

The MEDCIS scientific game guide for teachers

MEDCIS GAME – Motivating Secondary School Students To Learn
Research Methodology In Science



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SUPPORT MEDITERRANEAN MEMBER STATES TOWARDS COHERENT
AND COORDINATED IMPLEMENTATION OF THE SECOND PHASE OF THE MSFD

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 10 year-old or older 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.



A step-by-step guide

1. INTRODUCTION

1.1 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 the MEDCIS GAME 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.

1.2 Aims of the Project

What is the MEDCIS GAME?

The MEDCIS scientific game 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.

The MEDCIS game project will motivate students by replicating the excitement of scientific research. The Project will create an Internet-based game to develop an understanding of the research work and teach best practices.

Why to participate?

Playing the game proposed by the project, your students will improve their knowledge concerning the scientific way to study the reality around them, particularly biodiversity and other topics. By 'doing' these activities, students will become able to plan on their own new

exciting ecological researches. Moreover, students will participate in a big final competition with other European schools!

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.

What is the MEDCIS Game's aim?

The project aims at:

FOR STUDENTS	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

1.3 Why playing the MEDCIS Game and learning the scientific method?

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 need 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 the MEDCIS Game represents an opportunity for young people to learn more about the scientific method.

The Game has been conceived for secondary school students and will show how the scientific method is the system that all those who want to develop an effective and productive education and career need to understand. Without the scientific method, and its way of thinking, it is hard to progress in the modern world.

Moreover, the MEDCIS Game allows 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 on Marine Strategy Framework Directive (MSFD).
 - becoming active citizens and stewards of the environment
- make learning more engaging and relevant to young people
 - developing logical reasoning and critical thinking skills
 - 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
 - developing logical reasoning and critical thinking skills
 - connecting local investigations to global issues.

The game will challenge students to complete a scientific research on Marine Strategy Framework Directive (MSFD). Studying the Directive your pupils can learn more about the marine biodiversity, the marine litter, the noise.

1.4 What will happen during the project?

The MEDCIS Game includes three main steps and can be played either as part of the curriculum, or as an extra-scholastic activity. It includes:

- a) training components, with entry-level materials available on the project website and tools for deepening their knowledge
- b) self-training sessions, to practise and earn points in the game, designed on the basis of a *learning by doing and cooperative learning* approach
- c) a final competition played through an online game.

The fundamentals of the game are:

1. students' autonomy
 2. use of English, or other common languages, to communicate within each collaborative international.
 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:
3. game templates.

