NEW SHORES

a game for democracy

NAURU GAME

FOR ACTIVE CITIZENSHIP OF YOUTH

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Workshop Scenarios

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Introduction

What is this *Workshop Scenario*?

The New Shores Workshop Scenario is part of a **comprehensive educational kit** consisting of:

1. a multiplayer internet game *New Shores - a Game for Democracy*,
2. Game-based *Workshop Scenario*,
3. *Methodology Guide*,
4. e-learning platform.

All these materials have been developed parallelly as part of the Erasmus+ programme funded from the European Union.

Who and what is the *Workshop Scenario* aimed at?

This *Workshop Scenario* has been developed as a complementary document to the more theoretical *Methodological Guide*. Its main objective is to equip **youth educators** wishing to lead a workshop with *New Shores – a Game for Democracy* with all necessary information regarding the **circumstances of the workshop**, as well as ideas to consider, and **suggested activities before and after playing the game**.

New Shores has been developed to train and develop three key competencies of young people, needed in the context of **democracy and sustainability** (to get more information about the competences, read the relevant section of the *Methodology Guide*):

- Social and civic competence
- Mathematical competence and basic competence in science and technology
- Sense of initiative and entrepreneurship

You may use the debriefing session ideas and sets of additional activities (offered at the end of this document) after the game to deepen the learning process according to your specific focus.

General information

The most significant thing that you, as an educator/moderator, should know is that there is no one "proper" way to run the New Shores workshop, and the tips collected in this document may be freely modified to suit your prefered facilitation style. While working with a group not every situation can be predicted, thus instead of committing yourself to one specific mode of action, try to stay flexible and adapt it to potential twists and turns. Being conscious of your choices and open to your group's needs is the key to lead an effective workshop and provide a real learning opportunity for your students.

Role of the moderator

As a moderator, you become a leader and the facilitator of the game. **You don't have to be an expert either in democracy or sustainability** (however if you believe your knowledge on the topics is not sufficient, look for the links to the inspiring articles and videos listed at the end of this document). Your role is first and foremost to carry out the game and a debriefing session. You will have to think about the technical aspects of the workshop, provide the equipment and take care of the practical issues, like managing the rounds during the game.

You are also going to ensure the safety of the experience, addressing any emerging problems (such as conflicts or lack of interest on the players' side - for communication tips, read the relevant section of *Methodology Guide*) or shed light on situations which have emerged during the play.

During the debriefing session, your task will be to ask questions, spur participants to air their opinions, and learn from each other. While some players will gain more understanding of the problem and verify their beliefs, others may choose to defend their old views. At this stage of the game, the key is to encourage participants to develop **independent critical thinking**.

Whatever you do, you need to be aware of our own role in the whole experience. As with *New Shores* our aim is to facilitate the participants' learning experience, as opposed to directly teach them something, **we suggest to stay as neutral as possible**. If we are too directive, it doesn't support the participants in experiencing themselves freely.

Aim of the workshop

Before the workshop, try to clarify what is your specific aim. Identifying a goal will help you decide on debriefing questions and post-game activities that best match it. Is it:

- to introduce the topic of democracy?
- to provide an opportunity to experience the power of cooperation?
- to „teach" about conflict-resolution?
- to build up a sustainable attitude?
- to develop competences?
- to „have fun"?

There is no way to prepare for every possible option. We don't need to panic if something doesn't go as planned – every situation can be turned into learning.

Online/face-to-face workshops

New Shores is an internet-based game, therefore it can be used both face-to-face or online, with the participants situated in different location (the chat option may come in handy then). Usually, face-to-face workshops provide a deeper experience, as the participants are excited to enter a new social situation. On the one hand, it might be a bit stressing but on the other, it makes the game more realistic and lively. Online workshops can be useful in contexts where a workshop couldn't be otherwise possible (for example due to geographical difficulties).

Participants

New Shores - a Game for Democracy is addressed mostly to **middle and secondary school pupils** and **students of higher education**, although with necessary guidance, it may be successful also with younger kids.

Here are some factors that you have to consider planning your workshop:

- Do the participants know each other already, or is it a „fresh" group?
- Is it a „homogenous" group (eg. everybody is around 16 and is interested in gaming – in an afternoon-club) or they might be very different (eg. youngsters between 13 and 19 – in a summer camp)?
- Do we know the participants? Do we have some pre--conceptions about who will act in a certain way?

Regarding the number of participants, the game may be played even by as many as 20 participants at the same time. However, **the optimal number of players is between 7 and 10.** In case there are more participants you want to include (or you don't have enough tablets), there is always an option to pair the students up or put them in small groups. This will give an extra layer to the experience, as the pairs/groups will have to communicate and come up with a common strategy. Although it may be challenging, such interaction may create a sense of partnership, which engages the players more.

Length of the workshop/game

The *New Shores* workshop usually takes **at least 3 hours** and consists of:

- ice-breaking activities (15 min)
- game introduction / trial round (15 min)
- game session (60 min)
- debriefing session (60 min)
- post-game activities (30 min)

As for the game itself, we suggest playing **10 rounds** (6 minutes for a round), which is enough time for players to explore the game's potential without losing interest. Depending on your possibilities, you may play fewer rounds or shorten certain activities. Whatever you decide, **never skip the debriefing session!** It's an essential part of the experience.

If you work at a school and are bound by a 45-minutes lesson limit, you may want to combine two lesson units. Also, if your school joins the celebrations of Earth Day, International Day of Democracy or World Environment Day, you may seize the opportunity to combine these with a longer *New Shores* workshop.

