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**ECODISCOVERY**

*"Play And Discover The Future"*



PROJECT RESULT 4 • COORDINATOR COMPILATION

# Educational Resources

Project Result 4 – A Resource Pack for Teachers and Students

**Project: EcoDiscovery – Play And Discover The Future**

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**Website: [www.ecodiscovery.eu](http://www.ecodiscovery.eu)**



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# Introduction

## About EcoDiscovery

EcoDiscovery – *Play And Discover The Future* is an Erasmus+ KA210 small-scale school partnership between organisations in Türkiye, the Czech Republic and France. Its central output is ECOTOPIA, an educational game that raises environmental awareness through game-based learning.

## Purpose of this resource pack

This resource pack (Project Result 4) brings together everything teachers and students need to use ECOTOPIA inside and outside the classroom: an About ECOTOPIA overview, the Teacher Guide, the Student Guide, the game chapters and learning goals, environmental fact sheets, classroom activities, evaluation forms and access information.

## How to use this pack

Teachers can start with the Teacher Guide and Fact Sheets; students with the Student Guide and Access Information. The game chapters explain the learning goals behind each task, and the evaluation forms help capture what learners gain.

## About ECOTOPIA

ECOTOPIA is a scenario-based, mission-oriented educational game developed by teachers and students from Türkiye, the Czech Republic and France within the EcoDiscovery Erasmus+ project. Players join an Eco-Team and solve real environmental challenges across four themes: water, energy, biodiversity and waste. It is designed for middle-school learners aged 10–14.

### Key facts

- **Engine:** Unity (WebGL, Android, Windows), programmed in C#.
- **Platforms:** Web (game.ecodiscovery.eu), Android (Google Play & APK) and Windows.
- **Languages:** Turkish, English, Czech and French.
- **Access:** free, no account required, rated 3+ on Google Play.
- **AI assistant:** a Gemini-based helper (press R) answers environment questions in-game.
- **Feedback:** information cards, scoring (0–100), badges and a privacy-masked leaderboard.

### Learning objectives

Through interactive tasks, ECOTOPIA aims to build environmental awareness, critical thinking and sustainable-living skills, encouraging learners to identify problems, generate solutions and observe the consequences of their decisions.

## 1 | Introduction

This Teacher Guide supports educators who wish to use **ECOTOPIA**, the educational game of the EcoDiscovery project, in the classroom. ECOTOPIA turns four environmental themes – water, energy, biodiversity and waste – into playable tasks in which learners act as members of an Eco-Team, make decisions and discover their real-world consequences.

### The Four Themes of ECOTOPIA

Each theme becomes a chapter of interactive, mission-based learning

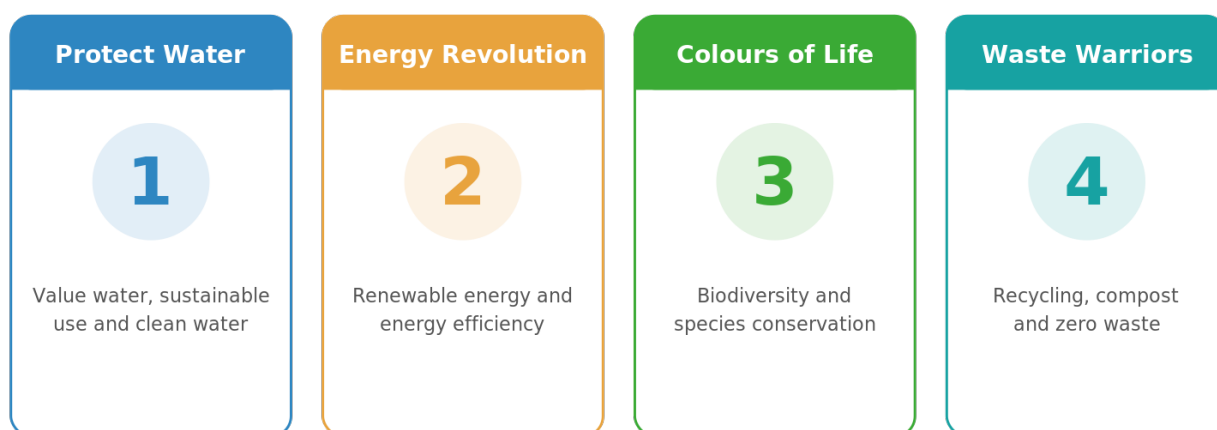


Figure 1. The four sections of the game, one per environmental theme.

The guide offers a ready-to-use lesson flow, discussion questions, follow-up activities, differentiation ideas and assessment tools, and links each part to concrete learning outcomes. It works in science, geography, citizenship, English (CLIL) and cross-curricular lessons. The game is free, needs no account, and is available on web, Android, APK and Windows in four languages.

## 2 | Recommended Age Group

ECOTOPIA is designed for middle-school learners aged **10–14** (rated 3+ on Google Play). The table below suggests how to adapt the focus of a session to different ages within this range.

| Age   | Suggested focus                                                                                                                                           |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10–11 | Play in pairs; focus on the information cards and simple real-life actions. Emphasise vocabulary and cause–effect (“what happens if…”).                   |
| 12–13 | Individual or paired play; connect tasks to science and geography concepts. Use the discussion questions and a short follow-up task.                      |
| 14    | Independent play; use the game as a springboard for debate, data work and a project or campaign. Encourage learners to evaluate the solutions critically. |

## 3 | Classroom Integration

## Subjects and curriculum links

| Subject            | How ECOTOPIA fits                                                     |
|--------------------|-----------------------------------------------------------------------|
| Science            | Water cycle, energy sources, ecosystems, materials and decomposition. |
| Geography          | Resources, sustainability and human impact on the environment.        |
| Citizenship / PSHE | Responsibility, community action and sustainable choices.             |
| English (CLIL)     | Environmental vocabulary, giving reasons and persuasive language.     |
| Art / ICT          | Game-design thinking, visual communication and digital literacy.      |

## Ways to use the game

- **Whole-class** on a projector: play one task together and discuss each choice.
- **Paired play** on tablets or computers: learners support each other and compare scores.
- **Station activity**: one section per station in a carousel across a lesson.
- **Homework / flipped learning**: play a section at home, discuss findings in class.

