

AdSwiM Project

For a better quality of the Adriatic Sea and a
healthier habitat for everyone.

Proposed didactic module for primary schools

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The Adriatic Sea is one, its care belongs to everyone.

Brief presentation of the project

The objective of the two-year Interreg Italy - Croatia AdSWiM project is **to improve the environmental quality conditions of the sea and the coastal area through the managed use of treated urban waste water** using sustainable and innovative technologies and approaches. The project, launched in 2019, promotes the integrated cross-border management of water resources **to restore the disturbed balance of nutrients that affects the sea food chain.**

During the two years of the project activities, **new tools** will be proposed to acquire better knowledge and **control on the ecological status of the marine ecosystem, an innovative and environmentally friendly wastewater treatment technology** and will evaluate whether the current regulations can be changed. with a view to supporting the quality and fertility of our sea. In fact, the partners will examine new treatments, new analytical devices and new chemical and microbiological parameters for assessing the quality of wastewater. They will check the level of nutrients, pollutants, faecal bacteria near marine discharges and purifiers, sampling, testing, analyzing and comparing data. In order to enhance the efficiency of the AdSWiM research results, **they will define the new Adriatic guidelines and a common measurement model for a more efficient management of wastewater treatment.**

The project involves 6 cross-border research institutes ([Uniud](#), [OGS](#), [Polytech. Marche](#), [IC-CNR](#), [Metris](#), [FGAG](#)), 2 municipalities ([Udine](#) and [Pescara](#)), 3 wastewater treatment companies ([CAFC](#), [VIK](#), [Izvor Ploče](#)) e 1 unit for the regulation and provision of health care and education to the public ([IPHZ](#)).

Local involvement of partners

At the local level the following partners are involved in the project:

- **l'Università di Udine Dipartimento di Scienze Agroalimentari, ambientali e animali - DI4A** the University of Udine Department of Agri-Food, Environmental and Animal Sciences - DI4A which is the project leader and focuses on water disinfection with the study of systems with reduced environmental impact and in the optimization of control systems based on sensors and new materials (contact: researcher and professor Sabina Susmel).

- **The Municipality of Udine** who is the promoter of communication activities and the coordinator of common guidelines and protocols that respect the territorial particularities (contact: architect Agnese Persotto).
- **CAFC Ltd.** which manages the integrated water service (aqueduct, sewage and purification) in most of the area of central Friuli (120 municipalities out of 135) and which in the project will deal with the optimization of its purifiers and the application of new technologies studied during the project aimed at removing harmful pathogens with technologies with reduced environmental impact (contact: ing. Michele Mion).
- **OGS** which carries out monitoring on emerging bacterial species both at the level of purified water and at sea to create a database on these species and evaluate the possible introduction of new water quality markers, as well as understand the real impact of the purification plants in terms of of microbiological water quality (contact Dr. Mauro Celussi).

AdSWiM meets LaREA ARPA FVG for an educational collaboration for elementary school children and their teachers

The project foresees a series of communication and information activities both on the local territory, choosing one or more schools as pilot, and on the wider cross-border territory identified by the Cooperation Program: we mainly involve teachers and their students to raise their awareness on water-related issues. In particular, **to reflect on the management of this natural resource, on the urban wastewater management system and to transfer these observations to the environmental and social dimension of the problem of sea pollution and to the role of the depuration plant in this process, as well as the role that each individual and citizen can play in the process of protecting the environment in which he/she lives.**

Can an artificial structure, which fulfils anthropogenic impact on the environment as it is a depuration plant, become a resource for the environment itself through good management practices and with the conscious behavioural contribution of the citizen?

In addition to flyers, posters, brochures and events, the project will create two infographics (infographics) as tools made available for the dissemination of the objectives and results of the project.

LaREA (Regional Environmental Education Laboratory) is a public structure of ARPA FVG that deals with environmental education, information and communication. It carries out, with public and private subjects, environmental education and sustainable development projects. In particular:

- plans educational activities;
- trains teachers and operators in the educational sector;
- co plans activities with subjects and territorial networks;
- organizes and coordinates events;
- creates and manages exhibitions and shows;
- processes and organizes contents;
- experiments with new communicative languages and educational contexts.

The local partners of the project therefore contacted LaREA to jointly develop a targeted educational module for primary school teachers and their pupils.

The module involves the training of the teachers on one hand and, on the other, the direct involvement of the pupils through workshops and activities carried out in the classroom, as well as during guided visits to the depuration plant managed by CAFC.

