

Educational Kit: Reunion Island Facing the Climate Crisis (2050)

General Information	Details
Level	High School (Grade 10, Grade 11) / Linguistic Level B1+ (English)
Estimated Duration	4 to 6 hours of group work (flexible based on chosen steps)
Main Objective	Study coastal risks linked to climate change in Reunion Island (cyclones, submersion, acidification) through a prospective geographical and historical approach.
Format	Work in Groups of 4 (ideally 1 group per scenario, or rotation through scenarios)
Final Submission	Digital Production (Emergency Map, Infographic, Press Kit)

I. Learning Objectives and Skills (Skills & Learning Outcomes)

Category	Learning Aims	Developed Skills
Geography / Climate	Understand the relationship between climate change and the amplification of extreme coastal risks (cyclones, swells, submersion).	Spatial Analysis: Interpret risk maps (PPRL), locate key stakes/issues.
Prospective / Planning	Adopt a prospective approach to develop adaptation strategies (e.g., Strategic Retreat) and future scenarios (Inaction vs. Adaptation).	Critical Thinking: Evaluate the impact of inaction and propose concrete solutions.
History / Resilience	Compare past risk management (historical cyclones) with current challenges, to understand the concept of resilience.	Documentary Research: Use archives and official sources (Météo-France, DEAL).
Digital / Communication	Master simple ICT tools for research, data analysis, and the production of professional documents (maps, infographics, reports).	Multimedia Communication: Create visual and structured submissions (Canva, Slides, Scribble Maps).

II. Essential Vocabulary (B1/B2 Vocabulary Checklist)

This is the technical vocabulary students must correctly mobilize in their productions.

Category	Key Terms (English)	Key Terms (French)
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Risks and Threats	Cyclone / Hurricane, Swell / Ocean Surge, Marine Submersion , Coastal Erosion , Sea-Level Rise, Coastal Hazards.	Cyclone / Ouragan, Houle , Submersion Marine , Érosion Côtière , Élévation du niveau de la mer, Aléas côtiers.
Biology and Ocean	Acidification , Coral Bleaching, Marine Fauna, Ecosystem, Pollution, Heat Stress.	Acidification , Blanchissement des coraux, Faune Marine, Écosystème, Pollution, Stress thermique.
Planning and Solutions	Resilience , Adaptation , Hard Protection (sea wall, dyke), Strategic Retreat , Buffer Zone, Infrastructure, Vulnerability.	Résilience , Adaptation , Protection en dur (digue, mur), Recul Stratégique , Zone Tampon, Infrastructure, Vulnérabilité.
Cartography	Map Legend, Hatching, Stakes / Issues, "Red Zone", Cartographic Symbol, North Arrow.	Légende de la carte, Hachures, Enjeux, "Zone Rouge", Symbole cartographique, Flèche du Nord.

III. Detailed Scenario Breakdown

Groups work in parallel or in rotation, with each scenario having a specific expert role.

Scenario 1: The Geographer (The 2050 Emergency Map)

Role	Planning Geographer
Operational Objective	Create an Emergency Map for a coastal area, distinguishing Threats (Inaction Scenario) and Solutions (Adaptation Scenario).
Key Steps	1. Analysis of risk maps (PPRL) and identification of key stakes/issues (roads, ports). 2. Production of the digital sketch (Threats/Warm Colors; Solutions/Cool Colors).
Recommended ICT Tools	Scribble Maps (Annotation), Lucidchart/Draw.io (Sketch), GeoPortail (Spatial analysis).

Scenario 2: The Journalist-Historian (Storm Archives)

Role	Investigative Journalist (History & Climate)
Operational Objective	Produce a Shock Press Kit that shows how the history of cyclones in Reunion Island is different from the current climate crisis.
Key Steps	1. Research on a historical cyclone (e.g., Firinga 1989): damage and resilience. 2. Creation of a Timeline to visualize lessons from the past.
Recommended ICT Tools	Timeline JS (Chronological Timeline), Pearltrees/Padlet (Source organization), Google Slides (Visual Report).

