01/19/2017 Shelby Connelly and Julia McGaffney

Experimental Inquiry Project

How do freshwater plants grow in different water qualities? Our first hypothesis is that freshwater plants grow best in their natural environment, have decreased growth in grey water and die in soapy and oily water. We believe that grey water will decrease freshwater plant growth as it's not as clean as freshwater. We believe that freshwater plants will die in oily water from our knowledge of oil spills. Our second hypothesis is that freshwater plants grow healthily in their natural habitat and grey water but die in soapy water and oily water. We believe that the freshwater plants survive in grey water as we can recycle and water our plants with grey water to decrease our environmental impression.

To test our hypotheses, our method is to grow Taxiphyllum Barbieri, also known as Java Moss, in four clear plastic cups. Each cup will have a different water quality. The different water qualities will be fresh water, grey water, soapy water and oily water. Each day for a week we'll measure the plants observe them and their changes and record what we observed in multiple tables.

The environmental issues of the experiment are that the plant will most likely die in the soapy and oily water. It's unethical to kill organisms for examination. However the examination refers to how it's unethical to contaminate water. A cultural issue is that Taxiphyllum Barbieri could become an invasive plant with a given water quality. The environmental issue that we're basing our hypotheses off of is water contamination.

To carry out our experiment, we'll need four clear plastic cups, four Taxiphyllum Barbieri plants, aquarium gravel, a ruler, a camera, fresh water, grey water, dish soap and motor oil. Fresh water and dish soap will create soapy water. Fresh water and motor oil will create oily water.

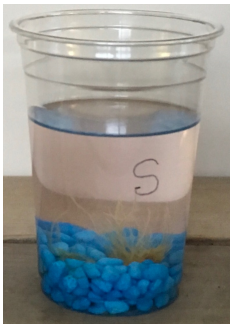
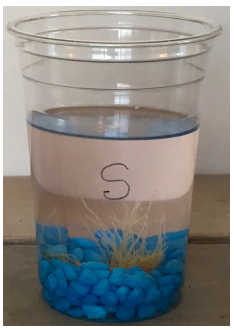
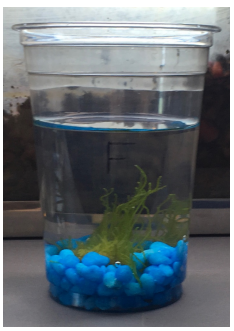
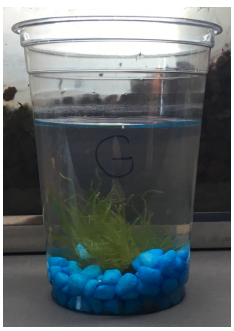
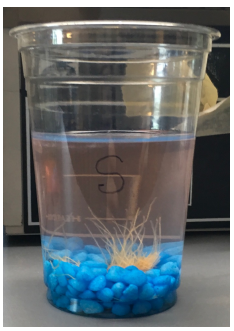
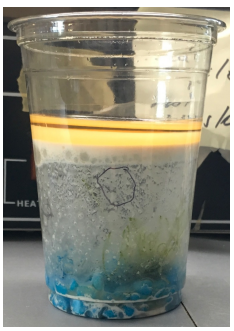
Water contamination is dangerous as if someone were to consume a living thing from a contaminated environment, they could become ill.

