

COORDINATOR

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**Science and Art- Rediscover, Research and Creative Recycle
Module 6. Environment and climate change**

Bahna Mare

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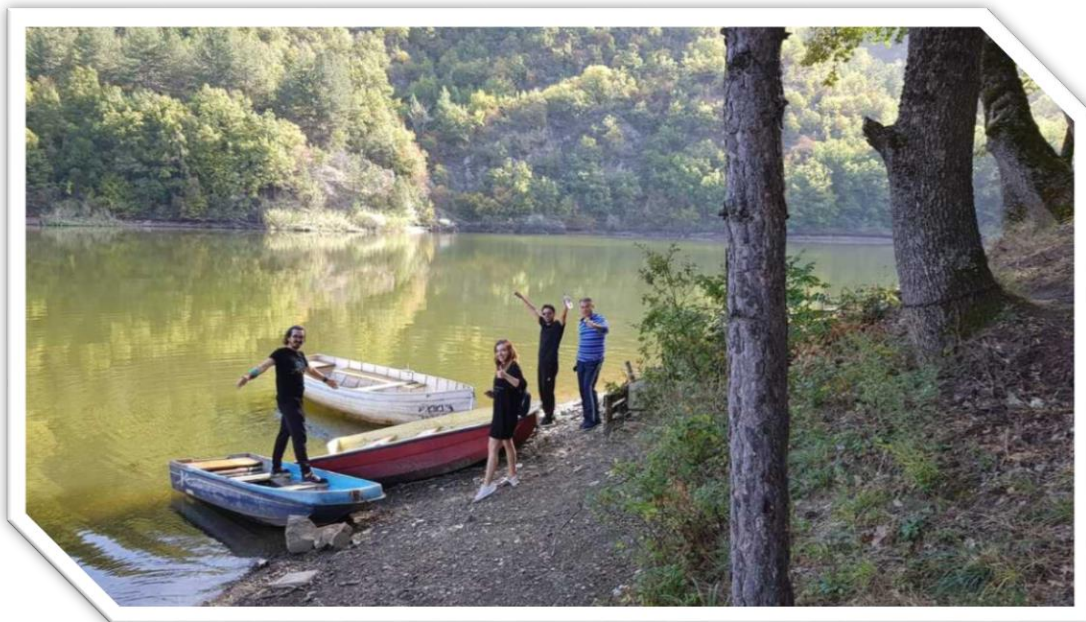
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„Science and Art- Rediscover, Research and Creative Recycle” Module 6. Environment and climate change



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CrowdAid A.P.S., Ente del TerzoSettore, Italy, partner
Room For Art, Cyprus, partner
VIBE Slovakia, Slovakia
ErdemlilceMilliEgitimMudurlugu, Turkey, partner
Eko Tim Istok, The Republic of North Macedonia, partner

Transnational meeting no. 6
Environment and climate change
Kochani, The Republic of North Macedonia,
October 20-21, 2023

