Online OTTERS Workshop - Portugal

Introduction: On May 8th and 15th, 2024, NUCLIO organized a co-creation workshop with Portuguese speaking teachers (including a teacher from Brazil and a teacher from Cape Verde) in an online format. The goal of this workshop was to introduce the OTTERS project to the educational and citizen science community in Portugal and begin the professional development process for educators who wish to join the OTTERS community and implement the project in their schools. It also aimed to engage the educational community in a co-creation process for integrating citizen science into the school curriculum.

Participants

The sessions were attended by 131 people, representing 113 schools and an open science platform (from Figueira de Castelo Rodrigo), with 111 participants in the first session and 106 in the second session. Of these participants, 86 attended both sessions.

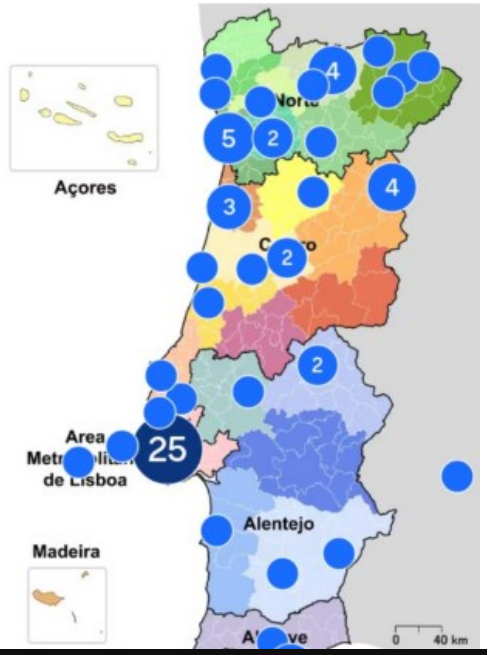
Number of participants: 131

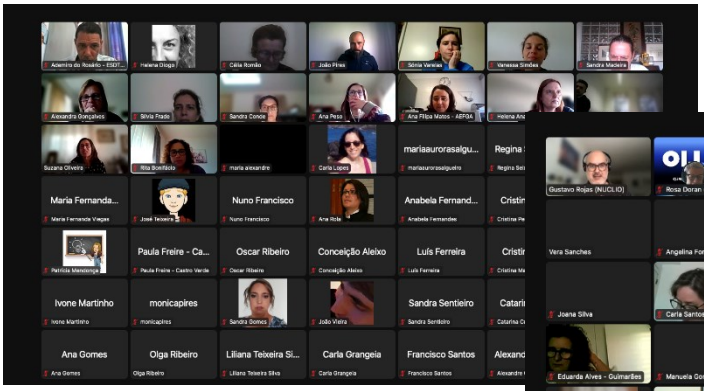
Session 1 – 8th of May, 17h30 to 19h – 111 participants

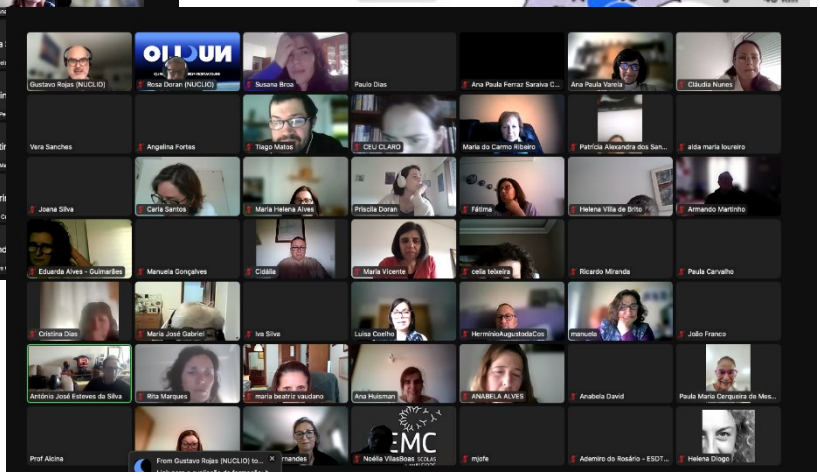
Session 2 – 15th of May, 17h30 to 19h - 106 participants

