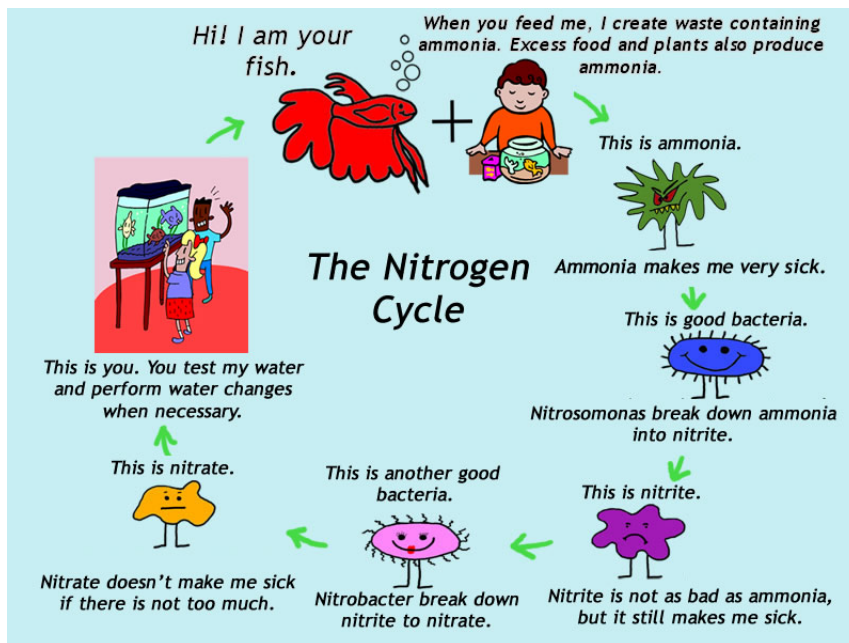

The Nitrogen Cycle and Your Aquarium

The water aquariums looks like, well, water. However, there is an elaborate cycle developing at a microscopic level called the Nitrogen Cycle. If this cycle is not managed properly, your fish can become very sick and even die.

In a nutshell, here is what happens. Fish eat, and then fish excrete waste into the water. Fish waste is very high in a substance called ammonia. Decaying plants and excess food can also contribute to the amount of ammonia in your tank. Ammonia is VERY toxic to fish.



You may have noticed the BIO-wheel in your aquarium kit. This BIO-wheel helps support the growth of good bacteria in your tank. One such colony of good bacteria is known as Nitrosomonas. These bacteria break down ammonia to Nitrite.

Nitrite still makes fish sick, but never fear, another colony of good bacteria called Nitrobacter helps break down Nitrite to Nitrate. Nitrate does not make fish sick unless it is present in large



quantities. If the Nitrate levels get too high in your tank, a water change can resolve the problem quickly.

Assignment #2

With your team, investigate the methods for cycling an aquarium. Develop a detailed plan for cycling your aquarium and prepare a presentation explaining why the method that you developed is the "best method." You will also need to develop a timeline for your process. How will you know when your tank is fully cycled? How will you monitor the process? What supplies will you need? There are some resources to help you get started at:

<http://www.cstecalumet.org/Aquatic%20Adventures%20Academy/aaanitrogencycle.html>

***Note: It is important that no organisms are harmed during the cycling process.**

Communicating Research Findings

Prepare a presentation to share your team's plan with the rest of the group. Be sure to include proposed solutions to the questions posed above. You should also include support for each response.

Curriculum Connections

Can you think of other cycles that exist in nature? What are some of the characteristics that are common to these cycles?



Aquatic Adventures Academy Project Rubric

Teacher Name: _____

Student Name: _____

CATEGORY	4	3	2	1
Plan for Organizing Information	Students have developed a clear plan for organizing the information as it is gathered and in the final research product. All students can independently explain the planned organization of the research findings.	Students have developed a clear plan for organizing the information in the final research product. All students can independently explain this plan.	Students have developed a clear plan for organizing the information as it is gathered. All students can independently explain most of this plan.	Students have no clear plan for organizing the information AND/OR students in the group cannot explain their organizational plan.
Response to Questions	Students present well-developed responses to all of the posed questions.	Students present well-developed responses to most of the posed questions.	Students present well-developed responses to some of the posed questions.	Students present well-developed responses to few to none of the posed questions.
Delegation of Responsibility	Each student in the group can clearly explain what information is needed by the group, what information s/he is responsible for locating, and when the information is needed.	Each student in the group can clearly explain what information s/he is responsible for locating.	Each student in the group can, with minimal prompting from peers, clearly explain what information s/he is responsible for locating.	One or more students in the group cannot clearly explain what information they are responsible for locating.
Quality of Sources	Researchers independently locate at least 2 reliable, interesting information sources for EACH of their ideas or questions.	Researchers independently locate at least 2 reliable information sources for EACH of their ideas or questions.	Researchers, with some adult help, locate at least 2 reliable information sources for EACH of their ideas or questions.	Researchers, with extensive adult help, locate at least 2 reliable information sources for EACH of their ideas or questions.
Group Timeline	Group independently develops a reasonable, complete timeline describing when different parts of the work (e.g., planning, research, first draft, final draft) will be done. All students in group can independently describe the high points of the timeline.	Group independently develops a timeline describing when most parts of the work will be done. All students in group can independently describe the high points of the timeline.	Group independently develops a timeline describing when most parts of the work will be done. Most students can independently describe the high points of the timeline.	Group needs adult help to develop a timeline AND/OR several students in the group cannot independently describe the high points of the timeline.