Tariq Evans
Morgan Stroud
Anais Camacho
Adriana Frias

March 27, 2017
Science Period: 9

Background Info:

In terrestrial, the organisms and materials present were soil and grass. The soil provided the medium for the grass to grow, holding the nutrients necessary for the grass to grow. The grass was a producer and its main role was to convert carbon dioxide into sugar and oxygen which was imperative for the survival of the ecosystem. In the decomposition, the organisms and materials present in this level were: leaf litter, salamanders, spiders, ants, centipedes, and worms. The leaf litter would be considered producers even though they were already dead. They were producers because this is where the primary consumers got their energy. This is why the leaf litter was so important. The salamander was a primary consumer as it ate the leaf litter. The spider was a secondary consumer as it ate other insects. The ants, centipedes, and worms all were primary consumers as they all ate the leaf litter. These organisms were important because they all helped the energy flow through the ecosystem. For the nitrogen cycle, nitrogen from the atmosphere goes into the soil which transfers to the plants. Once the nitrogen goes from the soil into the plants, from the plants roots it goes through nitrification where bacteria turns the nitrogen molecules into nitrites and nitrates. In our eco column the nitrites and nitrates go into the soil when the water drips from our terrestrial chamber into our aquatic chamber where some of it turns into ammonia. The nitrites and nitrates left in the soil goes back into the roots, through the plants where it is released back into the atmosphere. In aquatic, the organisms and materials in the aquatic zone included water, fish, and elodea. The water was important because it allowed the water system in the eco-column to occur. This is very important because without a functioning water system the other organisms in the upper levels could not survive as no water would make it up to them. The fish were primary consumers as they ate the elodea This is important because it allowed the carbon cycle to occur as they ate the

glucose produced by the plants and gave off the carbon dioxide the plants needed to produce said glucose and to make the nitrogen cycle function as they excreted ammonia which was converted into nitrate by nitrifying bacteria and taken in by the plants to grow. The elodea played an important role as a producer as described above.

Driving Question:

Will we be able to keep the fish and plants alive for the duration of the experiment?

Hypothesis:

If we put a fish in, then it'll survive for awhile because the hole provides oxygen for the fish.

Materials:

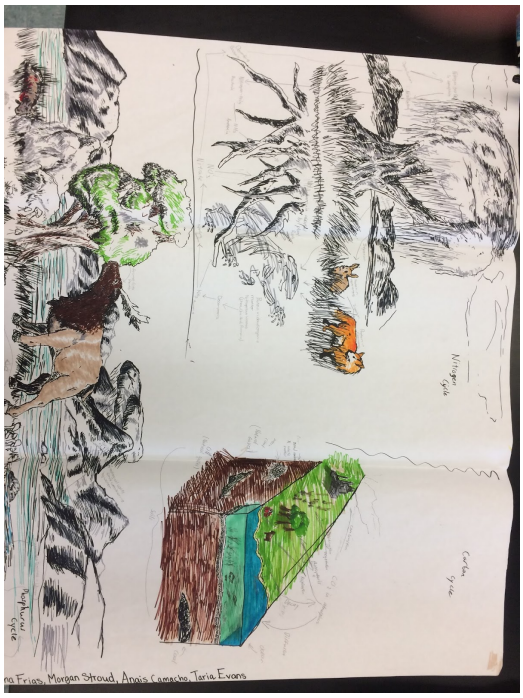
- Terrestrial Plant x1
- Aquatic Plant x1
- Soil
- Water
- Three 2-liter Bottles
- Pebbles
- 4 Ghost Shrimp
- Two Tailed Half Moon Betta
- Filter (Coffee Filter)

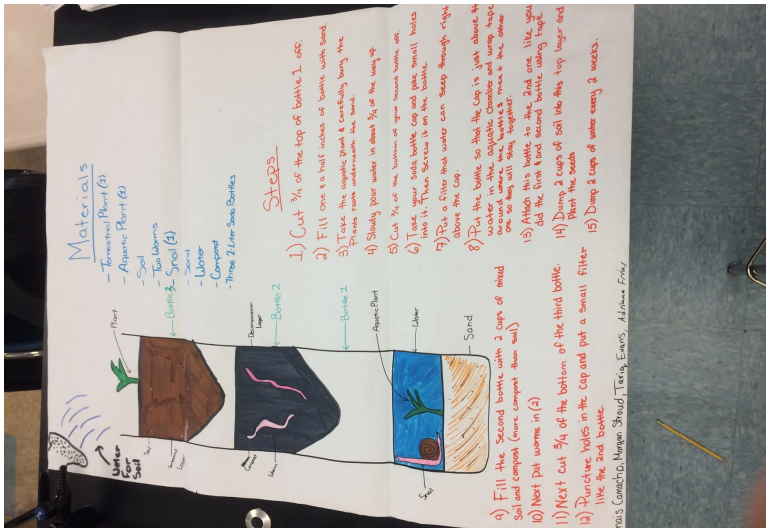
Procedure:

1. Cut ¾ of the top of bottle 1 off
2. Fill 3.81 cm of bottle with rocks
3. Take the aquatic plant and carefully put the plant in on top of the rocks
4. Slowly pour the water in about ¾ of the way up.
5. Cut ¾ of the bottom off bottle 2
6. Take the soda bottle cap and poke small holes into it. Then screw it on the bottle

7. Put a filter that water can seep through right above the cap.
8. Put the bottle so that the cap is just above the water in the aquatic chamber
9. Next cut ¾ of the bottom of the third bottle
10. Puncture holes in the cap
11. Place the bottle on top of the second bottle and tape it together
12. Dump 2 cups of soil into this top layer and plant the seeds.
13. Put fish in aquatic chamber of Ecocolumn
14. Dump 1 cup of water once every 3-4 days.

