MEGA

GAME BOOK

Environmental Learning Games

Compendium

First Edition

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MOLDOVAN ENVIRONMENTAL GOVERNANCE ACADEMY

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FOREWORD

Dear Friend,

You now hold in your hands / see on your screen the result of a thorough market research of environmental games conducted by the Moldovan Environmental Governance Academy (briefly MEGA). With this MEGA Game Book we, the MEGA Team, want to offer you a comprehensive tool for advancing your environmental education to a new level – the level, where learning is based on active engagement and fun. We believe that games are a powerful tool for involving people, especially children and youth, in environmental management and protection, developing their capacity to address environmental challenges, and ultimately change their behavior to a more eco-friendly and sustainable one. This belief has already been proven by numerous research articles, papers, and books. We have also contributed to this research with our own scientific articles, which you can now find on the web.

All in all, we hope that you will find the MEGA Game Book interesting and useful for your field of activity, be it school / university education, informal education, raising awareness about environmental issues, or just interest in playing environmental games by yourself.

We wish you a MEGA interesting and fun playtime with positive environmental impact!

Alexandr Iscenco

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GREATITUDE LETTER

The content of the MEGA Game Book is rich with various environmental games due to the contributions from a number of MEGA awesome people worldwide. Thus, we would like to express our gratitude for contributing to the publication to the following people:

- Huyen Do Thi Thanh
- Valeria Svart-Gröger

If you would like to contribute to the MEGA Game Book as well and thus see your name here, please check the instructions on how to do it at www.megageneration.com/projects or write us to hello@megageneration.com.

We are looking forward to see your environmental games in the MEGA Game Book!

INTRODUCTION

Nowadays we live in an epoch, when the most influential force of change on the planet Earth in not the Nature anymore, but Human. We, humans, are now changing the composition of atmospheric gases and thus stimulating global climate change, managing the structure of rivers and lakes, altering the landscape and influencing the biodiversity and species distribution on the whole planet. That is why a number of scientists call the current epoch **Anthropocene** – "The New Era of Humans".

However, "*with great power comes great responsibility*", as the well-known quote by Stan Lee reads. Indeed, more and more people start to realize that exploiting the natural resources in an excessive and unsustainable manner may lead to irreversible changes in the functioning of a planetary ecosystem with a number of negative consequences. These include the increase of appearance of devastating storms and typhoons, disappearing of valuable species of plants and animals, degradation of fertile soil, spreading of deadly infections, increase of pollution mitigation and medical costs, disruption of economic systems, decrease in wellbeing, growth of the poverty rate and many other. And they are not threatening the Nature (it will be able to "heal the wounds" and recover) as much as they do to the mankind.

This is why the concept of **sustainability** was developed and is pursued nowadays. Instead of traditionally dividing economic growth, social issues and environment protection into separate areas, it intends to bring them together under a single balanced platform, where each part supports and enforces the other without compromising on their development. Getting the sustainability concept integrated in one's affairs has shown to be beneficial in terms of improvements of the surrounding environment, better quality of environmental services, lower morbidity and mortality rate, reduction of poverty, better cost-efficiency and many other gains. However, the current efforts in terms of sustainability and environment protection are not enough to ensure their efficient implementation worldwide. There is great need for more passionate, devoted, knowledgeable, skillful and experienced specialists in this domain: researchers on sustainability, "green" entrepreneurs, volunteer environmentalists, etc. And in order to have them one needs an **efficient, engaging, interactive and practical environmental education and learning system**.

But there is once more a "however" here. The current education system is dominantly theory-based, that is with the current rate of research and development (R&D) in its majority becomes outdated and obsolete by the time a student graduates. There is simply not enough practical, hands-on learning and experimenting, as well as low access to opportunities of pursuing passion for environment for young people, especially from developing countries and poor families. Ultimately, the current methods of education and learning dominated by lectures, generally do not maximize the learning capabilities of students, do not benefit from the tools of accelerated learning and do not stimulate the interest and

passion for environmental protection and management. As a result, people find the domain not quite attractive and shift their focus to other more promising and profitable areas, increasing the gap of specialists needed to support sustainable development and protection of the environment.

In order to address this issue we, the MEGA Team behind the **Moldovan Environmental Governance Academy (briefly MEGA)**, have decided to implement the concept of **gamification** in environmental education and learning. Gamification is essentially the use of game elements and mechanics in non-game contexts to actively engage people in these contexts and maximize their contribution, performance and results. In MEGA we do it in the form of the **Game with Impact** – the unique game platform that creates measurable impact by connecting young people passionate about environment through community learning in an entertaining way. In other words we offer the on-line and off-line learning, connecting and impact-creating platform in the form of a real-time game that provides:

- Interactive trainings and workshops on environmental management and governance;
- Open space for networking, collaboration and co-creation for young environmentalists;
- Tools for creating and measuring positive economic, social and especially environmental impact.

Still, although the MEGA game is unique, we are not the only ones to integrate gamification with environmental learning. It is very inspiring for us to see that there are a lot of great and interesting games aimed for raising awareness about the environment, educating people about it and providing valuable learning on how to protect and manage it. And we would like to share these games with you. This is why we have created the **MEGA Game Book** for you.

How to use this book?

The MEGA Game Book represents a compilation of environmental learning games from all over the world. The games are arranged by domains of environmental science: Climate Change and Energy, Biodiversity Conservation, Soil Conservation, Forest Protection, Water Management, Waste Management, Sustainable Development and Governance, Eco-innovation and "Green" Business, Miscellaneous. You simply choose the domain you work with and thus need games that are related to it.

Each domain is then split into on-line, board and real-action games. Thus, you can choose the type of the game you would like to implement in your activity.

Every game is described in a structured way through a table with a number of categories. You is able to see some screenshots or photos of the game, its developer, the main goal, key learning points obtained, game mechanics used, brief description, who and what is it best suitable for, and the information on how to access / create and play it.

Happy playing!

GAMES COMPENDIUM

Chapter I. Biodiversity Conservation

On-line Games

#1	**Forgotten Island**
Representative Images:	
Developer:	Citizen Sort / Syracuse University
Main goal:	Study organisms to assess man's impact.
Key Learning Points:	1. Interaction among different species in an ecosystem. 2. Influence of anthropogenic activity on biodiversity and ecosystems.
Game mechanics:	You earn money and points and then compare the score to other players.
Description:	If you loved *Monkey Island*, this game, a visually beautiful point-and-click adventure game with a compelling narrative, is for you. You're a scientist with a secret past, trapped on a mysterious island where an explosion has destroyed the biology lab. Photographs of organisms are strewn across the island. Collect and answer questions about the photos to earn game money, which you spend on tools to achieve progress and hopefully get off the island. Your classification of these real-life photos from around the world will help biologists to study the effects of urban sprawl on local ecosystems or to detect evidence of regional or global climactic shifts.
Best suitable for:	Trainings on biodiversity science for interested people of all ages.
How to play:	Access the link: http://ictmagic.sharedby.co/share/G0hoLT

#2	Ora
Representative Images:	
Developer:	Driedfrog / Landcare Research Manaaki Whenua
Main goal:	Protect a forest… to help protect forests.
Key Learning Points:	1. Learn how to monitor trees to assess forest health. 2. Management of pests and conservation of native forests.
Game mechanics:	You earn money.
Description:	Inside the Ora world, you'll be able to watch the forest react to its animal pests, then set up and run management operations using tools based on those available in the real world - plan your own strategies and see if you can beat the budget constraints and save the forest, or just feed the possums and watch them multiply and eat the forest! Not released until later this year, but well worth keeping an eye out for. You'll be charged with taking care of a plot of New Zealand forest and protecting it from ravenous Australian bushtail possums. Set traps, create sanctuaries or fly aerial operations to sow toxic bait to save your pixelated forest. Researchers will then take the best strategies and apply them in real New Zealand forests, where native plants and animals are under threat from these invading possums. To help raise money for the game, Ora's developers have released *Possum Stomp*, a mini game app available on iOS or Android.
Best suitable for:	Trainings on waste collection and volunteering for children of 10 – 15 years old.
How to play:	Access the link: http://ictmagic.sharedby.co/share/G0hoLT

