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The EcoMystery Project:

Interactive Escape Rooms for Climate Crisis
Awareness and Civic Engagement in School

WP3

Escape the Climate Crisis Coursework

Module 6: A Collection of Climate Change Games

Project partners



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Module 6 - A Collection of Climate Change Games

The EcoMystery Project: Interactive Escape Rooms for Climate Crisis Awareness and Civic Engagement in School Education

(2024-1-IT02-KA220-SCH-000248873)

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Module 6 - A Collection of Climate Change Games

Module 6 - A Collection of Climate Change Games

This module introduces students to climate change through a collection of educational physical and digital games. It focuses on using game-based learning as an engaging way to explore the causes, impacts, and possible solutions to climate change. Through board games, bingo games, crossword puzzles, digital simulations, and treasure hunts, students are encouraged to learn by playing, discussing, making decisions, and solving problems together.

The module helps students understand that climate change is not only a scientific issue, but also a social, civic, and everyday challenge. By taking part in different games, students explore topics such as greenhouse gases, renewable energy, waste reduction, climate adaptation, sustainable consumption, global cooperation, and the Sustainable Development Goals. The activities support active participation, teamwork, critical thinking, creativity, and reflection on real-life climate actions.

This module can be used as preparation for EcoMystery escape rooms, as a follow-up activity after an escape room experience, or as a separate set of classroom activities for climate education. It is flexible and can be adapted to different age groups, time limits, learning needs, and classroom settings.

Learning objectives

After completing this module, students will be able to understand how games can help them explore climate change, sustainability, and possible solutions in an active and engaging way. Through digital and physical games, students will identify the main



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causes and impacts of climate change and connect them with real-life examples from their school, community, and everyday life.

Students will also learn to compare different types of climate solutions, including individual actions, school-based initiatives, community responses, and wider policy-level measures. By taking part in game-based tasks, they will strengthen their critical thinking, collaboration, communication, creativity, problem-solving, decision-making, and digital literacy skills.

Most importantly, students will reflect on how the choices they make during the games can be connected to real-world climate action and how they can contribute to a more sustainable future.

Time required

The full module requires approximately **3–5 teaching blocks of 45–50 minutes each**, depending on the number and type of games selected.

A shorter version can be completed in approximately **2 teaching blocks** by introducing the topic, playing one selected game, and completing a short reflection activity.

A longer version may take **5 or more teaching blocks** if students experience several games, compare their outcomes, create their own climate-related game materials, or develop follow-up EcoMystery actions for their school or community.



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Theoretical part

Module 6 of the EcoMystery project uses educational digital and analog games to explore climate change, sustainability, and the Sustainable Development Goals (SDGs). The pedagogical approach integrates active learning, problem-solving, and critical thinking, promoting understanding of global environmental challenges.

This module is based on learning theories such as game-based Learning, Constructivism, and Inquiry-Based Learning, allowing students to learn through exploration, collaboration, and decision-making.

The scientific understanding of climate content is based on the following theories:

- **Greenhouse Effect:** explains Earth's natural warming and the impact of excess gases such as CO₂.
- **Anthropogenic Global Warming:** shows that human activities are the main cause of current climate change.
- **Carbon Cycle:** describes how carbon moves between the atmosphere, oceans, and biosphere, and how human actions disrupt it.
- **Climate Models (IPCC):** provide forecasts based on global scientific evidence.
- **Climate Mitigation and Adaptation:** strategies to reduce causes and respond to impacts.
- **Planetary Boundaries:** define safe ecological limits for Earth systems.
- **Systems Thinking in Climate Science:** highlights the interconnection between environment, economy, and society.

This module integrates Game-Based Learning with scientific education on climate change, promoting skills in inquiry, critical thinking, and decision-making.



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The combination of learning theories and climate science enables an interdisciplinary approach in which students understand not only environmental concepts but also their social and political implications.

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Classroom activities

- Compilation of existing games (digital + physical).
- Guidance on age-level, skills targeted, and SDGs addressed.

Activity 1 - Climate Change Bingo Human Impact and Climate Change Bingo – Understanding Environmental Actions and Impacts	
Subject or subjects	• Science (Environmental Science) • Geography • Citizenship Education • Cross-curricular: English (vocabulary and communication skills), ICT (digital interaction)
Age/Level	• 12–15 years
Time required	• 45–60 minutes
Learning goals	• Understand human activities that impact climate change • Identify key concepts such as greenhouse gases, deforestation, recycling, and renewable energy • Classify actions as positive or negative for the environment • Develop environmental awareness and responsibility • Encourage sustainable behavior in daily life • Promote curiosity about climate solutions • Communication and interaction during gameplay • Cooperation in identifying correct answers
Prior knowledge & skills	Students should already have:

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	• Basic understanding of climate change • Familiarity with environmental vocabulary (e.g. pollution, recycling, energy) • Basic reading and comprehension skills in English • Ability to work in groups
Materials, resources & settings	• Printed or digital bingo cards • List of terms from the game (climate actions and impacts) • Markers or pens • Projector (optional for teacher calling words) • Timer (optional) • Setting: • Classroom (preferred) • Online / hybrid (adaptable)
Community/Stakeholder Involvement (optional)	• Local environmental NGO (discussion on sustainability actions) • Municipality environmental department (waste, recycling initiatives) • School eco-club participation
Activity description	
Students participate in a bingo game based on human impact and climate change concepts. Step-by-step: 1. The teacher introduces key vocabulary: ◦ greenhouse gases, deforestation, renewable energy, climate change, recycling, fossil fuels 2. Each student receives a bingo card. 3. The teacher reads out definitions, examples, or keywords. 4. Students mark the correct term on their card. 5. The first student to complete a line (horizontal, vertical, or diagonal) shouts "Bingo!" 6. The teacher checks answers and briefly explains each concept. 7. Group discussion follows on how each action impacts the environment.	