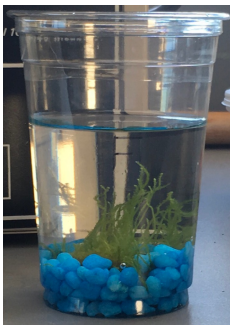
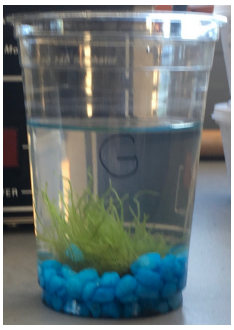
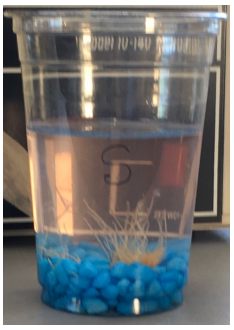
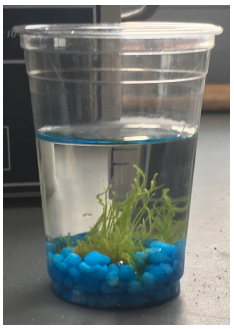
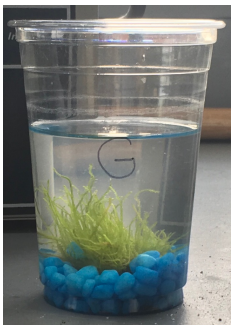
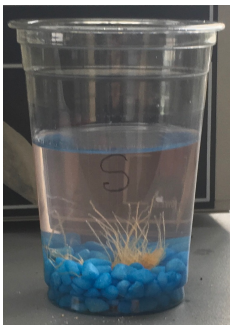
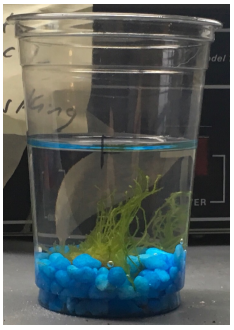
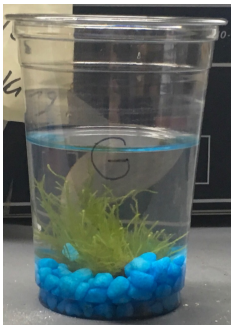
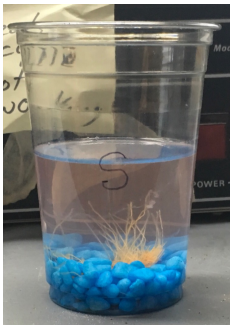
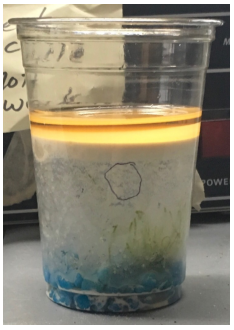
Our experiment is linked to the First Peoples ideas of consequential activity, duties and authorities, history, patience and time. Contaminating water is a form of consequential activity that primarily has a negative impression on aquatic environments and can travel up the food chain and have a negative impression on land environments. Having a positive environmental impression is an example of a duty or an authority. Negative environmental impression worsens with time, referring to history. For our plants to grow, we had to be patient, just as we'll have to be patient as slowing, stopping or even reversing the results of pollution will take time.

