

## Constructed Wetland for Wastewater Treatment

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Pollution of water, an important component of all life on Earth, is a global problem. Presence of fresh clean water is a necessary condition for the existence of all living organisms on the planet. Constructed wetlands can become very energy efficient engineering solutions for wastewater treatment using natural functions of wetlands. Even in a small area, it is possible to create such a wetland in the size of 1-2 meters and to purify water. Because of severe climatic conditions, methods of purifying water with constructed wetlands is not common in Russia. Therefore, our students decided to make constructed wetland, which will be effective for conditions of our country.

For constructed wetland, we used macrophytes that can purify water effectively, took the soil from a natural wetland with bacteria and protozoa. Further checked the efficiency of the wetland. Within two weeks we conducted an experiment, there the change of the concentration of nutrients was checked. At the beginning of the experiment, we poured sewage with a high concentration of ammonium, nitrates and phosphates. By the end of the experiment, their concentration decreased. The biochemical oxygen demand value decreased, the oxygen concentration increased.

This method of water purification is economically efficient. Construction costs only about 230\$, and this wetland is able to treat sewage water from one household. After constructing of wetland, we need to create conditions for effective work of plants, bacteria and protozoa. After purifying, this water may be used for irrigation.

In the experiment, students constructed the wetland in their garden. After successful experiment, we proposed to create the same wetland in school garden. The school administration accepted this idea with enthusiasm and we began to build wetland in our school garden. Thus, our project has found practical application.