

Title: Will it Survive?

Heading:

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Class: Period 9

Background Information:

We know that an ecosystem, which is what we're building, contains both living and nonliving things. These things interact with one another. We also know that in order to keep the ecosystem balanced, everything in the ecosystem has to work and interact with each other. There are aquatic and terrestrial ecosystems.

Aquatic ecosystems have to do with water and terrestrial ecosystems had to do with land. We know that the nitrogen, carbon and phosphorus cycles happen in ecosystems. Producers, consumers and decomposers are also needed in order to keep an ecosystem running well. There also has to be a balance between the amount of carbon dioxide, oxygen, plants, and animals in the ecosystem for it to run well.

We know that in ecosystems, plants need certain nutrients and need to go through the process of photosynthesis in order to survive. When photosynthesis occurs, plants give off oxygen into the air. For photosynthesis to occur, plants need carbon dioxide, which is produced by animals in the ecosystem. These animals need the oxygen plants give out in order to survive. This is one way of how the plants and animals in the ecosystems work together. For the plants to grow, the soil also has to be healthy. The soil can't be too dry or overflowing with water. If the soil is too dry or overflowing with water the soil won't have the nutrients it needs and the plants won't be able to grow. Plants can actually grow without soil as long as the nutrients they need are in the water.

In order for the animals in the ecosystem to survive, there needs to be oxygen in the bottles for them to be able to breathe. There also must be space for them to roam around and not get too cramped or stuck. Food sources and water also needs to be available for the animals to survive.

There also needs to be a way to filter out the animal wastes so that it doesn't affect the animals or ecocolumn. A food web would also be an efficient way to get the animals what they need. The sun's rays must also be able to get through so the plants can use the energy.

Driving Question: Does the amount of ammonia, nitrite or nitrate in the water affect the plant growth that's on the soil?

Hypothesis: (1-2 sentences) (if.....then.....because.....)

If there is an extreme amount of nitrite, nitrate or ammonia in the water the plants won't grow as well as it would with ideal amounts of nitrite, nitrate and ammonia.

Materials: (list)

1. 2 bottles (2-liter) (Specifically coca-cola bottles)
2. Tape
3. Scissors
4. Water
5. Soil
6. Radish seeds
7. Water
8. Pebbles
9. Coffee filter
10. Rubber band

Procedure: (list)

Step 1: You grab one of the bottles, and label it "Bottle #1". After this, you grab the other one and proceed to label it "Bottle #2". Do not write the numbers on the labels, as we will be removing those.

Step 2: Grab Bottle #1 and cut off 3 and a half inches from the top of the bottle. Take the cap off before doing so.

Step 3: Grab Bottle #2 and don't do anything but stab five holes in the cap. Each hole should be at least 1 millimeter of diameter. After this, carefully wrap a coffee filter around it, sealing it with a rubber band.

Step 4: To Bottle #2, cut off four inches from the bottom. Now

Step 5: We will add in up to an inch of pebbles.

Step 6: We will add in up to three inches of water to bottle number one. For the correct water, mix 250 ml of pond water and 500 ml of distilled water. This gets put into Bottle #1.

Step 7: For the correct dirt, Mix 1/4th of a cup and 1/16 of water (we did take some out as it was flooding) for moist dirt. This will go into Bottle #2 along with the worms. Put this inside Bottle #2. Then, grab your worms and place them inside as well.

Step 8: Now it's time to put our algae in. Here, we put in exactly 42 grams of algae into the water.

Step 9: Now, begin to focus on Bottle #2. Place 128.3 grams of soil into it. Then, put in 24 fertilizers seeds, and 17 normal seeds. Then, put 110.6 grams of soil on top of the seeds.

Step 10: On the third day, put 30 ml of tap water into Bottle #2.

Step 11: Now on the third day, our teacher provides us a guppy. We realized the algae was too much, and we took 2.5 grams out.

Results/Data:

Day 1: The radishes didn't grow and our soil was bad so we had to switch it to a healthier soil and replant the radishes in order to have progress.

Day 9: The nitrite level is at 3 and the nitrate level as 2.

