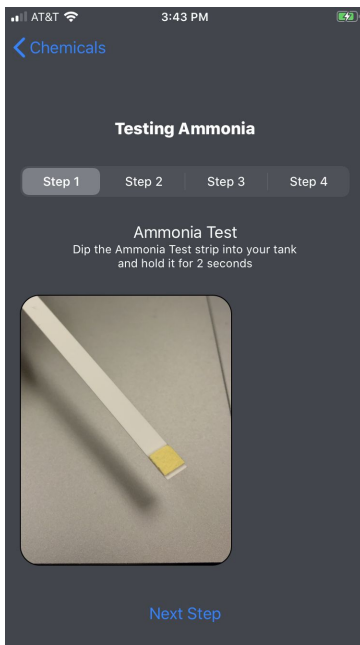
1. The previously scheduled reminder goes off.



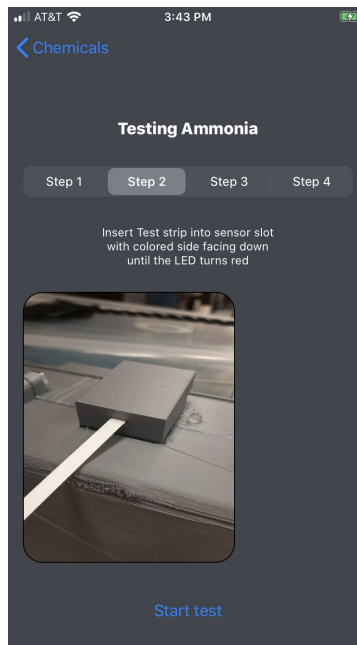
2. On the main screen, select **Check Chemicals**.



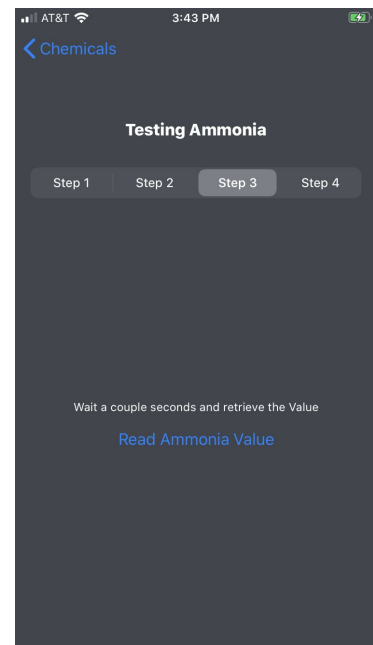
3. Select **Check Ammonia**.



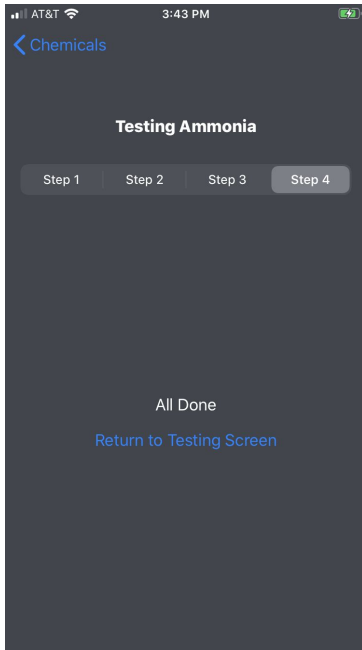
4. Take an ammonia test strip, hold it in the water for 2 seconds without motion, and then select **Next Step**.