*Did you know? Play each task yourself before the lesson so you know which information cards and choices to highlight.*

## 4 | Suggested Lesson Flow (45–60 minutes)

### A Ready-to-Use Lesson Flow

One 45-60 minute lesson built around the game

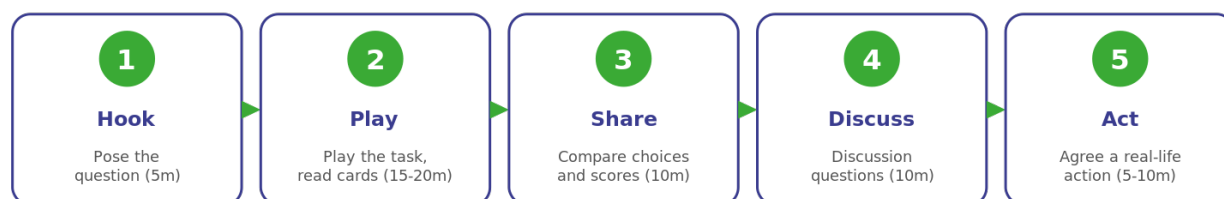


Figure 2. A simple five-stage lesson built around one task.

| Stage | Time      | Activity                                                                                        |
|-------|-----------|-------------------------------------------------------------------------------------------------|
| Hook  | 5 min     | Pose the task question (e.g. "How much water can we save at home?"). Collect quick predictions. |
| Play  | 15–20 min | Learners play the selected section/task, reading the information cards as they go.              |

|                |          |                                                                                     |
|----------------|----------|-------------------------------------------------------------------------------------|
| <b>Share</b>   | 10 min   | Compare choices and scores. Which facts surprised them? Which choices were hardest? |
| <b>Discuss</b> | 10 min   | Use the discussion questions for the section (Section 5).                           |
| <b>Act</b>     | 5–10 min | Agree on one real-life action to try before the next lesson (Section 6).            |

## 5 | Discussion Questions by Section

### Section 1 – Protect Water

- Where does water get wasted in our school and homes?
- How should a city share limited water between homes, farms and industry?
- What is grey water, and where could we reuse it?

### Section 2 – Energy Revolution

- Which energy do we use that comes from the sun or wind?
- What is "vampire energy" and how can we stop it?
- How could our school produce or save more energy?

### Section 3 – Colours of Life

- Why do pollinators such as bees matter for our food?
- What makes a good habitat for wildlife?
- How can replanting help nature recover?

### Section 4 – Waste Warriors

- Which of our everyday items could be recycled or reused?
- What can and cannot go into compost?
- How can waste become a useful resource?

## 6 | Follow-up Activities

- **Home water audit.** Learners check taps and habits at home and report savings.
- **Energy detectives.** Map lights and devices left on at school; propose fixes.
- **Pollinator corner.** Plant a small pollinator-friendly patch in the school grounds.
- **Classroom sorting station.** Set up paper, plastic, glass and metal bins and track use.
- **Design a task.** Learners invent their own ECOTOPIA task with an information card.
- **Campaign poster.** Groups create a poster sharing three facts and one call to action.

*Did you know? Link follow-up activities to the evaluation forms so learners can reflect on what changed.*

## 7 | Differentiation & Inclusion

- **Support:** pair confident readers with others; pre-teach key vocabulary; let learners replay a task.
- **Challenge:** ask fast finishers to design their own task or beat their score with fewer wrong choices.
- **Language:** switch the game language or use it as CLIL support for English learners.
- **Access:** the game runs on standard devices; whole-class projector play suits limited hardware.
- **Grouping:** mixed-ability pairs encourage peer explanation and discussion.

## 8 | Game Features to Highlight

### The AI assistant

ECOTOPIA includes an AI assistant powered by the Gemini API. Learners press the **R** key during play to ask an environment or game question and receive an instant, age-appropriate answer.

### The In-Game AI Assistant

A Gemini-powered helper for environment questions - no data stored

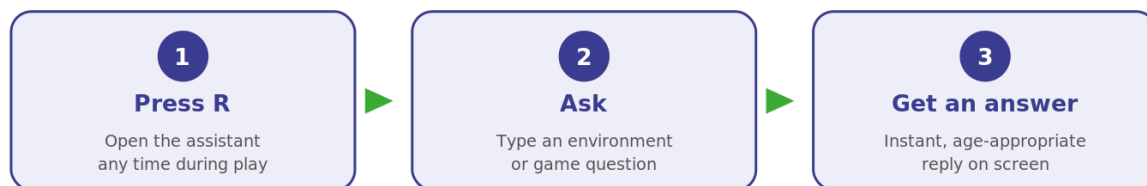


Figure 3. Encourage learners to ask "why" questions with the AI assistant.

The assistant only answers environment and game topics and stores no student data – a safe way to feed curiosity mid-lesson.

### Scoring and reflection

Each task gives a score (0–100) based on speed and the number of correct choices, feeding badges and a privacy-masked global leaderboard. Emphasise learning over ranking.

## 9 | Assessment & Reflection

Use the companion *Evaluation Forms* (Student Reflection Form and Teacher Observation Form) to capture learning alongside the game score. Suitable evidence includes participation in discussion, the quality of the chosen real-life action, a learner's own designed task or poster, and pre/post changes in environmental vocabulary and attitudes. The Student Guide and Environmental Fact Sheets give further support and are available at [www.ecodiscovery.eu](http://www.ecodiscovery.eu).



## 1 | Introduction

Welcome, young explorer! This Student Guide helps you get the most out of **ECOTOPIA**, the educational game of the EcoDiscovery project. In ECOTOPIA you join an Eco-Team and solve real environmental challenges about water, energy, nature and waste, seeing the consequences of your decisions along the way.

The guide explains how to start the game, how to move through it, how to complete tasks, how to use the built-in AI assistant, and how to turn what you learn on screen into real actions. Keep it beside you the first few times you play.

## 2 | About ECOTOPIA

ECOTOPIA is a scenario-based adventure made of four sections. In each section you complete tasks as a member of the Eco-Team. It was created by teachers and students from Türkiye, the Czech Republic and France, and is available in four languages (Turkish, English, Czech and French).

### The Four Themes of ECOTOPIA

Each theme becomes a chapter of interactive, mission-based learning

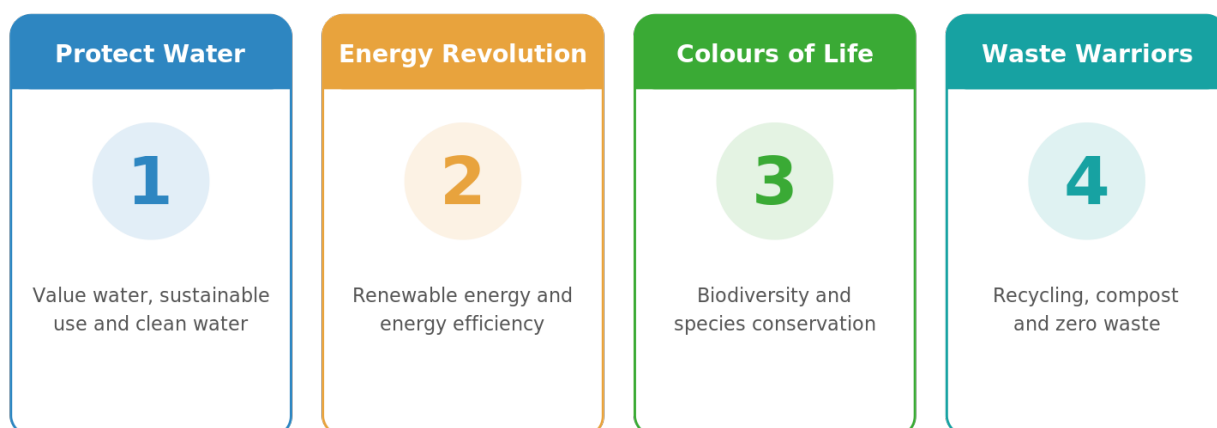


Figure 1. The four sections of ECOTOPIA, each a different environmental adventure.

