PREPARING THE INVESTIGATION: THE IN-CLASSROOM GAME SETUP.

INTRODUCTION

You have in your hands “Flut Island”, the board game from the European project LocAll4Flood.

This project addresses the urgent need to improve resilience and preparedness for flash floods, one of the most devastating and increasingly frequent natural hazards in the Mediterranean.

The objective is to translate complex scientific data into a meaningful learning experience through play.

It turns your students into a team of environmental investigators. The game’s narrative is as follows: after a catastrophic storm in various zones on the fictional *Flut Island*, their mission is to analyse what went wrong (post-disaster analysis) and what worked.

By solving puzzles, students will work hands-on with:

- The interpretation of flood zone maps.
- The analysis of the cause-effect relationship between urban planning, geography, nature, land use, and the catastrophic consequences associated with flash floods.
- Critical thinking and team-based decision-making.
- Climate awareness (SDGs 11 and 13) and Nature-Based Solutions (NBS).

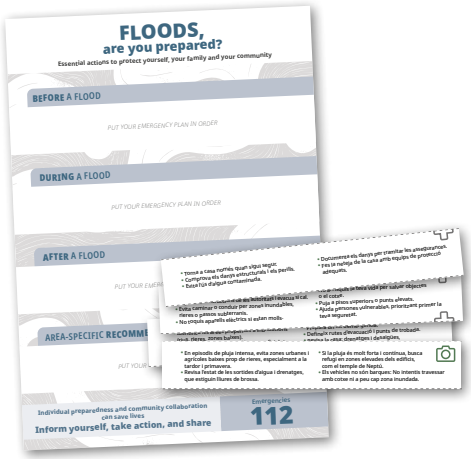
This is a “Print & Play” game, designed so you can easily print all the material, distribute it in the classroom, and play. Organisation is key to the investigation’s success! First, you must divide the students into 6 teams; each will be responsible for investigating a specific region of Flut Island.

Of the 6 zones, you should bear in mind that regions 1 and 6 are slightly more complex, so you can assign them to teams with greater reasoning and analysis skills.

NECESSARY MATERIALS

The materials needed to carry out the activity are described below. All of them are designed to be printed on A4 sheets and cut out.

There are two exceptions. Firstly, this guide, which does not need to be printed and can be consulted digitally, is intended solely for teachers; and secondly, the general map of the island, which can be printed on A3 or two A4 sheets.



Game Pack 1

Game Pack 2

Game Pack 3

- **Game guide:** You have it in your hands; it is aimed at teachers. It includes the game solutions.
- **Map of Flut Island:** 1 single copy. A3 format or 2 A4s to assemble.
- **Flut Island tourist brochure:** 1 A4 copy per team, optional but recommended for immersion in the activity.
- **The player's solution sheet:** this is the template where teams can note the information gathered, register progress, write partial codes, or formulate hypotheses. You must print one per zone, so each team has its corresponding one.
- **Game Pack 1 – Get Organised:**
  - "Are you prepared?" sheet, one per team. 6 copies on A4.
  - Set of 4 action cards per zone, one set per team. 6 cut-out copies on A4.
- **Game Pack 2 – Valid Claim?**:
  - Set of 3 claims, one per team. 18 cut-out claims on A5.
- **Game Pack 3 – Risk in Coordinates:**
  - Flood zone map, one per team. 1 copy, cut-out into six parts.
  - Coordinates sheet, one per team. 1 copy, cut-out into six parts.

Game Pack 4

Game Pack 5

- **Game Pack 4 – Tempus Fugit:**
  - Set of Polaroid-style photos, three per team. 2 cut-out A4 sheets with 9 photos each.
  - Land typology sheet, one per team. 6 copies on A4.
- **Game Pack 5 – Secret NBS:**
  - Set with 10 notes on NBS. 5 cut-out sheets on A5.
  - 3 newspaper pages, 1 set per team.

All documents are to be printed in A4 format (the map is optionally A3, as mentioned) and will mostly need to be cut out. Colour printing is recommended for a better experience.

Recommended auxiliary materials:

- **Scissors and glue/adhesive tape:** To cut out and assemble some elements.
- **Pencils, pens, and blue markers:** For taking notes and painting maps.
- **Access to a clock or stopwatch (optional):** If you want to test your mental speed.

SESSION PREPARATION

Before the class, it is recommended that teachers prepare the materials. Specifically:

- You must print all the materials.
- You must cut out the materials that indicate it (this can also be a task for each team to do at the beginning).

