

THE WAY OF WASTE – Lesson Plan 1_Romania

History states that humanity being about 2.5 million years old, of which 99.4% of the time, our ancestors were preoccupied with the search for primitive stone tools. Subsequently, the accelerated development of mankind followed, and nowadays there is less and less time left for the search for new and viable solutions, which could facilitate human existence on earth. It is also important to mention the fact that all living things adapt to the existing environmental conditions, while man is the only being that changes the environment. Accelerating technological progress creates more and more needs, and meeting the unlimited needs of people requires the exploitation of an increasing amount of natural resources.

The Environmental Action Program sets the priority objectives regarding EU policy in the waste management sector, respectively:

- Reducing the amount of waste generated;
- Maximizing reuse and recycling;
- Limiting incineration of non-recyclable materials;
- Progressive limitation of storage of waste that cannot be recycled or recovered;
- Ensuring full implementation of waste policy objectives in all member states.

The European and national policy is based on the "waste hierarchy", which sets the priorities in terms of waste management at the operational level: first of all, the prevention or reduction of the amount of waste generated and the reduction of its degree of danger, reuse and only then valorization are encouraged waste through recycling, and other valorization operations, such as energy valorization. Last in the hierarchy is waste disposal, which includes waste storage



and incineration. Also, the transition to a circular economy is a priority at the level of the member states. In the circular economy, the value of products, materials and resources is maintained in the economy as long as possible and the generation of waste is reduced to a minimum. The transformation of waste into resources is one of the main elements underlying the circular economy. The purpose of the activities included in the lesson plan is to develop students' attitudes and skills that will determine in the future a behavior necessary for waste management, but with minimal negative effects on the environment. The national waste management policy must subscribe to the European waste prevention policy and aim to reduce resource consumption and the practical application of the waste hierarchy. The provisions of national and European legislation aim to move Romania towards a recycling society and apply the waste hierarchy, for all types of waste.

Energy, water, fuel and various additional substances are used to produce any product except the raw material. Obtaining each component, necessary for production, involves costs related to the use of natural resources, waste generation, water pollution with toxic substances and emissions of harmful gases into the atmosphere.

We are sorely mistaken when we think that the negative impact on the environment stops with the production of goods. After it is manufactured, the product is distributed and sometimes, to reach the final customer it is transported quite long distances. This fact involves the burning of fossil fuels, which subsequently releases carbon dioxide (CO₂) emissions into the atmosphere and contributes to the intensification of the greenhouse effect and global warming. Also, the raw materials used for fuel production are exhaustible.

Once purchased and used, many of the products end up in the trash. And people rarely think about the fact that most of the objects they throw away are made of inorganic materials. Unable to decompose naturally, they accumulate. According to statistics provided by Eurostat, 2,515,100 tons of waste was generated only in the 28 EU member states. The situation is just as sad in Russia, where approximately 4.5 billion tons arrive at landfills annually (of which 40 million tons are household waste from the residential sector).

It is important to be aware of the seriousness of the problem and to educate ourselves, to see the entire life cycle of a product and evaluate things according to the following criteria



- the amount of resources used;
- the type of material from which it is made (whether the resource is renewable or not);
- the distance between the place of production and the place of consumption;
- what impact on the environment does resource extraction and production entail;
- the possibility of recycling the material from which it is made, or the possibility of natural decomposition.

Until such an ecological attitude is formed, humanity is forced to face a number of global problems.

Overall: Problem-Based Learning (PBL) is generally applied in this lesson plan PBL is a teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and principles as opposed to direct presentation of facts and concepts. In addition to course content, PBL can promote the development of critical thinking skills, problem-solving abilities, and communication skills. It can also provide opportunities for working in groups, finding and evaluating research materials, and life-long learning.

The issue of waste will be addressed in social education classes, geography, biology, study subjects aimed at the formation of skills such as: developing an investigative approach from the perspective of permanent education and for everyday life; cooperation for carrying out activities and for investigating specific problems of different groups and communities, by assuming social and civic values and norms; responsible participation in decision-making by exercising the spirit of initiative and entrepreneurship, respectively by demonstrating an active social, civic and economic behaviour.

Lesson s of 45 minutes	Pursued objectives	Resources/information presented to students during class	Activities during the actual lesson	Work assignments for students
1.	- to be aware of the interdependence between the quality of the environment and the quality of life;	ECOLOGICAL EDUCATION – EDUCATION FOR LIFE The natural environment cannot be defended only on one day (June 5), but on all 365 days of every year, every moment of every day, by all the inhabitants of the planet. We must	Practical activity of greening the areas around the school □ 30'	- Creation of a PPT presentation on the theme "The need for ecological education at any age"