#3	**Wildlife Savior**
Representative Images:	
Developer:	Wildlife At Risk (WAR), Vietnam
Main goal:	Become a wildlife savior by eliminating items that represent threats to wildlife.
Key Learning Points:	1. Learn how about human activities that pose threats to wildlife. 2. Find out which actions help protect the wildlife.
Game mechanics:	You gain points and increase your score.
Description:	The “Wildlife Savior” game helps you identify threats to wildlife as well as actions you could take to save Vietnam’s endangered wildlife. In this game, there are 24 items representing threats to wildlife (also called negative items) and 24 items representing positive actions toward wildlife (positive items). Each item is equal to 10 scores. Flash item is equal to 30 scores. By eliminating negative items the player earns score, while eliminating positive one he/she loses scores. If all negative items are eliminated, the player is awarded with 300 scores. The game ends if his/her score is less than zero. The game lasts for three minutes and the items falling faster and faster from the beginning to the end. After 3 minutes, the game is automatically ended and the player’s scores are counted. Ten players with highest scores are ranked. The player can decide if he/she wants his/her name to be recorded and showed as one of the Top Wildlife Saviors.
Best suitable for:	Biodiversity / wildlife education for children of 12 – 15 years old.
How to play:	Access the link: www.wildlifeatrisk.org/new/wildfile_wonders/wildlife-savior-play

#4	**Which are My Footprints**
Representative Images:	
Developer:	Wildlife At Risk (WAR), Vietnam
Main goal:	Correctly match the images of different animals with their footprints.
Key Learning Points:	1. Get to know about endangered species of animals. 2. Learn to identify their footprints.
Game mechanics:	You gain points.
Description:	"Which are My Footprints" is a simple on-line game with the task to match the footprints appearing on the screen with the pictures of different endangered animals shown around the main game window. The species of animals presented include: Cobra, Hornbill, Oriental small-clawed otter, Sunda Pangolin, Asian elephant, Leopard, Tiger, Moon bear, and Yellow-cheeked crested gibbon.
Best suitable for:	Biodiversity / wildlife education for children of 12 – 15 years old.
How to play:	Access the link: www.wildlifeatrisk.org/new/wildfile_wonders/wildlife-savior-play

#5	**Guess My Name**
Representative Images:	
Developer:	Huyen Do Thi Thanh et al. – Wildlife At Risk (WAR), Vietnam
Main goal:	Identify the names of different species of endangered animals.
Key Learning Points:	1. Get to know about endangered species of animals. 2. Stimulate player to find out more information about these species.
Game mechanics:	You progress further in the game.
Description:	The game “Guess My Name” is developed from one of the 17 awarded ideas of the contest on initiating computer game ideas among secondary school children. The contest was implemented by Wildlife At Risk (WAR) in cooperation with Khan Quang Do magazine in 2012. The game represents a visual quiz, where the player is asked to type in the names of the animals shown on the screen. In this way it stimulates him/her to seek the name and additional information on the species presented in the game.
Best suitable for:	Biodiversity / wildlife education for children of 12 – 15 years old.
How to play:	Access the link: www.wildlifeatrisk.org/new/wildfile_wonders/guess-my-name

#6	**How Do I Sound**
Representative Images:	
Developer:	Huyen Do Thi Thanh – Wildlife At Risk (WAR), Vietnam
Main goal:	Correctly match the images of different wildlife with its sounds.
Key Learning Points:	1. Get to know different endangered wildlife species of Vietnam. 2. Learn to identify different wildlife sounds. 3. Be amazed with how wildlife sounds.
Game mechanics:	You gain points.
Description:	"How Do I Sound" is a simple game where player matches a sound in the middle of the screen to the one of a wildlife species shown in a circle of different wildlife images on the screen. Currently there are nine different wildlife images and sounds including: Tiger, Moon Bear, Yellow Cheeked Crested Gibbon, Hornbill, Cobra, Oriental Small Clawed Otter, Pangolin, Leopard, and Asian Elephant.
Best suitable for:	Biodiversity / wildlife education for children of 12 – 15 years old.
How to play:	Access the link: www.wildlifeatrisk.org/new/wildfile_wonders/game/1/how

#7	**Wolf Quest**
Representative Images:	 
Developer:	Minnesota Zoo, Eduweb
Main goal:	Live as the wolf. Survive.
Key Learning Points:	1. Wolf behavior and ecology. 2. Natural circle of life. 3. Dangers awaiting wild animals (particularly wolves).
Game mechanics:	You acquire skill points.
Description:	In this exciting and educational 3D wildlife simulation game with superb graphics, you will become a gray wolf gaining first-hand experience of the life-cycle of the gray wolves in Yellowstone National Park. Gray wolves had historically endured a negative view and had been a persecuted and controversial predator culled by biased humans. Changing values and endangered species legislation resulted in efforts to preserve large predators, including the gray wolf, which were reintroduced into Yellowstone National Park in the mid 1990's in a successful attempt to restore the endangered animal species. Players will become familiar with Yellowstone National Park by undertaking wolf missions throughout the game, selecting options and choosing graphics, including the choice of single or multiplayer. You will encounter showdowns of dominance in attempting to introduce yourself to other wolves prior to finding a future mate. Your first step in the fall season on the slopes of Yellowstone's Amethyst Mountain is finding a mate while simultaneously finding food for your survival. Utilizing the map view will have you seeing other wolf territories and locations to hunt for elk, while on the lookout for grizzly bears, other rival wolves and coyotes. Elks and hares will sustain your strength on your mission. The scent key will help you locate wolf packs by tracking; the stamina bar assists you in gauging your stamina. The compass guides you in the direction of food and other wolves.
Best suitable for:	People above 9 years old.
How to play:	Download the game from: www.wolfquest.org

#8	My Conservation Park
Representative Images:	  
Developer:	Good World Games
Main goal:	Manage a protected area, keep out poachers, and at the same time support real life conservation efforts.
Key Learning Points:	1. Learn to protect endangered animals and their habitats. 2. Understand how to organize and contribute to real conservation activities.
Game mechanics:	You progress further through the levels of the game.
Description:	My Conservation Park is one of the games that lends to the social-media gaming pattern. It tasks you with building a healthy, sustainable environment and protecting your hero from threats. However, with My Conservation Park, you can go beyond building your own park. With this game, you are also helping to save endangered species around the world. This game will donate 15% of your virtual earnings to non-profit organization such as WWF and the Dian Fossey Gorilla Fund.
Best suitable for:	Biodiversity / wildlife education for children of 10 – 15 years old.
How to play:	Access the link: www.myconservationpark.com

#9	**Team WILD**
Representative Images:	
Developer:	Wildscreen
Main goal:	Try to save as many animals and habitats as you can.
Key Learning Points:	1. Learn to protect endangered animals and their habitats. 2. Understand the science of wildlife and habitats conservation.
Game mechanics:	You collect points and see your place on the leaderboard.
Description:	The game “Team WILD” offers young people aged 7 to 14 a fun opportunity to find out about science careers. Team WILD highlights some of the lesser-known science careers and inspiring the next generation of science superheroes and environmental stewards. From jungle to savanna, rainforest to coral reef, the Team WILD game will turn students into science superheroes by developing their speed, skill and coordination. As you play, you will discover a diverse range of field tasks a conservation scientist or ecologist must do in order to protect the world’s species and habitats and will unlock exclusive videos to hear from leading conservationists about what careers in the natural world involve.
Best suitable for:	Biodiversity / wildlife education for children of 7 – 14 years old.
How to play:	Access the link: www.arkive.org/education/team-wild

#10	Why Reef
Representative Images:	  
Developer:	Field Museum of Natural History / Numedeon Inc.
Main goal:	Save reef ecosystem and biodiversity.
Key Learning Points:	1. Understand the importance of protecting marine environment with its biodiversity. 2. Raise awareness about the science of conservation ecology.
Game mechanics:	You earn clams that can later be spent within the game.
Description:	Why Reef is a simulated coral reef in the virtual world of Whyville.net, where players are able to “dive” on two reefs, count and identify 50 different coral reef species, play games to learn who-eats-whom, test ideas about healthy and sick reefs using a simulation, and chat with a scientist. Over the course of the Why Reef project, the simulated reefs were damaged by two catastrophic events: an ecosystem collapse caused by the overfishing of top predators on the reef, and an ecosystem collapse initiated by coral bleaching. When the reef was at its most degraded, we launched the "Save the Reef" activities, asking Whyvillians to identify the cause of the catastrophe and empowering them to affect change. Why Reef is designed around the education mission of the Field Museum, leveraging the strengths of the Museum's innovative collection and research programs on coral reefs. The charismatic interconnectedness of a reef ecosystem serves as an ideal platform for the four original program and learning goals dedicated to increasing awareness of conservation biology, ecosystem ecology, stewardship and management, and science literacy. Why Reef allows players to be "citizen scientists" and also introduces the tools, such as critical thinking and problem-solving, necessary to understand the consequences of biodiversity loss.
Best suitable for:	Biodiversity / wildlife education for children of 8 – 16 years old.
How to play:	Access the link: www.fieldmuseum.org/whyreef