Participants in both sessions: 86

Number of represented schools: 113

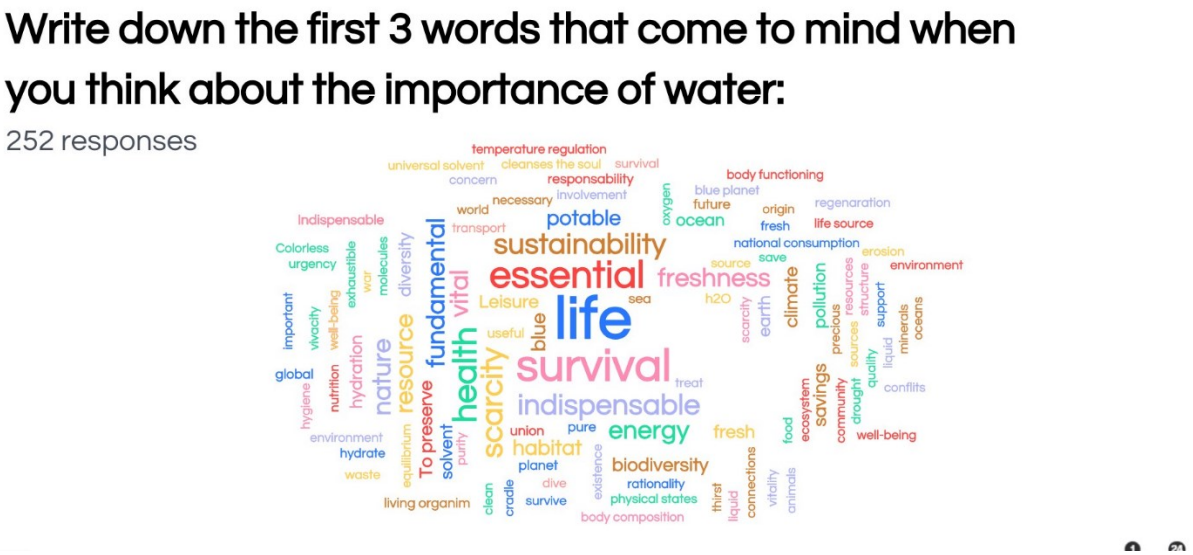






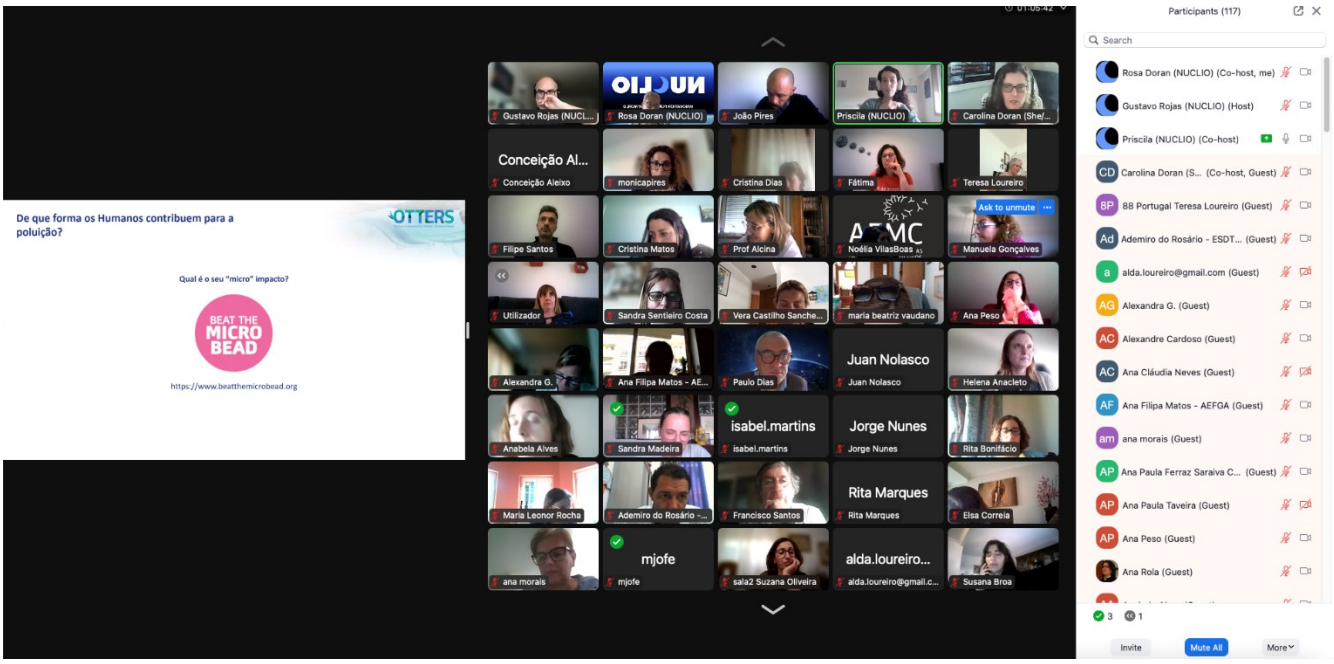
Introduction to the Theme

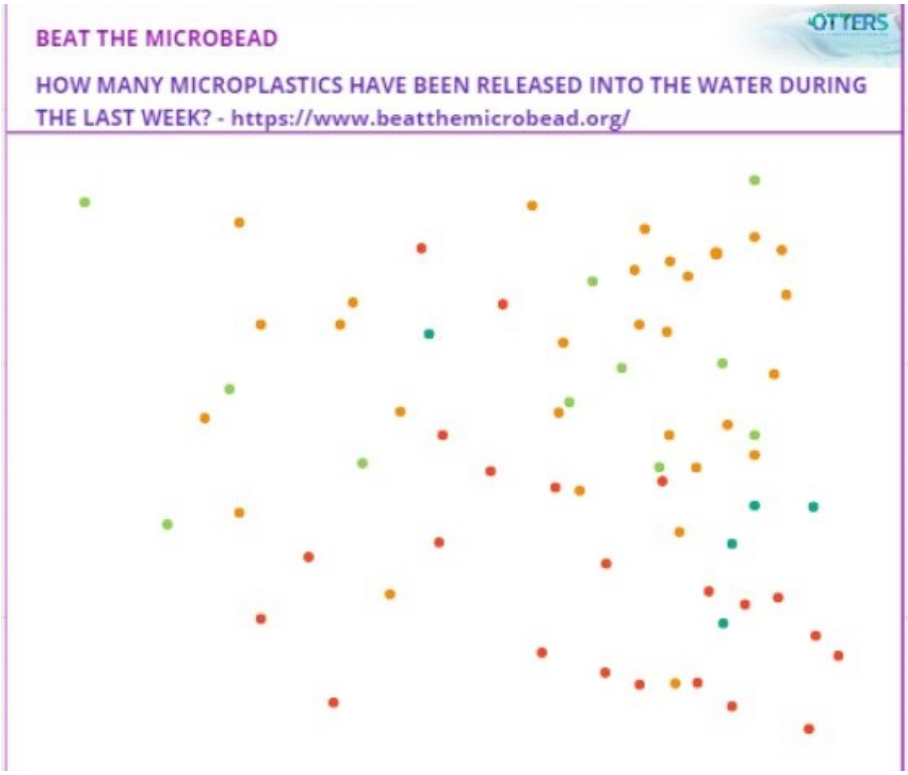
The importance of water and the impact of human activities on its availability and quality, including personal impact, was discussed. Participants were invited to access Mentimeter to reflect on the importance of water in their lives.



Next, a discussion on the human impact on the quantity and quality of water was held.

Participants were invited to visit the website "Beatthemicrobeat.org" to check their microplastic consumption footprint in cosmetic products. Using the Miro board tool, participants were challenged to place circles corresponding to their cosmetic footprint from the previous week into a dedicated space.





What is Citizen Science?

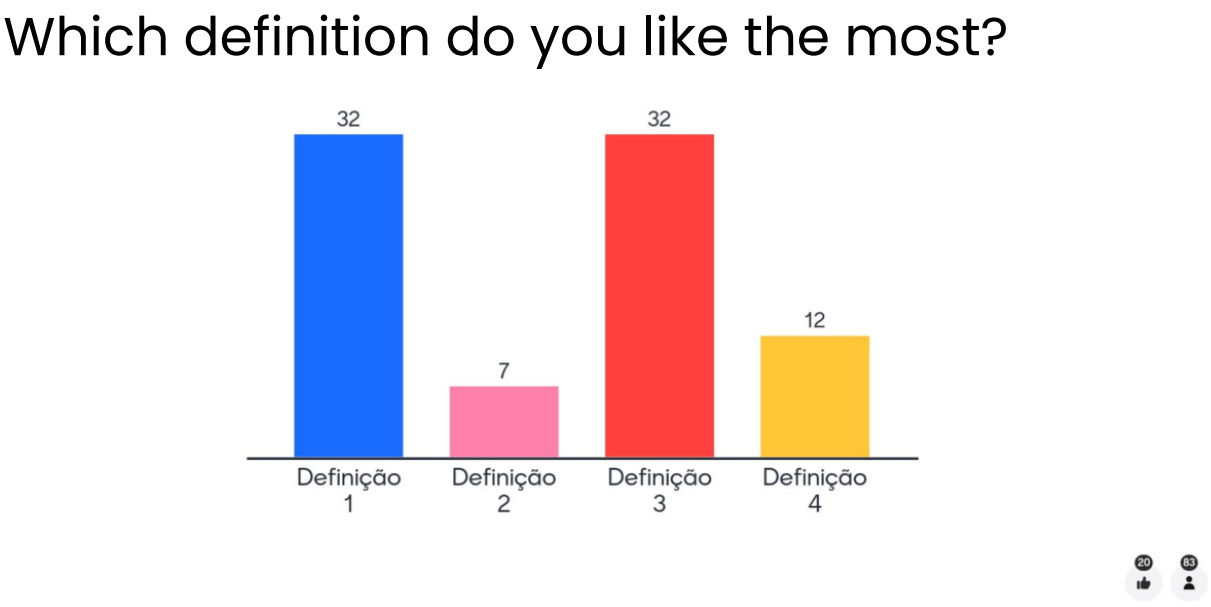
A reflection session on the meaning and definition of Citizen Science was conducted in collaboration with ECSA – European Citizen Science Association.

Before introducing the topic, participants were asked to reflect on their definitions of Citizen Science and share their ideas on Mentimeter and/or the Zoom chat. The main responses were:

Participation in scientific projects	Awareness	Citizen involvement in research activities	Citizen involvement in building scientific knowledge
Informed citizenship	Respecting others	Involving students as citizens in science matters	It is everyone's responsibility concerning scientific matters
An added value of science in life and society	Respect for nature	Citizen involvement in solving (+/-) scientific problems	Knowledge/practices that enhance the common good
Interdisciplinarity	Environmental action	Collaborative science	A way to say: Everyday science
Sustainability	Intellectual involvement	Compassion	Science for everyone
Healthy oceans	Veganism	Action	Improved life
Living in harmony with the environment	Inclusive science	Collaboration	Using scientific knowledge sustainably
Teaching science from a civic perspective, protecting and respecting natural elements	Participation in active citizenship projects	Acting with knowledge of impacts	Sustainable development
Rationalising consumption	Acting today for future benefits	A responsible citizen with sufficient scientific knowledge to improve their ecological footprint	

Outcome: It was concluded that the term "Citizen Science" was new to most participants. Some considered that volunteer beach clean-up activities represented citizen science programs. Only a few participants were familiar with the concept.

Four different existing definitions were presented, and participants were asked to vote for their preferred one.