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	<ul style="list-style-type: none">- to acquire knowledge regarding the complexity of the relationship between the species of an ecosystem;- to take an attitude towards any activity that can destroy the balance in nature;- to have a positive conduct, to participate in environmental protection activities, a condition of a healthy life, in full harmony with nature.	<p>defend the Blue Planet, the cradle of civilization and life, it being our home and that of all living things on Earth.</p> <p>Today, humans use (often abusing, knowingly or unknowingly) the earth's natural resources. In every corner of the world, humans are cutting down forests, extracting minerals and energy sources, eroding topsoil, polluting air and water, creating hazardous waste and producing a rupture of natural areas at a rate unprecedented in the history of life on earth. As the demands arising from overpopulation and development increase, it becomes increasingly difficult for people to satisfy their needs and wants. And it also becomes impossible to escape the consequences of serious environmental degradation: species extinction, desert expansion, pesticide contamination, increasing health problems, hunger, poverty and even loss of human life. Many experts are concerned that if this rate of destruction continues, we will witness the gradual destruction of the very systems that support life on earth.</p> <p>Environmental problems are urgent and must be addressed by the entire community, and education must be an integral part of the solution. Divergent opinions regarding the state of the environment, the consequences of its degradation and the role of education are good topics for discussion and debate. Also,</p>		
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		<p>environmental education should not force people to think a certain way, it can help people learn how to think – including how to solve problems, make decisions, weigh options and align values with personal actions.</p> <p>□ 15'</p>		
<p>2.</p>	<p>- awareness of the causes, effects and countermeasures for climate change; - adaptation to extreme weather phenomena and liability to potential natural disasters; - understanding and using basic notions related to climate change;</p>	<p>CLIMATE CHANGE - FROM THEORY TO PRACTICE</p> <p>1. What is climate change?</p> <p>Climate is the prevailing weather conditions averaged over many years, while weather is the short-term change we see and experience on a daily basis.</p> <p>Typically, the average climatic conditions in all regions of the Earth change due to natural processes. Thus, in the last million years there have been regular oscillations between warm periods and ice ages. These oscillations last tens of thousands of years, triggered by periodic changes in the Earth's orbit around the Sun, changes in solar emissions or natural internal processes of the climate system.</p> <p>Since the Industrial Revolution and until now, human activities have caused a significant increase in global atmospheric concentrations of greenhouse gases, mainly carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC -s), perfluorocarbons (PFCs), sulfur hexafluoride</p>	<p>- Perform a characterization of climate change, writing down expressions or words that define them, using the "cluster" method</p> <div data-bbox="1373 678 1653 1037" data-label="Diagram"> </div> <p>- Play Kahoot: https://kahoot.it/challenge/0932881?challenge-id=9a739104-05d0-424b-b82f-d2e0cfa28f76_1677355997822</p>	<p>- Make a cartoon about climate change</p>



		<p>(SF6), nitrogen trifluoride (NF3). These gases act like a window in a greenhouse: they absorb the Sun's energy and heat that is radiated from the Earth's surface, trap it in the atmosphere and prevent it from escaping into space. Within normal limits, this greenhouse effect makes life on Earth possible, since, if it did not exist, average temperatures would register negative values that would not allow survival. Instead, the increase in the greenhouse effect causes changes in the climate of the entire planet.</p> <p>The main sources of greenhouse gases produced by humans are:</p> <ul style="list-style-type: none"> • the burning of fossil fuels for the production of electricity, transport, industry and heating and cooling of households; • carrying out certain agricultural practices that are associated with methane emissions (CH4) - resulting from animal digestion, manure management and rice cultivation, respectively nitrous oxide emissions (N2O) - originating from agricultural soils treated with nitrogen fertilizers of organic origin and mineral and manure management. • the reduction of forested lands as a result of the change of their 	<p><input type="checkbox"/> 20'</p>	
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		<p>destination, the burning of savannahs, stubble;</p> <ul style="list-style-type: none"> • storage on the ground and incineration of waste; • waste water handling; • the use of fluorinated industrial gases. <p>https://www.youtube.com/watch?v=S2ebdGxsI6E</p> <p>https://www.youtube.com/watch?v=hiUa93ePcoU</p> <p>https://www.youtube.com/watch?v=AKzr1tEJH7Q</p> <p><input type="checkbox"/> 25'</p>		
3.	<p>- promoting ecology as a science of managing nature;</p> <p>- identification of the main forms of pollution and its effects on the environment;</p> <p>- training of household waste management and recycling capacities;</p> <p>- developing creative abilities by reusing household waste as</p>	<p>RECYCLING AND WASTE MANAGEMENT</p> <p>https://youtu.be/RS7IzU2VJIQ</p> <p>https://www.youtube.com/watch?v=D6j0dS7dRi8</p> <p>https://youtu.be/GY3ssbnpcWY</p> <p>poluarea-cu-plastic---plan-cu-cuvinte_ver_4.pdf</p>	<p>- Let's know the conventional colors for containers!</p> <p><input type="checkbox"/> Didactic game:</p> <p>https://learningapps.org/15612084</p> <p><input type="checkbox"/> 5'</p> <p>- Make objects from recyclable materials.</p> <p><input type="checkbox"/> sugestions:</p>	<p>- Make a PPT presentation with the title "All about recycling" (minimum 6 and maximum 10 slides)</p>