Materials/equipment needed

The only indispensable equipments needed for the workshop are computers or other devices with Internet access (tablets) - one per player or pair of players. Other than this, you might need a projector with screen and materials for the ice-breaker activities or the debriefing session.

How to conduct a workshop?

Setting up the game

Before starting the workshop, you need to set up the technical equipment. Make sure that the internet-connection and the computers/tablets are working.

The steps to follow to set up the game are the following:

1. Open the play.games4sustainability.com website in the browser and set-up/log in to our Moderator's account.
2. Create the *New Shores* gameplay following the instructions on the Moderator Panel.
3. Open the play.games4sustainability.com website on the Players' devices or computers and log in to the Player's account using the login credentials on the Moderator Panel (P1, P2, P3, etc. - depending on a number of players involved).

If you need more detailed information, read the **instructions** or watch the short video tutorial for moderators.

Before the game

Break the ice

Even though the heart of the workshop is the game, it is also important to start the process in a right way. This is the time for participants to introduce themselves to others (if they don't know each other yet), break the ice and create an atmosphere where communication and discussion can naturally emerge. For this, you can use several **ice-breaker activities** listed at the end of this document. You can also introduce the **topics** you want to discuss/experience with your students, related to e.g. to democracy or sustainability.

Introduce code of rules

Po rundce zapoznawczej, wprowadź kilka zasad, którymi będziecie posługiwać się w trakcie warsztatu:

You are going to play a game, during which a number of different (also negative) emotional reactions may appear. Strong emotions can also emerge during the discussion after the game. Since I'm really concerned about your feelings, I would suggest that:

- *we treat each other with respect,*
- *if you want to express criticism, do it in a respectful and constructive manner,*
- *if for some reason you feel uncomfortable, let me know. We will stop the game and consider what should be changed so that everyone can have a good time.*

Do you agree to follow these rules?

Introduce the plot

Set the context of the game so that the players may identify with their roles more easy:

Imagine that you live on a mysterious island covered with a beautiful forest full of green trees and tasty berries. Soon you discover also that the ground is rich with coal deposits. You and other inhabitants of New Shores will try to organize your life in a way that suits you and other members of the community. To do so you can use the island's natural resources, such as wood, coal and berries. They will bring you money needed for private and public investments. With money you can raise

your standard of living by investing in e.g. a private library or a swimming pool with jacuzzi. You may also contribute to public buildings, which add to the community statistics, such as education,health and culture. It's up to you to decide on your priorities. Bear in mind, however, that your actions always entail consequences. Excessive use of the island's resources may increase the possibility of climate disasters...

Present the game's options

Launch the game on your computer and display it on the screen using a projector. Tell your students that the game is played over several rounds, which are divided into two phases: **Operations** when they can undertake various activities, and **Results** where they can observe the outcomes of their decisions.

Start the game and present the students with its interface and main functions. Perform a couple of actions (such as cutting trees, collecting berries, extracting coal, erecting and protecting private and public buildings) to let them understand the mechanics. Draw their attention to the screens: **Environment**, **Wealth**, **Players**.

Play a test round

1. After a brief introduction, give your students tablets.

2. Restart the game and play a **test round** so that everybody can get familiar with the options before the „real" game starts. If anyone needs your assistance, show them individually how to perform operations on their tablet. If you want, you may also resign from the test round and throw the participants in at the deep end and start right away. It may be challenging for some but it may reflect real life situations better).

3. **At this moment it is advisable to remind your students that *New Shores* is not a regular game, as it does not have one defined goal. Encourage players to think what would be their personal goal in the game!**

4. At this point you may also hand out paper instructions. However, don't focus too much on them. Let players use them according to their needs during the gameplay.

Playing the game

1. After the test round, restart the game again.

2. The real game has just started! Remember that if all the players have used their action points, you can move onto the next phase - by choosing the appropriate option on the Moderator panel.

3. During the **Results phase**, draw the participants' attention to **the Report** (a blue button at the top of the screen) and the **Environment** tab. If any disasters occur, show the participants that there is a correlation between cutting trees and extracting coal and climate change. If the participants are using desktop computers and, due to the sitting arrangement, are unable to talk to each other, invite them to sit in a circle for a while to exchange their reflections and conclusions in public.

4. Explain them the correlation between the elevation level and the pace of forest growth. Continue the game.

5. In the next round, show the participants the tab: **Players** and present them the options: **Money transfer** and **Sanction**. You may also mention that they can use the **Monitor** option.

6. In the course of the game draw the players' attention to the effects of their actions: disasters, damage of property, level of education, health care and culture, as well as their personal standard of living they have achieved.

7. If the players initiate a discussion, try to encourage them to touch upon problematic issues. You can even pause the gameplay for a moment (using the appropriate option on the moderator panel) to give them time to reach a consensus. **Another good idea is to call a community meeting somewhere between 5th and 6th round. To do this, ask players to choose the representatives of the island's community (e.g. only a half of the group) and arrange a small discussion circle (with the rest of players acting as an audience). Set a time limit (e.g. 10 minutes) for the community representatives to discuss any disputes or agree on a collective strategy for the following rounds.**

8. In the 10th round, the game will automatically finish and the **Final report** will be displayed. It enables players to compare their individual results against other players and to see what how their actions affected the island (by e.g. comparing the print screens of the island before and after the game). Don't draw your students' attention to the report right now - you will discuss it in more detail during the debriefing session.

After the game: debriefing session

After the game, our aim is to deepen the learning by making participants more aware of their and other's emotions and actions, their consequences, etc.