Scenario 3: The Biologist (Red Alert – Marine Fauna)

Role	Marine Biology Expert
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Operational Objective	Create an Alert Infographic to explain the unprecedented threat of climate change to marine fauna (coral or marine turtles).
Key Steps	1. Simple scientific research: explain the double threat (heat + acidification/pollution) to the chosen ecosystem. 2. Synthesis of data into a poster format.
Recommended ICT Tools	Canva / Genially (Design Infographic), Diigo (Collaborative annotation on scientific articles).

Scenario 4: The Coastal Geographer (Red Alert – Coastal Development)

Role	Coastal Risk and Planning Expert
Operational Objective	Create an Alert Infographic focusing on an amplified coastal threat (Submersion OR Erosion) and its concrete impact on a major development.
Key Steps	1. Choose one threat (Submersion or Erosion). 2. Choose one development (Littoral Road, Lagoon, or Housing). 3. Explain the mechanism of destruction and the socio-economic impact.
Recommended ICT Tools	Canva / Genially (Design Infographic), Google Earth (3D Visualization of the threatened development).

IV. Assessment Criteria (Assessment Checklist)

The evaluation should focus on content mastery (analysis), production quality (form), and the use of technical vocabulary.

Criterion	Description	Weight
Analysis and Content	Facts are accurate, the analysis of risks (past/future) is correct, and proposed solutions are relevant.	High
Vocabulary Mastery	Correct use of technical vocabulary (acidification, submersion, resilience, strategic retreat, etc.).	Medium
Final Submission Quality	The document (Map / Infographic / Report) is clear, structured, readable, and respects layout instructions (complete legend, clear titles, etc.).	Medium
Use of ICT Tools	The chosen digital tool was used appropriately to enhance the quality of the production.	Low

THE ACTIVITIES

Scenario 1: Reunion Island Facing Extreme Hazards in 2050

Your Objective: You are a High School **Geographers**. Your mission is to prepare the island for a future where cyclones and swells are more powerful. You must create the **2050 Emergency Map** for a coastal area to show the dangers if nothing is done, and the immediate solutions to put in place.

You must produce a Digital Emergency Map for a coastal zone you have analyzed, to show the dangers if nothing is done ("Inaction" Scenario) and the development solutions to implement immediately ("Adaptation" Scenario).

STEP 1: Become an Expert on Risks (45 minutes)

The goal is to root your scenario in the reality of the threats to Reunion Island.

The Risk News Flash:

Use the "**Reunion Risk Flash Sheet**" and the analysis documents (PPRL maps) to identify the threats.

- **Instruction 1 (Threats):** Identify and note the **two (to three) worst extreme threats** (cyclones/swells/erosion) that will hit the coast in 2050, caused by climate change.

- **Instruction 2 (Stakes):** List two (to three) essential elements (roads, ports, homes, leisure areas) that are located in this maximum risk zone and that would be destroyed or unusable during a very intense cyclone in 2050.

STEP 2: Create your "Threats and Solutions" Map (1h45)

Digital Tool: Use a simple drawing tool (Google Drawings, Canva, Lucidchart, Scribble Maps) to create your sketch.

1. "Inaction" Scenario: The Damage of 2050 (Warm Colors)

Draw the state of the coast after a major storm if no anticipation has been made.

Element to Draw	Cartographic Symbol	Meaning
Flooded Area	Dark Blue Hatching	Area submerged by the sea during a cyclone.
Eroded Area	Red Hatching	Beaches and land destroyed by waves.
Destroyed Area	Black Symbol / Black Cross	Essential infrastructure made unusable (e.g., road cut off).

2. "Adaptation" Scenario: The Solutions

Add the works and brave decisions taken to protect Reunion Island in a sustainable way.

