

Report TTO Globe Science Fair



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Introduction:

At school the 10-students were asked if they would like to participate in a science project, as you can guess we as a group liked the idea of this and decided to participate. Once we got all the information needed, we were able to think of a subject, the eutrophication process, we had talked about this in our biology classes already and all thought it would be interesting to get into it a little bit further. Then we had to wait for the package with meters to arrive so that we could start with the measurements. The package arrived and in the meantime we had contacted a farmer and asked if we could use his ditches for our project, this was fine by him so there we went and took our measurements. Now our report is finished and we hope to give you some more information on this subject and to live up to the expectations this science fair brings with it.

Research question:

What is the difference in NH_4^+ , pH and clarity of water in a ditch next to grassland and water in a ditch next to fertilized land?

Hypothesis:

The ditch next to the fertilized land will contain more NH_4^+ , have a higher pH and will be less clear than the ditch next to unfertilized land.

Theory:

Eutrophication is the process of more and more plants and algae growing in the water. This has negative consequences for the life in the water. It usually starts with using fertilizers. They contain phosphorus and ammonium to stimulate plant growth, but they also stimulate plant growth in water. More and more algae arise and the water starts to become less clear. It blocks the sunlight. Fish have a harder time finding their prey, while their prey can still hunt their prey. This leads to a decrease in water animals who eat the algae. Meanwhile there are more and more algae, which block the sunlight. This is an important factor for photosynthesis, which cannot take place anymore. As a result that the water plants and algae die quickly. Now that there are no water plants left to produce oxygen. Due to the little oxygen, the water animals die and eventually there is no life left in the water.

Eutrophication often takes place in water which is not flowing. Here the water doesn't take the algae sediments, but it stays in the same place, where it gets broken down into minerals for the other algae. You can easily see this in the summer, because then you see the algae in the water of ponds.

Eutrophication has a negative effect on water because at the end of the process there is no life possible anymore.

Materials:

- pH-level meter
- NH_4^+ meter
- a plate with different colours with which you can see how clear the water is
- water from a ditch next to fertilized and unfertilized land

Method:

We used a package with all sorts of meters, that the school bought us to get our results. With this package came a booklet in which it explains every step of taking a measurement. If you want to see what it looks like, just ask and we will show you. Besides the package with these meters we also had the plates with which we could measure the clarity of the water. With this we put the plate in the water and then put it further down and further down in it, eventually the white pieces of the plate were no longer white but getting yellow or even brownish. This was for us a sign that the water in the ditch was not very clear. We did these measurements two times to be able to get a better idea of what the difference in general is.

Results:

The pH levels in the water:

Ditch next to fertilized land		Ditch next to unfertilized land	
8	8	8	8

The level of NH_4^+ in the water:

Ditch next to fertilized land		Ditch next to unfertilized land	
0.2	0.2	0.2	0.2

The numbers are expressed in mg/L.

Clarity:

	Ditch next to fertilized land		Ditch next to unfertilized land
Where you can still see the white part	10 cm	10 cm	-
Where you can't see it anymore	30 cm	30 cm	-

We weren't able to measure in the ditch next to the unfertilized land because we could see the bottom clearly.

Conclusion:

As we can see from the results, the eutrophication process in the ditch next to fertilized land doesn't really deviate from the ditch next to unfertilized land. However, this does deviate from the hypothesis and theory because we suspected that there would be a difference between both the processes. If at one ditch the NH_4^+ , pH and the clarity values are higher, than we could conclude that this ditch had a faster eutrophication process, because these factors influence the eutrophication. As this is not the case and the values are the same, we can say that the eutrophication is the same in both ditches. This conclusion is only based on factors included in our research so this conclusion could be inaccurate.

Discussion:

- Measured only two times, there might not have been enough time between the periods of measuring to see a clear difference.
- The weather conditions were the same during both of the measures.
- It could be possible that we did not measure correctly since the theory states that there should be a difference between the two ditches since one is located next to fertilized land and the other is not. This could be because we had to look on a card with colours and we might not have matched them correctly or have not waited as long as the description in the booklet said.
- More factors could influence the eutrophication process.

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