

4. Journey in time – the river „Sidabra“ in the past, at the Present, in the Future



Title	Journey in time – the river „Sidabra“ in the past, at the Present, in the Future
Content/ Subject areas	<p>To reveal this integrated project, the students must have the knowledge from the 8th grade biology textbook (Subjects: "Grubby world, Clams - water and land settlers, Arthropod abundance", "The world belongs to the insects, the human population on nature), the 7th grade history textbook (Topics: "Baltic tribes, the Baltic crafts and businesses, mounds edge") and the 7th and 8th grades geography textbooks (Topic - "Rivers and lakes") the 8th grade chemical textbook (Theme - "Meet the chemicals"), the art (Subject – "Realistic painting"), and from technology (Theme - "Raft").</p>
Target group: age range and size of the group	<p>28 eighth grade students. Their ages 13 -14 years.</p> <p>6 groups of 4 or 5 students.</p>
Learning objectives / competences	<p>The aim: To show the students Joniskis district and the river Sidabra: the pollution, emissions and their impact on the environment polluters and as the river's future.</p> <p>To introduce the large variety of bottom invertebrates and the value for the nature.</p> <p>To develop a sense of responsibility for their own land, the country's environmental situation.</p> <p>To develop observation, cultivate aesthetic senses, awaken the imagination of capturing the area's natural identity, beauty by doing the creative tasks.</p> <p>To develop students' information culture.</p> <p>Increase motivation.</p> <p>Competences: knowledge, initiative and creativity, communication, ability to learn, personal, social, key subject.</p>
Description of overall activity	<p>Subject - Biology.</p> <p>Activities:</p> <ol style="list-style-type: none">1. 4 - 5 students, the members of the group will look through the glasses as environmentalists. And implements their objective set.2. Review the 8th grade themes: "World of Grubby, Clams - water and land settlers, Arthropod abundance.

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3. On the Internet they will find a large bottom invertebrates and their adaptation to live in various forms of pollution water.
 4. On the Internet and in the press they will find some accidents which were in river Sidabra and solutions to reduce pollution.
 5. Students will make a scoop to catch large bottom invertebrates.
 6. For these 3 steps (1, 2, 3, 4, 5) we will need three classes.
 7. On the expedition on the raft through the River Sidabra, the students catch large bottom invertebrates. They recognize and describe their adaptation to live in polluted water.
 8. Sets, River Sidabra, pollution class by captured large bottom invertebrates. It takes 1 lesson.
 9. After the expedition there is a reflection, during which the members of the group present their work (Annex. 2) and participate in the discussion.
 10. The self-assessment do the students themselves according to their contribution to the work done in the group (individual self-assessment) and the other group members for completing individual tasks. Evaluates teachers.

Subject - Chemistry.

Activities:

1. 4 - 5 students members of the group will look through the glasses as chemists. And implement their objective set. Reviews the 8th grade topic "Meet the chemicals.
 2. Students will find how the nitrogen and phosphorus compounds effects on the living organisms living in these compounds polluted rivers.
 3. In the "Environmental book they will find a description which will help to determine the physical properties of water.
 4. For these steps (1, 2, 3) we will need 3 lessons.
 5. Expedition on the raft through the River Sidabra. Students will use a portable laboratory and explore the physical properties of water, nitrogen and phosphorus content in the river Sidabra water.
 6. Establish, Silver River, the level of contamination by nitrogen and phosphorus compounds in the river water, according to the physical properties of water. It takes 1 lesson.
 7. After the expedition going reflection, during which time members of the group present their work done (Annex. 1) and is involved in the discussion.
 8. The self-assessment do the students themselves according to their contribution to the work done by the group (individual self-assessment) and the other group members for completing individual tasks. Evaluates teachers.
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Subject - History.