### What you will learn

- **Environmental awareness** – understand water, energy, biodiversity and waste.
- **Problem solving** – find practical solutions to real challenges.
- **Creativity** – design gardens, homes and clean-energy systems.
- **Responsibility** – connect your choices to their effect on nature.

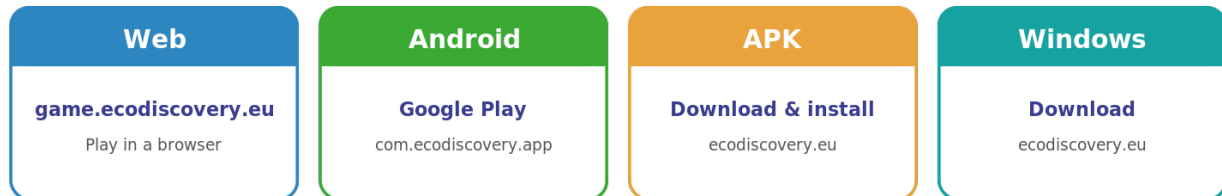
### Who is it for

ECOTOPIA is designed for middle-school learners aged **10–14**. It is rated 3+ on Google Play. You can play alone, in pairs or in small groups.

## 3 | Where to Play

## Where to Play ECOTOPIA

Free, no account, four languages (TR / EN / CZ / FR), ages 10-14



**Rated 3+ on Google Play - no data shared with third parties**

Figure 2. ECOTOPIA is free and runs on the web, Android, APK and Windows.

The quickest way to start is the web version at <https://game.ecodiscovery.eu> – it opens in any browser with no installation. On Android you can install it from Google Play ([com.ecodiscovery.app](https://play.google.com/store/apps/details?id=com.ecodiscovery.app)) or from the APK, and there is a Windows version too. The game is **free**, needs **no account**, and shares no data with third parties.

## 4 | Getting Started

- **Step 1.** Open the web version, or install the Android, APK or Windows version.
- **Step 2.** Choose your language (Turkish, English, Czech or French).
- **Step 3.** Turn the sound on for the best experience.
- **Step 4.** Start from Section 1 – Protect Water, or continue where you left off.
- **Step 5.** Read the short intro of each task before you begin.

*Did you know? Play with the sound on – many tasks use sounds (a dripping tap, birdsong) as clues.*

## 5 | Game Navigation

The game is easy to move around once you know the main areas of the screen:

- **Section map.** Choose which section and task to play.
- **Task scene.** The main play area where you click, drag and explore.
- **Score bar.** Shows your points and progress in the current task.
- **Badges.** Collect a badge for each task you complete.
- **Information cards.** Pop-up cards that teach a fact after your choices.
- **AI assistant.** Press the R key to ask an environment question at any time.
- **Menu.** Pause, restart a task, change settings or return to the map.

## 6 | How Tasks Work & Scoring

Every task follows the same simple rhythm, so once you finish one you will know what to do in all of them.

## How Every Mission Works

A repeating cycle that turns play into learning and action

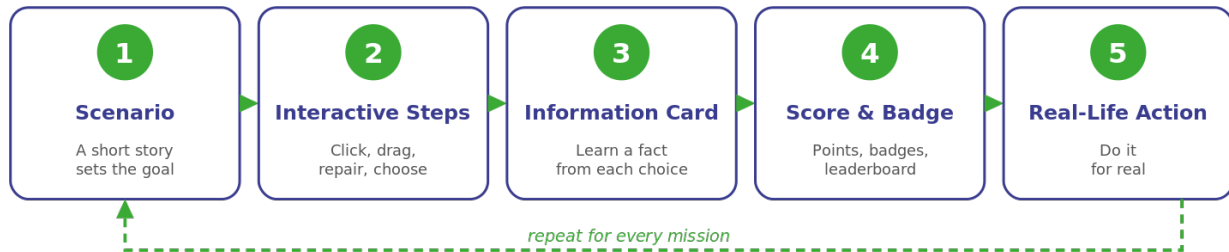


Figure 3. The five steps you repeat in every task.

### How your score works

- Your score (0–100) comes from two things: how **quickly** you play and how **few wrong choices** you make.
- Playing too fast does not help – the game rewards learning, not rushing.
- Your results screen shows your score, time, completion percentage and ranking.
- In the global leaderboard, names are shown in a masked form (for example, user\*\*\*) to protect privacy.

***Did you know?** A lower score is not a failure – each “wrong” choice teaches you something and you can try again.*

## 7 | Information Cards & the AI Assistant

### Information cards

Information cards appear as pop-ups during tasks and share a quick, memorable fact. Reading them helps you make better choices later. Examples:

- A dripping tap can waste up to **550 litres** of water per year.
- LED lamps use about **80% less energy** than traditional bulbs.
- Recycling aluminium saves about **95%** of the energy needed to make it from raw material.

### The AI assistant

ECOTOPIA has a built-in AI assistant powered by the Gemini API. Press the **R** key during play to ask any environment or game question and get an instant, age-appropriate answer.

## The In-Game AI Assistant

A Gemini-powered helper for environment questions - no data stored

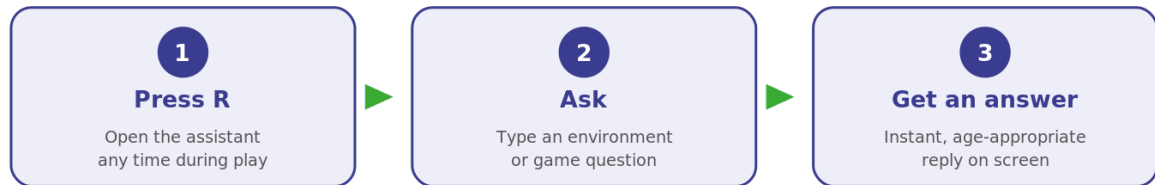


Figure 4. Using the in-game AI assistant in three simple steps.

The assistant only answers environment and game questions, and it does not collect or store your data. Use it whenever you are curious – asking “why?” is a great way to learn.

## 8 | Tips to Play Well

- **Read before you click.** The scenario tells you exactly what your goal is.
- **Learn from mistakes.** A wrong choice opens a card that explains the better option.
- **Collect the facts.** The information cards often help you in later tasks.
- **Aim for understanding, not speed.** The score rewards good choices, not rushing.
- **Ask the assistant.** If you are stuck or curious, press R and ask.
- **Finish the section.** Complete all tasks to earn every badge.