Keep the balance of activities and discussions, so the program is not boring, but also is not overwhelming.

Airing out emotions

It is possible that during the game several of the participants have experienced overwhelming emotions. They might have kept them to themselves or somehow displayed them during the gameplay. Do not ignore it! Whatever your workshop plan is, addressing emotions is its essential part and cannot be skipped. It is important to give a chance for everybody to air their feelings! Otherwise players may leave the workshop with negative impressions. As handling emotions is a delicate issue, we strongly recommend reading the *Methodology Guide* for tips on how to communicate with your learners.

Here are some questions you can ask in this section:

- How do you feel?
- How was the game?
- Was it easy or difficult for you?

Also, if you feel it is appropriate, you can offer the participants some activities that include moving (eg. jumping, or some ice-breaker activities), so people can „move out" the tension from their bodies.

Establish the facts and players' motivations

After airing out emotions, you can continue the discussion by establishing what has happened during the game (objective facts) and what was each player's motivation (subjective). Sometimes it is not obvious for the participants what were their motivation, therefore it is good if they can reflect on their own actions.

Here are some questions through which you can facilitate this discussion:

- What is the result of the game?
- What is the level of public development?
- What is your personal life standard like?
- Do you feel satisfied?
- Who has erected the biggest number of buildings?
- Who has extracted the biggest amount of coal?
- Who has cut the biggest amount of trees?
- Who was planting trees?
- What does it mean to win in this game?
- What were your goals in the game? Did you achieve them?
- How did the goals change during the game?
- What helped and what blocked you on your way to achieve your goals?
- Did you apply any strategy that governed your decisions in the game?

In this part of the debriefing session, you may direct your students' attention to the **Final Report** and discuss it in more detail.

Focus on democracy and sustainability

Following the personal reflection, you can start focusing on the „larger issues" – how this game simulates real life and our own roles in our community? You can draw participants' attention to the problem of limited resources and the way people manage their communities/societies.

Here are some questions to start the discussion with:

- Imagine what would happen to this island if we kept on playing?
- How do you imagine your future on the island?
- What would have happened if you had used up all the resources of the island?
- What would have happened if you had all been interested in gaining wealth?
- Describe the community you have created in this game. How did it feel to be its part?
- What was your role in the group?

It is also a good idea to look at the Final Report once again and compare two pictures - the screenshot of the island before the game and the image of what has left of it after the game was finished.

You can find different activities for each of these topics in the annexes.

Development of social and civic competences

According to your pre-defined goals, you might aim to develop your learners' social and civic competences (for a description of this competence see the *Methodology Guide*). Firstly, you need to break down what skills within this competence you want to focus on. Is it communication? Tolerance? Negotiation? Empathy?

Here are some questions to start the discussion with:

- How did you resolve conflicts?
- Have you made common decisions? How was the process?
- How did you, as an individual reacted to the common agenda and rules?

You can find different activities for each of these topics in the annexes.

When discussing the effect of humans on nature, it is a good idea not to be too negative, as this approach is often counter-productive. We should focus on what individuals can do.

Development of mathematical / science competence

If your aim is to develop your learners' mathematical competence or their basic competence in science and technology (for a description of this competence see the *Methodology Guide*), you can start the discussion by focusing on the processes of thinking in terms of logic, decision-making, calculating possible consequences.

You can ask the participants:

- How did you build up your strategy during the game?
- How did you calculate your next steps?
- How did you calculate the possible effect of your actions?
- How could the island grow sustainably?

You can find different activities for each of these topics in the annexes.

Development of a sense of initiative and entrepreneurship

In case your aim is to develop your learners' sense of initiative and entrepreneurship for a description of this competence see the *Methodology Guide*, you can start the discussion with these questions:

- How you, as an individual were able to create your own agenda for the game?
- Could you follow your own ideas? Could you join others' ideas?
- Did you focus more on the common good or on your own aims?
- Where is the right balance between these two and how they might be combined?
- Were you able to work together in a team?

You can find different activities for each of these topics in the annexes.

Closing

After the debriefing session and post-game activities focused on the selected competencies development, ask everyone to sit again in a circle and reflect for the last time on the whole experience.

You can ask the following questions:

- After this whole experience, how are you feeling?
- What can you take away with you?
- What have you learnt about ...?
- Would you change anything, if you could play the game again?
- What was the best part of the whole workshop?

Thank everyone for their participation and ask them to follow the project's website and join the e-learning platform. Also, don't forget to share your photos and experience connected with the workshop!

Activities

In this section, you can find the list of activities that can deepen the learning experience and make the N*ew Shores* workshop more attractive. They are divided into two different types: ice-breakers that are to be used before starting the whole workshop and post-game activities that are focused on developing selected competencies of your students.

Ice-breaker activities

If participants don't know each other:

1. Name-learning game

   Ask participants to stand in a circle. Use a ball or a soft toy and introduce yourself to the group using your favourite form of your name. Then, throw the ball to someone else (be careful not to throw the ball to the person standing the closest to you - it may spoil the game's effect) and ask him/her to say their name. The task is to recreate the order in which the ball has been passed to each other, but faster. You may also ask the participants to say the name of the person who has thrown the ball to him in the first round.

If participants know each other:

1. Show your mood

   Ask participants to stand in a circle. Tell them that their task is to show how they feel using only their body language. The rest of the group has to guess their mood, and - if they want to - the potential reason behind it.