Chapter II. Climate Change Mitigation

On-line Games

#1 **Climate Challenge**

Representative Images:	 
Developer:	Red Redemption Ltd.
Main goal:	Build a well prospering and environmentally friendly world within 100 years.
Key Learning Points:	1. Impact of governmental policy on climate and other factors influencing it. 2. Difficulties of sustainable development of country.
Game mechanics:	You choose 6 investments to implement in your country in 10 years. After 100 years there is a summary of your activity.
Description:	Climate Challenge is a single-player game about climate change, playable for free on the BBC website, aimed at young professionals aged 25-35. The game is a sandbox-style strategy game based on real climate change data, where the player can try out different approaches for themselves, learn about the issues and have fun at the same time. It was designed and developed by Red Redemption Ltd, with scientific advice provided by Oxford University Centre for the Environment (OUCE) and a number of Intergovernmental Panel on Climate Change (IPCC) scientists. The developers wanted to make a fun, challenging game, but a game that was also based on scientific facts. Climate Challenge uses the most commonly cited and accepted carbon dioxide emission forecasts, which are produced by the IPCC. In Climate Challenge, the player takes on the role of the President of Europe, choosing policies to reduce carbon dioxide emissions from 2000 to 2100. The player has to balance emissions reductions with making sure there is enough electricity, water and food for the people, whilst also managing their spending and trying to remain popular with the electorate. The game was accompanied by scientific notes for further learning and was also used for ongoing scientific research into the effectiveness of games as a learning tool.
Best suitable for:	Young professionals (target group 20 – 35 years old).
How to play:	Access the link: www.bbc.co.uk/sn/hottopics/climatechange/climate_challenge/index_1.shtml

#2	**Keep Cool**
Representative Images:	 
Developer:	Potsdam Institute for Climate Impact Research
Main goal:	Achieve economic development while keeping the climate system in balance.
Key Learning Points:	1. Green Technology is better. 2. Cooperation is absolutely necessary.
Game mechanics:	Includes virtual economy, points, carbon chips, carbometer (climate thermometer).
Description:	In Keep Cool, up to six players representing the world's countries compete to balance their own economic interests and the world's climate in a game of negotiation. The goal of the game as stated by the authors is to "promote the general knowledge on climate change and the understanding of difficulties and obstacles, and "to make it available for a board game and still retain the major elements and processes. The game allows the players to buy and build "green" (renewable energy), or "black" (fossil fuel) energy production plants and factories. Besides, the players can invest in scientific innovation. The game can be played with three to six players. The countries that players will use for the game depends on the number of players. Each of the countries has a distinct starting position in the game and some have special abilities/bargaining chips which can greatly affect negotiation. The United States begins the game with the most factories on the board (five black and one green) and always goes first. Europe begins with three black factories and one green, and the Tiger Countries begin with two black. The Former Soviet Union begins the game with one of each kind of factory, but has the special prerogative to demand one carbonchip from any player at the beginning of their turn. OPEC and the Developing Countries only start with one black factory each, but they both have special attributes which they can use to their advantage. OPEC receives an additional carbonchip as income for every four black factories on the game board. The Developing Countries can either add or remove up to three carbonchips to/from the carbometer from/to the chip pool. A player needs to fulfill both their economic target and their secret target to win the game. Once both of their targets are fulfilled, the game ends, whether or not the

	targets are met during that player's turn. It is possible that multiple players could achieve their targets at the same time. The very first thing a player does on his/her turn, even before the usual steps of collecting income and the rest, is draw a greenhouse card. Greenhouse cards are the random generators of disasters in Keep Cool. Most greenhouse cards are disasters which affect a particular region (consequently only one player) such as Malaria Pandemic in China or Cold Winter in Europe. Greenhouse also includes rarer events, such as global disasters (e.g. Sea-level rise) and beneficial events due to global warming, like more rain in Iran. The degree of the disaster or beneficial climate event is dependent on what level of warming has occurred in the game thus far, which is measured by the carbometer. In the blue zone, many disasters and other events have little or no effect. In the yellow and orange zones, disasters are particularly more potent as well as the benefit received from positive climate changes. In the red zone, climate events are catastrophic and beneficial events from positive change are severely reduced.
Best suitable for:	High-school and university students (16+ years old).
How to play:	Access the link: www.keep-cool-online.de

Chapter III. Energy and Energy Efficiency

On-line Games

#1 **Linkin Park Recharge – Wastelands**

Representative Images:	 
Developer:	Kuuluu Interactive Entertainment AG
Main goal:	Drain energy from Hybrids to recharge Earth's energy reserves and help mankind to survive.
Key Learning Points:	1. Energy is wasted and decreasing rapidly. 2. Ways of decreasing energy usage on your own (tips). 3. Renewable sources of energy.
Game mechanics:	You have view from up. You go with your team and destroy enemies.
Description:	LP RECHARGE – WASTELANDS is a mobile game that takes place in a not-too-distant future where humans have depleted all natural resources on the planet. Society and what little energy stores remain have been seized control of by machines and an elite minority. Players have to battle their captors and RECHARGE the world with clean, sustainable energy. LP RECHARGE – WASTELANDS shows amazing 3D environments and has large amounts of action, explosions and more. The mobile game LP RECHARGE – WASTELANDS brings attention to energy poverty and clean energy solutions.
Best suitable for:	Environmental trainings for youth of 13 – 25 years old.
How to play:	Access the link: www.lprecharge.com

#2	Ludwig
Representative Images:	 
Developer:	Ovos
Main goal:	Get to know about renewable sources of energy to save faraway world of robots.
Key Learning Points:	Gain knowledge of sources of energy: combustion, water power, wind energy, solar energy, etc.
Game mechanics:	Discover physical phenomena and analyze them in order to reveal the laws of physics and solve the tricky puzzles in the game.
Description:	Taking 3D point and click adventures to the next level, Ludwig adventures across a beautifully designed world as he tries to find parts to fix his broken spaceship. In order to do so, Ludwig must come to understand the complex physics that govern this strange world called “Earth”. Through a series of upgrades to his mechanical body, Ludwig unlocks more robust tools to analyze and understand an ever growing knowledge base of physics concepts and renewable energy sources. Unlike most educational games that focus on creating a wonderful experience first and then figure out where to fit the learning, Ovos took a different approach. They looked at the core standards of some of the most common scientific curriculums and used that as a framework to build Ludwig’s journey. The concepts, and the order in which you learn them, run parallel to any major physics textbook found in a grade school classroom. This unique method allows Ludwig’s game and learning objectives to fit in to any starting curriculum, allowing students to learn traditionally and along side Ludwig.
Best suitable for:	Children of 11 – 16 years old.
How to play:	Purchase game on its website: www.playludwig.com

Chapter IV. Water Management

On-line Games

#1 **Bert & Phil's Water Busters**

Representative Images:	 
Developer:	Seattle Public Utilities
Main goal:	Save water in your house by accomplishing different tasks.
Key Learning Points:	1. Ways of saving water in your surrounding. 2. Little steps can make a change. 3. Importance of saving water. 4. How much water can be saved if steps are undertaken?
Game mechanics:	1. Go around the house using arrows. 2. Do tasks (teach family, fix the sink, etc.). 3. After each level there is a quiz.
Description:	"Water Busters" lets you play the role of Phil Dumpster who must lower his family's water consumption and reduce his water bill. This game allows you to enter various rooms of a home, and do special tasks to save water. You play the role of Phil Dumpster, whose mission is to lower his family's consumption of water and reduce the water bill. There're five levels to the game which should takes about 20 minutes to play. As you walk by each room your task will be to collect items and tools you need to conserve water. In the first level, you tell your sister to use a waste basket instead of the toilet to save water. You give Phil's dad a stopper for the sink, so the sink doesn't have to run. You turn off the faucet and put washers between the hose of the sink to stop leaky sockets. You give another member of the house a broom to use instead of a hose to clean the sidewalk. You use a wrench to fix a dripping faucet to save water which could save you thousands of gallons every year.
Best suitable for:	Children of 6 – 14 years old.
How to play:	Access the link: www2.seattle.gov/util/waterbusters

#2	The Riverbed: An Eco Noir Mystery
Representative Images:	
Developer:	Mary Wharmby
Main goal:	Investigate the mystery and make the information about the water crisis accessible to all.
Key Learning Points:	1. Understand the water management challenges. 2. Learn about water scarcity issues and water conservation efforts.
Game mechanics:	You advance in the game by solving puzzles.
Description:	"The Riverbed: An Eco Noir Mystery" is a fictional murder-mystery game set in a land devastated by water scarcity. The setting, historical facts, character archetypes, and cost-benefit motivations are based on real-world cases. Indeed, in the first chapter of the game players are introduced to the story and the issue of water scarcity, while they explore a group of ships stranded in the desert by a receding sea based on the Aral Sea crisis in Central Asia. The aim of the game is to make information accessible about the water crisis to the emerging generation of young adults. The expectation is that users come away with a message of conservation and an enhanced understanding of water issues.
Best suitable for:	Everyone.
How to play:	Access the link: www.riverbedgame.com

