Data Literacy Learning Activity - Pedosphere

Soil properties along the Cetina River basin

Soil properties along the Cetina River basin

Topic: Looking at the soil properties along the river stream from its origin to the sea and interpreting the data collected.

Age of students: 12-15

Skills developed: understanding and interpretation of data collected, finding similarities and differences in data collected, basic orientation in the data clustered in a spreadsheet, learning about soil characteristics

Prerequisities: basic knowledge on Soil Characterization and Soil Types

Big Idea: Soil is not only one, there is a huge diversity in soil types and properties, even at such a small area along a single river basin. Diverse ecosystems can be found along the river - the soil type (along with othe factors of microclimate and relief) very much determines the vegetation growing on the surface.

Content

Slide 4-6: Introduction and reference to the original student research, including the map of the study sites along the river and soil analyzis photo documentation

Slide 7: Work assignment for students

Slide 8: Spreadsheet that students work with. The data collected present the physical and chemical properties of the soil samples taken at 9 study sites along the river.

Slide 9-13: Additional photo documentation of various sites along the river basin – can be used for demonstration different vegetation types

Slide 15: Correct answers

Slide 16: Additional resource – soil texture triangle

Introduction

- The data were collected by students of Elementary school Josip Pupačić Omiš, Croatia (teachers Tamara Banović and Ivica Štrbac)
- The aim of the original research was to test whether different types of soil affect the germination and growth of selected plants
- This data literacy learning activity focus only on the first part of the student research, which was analyzing the soil samples and determining the soil properties at 9 sites along the Cetina River basin.

Site locations along the Cetina River, where the soil samples were collected

1 - Vrlika
2 - Hrvace
3 - Sinj
4 - Ruda
5 - Trilj
6 - Ugljane
7 - Blato na Cetini
8 - Gata
9 - Omiš

Research period :

- ✓ December 2019. - January 2020.
- ✓ November 2021. - February 2022.

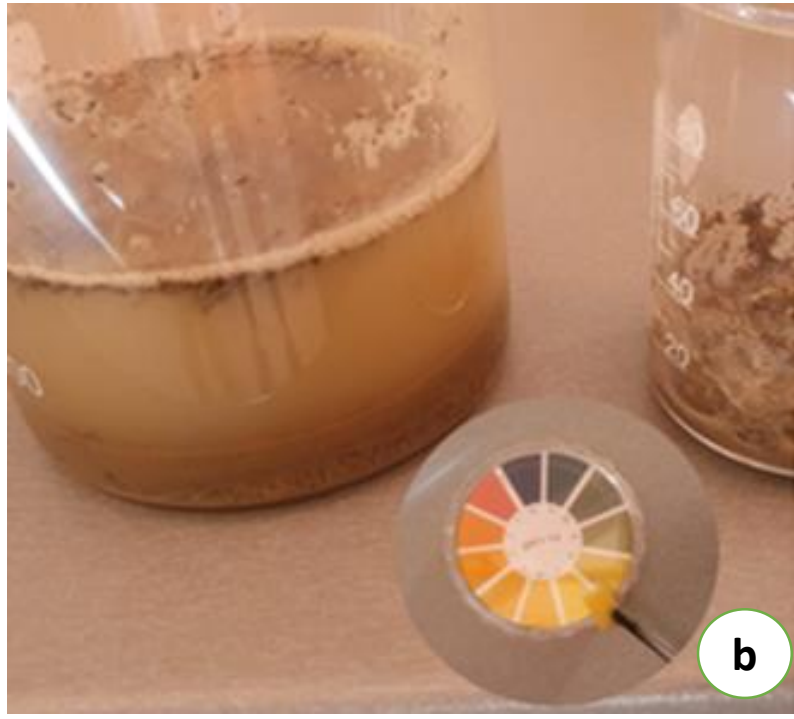
Determination of physical and chemical properties of soil

