WIMI Open: Wide Minds will Find EcoVirtual STEAM Solutions towards Climate change

Students Community Science Projects Booklet

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Introduction

The WIMI Project -Wide Minds will Find Eco Virtual STEAM Solutions for Climate Change is all about enabling students to take an active role in climate change through STEAM (Science, Technology, Engineering, Arts, and Mathematics) education, through different work packages, one of which focuses on practical Community Science Projects (CSPs). Climate change represents a paramount challenge of our era; however, numerous educational institutions, regardless of their emphasis on STEAM disciplines, lack pedagogical strategies that prepare students with the requisite skills and knowledge to confront this global dilemma. WIMI addresses this deficiency by developing an interdisciplinary, transnational educational model tailored for various types of schools, aimed at pupils aged 10 to 14. WIMI provides students with practical learning opportunities to employ scientific reasoning, creativity, and collaboration in developing solutions for climate-related issues in their local communities. The WIMI Project wants to combine STEAM subjects with climate change education so that pupils can learn how to think critically and come up with new ways to solve problems when it comes to environmental issues. It gives students the tools they need to plan and carry out Community Science Projects (CSPs), which are hands-on, research-based projects that deal with climate challenges in their local communities. The initiative also improves digital preparedness and hybrid learning by creating blended teaching tools and methods that work in both real and virtual classrooms. WIMI encourages students, teachers, and community groups from different countries in Europe to work together and talk to each other. It also strengthens schools' digital ecosystems and encourages active climate citizenship to get people in schools and the community to take real action on climate change.

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Partnerships

Our transnational partnership includes schools, NGOs, and research centers from all over Europe that all want to give students and educators more power through climate education that focuses on STEAM.

The Wi-Mi project brings together a diverse and committed partnership with the coordinating institution is Scoala Gimnaziala Mihai Eminescu from Romania, a school known for its strong focus on STEM and digital innovation. The consortium also includes Avrasya Enstitüsü Araştırma ve Geliştirme Limited Şirketi from Turkey, an educational research SME specializing in digital and green transformation. From Bulgaria, Osnovno uchilishte Hristo Smirnenski contributes its experience as a Microsoft Innovative School and leader in climate action education. Osnovna skola Glina from Croatia brings extensive experience in sustainability and international collaboration, especially with students from rural and disadvantaged backgrounds. Agrupamento de Escolas de Barcelos from Portugal is a large and inclusive school network with a strong Erasmus+ history and focus on climate-related projects. Finally, Education and Social Innovation Centre of Austria (ESICA) from Austria joins as a key NGO partner, bringing expertise in social innovation, digital learning, and inclusive education.

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Community Science Projects

Community Science Projects (CSPs) are projects that are fully done by students employ STEAM knowledge to solve real-world problems in the environment. Students discover a climate-related problem in their own area, do research, look at data, and come up with actual solutions that can make their community better. CSPs are more than just science projects; they are group learning activities that encourage teamwork, critical thinking, and caring for the environment. CSPs encourage students to think globally and act locally, using what they learn in school to make a difference in their own communities.

The WIMI Project aims to integrate STEAM disciplines with climate change education, equipping students with critical thinking and innovative problem-solving skills to address environmental challenges. It empowers students to design and implement Community Science Projects (CSPs) practical, research-based initiatives that tackle climate issues relevant to their own communities. In the first phase of the project, partner schools from Romania, Bulgaria, Croatia, and Portugal guided students in creating and presenting their CSPs during the National Award Ceremonies, where a wide range of creative projects were showcased. Students titled their projects with innovative names such as “Reusing Plastic,” “Ecological Gardening,” “Creative Pots,” “Eco Detectives,” and “How to Make Barcelos Greener”, reflecting both the diversity of climate topics and the students’ creative approaches. From these national competitions, one winning project from each country advanced to the International Award Ceremony, where they presented their solutions on a broader platform.

