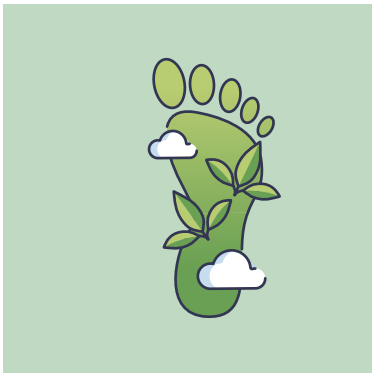
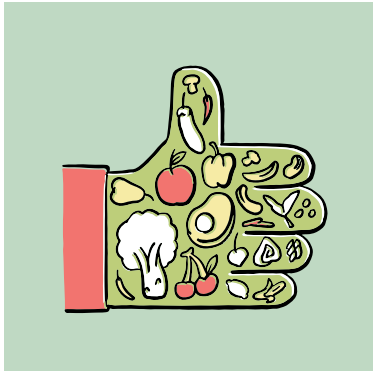
Sustainable escape room blueprint

Developed as a part of:
FutureProof: Youth Action for Sustainable Change





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The idea behind the FutureProof Project

The FutureProof: Youth Action for Sustainable Change project was launched under the INGENIUM Student Partnerships initiative to empower students to take an active role in shaping sustainable futures within their universities and communities. Conceived and coordinated by members of the INGENIUM Student Sustainability Board, the project connects students from 8 European universities through experiential learning, intercultural dialogue, and collaborative creation.

FutureProof combines knowledge, practice, and creativity. Its activities, from the preparatory meeting in Iași (Romania) to the three-day Sustainability Workshop in Skövde (Sweden), have focused on translating sustainability theory into tangible outputs that can generate long-term impact. These include:

- The Student Sustainability Questionnaire, mapping awareness, behaviors, and priorities related to sustainability on campus;
- The Student Sustainability Toolkit, which compiles practical examples, reflections, and ideas for action;
- The Student Sustainability Hub, a digital platform for sharing ongoing initiatives and connecting like-minded students; and
- The Sustainable Escape Room, an innovative, game-based learning tool that helps participants explore SDG challenges through interactive storytelling.

At its core, FutureProof embodies the principle that sustainability begins with collaboration. By bringing together students from diverse disciplines and cultures, it nurtures a collective capacity to innovate, empathize, and lead. Through dialogue, creativity, and shared responsibility, the project aspires to make sustainability not just a topic of study, but a lived experience across all INGENIUM universities.