Outcome: It was concluded that defining Citizen Science could be challenging, risking the exclusion of initiatives that do not fully meet the definition and limiting the potential of this area of development. Thus, the 10 principles of ECSA were referred to as guidelines that Citizen Science projects should follow:

The 10 principles of ECSA

ecsa European Citizen Science Association

https://zenodo.org/records/5127534#.YR98rkBCRhE

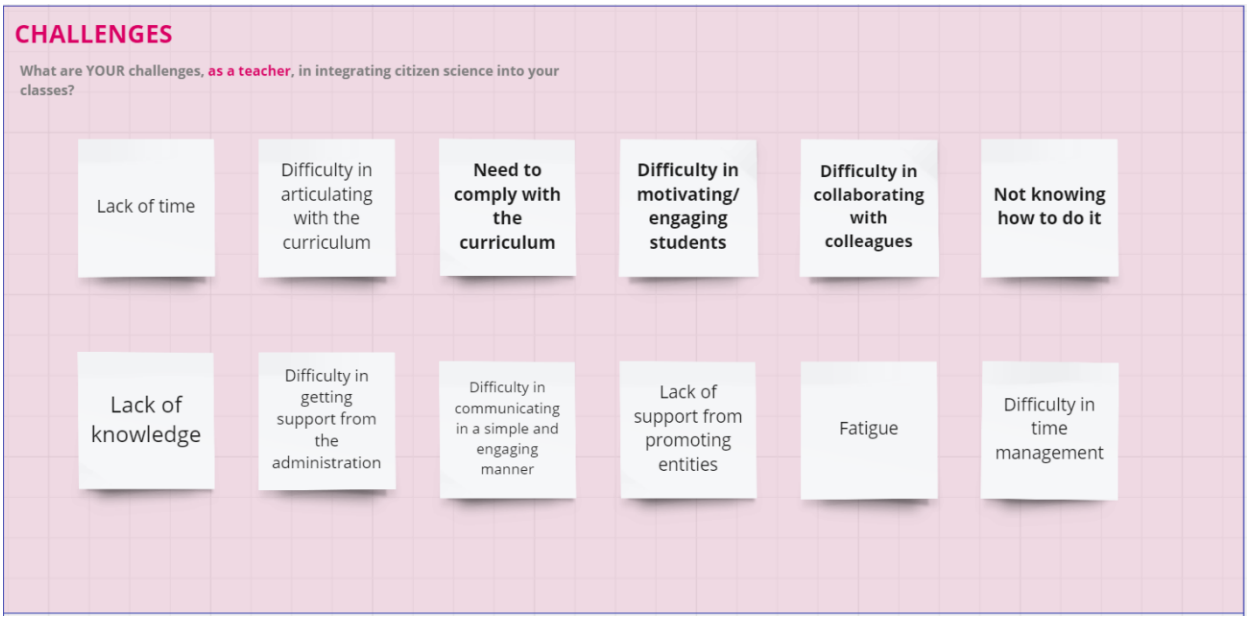
1. Actively involve citizens (as contributors, collaborators, or leaders) in scientific activities that generate new knowledge or understanding.
2. Produces genuine scientific results.
3. Benefits both citizen scientists and professional scientists.
4. Citizen scientists can participate in various stages of the scientific process.
5. Citizen scientists receive feedback from the project.
6. It is considered a research approach like any other, with limitations and biases.
7. The data is made public and whenever possible, the results are published in open access format.
8. The contributions of citizen scientists are publicly recognized in the results and publications.
9. The programs are evaluated based on their scientific output, data quality, participant experience, and scope of social and political impacts.
10. Project leaders take into consideration legal and ethical issues.

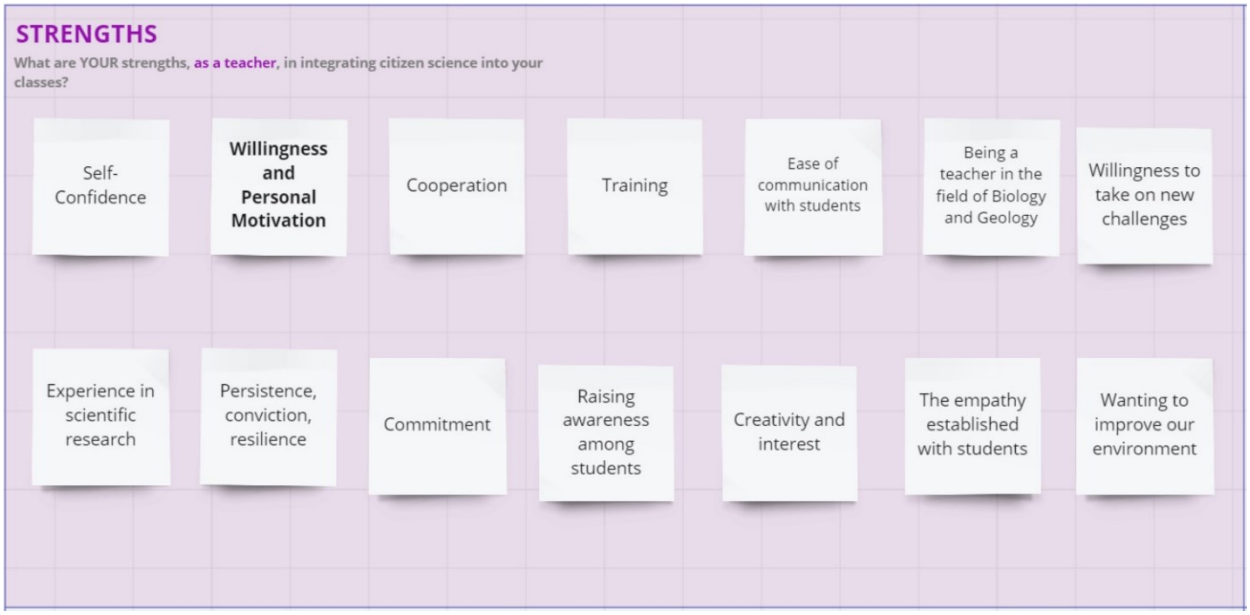
Citizen Science and Schools

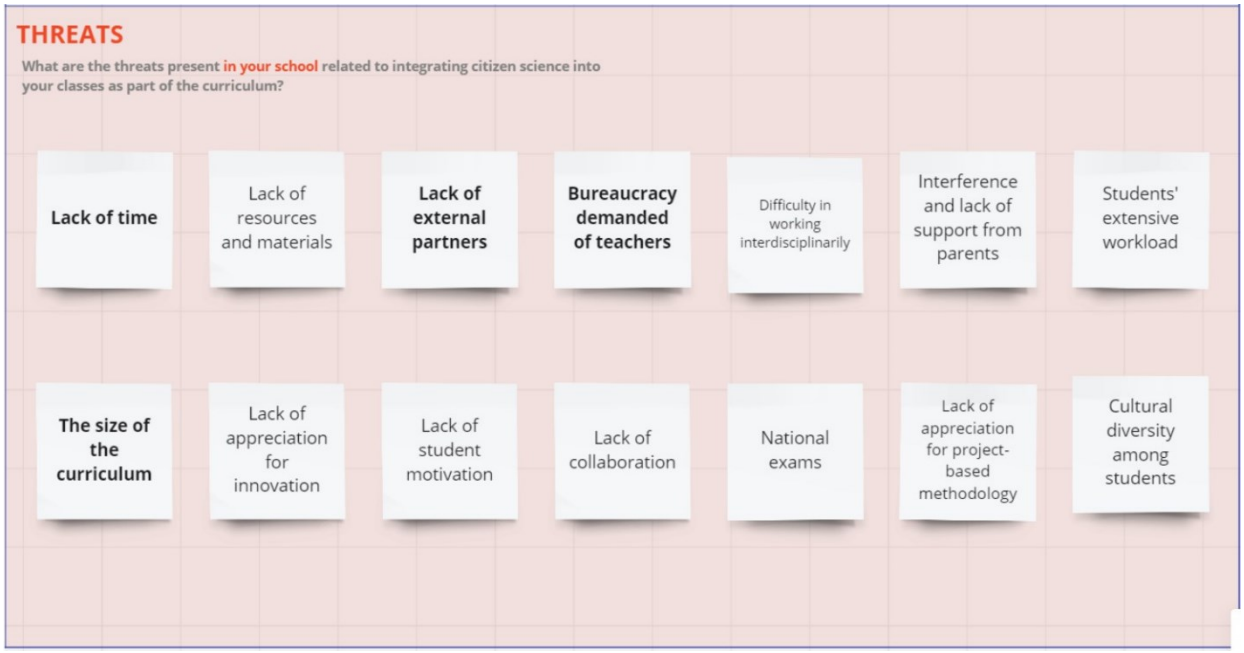
The relevance of integrating Citizen Science into the school curriculum was discussed:

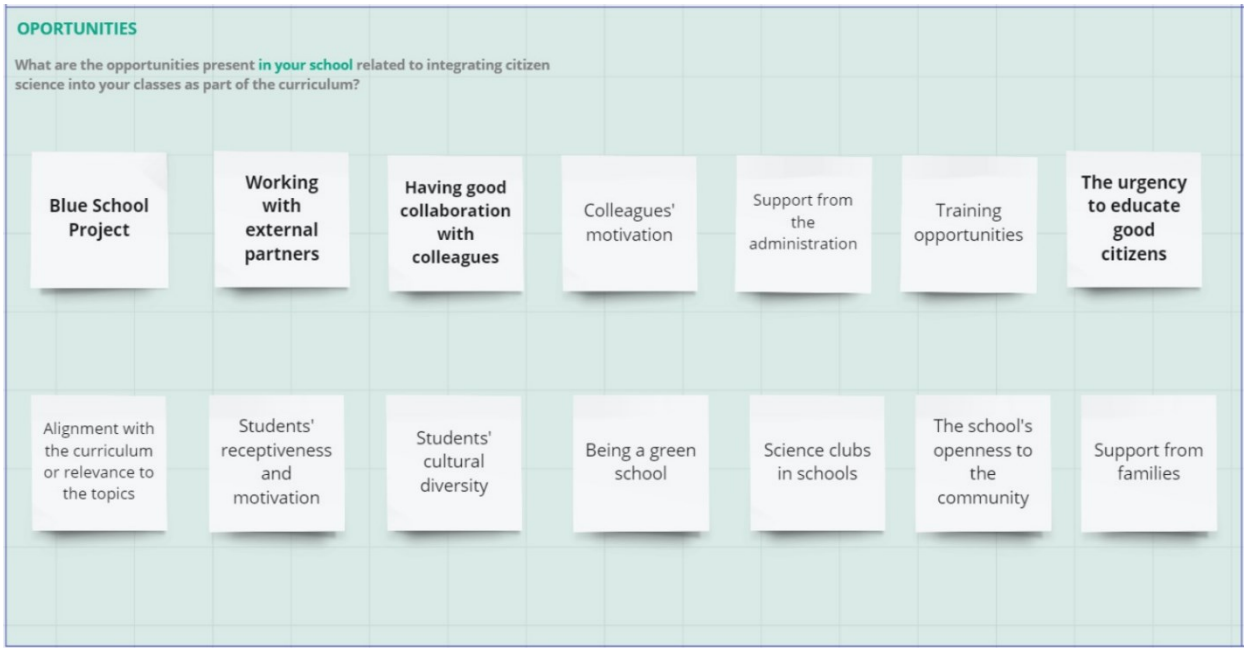
SCOT Analysis – Strengths, Challenges, Opportunities, Threats

An individual and collective reflection on the strengths and challenges teachers face in integrating citizen science into their curriculum, as well as the opportunities and threats they might encounter in their schools, was promoted. Participants interacted through Mentimeter and the Zoom chat.









Conclusions from the Analysis – The Way Forward:

It was concluded from this analysis that, to motivate the integration of citizen science into the curriculum, it is necessary:

1. Support schools in creating synergies with external partners that motivate, accompany, and support educators and students in citizen science activities.
2. Create awareness campaigns targeting school administrations and parents, highlighting the importance of citizen science in students' academic journeys.

3. Offer training opportunities that promote professional development and career progression for teachers, ensuring their capacity, awareness, and motivation to adopt citizen science campaigns in their practices and communicate effectively with students to inspire and motivate them.
4. Encourage whole school approaches to develop a school culture that prioritises innovation and the adoption of citizen science campaigns, enriched by partnerships with various stakeholders including partners, families, educators, and students.

Co-creation with Educators

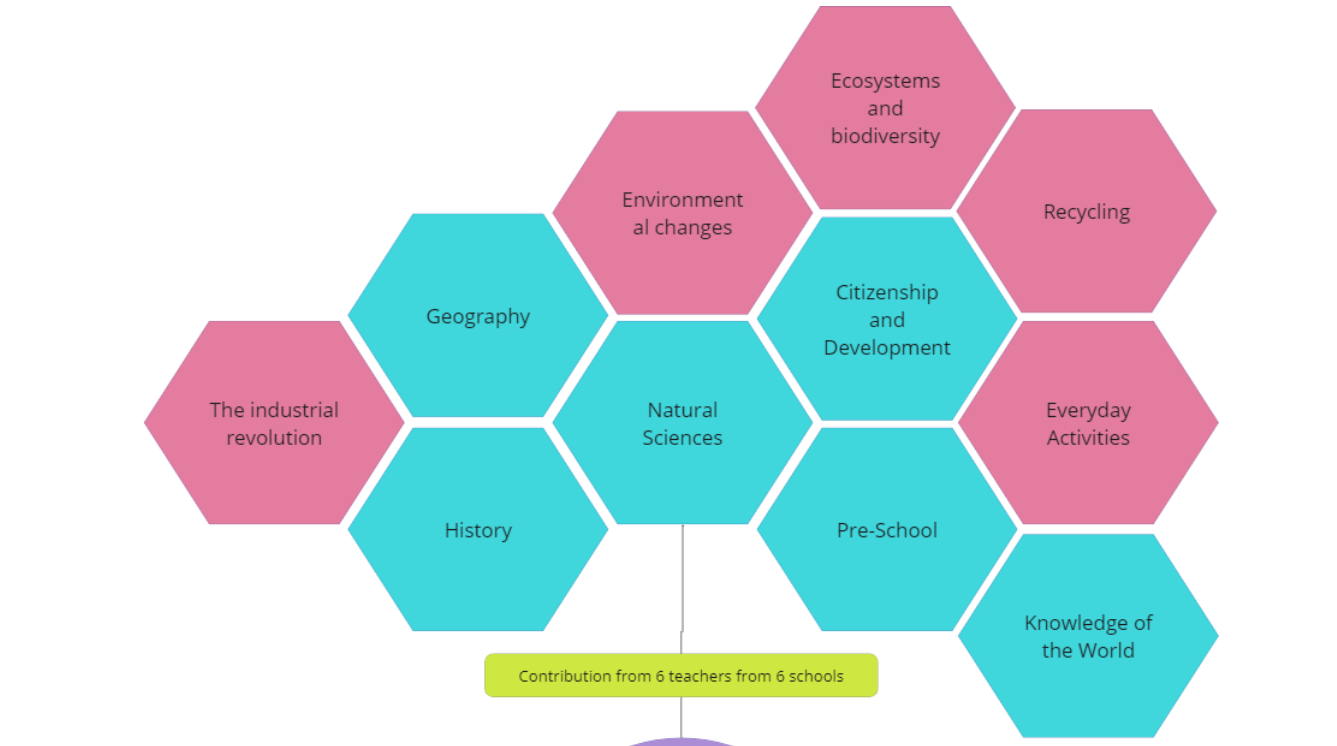
Various existing citizen science projects in Portugal were presented. Participants were asked to explore each project and choose the one that interested them the most to develop a simple integration plan into their curriculum.

Programas de ciência cidadã relacionadas com ecossistemas aquáticos:

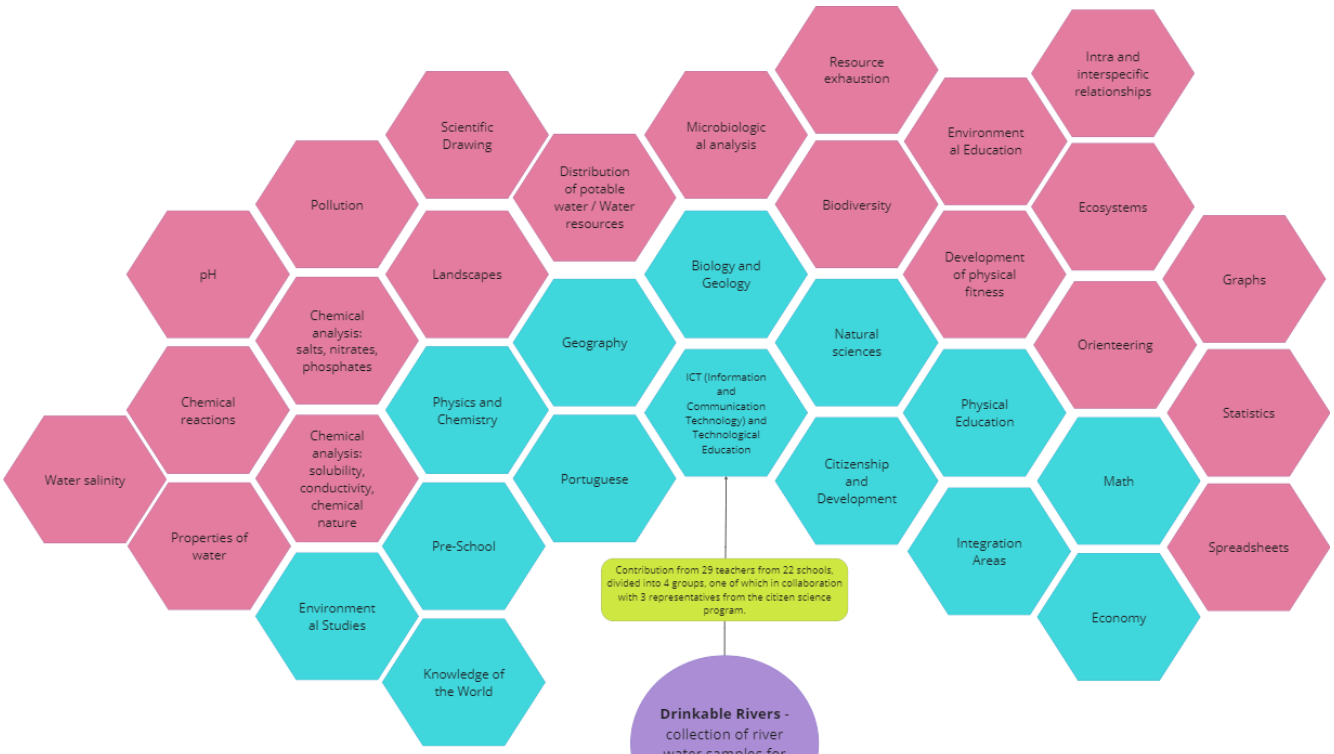
Algas na Praia - https://form.jotform.com/212044035885352	Alerta sobre grandes quantidades de Algas na praia É normal encontrarmos algas no mar e na praia! Mas quando há demasiadas algas podemos estar perante situações que resultam de um excesso de nutrientes provenientes da descarga de efluentes urbanos ou da fertilização na agricultura. Quando as algas crescem de forma excessiva, podem prejudicar a biodiversidade, as pescas e a qualidade ambiental da praia.	Portugal	Qualquer pessoa Responder a um questionário online sobre avistamento de algas
BioDiversity4All https://www.biodiversity4all.org/observations	Mapear a biodiversidade em Portugal. Já conta com mais de 1 milhão de observações Inclui projeto **CetaSee** - Avistamento de cetaceos - https://www.biodiversity4all.org/projects/cetasee Inclui projeto **FRISK** - Determinação de rotas de invasão de peixes introduzidos em ecossistemas dulciaquícolas: avaliação de risco (Ref. PTDC/AAG-MAA/0350/2014) - queremos descobrir "as rotas" percorridas pelos peixes exóticos.	Portugal	Todas as pessoas Possibilidade de criar projetos pessoais na plataforma deles.
Egg Hunt - SharkAttract https://sharkattract.pt/ovos/	A "Caça aos Ovos" pretende sensibilizar os cidadãos para a conservação de tubarões e raias através da descoberta dos ovos destas espécies nas praias portuguesas. Uma vez vazios, os ovos são frequentemente arrastados pelas correntes para a praia, fornecendo informação sobre a distribuição, diversidade e potenciais zonas de desova e berçário destas espécies.	Portugal	Todas as pessoas
Gelavista - https://gelavista.ipma.pt/sobre/	O GelAvista é o programa de ciência cidadã responsável pela monitorização dos organismos gelatinosos em toda a costa portuguesa, Açores e Madeira. Lançado em fevereiro de 2016, pretende envolver a comunidade no desenvolvimento da ciência, colmatando assim a falta de conhecimento sobre as espécies que ocorrem em Portugal. O programa reúne informação acerca destes animais, recorrendo à participação dos cidadãos que frequentam as zonas costeiras – praias, estuários, rios, marinas, e outros – durante as suas atividades de lazer (passeio à beira-mar, mergulho, vela, surf, etc.) ou as suas atividades profissionais (por exemplo, recolha nas redes de pesca).	Portugal	Qualquer pessoa através de uma app
Invasoras.pt - https://invasoras.pt/pt	Mapeamento de plantas invasoras por todo o país. Permite descarregar uma app ou fazer submissões através do website. Parceria com BioDiversity4All. Permite ver os resultados através de um mapa.	Portugal	Qualquer pessoa através de uma app/website
Lixo Marinho https://lixomarinho.app/. Website informativo: https://cidadania20.com/projectos/lixomarinho/	Produção de dados estatísticos e sensibilização para o problema do lixo na praia. Através da criação de uma conta pode submeter-se dados sobre lixo encontrado na praia. Permite a contagem simples e a contagem cientifica mediante uma lista detalhada.	Portugal	Qualquer pessoa através de uma app/website
Florestas Marinhas - https://marineforests.com/citizen-science/	Registo de espécies que formam florestas marinhas (ervas marinhas, algas, corais, etc.). Permite ajudar na identificação das espécies existentes nos registos de outros utilizadores.	Mundial	Qualquer pessoa através do website
NEMA - https://en.nemalgarve.com/ - Resultados: https://www.biodiversity4all.org/projects/nemalgarve	Identificação de espécies não-nativas na costa do Algarve. Submissão através do website.	Algarve	Qualquer pessoa
RAAlg - https://www.raalg.pt/raalg-rede-de-arrojamentos-do-algarve	Registo e alerta sobre arrojamentos no Algarve. Submissão pode ser por telefone ou formulário online	Algarve	Qualquer pessoa
Seagrass Guardians https://www.ocean-alive.org/en/home	Mapeamento e monitorização das pradarias marinhas. Participação através de contacto direto com o projeto.	Estuário do Sado	Não está claro, contudo através do website demonstram grande potencial para colaboração com escolas
Surf e água limpa - https://www.surfriderporto.com/projetos/surf-e-agua-limpa	Recolha de amostras de água na praia de matosinhos, e envio para laboratório para análise de existência de bactérias enterococcus e escherícia	Praia de Matosinhos	Voluntários em contacto com o projeto. Possibilidade de comunicar com eles e propor colaboração com escolas.
Drinkable rivers [Rios Potáveis] - https://www.plataforma.edu.pt/drinkable-rivers	Recolha de amostras de água para monitorização da qualidade da água do Rio Douro. Coordenado em Portugal pela Plataforma de Ciência Aberta de Figueira de Castelo Rodrigo	Figueira de Castelo Rodrigo e o Rio Douro	Comunidade, em colaboração com a plataforma de ciência aberta

Participants were divided into 12 working groups, organised based on their school and region. The results are presented as follows:

In the central balloon, in purple, is the name of the chosen citizen science campaign. The blue hexagons contain the identified subjects, and the pink hexagons contain the associated curricular contents.



In primary and pre-school, this campaign could be integrated into content areas. From the 7th to 9th grades, it can be integrated into Natural Sciences within the scope of the Domain of Curricular Autonomy and in the school's Science Clubs.



Contribution from 29 teachers from 22 schools, divided into 4 groups, one of which in collaboration with 3 representatives from the citizen science program.

Drinkable Rivers - collection of river water samples for quality analysis.

