

The ECOPOTENTIAL4SCHOOLS guide for teachers



A guide to accompany you through the game

The Game guide is designed to give you indications on how to use the project with your students. The project is addressed to high school students and teachers, and it consists of a series of consecutive steps leading to the final game. The project includes a number of supporting materials deepening the themes approached in the course of the game; each of them described in detail throughout this guide with indications of the **teacher's** role. If you would like to further understand the pedagogical basis and background of this project, please visit our web site.





A step-by-step guide

What is the link between schools, the game and students?

In a Europe that needs to adapt to a rapidly changing business and learning environment, it is critical for students to understand how science and technology provide the basis for the fundamental advances in education and workplace. The goal of **ECOPOTENTIAL4SCHOOLS** is to develop a new teaching approach and pedagogical strategy for learning a methodology useful in all the subjects of the scientific research, and also to realize and apply creative and innovative thinking. Today science and scientific methodologies cannot be limited to the small percentage of science students in schools, all students must understand these processes and the part they will play in their future educational paths and careers. The use of new technologies, including different types of games that go in the direction of the Problem Based Learning, will make a discipline more appealing and engaging for students of new generations. Therefore we propose a project that involves students and **teachers** giving them the opportunity to know and use new technologies and interact with each other in Europe.

Aims of the Project

ECOPOTENTIAL4SCHOOLS is an online project open to all schools in Europe. It is suitable for 10 year-old or older students. Your pupils and you will be invited to test students' skills on the scientific method and biodiversity research. **ECOPOTENTIAL4SCHOOLS** will motivate secondary school students by replicating the excitement of scientific research. The project has created an Internet-based game to develop an understanding of the research work and teach best practices. You will collaborate internationally across Europe, to build hypotheses, research and test the validity of their hypothesis, and finalize a theory based on their findings. Students will learn in a fun and engaging way the logical thinking and deductive reasoning, a core skill required not only in science, but also in all their futures activities The project aims at:



For students	promoting the knowledge of fundamental ecosystems as European
	transitional waters
	motivating young people towards research and enhancing their ability to
	realize creative thinking, apply test and hypothesis, get confidence and
	practicality, and develop research projects as a valuable tool for their
	future careers
	helping young people to acquire the basic life-skills and competences
	necessary for their own personal development and future employment
	opportunities
	helping the promotion of creativity and competitiveness in the working
	environment.
For teachers	supporting European teachers to use these proposed innovative
	approaches to set up a research work
	supporting the development of innovative ICT-based contents, services,
	pedagogies and practices for lifelong learning
	improving the volume of partnerships among schools in different Member
	States



Why playing ECOPOTENTIAL4SCHOOLS and learning about European Wetlands?

During the first and second game level, **ECOPOTENTIAL4SCHOOLS** promote the knowledge of the geography and ecology of these environments. The informative material about this part of the game can be downloaded <u>here</u>. Playing the games proposed by the project, your students will improve their knowledge concerning biodiversity and geography of European Wetlands. Wetlands are a diverse array of dynamic ecosystems formed in the contact of land and water. They have long been considered unproductive and unhealthy places, and only recently it has been realized their importance for the conservation of biodiversity and for the ecosystem services they provide. Public awareness is fundamental to conserve properly and gain the maximal benefit from these environments. The **ECOPOTENTIAL4SCHOOLS** game promotes this concept by referring to some of the most important Protected European Transitional Water Ecosystems: The Camargue Biosphere Reserve, the Curonian Lagoon, the Doñana National Park, the Danube Delta Biosphere Reserve and the Wadden Sea.

Why playing ECOPOTENTIAL4SCHOOLS and learning about the scientific method?

During the third game level, **ECOPOTENTIAL4SCHOOLS** promote the knowledge of science and the scientific method. The informative material about this part of the game can be accessed here. Why do young people need science and the scientific method in their life?

- Do they take pills?
- Do they use a mobile?
- Do they surf on the Internet?

All these normal, everyday activities are based on the scientific method and research, the basis of science. Even simple everyday things needs science for their development and manufacture. Today and tomorrow, young people will use the scientific method and its analytical structure for their education and careers. In this context **ECOPOTENTIAL4SCHOOLS** represents an opportunity for young people to learn more about the scientific method.

ECOPOTENTIAL4SCHOOLS students to find out how to do a lot of the things summarized in the *learning outcomes:*

- develop an understanding of scientific methodologies
 - improving clarity about different stages of problem solving



- developing an understanding of how to formulate hypotheses, identify relevant variables, collect and analyse data, interpret findings
- stimulating, inspiring and enhancing their motivation to undertake research projects and apply the scientific methodology
- developing their ability to deal with uncertainty
- develop skills and competencies in a wide range of environmental research domains
 - improving students' awareness and knowledge of biodiversity
 - becoming active citizens and stewards of the environment
- make learning more engaging and relevant to young people
 - o developing logical reasoning and critical thinking skills
 - o developing transversal competencies
 - providing opportunities for informal learning through game playing activities
 - promoting the use of the Internet and information technologies
- provide challenge and the opportunity to communicate with students from all over Europe
 - o developing logical reasoning and critical thinking skills
 - connecting local investigations to global issues.

What will happen during the game?