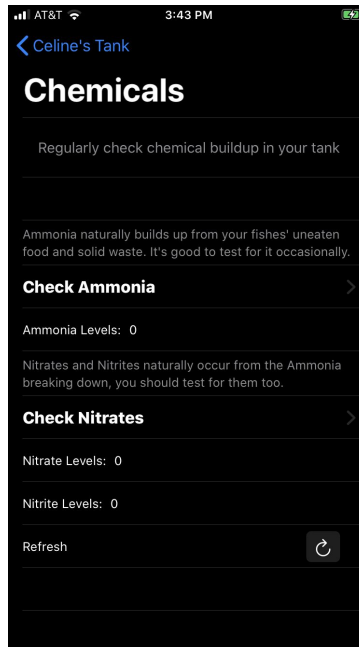
5. Insert the test strip into the color sensor slot, colored side facing down. Wait for the LED to flash red to indicate a proper reading. Select **Start test**.



6. Remove the test strip and select **Read Ammonia Value**.



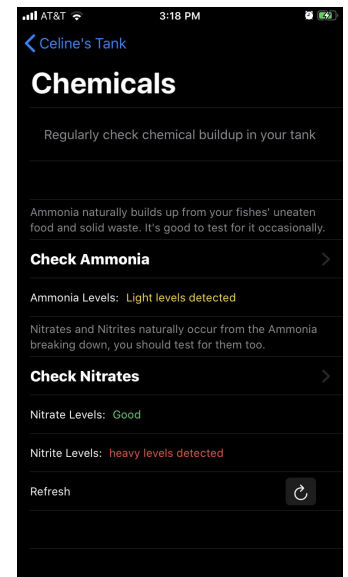
7. Once complete, select **Return to Testing Screen**.



8. The updated ammonia value will be displayed on the Chemicals screen.

4.4.3 Alarms

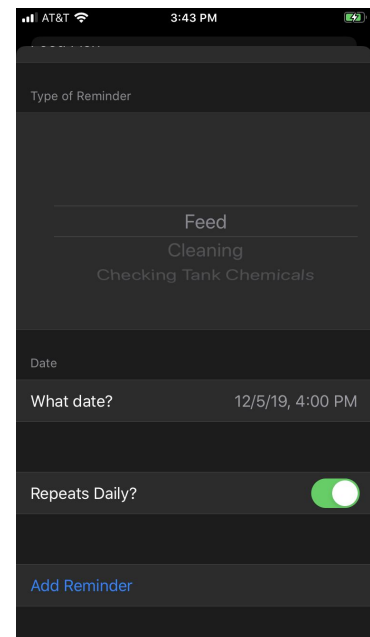
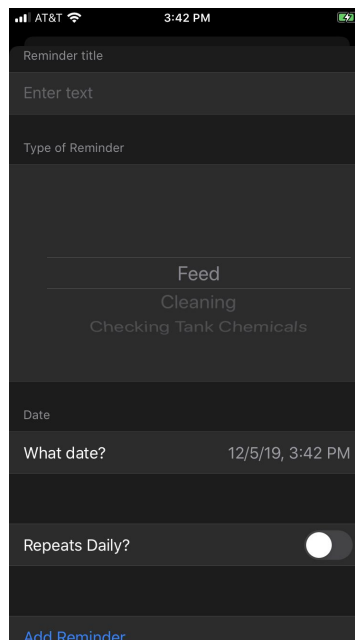
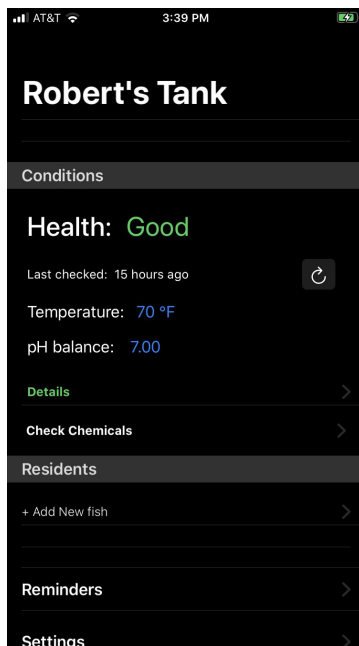
1. App notifies of an ammonia level above 0 ppm (right).
2. Cycle water in the tank, add biological and artificial filtration.



