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STUDY KIT FRAMEWORK

Title: KAMŠT, RAKE, WILD LAKE

Topic: field work with students

Key words: observing, orientation, wikiloc

Subject: geography, biology, chemistry, physics, history

Cross-curricular Topic: Trail of Idrija's Natural Scientists and Unesco technical heritage

Level: Medium

Age: 15-18

Number of students: 5-15

Duration in minutes: 180

Place (classroom, outdoor etc.): Outdoor

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Language: English, Slovenian

Overview: Learning in nature the topics from geography, chemistry, physics, history and biology.

Participants discover the Idrija's Natural Scientists and Unesco technical heritage and learn how various natural elements are interconnected.

Objectives:

Participants will

- be active in nature and learn by doing,
- use wikiloc,
- explore the trail of Idrija's Natural Scientists,
- understand the operation of the water wheel,
- observe bunkers,
- name several plants growing in Botanical Garden and along the path,
- learn to recognise and define some rocks,
- understand the connection between rocks and relief,
- conduct a chemical analysis of the water using a field suitcase.

Learning material and tools:

Working sheet, cell phones with wikiloc, maps, text, vegetation book, suitcase for analysis of water

Preparation:

The teachers will prepare a working sheet with questions about the places being visited.

Participants will install wikiloc on their smartphones and follow the path Rake and complete the worksheet.

Evaluation:

Participants write the answers to the worksheet during the trail.

The teachers check that the participants have fully understood the topic.

This publication was supported by the Erasmus+ Programme of the European Commission.

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Detailed description/instruction:

1. KAMŠT

The mine pumping device is famous for its water-driven wooden wheel with a diameter of 13.6 meters. It is the largest preserved device of this kind in Europe.



1. When was 'kamšt' built and why?

2. How much water per minute did the pump pump? _____

2. BOTANICAL GARDEN

The botanical garden is located on the edge of the town, at the entrance to the Zgornja Idrija Landscape Park. It was established in 2004 and has been developing ever since.



1. You're standing in front of the botanical garden. Who is it named after?
What can you find in the botanical garden?

2. Chronologically list the important natural scientists who worked in Idrija and were also famous in Europe. (You might find the facts on the board next to the garden helpful.)

3. There are many plant species in the garden. Choose three, take photographs of these plants and copy their Latin and Slovenian names. Define where they grow.

3. RAKE CHANNEL

The first Rake water channel, which directed water from the dammed Idrijca river at Kobilja to the centre of the town, was built in 1595. The power of the water fuelled numerous mining devices: saws; pumping, lifting, crushing and irrigating devices, heavy forging hammers and mills.

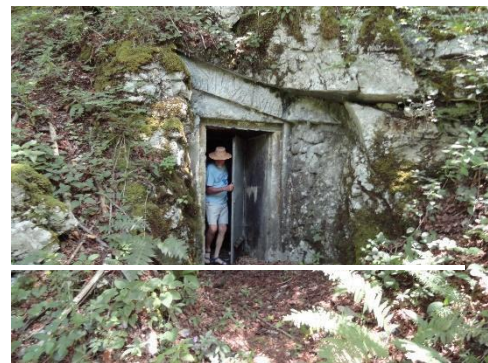


The Rake channel was originally made of wood and it was only constructed in brick and stone 170 years later. When the 'kamšt' was built, the water channel shortened and no longer led to the centre of the town.

The path runs continuously alongside the water, in the shades of trees and next to the lower level of the Idrijca river. It leads us past giant trees, the river curve at Zagod, a spring, multiple footbridges over the Idrijca river and it ends at the Kobilja dam.

4. BUNKERS

1. Who built these bunkers?



2. When were they built?

3. Why were they built?

4. Explain why they were built in this location.

5. THE WILDE LAKE

The lake Divje jezero (Wilde Lake) is a natural phenomenon almost like no other in the Slovenian territory. It is a typical karst spring into which waters flow underneath almost completely upright walls rising steeply above the lake and forming a kettle-like shape.



The lake and its immediate vicinity boast with immensely rich fauna and flora. It has been proven that around 150 types of Pteridophyta and seed plants grow in the nearby areas of the lake. This immense diversity is due to ecological diversity of the site and the geographical position of the lake (Wraber: Idrijski razgledi 29/31, 1986).

In rock cracks or on small ledges above the lake you can spot the Carniolan primrose - Primula Carniolica, a Slovenian endemic plant. The living conditions give a chance for many, even Alpine, plant species to grow here. These are the remains of Ice Age flora.

1. Find some of the plants that grow in this area and write down their names.

(You might find the facts on the board next to the lake helpful.)

Here two practical tasks are carried out: one in the field of chemistry and the other one in the field of geology.

GEOLOGY AT THE WILDE LAKE, IDRİJA

Fieldwork objectives: Students learn to recognise some rocks which build the area of the upper Idrija river and can be found in the deposit sediment near the river. They can read geological maps, describe rock characteristics and connect them to the relief. They learn about what a geologist does. They are aware of the diversity of the geological structure in our surroundings.

What we need: a worksheet, maps – the map of the Idrija Municipality, geological map of the area, a mobile phone with apps (a compass, GPS, an altimeter, a camera), pens, magnifying glass, 10% HCl, a geological hammer, some glass for scratching.

1. Describe the position of the Wilde Lake.

Coordinates; _____

Orientation, azimuth, points of fracture above the lake _____
from the point where you are standing.

Altitude: _____

2. Draw a sketch of the fracture above the lake and describe the characteristics of the fracture.

3. Use the map to help you describe geological characteristics around the Wilde Lake.

4. Gather several rock samples (at least 15). The geologist will help you choose the most interesting ones. Describe them in the table below. Take photographs of the 5 chosen rock

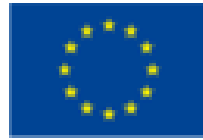
samples.

	<i>Rock 1</i>	<i>Rock 2</i>	<i>Rock 3</i>	<i>Rock 4</i>	<i>Rock 5</i>	
<i>Date and place of sampling the rock</i>						
<i>Name of the rock</i>						
<i>Hardness</i>						
<i>Structure</i>						
<i>Carbonate content</i>						
<i>Rock colour</i>						
<i>Classification of the rock by origin</i>						
<i>Does the rock scratch the glass? If it does, what does that indicate?</i>						
<i>Other features, e.g. Is the rock useful for us?</i>						

CHEMICAL WATER ANALYSIS WORKSHEET

Place of sampling: 1) _____ 2) _____

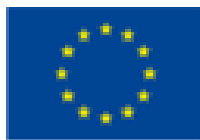
		Water sample 1	Water sample 2
	Sampling place description		
	Parameter (unit)		
Organoleptic properties	COLOUR		
	BRIGHTNESS		
	ODOUR		
Hardness of water	CARBONATE HARDNESS (°d)		
	TOTAL HARDNESS (°d)		
Nitrogen compounds	AMMONIUM (NH ₄ ⁺) (mg/L NH ₄ ⁺)		
	NITRATE(V) (NO ₃ ⁻) (mg/L NO ₃ ⁻)		
	NITRITE(III)(NO ₂ ⁻) (mg/L NO ₂ ⁻)		
Phosphorus compounds	PHOSPHATE(V) (PO ₄ ³⁻) (mg/L PO ₄ ³⁻)		
Acidity	pH value		
	TEMPERATURE (°C)		



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Physical properties	TIME (h)		
Interpret the results:			
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