2. A quick guide to the MEDCIS Game

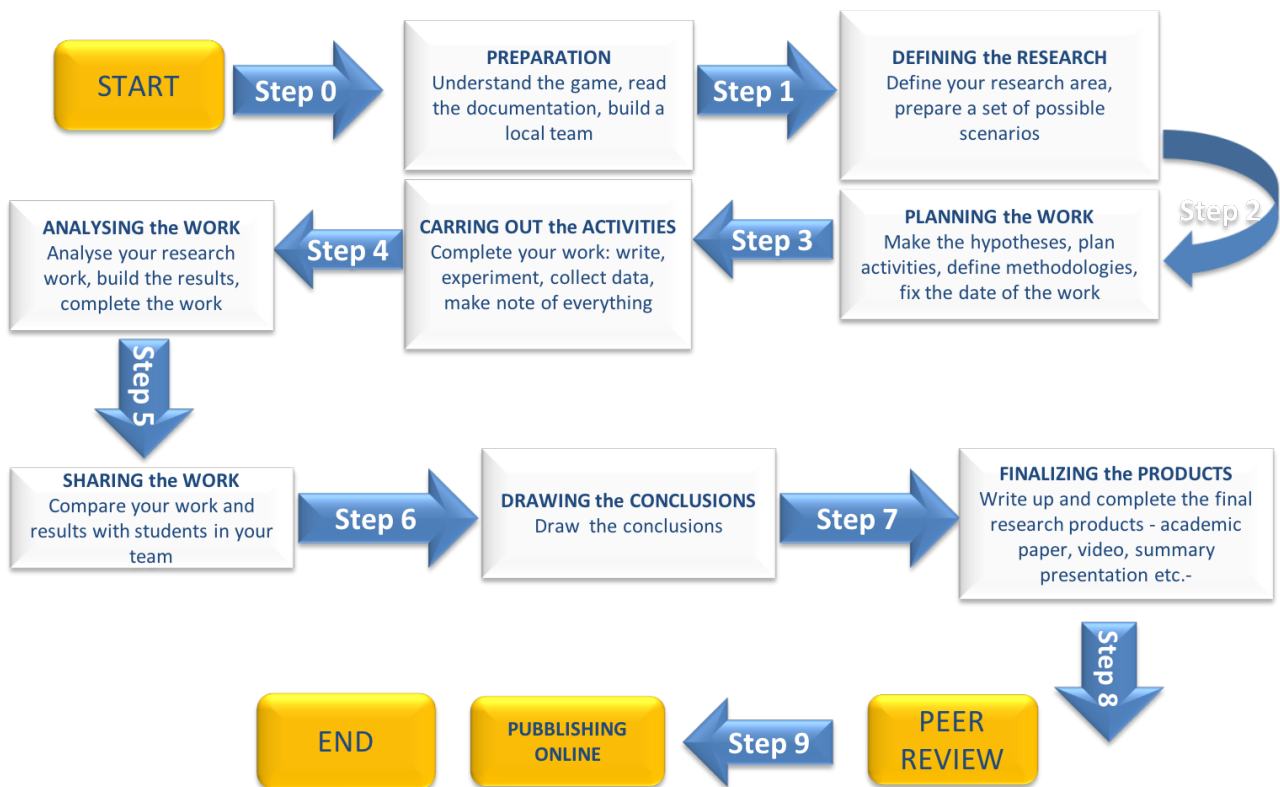
2.1 Training components

Should you want to know more about the *training components* aspects, different types of material about the general characteristics of the project and background documents also on the scientific method will be available on the project web site.

2.2 Learning by doing and cooperative learning

The activities that **teachers** and students have to perform during the '*learning by doing and cooperative learning*' phase have been summarized in the following scheme.

THE 'MEDCIS' GAME Phase 1 - *step by step*



❖ '*Learning by doing and cooperative learning*' description

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.

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.

However, teams who had run the *learning* session will keep their scores when entering the final online competition.

During the *learning* session each team in the schools will carry out simple experiments about the proposed topics (for example, 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 MEDCIS Game project website and share the products of the own research work (e.g., video, paper, report). The teams' activities, including the experimental work done, the report and the review work on other teams' reports, will be evaluated by an Awarding Commission.

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. More information about the publication of the final product of each team will be available on the platform.

The results of the students' work will be presented as:

- a. video records, power point presentation of the work and the reached conclusions - including field research/ conclusions. In the video (a very student friendly medium) students will be presenting their idea and research approach.
- b. 'one or two page summary' reporting their findings in a more structured and official way.

2.3 The final competition

The online competition will be actually composed by different levels, each one asking different questions to the players with an increasing degree of difficulty. All levels will address aspects of the scientific research methodology on the project topics that are expected to be have been treated by the teams in the training and self-training preparatory sessions.

Each team has to play collaboratively in order to get a high score. The competition will be performed on 4th May 2018.

The points earned in the learning by doing session and in the final online competition will determine the overall score of each team.

How getting scores

There will be two ways to get scores in the game: a self-training session, the so called *learning by doing*, during which all teams are encouraged to develop a complete research activity to learn and understand all aspects of the scientific method through direct experience. Then the online competition, in which teams will have to face simulating research activities showing that they have understood the scientific method and have been able to apply it in a correct way to the case that they encounter in the online game. **Teachers** will have a key role mainly in the self-training session, encouraging the teams to develop their researches, stimulating teams to discuss on all points and aspects of their researches and participating as senior scientists to these discussions.

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