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Additionally, the WIMI Project enhances digital readiness and hybrid learning by developing blended teaching tools and methodologies that support both classroom and virtual learning environments. WIMI fosters cross-national cooperation and communication among students, teachers, and community organizations across Europe, while strengthening schools' digital ecosystems and promoting active climate citizenship to inspire meaningful climate action within schools and the wider community. **What connects CSPs to climate change?** Community Science Projects (CSPs) are crucial for fighting climate change because they give students and communities the tools they need to develop local solutions to global environmental challenges. Students work on real-world climate problems like pollution, waste management, deforestation, and energy use through CSPs, which involve scientific investigation and creative problem-solving. Young people can use their STEAM expertise to look into environmental problems, come up with long-term solutions, and raise awareness in their communities through these initiatives. CSPs not only help students learn more about climate science, but they also encourage them to be responsible citizens who help make their own communities more climate-resilient and sustainable.

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Evaluation Criteria of the WIMI Award Competitions

The Award Competitions are a critical component of the WIMI project, as they honor the problem-solving, collaboration, and creativity of the students who participate. Creating a motivating environment for students to present their work and be recognized for their efforts, the competitions are organized at three levels: local, national, and international. In the National Award Competitions, student groups from Bulgaria, Romania, Croatia, and Portugal each developed five Community Science Projects per country, for a total of approximately 20 projects across the four countries. These projects covered a wide range of climate-related topics and showcased diverse solutions created through teamwork and innovative STEAM applications.

In the WIMI Award Competitions, each student project is evaluated against six key criteria that reflect the project's educational and climate action goals. These criteria ensure a fair, transparent, and meaningful assessment of how well the students applied their knowledge, creativity, and teamwork to develop solutions for climate change. Each criterion was discussed verbally with partner organisations connected online. In specific the criteria looked included climate change relevance, evaluating how well the project addresses a real-world climate change issue and proposes a meaningful solution, whether the project clearly identifies a specific climate related problem, does it offer practical approach to mitigate or adapt to effects of climate change and how does it promote climate change awareness and so on.

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Students' projects are assessed for the quality and depth of their application of knowledge from the disciplines of Science, Technology, Engineering, Arts, and Mathematics through STEAM Integration. Judges evaluate the project's ability to effectively address the identified climate challenge by evaluating the extent to which it meaningfully integrates one or more of these disciplines. The presence and innovative, pertinent, and purposeful application of STEAM components that are closely aligned with the project's objectives are a critical focus.

The project's originality and the students' creative thinking in both the concept and execution are the primary focus of Innovation and Creativity. This criterion evaluates the degree of originality of the proposed solution, the extent to which the students employed innovative and creative strategies to address climate change issues, and the extent to which the project introduced novel concepts or methodologies that distinguished it from conventional solutions.

Impact and Sustainability investigates the project's capacity to generate a tangible benefit and to establish an enduring positive influence. Judges seek implementation plans that are both practical and environmentally favorable, as well as those that are clear and realistic. Furthermore, they evaluate whether the project has the potential to be sustained or expanded in the future, thereby enhancing its long-term efficacy and reach in addressing climate challenges.

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Teamwork and Collaboration assesses the extent to which the students collaborated as a team during the project's development and presentation. This involves evaluating whether the project is a balanced team endeavor, with equal contributions from each member, and whether the group exhibited effective communication, cooperation, and shared problem-solving. The learning and project development process is considered to be significantly enhanced by the presence of strong collaboration.

Clarity, confidence, and professionalism are the primary objectives of Presentation and Communication, which pertains to the manner in which the project is communicated to judges and audiences. This encompasses the persuasiveness with which students expound on the importance of their project, the lucidity and engagement of the delivery, and the logical organization of information. Judges are in search of presentations that effectively communicate the project's relevance and impact, thereby facilitating the audience's comprehension of its significance and the solutions it provides.