Element to Draw	Cartographic Symbol	Action / Solution
Protection Structure	Thick Green Line	New sea wall, anti-swell barrier (hard protection).
Strategic Retreat	Displaced Blue Symbol	The essential infrastructure has been rebuilt further inland.
Buffer Zone	Light Yellow Surface	Protected natural area (mangroves, reconstructed dunes) to absorb the swell.

STEP 3: The Emergency Map – Final Submission

Your sketch is now the **2050 Emergency Map**. To be validated, it must be professional and complete:

- **Precise Title:** Name of the studied area + "Extreme Threats and Adaptation Plan in 2050".
- **Organized Legend:** Clearly separate the symbols for the **Threats (Inaction)** and those for **Adaptation (Solutions)**.
- **Orientation:** North indication.

Scenario 2: INVESTIGATION MISSION: The Ocean, History, and Climate in Reunion

The Mission Briefing

Your Goal: You are a team of Journalists-Investigators specializing in History and Environment. Your mission is to produce a Shock Press Kit that serves as the basis for a report.

Your kit must convince readers that while Reunion Island has always faced storms, current climate change poses completely new challenges that threaten marine life and coastal development.

Your objective is to produce a Shock Press Kit that shows:

1. How Reunion Island has always faced storms (the past).
2. Why climate change makes the fight harder today (the future).

KIT 1: STORM ARCHIVES (Lessons from the Past)

Question to Investigate: How did the people of Reunion survive past cyclones?

Section	Investigator's Instruction	Research Lead
The Shock Event	Choose a major cyclone of the 20th century (e.g., Firinga 1989 or Jenny 1962). Find a photo or testimony from that time.	Archival newspapers, Météo-France websites, historical accounts.
The Damage	What were the two worst consequences of the cyclone on coastal facilities (ports, roads, homes)?	Focus on what connects the ocean to the land.

GROUP's Final Production

- **Task:** Create an **Interactive Timeline** or a **Visual Archive Report**.
- **ICT Tools:** Timeline JS (for a timeline) or Google Slides/PowerPoint (for a simple visual report).
- **Submission Content:** A document that traces the stages of the chosen event (Before/During/After), illustrated by archive images and commented with the research texts (Damage and Resilience).

Scenario 3: RED ALERT – The Oceans Crisis 2050 seen by the Biologist

Question to Investigate: Why is climate change an unprecedented threat to Reunion Island?

1. Marine Fauna in Danger

- **The Biological Subject:** Choose a witness to the crisis (e.g., **coral OR marine turtles** and the impact on their reproduction).
- **Research and Answer:** Explain simply and visually (use a diagram or image in your report): How do **heat AND pollution/acidification** threaten this animal or ecosystem?

Final Production: The Oceans Crisis 2050

- **Task:** Create a **Digital Alert Infographic** (Synthesis Poster).
- **ICT Tools:** Canva or Genially (for a professional and visual design).
- **Submission Content:** A large format poster (a single digital page) that presents the environmental data (Fauna) and the impact on development (Coast) with clear titles, icons, and key figures.

Scenario 4: THE ALERT – The Oceans Crisis 2050 seen by the Geographer

The Threatened Coastline

- **The Future Risk:** Choose one of the coastal threats amplified by the climate (either **Marine Submersion** from strong swells, or **Beach Erosion**).
- **Shock Question:** If this phenomenon worsens, how specifically does it threaten one of the following developments? (Choose and explain your choice)
 - A. A major coastal road (e.g., the Littoral Road).
 - B. A leisure or tourist area (beaches, lagoon).
 - C. A residential area close to the sea.

Final Production: RED ALERT – The Oceans Crisis 2050

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Digital Tools for the Activities

1. Research and Document Analysis Tools (ICT)

These tools help students find reliable information and organize their research for the Expert Report.