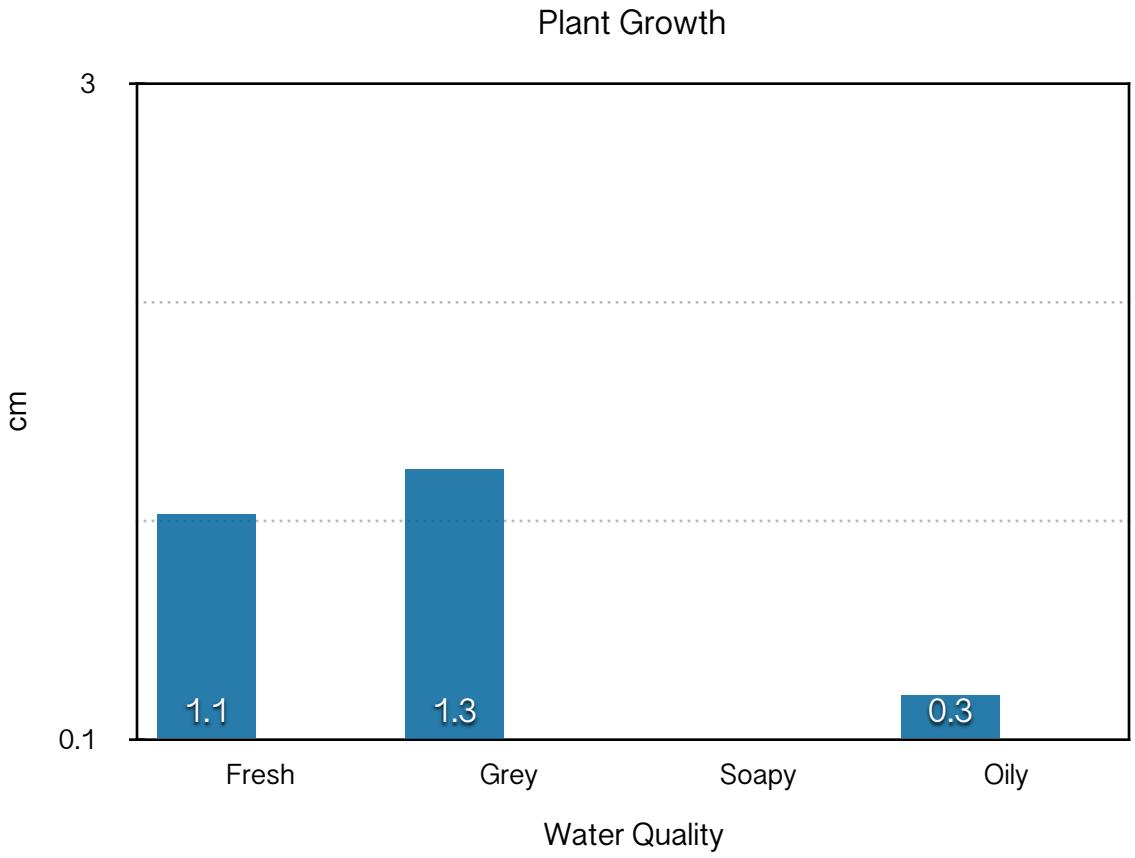
Our constant components were the material of the cups, the plant, the quantity of aquarium gravel and the quantity and temperature of liquid. Our altered component was the kind of liquid. Our discrepancy was that some liquids don't mix as they have different densities.