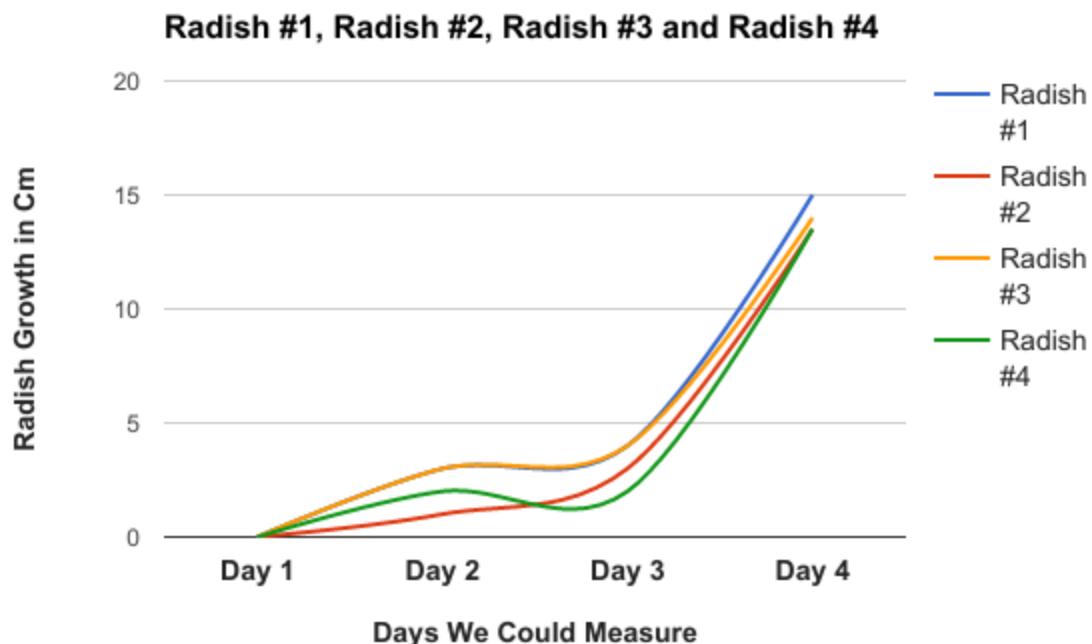
The ammonia is .7

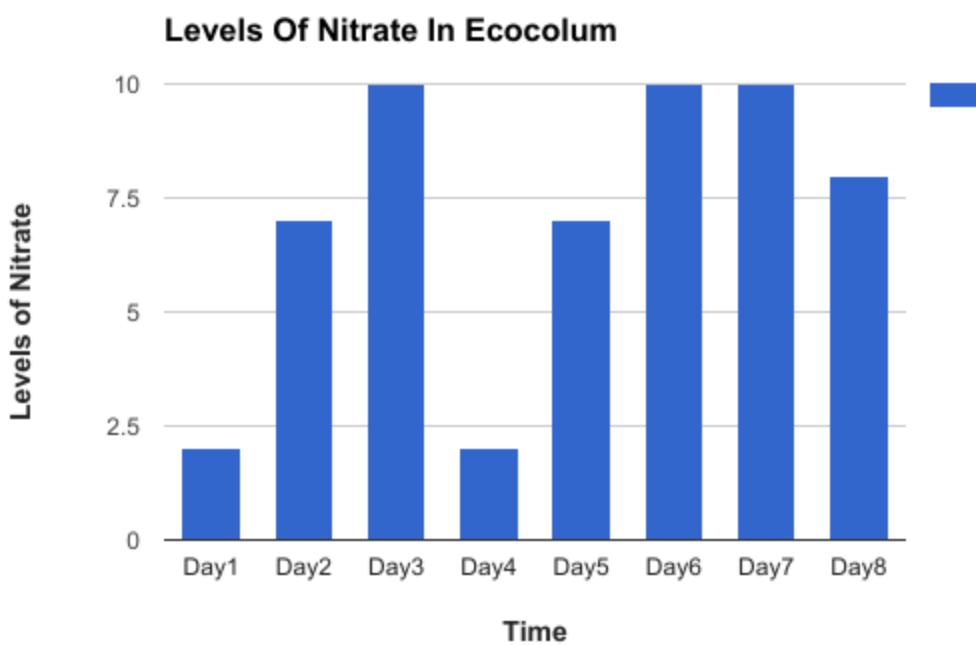
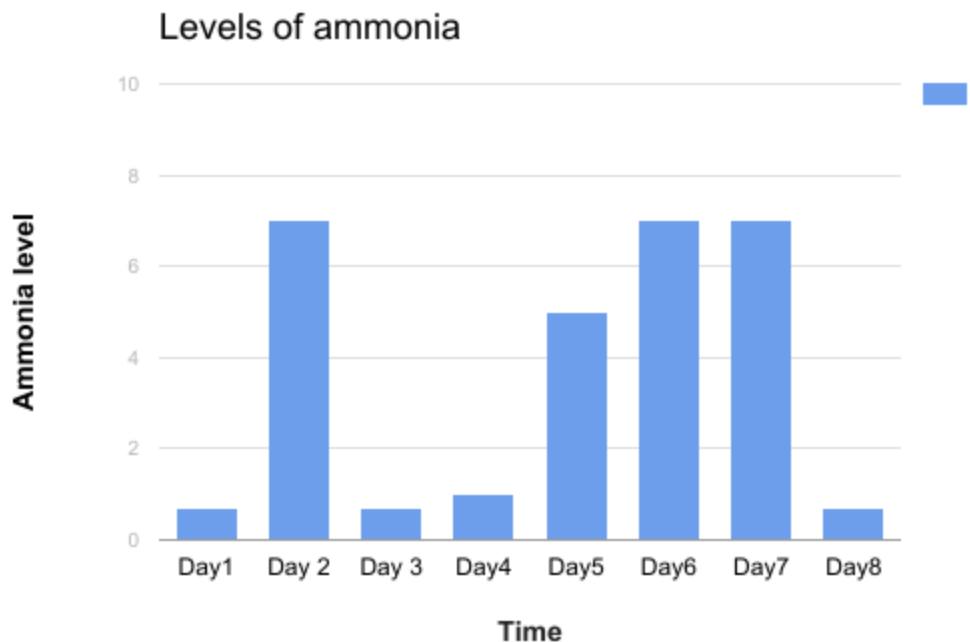
Day 10: The Nitrate level is 7 and the nitrite level is 3. Ammonia