## 9 | Real-Life Actions

ECOTOPIA is not only about the screen. Every task ends with a real-life action card inviting you to become a real eco-hero. Try these:

- Check the taps at home and report any that drip or run.
- Unplug chargers and adapters you are not using to stop “vampire energy”.
- Set up simple sorting for paper, plastic, glass and metal at home.
- Plant a pollinator-friendly flower such as lavender.
- Take a bag on your next walk and collect any litter you find.

*Did you know? Share your real-life actions with your class – small actions add up when everyone joins in.*

## 10 | Game Sections at a Glance

| Section          | Theme                    | What you do                                                                                 |
|------------------|--------------------------|---------------------------------------------------------------------------------------------|
| 1. Protect Water | Water & a healthy future | Fix water waste, manage a city's water, reuse grey water and clean a pond of microplastics. |

|                      |                               |                                                                               |
|----------------------|-------------------------------|-------------------------------------------------------------------------------|
| 2. Energy Revolution | Renewable energy & efficiency | Install solar and wind systems and design an efficient smart home.            |
| 3. Colours of Life   | Biodiversity conservation     | Observe species, rescue wildlife, design a pollinator park and replant seeds. |
| 4. Waste Warriors    | Recycling & zero waste        | Sort waste, build compost and match waste to new products.                    |

A detailed description of every task is in the companion document *ECOTOPIA Game Chapters*. Play the game and find all resources at [www.ecodiscovery.eu](http://www.ecodiscovery.eu).

## About the ECOTOPIA Game

ECOTOPIA is a scenario-based, mission-oriented educational game developed within the EcoDiscovery Erasmus+ project by teachers and students from Türkiye, the Czech Republic and France. It invites middle-school learners aged **10–14** to become members of an Eco-Team and solve real environmental challenges across four themes: water, energy, biodiversity and waste. The story and mission structure in this document were designed during the project's LTT activities and reflect the final game.

The game is built in Unity and available on the web, Android, APK and Windows, in four languages (Turkish, English, Czech and French). It is free and requires no account.

### How the missions work

- **Scenario.** Every mission opens with a short story that gives the player a clear goal.
- **Interactive steps.** Players click, drag, repair, sort and choose their way through each scene.
- **Information cards.** Correct and incorrect moves reveal fact cards; correct choices also show numerical data.
- **Scoring & ranking.** A score based on time and number of correct choices (0–100) feeds badges and a global leaderboard with privacy-masked names.
- **AI assistant.** Players can press the **R** key at any time to ask the Gemini-based assistant an environment question and receive an instant, age-appropriate answer.
- **Real-life action card.** Each mission closes by inviting the player to repeat the action in real life.

The four chapters are organised as a linear, spiral progression, so each new task builds on the last.

## Chapter 1 | Protect Water

Players learn the value of water, sustainable water use and how to combat water pollution – moving from the household to the city scale.

### Task 1 – Water Waste Detective

**Scenario.** As the home water hero, the player identifies and fixes wasteful habits in the kitchen and bathroom – dripping taps, long showers, open hoses – and sees the savings calculated for each fix.

#### Gameplay

- Inspect interactive kitchen objects (tap, dishwasher, vegetable washing, defrosting).
- Repair a dripping tap and choose to run the dishwasher only when full.
- Control bathroom habits: choose a short shower, fit a low-flow cistern, select Eco laundry mode.
- Watch a water-saving meter fill and earn a badge for high savings.

*Did you know? A dripping tap can waste up to 550 litres of water per year.*

*Did you know? A 5-minute daily shower can save around 10,000 litres of water per year.*

*Did you know? Running the dishwasher only when full uses water about 30% more efficiently.*

### Learning objectives

- Identify everyday sources of water waste at home.
- Connect small daily choices to large yearly savings.

**Real-life action card.** Check the taps at home and review your shower habits today.

## Task 2 – Manage the City's Water Budget

**Scenario.** The player zooms out to city scale and must balance a city's limited water supply, allocating resources fairly among the industrial, agricultural and residential sectors so none runs short.

### Gameplay

- Review the water needs of industry, agriculture and homes on a city dashboard.
- Allocate the limited water budget between the three sectors.
- Observe the consequences of each decision and rebalance to keep the city sustainable.
- Complete the level when all sectors are supplied without waste.

*Did you know? Agriculture accounts for around 70% of the fresh water people use worldwide.*

*Did you know? Balancing demand between sectors is key to managing water in a growing city.*

### Learning objectives

- Understand water as a shared resource at community scale.
- See the trade-offs involved in fair water management.

**Real-life action card.** Find out where your town or city gets its water and what uses the most.

## Task 3 – Greywater System

**Scenario.** The garden is drying out under water restrictions. The player builds a grey-water system – collecting, filtering and reusing water – to revitalise the garden.

### Gameplay

- Repair broken roof gutters hidden around the screen.
- Connect pipes in a puzzle to route water to the grey-water tank.
- Install a filtration unit, choosing between a simple or an advanced filter.
- Water the garden and revive the wilting flowers to earn a badge.

*Did you know? Grey water is lightly used water from sinks, showers and washing machines.*

*Did you know? Filtered grey water can be reused for garden irrigation, cutting yearly water use by up to 30%.*

### Learning objectives

- Understand what grey water is and where it comes from.
- Appreciate the importance of sustainable irrigation.

**Real-life action card.** Explore how a simple rainwater-harvesting system could work at home.

## Task 4 – Pond Microplastic Hunt

**Scenario.** The neighbourhood pond has turned cloudy and its wildlife is suffering from microplastics. The player cleans the pond with a scanning device and rescues the aquatic life.

### Gameplay

- Scan marked zones of the pond with a sonar-like device to locate microplastics.
- Collect and sort microplastics; each type reveals a fact card.
- Free the affected species and earn a badge for each rescue.
- Choose everyday habits that reduce plastic use.

*Did you know? Microplastics are plastic particles smaller than 5 mm formed as plastics break down.*

*Did you know? Microplastics building up in fish stomachs make feeding and survival harder.*

### Learning objectives

- Learn what microplastics are and how they form.
- Understand their impact on water ecosystems and how to reduce them.

**Real-life action card.** Reduce single-use plastics: carry a reusable bottle and bag.

## Chapter 2 | Energy Revolution

Exploring renewable energy and efficiency, players develop solutions at the neighbourhood, school and home levels.

### Task 1 – Energy Hunter

**Scenario.** Wearing an energy-scout jacket, the player tours the neighbourhood to find energy waste and offer green solutions.

### Gameplay

- Spot streetlights, billboards and devices left on unnecessarily.
- Replace them with solar-powered lights and timer systems.
- Set correct operating schedules for advertising screens.

*Did you know? Solar-powered lamps run on 100% renewable energy.*

*Did you know? A small wind turbine can generate around 500 kWh of energy per year.*

### Learning objectives

- Recognise energy waste and reach renewable solutions.
- Get to know solar and wind energy sources.