Activities:

1. 4 - 5 students, the members of the group will look through the glasses as historians and implements their objective set. Review the 7th grade topic: "The Baltic tribes, the Baltic and crafts businesses, mounds edge.
2. They will visit Joniskis history - Cultural Museum and get acquainted with exhibits - archaeological artefacts found during excavations at places where Sidabre Castle was standing, with it's destruction, the inhabitants lived there, their business, the river Sidabre origin name, and how to achieve Semigallians metals and other products.
3. These steps (1, 2) and will require 2 lessons + 1 lesson in Joniskis history - Cultural Museum.
4. Expedition on the raft through the River Sidabra, students will find a place where the Sidabra Castle stood, draw the scheme River Sidabra in the Past, in the Present and in the Future. It takes 1 lesson.
5. Determine the River Sidabra historical significance for Semigallians and for Joniskis habitants.
6. After the expedition there will be a reflection, during which the members of the group present their work done (Annex. 3), and participate in discussions.
7. The self-assessment do the students themselves according to their contribution to the work done by the group (individual self-assessment) and the other group members for completing individual tasks. Evaluates teachers.

Subject - Geography.

Activities:

1. 4 - 5 students members of the group will look through the glasses as geographers and implements their objective set. Review the 7th grade the last topic: "Rivers and lakes, and 8th grade geography textbook last topic:" Rivers and Lakes ".
 2. In the Map students will find the river Sidabra, its tributaries, the river's geographical location, river pollution methods
 3. They will visit and Joniskis water centre and become familiar with the water treatment methods.
 4. These steps (1, 2, 3) and will require 2 lessons + 1 lesson in Joniskis water centre.
 5. During the expedition on the raft through the river Sidabra, students will work with chemists. Students will determine the way the river pollution, the water content of the river flow. It takes 1 lesson.
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6. After the expedition there will be a reflection, during which the members of the group present their work done (Annex. 4), and participate in discussions.

7. The self-assessment do the students themselves according to their contribution to the work done by the group (individual self-assessment) and the other group members for completing individual tasks. Evaluates teachers.

Subject - Art.

Activities:

1. 4 - 5 students, the members of the group will look through the glasses as artists and implement their objective set.

2. Students will learn to paint from nature - large Sidabra river bottom invertebrates with the freely chosen instrument.

3. They will learn how to make a collage from the same drawings.

4. These steps (1, 2,3) and will require 3 lessons.

5. Expedition on the raft through the River Sidabra the students will work with the environmentalists who will catch the major bottom invertebrates, students will paint the invertebrates and do the poster "Large river Sidabra bottom invertebrates. By using papier - mache technique and freely chosen measure students restore the castle of Sidabra in collaboration with historians and technicians. It takes 1 lesson.

6. After the expedition there will be a reflection, during which the members of the group present their work done (Annex. 5), and participate in discussions.

7. The self-assessment do the students themselves according to their contribution to the work done by the group (individual self-assessment) and the other group members for completing individual tasks. Evaluates teachers.

Subject - Technology.

Activities:

1. 4 - 5 students, the members of the group will look through the glasses as technologists and implements their objective set.

2. Students will find on the internet the information about the rafts production out of secondary raw materials.

3. They will make a sketch of the raft and think about the means to produce the raft.

4. Make a raft.

5. These steps (1, 2,3, 4) and will require 3 lessons.

6. Students make a raft and swim in the river to do the expedition through the river Sidabra. It takes 1 lesson.

7. After the expedition there will be a reflection, during which the members of the group present their done work (Annex. 6), and they will be involved in the discussion.

8. The self-assessment will be done by the students themselves according to their contribution to the work done by the group (individual self-assessment) and the group members for completing individual tasks. Teacher's Evaluation.

After the expedition there will be a reflection, during which the members of the group present their work done (Annex. 6), and participate in discussions.

7. The self-assessment do the students themselves according to their contribution to the work done by the group (individual self-assessment) and the other group members for completing individual tasks. Evaluates teachers.

Description of the process and teaching/ learning strategies used

Students in biology lessons, the theme "Human population on nature" hears the lesson's aims and interests. They are divided into 6 groups, which will do the different tasks and look through different glasses. Students think about different hypotheses and activities (the description of the activities) as well as different tools (the description of the activities), use of learning and teaching strategy PLUS: A) is B) location, c) use of the information, d) evaluation of methods: practical research, collage, group work, individual work, discussion, project, goggles, development, design, expedition. By doing the tasks teachers use the formative assessment that students could adjust their work. After the expedition 6 Groups present their activities carried out. Students indicate where the life experience and knowledge they will apply. Discuss about the strengths and weaknesses during the project. Do the self-assessment themselves (according to their contribution to the work of the group), the group of each other, the teachers from these assessments led to mean and written diary.