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Accessibility & Inclusion	• Provide clear step-by-step instructions • Use visual supports and simplified language when needed • Allow collaborative learning in mixed-ability groups • Ensure accessibility of digital tools (screen readers, subtitles if available) • Offer alternative outputs (oral, written, visual) • Use of Braille for Students with Visual Impairments and Pictograms for Students with Hearing or Cognitive Disabilities
References / Bibliography	• Bingo Cards Free. (n.d.). Human impact and climate change bingo. https://bingocardsfree.com/card/human-impact-and-climate-change-bingo-61665.htm • NASA Global Climate Change. (2024). Evidence of climate change and education resources. https://climate.nasa.gov/ • SCIAF. (n.d.). Climate change bingo educational resource. https://www.sciaf.org.uk/resources/279-climate-change-bingo • United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. https://sdgs.un.org/2030agenda • UNESCO. (2017). Education for Sustainable Development Goals: Learning objectives. https://unesdoc.unesco.org/ • Intergovernmental Panel on Climate Change (IPCC). (2023). Climate Change 2023: Synthesis Report. https://www.ipcc.ch/report/ar6/syr/
Assessment	
Formative Assessment	• Teacher observes: • Participation and engagement • Correct identification of climate terms • Collaboration and communication



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	• Tools: • Observation checklist • Oral questioning during game
Summative Assessment (if applicable)	• Short quiz on climate vocabulary • Poster: "Human actions that affect climate change" • Reflection paragraph: "How can I reduce my environmental impact?"
Student Self-Assessment	Students reflect: • What new words did I learn? • Which actions are good or bad for the environment? • What can I change in my daily life?
Peer Feedback	Tell: one thing your partner did well Ask: one question Give: one suggestion
Documentation, Evidence & Follow-Up	
Evidence to Collect	• Completed bingo cards • Photos of gameplay (if allowed) • Student reflections
Impact Tracking	• Improved climate vocabulary • Increased environmental awareness • Active participation in discussion
Dissemination	• School environmental board • Eco-club presentation • School website or newsletter
Next Steps	• Create student-designed bingo cards • Extend into climate action project • Link to Sustainable Development Goals (SDGs)



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Teacher Reflection

- What worked well: high engagement through game-based learning
- What to improve: pacing and vocabulary support for weaker students
- Evidence of learning: correct use of climate terms in discussion
- Inclusion: ensure all students participate equally
- Community link: opportunity to connect with local environmental actions

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Activity 2 - Long Live the Goals! – Interactive Game about the Sustainable Development Goals

Subject or subjects

- **Citizenship and Development** (main subject)
- **Geography** – sustainable development, global inequalities
- **Natural Sciences** – environment, natural resources
- **Official language of the country (Portuguese, English, e.g.)** – communication, argumentation, and reflection
- **Visual Arts** – creation of posters or visual materials

Possible extensions:

- **Mathematics:** analysis of data about poverty, consumption, or climate.
- **Information Technology:** creation of presentations or digital quizzes about the SDGs.

Age/Level

- Students aged **10 to 15 years old** (lower and upper middle school / lower secondary education).

Time required

45–60 minutes

- Introduction: 10 minutes
- “Long Live the Goals!” game: 30–40 minutes
- Final reflection: 10 minutes

Learning goals

Cognitive goals

- Learn about the **17 Sustainable Development Goals (SDGs)**.
- Understand global problems such as poverty, climate change, and inequality.
- Relate local actions to global challenges.

Affective goals

- Develop empathy and social awareness.



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	• Encourage responsible and sustainable attitudes. Group work • Promote cooperation, discussion, and group decision-making. Psychomotor goals • Handling cards or a game board. • Active participation in interactive activities.
Prior knowledge & skills	Students should: • Have a basic understanding of environmental and social issues. • Be able to work in groups and discuss ideas. • Have basic oral communication skills. No in-depth knowledge about the SDGs is required.
Materials, resources & settings	Materials • “Long Live the Goals!” game board or cards • Cards with SDG challenges or questions • Markers or game tokens • Projector or presentation about the SDGs (optional) • Poster paper and markers for the final reflection Settings • Classroom • Can also be adapted for online or hybrid learning using digital platforms (e.g., Kahoot or Mentimeter).
Community/Stakeholder Involvement (optional)	Possible partners: • Local Europe Direct centre – providing educational materials about the SDGs. • Local environmental or social NGO – participation in an awareness session.



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- **Local municipality** – presentation of sustainable initiatives in the community.

Activity description

1. Introduction (10 min)

The teacher briefly presents the **17 Sustainable Development Goals**, explaining that they are global targets to improve the planet by 2030.

2. Group division (5 min)

Students are divided into small groups (3–5 students).

3. “Long Live the Goals!” Game (30 min)

Groups participate in the game by answering questions, solving challenges, or completing missions related to different SDGs.

Examples of challenges:

- Identify which SDG is related to a specific situation.
- Propose a solution to an environmental problem.
- Solve a short sustainability quiz.

Groups earn points by completing challenges correctly.

4. Final reflection (10 min)

Class discussion:

- Which goal was the most surprising?
- What can we do at school or at home to help?

Adaptation for younger students

- Use images and simple questions.
- Reduce the number of goals addressed.

Adaptation for older students



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- Introduce debates or mini-projects.
- Ask students to propose solutions to real problems in the community.

Accessibility & Inclusion

To ensure inclusion:

- Use **simple and clear language**.
- Include **SDG images and icons** to support understanding.
- Allow different forms of participation (oral, written, or visual).
- Organize heterogeneous groups to encourage peer support.
- Adapt the pace and complexity of questions when necessary.