Introduction

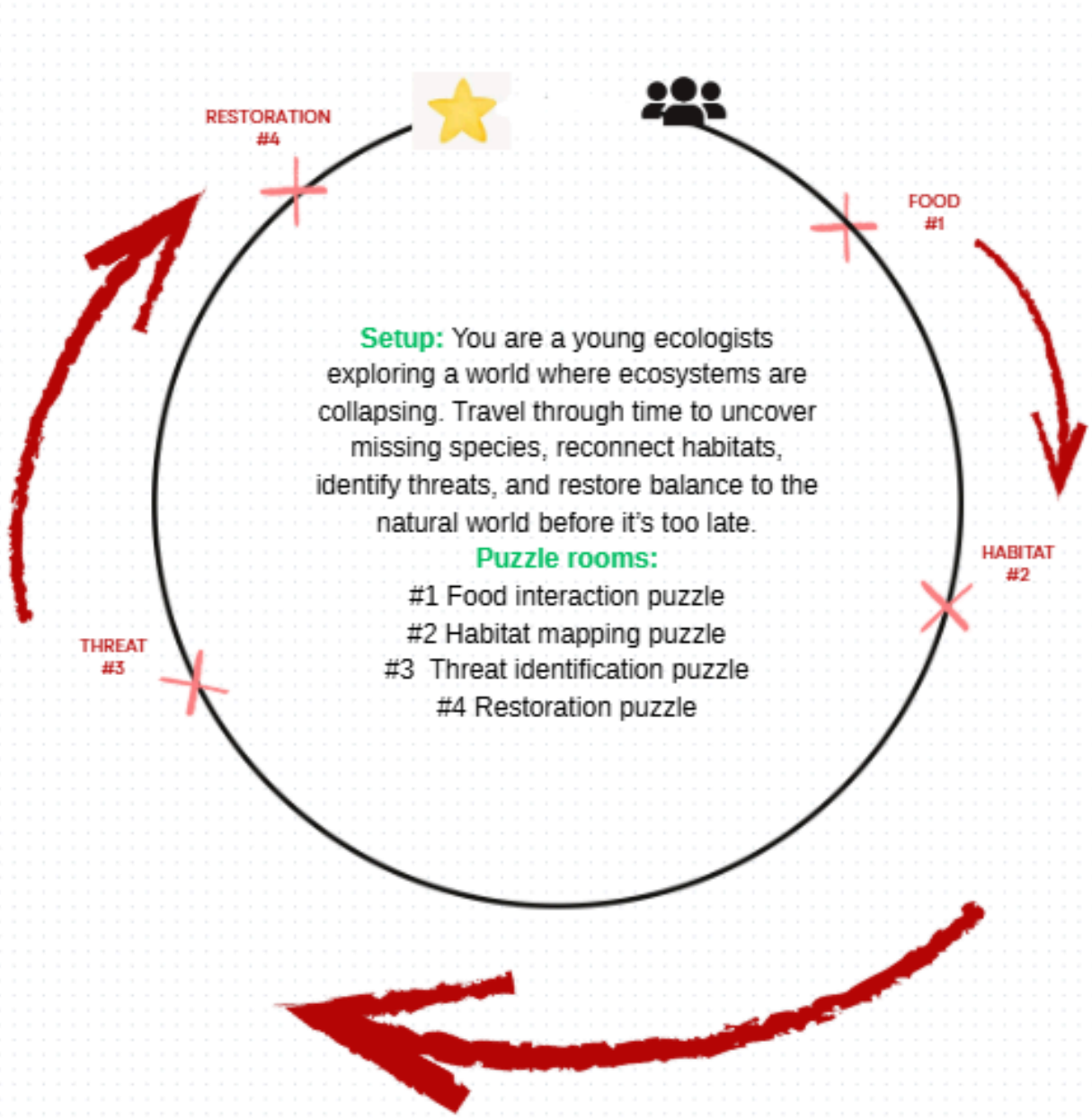
As experiential learning gains prominence in sustainability education, interactive and game-based methods have proven highly effective in engaging students and deepening their understanding of complex environmental and social issues. The Sustainable Escape Room developed within the FutureProof initiative builds on this pedagogical approach by offering structured, themed games that transform sustainability concepts into accessible, immersive, and collaborative learning experiences.

The Sustainable Escape Room Blueprint outlines the conceptual and practical foundations for implementing a series of sustainability-focused games designed by students for students. Its scope includes guidance on puzzle development, narrative cohesion, alignment with the Sustainable Development Goals, and recommended materials and facilitation strategies.

The core objective is to provide INGENIUM universities with a ready-to-use, adaptable set of game modules that can be embedded into workshops, courses, or campus events to strengthen sustainability literacy. Through hands-on problem-solving, teamwork, and scenario-based reasoning, the games aim to cultivate systems thinking, promote interdisciplinary dialogue, and encourage learners to connect sustainability principles with real-world challenges.

This blueprint is significant for FutureProof because it operationalises one of the project's main goals: empowering students to co-create meaningful sustainability learning experiences across the INGENIUM Alliance. By providing fully developed escape-room games, the initiative ensures that universities have accessible, engaging tools to foster student participation and strengthen sustainability culture on campus. In the broader context of higher education, the Sustainable Escape Room represents an innovative pedagogical resource that bridges theory and practice, transforms abstract sustainability concepts into active learning moments, and supports the development of critical competencies such as collaboration, creativity, and responsible decision-making. Ultimately, it reinforces FutureProof's mission to equip students with the skills and mindset needed to navigate—and positively influence—the sustainability challenges of the future.

Sustainable escape room plan



The escape room holistically promotes SDG 15 – Life on Land as the central theme, supported by SDGs 11, 12, 13, and 14, reflecting how ecosystem protection and restoration contribute to sustainable development.