Natasha Miteva, Vesna Efremova
Eko Tim Istok

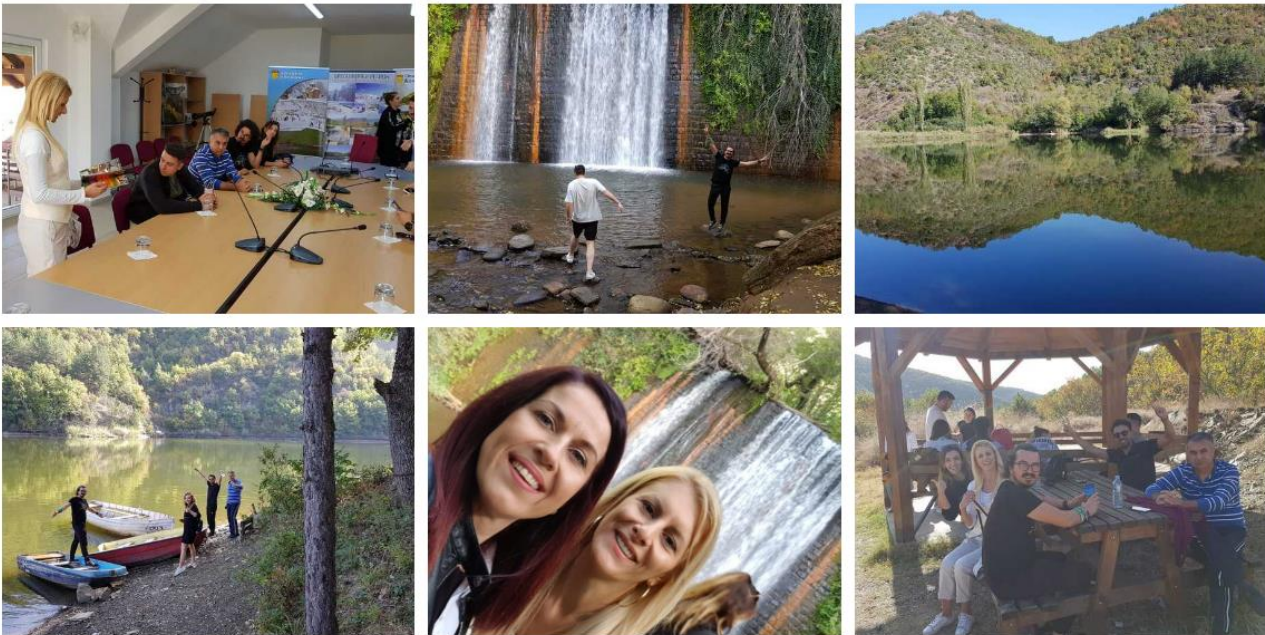
Date: 20 October, 2023

- Workshop 1 -production of eco tiles from waste plastic and sand
- Workshop 2- recycling with manual press for reducing the volume of plastic bottles
- Study visit of eco company Ekoproekt KO –
<https://www.ekoproektko.com.mk/>
- Study visit of factory for production of rice in Kochani with eco mission
- Local history and culture tour in town Kochani (park of revolutionary, culture center, Municipality of Kochani, Monument of freedom, St. George church, city center...)



Date: 21 October, 2023

- Visit of brana Gradce, artificial lake near Kochani and waterfalls nearby
- Visit of touristic center, Ponikva – Osogovo mountain, nature forests, ski lifts, St. Vasilij church, touristic resorts.



Introduction

EKO TIM ISTOK hosted partner organizations within the Erasmus + project ‘Science and art- Rediscover, research and creative recycling’ having transnational meeting no.6 held in Kochani, Republic of North Macedonia on 20-21 October 2023.

The main scope of the module 6 was fully achieved thus comprising the mission and vision of our organization. Throughout the activities envisaged for those two days we managed to provide the partners with new knowledge and skills regarding the relevance of material recycling and thus achieving preventing climate change and having cleaner environment. We create solutions for the conservation and rational use of natural resources for the benefit of all citizens and at the same time obtaining responsible society and conscious relationship between people and nature.

Natasha Miteva

Founder and member of Eko Tim Istok

- **Mission:** Providing education and support for the people of Eastern Macedonia in order to create a sustainable living environment in the future. We exist to protect the public interest and the right to a healthy environment.

- **Vision:** A better educated community with increased awareness and protection towards the environment. We are committed to enhance standards and improve the environment and nature condition, we advocate for the inclusion and participation of the public in order for everyone to be involved within the creation of a healthy environment.

Study visit of ‘Eko Zrno’ rice mill factory



Kochani is the only city in the Republic of North Macedonia that produces and mills rice. Due to the fact that rice is grown in Kochani our partners had the opportunity to visit and have an insight in the whole process. We visited the fields and that are in the vicinity of Kochani i.e. the surrounding villages. The process of harvesting was ongoing. Surrounding villages are characterized by fertile soil, plentiful water, favourable natural conditions for agricultural production – and fragmented land structures.

The visit of the rice mill factory enabled the partners to get to know with the environmentally friendly factories that enhance standards to create sustainable healthy environment. The owner of the factory provided us with the opportunity to get to know with the process of rice milling.

The Process of rice milling involves removal of husk and bran layers, which produce rice that can be edible, free of impurities. Rice milling business has been around for a long time. Especially, in countries where rice farming is major source of income, the rice milling business is one of the business in the agriculture that grows fast and help in economic development.

The process involves the following:

1. Pre-cleaning
2. De-husking
3. Paddy removal
4. Polishing or whitening
5. Grading and separation of white rice
6. Mixing
7. Mist polishing
8. Weighing of rice
9. Packing / Bagging of rice

Rice husks is an agricultural waste. A common practice in many countries are burning the rice husks in the fields after harvested that causing severe air pollution, produces large amount of carbon dioxide, sulphur dioxide and destroys the soil structure. It also poses a danger to farmers whose home are susceptible to catching fire when strong wind blows. Through our recycling process, rice husks are transformed to become natural and eco-friendly dining wares, cutleries and others kitchen wares that do not contain any harmful substances.

The company that we visited believes in creating a safe environment for you, which is why they craft their products out of the humble rice husks. These hardy products of nature have allowed us to create high quality, eco-friendly and toxic-free products. Rice husks products are developed based on the environment of delivering safe, environmentally-responsible products to home across the world.