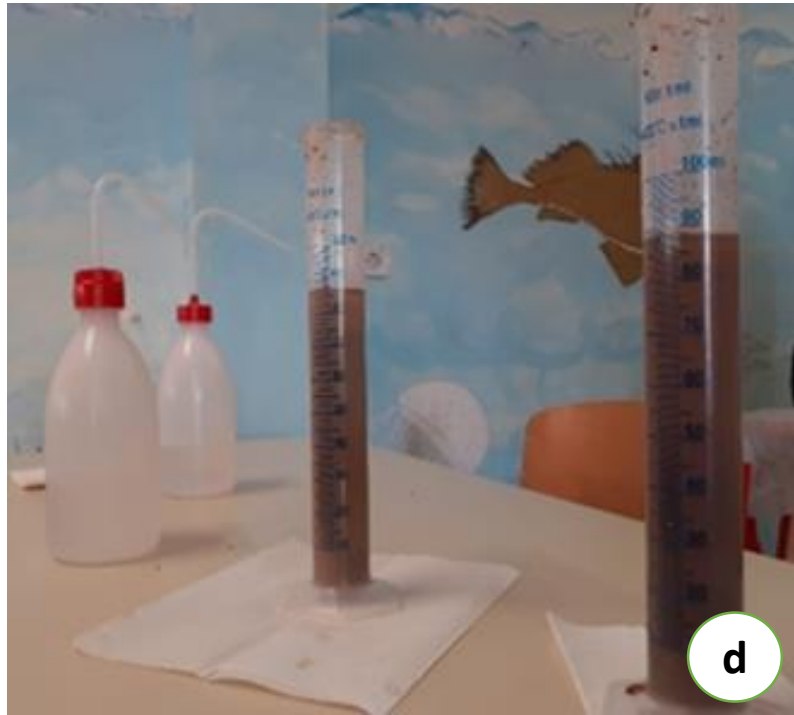
Using the GLOBE protocols:

- ✓soil characterization (consistency, structure and texture of the soil)
- ✓pH-value of the soil
- ✓Infiltration

Photos:

a) field sampling,
b) determining the pH value of the soil
c) Infiltration
d) determination of soil texture





Work assignment for students:

Task:

Understand and interpret the data on soil properties collected by GLOBE students from Omiš School.

Steps – Look at the table 1 at next slide:

1. What is the prevailing soil color?
2. Why do you think the pH of soil is 7 or 7,5? Find out about the type of rock/minerals typical for the Cetina River area (near Omiš city, Croatia). You can either look at the photos below or look it up.
3. What would be a typical soil pH in the area where you live?
4. What soil texture is prevailing in the area of the Cetina River?
5. Indicate four soil samples that had the biggest capacity to retain water. What have those four samples in common?
6. Which soil parameter inffluence the most how fast the water pass through the soil? Which type of soil allows water to pass through quickly and which one allows the water to pass very slowly?

Physical and chemical properties of the soil

Table 1 Results of physico-chemical soil properties at selected localities in the Cetina River basin

Soil sampling station	Soil color	pH - value	Soil consistency	Soil structure	Soil texture	Time of passage of the first drop through the soil/s	Volume of retained water in the soil/mL
9 - Omiš	gray-brown	7,5	firmly	grainy	sands	9	2
8 - Gata	brown	7	slightly	granular	clay loam	36	14
7 - Blato n/C	brown	7,5	slightly	granular	silt loam	31	18
6 - Ugljane	red	7	slightly	lumpy	silt loam	32	19
5 - Trilj	brown	7,5	slightly	prismatic	clay	48	11
4 - Ruda	brown	7,5	slightly	lumpy	clay	52	10
3 - Sinj	brown	7	brittle	lumpy	clay	58	12
2 - Hrvace	red	7,5	slightly	grainy	silt loam	28	20
1 - Vrlika	brown	7,5	slightly	grainy	silt loam	30	22

Figure 1 Omiš – The Cetina River meets the sea

Figure 2 Source of the Cetina River

Figure 3 and 4 Cetina River canyon

Figure 4 Vegetation in the upper reaches of the Cetina River

Figure 5 Vegetation in the middle course of the Cetina River

Figure 6 Vegetation in the lower reaches of the Cetina River

For answers to the questions go to the next slide ☺

Answers to the questions:

1. What is the prevailing soil color? brown
2. Why do you think the pH of soil is 7 or 7,5? Find out about the type of rock/minerals typical for the Cetina River area (near Omiš city, Croatia). You can either look at the photos below or look it up. The typical rock of the area is limestone, which contain calcium and is alcaline.
3. What would be a typical soil pH in the area where you live?
4. What soil texture is prevailing in the area of the Cetina River? Silt Loam
5. Indicate four soil samples that had the biggest capacity to retain water. What have those four samples in common? Study sites 1, 2, 6 and 7 (Vrlika, Hrvace, Ugljane, Blato) – they all show silt loam texture.
6. Which soil parameter inffluence the most how fast the water pass through the soil? Which type of soil allows water to pass through quickly and which one allows the water to pass very slowly? It is the soil texture and structure. The grainy and sandy soil allows the water to pass quickly, while the clay and lumpy soil does not allow the water to pass easily

Soil Texture Triangle

Soils are grouped into 12 texture class names depending on how much sand, silt, and clay is in each sample.

For more details on soil texture and other soil properties please refer to the GLOBE e-training modules:

https://www.globe.gov/get-trained/protocol-etraining/etraining-modules/16867724/12276