The didactic module proposes a **pull of systematic skills**, oriented to build relationships with the environment, which can later be returned by teachers to pupils in the classroom. The proposed topic is treated with a **methodological approach** to inform and offer the teachers intervention strategies that allow to effectively transfer content to the pupils as well as ideas for the evaluation of the new knowledge acquired (i.e. analysis and comparison between the different experiences of the participants). The aim is to encourage **critical reflection** and a sense of responsibility towards the surrounding reality. During each cycle of the course, **functional experiences** are organized in order to create answers to the driving questions related to the theme: during these experiences, attention will be given to the **language** used to exhibit and discuss the topic to strengthen the participant's **critical sense** and objective evaluation in particular to discern the scientific nature of the data and information with which we are in contact every day through digital sources:

- Ask questions about the information, thinking of new solutions to the problems given.
- Knowing how to reason and operate with a critical spirit, evaluating topics, interpretations, beliefs and theories.
- Knowing how to grasp interdisciplinary links.
- Possess analytical and synthetic investigation skills.
- Use a scientific method of reading the real.

- Be aware of the value of scientific data.
- Develop a sense of personal and social responsibility.
- Having a sense of community: a being-us, as much as a being-me.
- Manage differences, contrasts and conflicts in a peaceful and productive way.

a) Purpose of the didactic module

In particular, the project wants to create a didactic module for teachers and their students that can:

- 1) help to reflect on the conscious use of water resources;**
- 2) help to understand the connections that are created between the consumption of water and the natural cycle of water resources;**
- 3) explain how anthropogenic actions are inserted, in positive and negative terms, in the path of urban waste water;**
- 4) allows you to acquire systemic skills related to the environment in order to improve the individual and joint relationships we have with the habitat that surrounds us, through innovative learning methods and techniques.**
- 5) Think about how the urban waste water treatment system, the purifier, becomes an expression of the socio-cultural context and expresses the development trajectories of the company itself.**

At the same time, it is a didactic module on sustainability education that should help children to:

- 1) understand how to manage water in a sustainable way;**
- 2) reflect on how our daily gestures spill over the environment and how the whole water system (and not only) is connected;**
- 3) to think about how climate and anthropic changes are impacting on such a precious resource for our life;**
- 4) deduce how relationships are created between our actions and the environment in a proactive and conscious way in order to maintain the right balance with nature and with the habitat that surrounds us.**

b) Methods and techniques proposed

The didactic module aims to make both children and educators protagonists by using **brainstorming and cooperative learning techniques** for the enhancement of multiple skills and different styles in the production of shared ideas and solutions.

Both **the teachers** during their training activities, and later **the pupils**, are called to face the proposed problem as a common task - each of them will propose their own ideas and experiences and their own intellectual modalities. The connection between the participants (first the teachers and then the pupils) must take place on the level of cooperation, and not simply of collaboration.

Therefore, **the team work**, with which we would like to find the maximum of ideas on a specific theme and creative solutions to the problem, will be enhanced (we attach to this a fact sheet on brainstorming techniques taken from "Processes and teaching methodologies" by F. Tessaro).

If brainstorming techniques stimulate the creativity of the group and help to find solutions and proposals to the individual problems proposed, **infographic tools** will be introduced to make learning meaningful in activities that will help create connections between the real world and learning objectives.

The diversity of pupils, the situations and circumstances in which they live and face on a daily basis, requires **greater teaching flexibility** to help improve learning outcomes.

This tool is a great way to ensure that pupils retain and reiterate the information acquired by creating the logical connections between data and visual information. **The infographic is a simple and effective form of communication**, a new way of seeing the world of data, communicating complex ideas directly and immediately. The term identifies any graphics that display and explain information, whether it be data or words. Technically, **an infographic is a graphic that contains information**. Infographics are used to convey data and concepts faster and more intuitively than a text, they are part of digital and innovative and digital communication.

Teachers will thus be able to use infographics to:

- Introduce a specific unit or lesson.
- Introduce cooperative learning work.
- Suggest the work to be done in the classroom or at home and to reflect on the content to be learned.
- They will also be able to suggest pupils to create infographics for projects and tasks or use the infographic as a final product.

The introductory sheet on the infographic presented by [Easelly](#), a digital app, is attached to the proposal as study material (see the [link](#)).

c) Didactic module contents

Following the four operational paths proposed in the didactic module, the following contents are explored with the teachers divided into working groups:

- 1) **THE WATER USE:** the consumption of water is explored from the individual point of view, from the family point of view or from a restricted social group such as school, cities, industries and agriculture. We reflect upon logical connections by **creating conceptual maps**, stimulating the search for online data, comparing the results and the 4 environments. Are there any similarities? Who is the main consumer? It reflects on the secondary actions related to the use. The result is the creation of the first concept map.
- 2) Si creano i collegamenti tra **i dati raccolti sul ciclo dell'acqua e le mappe concettuali relative all'utilizzo dell'acqua.**
Il risultato dei due cicli sarà la costruzione del primo iconografico che collega l'uso dell'acqua al percorso idrico.