The rice husk is extremely useful and applied in different industries due to its:

- High silica content
- Resistance to fungal decomposition
- Resistance to moisture penetration
- Slow decomposition
- Good insulator
- Great as renewable energy

When you think about it, these properties lead to multiple usages especially in developing countries:

- As electricity for villages
- As power for lights
- As building materials
- As fuel for bricks

- As alternative materials to wood chips
- As a source for silica and silica compounds

Interestingly, the ash from rice husks is also used as renewable energy. Known as Rice Husk Ash or RHA, the applications include processing of steel, cement, and refractory industries. RHA has also been found to be superior to other supplementary materials like slag, silica fume and fly ash.

Commercially, rice husks are a good and sustainable source for daily living.



Study visit of the Company for production, trade and services

EKOPROEKT-KO DOO KOCHANI

The company's activity - collection and transportation of municipal and other types of non-hazardous waste is carried out by EKOPROEKT-CO DOO Kochani on the basis of the acquired permits for the collection and transportation of municipal waste, the performance of the activity of trade in non-hazardous waste and the performance of the activity of storage and treatment of waste issued and approved by the Ministry of Environment and Spatial Planning.

EKOPROEKT-KO carries out collection of non-hazardous solid waste, PACKAGING WASTE, GENERATED by the customer's operations.



EKOPROEKT-KO recycles the following materials: used old nylon, paper and cardboard, PET-plastic-PP-HDPE, WOODEN PALLETES. EKOPROEKT-KO delivers bags, containers for waste selection at its own expense and performs the measurement on a scale in its warehouse, the "Waste House".

The collected waste from the producers is primarily processed in the "Waste House", it is baled in the form of bales with dimensions of 90, 80, 80 and with the following weights on average: for paper and cardboard - 120 kg, plastic - 80 kg, HDPE - 70 kg, nylon - 100 kg. The mechanically treated waste is transported to the final recyclers.



The company cooperates with several schools and jointly implements the "Purchase of non-hazardous solid waste - secondary raw materials" program. The

main benefit is the possibility of creating eco-schools, which have adopted environmental protection. The implementation of the program provides concrete and measurable results for the local environment and the wider community.

They are aimed at achieving several goals:

- create conditions for a clean environment;
- creation of a mechanism for carrying out activities aimed at raising public awareness among the population about the harmfulness of plastic and other waste materials, as well as their use as raw materials;
- enhancing the effects of engagement for environmental conservation;
- involving, motivating and educating schools, civil society organizations, collectors and the public for the collection of waste packaging.

Production process of eco tiles

In the production process of eco tiles, only waste plastic and sand are used as raw materials, and if desired, facade paint. The plastic used for the production of eco-tiles is collected by individuals and legal entities (schools, restaurants, companies engaged in production) from Kochani, and Ekoproekt-Ko Company which has permits for the collection, transportation and treatment of non-hazardous and other types of waste. The production process begins with the crushing of plastic waste in a special machine - a crusher.



After the plastic is crushed, it is transferred to a mixer along with the sand to be mixed in a ratio of 50% plastic and 50% sand. The mixture thus mixed is placed in an electric extruder, where it melts at a temperature of 230 C.



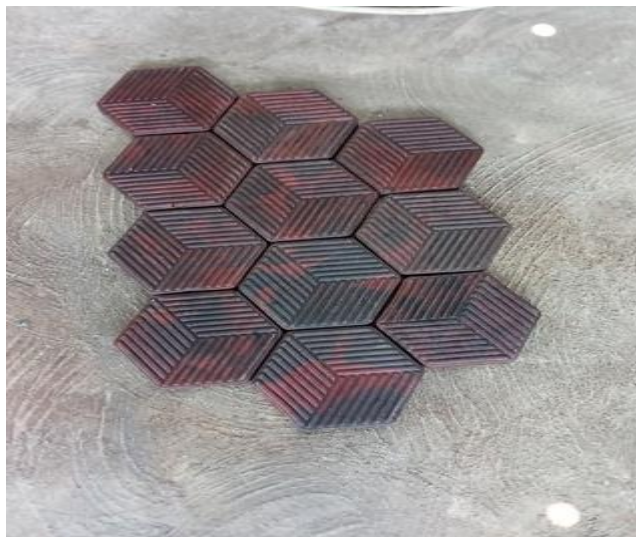
The melted mixture is then placed in a press mold, where it is pressed and a finished tile is obtained.



At the end of the process, it is placed into cold water to keep its shape.



The final product.