**Real-life action card.** Spot one source of wasted energy in your street and suggest a fix.

## Task 2 – Solar Garden Setup

**Scenario.** The player builds a shared solar garden to start clean-energy production for the neighbourhood.

### Gameplay

- Analyse the neighbourhood map and choose the area with the most sunlight.
- Optimise panel tilt angles to raise output.
- Install a Solar Tracker to increase energy production by about 25%.
- Run a one-day simulation and compare production with demand.

*Did you know? Sun-tracking systems produce 25–35% more energy than fixed panels.*

*Did you know? One square metre of solar panel produces about 150 kWh of electricity per year.*

### Learning objectives

- Learn how location and system choice affect energy production.
- Discover innovations such as solar trackers.

**Real-life action card.** Check whether your school or home roof gets enough sun for solar panels.

## Task 3 – School Energy Saver

**Scenario.** The player audits the school's energy use and adds renewable energy.

### Gameplay

- Switch classroom computers to Eco Mode.
- Turn off lights left on during the day.
- Install solar panels on the school roof and adjust their angle.

*Did you know? Eco mode lets computers use about 20% less energy.*

*Did you know? Solar-powered lighting can cut the electricity bill by up to 60%.*

### Learning objectives

- Build awareness of energy efficiency at school.
- See the role of solar energy in daily school life.

**Real-life action card.** Suggest an energy-saving idea to your teacher, such as switching off idle equipment.

## Task 4 – My Home's Energy Detective

**Scenario.** The player hunts energy leaks at home and develops smart solutions.

### Gameplay

- Use a thermal-camera simulation to find heat-loss points at doors, windows and the roof.
- Apply insulation or double glazing to fix them.
- Find and unplug "vampire" standby devices; set smart timers on appliances.

*Did you know? An uninsulated window loses up to five times more energy.*

*Did you know? Standby devices make up about 10% of a home's energy bill.*

### Learning objectives

- Understand insulation and smart appliance use.
- Learn the concept of vampire (standby) energy.

**Real-life action card.** Unplug idle chargers and adapters at home to cut standby energy.

## Task 5 – Smart Home Design

**Scenario.** Now an energy expert, the player combines everything learned to design the most efficient, eco-friendly smart home.

### Gameplay

- Place solar panels and add a solar tracker for extra output.
- Replace bulbs with LEDs and switch off lights left on.
- Move heavy appliances to off-peak hours with timers.
- Review the final Green Score and earn a badge.

*Did you know? LED lamps use about 80% less energy than traditional bulbs.*

*Did you know? Running appliances at low-demand hours can cut the bill by about 30%.*

### Learning objectives

- Learn correct ways to use solar energy.
- Understand efficiency through smart-home systems.

**Real-life action card.** Swap one home bulb for an LED and run heavy appliances at off-peak times.

## Chapter 3 | Colours of Life

Covering biodiversity, ecosystem balance and species conservation, players observe, protect and restore nature.

### Task 1 – Species Detective

**Scenario.** The player becomes a nature observer, documenting the variety of species living in a schoolyard.

### Gameplay

- Move around the schoolyard and click creatures to scan them (squirrel, ladybird, sparrow, daisy).

- Read a fact card for each species about its role in the ecosystem.
- Document as many species as possible within five minutes to earn stars.

*Did you know? A single ladybird can eat more than 5,000 pest insects per year.*

### Learning objectives

- Build biodiversity awareness.
- Recognise variety in nature through species observation.

**Real-life action card.** Observe and note how many different species live in a nearby garden or park.

## Task 2 – Save Endangered Species

**Scenario.** After a fire damages a habitat, the player relocates animals to safe areas and rebuilds their homes.

### Gameplay

- Find animals (fox, tortoise, owl) and carry them to safe zones.
- Rebuild a mini-ecosystem by placing bushes, trees and shelters.
- Restore vegetation so wildlife can return.

*Did you know? Forest fires displace around 1.5 million animals from their habitats each year.*

*Did you know? Natural shelters are critical for animals' survival.*

### Learning objectives

- Protect species under threat.
- Understand the concept of habitat and responsibility.

**Real-life action card.** Learn which species are endangered in your region and how they are protected.

## Task 3 – Pollinator Park

**Scenario.** The player designs a garden to support local pollinators – bees, butterflies and others.

### Gameplay

- Place flower species by drag-and-drop (lavender for bees, zinnia for butterflies).
- Add irrigation and shelters such as birdhouses and stone nooks.
- Score points for each correct plant–shelter combination and watch pollinators arrive.

*Did you know? About 35% of pollinators are at risk of extinction.*

*Did you know? Without bees, many crops such as coffee, strawberries and apples cannot grow.*

### Learning objectives

- Understand ecosystem services such as pollination.

- See plant–animal interaction and human impact.

**Real-life action card.** Plant a pollinator-friendly flower such as lavender at home or school.

## Task 4 – Seed Collector

**Scenario.** The player collects seeds from regional plant species and replants them to revive a damaged area.

### Gameplay

- Collect seeds from local plants around the map.
- Replant them in dry, damaged areas.
- Watch the area turn green and new animal species appear.

*Did you know? Restoring local vegetation supports the return of animal species and a healthier ecosystem.*

### Learning objectives

- Learn how local plant cover can be restored.
- Understand why biodiversity matters.

**Real-life action card.** Plant native flowers or a small tree in a suitable spot.

## Chapter 4 | Waste Warriors

Covering recycling, composting and bioenergy, players confront the fundamentals of waste management.

## Task 1 – Recycling Detective

**Scenario.** The player sorts wrongly discarded rubbish in the neighbourhood into the correct bins.

### Gameplay

- Walk a street lined with different waste bins.
- Drag and drop paper, plastic, glass and metal into the correct bins.
- Read a fact card to decide tricky “grey-zone” items such as milk cartons.

*Did you know? A glass bottle can be recycled endlessly.*

*Did you know? Correct sorting at the source is the key to effective recycling.*

### Learning objectives

- Learn to sort waste into correct categories.
- Understand why correct separation matters.

**Real-life action card.** Set up simple sorting for paper, plastic, glass and metal at home.

## Task 2 – Compost Kingdom

**Scenario.** The player builds a composting area, separating suitable materials and balancing the process.

### Gameplay

- Sort kitchen waste (peels, egg shells, tea grounds) from non-compostable waste.
- Add only compost-suitable items to the decomposition area.
- Balance carbon (paper) and nitrogen (vegetables) in a mini-game.

*Did you know? Done correctly, composting can produce natural fertiliser in about three months.*

*Did you know? Around 40% of household waste can be composted.*

### Learning objectives

- Learn what can and cannot be composted.
- Understand the carbon–nitrogen balance.

**Real-life action card.** Start a small compost bin for fruit and vegetable scraps.

## Task 3 – Recycling Gallery

**Scenario.** The player matches waste items with the new products they can become for a school exhibition.

### Gameplay

- Receive six waste items: plastic bottle, glass jar, aluminium can, cardboard box, old CD, battery.
- Drag each item to match the new product it can become.
- Unlock a fact card for every correct match and earn a badge.

