Dive in curriculum











Co-funded by the European Union

The curriculum for training on Citizen Science is essential as it provides a structured framework to empower youth through hands-on scientific inquiry and community engagement. Citizen Science projects enable young individuals to participate in real-world scientific research, fostering a sense of ownership and responsibility towards their communities and the environment. By engaging in Citizen Science, youth develop critical thinking, problem-solving, and collaborative skills that are crucial for their personal and professional growth. This curriculum not only introduces the concept of Citizen Science but also equips trainers with the methodologies and tools to inspire and guide youth in meaningful scientific endeavors. The integration of Citizen Science in youth work promotes lifelong learning and community involvement, making science accessible and relevant to everyday life.



This curriculum is utilized by UR Institute, GLUON, Puntozero, and PiNA to promote the E+ program and Citizen Science as a concept in the future. By adopting this curriculum, these organizations aim to spread the principles of Citizen Science, engage more youth in scientific projects, and foster a collaborative community dedicated to scientific inquiry and social improvement.



Competences for Trainers

Knowledge and Understanding:

- Citizen Science: Understanding its concepts, benefits, and outcomes for youth and communities.
- Systems Thinking and Design: Basics of systems thinking and how to apply design thinking in projects.
 STEAM Education: Understanding and integrating
- Science, Technology, Engineering, Arts, and Mathematics in educational projects.
- Arduino and DIY Tinkering: Basic knowledge of Arduino and how to transform spaces into interactive labs.
- Human-Centered and Problem-Based Learning: Utilizing these methodologies to engage and educate youth.

Skills:

- Facilitation: Ability to lead sessions, engage participants, and foster a collaborative learning environment.
- Project Planning and Implementation: Skills to plan,
- implement, and manage Citizen Science projects. Youth Engagement: Techniques to empathize with youth,
- involve them in projects, and guide them in data collection and analysis.
- Evaluation and Dissemination: Evaluating project impacts and effectively communicating findings to stakeholders.

Attitudes:

- Inspirational Leadership: Drawing inspiration from figures like Hedy Lamarr to motivate and engage participants.
- Empathy and Inclusivity: Understanding and valuing the perspectives of youth and community members.
- Innovation and Creativity: Encouraging innovative thinking and creative problem-solving.

But the far most important thing in Citizen science is:





Learning goals of different aspects of Citizens Science

I. Playground of Citizen Science

Learning Goals:

- Understand the Concept of Citizen Science
- Define Citizen Science and its importance in modern scientific research.
- Explore various examples and case studies of successful Citizen Science projects.
- Recognize the Benefits and Outcomes of Citizen Science
- Identify the benefits of Citizen Science for youth and communities, including educational, social, and environmental impacts.
- Discuss how Citizen Science projects can lead to tangible outcomes and community empowerment.

II. Inspire

Learning Goals:

- Explore possibilities through inspirational figures:
- Learn about Hedy Lamarr and her contributions to science and technology.
- Discuss how her life and achievements can serve as a source of inspiration for youth and community members.

III. Methodologies for Citizen Science

Learning Goals:

- Utilize Problem-Based Learning
- Understand the principles of problem-based learning and how to apply them in Citizen Science projects.
- Develop strategies to engage youth through real-world problem solving.
- Implement Inquiry-Based Learning
- Learn the fundamentals of inquiry-based learning and its application in scientific investigations.
- Encourage curiosity and critical thinking among youth participants
- Apply Human-Centered Design:
- Understand the steps of human-centered design and its relevance to Citizen Science.
- Develop skills to create user-focused solutions that address community needs.







Learning goals of different aspects of Citizens Science

IV. Planning and Implementing Citizen Science Projects

Learning Goals:

- Identify Community Problems:
- Learn techniques for identifying and prioritizing community issues that can be addressed through Citizen Science.
- Engage with community members to understand their perspectives and needs.
- Engage Stakeholders: Develop strategies for engaging stakeholders, including community leaders, local organizations, and volunteers.
- Understand the importance of stakeholder buy-in and collaboration for project success.
- Define Objectives and Outcomes: Set clear, measurable objectives for Citizen Science projects.
- Define desired outcomes and indicators of success.
- Select Appropriate Tools and Technologies: Explore various tools and technologies that can be used in Citizen Science projects, such as data collection apps, sensors, and online platforms.
- Evaluate the suitability of different tools for specific project needs.