level is 0.7. The shortest plant is 5 cm, while the tallest is 7.5 cm

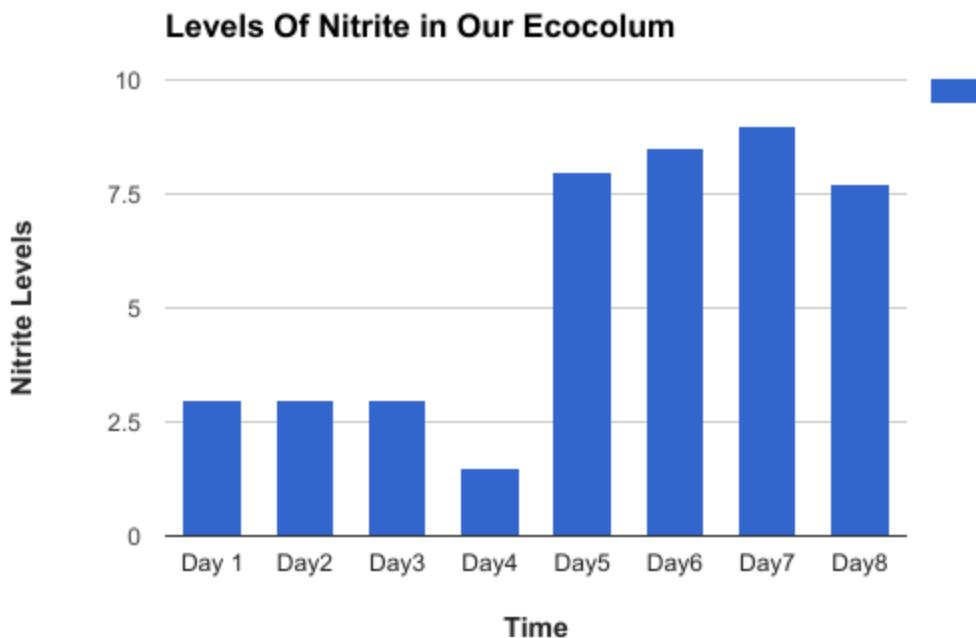
Day 12: The Nitrate level is 10, and the Nitrite level is 3. The plants are around 11 cm.