ROOM 1 - Food interaction puzzles

Storyline: *Players have been hired as "Sustainability Chefs" tasked with preparing a campus meal that is both environmentally friendly and culturally inclusive. The kitchen has been left in chaos, and they must solve some challenges to create the ultimate sustainable menu. Correctly solving puzzle 1 brings them closer to unlocking the "recipe of sustainability" and escaping the kitchen.*
Duration: *15 minutes (approx 7 minutes per puzzle)*

Setup Props:
Printed cards for ingredients.
3 colored bins labeled Compost, Recycling and Donation.
QR codes for optional extra hints or sustainability tips
Timer for the challenge atmosphere

PUZZLE 1: THE WASTE SORTING SHOWDOWN

Aim: *To correctly sort kitchen "waste items" into Compost, Recycling or Donation.*

Challenge:
Players receive 8 item cards denoting kitchen waste.
They must place each item in the correct bin.
Tricky items (plastic-lined cartons, oily paper, mouldy bread) force group discussion.

Items:
Banana peel : compost
Cracked eggshell : compost
Milk carton with plastic cover : recycling
Plastic wrap :recycling
Apple with bruises : donation
Tea bag : compost
Aluminum can : recycling
Mouldy bread : compost

Twist:
Each correct item gives them one letter (C, L, O, E, N...).
The letters unscramble into a hint needed for Puzzle 2 (e.g., "LOCAL").
3 wrong placements = they must draw a "kitchen setback" card (e.g., "The compost is contaminated - lose 1 minute").

The goal of puzzle 1 is to provide a quick lesson on proper waste separation, reducing food waste, and recognizing donation opportunities.

PUZZLE 2 — THE LOCAL MENU MASTERMIND

Aim: *Build a sustainable meal plan using only seasonal, local, and low-carbon ingredients.*

Challenge:

Players receive ingredient cards for a full campus meal (vegetables, proteins, grains, spices).
Some ingredients are labeled in season, some imported, some high carbon footprint.
Players must create a 3-item meal using the most sustainable ingredients.

Set-up:

Students receive 8 ingredient cards:
Local & sustainable (good choices):
Potatoes
Carrots
Lentils
Oats

High-carbon or imported (bad choices):

Beef
Avocado
Strawberries (off-season)
Cheese (high CO_2)

Instructions:

Using the word they unlocked ("LOCAL"), they must choose 3 local ingredients to create a climate-friendly meal.

Winning combination: *Potatoes, lentils and carrots*

Lastly, their chosen 3 ingredients correspond to a 3-digit code (e.g., potatoes = 4, lentils = 2, carrots = 7 → code 427).
Enter it → escape accomplished!

The goal of Puzzle 2 is to provide a quick, important lesson on local produce and low-carbon eating.

ROOM 2 - Habitat mapping puzzles

Storyline: *Players have been recruited as Habitat Guardians, an emergency ecological response team called in to rescue a landscape that is rapidly collapsing. A series of storms, wildfires, and human activities have torn the habitat apart, leaving wildlife stranded and migration routes blocked. The regional conservation agency left behind incomplete maps, misplaced species data, and half-finished corridor plans. To restore balance, the Guardians must analyze the damaged habitat, reconnect the landscape, and help species reach safety before the ecosystem collapses entirely.*

Duration: *15 minutes (approx 7 minutes per puzzle)*

PUZZLE 1. SPECIES ON THE MOVE: MIGRATION PATH MATCHING

Story hook: *several species need to move across the landscape to find breeding or feeding areas, but the habitat is fragmented.*

Goal: *match each species to the correct migration path and identify which are blocked by human impacts.*

Materials:

A storyline card

5 species tokens (e.g., wolf, frog, butterfly, deer, fish)

A map with multiple possible paths, some blocked

Small tokens representing threats (road, dam, pollution) are pre-placed on the map before the puzzle begins; players do not place them.

Correct paths have hidden letters underneath

Steps:

1. Read each species card:

◯ *frog: needs wetland patches*

◯ *butterfly: needs flower strips*

◯ *fish: must move through river segments*

◯ *deer: needs forest patches*

◯ *wolf: needs large connected forest areas*

2. Place species tokens on the start point.

3.Trace paths using their habitat needs.