Evaluation/ types of assessment

Students are evaluated in two stages: 1. they evaluate the themselves by thinking about the work done together in the group (individual self-assessment) and the class of students for completing individual tasks 2. Evaluate teachers. And applies formative assessment.

Materials and tools

This material is used for teaching biology, chemistry, art, geography, history, technology subjects. Extra-curricular activities, in regional and national competitions and conferences. ICT tools / applications: Microsoft Office, Paint, Internet Explorer, e-mail.

Timing and learning environment

Conclusion Teaching (learning) environment: 3 lessons in a traditional environment - classroom or 2 lessons in a traditional environment - the classroom + 1 lesson – in Joniskis waters center/ Lesson 1 "Joniskis history - Cultural Museum + 1 lesson expedition through the Sidabra river.

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1. This action is innovative because there were used different, active learning (learning) methods (eg. Project, discussions - it allows to change the perception of the things, glasses) methods, which focus on the role of students (eg. Project development, design).
2. In order to reveal the topic of this work - "A journey through time – The River Sidarba in the Past, in the Present and in the Future", pupils will need the knowledge and skills of the 6 major subjects: biology, chemistry, history, geography, art and technology. This allows students to integrate these things in knowledge and skills and an understanding of interfaces and applications in real-life situations.
3. The activity takes place in different environments and traditional (classroom) and unconventional (in Joniskis waters company, in Joniskis History - Culture Museum, Silver River).
4. These activities will rise the students' motivation.
5. These activities help students develop competencies: knowledge, initiative and creativity, communication, ability to learn, personal, social, key subject.
6. These activities and formative assessment, learning and teaching strategy PLUS ICT: helped pupils to solve problems collaboratively.
7. Activities taking place - the closest to the student's living environment. Such environmental and operational sense of responsibility for their own land, the country's environmental situation, the avalanche of attention, improves the aesthetic senses, stirs the imagination capturing the area's natural identity, beauty, the creative tasks.

Appendix No.1 Chemists

Purpose: Students will get acquainted with the Joniskis district and river Sidabra, develop a sense of responsibility for their own land, the country's environmental situation. To develop students' information culture. Increase motivation.

Students will get acquainted about the safety requirements: Avoid contact of reagents with skin and eyes. Do not swallow the reagents. Do not eat or drink during testing. Wash hands after handling.

Objective: 1. To investigate the physical properties of water and pollution of nitrogen and phosphorus compounds.

Hypothesis

Location: Silver River, chemical cabinet

temperature

Materials and tools: water samples for mercury thermometer.

Instructions:

Temperature affects many water occurring chemical and biological processes (oxygen and carbon dioxide dissolution in water, photosynthesis rate). Particularly important river life 10o temperature, because the water comes alive fauna (which occurs at the end of April). When the water cools below this temperature - again, everything dies (in early October). Temperature affects the taste and smell of water, it must be measured in the jar, as soon as the water is taken. Before taking the water sample scoop the water container into the water to equal the temperature of the water. Soak the thermometer in water for 5 - 10 minutes until the mercury has been stabilized. Register not only the river water temperature, but also the air temperature.

Results: the data obtained are listed in the table

Table 1. The river Sidabra water and air temperature.

Year, Month Day River water temperature air

Conclusion:

color

Materials and tools: water samples, distilled water, the tube, the white paper background, filter paper, funnel, container refiltration.

Instructions:

Usually clean water seems to us a clear, colorless, polluted - is associated with the fetid water, the running from the sewer pipe, or thrown into the water waste. This is confusing signs, because the toxic materials are soluble in water and is colorless and transparent stream can be completely lifeless. Water and the intensity of the color is determined visually white paper background, research comparing the water with the same volume of distilled water to cast it into exactly the same containers. Water color can be colorless, pale yellow, yellow, light gray, dark gray, brown, brown.

Results:

Conclusion:

Odor

Materials and tools: flasks, spirit lamp, thermometer, filter paper, glass flask covered.