*Did you know? Recycling aluminium saves about 95% of the energy needed to make it from raw material.*

*Did you know? Plastic bottles can be turned into polyester fabric.*

### Learning objectives

- Learn which wastes turn into which new products.
- Grasp the economic and environmental benefits of recycling.

**Real-life action card.** Before throwing something away, ask what new product it could become.

## Task 4 – Stop the Trash Mountain

**Scenario.** On a nature walk the player discovers a hidden pile of rubbish and cleans it up.

### Gameplay

- Collect rubbish with gloves and a bag.
- Earn different points per waste type and sort what you collect.
- Unlock a bonus fact card and win a "Clean Area" badge.

*Did you know? A newspaper decomposes in about six weeks, while plastic can remain for 400 years.*



## Learning objectives

- Understand decomposition times of different materials.
- See the impact of litter on nature.

**Real-life action card.** Take a bag on your next walk and collect any litter you find.

These eight fact sheets give teachers and learners concise, reliable background on the environmental themes behind the ECOTOPIA game. Each sheet explains a key concept, why it matters, practical actions anyone can take, and how the topic appears inside the game. They can be printed, displayed or used as reading and research material.

## Fact Sheet 1 Water Conservation

Chapter 1 • Protect Water

### Key concept

Only about 2.5% of the water on Earth is fresh water, and a small fraction of that is easily available for people to use. Conserving water means using this limited resource carefully and avoiding waste in everyday activities.

### Why it matters

Clean fresh water is needed for drinking, food production, hygiene and healthy ecosystems. As populations grow and climate patterns change, many regions face water stress, so small savings by many people add up to a large difference.

### Practical actions

- Turn off the tap while brushing teeth or washing vegetables in a bowl.
- Take shorter showers – a 5-minute shower saves a great deal over a year.
- Fix dripping taps quickly; a single drip can waste hundreds of litres a year.
- Run washing machines and dishwashers only when full.

**Connection with ECOTOPIA.** In Chapter 1 you hunt for hidden water waste in the kitchen and bathroom and learn how each fix saves litres of water.

## Fact Sheet 2 Grey Water

Chapter 1 • Protect Water

### Key concept

Grey water is the relatively clean waste water that comes from sinks, showers, baths and washing machines – but not from toilets. With simple filtering it can be collected and reused.

### Why it matters

Reusing grey water reduces the amount of fresh drinking water we use for tasks that do not need it, such as watering gardens or flushing toilets. This eases pressure on water supplies, especially during dry periods and restrictions.

### Practical actions

- Collect rainwater and light grey water for garden irrigation.
- Use plant-friendly, biodegradable soaps if water will be reused on plants.
- Direct washing-up or shower water to plants where local rules allow.
- Water gardens in the early morning or evening to reduce evaporation.

**Connection with ECOTOPIA.** In Chapter 1 you build a grey-water system – repairing gutters, connecting pipes and adding a filter – to rescue a drying garden.

## Fact Sheet 3 Microplastics

Chapter 1 • Protect Water

### Key concept

Microplastics are tiny plastic particles smaller than 5 mm. They form when larger plastics break down and are also released from synthetic textiles, packaging and some cosmetics.

### Why it matters

Microplastics are now found in oceans, rivers, soil and even drinking water. They can be eaten by fish and other animals, entering food chains and harming wildlife and, potentially, human health.

### Practical actions

- Reduce single-use plastics; carry a reusable bottle and bag.
- Choose natural fabrics and wash synthetic clothes less often or in a filter bag.
- Never litter; dispose of plastic waste responsibly and recycle where possible.
- Support clean-ups of local rivers, beaches and parks.

**Connection with ECOTOPIA.** In Chapter 1 you scan a pond, collect microplastics and rescue affected wildlife while learning how long plastics last in nature.

## Fact Sheet 4 Renewable Energy

Chapter 2 • Use Energy

Wisely

### Key concept

Renewable energy comes from sources that are naturally replenished, such as the sun, wind, water, geothermal heat and biomass. Unlike fossil fuels, they are not used up and produce little or no carbon dioxide during operation.

### Why it matters

Burning fossil fuels is the main cause of climate change. Switching to renewable energy reduces greenhouse-gas emissions and air pollution and provides cleaner, more sustainable power for homes, schools and cities.

### Practical actions

- Support solar panels or green-energy tariffs where possible.
- Learn how solar and wind produce electricity without emissions.
- Use energy at off-peak times to help balance the grid.
- Combine renewables with saving energy for the biggest impact.

**Connection with ECOTOPIA.** In Chapter 2 you install solar panels and wind turbines, adjust their angle and use solar trackers to maximise clean-energy production.



## Fact Sheet 5 Energy Efficiency

Chapter 2 • Use Energy

Wisely

### Key concept

Energy efficiency means getting the same result – light, warmth, clean clothes – while using less energy. It is often the cheapest and fastest way to cut energy use and emissions.

### Why it matters

Wasted energy costs money and adds unnecessary emissions. Efficient lighting, appliances and insulation lower bills, reduce demand on power stations and make renewable energy go further.

### Practical actions

- Replace old bulbs with LEDs, which use around 80% less energy.
- Unplug chargers and devices on standby to stop "vampire" energy.
- Improve insulation and close windows when heating or cooling.
- Switch computers and screens to eco or sleep mode.

**Connection with ECOTOPIA.** In Chapter 2 you become an energy detective – finding heat loss, switching to LEDs and hunting vampire energy to build an efficient smart home.

## Fact Sheet 6 Biodiversity

Chapter 3 • Balance Nature

### Key concept

Biodiversity is the variety of living things – plants, animals, insects and microorganisms – and the ecosystems they form. Each species plays a role in keeping nature in balance.

### Why it matters

Healthy biodiversity gives us clean air and water, fertile soil, and food. Many crops depend on pollinators such as bees, yet a large share of pollinators are now at risk, so protecting habitats is essential.

### Practical actions

- Plant pollinator-friendly flowers such as lavender.
- Leave wild corners and provide shelter such as insect hotels or birdhouses.
- Avoid pesticides that harm bees and other helpful insects.
- Observe and record local species to understand your ecosystem.

**Connection with ECOTOPIA.** In Chapter 3 you document species, rescue wildlife after a fire and design a pollinator park that attracts bees and butterflies.

## Fact Sheet 7 Recycling

### Chapter 4 • Reduce Waste

#### Key concept

Recycling turns used materials – paper, glass, metal and many plastics – into new products instead of sending them to landfill. Correct sorting is the key to making it work.

#### Why it matters

Recycling saves raw materials and energy and reduces pollution. Recycling aluminium, for example, saves about 95% of the energy needed to make it from scratch, and glass can be recycled again and again without losing quality.