Sightseeing of Kochani

In Kochani is located the Monument of Liberty as a symbol of all uprisings and battles, fights, revolutions and sacrifices for the liberty. It is a masterpiece of the artist Gligor Chemerski, built in 1981, and it is the biggest mosaic monument in Europe, on the top of our memorial art.



Kochani lays on the biggest geothermal reservoir of the Balkan Peninsula. Kochani geothermal region or the Podlog-Banja, which is located on the Northeastern part of Republic of Macedonia, exactly among $41^{\circ} 40'$ and $42^{\circ} 00'$ north geographic amplitude and $22^{\circ} 00'$ and $22^{\circ} 30'$ east geographic longitude. On the basis of complete performed interdisciplinary explore works it is certificated as one of world's biggest not magmatic springs of geothermal water, with total balanced static reserves from 150 million m^3 , with temperature of $75^{\circ} C$. Regarding chemical

content this geothermal water is sodium bicarbonate, with pH value from 7, not aggressive in closed system. The presence of Selenium, Fluorine and other elements is in the permissible limits and gives special performances to water for its usage and drinking.

Since February 2011, the geothermal water from the system Dolni Podlog-Kochani has been used and has been returned to the land again. The so called doublet system provides rational and ecological threat of the geothermal prospective. With the modernization, its capacity was enlarged with new 50 liters hot water in sec. or 350 thousand m³ water with temperature from 75°, for a year. Cubic water like this energetically substitutes 4.2 kg of petroleum. Now the geothermal energy is used for heating 20 ha glasshouses in Kochansko Pole, heating three schools, the building of the Basic Court and the Sports hall.

The first exploring of this source was in 1980 when the drilling of the first well was executed. Later, two more pumps were built, with total capacity of 300 liters in second. According to the studies of the American company „Geotermaks“ and the Austrian consortium ARGE GTM, the water in the Kochani geothermal reservoir owns exclusively favorable chemical characteristics.

The researches on this source show that in depth of about 2000 m there are certain reserves of water with 114° C temperature that can make enough pressure for activation of turbines for electricity production with power between 3.2 and 5 megawatts or approximately as the electricity production of two small hydro power plants.

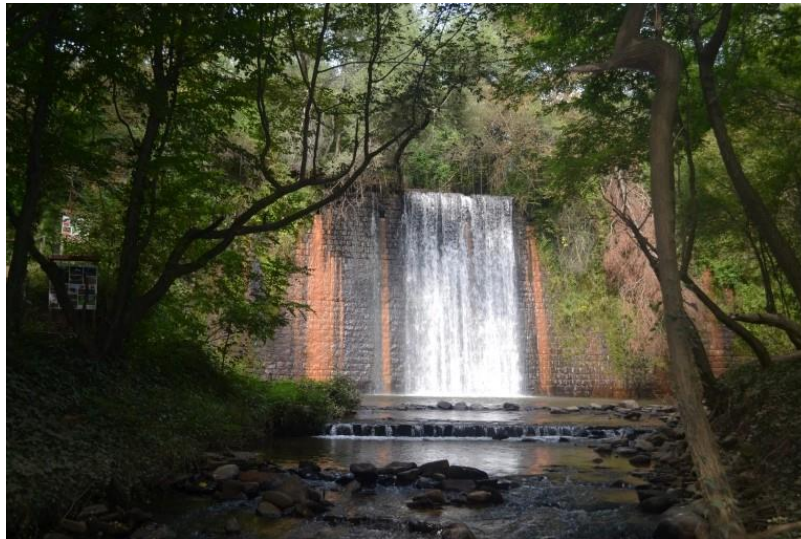
Visit of Dam ‘Gratche’

6 km northern from Kochani, the dam Gratche on the Kochani river was built, on 465 m altitude above sea level. This accumulation is 2,1 km long, and 0,35 km wide. The lake is situated in an extraordinary landscape canyon with very attractive environment and rich vegetation. The water from the artificial lake is used for irrigation and for industrial aims. There is a perfect nature ambient created around this lake and it is used for recreation, fishing and camping.

Gratche is a popular tourist locality, and together with the motel located on the coast of the lake offer perfect conditions for enjoyment.

Gratche Waterfall – a waterfall located on Osogovo mountain, along the Velika Reka river, about 1 km from Gratche lake. In 1958, an artificial dam made of stone blocks was built on Velika Reka, which aimed to prevent the sudden flow of water to the village of Ramna Skala, where the main dam was being built. With the accumulation of branches, stones and earth, the auxiliary dam began to fill with soil, and over time a waterfall was created. The waterfall is 12 m high and is about 1 km from the mouth of the Velika Reka river in Lake Gratche.

