



Co-funded by the  
Erasmus+ Programme  
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ERASMUS+ PROJECT NO.2018-1-LV01-KA201-046976

STEP- STEM  
to environmental problems

# "The Story of Small STEPs"



Education is not preparation for life; education is  
life itself.

JOHN DEWEY



## Latvia

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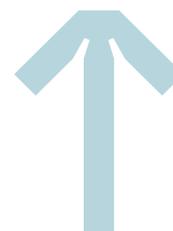


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# CONSORTIUM OF PARTNERS





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# 1 Project identification

PAGE 04



---

# 2 About STEP project

PAGE 05



---

# 3 Project objectives

PAGE 06



---

# 4 Project partners

PAGE 07



---

# 5 STEM best practice exchange

PAGE 13



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# 6 Multicultural events

PAGE 23

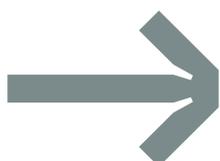


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# 7 Impact and testimonials

PAGE 24

Welcome Booklet



# CONTENTS

# PROJECT IDENTIFICATION

[HTTPS://STEMTOSTEP.WIXSITE.COM/HOME](https://stemtostep.wixsite.com/home)



Project Number	2018-1-LV01-KA201-046976
Project Title	"STEP - STEM To Environmental Problems"
Project Acronym	STEP
Programme	Erasmus+ Key Action 2 Strategic Partnerships for school education project
Call	2018
Project Start Date	01-09-2018
Project Total Duration	36 months
Project End Date	31-08-2021
Applicant Organization Full Legal Name	Austrumlatvijas Tehnoloģiju vidusskola
Number of Partners	6
Number of Mobilities	5
Project website	<a href="https://stemtostep.wixsite.com/home">https://stemtostep.wixsite.com/home</a>
Facebook	<a href="https://www.facebook.com/STEP-Stem-to-Environmental-Problems-363271030946920">https://www.facebook.com/STEP-Stem-to-Environmental-Problems-363271030946920</a>
Instagram	<a href="https://www.instagram.com/step201project/">https://www.instagram.com/step201project/</a>

# ABOUT STEP PROJECT



STEM education

## STEM SUGGESTS AN INTERDISCIPLINARY APPROACH INTO EDUCATION

The main aims of our project are to create common mind and conceptual framework and to ensure that the organizations of different countries are brought together to do a research on environmental issues, providing proposals for innovative solutions and facilitating students' interest into STEM. Hands-on environmental education projects enrich STEM learning and offer an exciting opportunity to engage more students in STEM.

So, taking a small STEP to solve the problems in the immediate environment is a big STEP in finding solutions to the global environmental problems. Students are offered the opportunities to learn science, mathematics, and engineering by addressing problems that have real-world applications. Providing students with real-world problems and asking them to brainstorm solutions bring their thinking skills into play.



# PROJECT OBJECTIVES

Promotion of STEM education

## STEM SUGGESTS AN INTERDISCIPLINARY APPROACH TO EDUCATION

Taking a small STEP to solve the problems in the immediate environment is a big STEP in finding solutions to the global environmental problems.

Within the project students are offered the opportunities to learn science, mathematics, and engineering by addressing environmental problems that have real-world applications. Providing students with real-world problems and asking them to brainstorm solutions bring their creativity, critical, logical and analytical thinking skills into play.



# PROJECT PARTNERS

Experienced in STEM education and projects related to environmental issues

## AUSTRUMLATVIJAS TEHNOLOĢIJU VIDUSSKOLA



Austrumlatvijas Tehnoloģiju vidusskola (Acronym: ATV) is a general-education high school, which is located in the city called Rezekne in the Eastern part of Latvia. The school was established in 2015. Its founder is Rezekne Academy of Technologies, which is one of the leading higher education institutions of Latvia.

ATV is unique, because, firstly, it is one of only two secondary schools in Latvia, which has been established by higher education institution. Secondly, it has a small number of students, which in turn gives the opportunity to have an individual approach to every learner. Every student is given an opportunity to develop, to improve their skills and abilities and to show their talents. And thirdly, the school implements STEM program and prepares students for studies at higher education institutions in the field of engineering and other STEM related disciplines.

Since ATV founder is Academy, our students regularly do practical work in laboratories of Academy's Engineering faculty, which is one of the most modern and best-equipped engineering faculties in Latvia.

Every ATV student develops a scientific research paper, which is presented and defended locally, regionally and at a national level. These studies are mostly done in STEM subjects and are supervised by STEM subject teachers.

The school has its own Students' parliament and School Board, which make decisions and give their contribution to school life. Moreover, since 2017 ATV is the member of European Parliament Ambassador School Programme and is actively participating in Ambassador School Programme activities organized in Strasbourg and Brussels. In 2021 the school has gained eTwinning school status.

The goal of Austrumlatvijas Tehnoloģiju vidusskola is to provide a qualitative and up-to date education, to prepare students for studies in higher education establishment and to bring up socially responsible, tolerant and patriotic citizens.