- Organise each team's material according to the region they belong to (easily identifiable by the colour code). You can hand them out using a folder or envelope, or leave them directly on the tables. It is recommended to organise the materials for each region by game.
- The common materials should be hung on the classroom walls. They must be visible as students will need to consult them. These materials are:
  - General map of the island
  - 10 informational notes about NBS

In the classroom, you should proceed as follows:

Divide the class into 6 teams.

Give each team their region's materials, a tourist brochure, and a solution sheet.

Contextualise the mission: "You are a team of experts (geologists, geographers, engineers, biologists) sent to Flut Island after a terrible flood. Your packet of documents corresponds to a specific zone on the island. You must find out why the disaster was so severe in this territory and what, if anything, worked."

Once all materials are printed, distributed by team, and the mission is explained, they can begin the investigation. They can proceed in any order they wish, although this game guide may suggest a path.

THE INVESTIGATION BEGINS: HOW TO PLAY

The session is divided into two parts:

- **Part 1: The Investigation (approximately 20 minutes).** Here, students conduct the investigation, analyse the documentation, solve the puzzles and challenges for their zone, and obtain the different symbols. At the end, they must arrange them to form the correct symbol chain, concluding their investigation.
- **Part 2: Debrief, solution reveal and connection to the real zones, analysis of learning (approximately 30 minutes).** At this point, the investigation results are checked, and an analysis is done on what happened in each territory, the main causes of the disaster (e.g., building in a flood zone, lack of vegetation, poorly designed bridges), and the solutions that can be applied. This is where it is revealed what each fictional zone corresponds to in reality, and a reflection on the learning acquired takes place.

PART 1. THE INVESTIGATION. DETAILED EXPLANATION FOR THE TEACHER.

Here, the main objective for each team is to solve all the investigations and cases distributed throughout the island's territories to assess which measures failed and what worked. As the investigation progresses, they will need to collect and link key information that will allow them to discover a final code. This code will reveal the real location in Europe that inspired the territory each team is investigating, closing the experience with a significant and contextualised revelation.

The game unfolds through a combination of investigation and deduction mechanics. Each team will have to read and understand the materials carefully, analyse visual and textual information, classify data, link them logically, and solve content-based puzzles.

Game phases:

1. Introduction and contextualisation phase: presentation of the general narrative and the island's situation after the storm. Each investigator delves into their territory to understand the context.

2. Resolution and investigation phase: detailed analysis of the material. Comprehension reading and selection of relevant information. Progressive resolution of the challenges and puzzles.

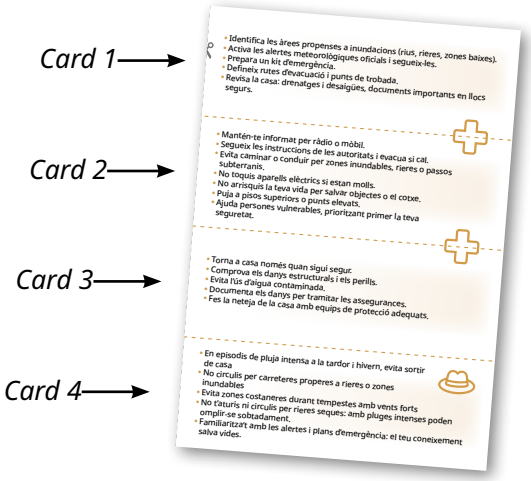
3. Synthesis and discovery phase: collection of the obtained symbols. Analysis of the final code and its resolution, revealing the real place that inspired the territory.

The challenges awaiting you and how to solve them (for the teacher's eyes only!)

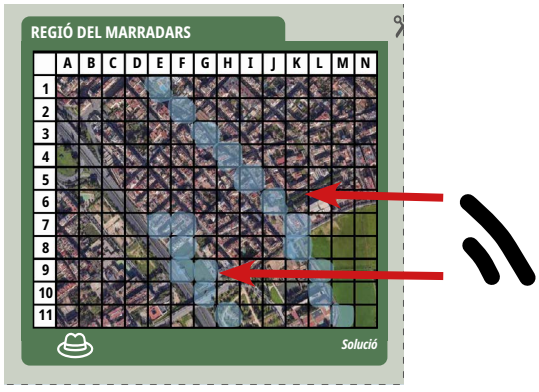
Each territory will present you with a set of specific games, designed to test your skills and knowledge about flood risk management. Here is a brief description and how to solve them:

GAME 1. Get organised in the emergency plan: in this challenge, you will have to decipher and organise the best way to act before, during, and after a flood, including specific recommendations for each zone. This is fundamental to understanding preparedness and response to these phenomena.