These waterfalls are a special attraction for visiting by the local population, domestic and foreign tourists and a great corner for educating young people about its natural values.



Gratche – an artificial lake located at the foot of the Osogovo Mountains, about 6 km away, north of Kocani. It was built in 1959 with the former village of Dolno Gratze . The dam is reinforced concrete with a height of 46 meters, the length of the block wall is 150 meters and is located at an altitude of 467 meters. The lake is 3.5 km long and 0.2 km wide, with a maximum depth of 29 m. The surface of the accumulation is 0.19 km², accumulates water of 2.4 million m³ used for industrial needs and for irrigation of 576 hectares of arable land in Kocansko Pole. In addition to commercial, Lake Gratche also has a tourist-recreational character, and on its coast there are two facilities with catering character and hotel. On the northern side of the lake, at the inlet of Mala and Golema Reka there is the archaeological site Dolno Gradiste.



The river has a very high decline (39.3%). Hydrological regime and favorable topographic conditions of Kocanska River allow building an artificial accumulation near the village Dolno Gratce, which according to the village was named Gratce. The accumulation is located about 6 km north of Kocani. The dam is reinforced- concrete with 46 meters height, which creates a volume of the accumulation of 2.4 million m³. Water from the accumulation is used for the industrial and for irrigation of arable land of Kocani field.

In or near the project location there are registered endemic, protected and endangered animal or plant species or protected areas and habitats.

Ichthyofauna within the river Kochanska, is represent with several species such as: *Rutilus macedonicus* Steind. (Macedonian Roach), *Leuciscus cephalus vardarensis* Kar. (European chubs), *Chondrostoma nasus vardarensis* Kar. (Common nase), *Barbus macedonicus* Kar. (Macedonian barbel), *Gobio gobio* L. (Gudgeon) etc. The information about fish biodiversity in the river Kochanska are obtained from the Fishing Management Basis for “Watershed of river Bregalnica” for the period 2011-2016.

Visit of Osogovo Mountains

Only 20 km north of Kochani, on the Osogovo Mountains Range, on 1580 m above the sea level high, the tourist locality Ponikva is situated. The monastery „St. Vasilij Veliki“ was built on Ponikva. There are accommodation capacities and sport facilities built. Ponikva is mostly visited during the winter. On Ponikva there is a resort with 82 beds, ski trails, two ski lifts, a weekend settlement, restaurants, motels, and a special attraction is offered by the hunting reserve "Osogovo" rich in game such as deer, roe deer, wild sheep and wild boar. The reservoir is spread on 1.300 ha and it is popular among the sport hunters. Near the crossroad of the municipalities Kochani, Kriva Palanka and Kratovo, on altitude above sea level from 2.085 m the peak Carev Vrv is rising, the second high peak of Osogovo mountain, where snow cover is held more than 6 months in the year.

The vegetation present at the area consists of thermophilous forests of hornbeams and oak, *Quercetum frainetto-cerris*, fragments of European hop-hornbeam (*Ostrya carpinifolia*) on the southern slopes. The valleys of the northern slopes are populated with beech forests (*Festuco heterophylae-Fagetum*). The matrix is composed of forests mainly thermophilous forests of hornbeams and oak, and *Quercetum frainetto-cerris* with patches of abandoned meadows.

Autumn emotions

Liliana Dunăre, teacher

In November 2023, the students of the 10th F and 11th E classes from the Gheorghe Cartianu Technical College, Piatra Neamt, created the "Autumn Emotions" exhibition.

Autumn, the season of change, brings its own magic and inspiration to the world of fashion. In an exhibition of sketches illustrating fall clothing, students join forces to capture the beauty and character of this season in every detail of their creations.

This exhibition offers a foray into the fascinating universe of fashion, presenting sketches that translate the elegance and sophistication of autumn into colors and lines.

The works on display in this exhibition are obviously inspired by the spectacular landscape changes that autumn brings with it. Warm color palettes such as ochre, burgundy, emerald green and gold are prevalent in the clothing sketches, reflecting the fallen leaves, golden sunlight and general atmosphere of autumn.

Textures and Materials Fashion designers, through crochet, bring to the fore rich textures and lush materials, designed to provide a special tactile and visual experience. The cuts present games of volumes and silhouettes, and the chosen materials - fine wool, velvet, silk and soft knits - contribute to comfort and elegance.

Within the exhibition, the diversity of the silhouettes is noticeable, from the broad and fluid ones, inspired by the dancing leaves of the trees, to the most structured and defining ones, evoking the architectural forms of the buildings intertwined with history. Asymmetrical lines and intricate details give each crochet a distinct and original identity.