Pictures



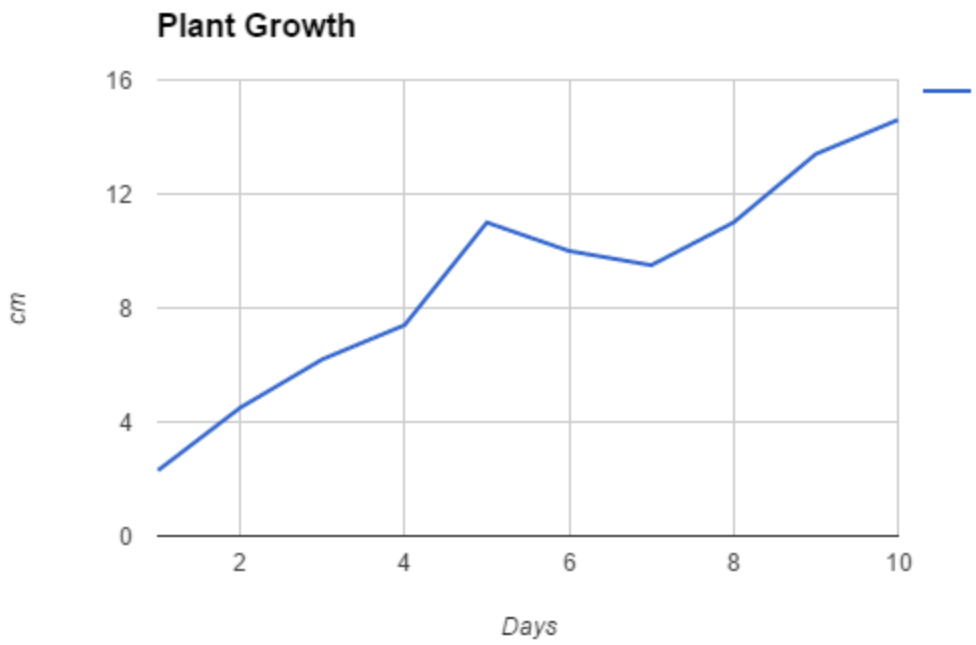


Results/Data:

Week 1	Day 1	Day 2	Day 3	Day 4	Day 5
Plant height	2.3cm	4.5cm	6.2cm	7.4cm	11cm
Plant color	Green	Green	Green	Green	Green

Betta Fish	N/A	N/A	N/A	N/A	One Betta Fish
Amount of food fed	4 Pellets	4 Pellets	4 Pellets		
Alive or dead	Alive	Alive	Alive	Alive	Alive

Week 2	Day 1	Day 2	Day 3	Day 4	Day 5
Plant height	?	9.5 cm	11cm	13.4cm	14.6cm
Plant color	Green	Green	Green	Green	Green



Analysis:

By keeping the added amount of water constant[1 Cup], the plant[radish] grew x centimeters everyday, the Nitrate levels within the aquatic chamber increased by $0.2mg/L$. In addition, during the process of growing radishes and filtering the dirt, we've managed to grow our aquatic plant[Marimo Moss Ball]. This process also provided a 'livable' environment for our fishy little critters. The critters were provided with store bought food which helped ensure their well being.

The ghost shrimp didn't get along with the fish so well. The four shrimp died within a week while living with the male halfmoon betta. The betta fish on the other hand is still alive to this day. After watering the plant, the dirty water transfers to the aquatic area, causing the water to became very filthy. The plant is currently dying from too little water and sunlight.

Conclusion:

In conclusion, preserving the life of the betta fish wasn't an issue. Where as having four ghost shrimp share the small environment is futile. We've collected enough substantiable evidence to validate our hypothesis because, the fish managed to survive throughout the entire duration of the experiment due to the hole supplying it oxygen.

More attention should have been provided for the plant. It would of have had a better chance of surviving with a greater amount of water and sunlight. If there was more water and space, the shrimp could of had a better chance at surviving. The shrimp didn't eat much because the fish kept trying to attack it.

Morgan:

I learned that there are lots of things needed to be done in order to keep a fish alive inside an ecocolumn. I also learned that plants grow faster with fertilizer seeds than just with the plant seeds alone.

What I would do differently is get some sort of goldfish instead of a betta. I would also give the plant a greater amount of both water and sunlight than recommended. If I were in a group alone then I wouldn't put any type of living creature in the water portion of the ecocolumn except for an aquatic plant.