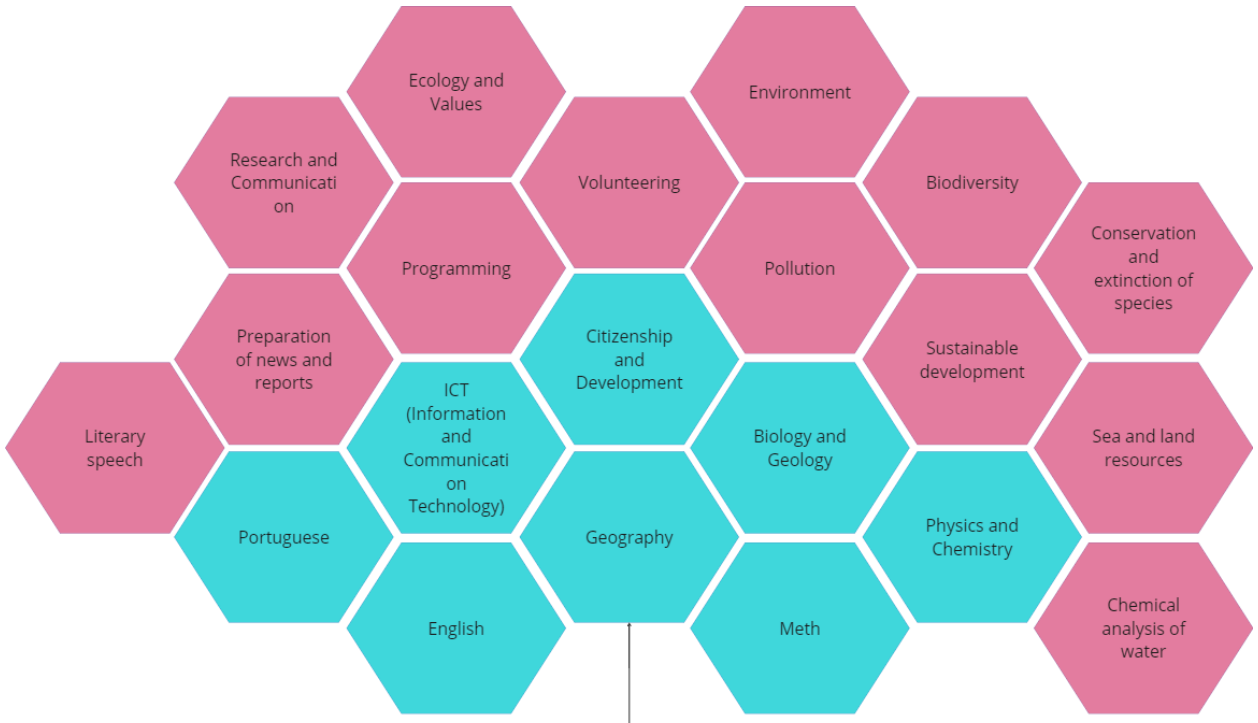
HOW CAN STUDENTS CONTRIBUTE?

Development of hiking trails	Information dissemination (promoters)	Community awareness about water quality
Periodic sampling collection at various points along the river	Historical survey of landscape evolution	Recording and analysis of data in the classroom
Biodiversity monitoring and physical and chemical characterization of water	Litter collection	Signaling large-sized waste (junk) for municipal information

HOW CAN STUDENTS BENEFIT?

Engage with curriculum content in a more active manner - fostering more meaningful learning.	Integration of content from different disciplines
Working on local issues and creating greater involvement with the community	Putting learned content into practice
Proactive citizenship	Transitioning towards sustainability and ecosystem preservation

Better time management by teachers when teaching these topics in an integrated manner with other areas of knowledge/disciplines. Creation of sample collection teams and a walk to determine collection sites during the campaign. Analysis of the characteristics of the natural environment, considering the influence of biotic and abiotic factors, identification of invasive species, appreciation of heritage, and local resources.



Contribution from 5 teachers from 3 schools

Algas na praia - warning about algae on beaches

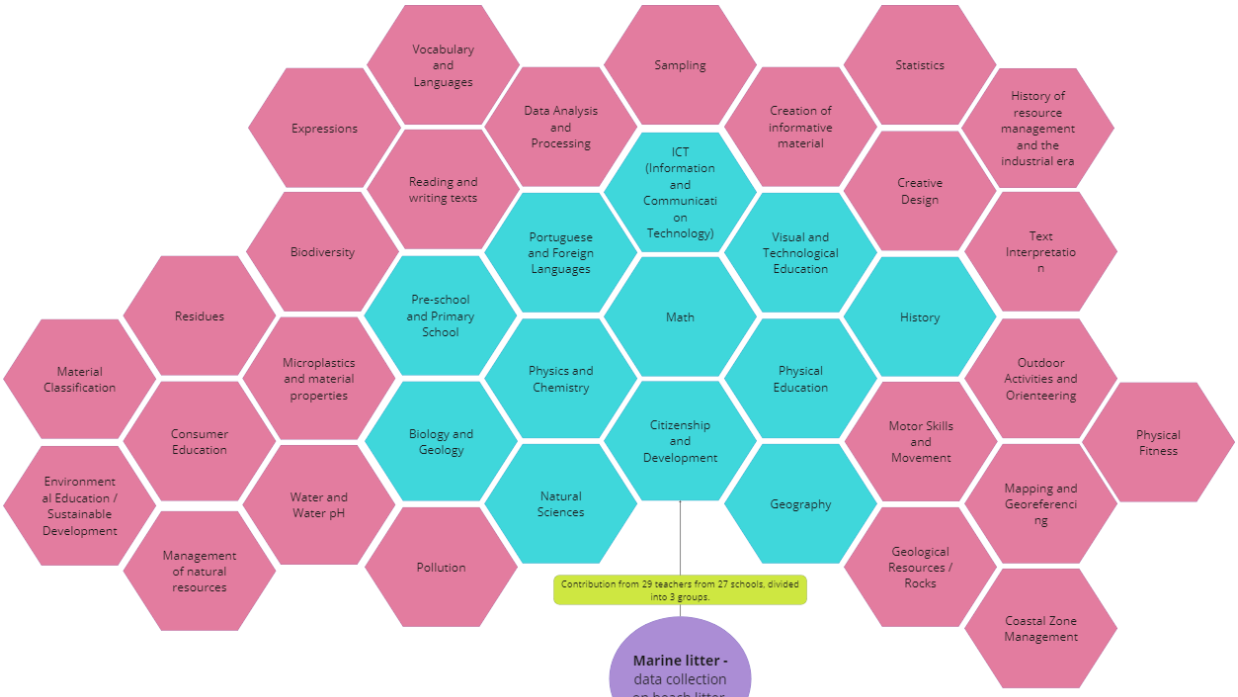
HOW CAN STUDENTS CONTRIBUTE?

Field Trip	Sampling	Monitoring
Research and data processing	Work presentation	Reporting

HOW CAN STUDENTS BENEFIT?

- Active citizenship and involvement with community issues
- Research and data production skills

Creation of an annual interdisciplinary project, aimed at developing skills and acquiring learning essential to the various disciplinary areas.
Monitoring a beach in the school district / area.



Contribution from 29 teachers from 27 schools, divided into 3 groups.

Marine litter - data collection on beach litter.

HOW CAN STUDENTS CONTRIBUTE?

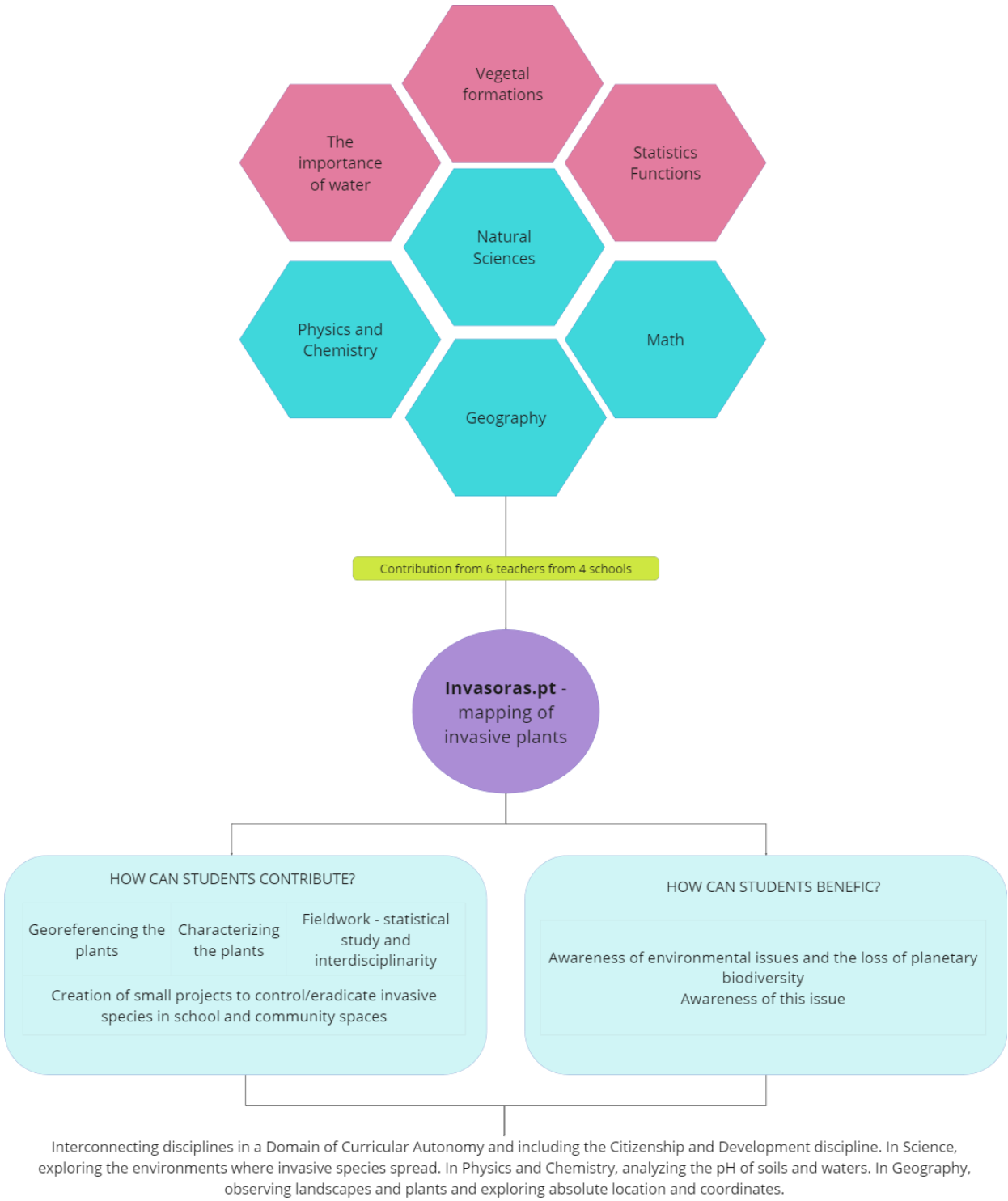
Collection and sorting of garbage on a beach	Quantification of garbage	Research and statistical treatment	Monitoring the recycling process journey
Art with trash	Georeferencing of garbage	Awareness-raising and production of communication and dissemination materials for the community	