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International Award Competition
Student's Community Science Projects

In this section, we proudly present the outstanding Community Science Projects (CSPs) created by student groups who advanced to the International Award Competition. These projects represent the best efforts from the national competitions held in Romania, Bulgaria, Croatia, and Portugal, where young climate innovators showcased their creativity, teamwork, and problem-solving abilities. The following pages feature a summary of each finalist project, including the problem they addressed, the solutions they proposed, and the creative process that brought their ideas to life.

Portugal

Project Name:	Barcelos Green: Care Today, Live Better Tomorrow
Project Idea Summary:	Transform urban spaces in Barcelos into greener and more sustainable areas through community participation, the use of recycled materials, simple technologies, and environmentally conscious practices.
The Problem Our Project Addresses:	Lack of accessible green spaces, low environmental awareness, and the high use of disposable materials, which worsen pollution and reduce urban quality of life.
Solution Summary:	Create urban gardens, plant trees, install sustainable structures using recycled materials, promote environmental awareness campaigns, and encourage green mobility.

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Croatia

Project Name:	Glina's Green Smart Islands – A Natural Solution for Heavy Rains
Project Idea Summary:	Reduce torrential floods in Glina by using smart green islands that absorb rainwater, providing a sustainable and natural way to manage excess water.
The Problem Our Project Addresses:	Frequent torrential floods in Glina caused by the lack of permeable spaces that can absorb and manage rainwater, leading to water accumulation in urban areas.
Solution Summary:	Install smart green islands throughout the city that absorb rainwater, store it for later use in irrigation, and use technology to monitor soil humidity and water levels, creating a more sustainable and flood-resistant urban environment.

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Bulgaria

Project Name:	Our School with a Green and Smart Roof
Project Idea Summary:	Transform the school rooftop into a green space by planting honey plants and collecting rainwater for their irrigation, creating a sustainable habitat for bees.
The Problem Our Project Addresses:	The cutting down of trees in the city, the declining bee populations essential for pollination, and the wasted potential of rainwater that is not being collected or reused.
Solution Summary:	Plant bee-friendly plants on the school rooftop to support pollinators and install a rainwater collection system that stores water in a tank for irrigating the rooftop garden, promoting sustainability and biodiversity.

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Romania

Project Name:	Stop! Are You Breathing or Are You Polluting? Traffic and Climate Change
Project Idea Summary:	Raise public awareness about how traffic contributes to climate change and promote environmentally friendly transportation alternatives.
The Problem Our Project Addresses:	Air pollution caused by heavy traffic, which increases harmful emissions and contributes significantly to climate change and poor air quality in urban areas.
Solution Summary:	Encourage the use of public transportation, cycling, walking, and other non-polluting means of transport to reduce traffic-related emissions and improve air quality in the community.

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First Prize Winners

The project titled "Stop! Are You Breathing or Are You Polluting?" won the first prize in the International Award Competition, followed by other projects winning as second and third place, however this one won first because it had a strong message, seems to be able to make a significant impact in the community, and offered a practical way to deal with one of the biggest climate problems: traffic pollution. The student team did a great job of integrating STEAM by combining scientific research on air pollution and climate change with creative awareness campaigns and technology-based solutions to encourage sustainable commuting. Their initiative stood out because it was clear what it was trying to do, it was useful in everyday life, and it could have an instant effect in the actual world. The idea gave towns around the world a simple but effective way to get people to use public transportation and other non-polluting ways to get around. The team also did a great job with their presentation and communication abilities, building a strong case for the need to deal with traffic pollution right away and motivating others to do something about it.