2. Triangle game

   Participants stand in a circle. Each of them has to choose two other people, without telling who they chose to anyone. When they are ready, they have to move in a way, that they are equally far away from the two chosen persons, forming an equilateral triangle. Most often it takes a long time for the group to settle down, as if someone moves, it creates a ripple effect and it moves the others as well. When they are settled down, you may have a short discussion about being interconnected, and how the change of an element of a system affects the rest of the system.

Post-game activities

The activities collected in this section have been designed to match three main sets of competencies:

1. **Social and civic** (democratic focus)
2. **Mathematical and scientific** (sustainability focus)
3. **Entrepreneurial** (proactive attitude focus)

In many cases, it was very difficult to classify a given activity on the basis of the competency trained (as mosts of the tasks collected here require a certain degree of all three types of skills to succeed). However, for the sake of simplicity, we decided to introduce two major groups of activities: **1) aimed at training social, civic and entrepreneurial skills** (where scientific and mathematical knowledge may be required but is not necessarily the main focus) and **2) aimed at training mathematical and scientific skills**.

Moreover, to encourage students to be more proactive, in many cases the suggested tasks include a **call for action** that replaces more traditional "homework". We encourage you to apply this type of follow-up as it multiplies the positive effect of the workshop and may render into a more long-term attitude change. We would also appreciate if you share your class's success stories on the e-learning platform!

Practical tips

- Graphic materials and students instructions should be printed for each student / group of students or displayed on the screen (see: *Printables*).
- You can introduce exercises in an arbitrary order or use only some of them (depending on the time limit you have and the group's competence level).

Activities for training social, civic and entrepreneurial skills

1. 50 shades of democracy

   Time: 45-60 min

   Focus: democracy

   Competencies trained: social and civic

   Type of interaction: group work

   Materials needed: several tablets or laptop computers, Internet access, colourful Xerox sheets of paper, a big flipchart or a sheet of poster paper, markers

   Description: "50 Shades of Democracy" enables students to observe the evolution of the democracy through ages, and come up with their idea on the concept.

Depending on the size of your class, you may organize your students into groups (up to 5 people in each). Give each group a tablet/laptop computer, several colourful Xerox sheets of paper and markers.

Set a time limit (e.g. 20 minutes) for the students to search for definitions of democracy through times and cultures and write them down on the colourful cards they have received (each definition separately).

Meanwhile draw a timeline on a flipchart or a poster sheet of paper, marking several milestones, e.g. ancient times (60,000 BC - 650 AD), middle ages (500 - 1500), early modern period (1500-1750), mid modern period (1750-1914), contemporary period (1914-now).

When the groups finish their research, ask your students to stick the definitions into a proper period (removing items that are repeated). Go through all the definitions with your students and ask each of them to chose the elements they find more relevant or important. As a summary, ask the whole class to collectively come up with one definition of democracy that they may all identify with (using the pieces they found but also their own ideas). Write it down and hang it in a visible place in the classroom.

If you are afraid, your students won't find enough definitions, use resources from the *Links*.

Additional idea: ask students what democracy means in reference to this class, to their neighbourhood, to their region, country, world.

Call to action: Ask students to identify one thing in their behaviour that they could change to make their class more "democratic". Encourage them to write it down and self-monitor their behaviour for a week. Summarize the experience by encouraging the students to share their success story in a self-chosen way (it may be a poem, an essay, a drawing, a comic, a clay sculpture). Share this success story with us on e-learning platform.

2. "I" in the group

Time: 20 min

Focus: democracy

Competencies trained: social and civic competences

Type of interaction: group work

Materials needed: several sets of DİXİt cards (or other cards with non-definitive pictures)

Description: This activity encourages students to reflect on their own behaviour and the reasons behind it in social situations.

Divide the group into small groups of 5-6 people. Give each group a set of Dixit cards. Ask them to check all cards and choose one that they feel describes the way they behave in social situations. Their choice can be based on any kind of association, the point is that they feel somehow connected to the card and through it can give an explanation of their social behaviour (they can think of their group of friends, their family or groups of new people as well). Then ask the learners to show their group the card they chose and give a small explanation. Set a time limit for this (around 15 minutes), then ask the groups to sit back in the big circle. Ask all the learners to share their experiences, if they have found a card that really describes them, if it was easy or difficult to share it with the others. If you feel comfortable enough with your group, you can ask the learners if they found out something new about each other through the explanations and if they agree with what they have heard from the others.

Alternative: The group is divided into small groups, but some groups work with the Dixit cards, while others work with the "Welcome to Earth - the aliens' guide to humanity".

Call to action: Ask the students to pay attention to their social behaviour for a week: paying attention to how they feel and how they behave. Ask them to think about whether they would like to change anything about their behaviour habits, and if they do, find one specific issue and experiment with new ways. After one week, ask them about their experiences and if they have experimented with new behaviours?

3. Let's capture this: photowalk

Time: at least 2,5h (1 h for walk, 30 min for selecting photos, 1 h for presentation)

Preparation: 20 - 25 min

Focus: depending on the project

Competencies trained: social and civic, entrepreneurial

Type of interaction: small group work

Materials needed: at least one camera/mobile phone with camera per group, one instruction sheet per group (see: Printables), laptop computer with USB port, projector and screen.

Description: Photowalks often include groups of people walking together and taking photos of things or people they find interesting on their way. The objective of the task is to show how different our perspectives and interests are, and how ordinary things can be turned into the piece of art. When completed properly, the activity enables your students to develop not just their artistic vision, but also sensitivity and critical thinking.

Depending on the size of your class, you may divide your students into groups (up to 4-5 people in each). Give each group the projects description sheet (see: Printables) and encourage them to choose one. You may also think about completely different projects, more suitable to your context. Whatever you decide, try to plan the walk so that the topics you want to explore would be possible to spot on the way.