Instructions:

Water smell depends on the biochemical processes in water, soil composition and sanitary condition, from entering the domestic waters flush variety of materials. In the flask, the addition of the test river Sidabra water and is covered with glass. Water whip a circular motion, move the glass and smell the smell of the water. If the water is not determined there will be the smell of boiled water, to identify the smell. After heating to 50 ° Celsius after cooling water up to 20 ° Celsius after sniffing the smell of the water.

Results: the data obtained are listed in the table

Table 2 Sidabra river water smell

Water physical characteristic point Sidabra

Odor

Conclusion:

Concentrations in water.

Materials and tools: Reagents from portable laboratory.

Instructions:

Pour into a container of water and 10 ml mark. Put the two measuring spoons of reagent (1), close the jar and shake to dissolve the reagent. Open the container and place one measuring spoonful of reagent (2), close the jar and shake for 1 minute. It can stay a little sediment. Then leave the sample for 10 minutes. After they open the container and compare the color of the water with the color chart. Comparing Place a container on the marked local color table. The color values applicable from above. The concentration (mg / l) at each specified color, what color suits your sample - the nitrate concentration value we collect. Intermediate values must be calculated. Results:

Conclusion:

Ammonium ions in water

Materials and tools: Reagents from portable laboratory.

Instructions:

Pour into a container of water and 5 ml mark. Pour 10 drops of reagent (1) solution and stir. Open the container and place one measuring spoonful of reagent (2), close the jar and shake until everything is dissolved. Then leave the sample for 5 minutes. Then add 15 drops of reagent (3) closing the container a good shake. Leave the sample for 7 minutes. Then you open the jar compare the water color with a color chart. Comparing Place a container on the marked local color table. The color values applicable from above. The concentration (mg / l) at each specified color, what color suits your sample - the ammonium concentration value we collect. Intermediate values must be calculated.

Results:

Conclusion:

Phosphates in water

Materials and tools: Reagents from portable laboratory.

Instructions:

Pour into a container of water and 5 ml mark. Pour 10 drops of reagent (1) solution and stir. Open the jar and add 1 drop of reagent (2), close the jar and shake until everything is mixed.

Then leave the sample for 5 minutes. Then you open the jar compare the water color with a color chart. Comparing Place a container on the marked local color table. The color values applicable from above. The concentration (mg / l) at each specified color, what color suits your sample - the phosphate concentration value we collect. Intermediate values must be calculated

Results:

Conclusion:

Nitrites in water

Materials and tools: Reagents from portable laboratory.

Instructions:

Pour into a container of water and 5 ml mark. Put two tablespoons of measuring reagent, close the jar and shake until everything is dissolved. Then leave the sample for 3 minutes. Then you open the jar compare the water color with a color chart. Comparing Place a container on the marked local color table. The color values applicable from above. The concentration (mg / l) at each specified color, what color suits your sample - the nitrite concentration value we collect. Intermediate values must be calculated

Results:

Conclusion:

Facts

Joniskis district - also not one of those where the tourist or traveller gladden the heart of a huge, roam the forest, and the eyes constantly ripple from rivers and lakes-blue. Natural rivers and lakes Joniskis district poor. No interlayer underground waters that nourish the rivers. Therefore, most natural rivers do not reach the ground water, and in winter freezes to the bottom, and in the summer it dries. This is typical of the river and silver. The larger of Musa and Lielupe river basin - silver. The total of its length - 45 km, and the area length of 33.2 km. It flows to Riga as an independent river, and then flows into the river Plato, and this carries the waters of Lielupe. According to the mineral nitrogen mg / L target to significantly polluted rivers Lithuania - Class V, while the phosphates heavily polluted rivers Lithuania - Class VI.

discussion

Nitrates and phosphates entering ways in the River Sidabra.

Questions and Tasks

1. What are the elements called Biogen?
2. The effects of phosphates and nitrates in the current state of the river.
3. The effects of phosphates and nitrates in the river-dwelling organisms.

problem-solvers

Students from portable laboratory takes --- NO₂, NH₄⁺, NO₃⁻. Find information sources, as these ions associated with phosphates and nitrates.

1. What ions in the form of water plants absorbed nitrogen?
 2. Location of nitrogen gets the animals?
 3. As ammonium ions to water?
 4. What bacteria converts ammonium ion into?
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5. What turns a volatile nitrite ion into?