# ESKİŞEHİR İL MİLLÎ EĞİTİM MÜDÜRLÜĞÜ



Eskişehir Provincial Directorate of National Education is responsible for planning, programming, performing, inspecting and coordinating the educational activities at schools within the borders of the province Eskişehir including 14 districts 2 of which are central districts. It establishes a network of national and international resources to support lifelong learning. 11,048 teachers are working at 479 institutions with a number of 138,456 students.

EU Projects are carried out with the consultancy of our Research and Development Office within the provincial directorate together with science and society supporting projects, projects from lifelong learning programmes and local projects. Our R&D Office has also prepared many projects together with NGO's and local authorities (municipalities, universities).

STEM education approach is highly crucial for Eskişehir Educational Directorate. STEM approach is used at schools from kindergarten to high schools and in local and international Project topics as well. Its observed this approach helps students in Eskişehir to widen their horizon and improve their 21st century skills.



[HTTPS://STEMTOSTEP.WIXSITE.COM/HOME](https://stemtostep.wixsite.com/home)



# ŞEHİT MEHMET ŞENGÜL FEN LİSESİ



Our school which is located in a beautiful rural village of Çukurhisar , situated 18 km far away from the city center of Eskişehir. Eskişehir is a city in the northwestern part of the Central Anatolia in Turkey. The city is home to about 600,000 people and three of Turkey's biggest universities—Anadolu University, Eskişehir Osmangazi University and Eskişehir Technical University—therefore the city is widely nicknamed as "students' city" in Turkey. The name Eskişehir translates to "the old city" in Turkish, a fitting name as the city fully embraces modern life while still maintaining a sense of tradition and ancient values.

Şehit Mehmet Şengül Science High School is a comprehensive four-year public scienceschool enrolling 450 students in grades 9-12. Our school opened in 2016 and is going to graduate its first senior class in the spring of 2020. The Ministry of National Education Regulations are applied with extra curriculun activities such as MUN Club, STEM Club, Drama Club, Model Aircraft Club in our school.

The main building has 20 classrooms, a fully-equipped conference hall, a library, a computer lab, science lab, an art and music studio, project design rooms . The boys' dormitory, the cafeteria and lunch hall, It offers a wide variety of well supported activities outside the classroom, especially in music, drama, sport, art. Because of the physical and technological facilities provided , students are continually able to develop themselves as well as keep up with new advances.

Our school is one of the most prestigious and foremost high schools in Eskişehir because of its academic achievements. As a Science High School, we offer a full range of educational opportunities for students from 15-18 years. We are proud of the successes of our school and the relationships with our students and families. We are conducting so many science projects and participating competitions, conferences, seminars, workshops. Stem-Step is one of the international projects that we are involved in as a partner.

Our basic aim is to provide an educational atmosphere open to improvements and the use of contemporary teaching methods in order to enrich the atmosphere. Our goal is to train our students as happy individuals who are hardworking, successful, skilful in different life spheres, with strong characters and values. By equipping the students with the 21st century skills, we accompany and guide them while growing and developing.

HTTPS://SMSFL.MEB.K12.TR/



# ASOCIATIA EDULIFELONG



Asociația Edulifelong is a non-profit organization founded in 2013, which promotes an alternative to the actual educational and training system, a different way of understanding the teaching-learning processes, by offering high quality non-formal education and also training to adults (mainly teachers but also youth workers) as well as young people.

Our institution is a Training Center that provides training in instructional and assessment strategies, uniquely tailored to the needs of educators, teachers working in the school environment. Our current offer consists in two courses: "Make Maths and Science teaching attractive!" and "From teachers to facilitators and moderators of a student-centered learning process". The first one is being delivered as a face to face training, while the second one may be attended online as well as face to face. Our trainees are teachers from Romania and from other European countries.

Our Association also assists young people to apply for local, national and European funds and enables them meeting other youngsters through the planned project and activities. We are doing our best to help them to acquire personal and professional growth.

Asociația Edulifelong is acting as an education and training centre promoting and enhancing the development of adults and young people offering them new opportunities for training and helping them to become more employable, better skilled.

A special focus is on the youngsters and adults facing different factors of exclusion: youngsters and adults with educational difficulties, unemployed with economic or social obstacles etc.

We have a serious team of facilitators, trainers and educators and the right range of participants, thanks to our wide local and national partnerships involving, schools, universities, rural communities and municipalities.

Our activities cover the three main areas: non-formal education, education for personal development and professional training. Through the planned projects and partnerships, our association aims at involving young people and youth workers, with the help of non-formal and formal education methods, in activities at local, regional or transnational level. In order to achieve our goals we intend to organize activities and events such as: meetings, workshops, training courses, seminars, conferences, street events, festivals, youth exchanges etc. In our numerous national and international projects (Erasmus+) we closely work with stakeholders on the local, national as well as the European level.