ECOPOTENTIAL4SCHOOLS includes three main levels and can be played either as part of the curriculum, or as an extra-scholastic activity. During the first and second game level, **ECOPOTENTIAL4SCHOOLS** promote the knowledge of the geography and ecology of these environments. The informative material about this part of the game can be downloaded <u>here</u>. During the third game level, **ECOPOTENTIAL4SCHOOLS** promote the knowledge of science and the scientific method. The informative material about this part of the game can be accessed <u>here</u>.

The fundamentals of the game are:

- 1. students' autonomy
- 2. use of English, or other common languages, to communicate within each collaborative international group game submission languages dependent on partner language competencies
- 3. teachers as facilitators and mentors ONLY
- 4. students as key actors of the game learning by doing
- 5. structured appropriate documentation for students and teachers



Pathways of learning

Starting from the training sessions, **teachers** will discuss with the components of their teams the learning approach to the game, having the open option to acquire information about the topic of the game and the methodology from the project web site, where they will find specific sections dedicated to these aspects.

The '*learning by doing and cooperative learning*' is in itself a self-training session for the teams and has to be intended as a preparation for the final game. However this phase will be included in the overall evaluation. Although schools from all countries will be invited to participate to this phase, this will be consider a facultative session of the game. Teams will not be required to compulsory run any *learning by doing* session to be admitted to the final online competition.

In this session, the *cooperative learning* method is part of the active learning methodologies, based on the positive interdependence between group members. It is useful to underline that the cooperative method is an experiential and motivating educational approach, able to value the different intelligences and learning approaches of the groups' members.





Step 0-step 3: students need to learn about the subject and collect information about the research topic from provided material, book, scientific papers, web.

Step 4-step 5: students make a general question about the topic, interacting with other students.





Step 0: students can read on the scientific methodology in order to learn more (see project website).

Step 1: students make the scientific hypothesis, null and alternative hypotheses, about the research topic.

Step 2: students test the scientific hypothesis and have to know how much information is necessary to test it.

Step 3: students organize the experimental plan on the research work fixing each point to set up.

Step 4: it is time to go to the field and collect data following the steps decided in the experimental plan.

Step 5-6: students organize their data in order to perform a simple statistical analysis. At the end of this step, they will get one or more products of their work.



The final competition

The online competition has been designed to be quite demanding and each team has to collaboratively answer to get to the final score. The first two levels of the game are dedicated to the knowledge of the geography and ecology of European Wetlands The third level fulfills aspects of the proposal and serves to consolidate the basics of the scientific method referring to biodiversity.

During <u>the online competition</u>, each team has to cover a set of minigames which different objectives to be reached. A maximum of 90 points over 100 can be scored in this phase. The remaining 10 points may be scored exclusively by joining the 'Bonus phase' (see next section).

The competition will be on May 8th, 2018 and remain open for a certain amount of time, starting at 10 a.m. CET

Each team can earn a bonus at the end of each minigame (the minigame is a single path of exercises included in the game) depending on the time spent to accomplish each objective. Once a team starts the final competition it has to play it until its end. No breaks are allowed. Only the teams concluding the game will be included in the final rank At the end of the game the team with the highest score will be declared winner. The teams classified in the first, second and third positions receive a cup and a diploma. The scientific committee reserves the right to attribute special prizes taking into account the results produced by the teams. A certificate of participation will be given to all participants. The products of the winners will be published on the projects web site



Bonus Phase: Learning by doing

Starting from the training sessions, **teachers** will discuss with the components of their teams the learning approach to the game, having the open option to acquire information about the topic of the game and the methodology from the project web site, where they will find specific sections dedicated to these aspects. In this session, the cooperative learning method is part of the active learning methodologies, based on the positive interdependence between group members. It is useful to underline that the cooperative method is an experiential and motivating educational approach, able to value the different intelligences and learning approaches of the groups' members.

During the *Bonus Phase* each team in the schools will carry out simple experiments about the biodiversity following the schematic steps suggested by the project team in this guide. These may be field or laboratory experiments, as well as desk experiments, run on computers using available experiments and data. The teams will then enter their work results onto the **ECOPOTENTIAL4SCHOOLS** website and share the products of the own research work (e.g., video, paper, report). Teams will also be invited to review and evaluate the reports submitted by the other teams, highlighting limits in the methodology used and in the consistency of the results presented and the conclusions drawn on that basis.All required information/videos/documentation will be included within the game itself and all pre-required information to play the game will be made available on the project's platform. The *Bouns phase* must include the following stages:

- activities
- compare & report
- the "what I have learnt" game

The results of the Bonus phase may be presented alternatively as:

- a video record of their activities together with the conclusions they reached this includes some field research conclusions. The focus here is on presenting and promoting their idea and research with a maximum length of 3 minutes. The video will be published on youtube and linked to the platform.
- a two pages summary including their research goals and findings (students will find a template to prepare it).
- a poster on the results of the research project and the conclusions reached during their work (students will find a template to prepare it).
- A 15 slides presentation of the research project and the conclusions reached during their work (students will find a template to prepare it).

The final product of all activities will be delivered within 30th of April 2018. Each team has to publish the products (i.e., papers and videos) of their 'research project' on the dedicated area, the '*team wiki area*' for evaluation. The products of each team are evaluated both by a scientific committee and the other teams. The scientific committee attributes a score to the products of each team, ranging from a minimum of 0 to a maximum of 10. The evaluation rules of the products will



be based on a specific matrix and focus on the process followed, rather than on the accuracy of results. The Bonus phase is not mandatory to join the competition, but it allows to gain extra 10 points that may be crucial to determine the final winner!