#### Practical actions

- Sort paper, plastic, glass and metal into the correct bins.
- Rinse containers so they can actually be recycled.
- Check local rules for tricky items such as cartons and batteries.
- Reduce and reuse first – recycling is the last step, not the only one.

**Connection with ECOTOPIA.** In Chapter 4 you sort waste into the right bins and match items to the new products they can become, learning the energy savings of recycling.

## Fact Sheet 8 Compost

### Chapter 4 • Reduce Waste

#### Key concept

Composting lets food scraps and garden waste break down naturally into a nutrient-rich material that improves soil. It relies on a balance of “green” (nitrogen-rich) and “brown” (carbon-rich) materials.

#### Why it matters

A large part of household waste is organic and could be composted rather than sent to landfill, where it produces methane, a powerful greenhouse gas. Compost returns nutrients to the soil and reduces the need for chemical fertilisers.

#### Practical actions

- Compost fruit and vegetable peels, egg shells, tea and coffee grounds.
- Balance food scraps (green) with paper or dry leaves (brown).
- Avoid composting meat, dairy and plastics.
- Use finished compost to enrich school or home gardens.

**Connection with ECOTOPIA.** In Chapter 4 you build a compost area, sort suitable materials and balance carbon and nitrogen to create natural fertiliser.

These four ready-to-use classroom activities extend the ECOTOPIA game into hands-on, real-world learning. Each links to a game section and can be run in a single lesson with simple materials. They suit ages 10–14 and can be adapted for different subjects. Every activity lists its objective, materials, curriculum links, steps, learning objectives and a differentiation idea.

## The Four Themes of ECOTOPIA

Each theme becomes a chapter of interactive, mission-based learning

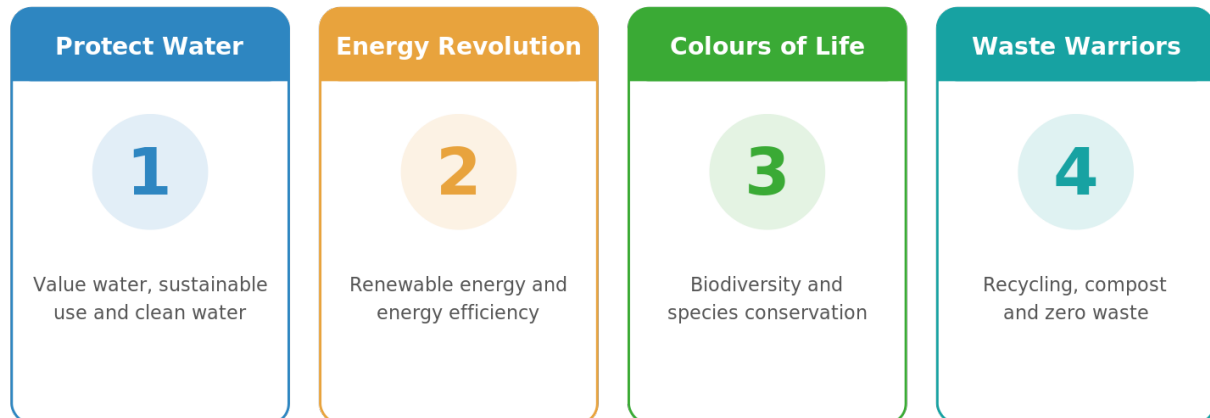


Figure 1. Each activity connects to one of the four game sections.



## Activity 1 Water Saving Challenge

### Section 1 • Protect Water

|                   |                                                                                                             |
|-------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Objective</b>  | Learners identify and reduce water waste at school and home, connecting daily habits to measurable savings. |
| <b>Duration</b>   | One lesson (45 min) + a week-long home challenge                                                            |
| <b>Materials</b>  | Water audit checklist, pens; optional stopwatch and measuring jug                                           |
| <b>Curriculum</b> | Science (water cycle, measurement); Citizenship (responsibility)                                            |

### Steps

- Discuss where water is used and wasted; predict the biggest wasters.
- In pairs, complete a water audit of the classroom or a home area using the checklist.
- Calculate simple savings (for example, minutes saved in the shower).
- Each learner commits to one water-saving action for a week and records progress.
- Share results in the next lesson and celebrate the biggest savers.

### Learning objectives

- Explain why fresh water is a limited resource.
- Identify personal habits that waste or save water.
- Estimate savings from a simple behaviour change.

**Differentiation.** Younger learners audit one tap; older learners estimate weekly litres saved and present the data.

**Link with ECOTOPIA.** Follows Section 1, where players find hidden water waste and fix it. **Extension:** Create a class poster of the top five water-saving tips.

## Activity 2 Energy Detective

### Section 2 • Energy Revolution

|                   |                                                                                     |
|-------------------|-------------------------------------------------------------------------------------|
| <b>Objective</b>  | Learners audit energy use, spot waste and propose efficient or renewable solutions. |
| <b>Duration</b>   | One lesson (45–60 min)                                                              |
| <b>Materials</b>  | School map or floor plan, clipboards, pens; optional plug-in power meter            |
| <b>Curriculum</b> | Science (energy sources, efficiency); Geography (sustainability)                    |

### Steps

- Introduce energy waste and “vampire” standby energy.
- Teams tour the school (or classroom) to map lights and devices left on.
- Mark waste points on the map and suggest a fix (switch off, LED, timer, solar).
- Teams present their map and the estimated impact of their fixes.
- Agree on one whole-class energy rule to adopt.

### Learning objectives

- Distinguish renewable and non-renewable energy.
- Identify sources of energy waste in a building.
- Propose realistic efficiency or renewable solutions.

**Differentiation.** Provide a ready-made checklist for support; ask extension groups to rank fixes by cost and impact.

**Link with ECOTOPIA.** Follows Section 2, where players hunt energy leaks and install renewables. **Extension:** Track the class electricity habit for two weeks and compare.

## Activity 3 Biodiversity Walk

Section 3 • Colours of Life

|                   |                                                                                    |
|-------------------|------------------------------------------------------------------------------------|
| <b>Objective</b>  | Learners observe and record local species to understand biodiversity and habitats. |
| <b>Duration</b>   | One lesson (45–60 min), outdoors                                                   |
| <b>Materials</b>  | Observation sheet, pencils; optional magnifiers, cameras, field guide              |
| <b>Curriculum</b> | Science (ecosystems, classification); Art (nature sketching)                       |

### Steps

- Discuss what biodiversity is and why pollinators matter.
- Walk a safe route in the school grounds or a nearby park.
- Record species seen (plants, insects, birds) and where they were found.
- Back in class, group findings and discuss which habitats supported most life.
- Plan one action to boost local biodiversity (for example, a pollinator patch).

### Learning objectives

- Recognise a range of local species and their habitats.
- Explain the role of pollinators in the ecosystem.
- Suggest a practical way to support local biodiversity.

**Differentiation.** Give picture ID cards for support; ask extension learners to group species by type or habitat.

**Link with ECOTOPIA.** Follows Section 3, where players document species and design a pollinator park.  
**Extension:** Build an insect hotel or plant pollinator-friendly flowers.