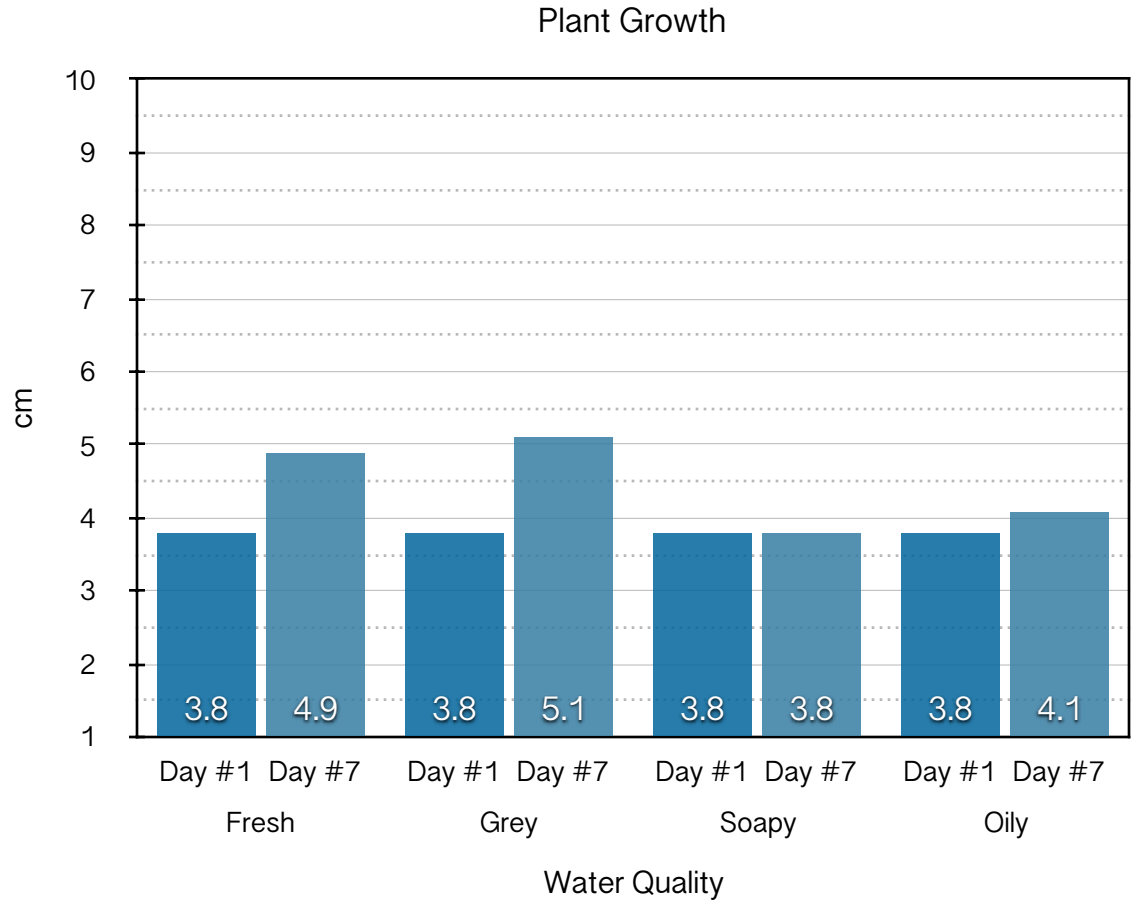
Taxiphyllum Barbieri

	Fresh	Grey	Soapy	Oily

Day #1				
Day #2				
Day #3				
Day #4				

Day #5				
Day #6				
Day #7				


Plant Growth
3
0.1
cm
1.1
1.3
0.3
Fresh
Grey
Soapy
Oily
Water Quality


Plant Growth
10
9
8
7
6
5
4
3
2
1
cm
3.8
4.9
3.8
5.1
3.8
3.8
3.8
4.1
Day #1
Day #7
Fresh
Grey
Soapy
Oily
Water Quality

At Day One, all four plants measured 3.8cm. By Day Two, the soapy water plant died and became a shade of yellowish brown. By Day Seven, the three remaining plants had grown by minimum 0.3cm. The freshwater plant grew by 1.1cm resulting with a final height of 4.9cm. The grey water plant grew by 1.3cm resulting with a final height of 5.1cm. The oily water plant grew by 0.3cm resulting with a final height of 4.1cm.

In conclusion, Taxiphyllum Barbieri grows well in freshwater and faster in grey water. It's possible to decrease our environmental footprint by recycling grey water to water our plants. However, it's nonetheless unethical and non-environmentally friendly to contaminate water with grey water. Soap kills Taxiphyllum Barbieri, placing itself higher on the contaminant list for this plant. Motor oil slows and decreases Taxiphyllum Barbieri's growth.

When water becomes contaminated, the contamination begins accumulating and magnifying in primary producers and travels up the food chain. Plants are primary producers, which explains why the results of water contamination were quickly identified in our experiment.

Our observation backed the majority of our second hypothesis. The component of our hypothesis that didn't match our findings was that Taxiphyllum Barbieri has decreased growth in oily water but doesn't die.

We had multiple flawed components in our experiment. First, each Taxiphyllum Barbieri had a slightly different quantity of aquarium gravel, giving the illusion that the Taxiphyllum Barbieri was taller than reality. Second, the motor oil didn't mix with the water as we expected it to. As it has a different density, it floated on top. Third, we measured the Taxiphyllum Barbieri outside of the cups. Water magnifies objects, which gave the illusion that the Taxiphyllum Barbieri was taller than reality.

The confusing variable in our experiment is that the Taxiphyllum Barbieri in grey water grew taller than the Taxiphyllum Barbieri in freshwater.

We could've observed which Taxiphyllum Barbieri grew the fastest and which grew the slowest or which Taxiphyllum Barbieri survived the longest and which died the quickest.

If we had the chance to redo this experiment, there'd be multiple components that we could carry out with a superior method. We could use an equal quantity of aquarium gravel for each cup, use an oil with an equal density to water and measure the Taxiphyllum Barbieri outside of the cups.