Our aim is helping them to take an active part in our community's life, to widen their possibilities to become a responsible citizen in the European Union.

Using non-formal education methods, we promote the transmission of knowledge and know-how by dealing with projects about topics connected to contemporary issues such as: cultural diversity, young entrepreneurship, health and sports, equality for men and woman, green environment, inclusion of Roma youngsters in communities, tolerance and European awareness.

Our aim is to serve the unique professional development needs of practicing and aspiring teachers, counselors, educators, trainers working in public schools across Europe. We strive to provide research-driven, practical training, designed to be put into practice in school setting.



# INSTITUTE PERSPECTIVES

Association Institute Perspectives is an educational organization dedicated to the implementation of European integration policies in the Republic of Bulgaria by developing, testing and implementing innovative methods and approaches in the field of social entrepreneurship, intercultural and human rights, non-formal education and the protection of cultural, historical and natural heritage. The organization was founded by University students and was formally set up in 2012, undergoing three development stages.

Organizational structure: We have established a 4-level organizational structure: Leadership, Members, Associate Members, Youth Coordinators, Mentors and Volunteers.

Our organization has the capacity to provide educational services to three target groups:

- Young people aged 15-24 in vulnerable groups at risk of social exclusion or radicalization.

- Students from Bulgarian and European Universities for conducting internships in real working environment in social and educational institutions.

- Young adults from 25 to 40 - representatives of ethnic minorities, young adults with Special Educational Needs and youths with mental and physical disabilities.

From 2015 to 2019 we provided opportunities for 320 young people from 15 small towns in Bulgaria to take part in 45 European Youth Exchanges under KA105 projects of the Erasmus + programme. There were organized trainings in 8 small towns in Bulgaria, engaging over 1600 young people for a period of 3 to 21 days.

Institute Perspectives, are member of National Working Group for implementation of EU Youth Dialogue.



# OŚRODEK BADAWCZO - EDUKACYJNY W ZIELONOWIE

Research-Educational Centre Zielonowo (OBEZ) ,focuses on work with youth and adults with the aim to develop their ecological and social attitudes, their environmental knowledge and awareness in the framework of various non-formal educational activities.

Our research and training activities cover sustainable and healthy life-style, awareness of global climate and environmental changes, green social economy and wildlife protection. We are working in in a rural community (gmina) Wieleń Wielkopolska region. Here we organize also educational courses for nature lovers, trainings in silvotherapy (forest therapy) as well research intensive programs for MA/Phd students, as we cooperate with Adam Mickiewicz University in Poznań.



# STEM BEST PRACTICE EXCHANGE



WELCOME TO STEM EDUCATION

**STEM practice is based on the idea of educating students in four specific disciplines – science, technology, engineering and mathematics which includes an interdisciplinary and applied approach. Rather than study those four disciplines as separate and discrete subjects, the project "STEP-STEM to environmental problems" integrates them into a cohesive learning based on real-world applications when dealing with the environmental issues.**

Throughout the project implementation period students from project partnership countries got acquainted with the environmental issues that must be tackled in each country at a local, regional or national level.

Each participating country chose the topic that is essential to inspect, hoping to find the best solutions together with other peers. For Latvia it was waste management, for Poland- biodiversity and deforestation, Bulgaria focused on the preservation of Danube river and the importance of plants in our life, but in Romania and Turkey project participants did a research on water pollution.

While doing research on all those environmental issues in Latvia, Poland, Romania, Bulgaria and Turkey students developed their skills and knowledge in STEM subjects, met specialists of the field, visited different plants and organizations, did different kinds of research, learned to analyze the obtained data, made conclusions, generated ideas on different solutions, presented the best ideas, as well as they acknowledged the importance of STEM when dealing with environmental issues and the need to tackle those problems in order to live in an environmentally friendly society and greener future world.



# WATER FILTRATION IN TURKEY MOBILITY

## TARGET AUDIENCE

4-10th grade level

## SKILLS THAT ARE DEVELOPED

Numbers and Operations, Science and Technology

## GOAL OF THE ACTIVITY

- To experience some "real-life" engineering
- To apply mathematics reinforcement

## THE ACHIEVED/ EXPECTED RESULTS

- Understand how filtration works.
- Create creative design methods.
- Problem solve given a design challenge.
- Apply mathematics (multiplication) reinforcement.
- Engage in teamwork to solve a challenge

## DESCRIPTION OF THE ACTIVITY

Students are asked to design methods to filter water using ordinary materials, while also considering their designs' material and cost efficiencies. They learn about the importance of water and its role in our everyday lives. They come to understand what must occur each day so that they can have clean water.

Tell the students they have been hired by (your last name) Water Supply Company. With the ongoing drought, not enough water is available for all the things we need to supply – people, animals and plants. Tell them that they will each be given a sample of the dirty water they have remaining, and show them the tubes "A," "B" and "C." A is nearly ready for human use, B is nearly ready for animal use, and C is nearly ready to feed the plants. Remind them that no one must taste anything in the lab.