4.Identify which paths are suitable and which are blocked.

5. On each correct path's destination point is a hidden letter → together form the word "HABITAT."

Aha! moment: *different species require different habitat structures, restoring connectivity benefits the whole ecosystem.*

Setback Trigger: *A species is assigned to the wrong path twice.*

Setback cards:

"Barrier Collapse!" A dam breaks, fish struggle. → Players must remove all tokens on river paths and redo them.

"Species Confusion!" The team must swap the position of two species tokens, even if they were correct.

"Poachers Detected!" For the next 15 seconds, only one player may touch the map.

"Habitat Fire!" One habitat patch becomes temporarily unusable. → Place a "fire" marker on one map tile; species cannot cross it.

PUZZLE 2. THE TORN HABITAT MAP RECONSTRUCTION

Story hook: *a new highway has cut across the habitat. Players must design wildlife corridors that reconnect the ecosystem.*

Goal: *choose three correct corridor locations out of eight options to reconnect species habitats.*

Materials:

A laminated map showing:

-Forest patches;

-Wetlands;

-A new road blocking movement.

8 possible corridor tiles (bridges, underpasses, green strips)

Wrong corridors cross unsuitable areas (city, steep cliffs, deep water)

Correct corridors reveal numbers on their backside

Steps:

1.Study the map and route barriers.

2.Evaluate which corridors correctly link:

◯ *forest to forest*

◯ *riverbank to wetland*

◯ *meadow to meadow*

3.Place the three correct corridor tiles.

4.Flip them to reveal numbers (e.g. 5-2-8).

Unlock: *The numbers form the code for the next lock.*

Aha! moment: *not all corridors are equal — ecological suitability matters (land cover, slope, proximity to human activity).*

Setback trigger: *players choose 1 incorrect corridor location.*

Setback cards:

“Road Expansion!” One potential corridor spot becomes unusable. → Cover one incorrect corridor tile with a red X marker (reduces options).

“Budget Cut!” You lose restoration resources. → Team must discard one corridor tile from the available pool (not the correct one).

“Human Disturbance!” A nearby settlement expanded.→ Move one correct corridor tile two squares away, team must find the new correct placement.

“Flooding Event!” One player must stop talking for 20 seconds while others decide the next placement.

ROOM 3 - Threat identification puzzles

PUZZLE 1 — SCRAMBLED SENSOR LAB

Story hook: The lab's environmental sensors glitched during a storm. Pollution, invasive species, and climate indicators are all mixed up.
Goal: Identify the correct threat by matching each set of scrambled readings to its corresponding threat card.

Materials:
3–4 "Sensor Readings" cards (e.g., low oxygen, algal bloom, high nitrate, fish die-off)
4–5 Threat Cards: Pollution, Invasive Species, Climate Change, Overexploitation

Mechanism:
1. Read each sensor set.
2. Use logical deduction to match them to the right threat.
3. Each correct match gives 1 letter.
4. Letters spell the final threat code, e.g. "IMPACT."

Aha! Moment: Players realize multiple indicators together reveal the hidden cause.

Setback Mechanic:
If players make 2 incorrect matches, draw one Setback Card:
"Sensor Offline — Lose 20 seconds."
"False Positive — Remove one correct letter until re-verified."
"Power Surge — One player cannot speak for 15 seconds."

PUZZLE 2 — THREAT HOTSPOTS MAP SCAN

Story hook: A biodiversity map shows unusual patterns—dead zones, species absences, temperature spikes. Players must locate the underlying threat.
Goal: Identify which threat is responsible by matching map anomalies with threat profiles.

Materials:
One map with symbols:
Dead fish (low oxygen)
Brown water (pollution)
Chewed plants (invasive herbivore)
Heat zones (climate anomaly)
4 Threat Profile Cards
Each correct hotspot–threat match reveals a symbol.

Mechanism:
Scan the map and identify anomalies.
Match each anomaly to a threat:
Dead fish → pollution
Heat zone → climate change
Chewed leaves → invasive species, etc.
Each correct match gives a symbol or letter.
Decoding symbols gives the final word (e.g., “THREAT”, “SOURCE”, “CAUSE”).