Accessories are the pinnacle of autumn outfits, each element adds an extra touch of elegance and personality. The sketches capture the details in a way that highlights the designers' attention to detail.

The exhibition of sketches of autumn clothes offers a fascinating journey into the world of fashion, illustrating the artistry and creativity of students in reinterpreting autumn in terms of style and elegance. Each sketch represents a unique story, conveying emotions and energy specific to this enchanting season.

Through colors, textures, silhouettes and impeccable details, these creations redefine the beauty of autumn and prove that fashion can be a complex and captivating form of artistic expression



Creative recycling of cardboard and textile materials

Constantin Pricope

Cardboard is a type of thicker paper that proves to be very useful when it comes to packing items.

The usefulness of cardboard is undeniable and, fortunately, it is 100% recyclable.

We can make many objects by recycling cardboard. Thus, we can use:

- plain cardboard - found especially in the packaging of food products, pizza boxes
- corrugated cardboard, from packaging boxes
- egg packaging boxes
- cardboard rolls (those left over, as a rule, from toilet paper or paper towels)
- carton for packing large household appliances

Most **household textiles and clothing** can be recycled, regardless of quality and degree of wear.

Textiles do not degrade easily in landfills due to the lack of sunlight and oxygen, and burning them contributes to air pollution. For this reason, recycling clothes contributes to maintaining a clean environment.

From cardboard and old clothes we made boxes for storage and paintings that we decorated with ornaments made from recyclable materials.







The Magic of Creative Recycling - Unique Christmas Ornaments

Șalaru Constanța, teacher

The holiday season is approaching, and the generous spirit of Christmas brings not only joy but also a wonderful opportunity to address how we can contribute to the protection of the environment. Creative recycling is becoming increasingly popular, and transforming used objects into beautiful and personality-filled ornaments, truly unique and distinctive, is a wonderful way to add a touch of originality to the holidays while promoting sustainability.

In the glittering world of Christmas ornaments, creative recycling seamlessly blends with the festive spirit. Why not turn ordinary objects into works of art that bring smiles and celebration into our homes? In this sense, used objects become the secret ingredients for truly remarkable Christmas decorations.

We can blend the magic of the holidays with environmental concerns and have plenty of creative ideas to create Christmas ornaments using recycled materials:

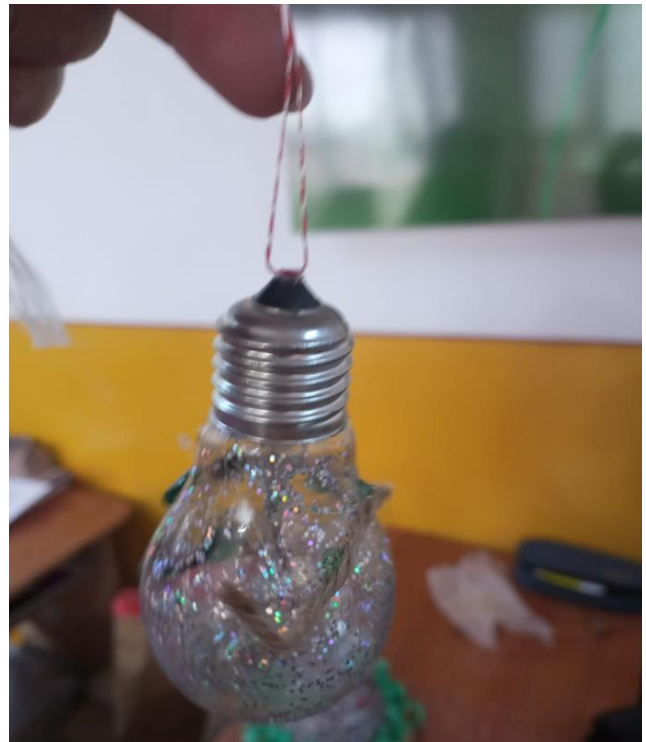
- Single-use cups have become a spectacular snowman.



- The expired pasta can be recycled in a surprising way - transforming them into thematic Christmas ornaments, becoming a beautiful little tree that adds a touch of originality to the home deco



- Egg cartons have provided a versatile material for festive creations, becoming handmade Christmas wreaths.
- The pine cones fallen on the ground have become the foundation for rustic ornaments.
- Burnt-out light bulbs have become central elements of Christmas decorations.