Put trays of materials in front of the students. Let them decide in teams what materials they would like to use to filter their water. To challenge students, include one of the following constraints:

- Limit the amount of materials allowed for the design.
- Assign a price per unit of material and give students a budget to work within.

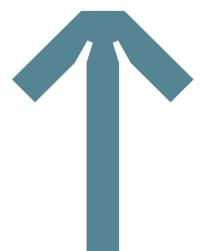
Have students draw schematics of the layers. Once completed, give each team 25 ml of the dirty water to begin to filter in their test tubes.

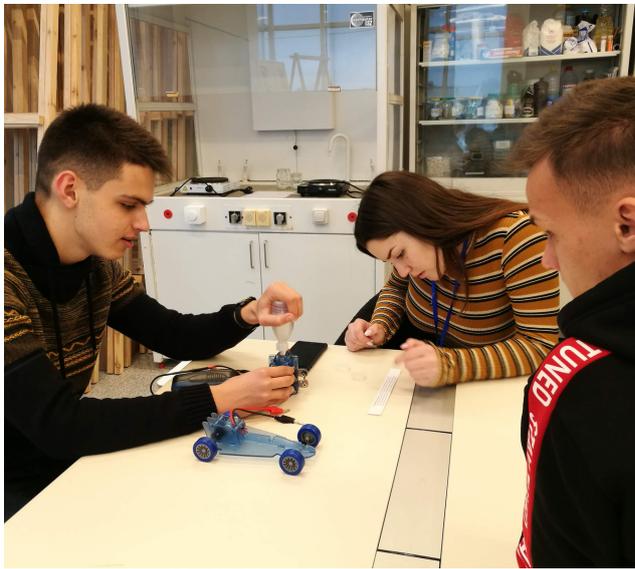
Once filtering is complete, have them bring the test tubes to you for observation. Decide if the water is A, B or C grade and help them measure their sample in a graduated cylinder.

## RESOURCE

[https://www.teachengineering.org/activities/view/water\\_filtration](https://www.teachengineering.org/activities/view/water_filtration)

# STEM BEST PRACTICE EXCHANGE





# WASTE AS A SOURCE OF GREEN ENERGY IN LATVIA MOBILITY

## TARGET AUDIENCE

7th - 12th grade level

## SKILLS THAT ARE DEVELOPED

- Problem Solving
- Communication and collaboration
- Critical Thinking
- Creative Thinking

## GOAL OF THE ACTIVITY

- To get acquainted with the possibilities of environmentally friendly and sustainable waste management;
- To develop an idea on how to dispose of waste and obtain green energy

## THE ACHIEVED/ EXPECTED RESULTS

- Know how to visualize data in graphs
- Understand how to analyze the data
- Offer a solution to the given problem
- Apply mathematics/ physics reinforcement
- Engage in teamwork to solve a challenge

## DESCRIPTION OF THE ACTIVITY

Students get acquainted with SIA Getliņi EKO, which is one of the most modern municipal solid waste landfills in Europe, and which uses biodegradable waste for production of biogas that is converted into energy – electricity and heat. The produced heat is used in SIA Getliņi EKO greenhouses, where Getliņi tomatoes, cucumbers and hanging flowers are grown.

### Task for students:

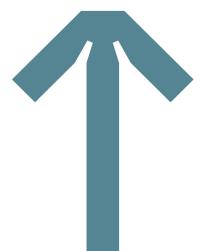
Using landfill engine data on energy consumption, energy input and heat output, students need to calculate the engine's efficiency in generating electricity and heat. Students present the data given in the graph on the increase in electricity and heat production over the last 5 years. Students find a regularity between the biogas produced by the landfill and the amount of waste and come to the conclusion how rapid is an increase or decrease in waste created by society.

Students in groups generate ideas on possible engine improvements in order to increase its efficiency.

Since biogas production requires the accumulation and long-term storage of waste and can cause some damage to nature, students have the task to develop ideas on how to dispose of waste and obtain energy without harming nature as a result of this process. They propose the target audience/facilities that might be interested in this product. Students do calculations and estimate profitability. They make posters and present their ideas to the rest of class

## RESOURCE

<https://www.getlini.lv/en/about-company>





# HYDROGEN - ECOLOGICALLY CLEAN AND ENVIRONMENTALLY FRIENDLY FUEL, INEXHAUSTIBLE SOURCE OF ENERGY IN LATVIA MOBILITY

## TARGET AUDIENCE

Primary and secondary education students who have an interest in chemistry as a science and its connection with solving environmental and ecological problems.

## SKILLS THAT ARE DEVELOPED

- Problem solving skills
- Ability to carry out experiments using chemical laboratory equipment, utensils and equipment.

## GOAL OF THE ACTIVITY

Through a series of interesting and engaging experiments students get an idea of gaseous hydrogen both as an energy source and as a chemical element which requires safe working methods and which can be dangerous if the safety measures are ignored or neglected.