After the walk (it may be on the same day, or some time later), encourage students to group themselves according to the topic they were working on. Set them a time limit to watch and comment all the photos they took. Each group has to decide on 10 top pictures they want to present (ask them to justify their decisions).

When ready, upload all the selected photos on the school computer. Use the projector to display the photos to all students. Discuss the concepts behind the photos and what they mean to each student. Try to relate photos to the topics you want to touch upon (may it be sustainability, social inequalities or negative impact on environment).

Call to action: Introduce the idea of organizing a photo exhibition. Help the students with preparations, but let them be as creative and self-deciding as possible. Don't forget to share the final effect with us on e-learning platform!

4. Let's' debate

Time: 30-40 minutes

Focus: democracy / sustainability / pro-active attitude

Competencies trained: social and civic competences / sense of initiative and entrepreneurship

Type of interaction: individual and group work

Materials needed: pieces of papers, pens / pencils, Internet access and mobile devices (can be their own smartphones)

Description: This activity helps students develop their debating skills, which is part of the democracy focus. Based on which topic the group debates about, the focus can be on either democracy, sustainability or pro-active attitude.

Tell the students that you are organising a debate now. Choose one from the following topics that the debate can focus on:

- A tax on carbon-emission should be introduced (sustainability)
- Animal/human cloning should be banned (sustainability)
- Development of artificial intelligence should be subsidised from public funds (sustainability)
- Age of voting on national election should be lowered (democracy)
- It should be compulsory for future parents to take part in parenting courses (democracy)
- Democracy is the best form of government (democracy)
- Entrepreneurial knowledge should be a compulsory subject in schools (pro-active attitude)
- All students should be required to volunteer in the community (pro-active attitude)
- Does money motivated people more than any other factors in the workplace? (proactive attitude)

You can also find out your own debate topic, or ask your students if there is a topic they would like to discuss.

Ask the students to think about the question for 1 minute (not longer) and take a side - are they generally against the question of the topic or for it? Based on their answers, divide them into two groups.

Ask both group to spend 10 minutes on researching the topic. They can use the Internet for the research and set up their key argument points (writing them down on a piece of paper). Tell them to choose 1 main spokesperson, and 3 others who are supporting the spokesperson. Ask the chosen members to come in front of the room, and let them sit down in a semicircle. Tell them, that the aim of the debate is to find a common viewpoint or a compromise.

Then the debate starts. Ask the spokespersons to lay down their key arguments in 3 minutes, one after the other. At this point, they have to listen to each other. After this session, they can freely interact with each other for 5-10 minutes, but always keeping respective attitude towards the other side. It is mainly the spokespersons speaking, but the supporting speakers can say their ideas to the spokesperson. After this, give 5 minutes to them, so the speakers can reunite with their groups to discuss their stand on the debate and what solutions they can see. Finally both spokespersons come back to the front and try to come up with a compromise.

After the debate, ask first the speakers, than the rest of the group about their experiences and if they think they were successful in the debate. You can also discuss what they think it means to be successful in a debate (finding a compromise? pushing through your ideas? ...).

Call to action: Ask your students to ask other people's opinion on the chosen topic. They should ask their parents, siblings, family members, neighbours, friends, sport team's mates, coaches, etc. Ask them to note others' answer and share their experiences later on with the group. During this discussion, ask they have heard any new arguments, that hasn't been raised in their own debate.

5. Living library

Time: longer process of 3 x 45 min or more

Focus: proactive attitude

Competencies trained: sense of initiative and entrepreneurial competence

Type of interaction: one on one meetings

Materials needed: flipchart, flipchart markers, paper and pens

Description: The exercise creates the possibility to borrow „Living Books" that is people whose lifestyle, profession or hobby seem especially intriguing to us and to talk with them and ask questions about their lives. The aim of the exercise is to refute stereotypes and stay open for creative exchange of thought among diverse groups of people.

The first step in setting up the Living Library is to brainstorm the topic of the meeting (e.g. democracy or climate change) and jobs that are connected with it. When this is done, help kids come up with names of relevant people for each job and a list of questions that they would like to address the guest. Be realistic - these have to be the people who could be available to visit your school. Try to find at least 5-15 people.

The second biggest step in the process is to decide on a date when the Living Library is going to be held. When it is set, help class choose at least one or two children responsible for inviting the people from the list to become the Living Books in the Living Library.

The idea behind the Living Library project is to give each children the opportunity to "borrow a Living Book" that is to talk with a selected guest one on one (or if the number of Living Books is too small, in small groups) and ask them the questions that they came up with earlier. Every kid should have a chance to talk to everybody. After the session, it is a nice idea for kids to hand the guests some symbolic handmade gifts for their pro bono appearance.

Call to action: After the event, there should be an occasion where kids can talk about their experiences and what they have learnt from the conversations with adults. The findings could be represented in a form of poster. Don't forget to share your pictures of both the Living Library Day and posters on e-learning platform.

6. Map of dreams

Time: 45-60 min

Focus: proactive attitude

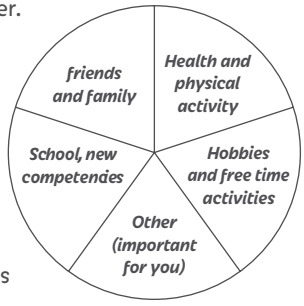
Competencies trained: entrepreneurship

Type of interaction: individual work

Materials needed: Xerox paper, pig poster sheets of paper, old magazines, scissors, glues, markers, crayons

Description: The "Map of dreams" activity enables students to identify their dreams and wishes and turn them into achievable goals.