References / Bibliography

- **2030 Agenda – United Nations Sustainable Development Goals**
<https://sdgs.un.org/goals>
- **Educational resources on SDGs – European Commission / Erasmus+**
- [Game](#)

Assessment

Formative Assessment

During the activity, the teacher observes:

- Student participation
- Cooperation within groups
- Ability to connect problems with the SDGs

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	Tools: • participation checklist • quick questions or polls
Summative Assessment (if applicable)	Possible final product: • Poster or presentation about one of the SDGs. Evaluation criteria: • understanding of the goal • creativity • clarity of explanation • teamwork
Student Self-Assessment	Students reflect: • What did I learn today about the SDGs? • Which goal do I consider the most important? • What can I do in my daily life to help?
Peer Feedback	Tell – Ask – Give method • Tell: say something positive about the group's work • Ask: ask a question • Give: suggest an improvement
Documentation, Evidence & Follow-Up	
Evidence to Collect	• Photos of the activity (with permission) • Students' posters or work • Quiz results
Impact Tracking	• increased knowledge about the SDGs • active student participation • ideas for sustainable actions proposed by students



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Dissemination	Sharing the results: ● School website ● School social media ● school sustainability event
Next Steps	● Develop school mini-projects linked to an SDG ● Organize a sustainability campaign at school ● Partnership with a local NGO or an Erasmus+ project
Teacher Reflection	
● What worked well & why? Active student participation and strong interaction between groups. ● What would I change next time? Add more practical challenges or local examples. ● Evidence of learning Students demonstrated a basic understanding of the SDGs and suggested concrete actions. ● Inclusion & wellbeing All students participated through collaborative work. ● Partnerships & community Opportunity to strengthen connections with local organizations working on sustainability.	



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Activity 3 - RECxploration Digital

RECxploration Digital – Interactive Exploration of Climate Change and Sustainability

Subject or subjects

- Geography
- Science (Environmental Science)
- Citizenship Education
- ICT / Digital Literacy
- Cross-curricular connections:
- Economics (sustainable development and resource management)
- English (communication and scientific vocabulary)
- Ethics (environmental responsibility and decision-making)

Age/Level

- **Age Group:** 12 to 16 years old (Middle to High School students)

Time required

- **60–90 minutes** (depending on depth of exploration and discussion)

Learning goals

Cognitive goals

- Understand key concepts of climate change and sustainability
- Analyse environmental challenges through digital interaction
- Interpret cause-and-effect relationships in climate systems

Affective goals

- Develop environmental awareness and responsibility
- Encourage sustainable behaviour and critical reflection
- Foster curiosity about global climate issues

Group work

- Collaboration in pairs or small groups

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	• Discussion and sharing of decisions and findings Psycho-motor goals • Navigate digital platforms and interactive content • Develop ICT skills and digital literacy
Prior knowledge & skills	• Basic understanding of climate change concepts • Basic ICT skills (using computers/tablets) • Ability to read and interpret simple scientific information • Basic teamwork and communication skills
Materials, resources & settings	Materials & resources: • Computers, tablets or laptops • Internet access • REExploration Digital platform/game • Worksheets or digital note templates • Projector (optional for teacher guidance) Settings: • Classroom • Computer lab • Online or hybrid learning environment
Community/Stakeholder Involvement (optional)	• Local environmental NGOs (discussion or feedback sessions) • Municipal environmental departments (real-world sustainability actions) • Europe Direct centres (EU climate policies and education support)

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Activity description

Students interact with the RECxploration Digital platform, exploring climate-related scenarios in an immersive digital environment. [RECxploration digital](#)

Steps:

1. Teacher introduces key concepts (climate change, sustainability, SDGs)
2. Students access the digital platform individually or in groups
3. Students explore scenarios and make decisions within the system
4. They observe the consequences of their choices in real time
5. Students record findings and reflect on outcomes
6. Group discussion on strategies and climate solutions

Accessibility & Inclusion

- Younger students: guided exploration with simplified tasks and teacher support
- Older students: deeper analysis, independent exploration, and critical discussion
- Provide clear step-by-step instructions
- Use visual supports and simplified language when needed
- Allow collaborative learning in mixed-ability groups
- Ensure accessibility of digital tools (screen readers, subtitles if available)
- Offer alternative outputs (oral, written, visual)

References / Bibliography

- European Commission – Climate Action Education Resources
<https://climate.ec.europa.eu/>
- European Union – Education for Climate Coalition
<https://education.ec.europa.eu/>
- UNESCO. (2017). Education for Sustainable Development Goals: Learning Objectives
<https://unesdoc.unesco.org/>
- IPCC. (2023). Climate Change 2023: Synthesis Report
<https://www.ipcc.ch/report/ar6/syr/>

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	Game RECxploration
Assessment	
Formative Assessment	Teacher monitors: - Participation and engagement - Quality of decisions and reasoning - Collaboration in group tasks - Understanding of climate concepts Tools: - Observation checklist - Oral questioning - Learning notes/worksheets
Summative Assessment (if applicable)	- Group presentation of findings - Digital poster or infographic - Short written reflection on climate decision-making
Student Self-Assessment	Students reflect on: - What did I learn today? - What decisions were most effective? - How can I improve my environmental actions?
Peer Feedback	- Tell: one positive aspect - Ask: one question - Give: one suggestion for improvement
Documentation, Evidence & Follow-Up	
Evidence to Collect	- Screenshots of digital exploration - Student notes and worksheets - Photos of group discussion (if applicable)



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Impact Tracking	• Increased climate awareness • Improved digital literacy • Better understanding of sustainability concepts
Dissemination	• School website or newsletter • Classroom presentations • Environmental awareness campaigns
Next Steps	• Develop student-led climate projects • Connect with local environmental initiatives • Extend to other EcoMystery games for interdisciplinary learning
Teacher Reflection	
• What worked well and why? • What should be improved next time? • Did students meet learning objectives? • Were all students included and engaged? • What partnerships added value to learning?	

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Activity 4 - Crossword Puzzles – Climate Change and Global Cooperation

(Created with the Crossword Mint platform)–

<https://www.crosswordmint.com/>

Subject or subjects	- Science (climate change, climate system, greenhouse gases) - Geography / Social Studies (global inequalities, climate justice, international cooperation) - Citizenship / Economics (climate policies, mitigation and adaptation)
Age/Level	12–15 years old (suitable for lower secondary; can be adapted for upper secondary by increasing conceptual complexity).
Time required	45–90 minutes, which may be organized in two stages: - Stage 1 (20–30 min): concept review and collaborative crossword creation on the platform. - Stage 2 (25–60 min): solving crosswords (between groups) and discussion/reflection.
Learning goals	- Consolidate key concepts related to climate change (mitigation, adaptation, renewable energy, climate justice, emissions, etc.). - Understand cause–effect relationships between human activities and global warming. - Develop conceptual precision and scientific literacy. - Promote cooperation and critical thinking through the creation and solving of clues.
Prior knowledge & skills	- Basic understanding of climate change, the greenhouse effect, and global warming limits (e.g., 1.5–2 °C). - Ability to formulate clear and accurate definitions. - Basic digital skills.