V. Facilitating Youth Participation in Citizen Science Learning Goals:

- Empathize with Youth Perspectives:
- Understand the unique perspectives and motivations of youth participants.
- Develop approaches to foster empathy and inclusivity in project planning and execution.
- Develop Youth-Led Citizen Science Projects: Encourage youth to take leadership roles in project design and implementation.
- Provide guidance and support to help youth develop their own Citizen Science initiatives.
- Engage Youth in Data Collection and Analysis: Train youth in data collection techniques, ensuring accuracy and reliability.
- Involve youth in data analysis and interpretation, empowering them to draw meaningful conclusions from their work.



Learning goals of different aspects of Citizens Science

VI. Evaluating and Disseminating Citizen Science Results

Learning Goals:

- Evaluate Project Impact: Learn methods for evaluating the impact of Citizen Science projects on individuals and communities.
- Use evaluation findings to improve future projects and practices.
- Communicate findings to stakeholders: develop skills in presenting project results to stakeholders, including community members, funders, and policymakers.
- Create engaging and accessible reports, presentations, and other communication materials.
- Share best practices: Identify and document best practices from Citizen Science projects.
- Share lessons learned and success stories to inspire and guide others in the field.

VII. Conclusion and Next Steps Learning Goals:

- Reflect on training and Citizen Science role: Reflect on the knowledge and skills gained during the training.
- Discuss the role of Citizen Science in youth work and community development.
- Identify future opportunities: explore future opportunities for integrating Citizen Science into youth work.
- Develop a plan for continuing Citizen Science activities and engaging new participants.









Understanding and effectively implementing the following methodologies is critical for the successful execution of Citizen Science projects, especially when engaging youth. These methodologies foster active participation, critical thinking, and practical problem-solving skills.

1. Problem-Based Learning (PBL)

Problem-Based Learning is an instructional method where young people gain knowledge and skills by working on a complex problem without a predefined solution. It emphasizes youth-centered inquiry and collaboration.

Key Elements:

- Real-world problems: Focus on problems relevant to the students' community or interests.
- Inquiry and Research: Encourage youth to research, gather information, and develop solutions.
- Collaboration: Promote teamwork and communication among students.
- Reflection: Provide opportunities for young people to reflect on their learning and problem-solving processes.

- Develop projects that address local environmental or social issues.
- Facilitate group discussions and brainstorming sessions to identify potential solutions.
- Encourage young people to engage with community members and experts to gather diverse perspectives.

2. Inquiry-Based Learning (IBL)

Inquiry-based learning is a pedagogical approach that engages young people in investigating questions, problems, or scenarios. It emphasizes the development of inquiry skills, such as questioning, analyzing, and critical thinking.

Key Elements:

- Questions and curiosity: Start with questions that spark young peoples' curiosity and interest.
- Investigation: Guide young people in exploring and investigating these questions through experiments, observations, and research.
- Evidence-Based Conclusions: Encourage young people to draw conclusions based on evidence gathered during their investigations.
- Continuous Reflection: Foster a culture of continuous reflection on findings and processes.

- Design projects where young people formulate their own research questions related to Citizen Science.
- Support young people in conducting experiments, collecting data, and analyzing results.
- Encourage presenting and discussing findings with peers and the community.





3. Human-Centered Design (HCD)

Human-Centered Design is an approach to problem-solving that involves the endusers throughout the design process to ensure that the solutions developed are tailored to their needs.

Key Elements:

- Empathy: Understand the young peoples' needs, experiences, and emotions through interviews, observations, and engagement.
- Ideation: Generate a wide range of ideas and solutions through creative brainstorming sessions.
- Prototyping: Develop prototypes or models of potential solutions and test them with different people
- Feedback and Iteration: Use feedback from young people to refine and improve the solutions continuously.

