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Glogovica pond – calculating the surface of irregular figure

Teaching area	Mathematics , nature and society, arts, civic education, health education
Topic	Glogovica pond – calculating the surface of irregular figure
Learning outcomes / competences	<p>Student will be able to:</p> <p>Track and show the movement in nature on the map Find the water on the map Understand and explain the relationship between water quantity in nature and size of settlement Calculate the distance in nature using the map Set a rectangular network in space Calculate the surface of an irregular figure Enlarge the surface of the figure Understand the irreplaceable role of water in life of people, plants, and animals List houseworks in which water is used Indicate the proportion of water in human organism Indicate how much water is needed daily for the organism to function normally Describe the process of microscoping the water Explain the difference between drinking and fresh water Explain the impact of the natural conditions on the culture of living, on the example of water supply Indicate changes in household water supply Specify the conditions for the development of water supply for households Plan and describe their own actions to protect water</p>
Age of students (previous knowledge required)	<p>2nd grade (Body and space hygiene, recognizing the human's impact on the environment, knowing geometrical figures, adding numbers);</p> <p>3rd grade (Human influence on the environment, nutrition and hygiene, length measurement, adding</p>



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	<p>numbers);</p> <p>4th grade (Orientation in space, compass, map, concept of scale, meaning of water for people's lives, plants and animals in homeland, use of rectangular network, drawing rectangles, calculation of rectangular surface)</p>
<p>The prevailing type of activity (field work, play, practical activity ...)</p>	<p>Field research - collecting the data needed for drawing the sketches and calculating the surface; Drawing - making sketch drawings at a given scale; Creative work - creating ideas for calculating the surface of a free figure; Discussion - analysis and selection of a viable procedure; Construction of a rectangle in the drawing the pond Calculation – calculating the surface of the pond, in the drawing and in the nature</p>
<p>Key concepts</p>	<p>NATURE AND SOCIETY: land, water, pollution, hygiene, water features, water supply, cultural and historical monuments, map, scale</p> <p>MATHEMATICS: curved line, dot, geometric figure, free figure, surface, size and surface enlargement</p> <p>ARTS: Brightness, Toning, Line in Space, Physical Drawing, Building</p> <p>CIVIL EDUCATION: Responsibility, Culture of the homeland, Public Property, Ecology</p> <p>HEALTH EDUCATION: Water - the Healthiest Drink, Human Behavior, Hygiene</p>
<p>The pedagogical scenario / course of realization of teaching sequences</p>	<p>1. MOTIVATION</p> <p>The pupils had previously investigated the locality of Straževnik and noticed the remains of stone houses and the preserved church. They collected data on living conditions in an abandoned village: climate, soil, plant and animal communities, but did not encounter water within the explored site. The problema question: how did the population organize water supply? Classroom - Preparatory Activities Using the maps, students find the nearest water,</p>

Glogovica pond. They measure the distance from the pond to the Straževnik on the map, and enlarge it to the natural value (500m). They assume that the inhabitants were transferring water from this pond. In order to confirm this assumption, it is necessary to go to the field and determine whether the pond could meet the needs for water.

2. FIELD RESEARCH

The teacher announces the research task: Calculate the amount of water in Glogovica.

Pupils consider what determines the amount of water in the pond (the surface and the depth).

3. PROCESSING INFORMATION

Students create and present ideas for calculating Glogovica's surface.

After the analysis of the proposals, students accept the proposal they consider feasible: collect the required data on the field, and create a drawing of the pond at the given scale in the classroom. Then they will draw the rectangles in the sketch and calculate their surfaces. Summarizing the rectangular surfaces, they will get the surface of the pond.

The students elaborate the selected proposal: they select scientific tools, technical equipment, take their duties, and shape the tasks. The procedure is hampered by the fact that the surface of the pond is irregular.

2a - A new cycle of field research - data collection

Students construct a rectangular net in the space above the surface of the pond. They measure the sides of the rectangle and write the values on the sketch.

3a - New cycle of classroom research - creative solving of the problem

The students draw the drawing of the pond at the given scale.

In an incorrect shape of the pond, rectangles of



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	<p>different sizes are drawn. They calculate the surfaces of the drawn rectangles. (They cut edges that couldn't fit in the rectangles, and paste these cutouts on the model of the rectangle.) They count the surfaces of all rectangles, thus calculating the surface of the figure of the pond. Led by teacher, students acquire procedural knowledge of enlarging the figure. They enlarge the surface of the pond figure to the natural size of the pond.</p> <p>Preparation for a new project stage: Consider how new information about the pond surface can help us in calculating the amount of water in the pond. Think about whether people in the past, when the pond was the only source of water, used water in the same way as today. Talk about the importance of water in human life. Talk about the relationship of each individual towards water and other natural resources, and his contribution to improving living conditions.</p>
<p>Place of activity realization (Classroom, outdoor space...)</p>	<p>Locality of the pond, classroom</p>
<p>Teaching material and aids</p>	<p>ropes, wedges, construction meter, geometric drawing and measuring equipment, rectangle models of various sizes, cardboard, scissors, glue</p>
<p>Duration of activity</p>	<p>1 week (25 hours)</p>
<p>Ways of assessing the outcomes</p>	<p>Conversation, demonstration of practical skills, public presentation of project work and results</p>
<p>Material results / evidences on the work and results</p>	<p>Drawing of the pond created in the given scale, presentation of project work and results</p>