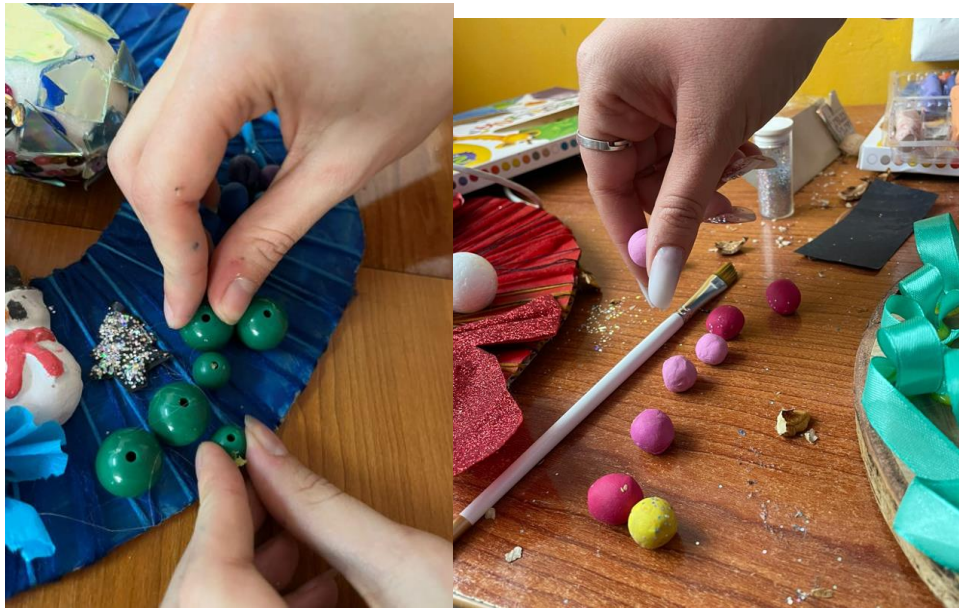


- We can collect cotton swabs and empty toilet paper rolls, keeping them to transform into Christmas ornaments.



- From paper, we can create cute angels, trees, globes, or other ornaments.
- With glass bottle caps, snowman-shaped ornaments can be crafted.





These ideas not only add a personal touch to Christmas decor but can also contribute to promoting creative recycling, sustainability, and creativity during the holidays, transforming recycled materials into beautiful and meaningful ornaments.



As the holidays approach, creative recycling offers a wonderful way to bring joy into our homes while respecting the environment. Christmas ornaments made from recycled materials not only adorn our spaces but also convey a powerful message about the importance of resource conservation and sustainable thinking. By transforming used objects into original decorations, we reduce waste and contribute to the preservation of natural resources.

Let's bring the magic of creative recycling into our holidays and turn ordinary things into festive works of art!

Local workshops

Gabriela-Brândușa Horlescu, Nicoleta-Daniela Grădinaru

Room for Art, Cyprus

On December 5, 2023, Room for Art's volunteer, Georgia Patsalou, presented our project's activities to local organization's CCIF's manager and associates and elaborated on how the project involves activities aimed at promoting recycling initiatives that harness energy generation while positively impacting life and the environment.



Erdemli Ilce Milli Egitim Mudurlugu, Turkey

Türkiye Erdemli District Directorate of National Education held the local dissemination workshop of the North Macedonia mobility workshop.



VIBE Slovakia, Slovakia

As Christmas are slowly approaching we decided to held a workshop dedicated to crafting natural aromatic Ikebanas that can bring festive atmosphere to your households.

Supporting the principles of sustainability, we encourage the use of ripe fruits and herbs. By utilizing organic materials that have reached their peak ripeness, we can not only enhance the aroma of our Ikebanas but also contribute to reducing food waste.

Another eco-concious idea is to repurpose used egg shells. Once the aromatic essence of our Ikebanas has faded, we will combine the remaining fruits with the ground egg shell powder, creating a nutrient-rich fertilizer that will be used to nourish our plants



ASOCIAȚIA SPRIJIN+, ROMANIA

Piatra-Neamt, December 9, 2023

Handmade products for the Winter Holidays - art, uniqueness and emotion

We are about to say goodbye to this year... But it is not long until the Christmas holiday, an occasion of joy for everyone. To mark this event, in today's workshop we prepared unique decorations for the Christmas tree, to give them to loved ones in the family.

We all know that handmade items have a special charm and are unique, which makes them completely and utterly special.

Whether we call them handmade items, artisanal items or handmade items, these unique products will always bring a smile to our faces, restore our confidence in our own strength, and help us increase our self-esteem.

Even if technology has evolved, handmade products have continued to retain their value, precisely because of the creation of man who will always be a craftsman, artist and creator.

