



OSNOVNA ŠOLA KAJETANA KOVIČA POLJČANE

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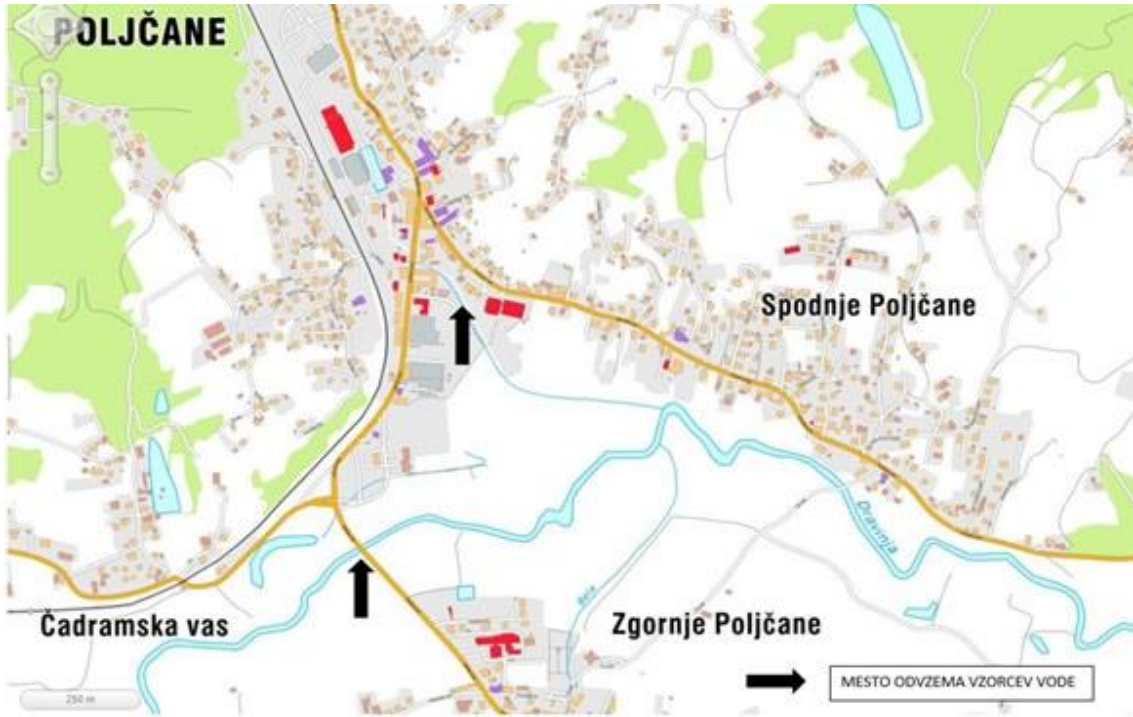