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Student's Community Science Project Presentations

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Community Science Project: Stop! Breathe or Pollute? Traffic and Climate Change

Country: Romania

Team members:

- **Mihăiță Ianis Andrei**
- **Rotaru Alexandra Ioana**
- **Sandu Maria Alexandra**
- **Vasile Daria Ioana**
- **Gușă Emanuel**

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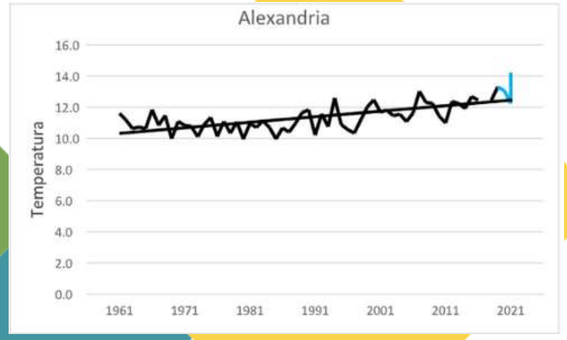
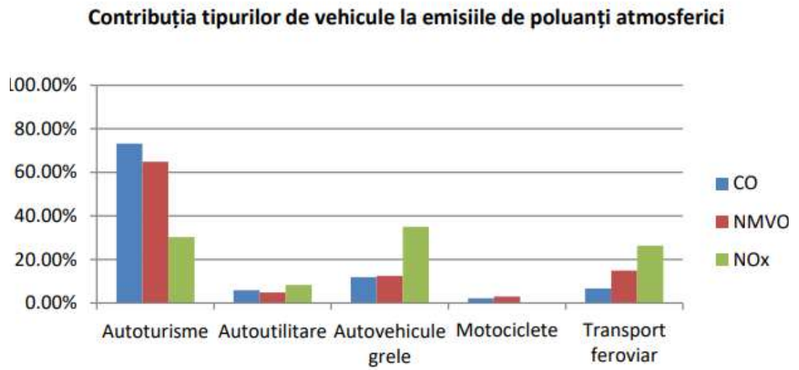
STEAM against climate change:

- Greenhouse gases (GHGs) are substances in the atmosphere that form an "invisible layer" that allows sunlight to penetrate, but prevents some of the heat from returning to space, thus contributing to global warming.
- Of the activities generating greenhouse gases, transport is responsible for approximately one fifth of them.
- In our hometown there is heavy car traffic which contributes to the increase in greenhouse gases.



Evolution of the average annual temperature (in °C) and trend at the Alexandria meteorological station, in the period 1961-2023. (https://www.anpm.ro/web/apm-teleorman)



Contribution of various types of vehicles to air pollutant emissions at Teleorman county level 2023. (https://www.anpm.ro/web/apm-teleorman)

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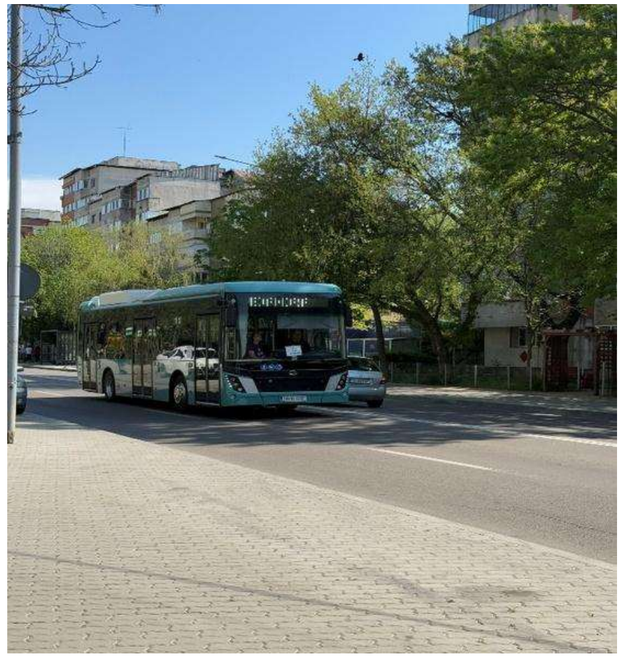
Solutions:

- using public transportation using 100% electric buses in our city (science, technology and engineering).
- moving from one distance to another, using other methods such as: bicycles, scooters or walking (science and engineering).