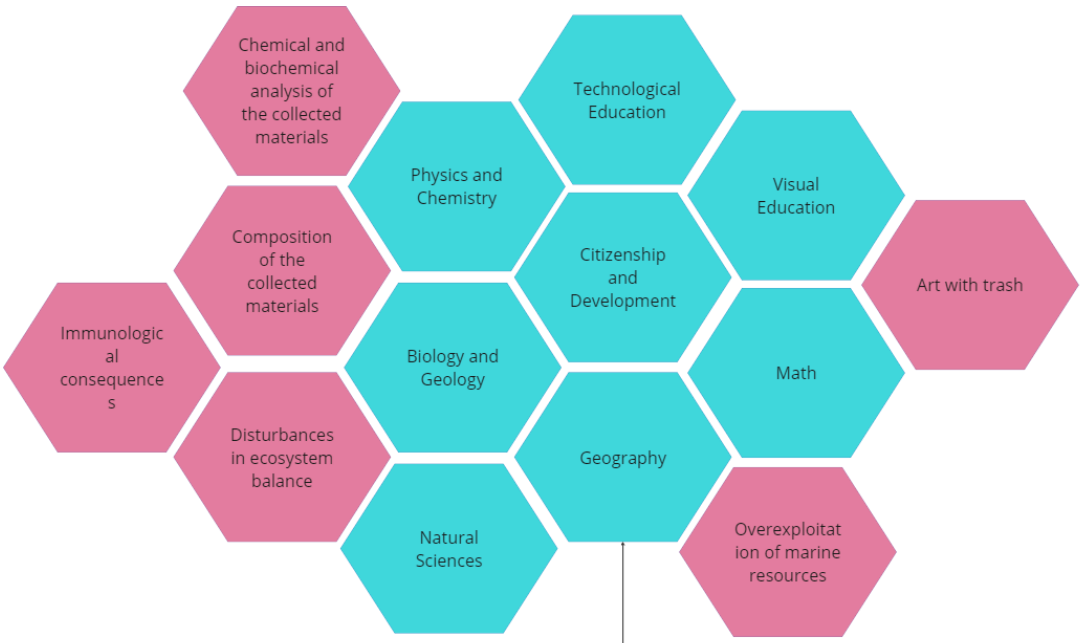
HOW CAN STUDENTS BENEFIT?

Encourage autonomy, environmental awareness, and sensitivity towards the 3Rs (Reduce, Reuse, Recycle).	Develop skills and put essential learnings into practice.	Harmonious development of citizens, cooperation, and active citizenship.
Awareness, attitude, and respect for others and the environment.	Engagement with universities and other levels of education.	Promoting contact with nature.

Choosing a beach and motivating the participation of one class per school (in an e-twinning style project). Carrying out pre-activities and online meetings: studying the geographical location (tides), type of possible waste to be collected (separation/sorting). Defining the necessary material/equipment. Considering safety issues. Fieldwork (in-person meeting): Categorizing and quantifying the collected waste. Final meeting for presentation of results and intervention proposals.

Research project "Water in my municipality". Study visits "A day at the Municipal Water and Sanitation Services" to learn about the analysis of physicochemical parameters and wastewater treatment. Use of resources acquired in the cleaning action for the creation of works of art. Sampling, cataloging, and statistics. "Plasticus maritimus" activity. Development of awareness-raising content in Portuguese, English, and French.
Scientific study visit, stimulating exploration and contact with nature through the realization of trails.


Vegetal formations
The importance of water
Statistics Functions
Natural Sciences
Physics and Chemistry
Math
Geography
Contribution from 6 teachers from 4 schools
Invasoras.pt - mapping of invasive plants
HOW CAN STUDENTS CONTRIBUTE?
Georeferencing the plants
Characterizing the plants
Fieldwork - statistical study and interdisciplinarity
Creation of small projects to control/eradicate invasive species in school and community spaces
HOW CAN STUDENTS BENEFIC?
Awareness of environmental issues and the loss of planetary biodiversity
Awareness of this issue
Interconnecting disciplines in a Domain of Curricular Autonomy and including the Citizenship and Development discipline. In Science, exploring the environments where invasive species spread. In Physics and Chemistry, analyzing the pH of soils and waters. In Geography, observing landscapes and plants and exploring absolute location and coordinates.



Contribuição de 8 professores de 7 escolas. *Esta campanha foi identificada pelos professores.

In search of "ghost nets" - Collection of lost fishing nets

HOW CAN STUDENTS CONTIBUTE?

Classification of materials and their origin	Alert about the impact of overfishing
Raising awareness among fishermen about the issue of marine litter	Involvement of local artists and students in the reuse of materials for artwork

HOW CAN STUDENTS BENEFIT?

Empowering students to identify problems and propose solutions	Learning more about the composition of the chemical compounds present
Developing communication skills	

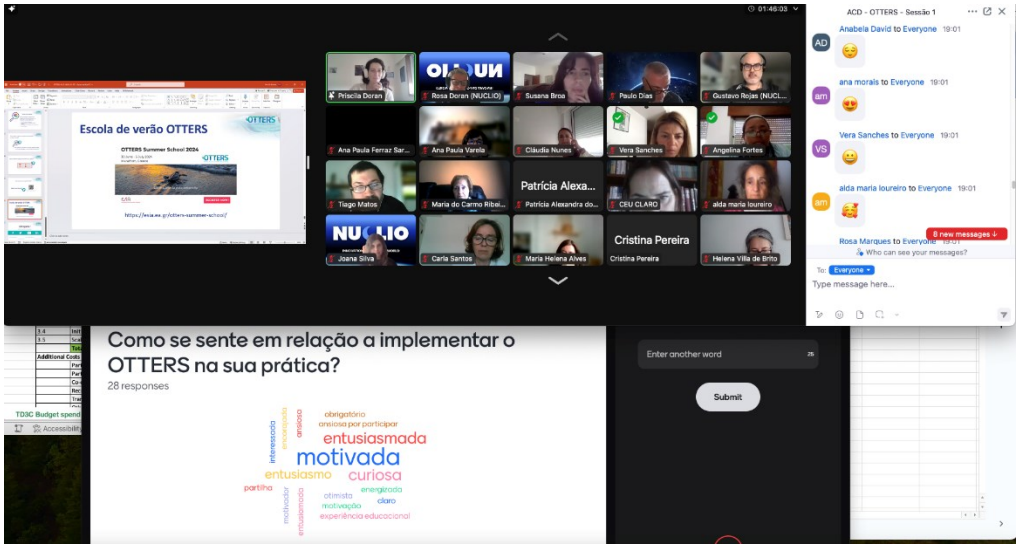
In Geography, address fishing and maritime resources. In Physics and Chemistry, emphasize the presence of nanoplastics in breast milk. In Biology and Natural Sciences, discuss disturbances in ecosystem equilibrium. In Mathematics, explore statistics regarding the materials found.