Aha! Moment: spatial distribution on a map reveals the true environmental pressure.

Setback Mechanic:
Trigger: 2 incorrect hotspot assignments.

Setback Cards:
“Storm on the Horizon — Cover one hotspot with a cloud token for 15 seconds.”
“Misread Satellite Data — Rotate the map 180°.”
“Wildlife Panic — Only one player may interact with the map until next correct match.”

ROOM 4 - Restoration puzzles

PUZZLE 1 - THE HABITAT RESTORATION MATCH-UP

Aim: *Players must correctly match disturbed habitat scenarios with the restoration actions that repair them. This teaches ecological recovery principles: removing stressors, rebuilding structure, reintroducing species.*

Challenge: *Players receive 8 scenario cards (environmental problems) and 8 action cards (restoration solutions). They must match each scenario with the correct ecological action.*

Scenario Cards (Problems):

River full of sediment
Forest fragmented by road
Invasive plant spreading rapidly
Polluted agricultural field
Wetland drained
Loss of pollinators
Overgrazed meadow
Native fish declining

Action Cards (Solutions):

Build riparian buffers
Install wildlife corridor
Remove invasive species
Reduce chemical input / soil remediation
Restore hydrology
Plant flower strips
Adjust grazing pressure
Restore native aquatic plants / reduce barriers
Each correct pair teaches a core restoration concept.

Twist:

Each correct pair reveals one letter (printed on the back of the action card or as a token given by the facilitator).
Correct letters form the 7-letter word: BALANCE (You can assign letters like B-A-L-A-N-C-E in the order above or scrambled). Incorrect pairs produce no letters, forcing players to rethink their choices.

Setback Mechanic (Optional – adds tension)

If the team makes 3 wrong matches, they must draw a "Restoration Setback" card such as:
"Storm destroys seedlings – lose 1 minute."
"Invasive species regrow – return one solved pair and redo it."
"Pollution spike – all players freeze 10 seconds."

This mirrors the tension of ecological restoration in real life.

Step by step:

- *Spread the 8 scenario cards on the table.*

- Spread the 8 action cards beside them.

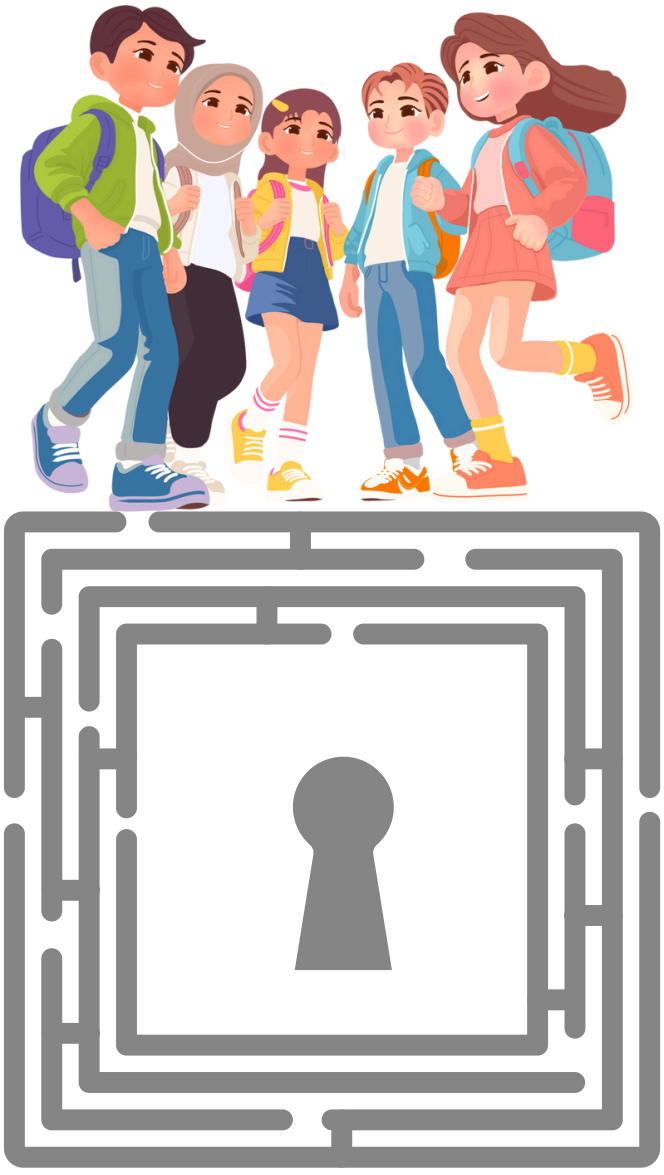
- Discuss quickly and match each scenario with the correct action.

