PREDATOR PLANTS

Eutrophication impact

Imagine, you are walking in the summer in the country with lots of water sources, rivers, lakes, ponds and rivulets. You may remember that the water did not look the same. Some water seemed to be quite clean, some was covered with oily spill, other with lots of plants or it seemed just *green*.

But not everything what is green, is good for nature. Water with lots of plant organisms, like algae, is possible threat for other organism. How is it possible and is the big amount of plants in water natural for water?

Bring samples of different water sources in science class and study the differences. Can you find out whether the water pollution is caused by inorganic or organic material?

What you might need to know

The process when water is proliferated with plants is called *eutrophication,* which means the ecosystem, especially water is enriched with nutrients such as compounds containing nitrogen, phosphorus, or both (from Greek *eutrophos*, well-nourished). Eutrophication can be a natural process in lakes, occurring as they age through geological time. But human activities can accelerate the rate at which nutrients enter ecosystems.

The big amount of water plants may seem harmless as they produce oxygen. The problem becomes at night when plants breathe during the dark phase, so they consume the oxygen which can cause lack of oxygen for other organism in the morning. Second problem comes at the end of vegetative period or after human intervention when algae and blue-green algae dies out. The dead biomass sinks to the bottom where it decomposes and bacteria are

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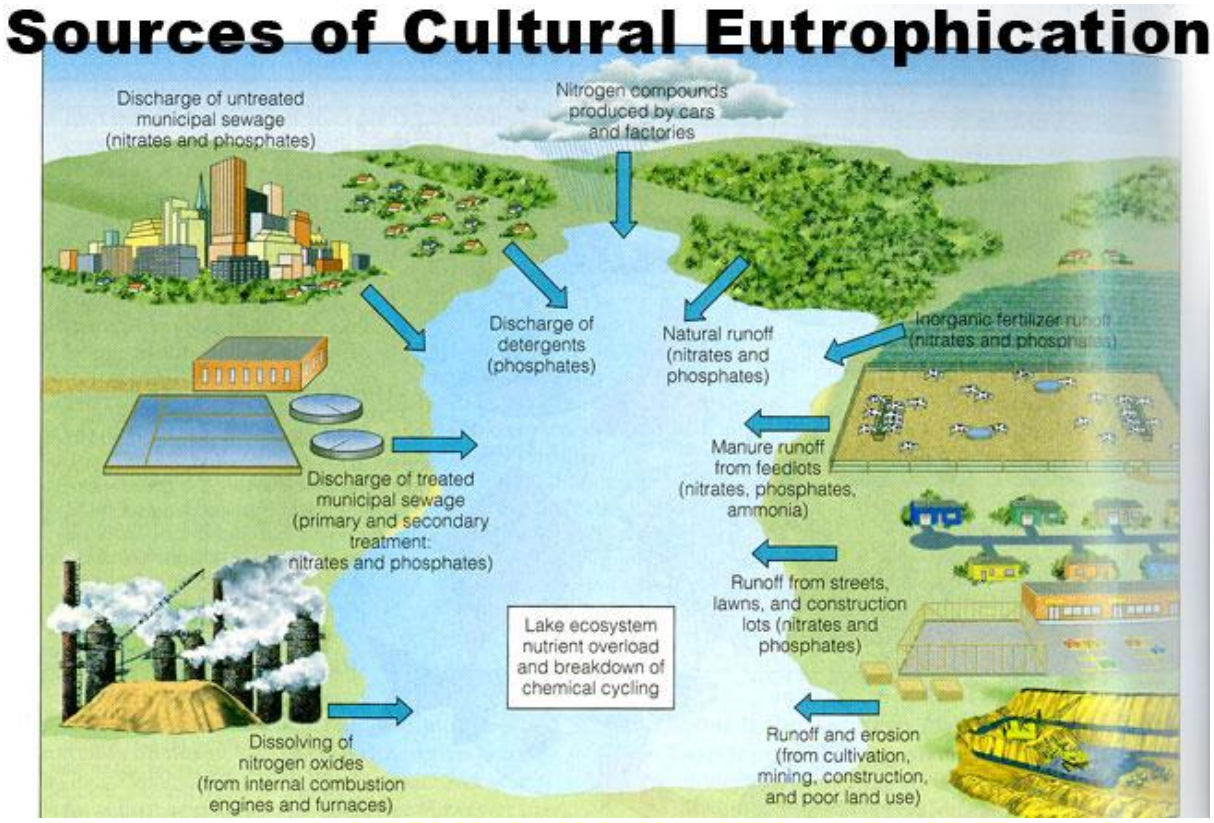
created simultaneously. Bacteria reproduce themselves and consume more oxygen so organisms living at the bottom cannot breathe enough.



https://confluence.furman.edu:8443/display/GGY230F10/Dead+Zones

The areas of low-oxygen water in the aquatic environment (hypoxic areas) are therefore called *dead zones* and they can be found off the coasts of very populated, industrialized nations.

For cultural eutrophication is typical draining the nutrients into water which occurs over decades. Natural eutrophication occurs over centuries and results from natural sources of nutrients and sediments. The eutrophication is supported also by natural conditions, such as the intensity of light and temperature. That's why eutrophication causes problems in summer.