- Engage community members to understand their concerns and needs related to Citizen Science projects.
- Facilitate ideation sessions with young people to brainstorm innovative project ideas.
- Develop and test prototypes of solutions or tools that can help in data collection or analysis.
- Use feedback from participants to refine and enhance the projects.



4. LEGO® SERIOUS PLAY® (LSP)

LEGO® SERIOUS PLAY® is a facilitated meeting, communication, and problemsolving method in which participants use LEGO bricks to build models that express their ideas, reflections, and understandings. This hands-on, minds-on approach encourages creative thinking and discussion.

Key Elements:

- Building Models: Young people build models with LEGO bricks to represent ideas and concepts.
- Storytelling: Each young people shares the story behind their model, providing insights and perspectives.
- Reflection: Group reflections on the models and stories to deepen understanding and learning.
- Iteration: Participants rebuild and modify their models based on new insights and feedback.

- Idea Generation: Use LSP to brainstorm and visualize potential Citizen Science projects.
- Problem-Solving: Build models to represent community issues and explore possible solutions.
- Engagement: Encourage youth to express their ideas and perspectives through tangible, creative models.
- Reflection: Facilitate discussions around the models to extract deeper insights and foster collaborative learning.



Implementing These Methodologies

When implementing these methodologies, it is crucial to create an environment that supports active participation, open communication, and continuous learning.

Trainers should:

Encourage Curiosity: Foster a culture of curiosity and questioning. Support Collaboration: Facilitate teamwork and ensure that every participant's voice is heard.

Provide Resources: Offer the necessary tools, materials, and guidance for successful project execution. Reflect and Iterate: Encourage reflection on both successes and challenges, and use this feedback to improve future projects.

Curriculum: Train the trainers

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Time	Sunday	Monday - museum	Tuesday	Wednesday	Thursday	Friday	Saturday
9:30 - 11:00		Getting to know each other	Hedy Lamarr - who was she and how she can serve as an inspiration	Sight visit	Basis of systems thinking & design	Design your STEAM project	Brunch with decision-makers
11:00 - 11:30		Break	Break	Break	Break	Break	
11:30- 13:00		Playground of Citizen Science - What is it?	DIY Tinkering space - How do we transform every space into LAB?		Understanding and playing with Arduino	Design your STEAM project	
13:00 - 15:00	Arrivals	Lunch	Lunch	Lunch	Lunch	Lunch	
15:00 - 17:00	Arrivals	Playground of Citizen Science - Diving deeper	Environment microbiome analysis		Microenvironment in a bottle (open & close systems)	Presentation of the projects	
17:00 - 17:30	Arrivals	Break	Break	Break	Break	Break	
17:30 - 19:00	Arrivals	Learning bazaar	Learning bazaar	Learning bazaar	Learning bazaar	Final Evaluation	
19:00 - 20:00	Arrivals	Dinner	Dinner	Dinner	Dinner	Dinner party	

This curriculum was tested in Udine and demonstrated significant success in engaging trainers and youth and fostering a deeper understanding of Citizen Science. The hands-on methodologies, such as LEGO[®] SERIOUS PLAY[®], problem-based learning, inquiry-based learning, and human-centered design, proved effective in stimulating critical thinking, creativity, and collaboration among participants. The positive outcomes from this test phase underscore the curriculum's potential for broader application by UR Institute, GLUON, Puntozero, and PiNA in promoting the E+ program and Citizen Science as a valuable educational and community engagement tool.



Title: Dive in curriculum for trainers

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Publisher: Kulturno izobraževalno društvo PiNA, Gortanov trg 15, 6000 Koper, Slovenija Year: 2024 Publication's web address: https://www.pina.si/en/portfolio/dive-in-2/ is licensed under CC BY-NC-SA 4.0.

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Publication if free of charge.

This handbook was produced as part of the Dive in project, co-funded by the European Union through the Erasmus+ programme. The views and opinions expressed are solely those of the authors and do not necessarily reflect those of the European Union. Neither the European Union nor the funding authority may be held liable for any opinions expressed herein.

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Co-funded by the European Union