#3	Citizen Science
Representative Images:	  
Developer:	Games Learning Society
Main goal:	Investigate the impact of pollution on freshwater lakes.
Key Learning Points:	1. Sources of water pollution 2. Ways to mitigate water pollution.
Game mechanics:	You advance in the game by solving argument and evidence puzzles.
Description:	"Citizen Science" is an online flash-based computer adventure game in which the player is a young adult who becomes concerned about the health of a local lake threatened by eutrophication. Based at Lake Mendota in Madison, WI, the player's goal is to restore the lake. By focusing on the ecological needs of Lake Mendota as well as the surrounding community, the game is able to bring together real-world issues and scientific practices. The game is easy to learn and play. Short text messages as instructions on how to navigate and control are delivered to the player right from the start. There are clear visual cues and text instructions for what should be accomplished. Two of the mini-games are simulating taking measurements. The third mini-game is a simulation of what the lake would be like in the future depending upon what changes were implemented and followed. The primary 'doing' (fourth mini-game) is that the player must speak to an NPC and construct an argument from the pieces of evidence.
Best suitable for:	School activities for children of 15 – 18 years old.
How to play:	Access the link: www.gameslearningsociety.org/project_citizen_science.php

Chapter V. Waste Management

On-line Games

#1 **Clean the World**

Representative Images:	
Developer:	Let's Do It! / Aplefly Games
Main goal:	Travel around the world and remove the waste streams from the face of the planet.
Key Learning Points:	1. Waste pollution is everywhere in the world. 2. You cannot remove all the waste alone. In order to clean the planet a collective effort of the global community is needed.
Game mechanics:	1. The more waste you collect, the bigger your group / vehicle becomes. 2. You earn points and then compare the score to other players.
Description:	This is World Cleanup game, where your mission is to clean up the garbage from our entire planet. As in the real world, it's not enough to just keep cleaning yourself. If you want the entire world to be cleaned up, you need to motivate more people to join you! If you start picking up the litter, your action will begin to motivate other people around you. But don't rush, be wise! If you try to clean up a landfill that is too big for your group, there's a danger of demotivating people. Then you have to restart the game. Build up the momentum and action patiently. Be sure to keep the motivation of your group high. Go for bigger tasks and landfills step-by-step – be sure you have enough people and resources.
Best suitable for:	Trainings on waste collection and volunteering for children of 10 – 15 years old.
How to play:	Access the link: www.letsdoitworld.org/games/cleantheworld/index.html

#2	**Recycle!**
Representative Images:	  
Developer:	Vital Sud Morvan / Mideri / Brave Kid Games
Main goal:	Sort the waste into the right bins and try to earn as many points as you can.
Key Learning Points:	Proper separation of waste is necessary for recycling.
Game mechanics:	You earn points.
Description:	In this simple game you need to send different waste items to proper bins for recycling. Bins flash randomly one by one, and each turn you need to click on a waste item that should go to the activated bin. And you need to do it as fast as possible within the game time of 60 seconds. You score is then showed when the time expires.
Best suitable for:	Trainings on separating waste for recycling for children of 8 – 15 years old.
How to play:	Access the link: www.jocuri12.com/jocuri-activitate-de-reciclare-3325.html

#3	**Check Your Knowledge of Recycling**
Representative Images:	
Developer:	Eesti Energia
Main goal:	Check your knowledge of recycling by dragging the waste into the correct bin.
Key Learning Points:	Proper separation of waste is necessary for recycling.
Game mechanics:	You try to get as many correct answers as possible.
Description:	This simple game allows you to test how well you know how to separate municipal waste. Here you are offered 4 types of waste containers – for municipal solid waste, bio waste, packages and paper – as well as a number of waste items. Your task is to put the items into the right bins by dragging them into the containers. At the end of the game you can see how many correct answers you have got, as well as check the answers to each question during the game. This is a very easy game that you can apply as a fun test after a training / workshop on proper waste management, waste separation and recycling.
Best suitable for:	Trainings on separating waste for recycling for children of 10 – 20 years old.
How to play:	Access the link: www.energia.ee/en/prugimang

Activity Games

#1	**Defend the Egg**
Representative Images:	  
Developer:	Dreamups / Gutta-Club
Main goal:	Teach about recycling and reusing waste as a material to achieve certain goals.
Key Learning Points:	1. The most preferable waste management option is waste prevention and reuse. 2. Upcycling waste into creative solutions can bring interesting results. 3. Have some fun.
Game mechanics:	The game features competition between teams.
Description:	The Defend the Egg game represents an interactive and co-creative activity of reusing waste to achieve the goal. The participants need design and construct structures and devices to prevent the egg falling from a certain height from cracking. The game features interaction between teams in the form of exchanging resources in order to achieve their goals.
Best suitable for:	Environmental trainings for children and young people of 8 – 20 years old.
How to play:	Prepare the logistics: 10 balloons, 2 scissors, 5 units of adhesive tape, 5 markers, 5 eggs, and different waste materials scavenged around. Using limited numbers of materials participants need to protect the egg given to them from cracking using teamwork, creativity, and a good design. They spend 20 min. constructing protective structures for the eggs by using the given materials. At the end the trainers drop each structure built by the participants at least fifteen feet (for example, from second floor to the first one), and so the goal is for each structure to be able to withstand such a fall. Each team will only be given limited resources, and so they must be wise with what they have. They may not use any other resources other than what is given to them, but they can exchange materials between teams. For better stimulation to work as a group each team will get different types of materials and the rule that if one egg breaks all teams lose. The debriefing at the end of the game features the discussion on how we can recycle and reuse waste materials in a creative way to achieve our goals in life.

#2	**Waste Hierarchy Puzzle**
Representative Images:	
Developer:	Medium
Main goal:	Inform about the Waste Hierarchy and why it is needed.
Key Learning Points:	1. There are different waste management options arranged into the Waste Hierarchy. 2. The most preferable waste management option is waste prevention and reuse. 3. Have some fun.
Game mechanics:	The game features competition between teams.
Description:	The Waste Hierarchy Puzzle teaches children different ways of managing waste by allowing them to build the pyramid / tower of the Waste Hierarchy. They work in teams to construct the correct Waste Hierarchy and explain the preference and effectiveness of each option under the trainer's guidance.
Best suitable for:	Environmental trainings for children and young people of 10 – 20 years old.
How to play:	Prepare the logistics: - 3 sets of pieces of paper with different elements of the Waste Hierarchy written on them; - 1 set of LEGO bricks; - 1 bag of sweets. Trainer divides the participants into 3 groups (he / she can use 3 types of sweets for this). Each team gets a set of words written on different small pieces of paper (alternatively the teams can receive LEGO bricks with the paper with elements glued to them). The elements can include the waste management options (Prevention, Recycling, Incineration, and Landfill) and consequences of each one (efficient resource use, obtaining cheaper materials, emission of toxic gases, soil degradation, water pollution, etc.). They are asked to arrange the pieces into the form of a pyramid (tower if using LEGO bricks), according to the Waste Hierarchy model. The first team, which builds the Waste Hierarchy pyramid, wins. After making the pyramid, each team explains what the key concepts mean.

#3	**Waste Separation Race**
Representative Images:	
Developer:	Medium / Moldovan Environmental Governance Academy
Main goal:	Train to separate Municipal Solid Waste and explain the importance of it.
Key Learning Points:	1. In order to be recycled waste must be separated properly. 2. Different types of waste go to different containers and should not be mixed. 3. Have some fun.
Game mechanics:	The game features competition between teams.
Description:	The Waste Separation Race teaches children to separate their waste for recycling in a fun way. The participants work in teams to place each waste item into the proper container while competing with the other team. This is done in a fast way, when the participants need to make quick, but correct decisions in order to win the game.
Best suitable for:	Environmental trainings for children and young people of 8 – 20 years old.
How to play:	Prepare the logistics: - 2 sets of 3-4 containers for different types of waste (alternatively you can use same types of containers with names of different types of waste written on them); - Around 60 pieces (30 for each team) of 3-4 different types of trash found around. The trainer splits the participants into 4 small groups, according to the season they were born in. After that he makes 2 bigger teams by asking the participants to unite in the Winter+Summer and Autumn+Spring groups. The two teams are given a pile of different types of waste and waste separation containers standing at a distance from them. The participants stand one by one in a line (since there are 2 teams, there will be two lines) and are asked to identify the type of waste and put in the right container. One by one they run to the containers, take a certain piece of trash, place the trash in the proper container and run back to their teams to pass on the turn to the next team member. The team that finishes first and has the least mistakes wins the game.

