

The Impact of Microplastics on Algae Respiration

The problem we hope to solve is how microplastics in water are affecting algae respiration and production of oxygen. Algae are a very important oxygen supplier globally and are important in the larger aquatic ecosystem. We know that microplastics have harmful effects on almost everything and algae is no different. How can the algae continue to produce about 20% of our oxygen when they are fighting their own battles? Not only are we looking into algae respiration and their production of oxygen but we are also taking into consideration that 25% of oceanic life rely on algae at some point in their life.

So far we have researched algae and microplastics and how they affect each other. We have found that microplastics can have different effects on algae. We can see a variation in the stress on the algae affecting its biological process depending on the size of the microplastic as well as the type of algae. For example, algae can have a decreased photosynthetic effectiveness after interacting with microplastics.

We plan to recreate algae and microplastics using python object oriented coding. We will also be running experiments on algae in person and using it to compare to our computer model. We will then be using that code to gather data and analyze trends using a cluster model.

In our computational model we have created algae and microplastic using object oriented code. Our code currently only allows the algae and the microplastic to interact on a two dimensional plane moving and interacting with one another. The algae lacks complex biomechanisms and simply acts on the basic commands of move, reproduce, or die. We will continue to refine the code so it better mimics the patterns and behavior of the algae.

On our physical experiment side of the project we have prepared and purchased the necessary materials to grow and run our experiments on the algae. We are using *Anabaena* algae for our first experiment. This algae grows quickly and will allow us to conduct and complete experiments in the span of a couple days. We will be testing the waters PH to look at the respiration and photosynthesis of the algae in the water. Additionally, we will be measuring the biomass of the algae to determine how the plastic has affected the algae's growth.

Our results will look like lots of numbers at first, but we hope that with our results we can come up with some patterns with the algae. We hope to see some similarities between the algae

and the model. However, we expect our first results to vary and plan to continue to identify important factors and further refine our model.

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