4.5 Nitrite/Nitrate

Sofishticated will raise an alarm for high nitrite or nitrate levels. General nitrite/nitrate levels for various species have been stored in the app's database. Testing for nitrite/nitrate requires assistance from the user. A daily reminder notifies the user to sample the tank water using a nitrite/nitrate test strip and sample it through Sofishticated.

4.5.1 Configuration

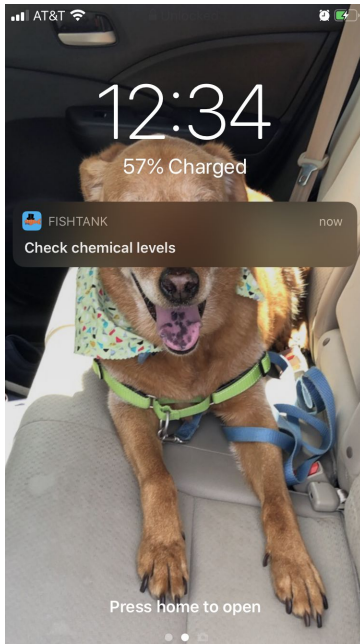


1. On the main screen navigate to **Reminders** to add a reminder to check the nitrite/nitrate levels.
2. Enter a name, select the type of reminder, the date and time of occurrence, and when it should repeat.
3. When finished, select **Add Reminder**.
4. The nitrates test also requires specific test strips: Tetra Easy Strips. These test strips can be found on Amazon, and at other standard pet supplies retailers.

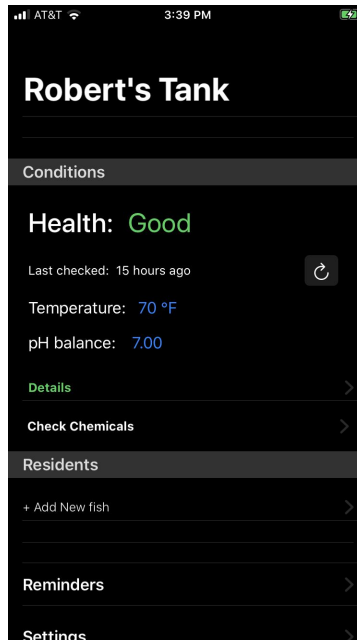


Figure 3: Appropriate nitrit and nitrate test strips for Sofishticated product

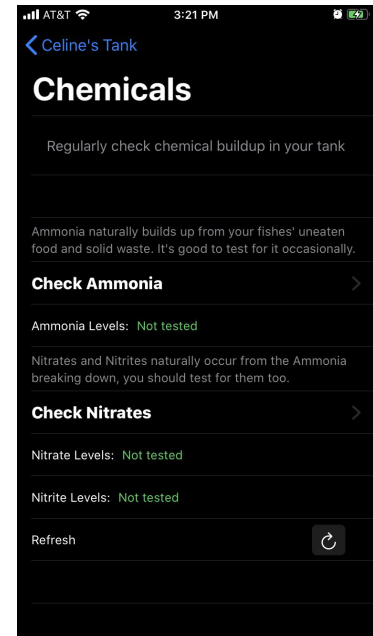
4.5.2 Measurements



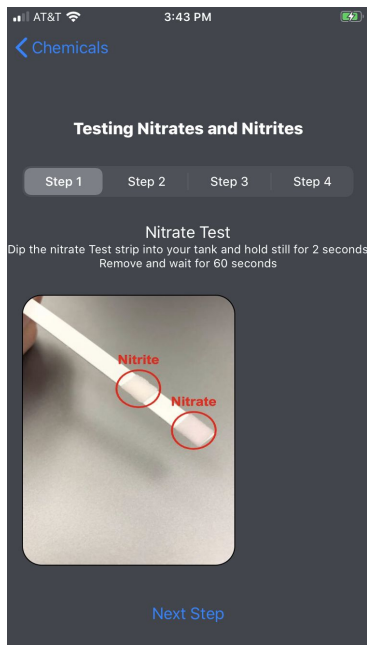
1. The previously scheduled reminder goes off.