## Activity 4 Zero Waste Classroom

Section 4 • Waste Warriors

|                   |                                                                                    |
|-------------------|------------------------------------------------------------------------------------|
| <b>Objective</b>  | Learners reduce, reuse, sort and compost to move the classroom towards zero waste. |
| <b>Duration</b>   | One lesson (45 min) + ongoing routine                                              |
| <b>Materials</b>  | Sorting bins/boxes, labels, gloves; optional scales and a compost caddy            |
| <b>Curriculum</b> | Science (materials, decomposition); Citizenship (community action)                 |

### Steps

- Audit one day's classroom waste and sort it into categories.
- Discuss which items could be reduced, reused, recycled or composted.
- Set up labelled sorting stations and a simple compost caddy.
- Assign weekly monitor roles to keep the system running.
- Weigh or count waste weekly and set a reduction target.

### Learning objectives

- Classify common waste and its correct disposal route.
- Explain the benefits of composting and recycling.
- Design a simple system to reduce classroom waste.

**Differentiation.** Support learners sort with picture labels; extension groups design a whole-school waste plan.

***Link with ECOTOPIA.** Follows Section 4, where players sort waste, compost and design a zero-waste home.  
**Extension:** Run a "waste-free lunch" day and measure the difference.*

## Activities at a Glance

| Activity               | Section    | Setting       | Key outcome                  |
|------------------------|------------|---------------|------------------------------|
| Water Saving Challenge | 1 – Water  | Class + home  | Reduce personal water waste  |
| Energy Detective       | 2 – Energy | School        | Spot and fix energy waste    |
| Biodiversity Walk      | 3 – Nature | Outdoors      | Observe and support species  |
| Zero Waste Classroom   | 4 – Waste  | Class routine | Cut and sort classroom waste |

## Student Reflection Form

Complete this form after playing ECOTOPIA. There are no wrong answers – it helps you and your teacher see what you learned and what you will do next.

**Name:** \_\_\_\_\_ **Class:** \_\_\_\_\_  
**Date:** \_\_\_\_\_ **Chapter played:** \_\_\_\_\_

### Part A – How much do you agree?

Tick one box for each statement (1 = strongly disagree, 5 = strongly agree).

| Statement                                               | 1 | 2 | 3 | 4 | 5 |
|---------------------------------------------------------|---|---|---|---|---|
| I understand the environmental topic of this chapter.   |   |   |   |   |   |
| I learned new facts from the information cards.         |   |   |   |   |   |
| I can explain why my choices in the game matter.        |   |   |   |   |   |
| I enjoyed playing and want to play more chapters.       |   |   |   |   |   |
| I feel I can take real actions to help the environment. |   |   |   |   |   |

### Part B – Tell us more

One new thing I learned:

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The choice I found most surprising or difficult:

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### Part C – My real-life action

One thing I will do at home, at school or in my neighbourhood before the next lesson:

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# Teacher Observation Form

Use this form to record observations during or after an ECOTOPIA session. It supports formative assessment alongside the Student Reflection Form.

Teacher: \_\_\_\_\_ Class: \_\_\_\_\_

Date: \_\_\_\_\_ No. of learners: \_\_\_\_\_

Chapter /  
mission: \_\_\_\_\_

## Part A – Observed learning behaviours

Rate how far each was observed (1 = not observed, 2 = emerging, 3 = evident, 4 = strong).

| Statement                                                    | 1 | 2 | 3 | 4 |
|--------------------------------------------------------------|---|---|---|---|
| Learners engaged with the missions and information cards.    |   |   |   |   |
| Learners connected game choices to real environmental ideas. |   |   |   |   |
| Learners collaborated and supported one another.             |   |   |   |   |
| Learners used relevant environmental vocabulary.             |   |   |   |   |
| Learners proposed realistic real-life actions.               |   |   |   |   |
| Learners reflected critically on the solutions in the game.  |   |   |   |   |

## Part B – Evidence and highlights

Notable contributions, examples or misconceptions observed:

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## Part C – Next steps

Follow-up activity, support or extension planned for this class:

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## Access Information

The ECOTOPIA educational game and all EcoDiscovery project resources are free to use for educational, non-commercial purposes. The game is available on multiple platforms and in four languages (Turkish, English, Czech and French). It is designed for middle-school learners aged **10–14**, is rated 3+ on Google Play, requires no account and shares no data with third parties.

### Platforms and links

| Platform              | Link / information                                                                                                                          | Status |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Web browser           | <a href="https://game.ecodiscovery.eu">https://game.ecodiscovery.eu</a> – play instantly, no installation.                                  | Active |
| Android (Google Play) | <a href="https://play.google.com/store/apps/details?id=com.ecodiscovery.app">play.google.com/store/apps/details?id=com.ecodiscovery.app</a> | Active |
| Android (APK)         | <a href="https://ecodiscovery.eu/releases/Ekotopia.apk">https://ecodiscovery.eu/releases/Ekotopia.apk</a>                                   | Active |
| Windows               | <a href="https://ecodiscovery.eu/releases/Ekotopia.rar">https://ecodiscovery.eu/releases/Ekotopia.rar</a>                                   | Active |
| Project website       | <a href="http://www.ecodiscovery.eu">www.ecodiscovery.eu</a> – game, news and all project results (4 languages).                            | Active |

### Quick start (web version)

- Open <https://game.ecodiscovery.eu> in your browser.
- Choose your language: Turkish, English, Czech or French.
- Turn the sound on – no login or account is needed.
- Start from Section 1 – Protect Water and play through the tasks.

***Did you know?** The game runs on standard school computers and tablets thanks to Unity WebGL – no special hardware is needed.*

### In-game AI assistant

ECOTOPIA includes an AI assistant powered by the Gemini API. During play, press the **R** key to ask any environment or game question and receive an instant, age-appropriate answer. The assistant only answers environment and game topics and does not collect or store student data.

### Scoring and privacy

Each task gives a score from 0 to 100 based on how quickly the player finishes and how few wrong choices they make. The results screen shows score, time, completion percentage and ranking. In the global leaderboard, usernames are shown in a masked form (for example, user\*\*\*) to protect privacy, in line with data-protection rules.

### Recommended devices

- **Computers & laptops** with an up-to-date browser (Chrome, Edge, Firefox or Safari).
- **Tablets** for touch-based play in the classroom.
- **Android phones and tablets** via Google Play or the APK.



- **Windows computers** via the downloadable Windows version.

### About the project

EcoDiscovery – *Play And Discover The Future* is an Erasmus+ KA210 small-scale school partnership between organisations in Türkiye, the Czech Republic and France. The ECOTOPIA game and its educational resources build environmental awareness through game-based learning and are shared free of charge under the project's Creative Commons license for educational, non-commercial use.

**Play the game and follow the project:** [www.ecodiscovery.eu](http://www.ecodiscovery.eu)