	material for making toys;	https://youtu.be/IA9O9YUwQew <input type="checkbox"/> 15'	<u>Recycled paper braids - how to make a basket using newspaper - YouTube</u> <u>Awesome Idea How to make a beautiful flowerpot by recycling plastic bottles - YouTube</u> <input type="checkbox"/> 25'	
4.	<ul style="list-style-type: none"> - to know the polluting factors. - to present how pollutants reach the ecosystem. - to identify the sources of water pollution. - to present the consequences of pollution . 	<p>WATER = LIFE; KEEP IT CLEAN!</p> <p>Approach to the topic using the PBL method In 1969 the famous Norwegian scientist and adventurer Thor Heyerdahl undertook an expedition in a papyrus boat "Ra". During the trip, he discovered a lot of plastic waste and oil slicks in the ocean and launched a call to protect the oceans. Half a century has passed and this phenomenon has gained momentum. Currently, within five large ocean basins, there are already 5 such garbage islands. The largest is in the Pacific Ocean and stretches over an area similar to that of Canada. Underwater eddies that are massive and slow, like "traps", collect tons of plastic waste with the help of sea currents, which are stored on the surface of the water forming permanent islands. 80% of plastic waste is of continental origin and comes from all over the Earth, but we should not think that it is "supplied" only</p>	<p>Activity in groups of 5 students: Students are asked to record all forms of pollution and the impact on the environment, according to the video presentation. Students will analyze if there is any of these forms of pollution in the locality where they live. <i>Are there other forms of pollution where I live that don't appear in the film?</i></p> <p><input type="checkbox"/> 15'</p> <p>-- Each team writes a letter addressed to the local authorities, asking for periodic analysis of the city's drinking water .</p>	<ul style="list-style-type: none"> - Make a video of unpolluted running waters in the region.



		<p>by the riparian countries. The name "island" in the given context is not an accurate one because this waste in the oceans is not a compact mass and does not resemble an ordinary island, but rather a "garbage soup": a multitude of pieces of plastic float at surface or at a depth of up to hundreds of meters, and over 70% of waste moves to the depths, affecting life in the lower layers.</p> <p>https://youtu.be/Sp572udnPVg</p> <p>Since all the garbage islands are in international waters, so far, no state near which the plastic island "walks" unhindered has assumed any responsibility in this regard. Once in the ocean, this garbage becomes "nobody's", but this fact does not prevent it from destroying the environment and profoundly modifying the ocean ecosystem. Birds, fish and other aquatic inhabitants suffer from human indifference. Oceanic litter is the main cause of the annual deaths of over one million seabirds and over 100,000 marine mammals. Animals ingest the plastic, which they mistake for food or plankton. In the marine environment, plastic degrades over time until it becomes extremely small particles, similar to zooplankton. In this form, it reaches the food chain and is consumed by the creatures in the oceans, which we can find on our plates at some point.</p> <p>https://youtu.be/1qT-rOXB6NI</p>	<p><input type="checkbox"/> 15'</p>	
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		□ 15'		
5.	<ul style="list-style-type: none"> - identification of green energy sources; - awareness of the need to replace conventional energy resources with renewable ones; - application in the school and community of initiatives to support a healthy environment; - carrying out projects as appropriate responses to a series of challenges, such as the energy crisis; 	<p>SOLUTIONS FOR A GREEN FUTURE (PBL)</p> <p>What is green energy?</p> <p>Green energy is a type of energy that comes from natural sources, whether we are talking about sunlight, water flows, wind or even waves, which generate tidal energy.</p> <p>Their biggest advantage is that while they provide us with the energy we need in our daily lives, they do not affect the environment in a negative way, such as by removing greenhouse gases into the atmosphere.</p> <p>https://youtu.be/FN7vfYDM3ZY</p> <p>https://www.youtube.com/watch?v=9_4cf4KnC0g</p> <p>https://www.youtube.com/watch?v=4R7L8g4-vBo</p> <p>https://www.youtube.com/watch?v=vP3m57HRITU</p> <p style="text-align: center;">□ 15'</p>	<p>Energy sources!</p> <p>□ Didactic game:</p> <p>https://wordwall.net/ro/resource/16765053</p> <p style="text-align: center;">□ 5'</p> <ul style="list-style-type: none"> - Make a poster showing the advantages and disadvantages of using solar, wind, geothermal and biogas energy. - 25' 	<ul style="list-style-type: none"> - Green/passive housing – make a mock-up of a home with low energy consumption.
6.	<ul style="list-style-type: none"> - developing a behavior for the management and use 	<p>THE FOREST – THE GREEN GOLD OF THE PLANET</p>	<ul style="list-style-type: none"> - Didactic game: 	<ul style="list-style-type: none"> - Make a flyer/ to distribute to get the local community to

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