Day 22: ammonia level is ideal. The Nitrate level is 10. And the Nitrite level is 1.5

Day 24: Nitrate level is 5, Nitrite level is 8. Ammonia was 7.







Is the fish still alive?

3/27/17	3/28/17	3/29/17	3/30/17	3/31/17	4/3/17
No fish	Alive	Alive	Alive	Alive	Dead

Of Worm's Still Alive

3/28/17	3/29/17	3/30/17	3/31/17
4	4	2	1

Analysis: (two paragraphs)

With the information that we collected from this lab, we can clearly note that the high levels of ammonia affected our fish's survival. Due to the amount of ammonia, nitrate, nitrite in the water, our fish, Jisoo, died. On the first day when we put Jisoo in, the ammonia level was at 7, but we originally didn't know it was at 7 because we calculated it wrong. Later, based on our bar graphs, the ammonia levels went up, especially from day 1 to day 4. When Jisoo died, we waited a week to take him out and decided to change our driving question from, "Does the ratio of plants to animals affect the success of our ecocolumn?" to "Does the amount of ammonia, nitrite, or nitrate in the water affect the plant growth that's on the soil?" since our original driving question would be hard to work with at this point. But when we did take him out, the ammonia levels dropped down again. The reason behind this was because our fish was no longer there to let out any waste containing ammonia. Without the continuing release of ammonia, the ammonia levels went down while the nitrate and nitrite levels increased. From day 4 to day 5, our nitrite levels boosted up really fast from 1.5 to 8.

Our radish seeds grew a lot even though our nitrate, nitrite, and ammonia levels in the water were pretty high most of the time. According to the "Radish Growth" bar graph, our plants grew the most from Day 3 of calculating measurements to Day 4 of taking measurements. We weren't able to take measurements everyday because of weekends, spring break, people coming in for presentations, and because of a field trip we took.

In the end, only one of our four worms survived. Our soil was really bad at first which killed two of the original four and our only caterpillar.

Conclusion: (two paragraphs)

In conclusion, our hypothesis was wrong. Our plants did grow a lot, and turned out to be healthy, despite there being an extreme amount of nitrite and nitrate in the water. The soil we planted after we took away the first batch was fertilized and worked well, unlike the first one. The coffee filter we put at the bottom of Bottle #2 with soil also worked well. It succeeded and kept the soil from slipping through the holes we made in the cap. This kept the soil from going through and into the water. It also let the water condensate up to the soil and into the plant's roots.

Our soil was really bad and dry at first, which killed two of our six worms and our only caterpillar leaving us with four worms. At one point, our worms were in soil that was overflowing with water, which one of my group members for some reason did without consulting us. But we then traded the soil for healthier and more fertilized soil so that our plants could grow and be healthy, while the worms would also be able to survive. Unfortunately, two of the four worms left died because of the water, and then another one died a few days after, leaving us with one worm only. In the end, only one of our four worms survived.

Our guppy, Jisoo, survived a decent amount of days. But, after returning from a weekend we found Jisoo dead. The ammonia level was extremely high from the start, which we found out later on because we originally measured it wrong. As a matter of fact, we continued to argue over the amount of algae we were going to put in the fish's water. It was so bad, that our fish couldn't move because of it. Eventually, we managed to compromise and take out some of the algae. With this, our fish was able to swim. Moving on from this, Jisoo only lasted four days. In these four days, we fed the fish how we were supposed to. So yes, we didn't succeed, but we all learned something from these experiences.

I learned...

During the lab I learned how to run an ecocolumn and that an ecocolumn is like an ecosystem but smaller and that in order for it to be successful biotic and abiotic things have to interact and work together. I also learned the difference between a food web and a food chain which is, a food web consists of many food chains and food chains are the chains in ways animals get food. I also learned that ecosystems and ecocolumns usually have both food chains and food webs in order for them to keep on working and being successful. I now know what the nitrate, nitrite, and carbon cycles do and what ammonia is. I also now know how to measure ammonia, nitrite and nitrate levels and why there shouldn't be an extreme amount of any of them in a fish tank or anywhere, really.