Give each kid an A4 piece of paper. Ask them to draw a circle and divide it into 5 parts, each representing different aspects of their lives:



- Friends and family
- Health and physical activity
- School / new competencies
- Hobbies and free time activities
- Other (important for you)

Set a time limit and ask students to list about 2-3 realistic goals that they would like to achieve until the end of the current term. Let them write the goals down next to each heading. When they are ready, hand them poster paper, magazines and other materials, and give them 20-30 minutes to transfer their sketches into colourful, illustrated "map of dreams". Summarize the experience by asking each kid what their goals are and how they plan to achieve them.

Call to action: Ask each student to pin their maps of dreams in a visible place in their room and try to stick to the plans for achieving them. Upon the end of the term, ask each kid to bring the map to the classroom and share with the rest of the class which of the goals they've managed to achieve. Take a collective photo of the kids with their maps and share it on the e-learning platform.

7. New codex

Time: 30 - 40 min

Focus: democracy

Competencies trained: social and civic competences

Type of interaction: group work

Materials needed: papers, pens/pencils, role cards

Preparation: instruction sheets (see: *Printables*), role cards (see: *Printables*), decisions checkup lists (see: *Printables*)

Description: This is a role-play activity in which students imagine that they are members a small tribe in the Amazon rainforest whose codex of rules have to be adapted to suit their current needs. The activity strengthens the experiences, especially in the realm of making common decisions. There are different difficulty level for this exercise. If the group is not yet experience with these kind of problem-solving group tasks, choose the basic version. If you know your group well and they have experience in solving issues together, you can choose the harder versions. The basic instruction is the same for the different versions.

Level 1

Tell the students that they are going to play a role-play. Depending on the number of students in your class, play the game with the whole class or divide it into smaller tribes. Read or handle them the instructions (see: *Printables*) - you can create different scenarios by yourself as well.

Hand out to every student a role card (see: *Printables*); multiple students can get the same cards - it is important that they do not show the cards to each other). Now hand them the decisions checkup lists (see: *Printables*) - they will have to reach an agreement on the provided issues.

Set a time limit. First, give them 10 minutes. After this time, step in and check their progress. Go through the list of items they need to decide on and see how many of them they've ticked off. After this short check-up, let them continue discussion for another 10-15 minutes. Finish the exercise and ask the students to jump/move a little, to physically step out of the situation.

Then sit together and discuss the experiences. Ask the following questions:

- How are you feeling now?
- Have you managed to make all necessary decisions?
- What do you think are the reasons behind your success/ failure?
- Can you guess, without showing your cards, what your roles in the group were?
- Do they represent your values?
- How could the group be more effective the next time?

Constantly pay attention to how they are progressing and if they need your intervention. Arguments are good, but if they become too stormy or they start to hurt each other, you should intervene to prevent escalation.

Level 2

If the group has already some experience in making common decisions, you can raise the level of the activity by resigning from giving them the checkup lists. Instead, at the end of the exercise, ask them if they thought about these issues or not.

Level 3

For a more experienced group, you don't need to hand out the role cards, and you can let the student to represent their own personal opinions.

Call to action: Ask the students to think about their own class in regards to what rules they function by. Encourage each student individually to find at least 5 such rules and write them down. Then ask them to compare the lists and create a common one, which contains those rules or habits that they would like to keep. Decorate it and hang in the visible place in the classroom. Share the result on the e-learning platform.

8. Picture story

Time: 45-80 min (depending on how many students are in your class)

Focus: depending on the selected visual material

Competencies trained: social and civic / science / entrepreneurship

Type of interaction: group work

Materials needed: a set of pictures - you can print photos from the Internet (see: *Links*) or cut pictures from old magazines, flipchart/poster paper, glue, markers, crayons for each group of students

Description: "Picture story" helps students to practice their ability to connect seemingly unrelated issues and realms of the world, and to form a coherent narrative.

Choose the topic(s) you want to practice with your class (e.g. human impact on nature or social inequality). Depending on the size of the your class, your students could organize into groups (up to 5 people in each).

Give each group a sheet of flipchart/poster paper, glue, markers, crayons and a set of 5 random pictures, e.g.: 1) a polar bear on an iceberg 2) a smoky factory chimney 3) a supermarket shelf full with food products 4) a waste-land 5) an oil well. (The groups can have the same set of pictures or different ones. In the first case, it would be easier to compare and contrast different perspectives/ understandings of the same materials, while different sets might help students learn from each other.

Tell your class that they have e.g. 15 minutes to come up with a storyboard on a selected topic. They have to think about its title (e.g. climate change), a subtitle (e.g. the effects of our actions) and build a short story, e.g. In our everyday lives we are currently relying heavily on fossil fuels (5th picture). During our consumption (3rd picture) and production (2nd picture) we burn fossils which has global effects (1st and 4th picture).

Encourage your students to add text clouds or draw pictures that they believe are missing in the logics of their story. Each group could present their story, introduce the causal links among the pictures, explain the additional text clouds/pictures (if they have those). Presentations could have a time limit, previously set/agreed on. When all groups are done with their presentations summarize the learning points, the experiences and give your class a feedback.

Call to action: As a follow-up, try to turn the experience into a call for action. E.g. ask each student to come up with a promise they want to keep (e.g. not to buy unfair trade products). Set the time limit (at least one week but may be longer). Summarize the experience by encouraging the students to share their success story in a self-chosen way (it may be a poem, an essay, a drawing, a comic, a clay sculpture). Share this success story with us on the e-learning platform.