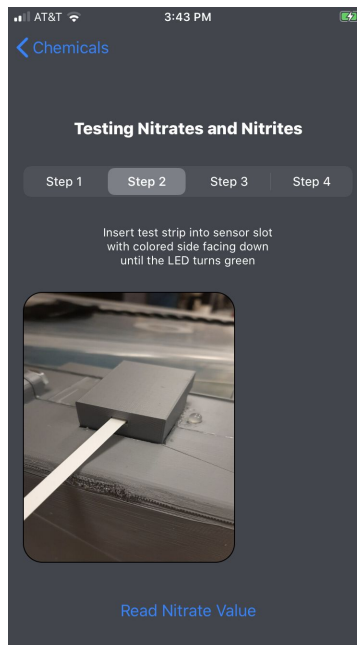
2. On the main screen, select **Check Chemicals**.



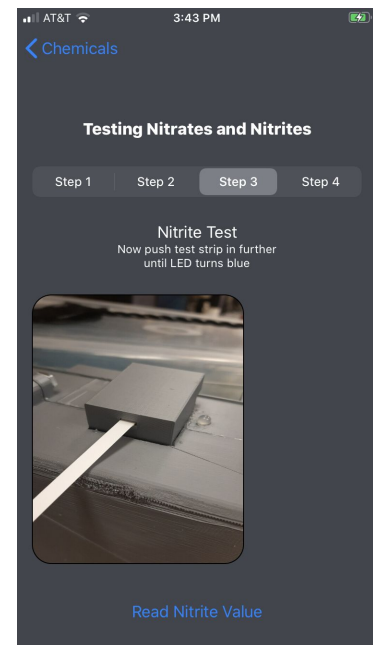
3. Select **Check Nitrates**.



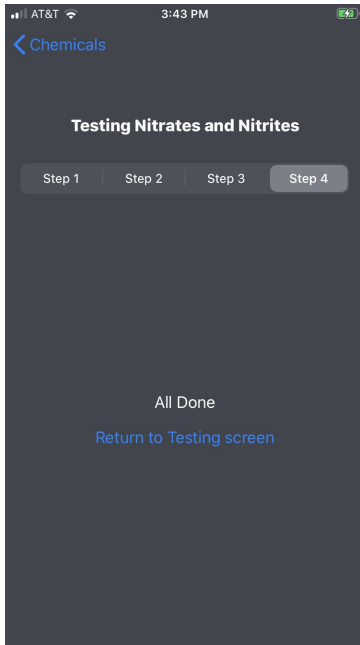
4. Take a nitrates test strip, hold it in the water for 2 seconds without motion, wait 1 min for the test strip to develop, and then select **Next Step**.



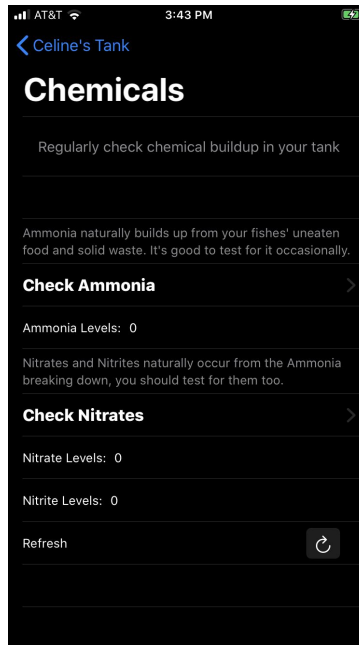
5. Insert the test strip into the color sensor slot, colored side facing down. Wait for the LED to flash green to indicate a proper reading. Select **Read Nitrate Value** to read the Nitrate value.