Chapter VI. Sustainable Development and Governance

On-line Games

#1 SymbioCity

Representative Images:	
Developer:	BTS
Main goal:	Create an attractive city for citizens and businesses alike by improving health, comfort, safety and quality of life for your and future generations, in harmony with nature, balancing the economical, social and environmental effects of your decisions.
Key Learning Points:	1. In order to achieve sustainability and establish a sustainable city you need to balance its economic, social and environmental aspects. 2. Combination of certain sustainable solutions has the potential to bring additional synergetic benefits.
Game mechanics:	1. You improve sustainability indicators and develop your city. 2. You earn points and then compare the score to other players.
Description:	The game places you in the role of a Mayor of a city. Your task is to develop it in a sustainable way by addressing economic, social and environmental issues. You do it by learning about the existing challenges and then developing and enforcing a city development plan. You can also get feedback on the strategic choices you have made.
Best suitable for:	Trainings and workshops on urban planning and development, sustainable cities and city governance for adults and senior city planners.
How to play:	Access the link: www.btslearning.com/app/eBS/symbiocity/index.asp

#2	**Plan It Green**
Representative Images:	  
Developer:	Wyse Games / National Geographic / General Electric / Center for Science
Main goal:	Create your own green city of the future utilizing the latest in green Eco-friendly technology and earth science. Invest in eco-friendly initiatives, like LED light bulbs and hydro-electricity.
Key Learning Points:	1. You learn about the environment, renewable energy systems and what it takes to build and manage a city of the future.
Game mechanics:	1. You develop your city and see it growing. 2. You play together with your friends and compare your results with the others.
Description:	Build your very own unique city. You decide where to put your buildings, which green improvements to make and which earth science to invest in. Connect with your friend's cities and help them make their city more eco-friendly. Plan it Green Live simulates planning and building a city. Each decision comes with benefits or consequences for the environment. The improvements you choose to make or not to make effect everything from the happiness of your citizens to your cities air quality.
Best suitable for:	Trainings and workshops on urban planning and development, sustainable cities and city governance for young people, adults and senior city planners.
How to play:	Access the link: www.planitgreenlive.com

#3	**Mobility**
Representative Images:	  
Developer:	Bauhaus-Universität Weimar / DaimlerChrysler
Main goal:	Developing a town into a larger metropolis by managing its traffic and the ability of its citizens to use transportation to get around the area.
Key Learning Points:	1. You learn about the urban transportation systems and how to plan and manage them.
Game mechanics:	1. You develop your city and see it growing. 2. You play together with your friends and compare your results with the others.
Description:	MOBILITY is a traffic-simulation game which requires you to construct a city in a virtual world, bring it to life and control the associated traffic volume. Both your own mobility and that of your city's inhabitants are the central issues you will need to address. Plan and build your own city and manage the inhabitants' mobility! Design an attractive, economically and ecologically sustainable environment for your citizens. Get to know alternative concepts and administer the local public transport network ... and just watch your city grow. That's MOBILITY - the traffic simulation game!
Best suitable for:	Trainings and workshops on urban transportation systems and transport management for youth and adults.
How to play:	Access the link: www.mobility-online.com

#4	**Cropland Capture**
Representative Images:	  
Developer:	The Geo-Wiki Project
Main goal:	Identify arable land to feed the world.
Key Learning Points:	1. Connection of the hunger problem with land management. 2. Developing the global crop map to contribute to global food security.
Game mechanics:	You earn points and have a chance of winning real weekly prizes.
Description:	By 2050 there will be 10 billion of us on the planet. That's a lot of hungry mouths that we'll struggle to feed with the current agricultural setup. Trawl through satellite images of the Earth and look for arable land to help develop the first-ever global crop map, which will help plan for global food security, identify yield gaps and monitor crops affected by droughts. The more land you identify, the higher your score and the better your chances of winning great weekly prizes, such as an Amazon Kindle, a smartphone, or a tablet. But hurry: the competitions stop in April.
Best suitable for:	Trainings on biodiversity science for interested people of all ages.
How to play:	Access the link: http://ictmagic.sharedby.co/share/G0hoLT

#5	EnerCities
Representative Images:	 
Developer:	Paladin Studios
Main goal:	Build a happy, ecologic, well-prospering city.
Key Learning Points:	1. Different strategies lead to different outcomes. 2. An economy may develop or sectors in a balanced way or become specialized on one or several particular ones. 3. Clean environment brings economic and social benefits.
Game mechanics:	You learn about the environment, renewable energy systems and what it takes to build and manage a city of the future.
Description:	Project EnerCities offers a serious gaming platform for young people to experience energy-related implications. The goal is to create and expand virtual cities dealing with pollution, energy shortages, renewable energy etc. The development of the serious game is based on state of the art technologies and insights. The game is fully web-based, 3D perspective (via Unity3D plug-in) and is suitable to play on low-budget computers. The game offers a semi-realistic simulation with game-like visual styles (cartoony) and low entry barriers (easy to understand; multiple levels in order to bring-in more complexity). All these approaches enable a wide distribution of the EnerCities serious game across Europe.
Best suitable for:	Children and youth of 14 – 20 years old.
How to play:	Access the link: www.enercities.eu

#6	SimCity
Representative Images:	 
Developer:	Maxis / Electronic Arts
Main goal:	Build prospering city – you can customize it as you wish.
Key Learning Points:	1. Every decision has consequences. 2. You are person responsible of look of your city. 3. Problems and profits of different policies . 4. Breaking myths of power plants (e.g. a coal plant is better because it is cheaper, or myths about nuclear power plant).
Game mechanics:	Build up economic prosperity.
Description:	SimCity is a dynamic, living, visually engaging world unlike anything you've ever seen before! Build the city of your dreams and watch as the choices you make shape your city and change the lives of the Sims within it. As a true city simulator, you will see that very decision, big or small, right or wrong, has real consequences for your Sims. Invest in heavy industry and your economy will soar - but at the expense of your Sims' health as pollution spreads. Implement green technology and improve your Sims' lives but risk higher taxes and unemployment. In SimCity, you're the Mayor, and you can do what you want! For the first time, SimCity will feature Multicity where you can go solo, invite friends or join with neighbors to build multiple cities in your region! Collaborate or complete with friends to grow the fastest population, create the most jobs, educate the most Sims and much more! Access SimCity World to connect to global markets and participate in regional challenges!
Best suitable for:	Everyone.
How to play:	Purchase on website: www.simcity.com

#7	**Sim Earth: The Living Planet**
Representative Images:	  
Developer:	Maxis Software Inc.
Main goal:	Manage the planet in a sustainable way.
Key Learning Points:	1. All spheres and ecosystems of the Earth are interconnected. 2. Every activity on the planet has its environmental consequences. 3. Practice sustainable development on a global scale.
Game mechanics:	You see results of your actions and strive for planetary prosperity.
Description:	Sim Earth is a simulator giving full control over a whole planet. It puts you in control of the geosphere, atmosphere, the evolution of simple microbes into fish, birds, reptiles, mammals and finally intelligent life – evolved out of apes, dolphins, or dinosaurs; this game covers a time-span of billions of years. Sim Earth: The Living Planet was designed by Will Wright and published in 1990 by Maxis. The program uses the Gaia theory from James Lovelock. The planet itself, including all vegetation and animals, lives as one big organism. And if something changes, either the physics or the biology, everything changes a bit to regain the balance. Basically, you control the atmosphere (such as sun power and cloud formation), the geosphere (volcanic activity, erosion, and continental drift), biosphere (reproduction rate, mutation rate and split rate) and the likes. Besides, you can place vegetation, add, move or remove different life forms and enjoy watching them evolve. Of course, you are free to intervene if you don't like where it is all going. A respectable number of graphs are available to give you a good idea about what your changes are leading to. Since this simulator deals with such a huge diversity, it's a bit cruder than its city-focused counterpart, SimCity. That is, for instance, once intelligent life is evolved one can put complete cities at the world. There are no clear goals; just the challenge of evolving intelligent life.
Best suitable for:	Everyone.
How to play:	Purchase on website: www.freegameempire.com/games/SimEarth

#8	**Fate of the World**
Representative Images:	 
Developer:	Red Redemption
Main goal:	Solve the crisis connected to climate change.
Key Learning Points:	1. Consequences of climate change on many layers of life. 2. Ways to prevent catastrophe. 3. Rising awareness of human influence on environment. 4. Test policy approaches to combat climate change.
Game mechanics:	1. Choose your mission. 2. Appoint your agents. 3. Device your strategy. 4. Battle consequences of your choices.
Description:	After another decade of inaction, the governments of the world wake up to a planet in chaos. The first impacts of climate change, population growth, resource over-exploitation and species loss have struck and a global organization has been created to respond. You are that response. Will you help the planet or will you be an agent of destruction?! Fate of the World is a nail-biting set of scenarios covering the next 200 years. At the heart of the game are 10 'Masterplans' where you call the shots for all people including 'Apocalypse' where the goal is to raise the planet's temperature to a lethal temperature; 'Lifeboat' where the goal is to save only yourself while abandoning everyone else to whatever catastrophes await them; and 'Utopia' where you can try to build a perfect society while battling population growth. Fate of the World is brought to you by the award-winning Red Redemption team, developers of the highly successful 'Climate Challenge' game played by over 1 million players and receiving global press coverage, and Klaude Thomas AAA veteran games producer of 'Battlestations: Midway'.
Best suitable for:	Young professionals.
How to play:	Purchase game on its website: http://fateoftheworld.net