- 2) **THE WATER JOURNEY:** We reflect upon the **hydrological cycle** and on the changes of the water state that occurs in nature as one of the most important phenomena for the presence of life, both animal and vegetable, on our planet. Consequently, we explore **the anthropic water cycle**, following the track - **where the tap water comes from?** We use **concrete data and geographic maps** concerning our territory elaborated and proposed by ERSA and CAFC. The connections between **the data collected on the water cycle and the conceptual maps relating to the use of the water are created.**

The result of the two cycles will be the construction of the first iconographic linking the water use theme with the water journey.

NOTE: See hints for organizing the work in the following [link](#).

- 3) **EVERYTHING FLOWS AND EVERYTHING TURNS BACK:** the results that the group has built during the previous cycle are used to reflect in working groups on **the impact of improper consumption of the resource** and on the effects it causes on natural ecosystems such as that of the sea and other water resources.

Reflections and conceptual maps are collected on the subject, while the trainer introduces the topic of **the depuration plant and its functioning. What is a depuration plant used for, how it is built and how does it work?** The practical laboratory is experienced during which a small depuration plant is built (teaching didactic laboratory). Bacteria microscopic view of the very very small world can be observed.

NOTE: This laboratory is also one of the **didactic playful activities that is done in the classroom before or after the guided visit proposed by the AdSWiM project** - see the guided visit leaflet.

- 4) **AQUOMETRO – “test and taste”:** l’ultimo ciclo del percorso si concentra sull’analisi e sul monitoraggio della salute della nostra acqua e del mare e di conseguenza sulla prevenzione: Quale lo stato dell’acqua che beviamo? Come si misura la qualità dell’acqua? Come è il nostro mare? Quale è la sua composizione? Ci si interroga sulle misurazioni e a cosa servono? Si osservano vari strumenti che la scienza utilizza per la misurazione e si costruisce **la seconda infografica che verrà poi collegata a cicli precedenti, come risultato del percorso.**

AQUOMETER - "test and taste": the last cycle of the course focuses on the analysis and monitoring of the health of our water and the sea and consequently on prevention: What is the state of the water we drink? How do you measure water quality? How is the quality of our sea? What is its composition? We wonder about measurements and what are they for? We observe various tools that science uses for measurement and build **the second infographic which will then be connected to previous cycles, as a result of the didactic module.**

NOTE: See ideas for the material on the [link](#) and here [OGS Trieste](#).

c) Timing and organisation

The didactic module was developed by researchers at the University of Udine, Department of Agri-Food, Environmental and Animal Sciences - DI4A, by the Municipality of Udine (UTI) and **by LaReA operators.**

The module is free and will be offered to a maximum of 15 teachers. The module will be performed in 4 afternoon meetings from 16.00 to 18.00 within the schools of Udine and in the FVG Region hall (to be agreed with the organizers) from September until December 2020.

It is proposed the provision of the course by skype connection to teachers of a school complex in **Fano (PesaroUrbino province)**: the aim is to increase the number of users while remaining in the territoriality of the consortium partners. The University could give the availability of the use of a multimedia room if there was a need. At the same time, a video tutorial (taken during the course of the module) could be made to be able to share it on Youtube channel.

d) The connections between the AdSWiM project the LaREA activities

The didactic module is part of the AdSWiM project dissemination and communication activities as per the introduction of this document.

One of the project objectives is related to raising awareness of citizens and schools. The course gives the opportunity to sensitize the teachers and classes involved to the problems and solutions that the project explores and proposes:

- investigate the topic of water resources and water consumption, the environmental impact and the presence of depuration plants and the wastewater management with both local and global attention.
- Develop a critical and proactive thought to identify concrete daily choices.
- Use effective communication methods to deepen and re-elaborate the topics treated as from project tools (infographics).

The works produced can be disseminated through the project's means of communication (the site and social media). In addition, the courses created by the classes and teachers can be presented as testimonials (best practice) during the events organized by the project in the territory of the program:

March 22 - World Water Day

April 7 - World Health Day

June 8 - World day of the sea and ocean

September 27 - World Tourism Day and at the same time linked to the world days related to climate change

The testimonials may be part of the publication dedicated to one of the scientific disclosure magazines (e.g. FOCUS JUNIOR).

The module is connected to the work of LaREA and to the free educational workshops for primary schools plan for the 2019/20 school year that ARPA FVG makes available on the theme of circular nature (period February-May 2020 and new school period September -December 2020). Multiple classes can also apply for each school. Requests for teacher training modules can only be sent to the email address: arpa@certregione.fvg.it

e) Guided visits for students and schools

The guided visits for the classes are scheduled in the months of March - April - June - September - October, in relation to the world days and must be agreed individually with the teachers and schools. A didactic leaflet will be provided.

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