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Implementation plan:

- campaign to distribute flyers made in the “Canva” program throughout the city. The flyers were distributed to encourage the use of public transportation.
- making a model using popsicle sticks, cotton wool, dish sponges, skewer sticks, wire, paper,

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Creativity and Innovation:

- Our project is unique due to several factors, one of which is the story behind it. Personally, we have been affected by the effects of climate change so decided to be the change and take the initiative.

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Our important message:

Don't let smoke steal your sunrise!










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Let's recap. Thank you!

Project Name	Stop! Are you breathing or are you polluting? – Traffic and climate change
Project idea (in brief)	Raising public awareness about the impact of traffic on climate change
The local problem you want to solve	Air pollution
The solution (in short)	Using public transport and other non-polluting means of transport
STEAM components used	Science, Technology, Engineering, Art

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Community Science Project

How to make Barcelos greener?

- **By:** Rita Martins, Sara Rosas, Inês Portela and Filipa Portela

Project Idea

Our project aims to find solutions to make the city of Barcelos greener, more sustainable, and environmentally friendly, through the creation of community urban gardens, tree planting, the implementation of bike lanes, and the promotion of composting (a biological process that involves fermenting and decomposing organic waste).

Our climate action solution:

Our solution involves creating community gardens, planting trees, implementing ecological bike lanes and composting sistema, making Barcelos fresher, susteinable and environmentaly friendly.

We applied the STEAM approach by combining it's various knowledge areas:

- **Science,** to understand air pollutants and their effects;
- **Technology,** by using sensor and micro controlares to collect data;
- **Engeneering,** to build the structure of the measuring device;
- **Arts,** to create visual awareness campaigns;
- **Maths**, to interpret the data and create graphs that show the results

Implementation Plan

Project Stages

- Survey of areas with little vegetariano and high environmental impact.
- Consultation with the local community about need and sustainable ideas.

Planning and Organizing Actions:

- Chosing priority locations.
- Creating an activity schedule.

Community Engagement and Awareness:

- Creating campaigns on social media.
- Organizing awareness events with schools and local associations.

Creativity and Inovation

Connection between Nature and Comunity:
Besides the plantation of trees, we want to envolve actively the residents of Barcelos in each step, from the choice of the green places to the maintenance of gardens and market-gardens.

Green Mobility:
We include a plan to encorauge the use of bicycles, with the installation of supports made out of recycled materials.

Our key message

Green Barcelos starts with each one of us.

Plant an idea and reap a future.

To sum up

Name of the project	Green Barcelos: Take care today, live better tomorrow
Project ideas summary	Turn urban spaces of Barcelos into greener areas and more sustentable throught the participation of the community, the use of recycled materials, simple technology and consistent enviromental practises.
The problem our project adresses	The lack of accessible green spaces, low environmental awereness and high use of disposable materials that agravate pollution and reduce urban quality of life.
Solution Summary	Create urban market-gardens, plant trees, install sustainable structures with recycled material, promote environmental awareness campaigns and encourage the green mobility.
Involved STEAM components	**Science:** environmental study, composing, plant cycle. **Technology:** QR Codes, social media, design software. **Engeneering:** Construction of suports and estrutures with recycled materials. **Art:**educational murals and design visual campaigns. **Mathematics**: Space planning, measurements of areas and quantity of materials.

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Community Science Project: *Our school with green and smart roof*

- Country: Bulgaria
- Team Members: Valeriya Sableva, Zhaklin Chonkova, Lora Petkova and Radostina Boykina

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Project Idea:

- We decided to create a green roof on our school. We want to plant honey plants and small trees to make the school greener and more beautiful.
- In our town, Rakovski, all the streets have been asphalted, but as a result, the trees along the sidewalks were cut down. It has become hotter, the air is more polluted, and there isn't enough greenery.
- Also, many bees are dying because of the poisons (pesticides) being used. Without bees, there is no one to pollinate the plants. That's why we want to help the bees by planting the kinds of plants they love – just like they've done at bus stops in the Netherlands.
- Additionally, we will collect rainwater in a tank in the yard to water the plants. This way, we won't waste drinking water and will take care of nature.