Redo:

If I were to redo this I'd probably work with different people because my group members were mostly conflicted, difficult and annoying. I would also use a bigger bottle so the fish would have more room to swim in and so we would have more room for things, like other animals and plants. I would also add snails and amano shrimp so that the water and bottle would be cleaner with the water in it. Other than working with different people, using a different bottle and adding a few more things, I don't think I would change much.



Ideas for Ecocolumn

Animals+Plants We Might Include:

caterpillars

algae

fish

amano shrimp

earthworms

grass

flower (especially for caterpillars)

coral

ants

Materials/Prices

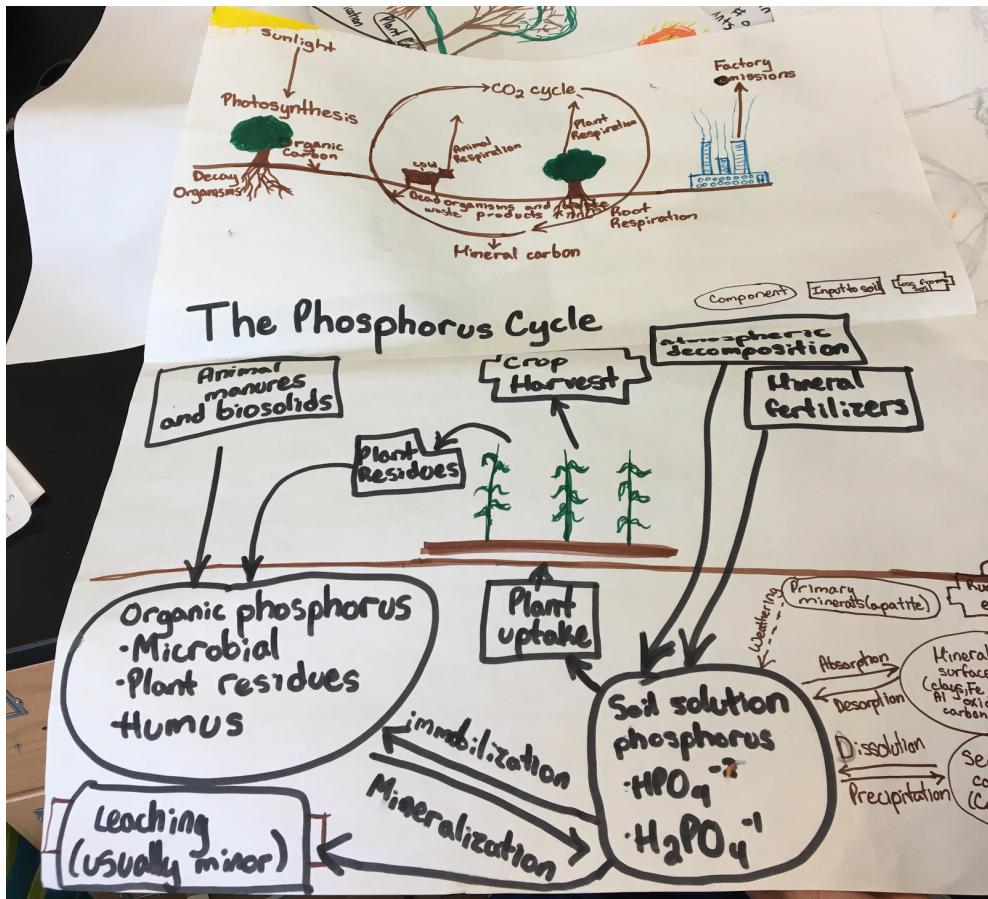
3 bottles (2-liter) - free