#9	**Anno 2070**
Representative Images:	  
Developer:	Blue Byte, Related / Ubisoft
Main goal:	Build society of the future, colonize islands and create sprawling megacities with multitudes of buildings, vehicles and resources to manage.
Key Learning Points:	1. Consequences of climate change on the global economy and society. 2. Efficient management of natural resources.
Game mechanics:	You develop your city and progress in the game.
Description:	Anno 2070 supposes that by 2070 high levels of climate change will have melted the Arctic ice cap, raising the global sea level to such a high altitude that only the tips of mountains are habitable. Humanity continues and settles on these lofty land-masses. When it comes to completing global missions, there are a few factions to choose from. The Eden Intitiative's Ecos realize that green technology and preserving nature is the key to success, and rely on nifty clean energy sources like wind and solar. On the other hand, the Tycoons, led by greedy CEO Skylar Banes, obviously still aren't convinced about the damaging effects of ignoring the climate, and continue exploiting resources. Sure they're rich and prosperous, but they have to deal with pollution and ever-dwindling fuel sources. Which side will you pick?
Best suitable for:	Everyone.
How to play:	Purchase game on its website: www.anno.ubi.com

#10	Landscape Game
Representative Images:	  
Developer:	Herry Purnomo / Center for International Forestry Research (CIFOR)
Main goal:	Manage your land and resources in a sustainable way to achieve economic and environmental prosperity.
Key Learning Points:	1. Understanding that in the landscape, there are many actors with legitimate interests. 2. Efficient management of natural resources. 3. Concept of externalities - the economic or environmental “side effects”.
Game mechanics:	You develop your land, acquire assets, earn money, and progress in the game.
Description:	How would you invest in a forest? Would you cut it down for timber, or preserve it for carbon credits? Would you clear it for oil palm, or build a tourist eco-lodge? Can you get rich—and be eco-friendly at the same time? These decisions are yours to make in “Landscape Game.” Race your opponents to build your wealth, but don’t ignore the impacts of your actions if you want to win. Landscape Game was invented by Herry Purnomo, a scientist at the Center for International Forestry Research (CIFOR) and a professor at Bogor Agricultural University (IPB).
Best suitable for:	Academia, community members, policy makers – anyone who is interested in balancing conservation and development.
How to play:	Download app or play on-line at the game website: www.cifor.org/landscapegame

Board Games

#1	**STRATAGEM**
Representative Images:	  
Developer:	Dennis Meadows, Donella Meadows, Ferenc Toth, and Norman Marshall
Main goal:	Achieve a sustainable economic growth of your country by making decisions regarding each economic sector and the distribution of resources among them.
Key Learning Points:	1. Different strategies lead to different outcomes. 2. An economy may develop or sectors in a balanced way or become specialized on one or several particular ones. 3. Clean environment brings economic and social benefits.
Game mechanics:	You achieve certain score and compare it to the other team.
Description:	STRATAGEM is a personal computer-based management training game on the governance of eco-social systems. STRATAGEM simulates in a simplified form the national economy of a country that has reached a stage of development like that found widely in Latin America. The game covers a time span of two generations (60 years). This is split in 12 periods of five years. Per five year planning period a series of decisions (concerning production and consumption of food, goods and energy and concerning investments and trading) must be taken that are used as input into the computer. The PC serves here as an accounting device, that presents the effects of the decisions taken in the form of a description of the situation at the end of the last planning period. A full cycle of the game thus consists of one set of decisions by the team (the input parameters) and a description of the newly calculated state of affairs at the end of that planning period (the output parameters). Five different roles are implemented in the game. Each role can be played by one or two participants. So a team of five to ten persons is required for playing STRATAGEM. Players are free to implement a wide range of social and economic decisions. Their actions must be carefully designed to be consistent with the cause-effect

	relationships that govern the behavior of the society if they want to reach a high level of development. A group of more than 10 persons can be divided into separate teams of about 5-10 players. Approximately 8 groups (maximum number: 10) can be handled by one computer-printer combination, and a game-operator with an assistant. In this way the results of all the teams can be compared with each other. There are no interactions between the teams. During the game there are twelve sets of decisions to be taken - each influencing the development of the region over a five-year cycle. Each set is divided into 5 sectors which are managed by at least one person: 1) population & household consumption 2) energy production & energy efficiency 3) food production & environment 4) goods production & human services 5) international financing. The game is normally played in one 6-8 hour period without interruption.
Best suitable for:	Trainings and workshops on environmental governance for students and adults (especially political advisers and government officials).
How to play:	Access the link: http://ivem.eldoc.ub.rug.nl/ivempubs/Software/Stratagemmanual

#2	**Landscape Game**
Representative Images:	  
Developer:	Herry Purnomo / Center for International Forestry Research (CIFOR)
Main goal:	Manage your land and resources in a sustainable way to achieve economic and environmental prosperity.
Key Learning Points:	1. Understanding that in the landscape, there are many actors with legitimate interests. 2. Efficient management of natural resources. 3. Concept of externalities - the economic or environmental “side effects”.
Game mechanics:	You develop your land, acquire assets, earn money, and progress in the game.
Description:	The Landscape Game offers an intelligent game that is fun, environmentally conscious and sensitive to government policy and market dynamics. The Landscape Game operates on a landscape, which is a mosaic of various land cover and land use patches that work as an ecosystem. Through this game, stakeholders can experiment with the likely impacts of human actions in a landscape where competing land uses and policy dynamics interact. Policy makers can learn how to maintain and improve the sustainability and productivity of a landscape by using various policy instruments, e.g., rules, taxes, land use, incentives and disincentives. This game introduces a variety of concepts such as landscape conservation, development, environmental services, investment alternatives, trade among players, competition and collaboration. The game challenges rational players to maximize their revenues, while at the same time taking care of the ecological and social conditions. Players who play to benefit these indicators will be rewarded at the end of the game.
Best suitable for:	Academia, community members, policy makers – anyone who is interested in balancing conservation and development.
How to play:	Access the game manual at: www.cifor.org/lpf/landscapegame

Activity Games

#1	**Sustainability Triangle**
Representative Images:	 
Developer:	Moldovan Environmental Governance Academy
Main goal:	Explain the interdependence among the three key elements of Sustainability: Economy, Society and Environment (or 3Ps: Profit, People, Planet).
Key Learning Points:	1. Explain the three pillars of sustainable development and their connection. 2. Do an icebreaker / physical activity. 3. Have some fun.
Game mechanics:	The game features individual competition to remain till the end.
Description:	Sustainability Triangle is an outdoor / indoor activity game played for about 15-20 minutes. It allows the participants to memorize the three main pillars of sustainability through an active movement exercise.
Best suitable for:	Environmental trainings for children and young people over 10 years old.
How to play:	Before the game the facilitator explains the concept of sustainability and its three key pillars: Economy, Society and Environment (or 3Ps: Profit, People, Planet). He / she asks the participants to observe the relations between them during the game. The game is played in 3 rounds. In the first round each player should choose 2 other ones and try to be always in a more or less perfect triangle with them. So, when one person that forms the triangle moves, the participant should change place in order to keep the form of a triangle. Within each triangle its members need to agree who takes on the role to represent Economy, Society and Environment, so that every triangle has all three elements. In the second round the rule is the same, but there is one piece of additional information. When somebody touches a player, he / she has to go out from the group. If somebody has this person in the triangle, he / she can decide if he / she goes out of the group or chooses another person. The aim here should be to remain a complete Sustainability Triangle with all three key elements. In the last round the person who is touched by a leader has to go out of the group, as well as taking other members of the triangle with him / her. When all participants

	leave the game, the facilitator asks the participants about the rule that was possible to be observed in the game and in sustainable development. The facilitator concludes the game with a discussion on the importance of interrelations and interdependence among all three elements – Economy, Society and Environment – in order to achieve balanced and sustainable development.