- Check answers (self-checking board or facilitator confirmation).

- Collect one letter per correct match.

- Unscramble the letters to form the word: ***BALANCE***

This word becomes a key input / verbal code for the next puzzle in Room 4.



PUZZLE 2 - SPECIES AT STAKE: INVASIVE VS NATIVE MATCH-UP

Aim and Challenge: Players learn to recognize invasive vs native European species (plants & animals, terrestrial & aquatic), understand their impacts, and match them with the correct conservation or management action.
Correct pairs reveal letters that form the final word BALANCE, symbolizing ecosystem equilibrium.

Scenario Cards (Problems):

Fallopia japonica: Japanese knotweed (invasive plant; riverbanks / disturbed soil)
Neovison vison: American mink (invasive predator; rivers, wetlands)
Carpobrotus edulis: Hottentot fig / ice plant (invasive coastal succulent)
Harmonia axyridis: Asian lady beetle (invasive insect; gardens & crops)
Fagus sylvatica: European beech (native tree; temperate forests)
Lutra lutra: Eurasian otter (native mammal; indicator of clean waters)
Austropotamobius pallipes: White-clawed crayfish (native; threatened freshwater species)
Salmo trutta: Brown trout (native freshwater fish; rivers & streams)

Action Cards (Solutions):

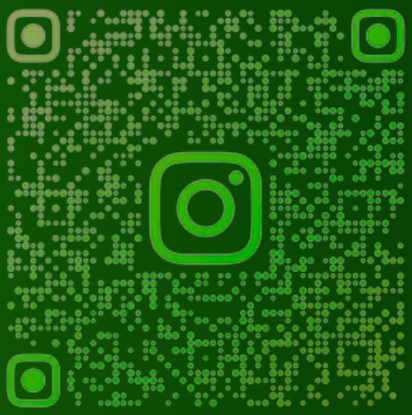
A. Physical removal / rhizome excavation + long-term monitoring
B. Targeted capture programs and population control
C. Coastal invasive removal + replanting with native dune species
D. Public awareness, sales restrictions, citizen reporting
E. Sustainable forest management + old-growth protection
F. Riparian restoration, water-quality improvement, habitat refuges
G. Captive breeding, health screening, controlled reintroduction
H. Remove river barriers, restore aquatic connectivity, reduce pollution

Answer Key for Facilitator:

Fallopia japonica → 1. Physical removal / rhizome excavation → Letter: B
Strong regenerative rhizomes require mechanical removal & repeated monitoring.
Neovison vison → 2. Targeted capture & population control → Letter: A
Key method for reducing predation pressure on birds & amphibians.
Carpobrotus edulis → 3. Coastal removal & native replanting → Letter: L
Replacing mats of Carpobrotus restores dune biodiversity.
Harmonia axyridis → 4. Awareness + sales restrictions → Letter: A
Spread is fueled by trade/transport; informing the public is crucial.
Fagus sylvatica → 5. Sustainable forest management → Letter: N
Native tree; conservation focuses on healthy forest structure.
Lutra lutra → 6. Riparian & water-quality restoration → Letter: C
Otters recover when water is clean and banks provide cover.
Austropotamobius pallipes → 7. Captive breeding + reintroduction → Letter: E
Threatened by disease (crayfish plague) and competition.
Salmo trutta → 8. Remove barriers & improve connectivity → NO LETTER (educational)

Correct match but gives no letter; shows not all good actions “feed” the final word.

THE FUTURE ISN'T SOMETHING TO ESCAPE FROM, IT'S SOMETHING TO SOLVE, TOGETHER.



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