## THE ACHIEVED/ EXPECTED RESULTS

Students gain an understanding of the potential of hydrogen as an ecologically clean, environmentally friendly, practically inexhaustible source of fuel and energy, as well as are aware of the need to follow safe working methods whilst working with hydrogen. Students come to the conclusion that hydrogen is very likely to be the fuel of the future, but it can be very dangerous if misused.

## DESCRIPTION OF THE ACTIVITY

### Hydrogen production, demonstration and properties.

Tasks:

- 1) obtain hydrogen from hydrochloric acid and zinc, store it in a beaker by expelling air, and to prove the presence of hydrogen;
- 2) accumulate hydrogen in a plastic measuring cylinder by squeezing water and to prove the presence of hydrogen;
- 3) reduce copper from copper (II) oxide with hydrogen;
- 4) analyze the results of experiments.

Before the experiment be sure that you have a laboratory stand, dry alcohol heater, matches, tube with gas drain, funnel with rubber ring, rubber tube with glass cap, beaker, crystallizer, plastic measuring cylinder, filter paper, tube, match splints, zinc, hydrochloric acid, goggles and gloves.

**Attention! Concentrated hydrochloric acid is corrosive!**

Activities:

- 1) Assemble the gas extraction device consisting of a tube and a funnel (see figure b);
- 2) Pour a little zinc granule into the gas extraction device, close the device and connect the rubber tube with the glass cap;

3) Place the end of the gas tube in the beaker. Keep the beaker upside down, as hydrogen is lighter than air.

4) Pour a little concentrated hydrochloric acid into the device.

5) After 30 seconds, check with a burning match splint that hydrogen has been accumulated in the beaker.

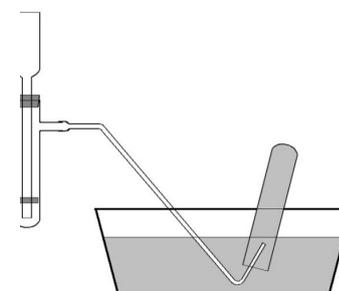
6) Answer the questions!

What are the signs of a chemical reaction in the tube?

Write the reaction equation.

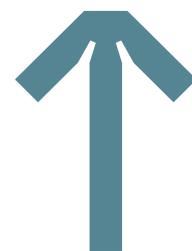
Which gas could not be stored in the same way?

Why is hydrogen considered the cleanest fuel?



WELCOME TO STEM EDUCATION

# STEM BEST PRACTICE EXCHANGE





## TARGET AUDIENCE

By participating in Erasmus Plus "STEP - STEM TO ENVIRONMENTAL PROBLEMS" project and in cooperation with Nadnotecki Institute of Adam Mickiewicz University we founded STEAM Forest Club, gathering youth of age between 15 and 18 years old from our municipality

# STEAM FOREST CLUB IN POLAND

## GOAL OF THE ACTIVITY

Sustainability - to continue the work of the STEM project after period of funding. Our youth decided to add "A" to STEM for art, (outdoor) activity and (eco) activism in order to achieve:

- -boosting up members' artistic expression through visual art, literature and movies on nature topic,
- -experiencing outdoor activity inspires to get out from home and learn for example orienteering (as an effective medium of becoming active while learning geography and biology),
- -engagement in global campaigns with the aim of preventing damage to the environment

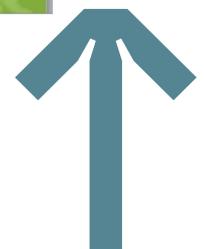
## DESCRIPTION OF THE ACTIVITY

The club develops creative methods of work during sessions in our microscope lab as well as makes students interested in studying the science through educational games and fieldwork activities while visiting natural places of interest (e.g. national parks, eco-farms, nature trails, botanic gardens) having at the same time fun from contact with nature. The methodological sequence we test (inspire, research, design, sketch, make and show) stimulates attention to sustainability and environment protection.

## THE ACHIEVED/ EXPECTED RESULTS

The STEAM activities made the members "future-ready" as the environmental problems are becoming increasingly urgent to resolve

# STEM BEST PRACTICE EXCHANGE





## TARGET AUDIENCE

The project participants experienced working and playing in international teams

# LETS WORK AND PLAY TOGETHER IN POLAND

## GOAL OF THE ACTIVITY

During meeting in Latvia the Polish group had the opportunity of international cooperation for the first time ever. Next in Romania and Poland students worked and play together with more and more effective results.

## THE ACHIEVED/ EXPECTED RESULTS

Learning, playing and working out idea and solutions on how to save natural world in mixed, international teams of different environmental problems experienced in their countries.