Chapter VII. Eco-innovation and "Green" Business

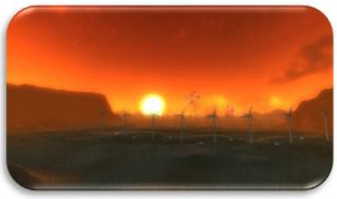
Board Games

#1 UN Global Compact Dilemma Game

Representative Images:	  
Developer:	KPMG / Foreign Ministry of Denmark / A.P.Møller-Mærsk / Novo Nordisk / Danfoss
Main goal:	Solve the dilemmas that your business faces in terms of addressing the UN Millennium Development Goals.
Key Learning Points:	1. You face dilemmas in your business that you need to address. 2. You need to consider the trade-offs and consequences of your decision making.
Game mechanics:	You move forward on the game board.
Description:	The game is based on the ten principles of the UN Global Compact and consists of real business dilemmas relating to human and labour rights, as well as environmental and anti-corruption issues. Through the game, players are trained in handling real ethical dilemmas, from various stakeholder perspectives. The game has been developed to assist and guide companies in implementing responsible business practices. It includes examples of good and poor practice of the UN Global Compact, as well as questions relating to the UN Millennium Development Goals. The game has been played widely around the world and is used as an awareness raising tool, to analyze stakeholders and identify dilemmas etc.
Best suitable for:	Trainings and workshops on entrepreneurship, responsible leadership and CSR for businesses, NGOs and universities.
How to play:	Order on the website: www.kpmg.com/dk/da/nyheder-og-indsigt/nyhedsbreve-og-publikationer/publikationer/advisory/csr/sider/un-global-dilemma-game.aspx

Chapter VIII. Miscellaneous

On-line Games

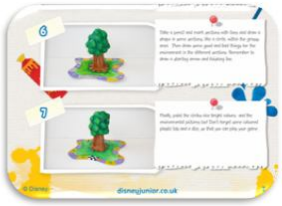
#1	**Flower**
Representative Images:	  
Developer:	Thatgamecompany
Main goal:	Control the wind in order to blow the flower petals and change the environment.
Key Learning Points:	1. Each action, even a small one, produces changes in the environment. 2. Every element of an ecosystem is connected to each other.
Game mechanics:	You progress through the levels.
Description:	The “Flower” game exploits the tension between urban bustle and natural serenity. Players accumulate flower petals as the onscreen world swings between the pastoral and the chaotic. Like in the real world, everything you pick up causes the environment to change. And hopefully by the end of the journey, you change a little as well. The goals and journey in each level vary, but all involve flight, exploration and interaction with the worlds presented to you. Using simple SIXAXIS wireless controls and by pressing any button, the player controls the lead petal and accumulates a swarm of flower petals as he moves at his own pace within the environment, causing the on-screen world to change. Flower's gameplay offers different experiences, pacing and rhythm to all players. Along the way, the environment will pose challenges to the player's progress.
Best suitable for:	Everyone.
How to play:	Order on the website: http://thatgamecompany.com/games/flower

#2	**Congo Jones and the Loggers of Doom**
Representative Images:	  
Developer:	Rainforest Foundation UK
Main goal:	Map and protect the Congo rainforest by working with local communities living in the forest.
Key Learning Points:	1. Learn about forest conservation issues and challenges. 2. Discover the ways of stopping deforestation.
Game mechanics:	You progress through the levels and accumulate points.
Description:	Congo Jones and the Loggers of Doom is a 2D casual game in which the gamer helps a forest community to map their land “before the loggers arrive,” in the process learning about forest conservation issues. Congo Jones' mission comes as the Congolese rainforest -- the second largest on the planet after the Amazon -- is under the carving knife. An area the size of France is at risk. The global threat is heightened with the knowledge that rainforest destruction is the second largest cause of global warming. You are invited to jump logs, climb waterfalls and evade chainsaws to help forest peoples save their lands before it is too late. You are encouraged to register at the game website for more information and other ways to help.
Best suitable for:	Children of 7 – 12 years old.
How to play:	Access the link: www.rainforestfoundationuk.org/congojones

#3	Econauts
Representative Images:	  
Developer:	GLS Studios
Main goal:	Develop your infrastructure in balance with the surrounding environment.
Key Learning Points:	1. Learn about anthropogenic activities and ecosystem response to them. 2. Find out the ways of sustainable development.
Game mechanics:	You progress through the game by accumulating points and earning money.
Description:	Lakes are sometimes thought of as discrete ecological bodies, detached from surrounding landscapes and contained within basins bound by shorelines. However, lakes are dynamic systems with many abiotic and biotic variables affecting varied spatio-temporal scales, typically invisible to human observers. “Econauts” immerses players in a rich environment, making difficult-to-observe ecological phenomena visible in a living landscape that players explore and examine to explain the relationships between choices that humans make and their ecological consequences.
Best suitable for:	Children of 10 – 15 years old.
How to play:	Access the link: www.gameslearningsociety.org/econauts_microsite

Board Games

#1 **Ecology Board Game**

Representative Images:	  
Developer:	Disney Junior
Main goal:	Make your own environmental board game.
Key Learning Points:	1. You apply your artistic skills to design and create an environmental board game. 2. You consider what environmental issues to include in your game.
Game mechanics:	You build your own board game and then play with it with your friends.
Description:	This is not exactly a game, but a process of creating a game. It involves some artistic skills, as well as understanding of certain environmental issues that need to be included in the game. There are step-by-step instructions on how to make the board and the tree on it for creative visualization.
Best suitable for:	Co-creation workshops in schools and kindergartens for pupils of 7 – 12 years old.
How to play:	1. Access the link: www.disney.co.uk/disney-junior/art-attack/attacks/ecology_board_game.jsp 2. Follow the instructions shown there to build a game board; 3. Think about a game concept and objectives and start playing.

Activity Games

#1 **I wanna be a…**

Representative Images:	  
Developer:	Moldovan Environmental Governance Academy
Main goal:	Develop environment protection solutions that can be applied in any profession and by any type of citizen.
Key Learning Points:	1. Get to know each other. 2. Everyone with every kind of profession can and should contribute to environmental conservation. 3. Develop creativity and direct it towards protecting the environment.
Game mechanics:	The game features individual competition to remain till the end.
Description:	I wanna be a… is a GTKEO game that can be played at the beginning of a training or educational program. Its essence is to identify possible solutions to environmental issues that are suitable for each type of profession and for every individual.
Best suitable for:	Environmental activities in schools for groups of pupils of 8 – 15 years old.
How to play:	The participants stand in a circle. If there are many players (more than 15) it is suggested to break into two-three groups with a facilitator in each group. One by one the players say their names and the profession each would like to take in the near or far-away future. They memorize these professions. After that each participant repeats his / her dream profession and says how he / she can contribute to environment protection when getting it. When everyone in the circle says a solution, every participant moves to the place of his / her neighbor, thus taking on his / her “profession”. This round the participants should come up with a solution according to the “new profession” again. Example: “I wanna be a scientist. And I can study the nature and help to understand how to protect it in the best way”. The environmental solutions must not be repeated. It is advised to have a facilitator that writes them down on a whiteboard / flipchart. If a participant cannot come up with a solution, he / she leaves the game. The winner is the one, who remains till the end.

#2	I, Ecologist
Representative Images:	N/A
Developer:	N/A
Main goal:	Experience the role of an ecologist / environmentalist and learn about possible solutions to current environmental problems.
Key Learning Points:	1. Each environmental problem has a solution. 2. There can be many possible solutions to any environmental issue.
Game mechanics:	Players use active brainstorming to stay in the game.
Description:	I, Ecologist is a simple game that involves brainstorming for solutions to the environmental problems of the present time. Participants take turns to get a particular environmental issue and then try to come up with possible solutions to it. The game can be played between individuals or between teams.
Best suitable for:	Environmental lessons and activities in schools for pupils of 8 – 15 years old.
How to play:	Prepare the logistics: - 1 dice with numbers from 1 to 6 on its sides; - 6 envelopes with different environmental issues written on them: climate change, deforestation, biodiversity loss, water pollution, desertification, etc. In each envelope put a number of possible options to solve the specific environmental issue written on that particular envelope. The players throw the dice in turn. Depending on the number shown on the dice each player or team of players takes the envelope with the issue corresponding to that number. Within a certain time limit the player / team should present their way how to solve the environmental issue they got. If the player / team cannot come up with a feasible solution, he / she / they can use one of the options from the envelope. But it can only be done twice per player / team. If the option taken out has already been presented by another player / team, it cannot be counted as an attempt. If a player / team cannot come up with a solution and has already used all 2 attempts, he / she / they are out of the game. The winner is the one, who remains in the game.