With the support of the
Erasmus+ Programme
of the European Union

MEASURING AND MONITORING THE WATER QUALITY OF THE DRAVINJA RIVER AND THE BREŽNICA STREAM



May, 2021



Map of the water sampling sites



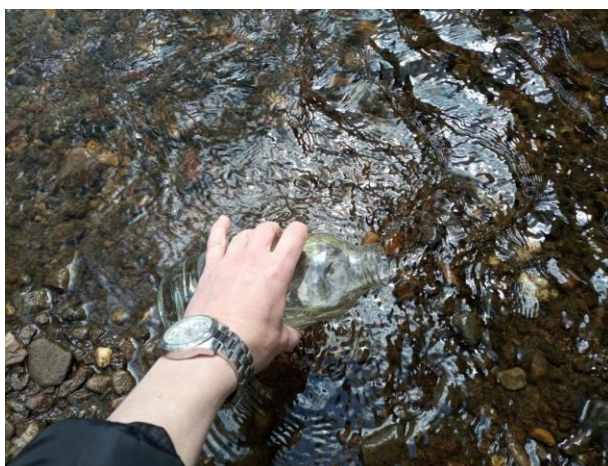
The Brežnica Stream



Sampling water from the Brežnica Stream

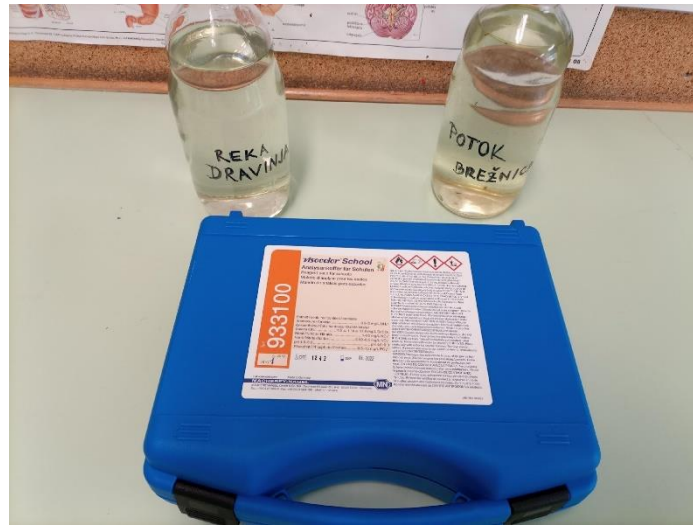


The Dravinja River



Sampling water from the Dravinja River

WATER TESTING EQUIPMENT



ZALA:

Hello everyone, we are Zala, Žiga and Sara, students of the Elementary School Kajetan Kovič Poljčane.

ŽIGA:

In this project, we will explain an experiment in the chemical analysis of water. The most common contaminants are nitrate (V) ions, nitrite (III) ions, phosphate, and ammonium ions.

ZALA:

The main purpose of the experiment is to determine the quality of water in the river Dravinja, and in the nearby stream Brežnica. We want to compare the results with the standards of the permitted presence of individual pollutants.



Sara, Zala, Žiga



Žiga



Zala

STEPS OF THE EXPERIMENT

ŽIGA:

- If ammonium is found in water, it can be concluded that water was in a contact with decomposing organic matter (such as sewage, slurry...).
- If nitrates are found in water it is usually due to excessive fertilization and decomposition of organisms.

ZALA:

- Nitrites are very harmful/toxic to all living creatures. The presence of nitrites in water is due to water contamination with feces. They are also found as additives in meat, sausages, fast food, and artificially fertilized vegetables.
- Phosphates are present in water if fertilizers and domestic sewage are used nearby. Phosphates are no longer used in washing powders.

ŽIGA:

Reagents will be added to the water samples. A chemical reaction will take place with the substance we want to determine.

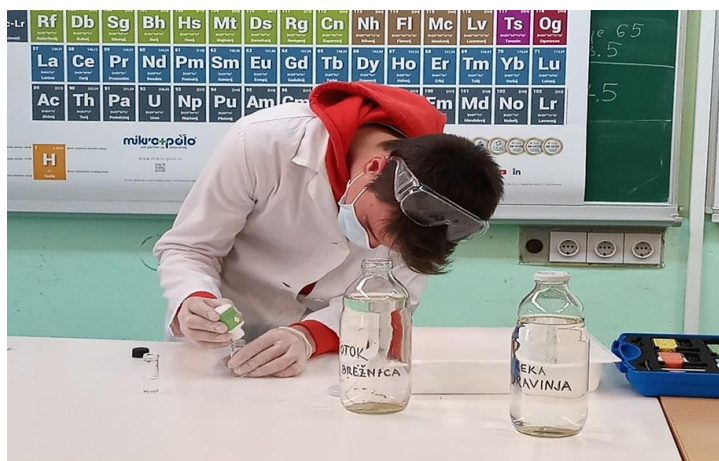
ZALA:

Because of the chemical reaction the color of the solution changes. We will compare the color of the solution with the color on the scale and read the concentration of the substance which should be determined.