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Materials, resources & settings	• Computers or tablets with internet access; • Crossword Mint platform (https://www.crosswordmint.com/); • A guiding list of climate-related concepts (provided by the teacher); • Draft worksheet for writing definitions before entering them into the platform; • Classroom arranged in small groups (2–4 students).
Community/Stakeholder Involvement (optional)	
Activity description	
1. Introduction (thematic framing) Briefly review key climate change concepts: emissions, economic sectors, renewable energy, climate policies, climate justice, adaptation, and mitigation. 2. Crossword Creation (in groups) Each group selects 10–15 climate-related concepts. Writes clear, scientifically accurate definitions appropriate to the age level. Enters the words and clues into Crossword Mint to automatically generate the puzzle. Reviews the scientific accuracy and clarity of the clues before finalizing. 3. Exchange and Solving Groups exchange crosswords. Solve another group's puzzle. Identify ambiguous or scientifically imprecise clues. 4. Discussion and Final Reflection Guided discussion: Which concepts were most challenging? Were any definitions vague or inaccurate? Which terms are essential for understanding global climate action? What parallels can be drawn with real-world climate policies?	



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Accessibility & Inclusion	• Provide a base list of concepts for students who need additional support. • Allow differentiated levels: ◦ Simple version (direct definitions); ◦ Advanced version (application-based or comparative definitions). • Assign roles within each group: definition writer, scientific reviewer, digital editor, spokesperson.
References / Bibliography	• UNESCO – Climate Change Education: https://www.unesco.org/pt/climate-change/education • ClimateEdHub – Climate Change Resources • https://climateedhub.org/resources/resources/climate-change-resources/ • Climate Education – Teaching Tools https://climateedhub.org/resources/resources/climate-education/ • Classrooms for Climate Justice – Resources https://www.classroomsforclimatejustice.org/resources • https://www.crosswordmint.com/
Assessment	
Formative Assessment	• Observation of scientific accuracy in definitions. • Ability to distinguish related concepts (e.g., mitigation vs. adaptation). • Linguistic clarity and terminological precision. • Group collaboration.
Summative Assessment (if applicable)	Submission of: • Final list of words and definitions. • Printed or PDF version of the crossword. • Short explanatory text: “Why we selected these concepts as essential for understanding climate change.”
Student Self-Assessment	Short reflection prompts such as: • “One concept I understand better after this activity.” • “One definition I would revise and why.” • “How I contributed to my group.”



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Peer Feedback	• One strength of the crossword. • One definition that could be improved. • One important concept that could have been included.
Documentation, Evidence & Follow-Up	
Evidence to Collect	• PDFs of the created crosswords; • Photos of group work while solving; • Reflection sheets.
Impact Tracking	• Display selected crosswords in school corridors; • Create a “Climate Challenge of the Week” using a themed crossword; • Share an example on the school website or newsletter.
Dissemination	• Compare the concepts addressed with real climate policies (e.g., national energy and climate plans or EU targets); • Identify concepts missing from public debate; • Develop a small school-based awareness campaign based on the most relevant terms (e.g., energy saving, protection of vulnerable groups, carbon footprint reduction).
Next Steps	• Develop a collaborative class climate glossary. • Progress to more complex activities (simulated debates, climate news analysis, policy evaluation).
Teacher Reflection	
Did students demonstrate conceptual understanding or mere memorization? Did the definitions reflect critical thinking or formulaic repetition? Did the activity promote scientific rigor or oversimplification? What adjustments are needed (time management, conceptual scaffolding, number of concepts)?	

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Activity 5 - Climate Adaptation Digital Game: Managing the City of Weatherton	
Subject or subjects	Geography, Science (Environmental Studies), Citizenship Education, ICT/Computer Science Cross-curricular links: Mathematics (data interpretation), Social Studies (decision-making and governance), English (communication and argumentation)
Age/Level	12–18 years (adaptable for lower secondary and upper secondary education)
Time required	1–2 lessons (90–120 minutes) or a full workshop session (up to 3 hours with reflection and discussion)
Learning goals	Cognitive goals: - Understand the impacts of climate change on urban environments - Analyse climate risks and evaluate adaptation strategies - Develop systems thinking and decision-making skills Affective goals: - Increase awareness of climate vulnerability and resilience - Encourage responsibility for sustainable development - Foster empathy for communities affected by climate extremes Group work opportunities: - Collaborative decision-making in roles (e.g. city planner, emergency services, agriculture, economy) - Negotiation and consensus-building between stakeholders
Prior knowledge & skills	Basic understanding of climate change and extreme weather events Basic ICT skills (using web-based tools or digital platforms)



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	Ability to work in groups and discuss/justify decisions Basic understanding of cause-effect relationships in environmental systems
Materials, resources & settings	• Computers/tablets with internet access • Projector or interactive whiteboard (optional) • SMHI Climate Adaptation Game (web-based) • Worksheets or digital note-taking templates Setting: Classroom / Online / Hybrid learning environment
Community/Stakeholder Involvement (optional)	Local municipality environmental or urban planning department (case examples) Civil protection services (flooding, heatwave preparedness examples) NGOs working on climate adaptation and sustainability education Europe Direct centers (EU climate policy connection)
Activity description	
Students engage with the SMHI Climate Adaptation Game, where they take responsibility for adapting a fictional city (Weatherton) to the effects of climate change. In the game, students face realistic scenarios such as floods, heatwaves, droughts, and extreme rainfall. They must make decisions about infrastructure, resource allocation, and emergency preparedness. The game is played in rounds representing time progression into the future. After each round, students observe the consequences of their decisions and adjust their strategy. Steps: • Step 1: Introduction and context setting	

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The teacher introduces the concept of **climate adaptation**, explaining the difference between mitigation (reducing emissions) and adaptation (responding to impacts). Students are introduced to the fictional city of Weatherton and its vulnerability to climate change.