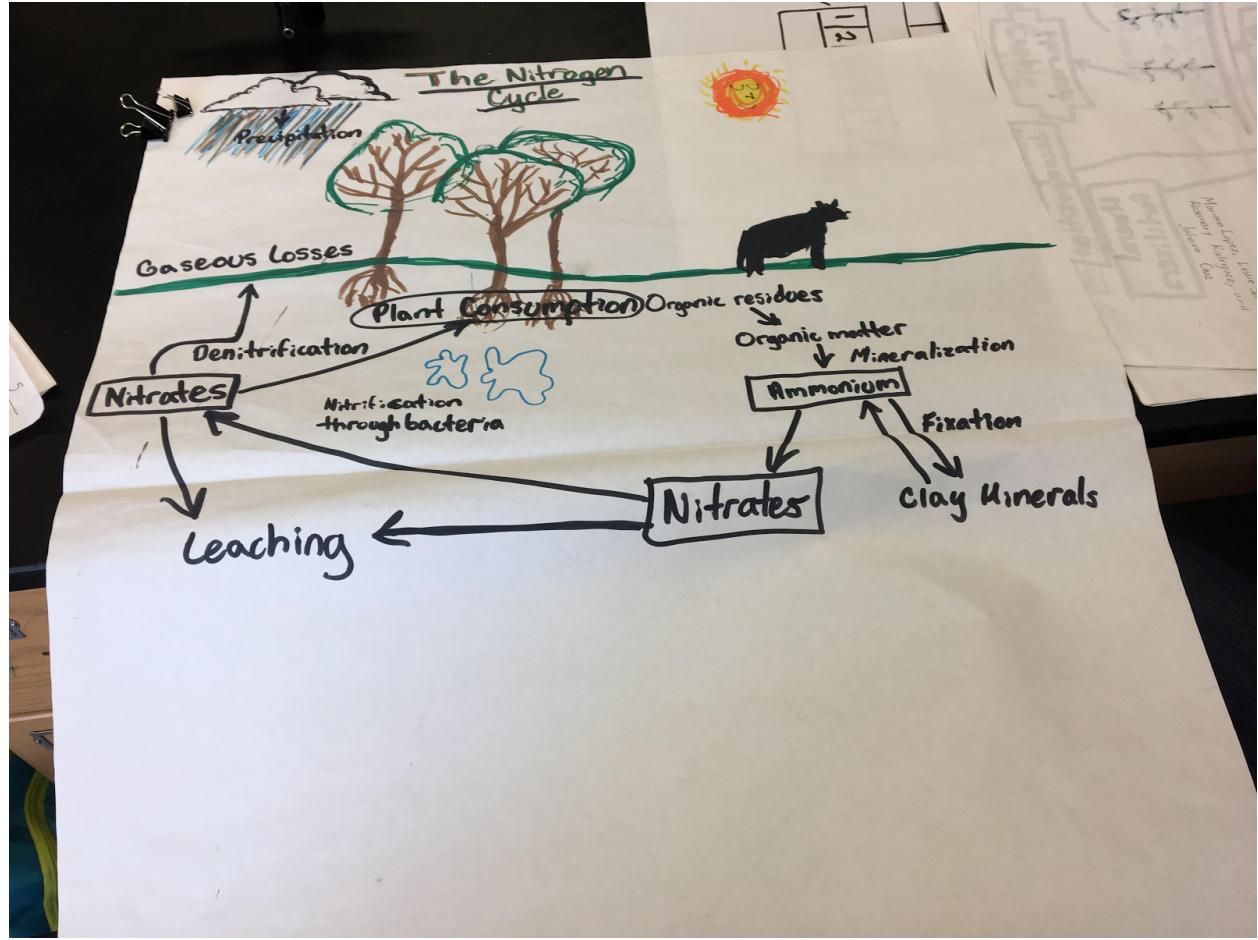
caterpillars (5) ~~\$2.49 + 7.95 shipping~~
never mind - free in Compton's yard

(3) fish-free

amano shrimp







Grass

# of days in project	1	2	3	4	5	6	7	8
# of cm it's grown								

fish

# of days in project	1	2	3	4	5	6	7	8
# of days it's surviving								

Caterpillars

# of days in project	1	2	3	4	5	6	7	8
# of days it's survived								

Amano Shrimp

# of days in project	1	2	3	4	5	6	7	8
# of days it's still alive								

Ants

# of days in project	1	2	3	4	5	6	7	8
# of ants there are								

Radish

# of days in project	1	2	3	4	5	6	7	8
# of cm it's grown								

Works cited:

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- <http://animal-world.com/encyclo/fresh/information/CycleAquarium.php>
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