In our workshop we made decorations for decorating the tree, a perfect choice for those who want to bring more nostalgia and warmth to the winter holidays.

During the holidays we all want to be at home, to share the joy with our loved ones.

So this year, choose to give the gift yourself and surprise your loved ones with inspired gifts because "There's no place like home!"

Christmas decorations can be made from materials such as: acorns, fir cones, light bulbs, paper, cardboard, corks, pieces of wood, dried flowers, but also from used jars.

Here are some unique ideas for Christmas ornaments and handmade decorations for the winter holidays!

Natural Christmas decorations from fir cones

Fir cones, due to their natural beauty and appearance, can be used to make Christmas decorations. If you take a walk through the nearby coniferous forests, you will surely find fir cones that you can use to create decorative objects. For those who appreciate handmade decorations, we can make: arrangements for the Christmas table, wreaths for the entrance door, miniature fir trees from cones or globes from the fir cones.



Orange and lemon peel ornaments for decoration

Oranges are recognized for their enticing flavors and are consumed mostly in the cold season.

For the holidays, you can choose to make an orange or lemon peel decoration along with globes and tinsel.

From orange caps and leftover cutouts from other decorations, you can decorate Christmas wreaths.

Another way to use dried orange peels is to decorate jars: a slice of dried orange next to a colorful ribbon will decorate jars or glasses that you can turn into candles.

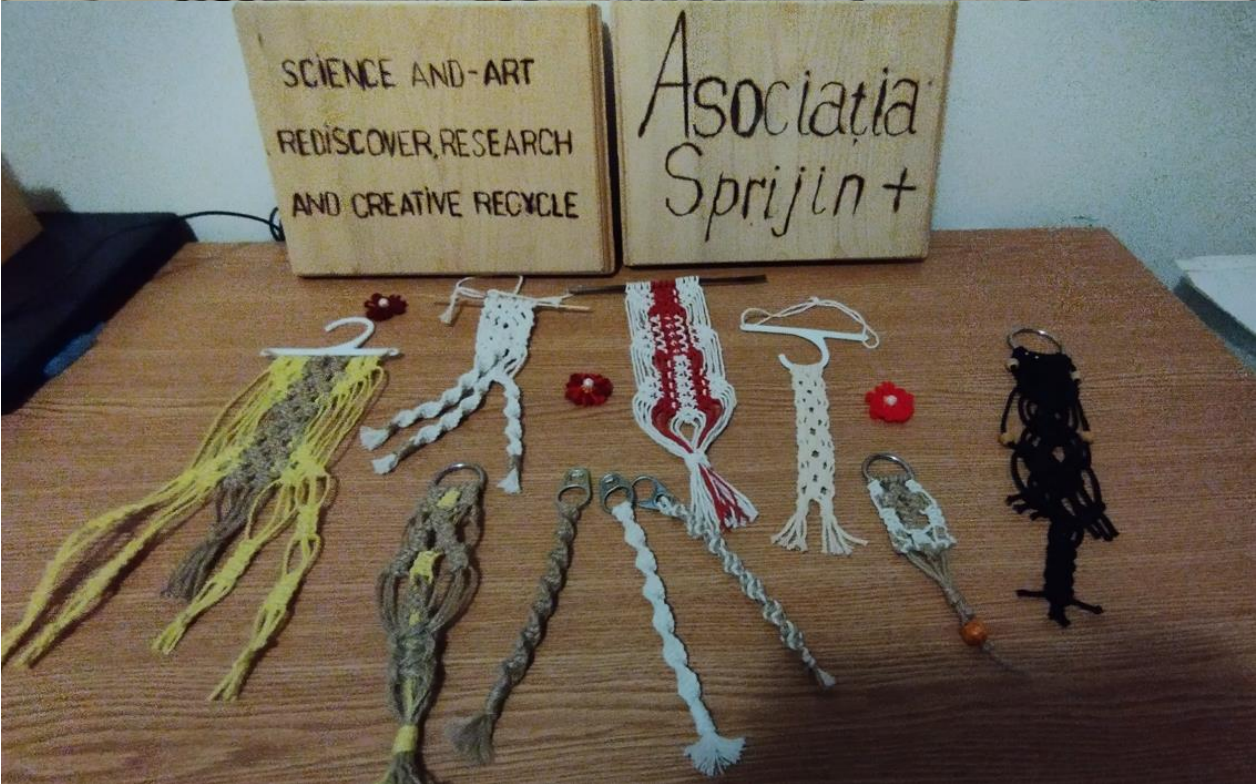


Decorations from wooden rings

Interesting interior decorations can be made from simple wood. The wood can be painted or carved and you will get special products.







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