- **Solution:**
  - Card 1: The one starting with "Identify areas prone to..."
  - Card 2: The one starting with "Stay informed..."
  - Card 3: The one starting with "Return home..."
  - Card 4: The one corresponding to each specific zone



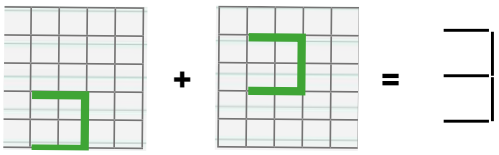
- **GAME 2. Valid claim?:** You will analyse different post-flood situations to distinguish between real, unavoidable accidents and negligence that could have been avoided. Your ability to discern responsibility will be key.
  - **Solution:** Of the three claims, there is one that is completely absurd as negligence has occurred on the part of the claimant.
- **GAME 3. Risk in coordinates:** you will delve into interpreting flood zone maps for different return periods, and their impact on urban and industrial areas. Through logic and observation, you will identify which zones would be compromised.
  - **Solution:** The squares on the map that match the coordinates on the note must be coloured in. The resulting shape reveals the correct icon.



- **4. Tempus fugit:** here you will investigate the speed at which a flood occurs and how the water level rises, considering the territory's configuration. You will analyse how the land type influences the hydraulic behaviour.
  - **Solution:** The times and the land typology must be compared with the chart to find the correct situation (and code).

- **GAME 5. The secret NBS:** Look for the news article from your region. You will face a scenario after a major flood where one part of the territory has resisted better than expected. Your task will be to investigate and discover which Nature-Based Solution (NBS) was implemented and managed to reduce the devastating impact.
  - **Solution:** By correctly analysing the news article, they must figure out how many and which NBS were used. Each NBS has an assigned symbol that can be combined with the others to eventually form a number. The number indicates the code for that region.

• Example of Kirkibara's solution:



Important note:

The games for the Marradars and Mount Makchia regions are slightly more difficult than the others. It is recommended to assign these regions to students who are more eager to work or have a higher performance level than the rest.

PART 2. DEBRIEF AND RESOLUTION. DETAILED EXPLANATION FOR THE TEACHER.

Here, each team must have selected a spokesperson, who will briefly explain how they understood their zone, its problems, possible solutions, and what final solution code they obtained. Each team's solution will be validated, and an investigation into where they might have gone wrong will be conducted if necessary.

To validate the result, the players' 5-symbol chain will be compared with the solution. A perfect match indicates a perfect resolution. Each incorrect symbol means one game was solved incorrectly.

At this point, each team should be congratulated on their results and told that Flut Island is not 100% fictional: each investigated territory is based on a real pilot site from the LocAll4Flood project in Europe, with very similar flooding problems.

SOLUTION CHAIN FOR EACH ZONE:

	Get Organised Game 1	Valid Claim? Game 2	Risk in Coordinates Game 3	Tempus Fugit Game 4	Secret NBS Game 5
The Marradars region					
Saint Joan de Kirkibara					
The Pulairab region					
The Poligolad region					
Bigurvy					
Mount Makchia					

THE SECRET REVEALED!

Below we reveal the connection between the fictional regions of Flut Island and reality. You might have already deduced some, either because you recognised an image or because the zone's name suggested it:

Team / Fictional Zone	Corresponding Real Zone	Real Risk Context
Zone 1: Marradars Region	Burmarrad (Malta) and the Torrent Gros & Torrent de Na Bàrbara area (Balearic Islands)	These areas have agricultural valleys (like the terraces in the brochure) that suffer very rapid **flash floods** when intense rains saturate the soils and small streams.
Zone 2: Sant Joan de Kirkibara (Capital)	Birkirkara (Malta)	It is one of the largest and most populated cities in Malta, located in a **natural valley *(impluvium).*** High urbanisation has waterproofed the ground, and during heavy rains, the streets literally turn into rivers.
Zone 3: Pulairab Region	Bari (Italy)	Bari is a large coastal city. Its risk comes from the ""lame"", ancient **dry riverbeds** that cross the city. These beds, often built upon, flood violently and suddenly during intense storms.
Zone 4: Poligolad Region	Dalgopol (Bulgaria)	This area (as the brochure suggests) is marked by **rivers and reservoirs** (like the Tsonevo, near the Kamchia river). The risk here is fluvial: river overflow and dam management during extreme rainfall.
Zone 5: Town and environs of Bigurvy	Gurb and the Plana de Vic (Catalonia)	This area is a wide **river plain** (the Plana de Vic), crossed by the Gurri river. The risk is the river overflowing (fluvial flooding) which affects agricultural and industrial areas near the riverbed.
Zone 6: Mount Makchia	Anthemountas Basin (Greece) and Kamchia-Varna Area (Bulgaria)	This is a ""sea and mountain"" territory. It combines the risk of **very fast-responding catchments** (Anthemountas basin) with that of floodplains from a large coastal river (Kamchia estuary).