The teacher explains that the city will face several climate-related events over time, and students must act as a city council to ensure safety, sustainability, and long-term resilience.

- **Step 2: Explanation of the game and objectives**

Students are shown how the SMHI Climate Adaptation Game works. The teacher explains:

- The structure of the game (rounds representing future time periods)
- The types of climate hazards they will face
- The decision-making system (choosing between different adaptation measures)
- The consequences of decisions, which affect indicators such as:
 - Population safety
 - Economic stability
 - Environmental health
 - Infrastructure resilience

Students are informed that there is no single correct answer; instead, they must justify trade-offs.

- **Step 3: Group formation and role assignment**

Students are divided into small groups (3–5 students). Each group represents a **city council team**. Within each group, students take on specific roles such as:

- Urban planner (infrastructure and housing)
- Environmental officer (ecosystems and sustainability)
- Emergency management coordinator (risk and disaster response)
- Economic advisor (budget and financial impact)
- Public health representative (wellbeing and safety)

These roles help structure discussion and ensure balanced participation.

- **Step 4: First gameplay round (baseline decisions)**

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Students begin the game at the initial stage of Weatherton. They are presented with early climate risks and must make their first adaptation decisions, such as:

- Strengthening flood protection systems
- Improving water management
- Upgrading urban infrastructure
- Implementing heatwave protection measures

After decisions are submitted, the game simulates outcomes and provides feedback on the city's resilience indicators.

- **Step 5: Second and subsequent rounds (progressive climate challenges)**

The game advances to new time periods where climate impacts intensify. Students face more complex scenarios, such as:

- Increased frequency of extreme rainfall events
- Extended drought periods affecting water supply
- Rising temperatures impacting public health
- Infrastructure stress due to repeated climate events

Students must revisit their previous decisions, adjust strategies, and respond to new constraints. Each round builds on previous outcomes, reinforcing systems thinking and long-term planning.

- **Step 6: Reflection during gameplay**

After each round, groups briefly reflect on:

- What worked well in their strategy
- What unexpected consequences occurred
- Which indicators improved or worsened
- How they should adjust their next decisions

The teacher facilitates discussion between rounds to encourage reasoning and comparison between groups.

- **Step 7: Final outcome and evaluation of city resilience**

At the end of the simulation, each group receives a final overview of their city's performance. Students analyse:

- Overall resilience of Weatherton



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- Balance between economic growth and sustainability
- Effectiveness of adaptation measures
- Long-term consequences of their decisions

Groups compare outcomes and discuss different strategies used.

- **Step 8: Group presentation and debriefing**

Each group presents their strategy and explains:

- Key decisions they made
- Trade-offs they had to consider
- Mistakes or unexpected outcomes
- What they would do differently in a real city context

A whole-class discussion follows, linking game experiences to real-world climate adaptation challenges in European and global cities.

Página principal do jogo: <https://app.ecciproject.eu/physical-game/>

Website do projeto: <https://www.ecciproject.eu/>

Materiais e recursos: <https://www.ecciproject.eu/resources/>

Adaptations:

- Younger students: simplified scenarios, guided decision options, teacher support
- Older students: more complex trade-offs, budget constraints, long-term planning, policy justification and written reflection

(Source: SMHI Climate Adaptation Game)

Accessibility & Inclusion

Ensure the platform is usable with screen readers or provide alternative text-based versions

Provide simplified instructions and visual supports for learners who need them

Allow oral or visual responses instead of written outputs when needed

Use structured group roles to ensure equal participation



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	Provide multilingual support or translated materials if required Ensure accessibility of digital tools (devices, internet access alternatives)
References / Bibliography	Swedish Meteorological and Hydrological Institute (SMHI) – Climate Adaptation Game https://www.smhi.se/en/climate/tools-and-inspiration/climate-adaption-game SMHI Climate Adaptation Educational Resources https://www.smhi.se/en/climate/tools-and-inspiration Linköping University research on serious gaming for climate adaptation (via SMHI materials)
Assessment	
Formative Assessment	• Observation of group collaboration and participation • Teacher checklist (decision-making, reasoning, engagement) • Monitoring of in-game choices and adaptation strategies • Short reflective notes during gameplay
Summative Assessment (if applicable)	Group presentation of climate adaptation strategy for Weatherton Written reflection or policy brief explaining decisions Evaluation rubric: understanding of climate risks, justification of choices, teamwork, communication clarity
Student Self-Assessment	What did I learn about climate adaptation? How did my group make decisions? What was the most difficult trade-off? What would I improve in my strategy?
Peer Feedback	Tell one strong decision from the group Ask one clarification question Suggest one improvement for adaptation strategy



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Documentation, Evidence & Follow-Up	
Evidence to Collect	Screenshots of game progress or outcomes Group notes and decision logs Presentations or posters Reflection sheets
Impact Tracking	Pre/post quiz on climate adaptation understanding Observation of engagement and collaboration Quality of proposed adaptation solutions
Dissemination	School website or newsletter Presentation during sustainability or science events Sharing with local municipality or climate partners Participation in EU or climate education initiatives
Next Steps	Develop a real school or community climate adaptation plan Extend into a project with local authorities or NGOs Create student-designed adaptation scenarios (ICT or geography project) Compare Weatherton decisions with real local climate risks
Teacher Reflection	
Which scenarios generated the most engagement and learning? How effectively did students understand trade-offs? Were all students actively included in group decision-making? What challenges appeared in digital access or gameplay? How could the activity be improved for different learning levels? What real-world connections did students make?	