Application:

Self-evaluation: How I helped a group to do the work (individual self -assessment)

1	2	3	4	5	6	7	8	9	10
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Group evaluation

The criteria and possible scores	Given scores	1 gr.	2 gr.	3 gr.	4 gr.	5 gr.	6 gr.
Accuracy (job did by the descriptions and there is an arrangement of the results of) - 5 points							
Adapting to life- 4 points							
Time (delivery of the project) - 1 point							

Teacher evaluation

The criteria and possible scores	Given scores	1 gr.	2 gr.	3 gr.	4 gr.	5 gr.	6 gr.
Accuracy (job did by the descriptions and there is an arrangement of the results of) - 5 points							
Adapting to life- 4 points							
Time (delivery of the project) - 1 point							

Appendix No.2 Environmentalists

Purpose: To get acquainted with Joniskis district and river Sidabra. To develop a sense of responsibility for their own land, the country's environmental situation. To develop students' information culture. Increase motivation.

Objective: 2. Access to the large bottom invertebrate diversity and significance of nature and man.

Hypothesis

Location: Silver River, Biology cabinet

Materials and tools: scoop bath, preferably white or bright, to collect and sort the animals, some plastic enclosed cups livestock, tweezers and comfortable work clothes to the water, head to describe organisms.

Instructions:

Scoop frame make the thick solid wire, D-shaped or triangular, the front edge of the latissimus is about 25 - 30 cm in length. It is fixed to 1.5 m long rod. Frame close with strong grid whose eyes - about 0.5 mm in diameter. Collector stands upstream scoop underneath the base to the bottom and hoeing with the scoop in front of the bottom of the foot or the hand, moving upstream. Propelled by a primer in conjunction with the animal enters the downstream held a grid from which they then carefully with tweezers a selection. We collect about 20 minutes. different biotopes that it would be caught the number and variety of organisms. In order to accurately assess the selected research stream in the local water quality, additionally preferably out of the water and explore a few stones or pieces of wood. In the wooded areas, which are out of the water, it must be observed the plants too. These can also be adheres animals species found the scoop. Results: the data obtained are listed in Table 1

Animals	The group which was found	The number of different groups	Assessment	
			Number of species in the group	Class
Plecoptera larvae				
Ephemeroptera larvae				
Trichoptera larvae				
Amphipoda, Megaloptera, Asellus Aquaticus, Hirudinae				
Tubifex tubifex				
Gastropoda and Bivalvia molluscs, Plathelminthes, Diptera larvae, Hydracarina, Coleoptera and their larvae, the other animals				The other animals do not influence the setting of the approximate class
The total number of species			Class	

Conclusion:

Facts

The larger than Musa and Lielupe rivers' basin there is the river Sidabra. The total length is 45 km, and the area length of 33.2 km. It flows to Riga as an independent river, and then flows into the river Plato, and this carries the waters of Lielupe. According to the mineral nitrogen mg / L target to significantly polluted rivers Lithuania - Class V, while the phosphates heavily polluted rivers Lithuania - Class VI. Lack of dissolved oxygen in water. Organic material need oxygen to break down, if organic matter accumulates a lot of oxygen can up too much, and then the organic material unraveling takes place under anaerobic conditions, often diverging toxic materials.

Discussion Is it worth it to clean streams such as silver bottom and abundant coastal vegetation? Why do you think so?

Questions and Tasks

1. In your own words, describe what the ecosystem and provide 1- 2 examples of ecosystems.
2. Large Benthic adaptation to live in the river Sidabra.
3. Had the river Sidabra accidents (oil entering slurry access) affect the water quality and the organisms that live in it?
4. What are the environmentalists actions helped to reduce water pollution in the event of such accidents (oil entering slurry entry)?
5. What are the factors that contribute to river bogging?

Problem-solvers picture River Sidabra. Is it metabolism intact, or is affected by eutrophication? The answer explain.



1. Where does the excessive nutrient content in the river Sidabra ecosystem come from?
2. Describe in your own words, how you understand the river blooms.
3. As a result of the abundant algae overgrowth a variety of organisms will be changed?
4. How the sludge at the bottom of the river forms?
5. What is the future of this river? Explain your answer.