Project idea:

- **In our town, Rakovski, over the past few years, more than 100 trees have been removed due to street asphalting. This means less shade and less clean air.**
- **Every year, around 30% of bees disappear worldwide because of pesticide use and the lack of flowers.**
- **In Bulgaria, the number of bee colonies has decreased by about 25% over the last 10 years.**
- **In the Netherlands, more than 300 bus stops already have planted roofs with vegetation that helps the bees.**

Our Climate Action Solution

What solution are you proposing to the problem in your community science project?
We decided to build a green roof on our school, where we will plant honey plants and small trees. This will help:

- bring back a small part of the greenery in the city after many trees were cut down;
- attract more bees, which are very important for nature;
- collect rainwater that we will use to water the plants.

Which STEAM discipline is your project related to and how did it contribute to your solution?
Our project is related to:

- **Science** – understanding why bees are important and how plants help improve air quality;
- **Technology** – developing ideas for collecting and using rainwater;
- **Engineering** – figuring out how to build the green roof and where to place the water tank; we are also planning to install moisture and temperature sensors powered by solar energy;
- **Art** – greening is an art form; we will arrange the plants in an aesthetically pleasing way;
- **Mathematics** – calculating how much water we will collect, how many plants we can grow, how much energy the solar panels will store, and how long it will last.

Implementation Plan

- We will plan the design of the rooftop garden by deciding where to plant the vegetation and which specific plants to use. It is not necessary to cover the entire roof at once—the project can be completed in stages.
- We will choose suitable honey plants, as well as small trees or shrubs that can grow well in pots.
- A rainwater harvesting system will be installed using a tank placed in the schoolyard. Additionally, we will use moisture and temperature sensors powered by solar panels.
- Students will take part in watering, cleaning, and monitoring the growth of the plants.We will also observe how bees and other insects interact with the plants.

Creativity and Innovation

- Our project is unique because we will create a rooftop garden with honey plants and small trees on top of our school - a concept that does not yet exist in Rakovski. This will make our school greener and more environmentally friendly.
- What also makes our project special is that we will plant species that support bees, helping to protect these important pollinators.
- We will collect rainwater to irrigate the plants, which is very beneficial because it reduces the use of drinking water. We will also install moisture and temperature sensors to monitor when the plants need watering. These sensors will be powered by solar panels.
- This project is also a great opportunity for us to learn how to take care of plants and protect the environment by actively participating in the process.

Our Big Message:

“Smart little bees, busy little hands – building a greener future under a green roof at our school!”

Let’s summarize

Project Name	Our school with green and smart roof
Summary of Project Idea	Planting honey plants on the school rooftop and collecting rainwater for their irrigation.
The Problem your project addresses	Cutting down trees in the city, the decline of bee populations, and the failure to use rainwater.
Summary of Solution	Planting bee-friendly plants on the school rooftop and collecting rainwater in a storage tank.
STEAM components involved	**Science:** Studying plants, climate, and bees. **Technology:** Using sensors and solar panels. **Engineering:** Designing the rooftop and the irrigation and monitoring system for moisture and temperature. **Art:** Aesthetic and visual design of the garden. **Mathematics:** Analyzing the collected data.

Our work

Our work

Thank you!