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Activity 6 - Curricular Treasure Hunt – Climate Change and Global Cooperation	
Subject or subjects	- Science (climate change, climate system, greenhouse gases) - Geography / Social Studies (global inequalities, climate justice, international cooperation) - Citizenship / Economics (climate policies, mitigation and adaptation)
Age/Level	12–15 years old (lower secondary; adaptable to upper secondary with increased complexity).
Time required	60–90 minutes: - Phase 1 (15–20 min): introduction and rules; - Phase 2 (30–50 min): treasure hunt activity; - Phase 3 (15–20 min): debrief and reflection.
Learning goals	- Consolidate knowledge about causes, impacts, and solutions to climate change. - Connect scientific concepts with political and social decision-making. - Develop collaboration, communication, and problem-solving skills. - Apply knowledge in an active and dynamic context.
Prior knowledge & skills	- Basic understanding of greenhouse effect, emissions, and global climate targets; - Ability to interpret written clues and solve challenges in groups; - Basic teamwork skills.
Materials, resources & settings	Without Technology: - Printed clue cards; - Simple classroom/school maps; - Numbered sealed envelopes; - Validation stamps or mission tokens. With Technology (Optional): - QR codes placed around the school;



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	• Smartphones/tablets (one per group); • Links to short texts, videos, or interactive questions. Space: • Classroom, library, courtyard, or pre-approved school areas.
Community/Stakeholder Involvement (optional)	
Activity description	
Students follow a sequence of climate-related clues placed around the school. Each correctly solved clue leads to the next location, culminating in a final mission (e.g., designing a mini climate strategy for the school). Clues may include: • Completing definitions (e.g., mitigation vs. adaptation); • Simple emission calculations; • Interpreting climate graphs; • Climate justice dilemmas; • Matching economic sectors with emission types. Thematic Framing • Students act as international teams working to prevent dangerous global warming. Team Formation - Groups of 3–4 students with defined roles: • Clue reader • Timekeeper • Recorder • Spokesperson • Treasure Hunt Route • Each group receives the first clue. • Correct answers lead to the next station. • The structure may be sequential or station-based rotation. Final Mission	

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- Students must:
- Propose three priority actions to reduce the school's carbon footprint.
- Identify one vulnerable group and propose a protective measure.

Final Reflection

- Which challenges were more difficult: scientific or social?
- Which decisions involved trade-offs?
- How does this relate to real-world climate policies?

Accessibility & Inclusion

- Provide varied task types (reading, calculation, visual interpretation);
- Balance teams strategically;
- Ensure structured participation from all members;
- Avoid excessive speed-based competition.

References / Bibliography

- UNESCO – Climate Change Education: <https://www.unesco.org/pt/climate-change/education>
- ClimateEdHub – Climate Change Resources
- <https://climateedhub.org/resources/resources/climate-change-resources/>
- Climate Education – Teaching Tools <https://climateedhub.org/resources/resources/climate-education/>
- Classrooms for Climate Justice – Resources <https://www.classroomsforclimatejustice.org/resources>
- NASA Global Climate Change – Educator Resources <https://www.commonsense.org/education/reviews/FAQ>
- OER Project – Climate Curriculum <https://www.oerproject.com/Climate>

Assessment



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Formative Assessment	• Observation of engagement and reasoning; • Quality of answers and justifications; • Group collaboration.
Summative Assessment (if applicable)	Written submission of final mission. Rubric assessing: • Scientific accuracy • Clarity of proposals • Cause–effect understanding • Feasibility
Student Self-Assessment	• “One concept I understand better.” • “One challenge that required deeper thinking.” • “How I contributed to my team.”
Peer Feedback	Each group presents its final strategy. Another group identifies: • One strength • One suggestion for improvement
Documentation, Evidence & Follow-Up	
Evidence to Collect	• Photos of the treasure hunt stations (cards, envelopes, QR codes); • Photos of students interacting, discussing, and solving clues in groups; • Final responses or missions submitted by the groups (paper or digital); • Students’ reflection or self-assessment sheets; • Teacher notes on participation, collaboration, and scientific reasoning.
Impact Tracking	• Display of final results and group responses on school walls or digital boards; • Creation of a “timeline” or treasure hunt map showing the route and challenges completed; • Analysis of students’ knowledge gains (comparison of concepts before and after the activity); • Possible integration into school environmental campaigns (carbon footprint reduction, renewable energy awareness, protection of vulnerable groups);



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	• Sharing experiences via school newsletters or science outreach events.
Dissemination	• Compare the groups' concepts and decisions with real climate policies (e.g., national energy and climate plans, EU targets) and identify overlaps and gaps. • Display final solutions or treasure hunt route maps in school corridors or noticeboards; • Share photos, reports, and reflections in school newsletters, websites, or educational social media channels; • Develop a small campaign or activity inspired by the treasure hunt (e.g., weekly sustainability challenges, protection of vulnerable groups, promotion of renewable energy); • Invite other groups or classes to try the treasure hunt, promoting internal dissemination and collaborative learning.
Next Steps	• Create a collaborative class glossary of climate concepts based on the treasure hunt clues and answers; • Develop more complex or integrated challenges, such as simulated debates on climate policies or analysis of environmental news; • Repeat the activity periodically, introducing new concepts or levels of difficulty to reinforce learning and retention; • Integrate the activity with school sustainability projects or EcoMystery, tracking results and long-term impact; • Reflect on adjustments needed to improve participation for all students, balance physical activity and learning, and deepen content understanding.
Teacher Reflection	



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- Did the activity promote deep understanding or only excitement?
- Did movement enhance or distract from learning?
- Were the clues appropriately challenging?
- What adjustments would improve pedagogical impact?