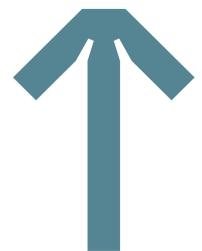
## DESCRIPTION OF THE ACTIVITY

These activities during meeting in Poland can serve as an example of diversity in types and results:

- welcome short ice-breaker/getting to know each other games lead by visiting partner groups
- drama activities about species in nature, raising awareness that deforestation destroys living species
- educational games about the role of people in the damage of forest ecosystem.
- Working on eco-friendly living-space design: students designed a small town on the edge of the forest in international groups
- Kahoot games on the topic of deforestation monitoring the knowledge gained.



# STEM BEST PRACTICE EXCHANGE





# HOW TO SELECT THE AREA WHERE TO PLANT IN BULGARIA MOBILITY

## TARGET AUDIENCE

7th - 12th grade level

## SKILLS THAT ARE DEVELOPED

- To understand the basic factors, which are related to planting.
- To develop knowledge for selection land, after deep analysis about the local advantages.

## GOAL OF THE ACTIVITY

To increase the motivation of students, to think about possible carrier in agricultural sector.

## DESCRIPTION OF THE ACTIVITY

Key factors to consider when selecting your gardening site.

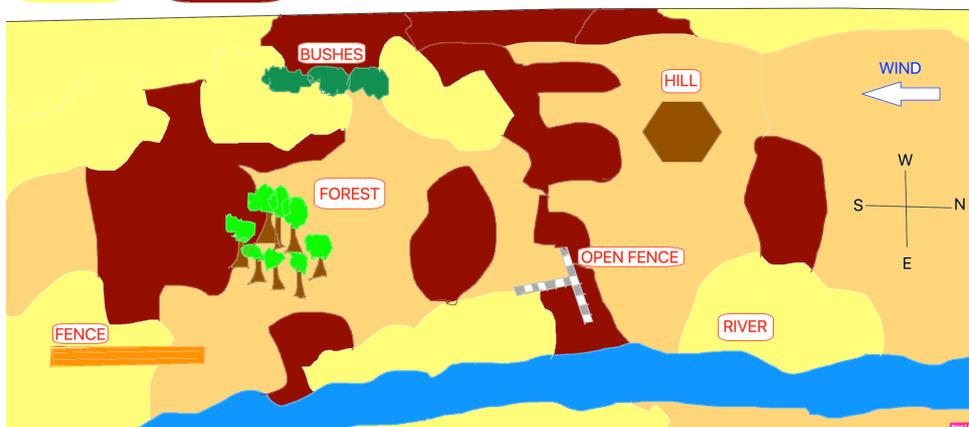
- SUNLIGHT EXPOSURE
- WATER ACCESSIBILITY
- PROTECTION FROM WIND
- GOOD SOIL
- LEVEL GROUND OR GENTLE SLOPE
- MICROCLIMATE FACTORS
- EFFORT.

## THE ACHIEVED/ EXPECTED RESULTS

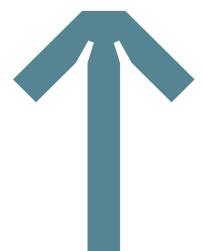
First part of the activity is online, when the teachers explain all necessary knowledge. The second part is in real life, and the kids do real actions for planting. The results is moving from the theory to real action.

Choose the best location for a gardening site, based on the 7 key factors.

- SANDY SOIL   
  LOAMY SOIL   
  CLAY SOIL



# STEM BEST PRACTICE EXCHANGE





# TRANSFORMATION ARCHEOLOGICAL HERITAGE WITH 3D MAPPING IN BULGARIA MOBILITY

## TARGET AUDIENCE

7th - 12th grade level

## SKILLS THAT ARE DEVELOPED

To develop knowledge for working with IT products.  
To learn how to combine different knowledge from mathematics, history, ingenering and science.

## GOAL OF THE ACTIVITY

To increase the importance of transision of existing cultural heritage to digital era.

## DESCRIPTION OF THE ACTIVITY

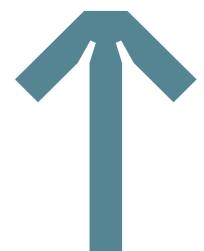
- The students have lecture about the historical path of targeted archeological aim. Is important to have a much as possible information about "Interesting facts".
- Next stage is brief description of 3D maping philosphy.
- Showing videos from already done 3D Shows.
- Giving time for the students to work in teams in 3-5 people.
- Presentation their products.

## THE ACHIEVED/ EXPECTED RESULTS

To generate ideas for transformation of existing places and to present it to local decison makers.



# STEM BEST PRACTICE EXCHANGE





# STEM CLUBS ACTIVITIES IN ROMANIA

## CHEMISTRY IN THE KITCHEN

### TARGET AUDIENCE

7th - 8th grade level

### SKILLS THAT ARE DEVELOPED

To develop knowledge for working with chemical products found in any kitchen .  
To learn how to combine different substances in order to obtain unexpected results while applying knowledge from chemistry lessons.