9. Privilege walk

Time: 15 minutes for the walk + 30 minutes for debriefing

Focus: democracy / pro-active attitude

Competencies trained: social and civic competences

Type of interaction: individual

Materials needed: open space, role cards (see: *Printables*), privilege statements (see: *Printables*)

Description: This activity is to experience what privilege is and how it works in society. In this version we use role cards, as playing with the students' real experiences can be too difficult to handle. Use this exercise without role cards only if you and your group is especially comfortable with each other.

Give each student a role card (see: *Printables*), and give them 3-4 minutes to think about their role, imagine what it's like to be that person described. You can prepare your own role cards as well.

Then ask them to line up in a straight line at the back of the room with plenty of space to move forward as the exercise proceeds.

Tell the following instructions:
I will read statements aloud. Please take one step forward if a statement applies to you. If you do not feel comfortable acknowledging a statement that applies to you, simply do not move when it is read. No one else will know whether it applies to you or not.

Then begin reading privilege statements (see: *Printables*) aloud in a clear voice, pausing slightly after each one. The pause can be as long or as short as desired as appropriate. When you have finished the statements, ask the students to take note of where they are in the room in relation to others. Have everyone gather into a circle for debriefing and discussion.

At the debriefing session ask the following:

- What did it feel like to take part in the exercise?
- How do they feel about the position they ended?
- Were there any factors they haven't considered before?
- Were there any statements that were particularly difficult for you (your character)?
- What do you wish people knew about you (your character)?
- What do they think would have happened if they used their own experiences?
- How do they think understanding more about privileges can help their current relationships?

Call to action: Ask the students to think about themselves at home, where they would end up in the privilege walk, using their own experiences. Ask them to try to identify any areas in their lives that they can improve, and identify problems in their neighbourhood / local community / wider environment that could be improved. Think about how they could improve that situation. Ask them to prepare a "testimonial" about this, which can be an essay, a drawing, a poem or something else. Share the results on the e-learning platform.

10. Reverse role play

Time: about 2 h

Focus: empathy

Competencies trained: social and civic

Type of interaction: group work

Materials needed: cards with roles (see: *Printables*)

Description: The activity enables students to experience the *New Shores* game from somebody else's perspective, fostering empathy and understanding.

This activity may only be used after your students have already played New Shores. It is important that they are familiar with the game and know what reactions it may evoke in them and in their peers.

You may use the role cards prepared by us (see: *Printables*) or encourage your students to create their own. Tell the class that they are going to play the game once again, but this time each player is going to set their goals in the game according to the role they'll receive. Remind them not to betray what their new role is to others.

The roles can be given randomly, but a higher impact can be achieved if each player (especially those with very strong beliefs and attitudes) are given a reverse behavioral role. E.g. somebody who considers equality a moral question should be given a selfish role in collecting as much wealth as possible.

After each of participants have received their roles and understood their task, play the game once again.

After the game the debriefing session can be focused on:

- How did the roles feel different than you usual behaviour? What was comfortable, uncomfortable?
- How difficult was it to keep your role?
- Who has surprised you with how well they played their role?
- What did you learn through these different roles?
- Would you like to have any of your character's features in real life? Why (not)?

Call to action: Encourage your students to create a list of advantages and disadvantages of behaving in the way determined by the role.

11. Simple action for everyday

Time: 45-80 min (depending on how many students are in your class)

Focus: democracy, sustainability, proactive attitude

Competencies trained: social, civic, science, entrepreneurship

Type of interaction: group work

Materials needed: a big grid with all 17 global goals (See: *Links*), short information about 17 global goals (see: *Links*), a flipchart/ poster sheet of paper per group, markers, crayons

Description: The activity familiarizes students with the issue of SDGs and encourages them to take up simple everyday actions to fulfill the 2030 Agenda.

Introduce the class to the topic of the 17 global goals for sustainable development (see: *Links*):

In 2015, world leaders agreed to 17 goals for a better world by 2030. These goals have the power to end poverty, fight inequality and stop climate change. Guided by the goals, it is now up to all of us, governments, businesses, civil society and the general public to work together to build a better future for everyone.

Depending on the size of the your class, divide class into groups (up to 5 people in each). Ask each group to chose

one goal out of 17. Now give each group a flipchart/poster sheet of paper, markers and crayons and tell them that they have 15 minutes to come up with at least 10 actions that they make on a daily basis to help achieve the chosen goal. They may note the actions down or illustrate them with simple icons. If they are not able to list as many as ten, you may support them by providing ideas from the inspiring resource "simple actions for everyday". When they finish, ask each group to name a leader who summarizes their poster to the whole class. The rest of the class should have the opportunity to ask questions and comment on the posters.

Call to action: Ask each kid to chose one action from any poster they like, write it down, and try to introduce this change in their lives. Set the time limit (at least one week but may be longer). Summarize the experience by encouraging the students to share their success story in a self-chosen way (it may be a poem, an essay, a drawing, a comic, a clay sculpture). Share this success story with us on e-learning platform. You may also encourage them to join the campaign "youneedtoknow".

12. Sinking ship role play

Time: 45-60 min

Focus: democracy

Competencies trained: social and civic / mathematical and scentific / entrepreneurial

Type of interaction: small group work

Materials needed: sheets of paper, pens, instruction sheet (see: *Printables*)

Description: This is a role-play activity in which students assume the roles of passengers aboard a sinking rescue boat. In order not to sink, the students have to decide which combination of things – totaling 60 kgs – they all agree on throwing away. This activity supports student's decision-making, prioritizing and consensus building by the process of collective problem solving.