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Activity 7 - Educational Bingo Game – Climate Change and Global Cooperation (Created with the MyFreeBingoCards platform – <https://myfreebingocards.com/>)

Subject or subjects	- Science (climate change, greenhouse gases, renewable energy) - Geography / Social Studies (global inequalities, climate justice, international cooperation) - Citizenship / Economics (climate policies, mitigation and adaptation)
Age/Level	12–15 years old (lower secondary; adaptable to upper secondary by increasing the complexity of words and concepts).
Time required	30–60 minutes: - Phase 1 (5–10 min): contextualization and rules explanation; - Phase 2 (15–40 min): playing the educational bingo game; - Phase 3 (5–10 min): discussion and reflection.
Learning goals	- Consolidate key concepts about climate change, adaptation, and climate justice; - Connect scientific terms with global policies and decisions; - Develop attention, memorization, collaboration, and argumentation skills; - Transform learning into a fun and motivating activity.
Prior knowledge & skills	- Basic understanding of greenhouse effect, emissions, and global warming targets; - Ability to understand scientific terms and contextualize them; - Group work and active participation skills.
Materials, resources & settings	- Computer/tablet and printer to create the Bingo Cards; - Printed bingo cards with key words; - Markers, beans, or chips to mark words;

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	• Word list and definitions for the teacher to call out; • Classroom organized in groups or individually, with visibility for all participants.
Activity description	
Educational Bingo turns climate change concepts into key words that students must recognize and relate. Each student receives a card with random words, and as the teacher reads definitions or examples, they mark the corresponding terms. The activity can be competitive or cooperative and includes discussions on the meaning of each word, connections to global climate action, and related dilemmas. It promotes memorization, active participation, and scientific reasoning, ending with reflection on learning and links to real-world policies. 1. Preparation: • Teacher selects 16–25 words or concepts related to climate change (e.g., mitigation, adaptation, renewable energy, carbon neutrality, Paris Agreement). • Each bingo card receives a random combination of words. 2. Word Drawing: • Teacher reads the definition or description of each term, and students mark the corresponding word on their cards; • Can be competitive (first to complete a row or column) or cooperative (all students fill their cards). 3. Discussion and Reflection: • Each marked word is discussed: • What does it mean? • How does it relate to global climate action? • What dilemmas or decisions are involved?	
Accessibility & Inclusion	• Combine simpler words with more complex concepts to accommodate different levels; • Encourage oral participation for students with reading difficulties; • Ensure all students discuss at least one word during the game; • Assign roles within groups: marker, definition reader, spokesperson.

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References / Bibliography	• UNESCO – Climate Change Education: https://www.unesco.org/pt/climate-change/education • ClimateEdHub – Climate Change Resources • https://climateedhub.org/resources/resources/climate-change-resources/ • Climate Education – Teaching Tools https://climateedhub.org/resources/resources/climate-education/ • Classrooms for Climate Justice – Resources https://www.classroomsforclimatejustice.org/resources • OER Project – Climate Curriculum https://www.oerproject.com/Climate • https://myfreebingocards.com/
Assessment	
Formative Assessment	• Observation of understanding of terms; • Participation in discussions; • Ability to relate scientific concepts to policies and actions.
Summative Assessment (if applicable)	• Brief report: “What I learned about climate action through bingo.” • Rubric: concept understanding, participation, clarity of explanations.
Student Self-Assessment	• “One word/concept I understand better.” • “One word I would like to explore further.” • “How I contributed to the group discussion.”
Peer Feedback	• Each group explains one word and its connection to climate action; • Other groups ask questions or add complementary explanations.
Documentation, Evidence & Follow-Up	
Evidence to Collect	• Bingo cards filled in by students; • Photos of the game in progress showing participation and interaction; • Student reflection sheets or short reports;

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	Teacher notes on discussion and concept comprehension.
Impact Tracking	- Compare students' understanding of concepts before and after the bingo; - Display cards or reflections on classroom walls or newsletters; - Reuse cards in future activities or weekly challenges; - Evaluate participation and motivation of students.
Dissemination	- Share the game and results with other classes or teachers; - Publish photos, reports, and reflections in school newsletters or websites; - Integrate key words and concepts into school sustainability campaigns or EcoMystery activities; - Create a cooperative version of bingo so different classes can collaborate on learning climate concepts.
Next Steps	- Develop new cards with more advanced or updated climate policy terms; - Create mini-challenges between classes using bingo to review content; - Incorporate debates or small tasks about climate dilemmas before or after bingo; - Keep a record of class progress in terms of scientific understanding and environmental literacy; - Reflect on adjustments needed to increase participation, motivation, and depth of learning.
Teacher Reflection	
Did the activity promote true understanding of concepts or just superficial memorization? Were students able to relate bingo terms to climate actions and global policies? Was participation balanced among all students, or did some dominate the activity? Did the use of technology (or lack of it) affect motivation and learning?	



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What adjustments could improve pedagogical impact, such as:

- number of words or complexity of definitions;
- time allocated for discussion of each word;
- group organization or roles;
- integration with other environmental literacy activities.



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Activity 8 - Our Sustainable Planet – Climate Change Board Game	
Subject or subjects	• Citizenship Education • Economics (sustainable consumption) • English (if taught in English – vocabulary development) • Matemática → cálculo de emissões • TIC → criação de campanhas digitais
Age/Level	12–15 years (lower secondary education)
Time required	60–90 minutes • 10 min → introduction • 30–40 min → gameplay • 20–30 min → discussion/reflection
Learning goals	Cognitive • Understand causes and consequences of climate change • Identify sustainable actions Affective • Develop environmental awareness • Encourage responsible attitudes Social / Group work • Collaboration • Decision-making Psychomotor • Handling game materials • Movement on board
Prior knowledge & skills	Basic understanding of: • climate change • pollution

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	Ability to: • work in groups • follow rules
Materials, resources & settings	Materials • Printed game board • Dice • Player tokens • Action cards Setting • Classroom (recommended) • Also adaptable to: ◦ Library ◦ Community centre
Community/Stakeholder Involvement (optional)	• Local environmental NGOs → awareness sessions • Municipality → sustainability initiatives Possible role: • guest speaker • real-life examples
Activity description	
Step 1 – Introduction • Brief discussion on climate change • Present key concepts: ◦ causes ◦ impacts ◦ solutions Step 2 – Gameplay • Students play in small groups (3–5 players)	

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- Each player moves along the board
- Landing on spaces triggers:
 - positive actions (move forward)
 - negative impacts (move backward)

Focus:

- decision-making
- understanding consequences

Step 3 – Access to Materials

Students and teacher access the printable game materials from the official source:

- Game board (PDF):
<https://cesie.org/en/resources/clearclimate-board-game-climate-change/>
- Cards and game materials (PDF):
<https://cesie.org/en/resources/clearclimate-board-game-climate-change/>
- Instructions (PDF):
<https://cesie.org/en/resources/clearclimate-board-game-climate-change/>

👉 Note: All materials are available on the same official page from CESIE (ClearClimate Project)

Step 4 – Preparation

- Print the materials:
 - game board
 - cards
- Cut and organize cards
- Divide students into small groups (3–5 players)
- Give each group:
 - 1 board
 - 1 dice
 - player tokens

Step 5 – Gameplay

- Students take turns:
 1. Roll the dice



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2. Move forward on the board
 3. Follow instructions on the square
- Squares may include:
 - ☒ Sustainable actions → move forward
 - ☒ Unsustainable actions → move backward
 -  Draw a card → complete a challenge
-  The game simulates real-life environmental decisions

Step 6 – Reflection

- Group discussion:
 - What actions helped most?
 - What surprised you?
 - What can you apply in real life?