### GOAL OF THE ACTIVITY

To increase the interest in STEM jobs and STEM related disciplines.

### THE ACHIEVED/ EXPECTED RESULTS

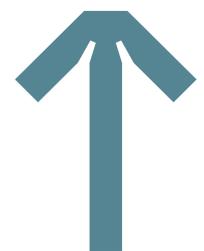
Increased interest of students towards chemistry.

### DESCRIPTION OF THE ACTIVITY

- The students will investigate the science that happens in your kitchen every day
- For the Carbon sugar snake you will need
  - A wide baking tray filled with 2 kg of sand
  - 4 tablespoons of bicarbonate soda
  - 1 tablespoon of icing mixture (also known as powdered sugar or confectioners' sugar)
  - 50 mL of ethanol, lighter fluid or methylated spirits
  - A BBQ lighter
  - Bowl & spoon
  - Fire extinguisher, fire blanket or running water & bucket nearby
- For the Volcano making you will need to:
  - Model a volcano, paint it and then make it erupt!
  - Our volcano model is 11 cm high
  - We used fast-drying plaster, a volcano mould, assorted paints, paintbrush, stir stick, fun graphic boards for decoration, a tray
  - Next it requires vinegar and baking soda for the eruption



# STEM BEST PRACTICE EXCHANGE





## STEM CLUBS ACTIVITIES IN ROMANIA SECOND LIFE OF USED TEXTILE

### TARGET AUDIENCE

5th - 12th grade level

### SKILLS THAT ARE DEVELOPED

1. The science behind various weave and knit structures determining how fabric is made.
2. The science behind why some textiles are more permeable than others.
3. To research about the percentage of waste textiles
4. To create a new product out of used textiles.

### GOAL OF THE ACTIVITY

To raise awareness about the large amount of wasted textiles, energy and water needed to produce them.

### THE ACHIEVED/ EXPECTED RESULTS

To generate ideas for transformation of existing textiles into new products.

### DESCRIPTION OF THE ACTIVITY

#### Activity 1 - T-shirt turned into Beach Bag

This is a project which recycles an old T-shirt.

Here we cut off the neck binding and then the sleeves to create handles.

By using the existing hem and strips of the cut-off pieces, we can make a drawstring closing on the bottom of the T-shirt to make a bag.

#### Activity 2 - T-shirt turned into Tote Bag

This is another project which recycles an old T-shirt.

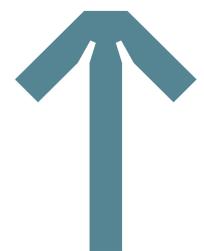
First, gather your cute T-shirt(s), ruler and a good pair of scissors. Cut the sleeves, neckline and bottom seam off your T-shirt.

Then, hold the top of each strip down (where they attach to the T) and pull each strip to the end until it stretches out.

Finally, tie the strips into square knots. Take the top and bottom matching strips and tie them together, until all the strips are tied.



# STEM BEST PRACTICE EXCHANGE



# The story behind MULTICULTURAL EVENTS



**All project partner countries organized multicultural events to celebrate cultural diversity with food, dancing, singing and national costumes.**

## LATVIA

In Latvia participants had the chance to dance Latvian folk dances, listen to Latvian songs and try traditional Latvian dishes like rye bread, dressed herring, gray peas, different types of salads and an apple pie.



## TURKEY

In Turkey participants had the chance to listen traditional folk instruments-*baglama* and *ney*(reed flute)- sing Turkish folk music,dance Turkish folk dances.They tried traditional Turkish cuisine such as *çiğköfte*, *çiğbörek*, *saç kavurma* etc.



## BULGARIA

In Bulgaria, we organise educational trip on the danube river on which the Romanian and Bulgarian students have discussion about their comon history and futhure integration in European union. The core moment of the activity was the 3 minutes silence period, when the students listen the sound of Danube ecoosytem and songs of 6 different birds. After the trip, the students had chance to eat traditional Bulgarian dishes.



## ROMANIA

In Romania we have organized a multicultural evening. This way participants had the chance to dance Romanian, Latvian, Polish, Turkish and Bulgarian folk dances, listen to songs from all partners countries and try traditional Romanian dishes. Moreover we have visited an open museum with old traditional houses to learn more about the culture and traditions in Romania.



## POLAND

Polish traditional dinner at a bonfire was followed by game and quiz activities connected with the topic of deforestation and decreasing biodiversity



# IMPACT AND TESTIMONIALS



## EMINE ŞENAY DOĞANER

Eskisehir İl Milli Eğitim Müdürlüğü, teacher, TURKIYE

Every project is a journey and opens doors to new worlds. With the STEP-STEM TO ENVIRONMENTAL PROBLEMS project, new doors were opened not only for students but also for us teachers. We had very different experiences. It was an honor to see how creative and sensitive the young people are to environmental issues. I was very happy to be a part of this project.