Self-evaluation: How I helped a group to do the work (individual self- assessment)

1	2	3	4	5	6	7	8	9	10
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Group evaluation

The criteria and possible scores	Given scores	1 gr.	2 gr.	3 gr.	4 gr.	5 gr.	6 gr.
Accuracy (job did by the descriptions and there is an arrangement of the results of) - 5 points							
Adapting to life- 4 points							
Time (delivery of the project) - 1 point							

Teacher evaluation

The criteria and possible scores	Given scores	1 gr.	2 gr.	3 gr.	4 gr.	5 gr.	6 gr.
Accuracy (job did by the descriptions and there is an arrangement of the results of) - 5 points							
Adapting to life- 4 points							
Time (delivery of the project) - 1 point							

Purpose: To acquaint students with Joniskis district and the river Sidabra. To develop a sense of responsibility for their own land, the country's environmental situation. To develop students' information culture. Increase motivation.

Objective 3.: To investigate river Sidabra historical past.

Hypothesis

Locations: River Sidabra, History Cabinet, Joniskis History - Culture Museum

Facts of Rhymed Livonian Chronicle

Now let me describe how successful the other group was. Sidabra , which I mentioned, was in the Semigallians land. They hurried toward the castle. They had to ride through the swamps. And through the dark forest, following paths that edge. We had to leave the castle - told them all to leave. The animals they had taken. Property in the castle wasn't. . The brothers worked until the castle burn like the ground. Yes, Sidabra was burned. They all land devastated. Rakte, Dobele, Sidarba were not able to resist. All three already mentioned here, they burned this year: One thousand one hundred and two and a half, yet add forty - years after the birth of the Lord.

Discussion

What is a fact is mentioned poetical Livonian Chronicle and how it relates to silver river past?

Questions and Tasks

1. At what age Semigallian tribe lived in Joniskis district?
2. The most important Semigallian center.
3. How Semigallians made a living?
4. Why the crusader attracted this land?
5. How concerns name of the river Sidabra with metal silver?
6. How metals and other products reached Semigallians?
7. The historic significance of the river Sidabra for Semigallians and for us - Joniškis inhabitants.
8. Draw the scheme of the River Sidabra in the Past, Present and Future.
9. Why Semigallians was forced to leave the country?

problem-solvers

1990 Summer Lithuanian Institute of History by archaeologists Sidabrė mounds and inhabitants exploratory research. One mound is on left in Kalnelis, and another mound is on the right side. Which photograph in a mound called the castle site and which hill?



Picture A



Fill in Table 1

District	
District	
Parish	
Name of the mound	
When the place was lived	
Archaeological finds	
Legends of the mound (if they exist)	

1. For what purpose was a mounds made for?
2. Describe the mound fortifications.
3. The mound is different from the barrow?
4. Historical sources are classified according to form:

Historical sources

4.1. Which source you will assign archaeological findings?

Application:

Self-evaluation: How I helped a group to do the work (individual self -assessment)

1	2	3	4	5	6	7	8	9	10
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Group evaluation

The criteria and possible scores	Given scores	1 gr.	2 gr.	3 gr.	4 gr.	5 gr.	6 gr.
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Accuracy (job did by the descriptions and there is an arrangement of the results of) - 5 points							
Adapting to life- 4 points							
Time (the project delivery on time) - 1 point							

Teacher evaluation

The criteria and possible scores	Given scores	1 gr.	2 gr.	3 gr.	4 gr.	5 gr.	6 gr.
Accuracy (job did by the descriptions and there is an arrangement of the results of) - 5 points							
Adapting to life- 4 points							
Time (the project delivery on time) - 1 point							

Appendix 4 Geographers

Purpose: To get acquainted the students with Joniskis district and the river Sidabra. To develop a sense of responsibility for their own land, the country's environmental situation. To develop students' information culture. Increase motivation.

Objective 4.: To investigate Sidabra River geographical position, tributaries, river pollution and polluters techniques, water treatment methods.

hypothesis

Location: Silver River, Geography cabinet, Joniskis water centre.