You can see all this in this video:

PEDAGOGICAL OBJECTIVES: BEYOND THE GAME

The clear educational objective of the Flut Island game is to raise awareness about the environmental and human impact of extreme climate phenomena. Its purpose is for the students, divided into cooperative teams, to take on the role of investigators to analyse the causes of a flood disaster after it has occurred.

By solving puzzles based on risk maps, reports, and Nature-Based Solutions (NBS), students develop critical thinking and STEM competency. They thus acquire the ability to interpret maps, understand concepts like flash floods, early warnings, and value nature-based strategies (NBS) as resilience tools.

Classroom Implementation

- **Target audience:** The game is primarily designed for students in educational institutions, especially at secondary school levels, third and fourth years.
- **Modality:** It is a team-based game, where each team is responsible for investigating one territory of the island.
- **Implementation:** The document details the game's implementation in two sessions:
  - **Phase 1:** Investigation. Introduction to the context, team organisation, and resolution of the puzzles for the assigned territory.
  - **Phase 2:** Debrief. Presentation of conclusions by each team, validation of results, and wrap-up.
- **Materials:** The teacher has all the necessary materials (Print & Play modality), these preparation instructions, and the solution key to validate the results.
- **The high point:** The activity concludes when the teacher connects the island's fictional territories with the real pilot sites of the LocAll-4Flood project (Malta, Italy, Bulgaria, Greece, Balearic Islands and Catalonia), consolidating the learning about real flood risks in Europe.

PEDAGOGICAL JUSTIFICATION: SUSTAINABLE DEVELOPMENT GOALS (SDGS)

The game aligns directly with several SDGs of the 2030 Agenda, providing a practical context for working on global citizenship:

- **SDG 11: Sustainable cities and communities.** The objective of the LocAll4Flood project is to improve the management of flash floods. The game teaches students the importance of urban resilience, territorial planning, and disaster risk management.
- **SDG 13: Climate action.** The game is a tool for climate literacy. It raises awareness about the impact of extreme weather events, encourages reflection on climate change, and presents adaptation strategies like Nature-Based Solutions (NBS).
- **SDG 4: Quality education.** Beyond the thematic content, the game promotes critical thinking, data analysis, and collaborative work—essential skills for a comprehensive education.

CURRICULAR INTEGRATION

Flut Island is a cross-curricular tool that can be integrated into various subjects in the curriculum:

- **Social Sciences, Geography and History:**
  - Interpretation of flood zone maps and orthophoto maps (part of the "Risk in Coordinates" challenge).
  - Analysis of the interaction between human action (urban planning, industry) and the natural environment.
  - Understanding of natural hazards and territorial management.
- **Biology and Geology (Natural Sciences):**
  - Understanding of the hydrological cycle and catchment concepts ("Tempus Fugit" challenge).
  - Identification of Nature-Based Solutions (NBS) as sustainable strategies ("The Secret NBS" challenge).
  - Reflection on the impact of climate change on ecosystems.
- **Technology:**
  - Understanding the impact of infrastructure (bridges, reservoirs, industrial zones) on water management.
  - Analysis of the effect of soil sealing in urban areas ("Tempus Fugit" challenge).
- **Ethical Values / Tutor Time:**
  - Fostering collaborative work and team-based decision-making.
  - Debate on human responsibility and negligence in the face of risks ("Valid Claim..." challenge).

DEVELOPMENT OF KEY COMPETENCIES

The game's structure, based on problem-solving, directly enhances students' key competencies:

- Competence in science and technology (STEM): Players apply the scientific method (observation, hypothesis, validation) to solve the puzzles. They acquire knowledge about meteorological (flash floods), hydrological, and ecological (NBS) concepts.
- Linguistic communication competence: Students must read, interpret, and synthesise information from multiple sources (maps, texts, images) and communicate their findings to the rest of the class.
- Personal, social and learning to learn competence: In the classroom modality, success depends on collaboration and communication within the team. Students learn to organise themselves, manage information, solve problems autonomously, and develop deductive reasoning.
- Civic competence: This is the pedagogical core of the game. The ultimate goal is to sensitise and make students aware of the dangers of floods and their role as informed and resilient citizens in the face of the climate emergency.

We hope this guide is useful for implementing Flut Island in your classrooms and fostering a culture of prevention. Furthermore, we inform you that the complementary digital game for Flut Island is also available, focusing on real-time decision-making during an episode of heavy rain and flash floods.

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