## VINETA PAVLOVA

Austrumlatvijas Tehnoloģiju vidusskola, teacher, Latvia

Every project is a challenge and you have to be ready to leave your zone of comfort and think outside the box. It was a great pleasure to work with such knowledgeable, creative and hard-working colleagues and students. I would like to thank everyone for support, hard work, enthusiasm and passion while exploring, learning and doing new things together. It was definitely a valuable experience to work together and find creative and unique solutions to existing environmental problems. I hope that this project is the beginning of some larger initiatives that we will be able to implement in the future.



## ZUZANNA HELWIG

Research-Educational Centre Zielonowo (OBEZ), Poland

The STEP project enabled me to travel to Latvia and Romania for learning and a lot of fun. When I was hosting my colleagues in Poland, the most I liked was meeting with biologist at Adam Mickiewicz University. We were introduced to problems of decreasing biodiversity and species extinction. We visited Natural History Collection of very interesting extinct and endangered species and had quiz about these problems. At the end we went out to "hunt" for insects outdoor, the classes were fantastic, full of fun and knowledge. I would like to study once at Faculty of Biology.



## MARTA RUDZĀTE

ATV student, Latvia

This project is not just about listening to smart people, it is also about becoming one of them. I am very surprised about how original and creative ideas my peers have. I have never thought that in a few minutes we could come up with and build a very unique invention that will reduce river pollution. It seems that everything has already been invented, there is no place to develop anymore, but after this project I see that this is just the beginning. This project gave me not only a different view of nature and climate changes, but also new friends with whom I will hopefully stay in touch for a long time.



## ECESU PAMUKLU

Şehit Mehmet Şengül Fen  
Lisesi, Student, Turkey

For me, the most significant achievement in this Project is getting a chance to know that we actually can have a part in making major changes to have a better World. Small or different, we all tried to add something from us that made the Project reach its goals: helping us, teenagers, gain consciousness about what kind of serious environmental issues exist and what we can do to tackle them using STEM and enjoying this engaging and interesting learning process.



## LYUBOSLAV LESICHKOV

Institute Perspectives, Bulgaria  
Director department of youth work

Obviously it is natural to be skeptical about most of the things. Considering the diversity of nationalities, and ages we had, it was hard to comprehend the idea of a successful STEM project during those vicious times. But with great colleagues, and even greater students, that idea was simply accomplished to another level, beyond what I thought was possible.



## DESI SLAVA RUSEVA

Student in Profesional High School of Economics  
"Dimitar Hadjivasilev", Svishtov, Bulgaria.

This is the best experience I have ever had. I made a lot of new friends all over the world. I learned so many things about other cultures such as new words in other languages and I've developed my English skills to another peak. I recommend this piece of adventure to everyone, which makes you feel full of happiness and joy.



## JULIA SZEWCZYK

Research-Educational Centre Zielonowo (OBEZ), Poland

It was so great that we could show to our international colleagues the Noteć Forest – the biggest forest area in Poland, where we live. During excursions in a forest we were making observation and discovering mathematical patterns in biological environment. Everything in our world, including our bodies has natural patterns. I enjoyed this activity a lot and also our common work on designing eco-village at the edge of the forest. Participation in the project was a great experience for me.

# IMPACT AND TESTIMONIALS





## ANDREEA BRANZAN

Student

Asociația Edulifelong, Romania

Thanks to Erasmus programme I had a chance to rediscover myself and see the world around me in a new light. It has given me the strength to try new things and to exceed my own expectations.

The STEP project made me understand the role we each play in protecting our planet and what we must do in order to preserve it for future generations.



## ȘTEFANIA CIUCĂ

Student, Asociația Edulifelong, Romania

Thanks to the STEP project I had the opportunity to travel to Bulgaria and virtually to Turkey. It was a unique experience that gave me the chance to improve my skills, to satisfy the curiosity and the desire to learn something new.

I lived unique moments with my friends who have become my family and whom I can't wait to see again. I feel that the Erasmus experience was an important part of my journey of initiation, and I think I needed that experience to become more self-confident.



## JEKATERINA JURJEVA

ATV student, Latvia

I liked that many professionals from different fields were invited to the project, who shared their experiences and informed the project participants about different professions related to the STEM field. I really enjoyed participating in this project because it took place in such an informal but friendly atmosphere. This project provided detailed information on environmental topics, gave the opportunity to find solutions to these problems using STEM approach and improve our English language skills. Thank you for the given opportunity to participate in this project!



## SANDRA TROŠINA

ATV teacher, Latvia

Even from teacher's perspective, there were many opportunities to deepen our knowledge, try new things, gain new skills, experiment with different approaches and "borrow" ideas. When hosting the event, I also got the opportunity to improve planning, structuring skills, got to meet a lot of new people and make useful connections. It was an enriching experience for students, too, due to the many experts, myriad of activities, different traveling opportunities, as well as chances to explore other cultures, compare, gain insights and generate new ideas for themselves and for the community.



# STAKEHOLDERS AND PARTNERS



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