Tool / Application	Usefulness for Students	Developed Skill
ZoteroBib (Web) or Google Docs Citations	Citing Sources: This tool quickly generates bibliographic references from a URL, which is an essential skill in High School.	Critical thinking, respecting copyright, research methodology.

Diigo (Browser Extension)	Collaborative Annotation: Students can highlight and add notes to online articles (CCEE, Météo-France). Notes are shared within the group.	Active and collaborative reading, note-taking.
Pearltrees or Padlet	Resource Organization: Create a digital "dashboard" to collect all links, images, and research articles for both activities (cyclone archives, coral data, DEAL maps).	Information management, digital organization.

2. Specialized Tools for Diagrams and Charts

These tools are perfect for creating clear and professional sketches without being complex drawing software.

Digital Tool	Specific Usefulness	Advantages for High School Students
Lucidchart (or alternatives like Diagrams.net/ Draw.io)	Creating the Sketch and Legend: These tools allow easy work with vector shapes (squares, arrows, lines), which is ideal for cartographic language (threats, flows, solutions).	Very intuitive drag-and-drop interface. Allows for precise and neat legend work (respecting colors and symbols).
Miro (or Jamboard for Google)	Collaborative Whiteboard: If Step 1 and 2 need to be done at the same time as production: these are collaborative whiteboards where you can paste a map, add notes, and draw the sketch on top.	Excellent for group work: all students can modify the map in real-time and see others' ideas.

3. Geo-Location and Annotation Tools (Scenario 1)

Digital Tool	Specific Usefulness	Advantages for High School Students
GeoPortail (French version)	Accessing Official Maps: Access official IGN maps and aerial views. This is an excellent alternative to Google Maps/Earth for very detailed data on the national territory.	Allows research on official French data (document legitimacy) and often the overlaying of different information layers.
Scribble Maps (or simple annotation tools)	Directly Annotating the Base Map: Students can load the PPRL map (provided image) and draw the symbols directly (red for risks, green for adaptations) without having to redraw.	Speed and ease: work directly on the reference map to locate the stakes.

4. Presentation Tool for Final Integration

Digital Tool	Specific Usefulness	Advantages for High School Students
Google Slides / PowerPoint	Simple Drawing and Integration: It is very simple to use as a basic drawing software (shapes, arrows) to create the sketch, and it allows for easy integration into the folder or an oral presentation.	Most students already know this software, which reduces tool learning time and allows focus on analysis.

5. Cartography and Spatial Analysis Tools

These tools are used to visualize risks and create the Prospective Sketch digitally.

Tool / Application	Specific Usefulness	Developed Skill
Google Earth (Web/App)	3D Visualization: Allows for a better understanding of Reunion's relief and the proximity of developments to the sea (especially crucial for submersion and erosion risks).	Spatial analysis, landscape reading.
Scribble Maps (Web)	Drawing on a Map Background: Allows importing a base map (e.g., DEAL map) and drawing simple annotations (symbols, colors, arrows) for the prospective sketch.	Digital cartographic production (without complex software).
GeoPortail (Web)	Official Maps: Access French IGN aerial views and maps, useful for precisely locating threatened developments (roads, ports).	Use of national geographical sources.

6. Production and Communication Tools : These tools are perfect for an attractive final submission, for the Shock Press Kit or the sketch.

Tool / Application	Specific Usefulness	Developed Skill
Canva (Web/App) or Google Drawings	Graphic Creation and Layout: Ideal for creating the "Digital Poster" of Activity 2, 3, 4 or the vector sketch of Activity 1. Easy to access, offers templates.	Mastery of image and design, professional layout.
Genially (Web)	Interactive Report: If you want a "more fun" submission, Genially allows you to create interactive presentations (with links, clickable images, and animated infographics) for the Expert Report.	Digital storytelling, creation of dynamic content.
Timeline JS	Chronological Timeline: Excellent for the History Part of Activity 2 (past cyclones): create an interactive timeline showing the evolution of damage/reconstructions.	Representation of time with a dynamic tool.