6. Insert the strip all the way into the color sensor. Wait for the LED to flash blue to indicate a proper reading. Select **Read Nitrite Value** to read the Nitrite value.



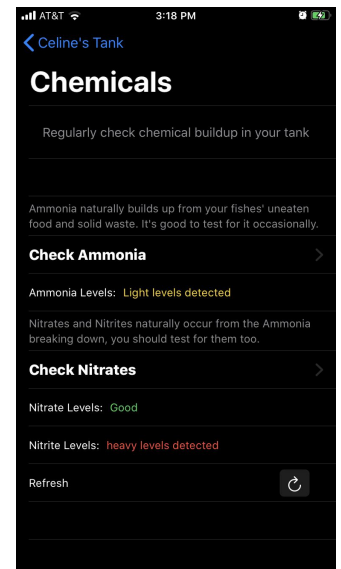
7. Once complete, select **Return to Testing Screen**.



8. The updated nitrate and nitrite values will be displayed on the Chemicals screen.

4.5.3 Alarms

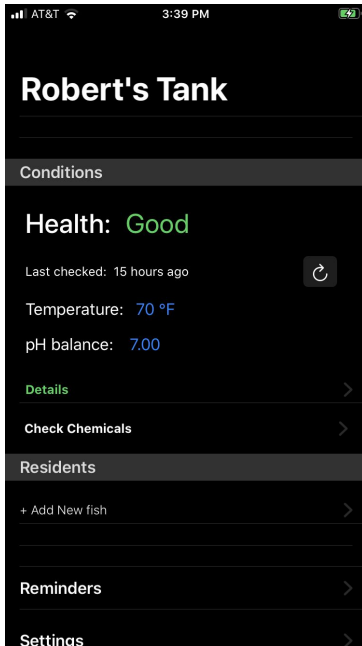
5. App notifies of high nitrates (right).
6. Cycle water in the tank, add biological and artificial filtration



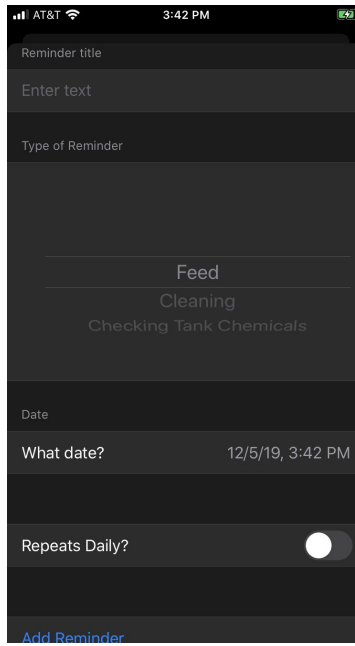
4.6 Feeding Reminder

Sofishticated provides a daily reminder to feed fish, to make it easy to maintain a regular feeding schedule.

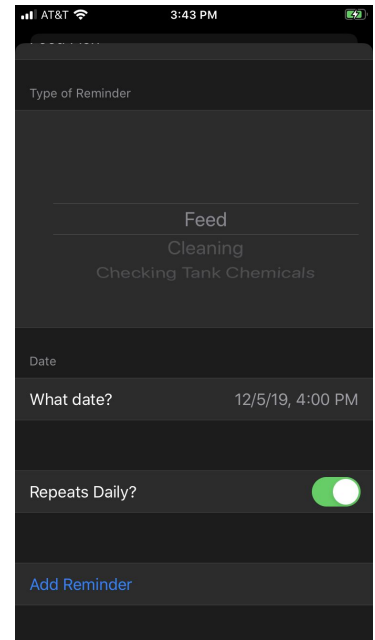
4.6.1 Configuration



1. On the main screen navigate to **Reminders** to add a reminder to feed the fish.



2. Enter a name, select the type of reminder, the date and time of occurrence, and when it should repeat.



3. When finished, select **Add Reminder**.