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Community Science Project:

Green Smart Islands – a natural solution to heavy rains

- Country: Croatia
- Team members: Nea Božić, Nola Rastovski, Tia Bobeta, Marija Lucić

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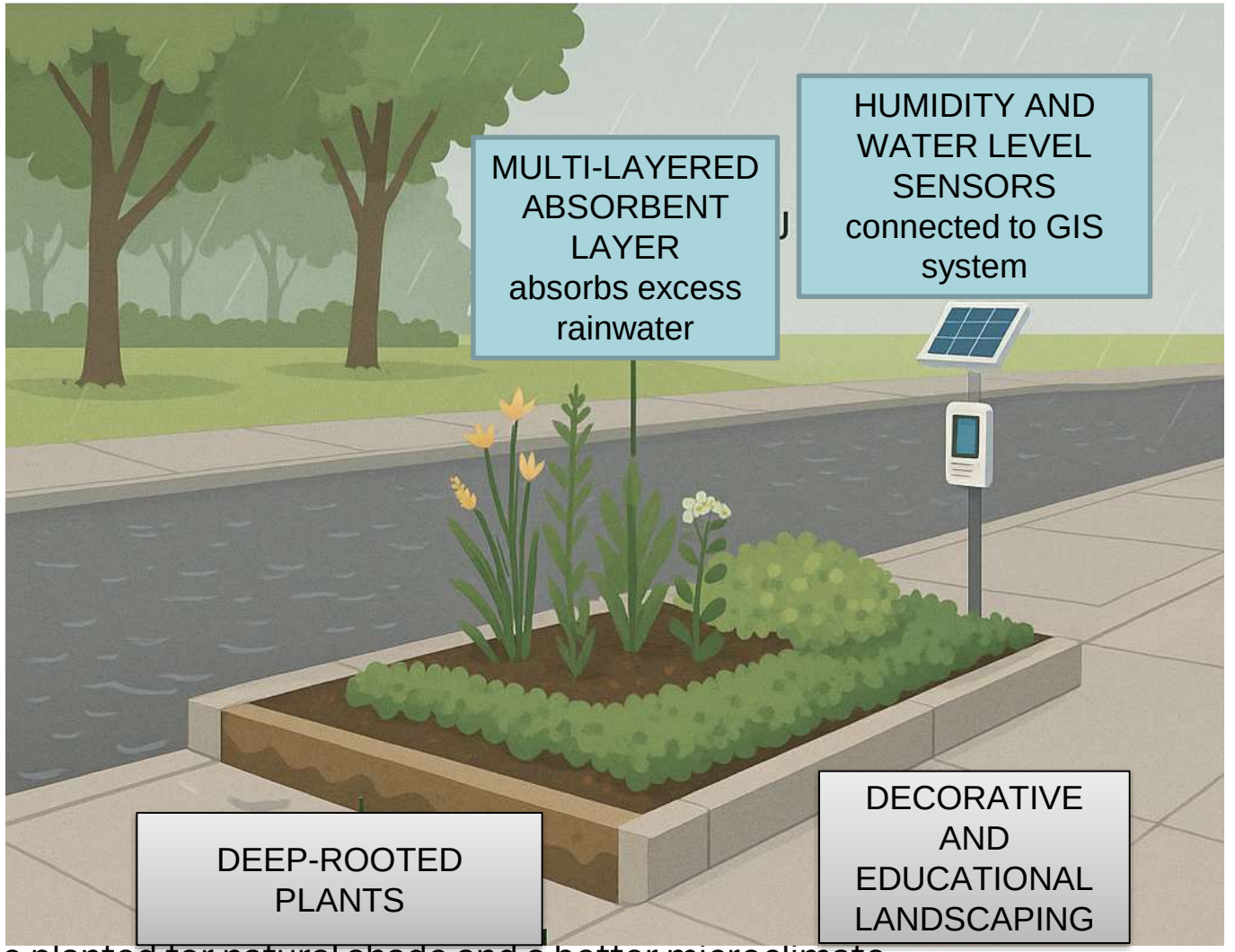
Project idea

- Problem: torrential floods in the city center of Glina after heavy rains, sewage cannot absorb all the water fast enough.
- Solution : „Green Smart Islands" – specially designed green areas that better absorb rain and excess water.
- In addition, this water would be collected in underground tanks and later used for watering gardens and parks. This helps the environment and saves water.