Facts: Joniskis district - also not one of those where the tourist or traveler gladden the heart of a huge, roam the forest, and the eyes constantly ripple from rivers and blue lakes. Natural rivers and lakes in Joniskis district are poor. No interlayer underground waters that nourish the rivers. Therefore, most natural rivers do not reach the ground water, and in winter freezes to the bottom, and in the summer it dries. This is typical of the river and silver. The larger of Musa and Lielupe river basin - Sidabra. The total of its length - 45 km, and the area length of 33.2 km. This river's pollution in Lithuania is the second after Kulpe.

Discussion of the larger river polluters are companies or individuals?

Questions and Tasks

1. What kind of water pollution, do you know?
2. What are the two methods of water pollution? And in what way is it the river Sidabra polluted?
3. Ask what contaminants can get into the nearest village or the river?
4. Why spilled oil spreads on the surface of the water in Baltic sea or lake or river Sidabra?
5. What kind of damage to the spilled oil makes the aquatic flora and fauna?
6. For what company cleaning equipment has become less powerful?
7. What are the compounds which were not cleaned in company Joniskis waters?
8. What is the Monera individual that helps to clean the water?
9. What are the main streets of the population Sidabra river polluters? In his answer, give.
10. Sidabra River geographical location. Tributaries.
11. Compute the water flow.

Lithuania solve the problem of water swept by mechanical or biological. Which cleaning method is more effective?

1. At what age or Lithuanian cities were equipped with primitive equipment the sewer?
2. In what year in Joniskis was build a mechanical treatment plant and to what years they operate?
3. How many of the suspended waste filtered up to the mechanical treatment plant?
4. In what year in Joniskis was build a biological treatment plant?
5. What is the biological sewage treatment capacity per day?
6. What is Joniskis treatment plant composition?
7. What is Joniskis treatment plant for the mechanical cleaning of water, and what biological treatment plants to clean the water?

Application:

Self-evaluation: How I helped a group to do the work (individual self- assessment)

1	2	3	4	5	6	7	8	9	10
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Group evaluation

The criteria and possible scores	Given scores	1 gr.	2 gr.	3 gr.	4 gr.	5 gr.	6 gr.
Accuracy (job did by the descriptions and there is an arrangement of the results of) - 5 points							
Adapting to life- 4 points							
Time (the project delivery on time) - 1 point							

Teacher evaluation

The criteria and possible scores	Given scores	1 gr.	2 gr.	3 gr.	4 gr.	5 gr.	6 gr.
Accuracy (job did by the descriptions and there is an arrangement of the results of) - 5 points							
Adapting to life- 4 points							
Time (the project delivery on time) - 1 point							

Appendix No.5 Artists

Purpose: To acquaint the students with Joniškis district and river Sidabra. Develop observation, cultivate aesthetic senses, awaken the imagination of capturing the area's natural identity, beauty, the creative tasks. To develop a sense of responsibility for their own land, the country's environmental situation. To develop students' information culture. Increase motivation.

Objective: 5. Learn to paint from nature - large Sidabra river bottom invertebrates with the freely chosen instruments to do a collage from the drawings. Make a poster "Large Sidabra river bottom invertebrates from the drawings. Using papier - mache technique and freely chosen measure students "restore" castle Sidabra.

hypothesis

Location: Silver River Art Cabinet

Application:

Self-evaluation: How I helped a group to do the work (individual self -assessment)

1	2	3	4	5	6	7	8	9	10
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Group evaluation

The criteria and possible scores	Given scores	1 gr.	2 gr.	3 gr.	4 gr.	5 gr.	6 gr.
Accuracy (job did by the descriptions and there is an arrangement of the results of) - 5 points							
Adapting to life- 4 points							
Time (the project delivery on time) - 1 point							

Teacher evaluation

The criteria and possible scores	Given scores	1 gr.	2 gr.	3 gr.	4 gr.	5 gr.	6 gr.
Accuracy (job did by the descriptions and there is an arrangement of the results of) - 5 points							
Adapting to life- 4 points							
Time (the project delivery on time) - 1 point							

Appendix No.6 Technology

Purpose: To acquaint the students with Joniskis district and the river Sidabra. Develop observation, cultivate aesthetic senses, awaken the imagination of capturing the area's natural identity, beauty, and the creative tasks. To develop a sense of responsibility for their own land, the country's environmental situation. To develop students' information culture. Increase motivation.

Objective: 6. Make a sketch of the raft, to consider measures raft produce.

Made raft. hypothesis