Evaluation

The workshop was short but produced important results, representing the beginning of a promising path aimed at strengthening connections between scientists and schools through citizen science integration into the school curriculum.

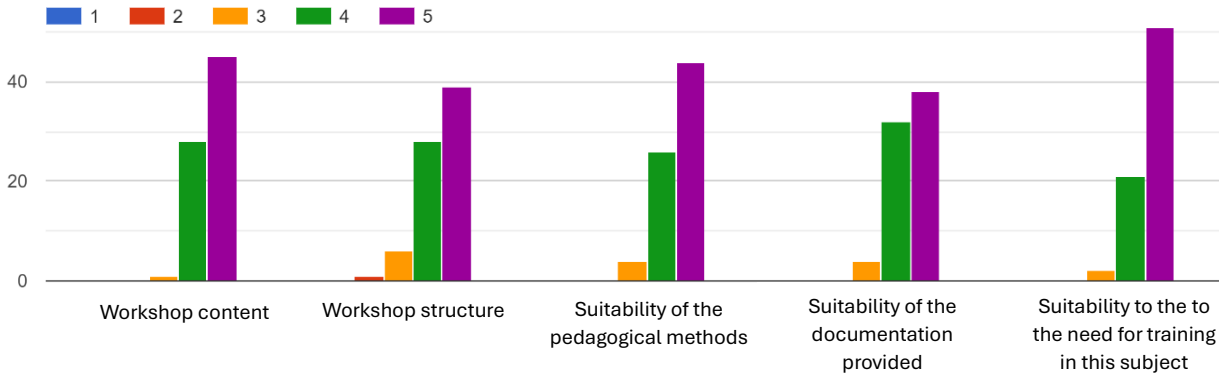
At the end of the session, participants were asked how they felt about implementing OTTERS in their teaching practice.

Some participants wrote words describing their feelings, while others responded with emojis in the Zoom chat:

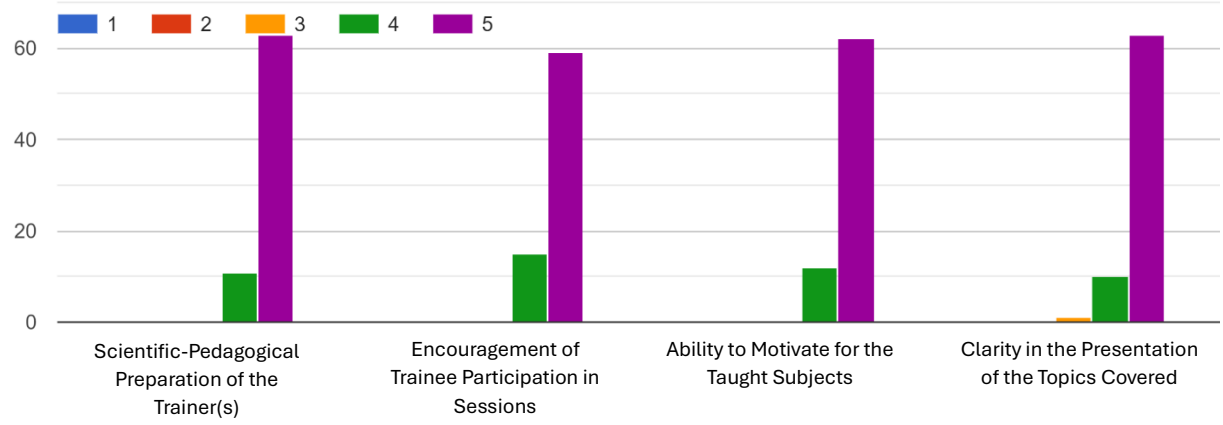


Finally, everyone was invited to answer a short evaluation survey of the workshop. 74 participants responded to the evaluation questions. The main results are presented as follows:

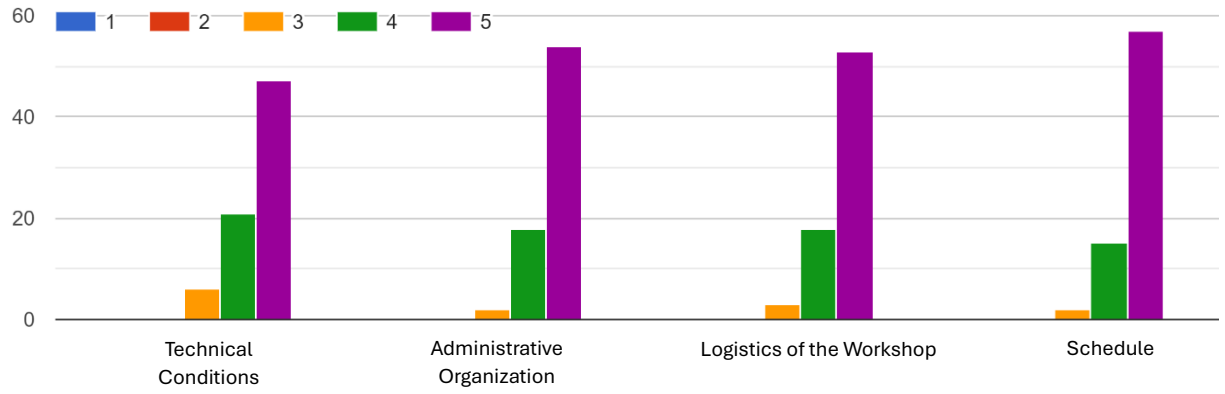
Content, Methodologies, and Training Needs - How do you rate the following elements on a scale of 1 to 5, with 1 being the worst and 5 being the best?



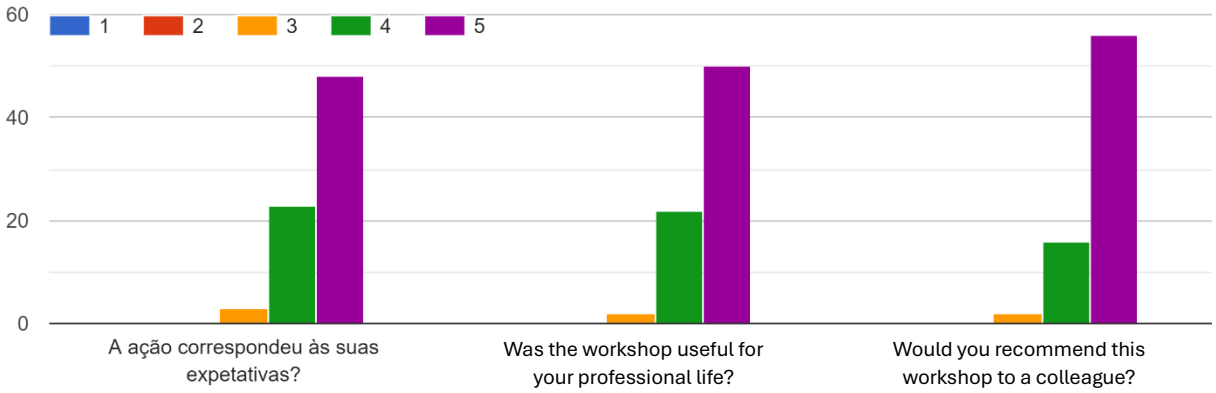
Performance of the Trainers - How do you rate the following elements on a scale of 1 to 5, with 1 being the worst and 5 being the best?



Organisation and Logistics of the Workshop - How do you rate the following elements on a scale of 1 to 5, with 1 being the worst and 5 being the best?



Overall Evaluation - How do you rate the following elements on a scale of 1 to 5, with 1 being the worst and 5 being the best?



In addition to the presented charts, most open-ended comments pointed to the participants' desire to engage in more similar and longer actions. Despite some technical difficulties with the Miro platform, which will be considered in future actions, the event was a success and indicates the need to create a longer accredited training course (50 hours) to start in the next school year.