Our Climate Action Solution

We are installing smart green islands in the city that:

- absorb excess rain
- store water in tanks below
- automatically water plants
- have humidity and water level sensors
- cool the space and beautify the environment



On larger islands, maple trees would be planted for natural shade and a better microclimate.

We combine knowledge from several subjects: **Biology** – plant selection, **Geography** – terrain analysis,

Informatics – sensor operation, **Technical education** – system development.

Implementation plan

- Investigate the places where flash floods often occur in Glina.
- Mark the most critical locations using GIS tools.
- Create a prototype of a green smart island with plants that absorb water well.
- Place a tank under the island to collect excess water.
- The tanks would be used to irrigate school or city gardens in the summer months.
- Involve citizens, schools and associations in planting and maintenance.

Materials, tools and technologies needed to bring the project to life:

- Recycled materials for making green island structures (recycled concrete, plastic, wood)
- Moisture and water level sensors to monitor conditions
- Tanks for storing rainwater (e.g. environmentally friendly plastic tanks)
- Automatic irrigation system for efficient water distribution
- Data tracking software (e.g. applications for monitoring moisture and water levels)
- Biological materials (plants, maple trees)

Creativity and innovation

Our project combines nature and technology in a new way. We don't just plant plants - we create smart green islands that themselves:

- recognize when to absorb or store water
- water plants when they need moisture
- cool the space with the help of trees like maples
- collect rainwater in tanks for later use

This is not an ordinary garden - it is a living ecological system that thinks smartly, protects against flash floods, saves water and helps cities adapt to climate change more easily.

Our goal is to show that even a small town like Glina can be an example of a sustainable solution for the whole of Croatia!

Our Big Message:

Nature provides – now it’s our turn.
Our city may not be big, but our ideas are.

"Smart islands to a smart city – Glina can do it!"

We call on schools, citizens and the City of Glina to together erect a green shield against climate change. Every island means a healthier and safer tomorrow!

Change begins from the heart starting from one smart island.

Let’s summarize

Project name	Glina’s Green Smart Islands– a natural solution for heavy rains
Summary of Project Idea	reduce torrential floods in Glina by using green islands that absorb rainwater
The Problem your project addresses	torrential floods in Glina due to the lack of space to absorb rainwater
Summary of Solution	installing smart green islands in the city that absorb water, store it for irrigation, and use technology to monitor humidity and water levels
STEAM components involved	biology (plant selection), geography (spatial and climate analysis), informatics (sensors and data monitoring) and technical education (modeling and irrigation system development)

Thank you for your attention!

Conclusion

The WIDEMINDS Community Science Projects Booklet is a great example of what kids can do when they have the right tools and a reason to care about climate change. Students from Romania, Bulgaria, Croatia, and Portugal have worked on real environmental problems through hands-on, student-led Community Science Projects (CSPs). They have done this with creativity, teamwork, and a strong sense of duty. These projects are more than just learning experiences; they show how local action can help solve problems on a global scale.

The WIMI initiative gives students the tools they need to be climate changemakers in their communities by combining scientific thinking with creative problem-solving. These projects show that making a real difference for the environment starts with knowledge and working together. They include making green rooftops, reducing the risk of flooding, and encouraging eco-friendly transportation.

We ask teachers, schools, and community leaders to use and change the WIMI approach to encourage students to study across disciplines and provide them the tools they need to act. Other schools can look to these CSPs as examples and start similar programs that link learning to making a difference in the community.

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This achievement would not have been possible without the dedication of our transnational partners, the guidance of committed educators, and most importantly, the passion and creativity of our students. Their voices, ideas, and determination lie at the heart of this project.

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