Ammonium

ŽIGA:

1. Fill a 5 ml water sample into the measuring glasses A and B, and put them in the comparator.
2. Add 10 drops of NH₄-1 to the glass B and seal it.
3. Mix.
4. Add 1 measuring spoonful NH₄-2.
5. Wait for 5 min.
6. Open the glass B, add 4 drops of NH₃-3.
7. Wait for 7 min.
8. Open both glasses and compare the color with the color scale.



Žiga is adding NH₄-1 to the glass B.

Nitrate

ŽIGA:

1. Fill a 5 ml water sample into the measuring glasses A and B and put them in the comparator.
2. Add 5 drops of.
3. Seal the glass and shake it.
4. Add 1 measuring spoonful of NO₃-2.
5. Seal the glass and shake the mixture for 1 min.
6. Wait for 5 min.
7. Open the glasses and compare the color with the color scale.

Nitrite

ZALA:

1. Fill a 5 ml water sample into the measuring glasses A and B and put them in the comparator.
2. Add 5 drops of NO₂-1 to the B glass.
3. Seal the glass and shake it.
4. Add 1 measuring spoonful of NO₂-2.
5. Seal the glass B and shake the mixture for 1 min.
6. Wait for 10 min.
7. Open both glasses and compare the color with the color scale



Zala and Žiga are waiting to compare the mixture with the scale.

Phosphates

ZALA:

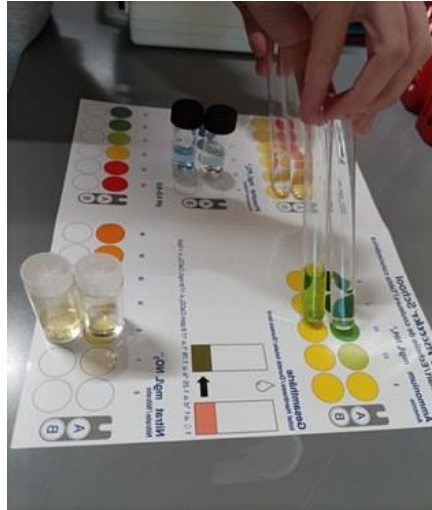
1. Fill a 5 ml water sample into the measuring glasses A and B and put them in the comparator.
2. Add 5 drops of PO4-1 to the B glass.
3. Seal the glass and shake it.
4. Add 1 measuring spoonful of PO4-2.
5. Seal the glass B and shake the mixture for 1 min.
6. Wait for 10 min.
7. Open both glasses and compare the color with the color scale.



Zala is adding PO4-1 to the B glass.

ZALA:

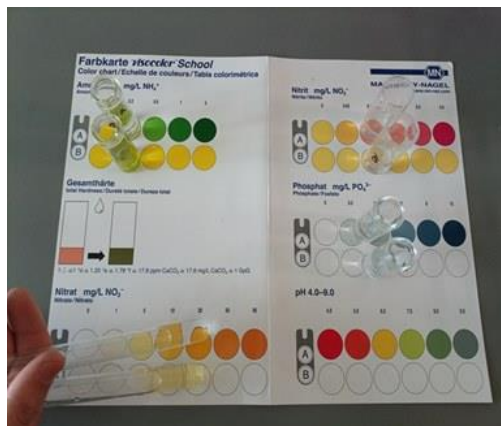
By the experiment I concluded that the water in the Dravinja River is contaminated with phosphates, which is due to the use of artificial fertilizers and household sewage.



Zala is comparing the color of the sample with the color scale.

ŽIGA:

By the experiment I concluded that the water in the Brežnica Stream is very polluted with phosphates, which is a result of the use of artificial fertilizers and household sewage. The ammonium content is also increased, due to sewage effluent.



Žiga is comparing the color of the sample with the color scale.

WATER POLLUTION

SARA:

The main source of **water pollution** is municipal wastewater from households, restaurants and similar facilities, as well as industrial wastewater from factories and other industrial plants.

Water flowing on the Earth's surface and groundwater is also polluted by rain which contains dirt from roads, roofs, and other surfaces. Modern farming causes pollution by nitrates in fertilizers.