#3	I want to be a Green Agent!
Representative Images:	N/A
Developer:	Moldovan Environmental Governance Academy / Regional Environmental Center
Main goal:	Assess the environmental knowledge and sustainable decision making.
Key Learning Points:	1. Evaluate the knowledge and understanding of environmental issues. 2. Teach how to make environmentally sound decisions.
Game mechanics:	Competition between teams; earning points; receiving the award in the end.
Description:	I want to be a Green Agent! Is based on a dilemma game, where the teams need to choose environmentally sound and appropriate option among the dilemmas in order to obtain the status of a Green Recruit or Agent.
Best suitable for:	Environmental activities for pupils and students of 8 – 18 years old.
How to play:	Prepare the logistics: - Rotating arrow (for which you can “reuse” a glass / plastic bottle); - Cards with description of situations / “missions” and options / dilemmas. The situations can be from different areas, such as Air Pollution, Climate Change, Deforestation, Loss of Biodiversity, Waste, Water Scarcity, etc. At the beginning of the game the facilitator informs the participants about the status of a Green Agent with its responsibilities and benefits. The participants are then grouped into teams of 3 – 6 members each. The teams form a circle around the rotating arrow and the cards with “missions” placed around it like a clock face. Each team takes turns to rotate the arrow, take the card with the “mission” and read it aloud along with the options / dilemmas. They will then have to choose the best possible option and argument it within 2 – 3 min. Other teams approve it or argue about it by giving arguments as well. In the end the facilitators allocate 1 point if the answering team performed well with decision and argument or 0 points if it could have been better, as the other teams have proven. Other teams can also receive points, if their contribution is very good and valuable. The game continues until one of the teams accumulates 5 points and thus becomes the winner. The other teams receive the points according to their performance during the game. As an option the players can be awarded with badges of Green Agents.

#4	**Waste Shuttle / Air Balloon**
Representative Images:	  
Developer:	Gutta-Club
Main goal:	Assess and identify the most promising environmental issues.
Key Learning Points:	1. There are not enough resources to address all issues, so we need to prioritize. 2. All environmental problems and their cause are interconnected.
Game mechanics:	Earning game points.
Description:	Waste Shuttle / Air Balloon is a teamwork game, where the players come up with environmental problems and their causes. After that they need to choose the most pressing ones by excluding the rest. Final debriefing is a very important part of the game, as it allows the players to reflect on the game and argument their choices.
Best suitable for:	Environmental activities for pupils and students of 15 – 20 years old.
How to play:	Prepare the logistics: - 30 blank cards / pieces of paper. Participants are divided into 3 groups. Each group receives blank cards / pieces of paper and brainstorms about 5 main global ecological problems and 5 main sources of pollution. Then the trainer tells about the magician, who can solve all these “problems”. This magician lives far away on the mystery island and we can get there only on the Air Balloon / Shuttle. So, we are putting all the “problematic” bags (one bag – one problem) into the balloon and it fly away. But the problem is that as soon balloon starts filling, there are too many bags (problems), so if we want to get to the magician, we need to throw away one bag (each team need to decide it in 2 minutes). Teams throw away bags till they have 3 main eco-problems and 3 main sources of pollution per all the participants (1 eco-problem, 1 source of pollution per group). The game ends with a common discussion about the main global ecological problems and how they affect the value of the environment.

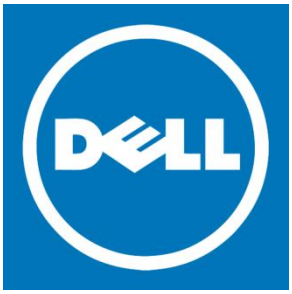
#5	NVDA (Non-violent Direct Action) Environmental Campaign
Representative Images:	  
Developer:	Regional Environmental Center / Moldovan Environmental Governance Academy
Main goal:	Learn to organize and realize environmental campaign under difficult circumstances.
Key Learning Points:	1. Organization of an environmental campaign requires good strategic planning, coordination of activities and persistence in achieving its objectives. 2. Good environmental campaigns require hard work and good teamwork.
Game mechanics:	Teamwork with increasing difficulty of challenges.
Description:	NVDA Environmental Campaign is a game simulating the situation the environmentalists face when they organize environmental campaigns. The game features performing non-violent direct action by the participants and various challenging situations they confront with while striving to achieve the campaign objectives.
Best suitable for:	Environmental activities for pupils and students of 15 – 25 years old.
How to play:	Prepare the logistics: - Name tags for the trainers with the names of Journalists, Random Person / Policeman, Member of Society, School Director, Mayor / Minister of Environment; - Additional props for specific roles (camera for journalist, bottle of alcohol for random person, briefcase for mayor, etc.). Trainer tells the participants about the challenges environmentalists face in their fight for better environment and related human health. He/she can present some images from Greenpeace non-violent direct action campaigns. Trainer presents the objective of the game to the participants: during 20' to convince the School Director and the Mayor / Minister of Environment to support their campaign with an order / law / support letter. They also need to inform the general public about the situation with local pollution and what needs to be done. In order to achieve this objective, the trainer tells the participants that they need to split into 4 small teams: research team, strategy team, innovation team, and the volunteers. During the next 10' the teams work on the strategy for the Campaign, do

	research, brainstorm for innovations, allocate roles among themselves, etc. Then within 20' the participants perform environmental action and hold discussions with the mayor, general public, press (played by the trainer and facilitators) to convince them about the importance and need of their campaign. There should also be an alcoholic / policeman that will spoil their plans. Trainer and facilitators play the roles one by one, while also monitoring the time and the performance of the teams. At the end the debriefing takes place. In addition, trainer comes with conclusions about building strong teams for environmental campaigns, the importance of strategy and clear roles, overcoming challenges and staying devoted to the campaign mission and goals, etc.

#6	**Green Agents' Facebook**
Representative Images:	  
Developer:	Moldovan Environmental Governance Academy / Medium
Main goal:	Learn to plan an environmental campaign and receive valuable feedback on its plan.
Key Learning Points:	1. There are different strategic techniques and approaches to environmental campaigns. 2. Collecting and using feedback is a good way to improve planning of campaigns.
Game mechanics:	Competition with collecting "likes" and comments.
Description:	Green Agents' Facebook is about teaching people how to set goals and design action plans for environmental campaigns. The game uses the concept and mechanics of a social network, particularly Facebook, in order for participants to give suggestions and feedback to each other. They do it by "liking" and commenting the "Facebook Walls" of each team and then analyzing the comments received.
Best suitable for:	Environmental activities for pupils and students of 15 – 25 years old.
How to play:	Prepare the logistics: - 4 flipcharts; - 5 markers; - 1 adhesive tape. Trainer presents and explains the key principles of planning environmental campaigns to the participants. Then he/she divides them into 3-4 teams and offers them to come up with concrete goals and actions for their campaigns and make simple action plans for each campaign. The trainer gives each team one flipchart and market. They use them to identify goals, objectives and actions of their environmental campaigns and then design strategies and action plans for them. After 15' the trainer asks the participants to hang the flipcharts with their plans on the wall by using adhesive tape. Then he/she asks each group to move to the flipchart, aka other team's "Facebook Wall", to the right and gives them 5' to give suggestions and feedback to that team by "liking" their flipchart and writing down comments with markers of different colour. After 5' the teams move clockwise to

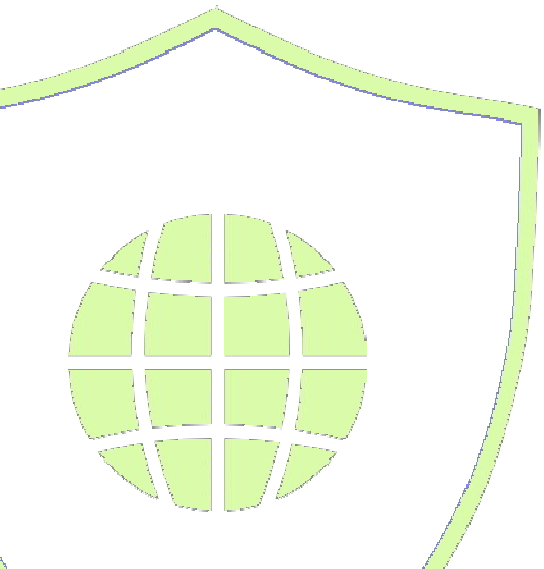
	another flipchart and do the same. This is repeated one or two more times in order for all teams to check and comment on all flipcharts. The trainer also walks around and writes his/her feedback on each “Facebook Wall”. After all this is done each team takes its own flipchart to analyze feedback after the session. Alternatively the trainer can take each flipchart and present its contents with the participants helping him/her. The team, who’s “Facebook Wall” has the most “Likes” and comments wins.

MEGA PARTNERS AND SUPPORTERS



The MEGA Game Book is a compendium of educational games (on-line games, activity games, board games) on the topics of environmental protection, management, and governance. It has been prepared by the Moldovan Environmental Governance Academy (MEGA) to help environmental organizations, teachers of classes on ecology and environment, trainers delivering sessions on these topics at various events, and other educators to enhance their education and learning practice through play, entertainment, and fun. The MEGA Game Book is also meant to support research on gamification in environmental education and the market of environmental "serious games".

For more information please visit us at www.megageneration.com or write us to hello@megageneration.com.



Moldovan Environmental Governance Academy

MEGA GAME BOOK

Environmental Learning Games Compendium

First Edition

Chisinau, 2015