Accessibility & Inclusion

Younger students:

- simplify vocabulary
- use visual support

Older students:

- add discussion questions
- include data analysis

Accessibility & Inclusion

- Use visual supports (icons, colours)
- Provide simplified instructions
- Allow mixed-ability groups
- Offer oral explanations
- Ensure all students participate (assigned roles)
- Use of Braille for Students with Visual Impairments and Pictograms for Students with Hearing or Cognitive Disabilities

References / Bibliography

CESIE – ClearClimate Project

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	https://cesie.org/en/resources/clearclimate-board-game-climate-change/
Assessment	
Formative Assessment	- Observe: - participation - collaboration - understanding - Tools: - checklist - teacher observation
Summative Assessment (if applicable)	Short presentation: "Top 3 climate actions" Poster or reflection
Student Self-Assessment	- What did I learn? - What action will I change? - Self-rating (1–5)
Peer Feedback	Tell – Ask – Give - Tell something positive - Ask a question - Give a suggestion
Documentation, Evidence & Follow-Up	
Evidence to Collect	- Photos (with permission) - Student reflections - Group outputs
Impact Tracking	Pre/post questions: - awareness - knowledge



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	Observe attitude changes
Dissemination	• School website • Classroom display • Environmental day event
Next Steps	• Create school sustainability campaign • Partner with local NGO • Extend to project-based learning
Teacher Reflection	
What worked well & why? • Engagement through gameplay • Active participation	
What would I change next time? • Adjust time for discussion • Differentiate difficulty levels	
Evidence of learning • Students demonstrated understanding • Applied concepts in discussion	
Inclusion & wellbeing • Most students engaged • Monitor quieter students	
Partnerships & community • Potential for real-world connection • Adds relevance to learning	



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Extra Resources (Additional classroom material for teachers)

Climate Change Science Resources

- Intergovernmental Panel on Climate Change (IPCC) – AR6 Reports
Comprehensive scientific assessments of climate change, impacts, and mitigation strategies.

<https://www.ipcc.ch/>

- NASA Climate Change and Global Warming
Accessible explanations, data visualizations, and evidence-based climate information.

<https://climate.nasa.gov/>

Sustainability and Education Resources

- United Nations Sustainable Development Goals (SDGs) Resources
Teaching materials, posters, and classroom activities aligned with the SDGs.

<https://sdgs.un.org/goals>

- UNESCO Education for Sustainable Development (ESD) Toolkit
Pedagogical guidance for integrating sustainability into teaching practice.

<https://www.unesco.org/en/sustainable-development/education>

- European Climate Pact. (n.d.). Citizen engagement on climate action.

https://climate-pact.europa.eu/index_en

- European Commission. (n.d.). Environment and climate policy.

<https://environment.ec.europa.eu/>

- European Environment Agency. (n.d.). Climate change adaptation and impacts.

<https://www.eea.europa.eu/themes/climate>

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- European School Education Platform. (n.d.). Teaching materials for sustainability education. <https://school-education.ec.europa.eu/>
- UNESCO. (n.d.). Education for Sustainable Development. <https://www.unesco.org/en/education/sustainable-development>
- Erasmus+ Programme. (n.d.). Erasmus+ programme overview and projects. <https://erasmus-plus.ec.europa.eu/>

Game-Based Learning and Digital Education

- European Schoolnet – Future Classroom Lab
Innovative methodologies for digital and game-based learning in education. <https://fcl.eun.org/>
- Kahoot! and Quizizz Platforms
Tools for creating interactive quizzes to reinforce climate learning.
- Minecraft Education Edition – Climate and Sustainability Worlds
Game-based simulations for environmental education and systems thinking.

Teaching Strategies and Pedagogical Support

- Inquiry-Based Learning Guides (OECD Education Resources)
Support for implementing investigative learning approaches in classrooms. <https://www.oecd.org/education/>
- Kolb Learning Cycle Applications in Education
Practical examples of experiential learning design.
- Systems Thinking in Education (The Waters Center)
Resources for teaching interconnected environmental systems thinking. <https://waterscenterst.org/>



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Suggested Classroom Integration Tools

- Padlet – collaborative idea boards for climate discussions
- Google Earth – exploring real-world climate impacts visually
- Mentimeter – live student engagement and polls
- Canva for Education – creating posters about sustainability and SDGs

Additional Erasmus Projects

- União Europeia. (s.d.). GAME4CHANGE: Digital serious games for climate change education. Erasmus+ Project Card. [Plataforma GAME4CHANGE](#)
- ECCI Consortium. (s.d.). ECCI project: Innovative game-based learning approach. Escape Climate Change Initiative. [ECCI Project](#)



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- Teles, S., & colaboradores. (Ano). Assessing online climate change games targeting youth. (Artigo científico em revista indexada; indicar título completo da revista, volume, páginas e DOI, se disponível) [sciencedirect](https://www.sciencedirect.com)
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- NASA Climate Kids. (n.d.). Climate kids: Games and activities. <https://climatekids.nasa.gov/>



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- National Geographic Society. (n.d.). Education resources on climate change. <https://education.nationalgeographic.org/>
- World Wide Fund for Nature. (n.d.). Climate and environmental education resources. <https://www.wwf.org.uk/learn>