SARA:

Water pollution is a global problem because water is almost everywhere on the planet and also easily accessible. Human settlements, industries, and agriculture are the major sources of **water pollution**.

Water is essential for life, we use it for drinking. Due to its properties, it is also used for washing, cooking, dissolving, cooling.

Many substances enter the water, including toxic ones, and endanger life in the environment.

Households **pollute water** with washing and feces.

Industry **pollutes water** mainly with heavy metals and other inorganic and organic substances.

Agriculture **pollutes water** with fertilizers and pesticides.

WATER POLLUTION BY HOUSEHOLDS



WASTEWATER



INDUSTRY



INTENSIVE FARMING - MINERAL FERTILIZERS AND CROP SPRAYING



ZALA:

Clean water is essential for life on the planet Earth. In this Erasmus+ activity we realized that the Dravinja River in our region is less polluted than it used to be in the last few years. But the Brežnica Stream is much more polluted by phosphates due to municipal wastewater. In the future we suggest a wastewater treatment plant to be built in Poljčane so the problem of pollution can be controlled and hopefully solved soon.

THERE IS NO LIFE WITHOUT CLEAN WATER

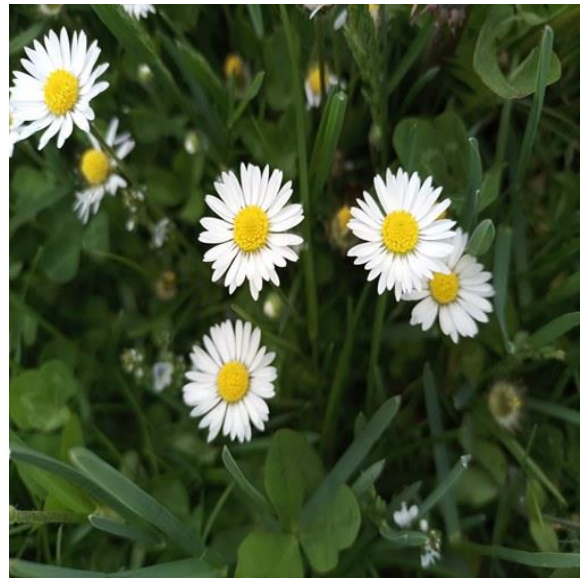


SARA:

But we all need to take care of less water pollution. Water is a part of nature that we must respect. Animals and plants are dying out due to pollution, as we change their natural environment. All pollutants created by human activities damage the quality of air, land, and water. So slowly, but surely, people destroy the planet Earth.

HOW CAN WE KEEP RIVERS AND STREAMS CLEAN?

- We can stop using substances that can pollute **water**, i. e. **streams**, and **rivers**.
 - Dispose engine oil at petrol stations or at special waste points.
 - Follow the instructions for handling the substances or agents we use.
 - Avoid excessive use of fertilizers.
- Stop disposing of waste, plastic, and other non-degradable materials in the environment.
 - Recycle and separate waste.
 - Save **water**.
 - Use things more than once.





SARA:

Dear students and teachers from my and all three partner schools. EARTH is our only place to live, so it must be saved at all costs.

EARTH provides us air, water, food, shelter, protection, and all necessary resources. EARTH is a privilege given to us and it is our responsibility to protect it. If there is no clean water there is no life.

Ans there is no planet B.

So we hope the results of our research and hard work will alert people of Poljčane to improve the situation and help all living beings.

ŽIGA:

Thank you for your time, thank you for reading.

ZALA:

Sustainability is for everyone and takes forever.

SARA:

**We shouldn't believe our planet will be saved by anyone other than us.
Sustainability is about doing more good and less harm to the planet Earth.**

Stay safe, stay healthy students and teachers

from Užice, Vilnius, Makole, and Poljčane. Love the planet Earth!



https://www.itl.cat/wallview/ioRRwhb_photo-wallpaper-the-earth-as-a-planet-beautiful/

Mentors:

Tatjana Zgubič

Polona Kobale

May, 2021