Before you start your experiment

1. Bring at least three samples of different water sources in total full plastic bottle and write down the general information about the samples.

	Sample 1	Sample 2	Sample 3
Sampling place			
Sampling time			
Colour of sample			
Transparency			
Odour			
Visible pollution			

2. For further laboratory activity you are going to use these types of sensors: turbidity, dissolved oxygen, temperature sensor and light intensity. What do you think: what is the use of each sensor?

Turbidity sensor: _____

Dissolved oxygen sensor: _____

Temperature sensor: _____

Explore the world around: simulate the processes in laboratory

Design your own experiment

1. Suggest the measurement that will compare the samples and find out which water source is the most polluted.

_____

_____

2. Find out if the pollution is organic or inorganic.
   a) Prepare the experiment so that the actual measurement takes 10-15 minutes.
   b) Prepare the design for long-term measurement. You will evaluate the results from long-term measurement in next days..

a)_____

_____

b) _____

_____

Make a prediction (hypothesis) of your expected results:_____
_____
_____
_____

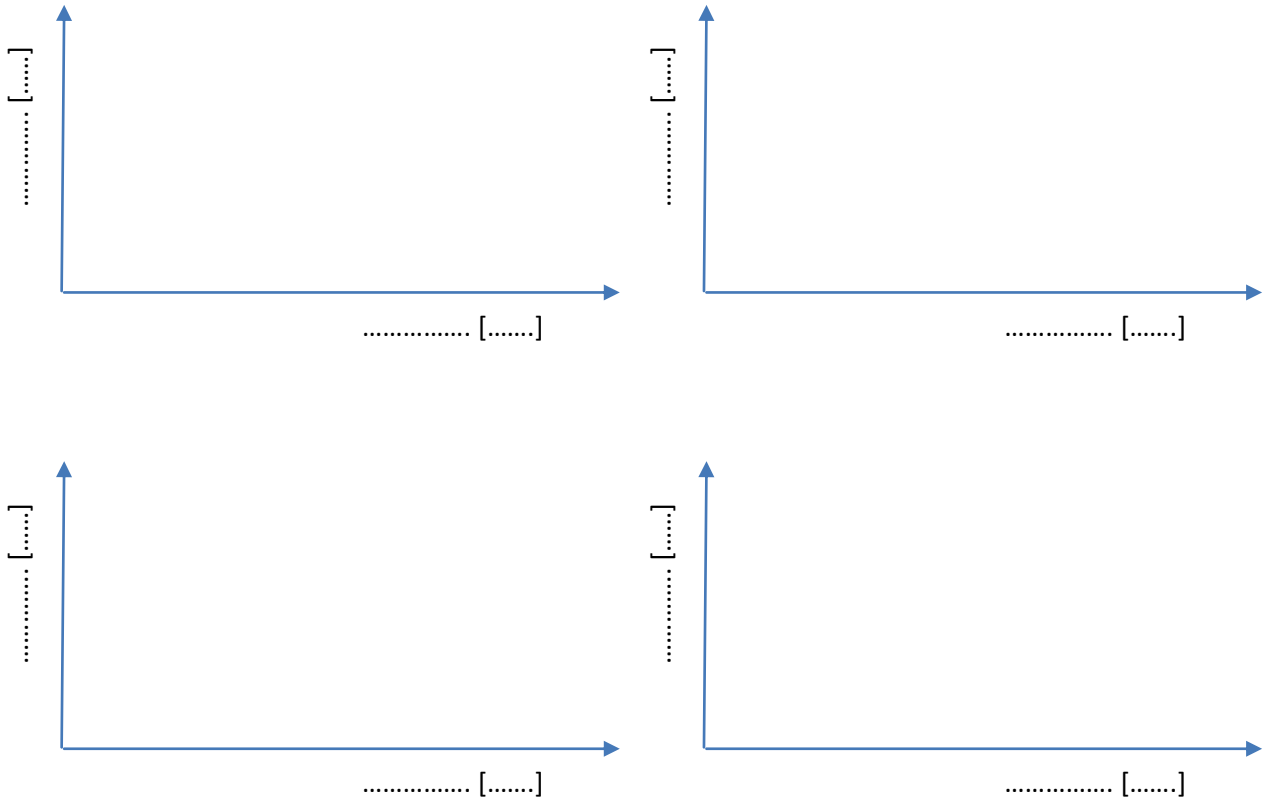
3. Observe the influence of added nutrients in each water sample. Prepare little samples of water, add to each of them 10 mL of phosphate solution, mix it and let it stay until next day. Make a prediction what will get change and how would you measure it.

Observation and description:

_____
_____
_____
_____

Evaluate measured data

1. Perform the designed experiment and draw down measured data into graphs.



2. Describe and explain the measured data (= interpret the results). Choose a proper way how to compare the results in graph(s).

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Conclusion

_____

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Show your results

Write an official letter to municipal authority, the department of environment, where you inform them about the current quality of water samples in the area. If it is needed, make some reasonable suggestions for improvement of water.

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