Depending on the size of your class, you may divide your students into groups (up to 5-6 people in each). Give each group an instruction sheet (see: *Printables*) or read it aloud.

While negotiating, students must provide reasons for each decision. Set a time limit for the decision (e.g. 10 minutes). When all the groups finish their task, ask the students to sit in a circle and present their complete list. Discuss their decisions together. Ask them questions relating to the decision-making problem; what were the biggest challenges they faced, were they mostly unanimous or divided in their opinions, how did they resolve conflicts, etc.

Additional idea: If you still have some time, ask students to divide the 10 items into categories. Students may struggle with this task for a while, so help them understand that the items come in two types: things required for survival and for rescue. As students strive to find the right mix of things to throw away, they might want to consider their priorities: survival or rescue. Allow them to modify their lists now and prepare their perfect kits. Ask them to provide their arguments as well. Finally ask the whole class to search for consensus.

Share your reflection and students' lists on the e-learning platform.

13. Welcome to Earth - the aliens' guide to humanity

Time: 20-25 minutes

Focus: democracy

Competencies trained: social and civic competences

Type of interaction: group work

Materials needed: sheets of paper, pencils or pens, instructions for players (see: *Printables*)

Description: In this activity, students imagine that a group of aliens is going to visit the Earth. To help the tourist understand the rules governing the Planet, students have to come up with 10 basic rules that societies usually stick to. This way, the activity enables students to explore the issue of establishing and following rules that govern group behaviours.

Depending on the size of your class, you can divide your students into groups (up to 5-6 people in each). Tell them:

A group of aliens is going to visit Earth. They are very curious about our species and its habits. In your group brainstorm 10 basic rules that humans have to follow when they are together (e.g. in a family, classroom or at the community meeting).

Now give them detailed descriptions of their task (see: *Printables*) and set a time limit (e.g. 10-15 minutes) for the students to come up with the 10 rules. After they are finished, invite everybody to sit down in a big circle and ask each group leader to read out their rules. Facilitate a group discussion about the lists to see how similar they are and what are the reasons behind setting them. If you wish, you may expand the activity by asking students which of the rules they have identified apply to their class.

Alternative: The group is divided into small groups, but some groups work with setting up the rules, while others work with the 'I' in the group activity.

Call to action: Ask the students to write down the 10 rules their group has come up with in a notebook and carry it with themselves for one week. Encourage them to pay attention to the interactions they have with both people they know (friends, family members, classmates, etc.) and those just met in public places (shop assistants, waiters, cinema attendants, etc.). If they recognize in any interaction a rule they have written down, ask them to note it, including any relevant details about the situation. Discuss their experiences after the week.

Share your reflection and students' lists on the e-learning platform.

Activities for training mathematical and scientific skills

The activities collected in this section come in two types: the ones that are directly connected with the *New Shores* world (and are often based on its rules and print shots from the actual game), and the ones that (although still strongly corresponding to the game) go beyond the *New Shore's* experience and do not require previous exposure to the game.

Whatever activity you decide to apply, there are some general remarks that you should keep in mind:

1. Using symbols (x, y, n etc.) instead of full variables descriptions in formulas is recommended for educational purposes;
2. In real world, CO_2 concentration in the atmosphere is usually measured in ppmv units — parts per million by volume. E. g. the concentration of 380 ppmv means that each cubic meter of the air contains 380 cubic centimeters of CO_2. For the sake of simplicity, we don't use this unit in the exercises, but the moderator should be aware of it.

New Shores-based activities

1. How does forest regenerate?

   Time: 20 min

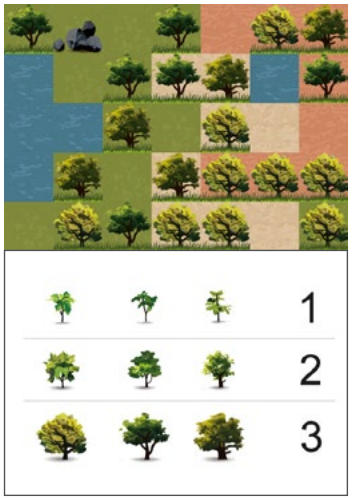
   Focus: sustainability

   Requirements: basic knowledge of arithmetic with fractions, ability to construct and solve simple equations.

   Type of interaction: individual, pair work or group work

   Materials needed: images: small map and forest points table (optionally: laptop computer, projector, screen), instructions for students, pens and paper

   Display or give each student or group of students a set of visual materials and instructions:



The forest in the New Shores game, just like in the real world, can self-regenerate. The regeneration rate depends on the forest condition. Each tree in the game is worth a certain amount of forest points (see forest points table). The forest condition is just the sum of all the forest points from all the trees.

The number of young trees appearing in the next round due to the forest's regeneration is represented by the following equation:

Number of young trees = Forest condition × Regeneration factor

Assuming that the regeneration factor is ***0,15****, determine how many young trees will appear on the map in the next round.*

Set a time limit (e.g. 10 minutes) for students to come up with the correct answer. Provide feedback and explain any difficulties.

The real formula used in game:

$$\textit{Number of young trees} = \textit{Floor}\left(\textit{Forest condition} \times \textit{Regeneration factor}\right)$$

where ***Floor(x)*** gives the integer part of ***x***.

Solution:

1. Count the existing trees:
   Number of trees = 20
2. Calculate the forest condition (there are only big trees on the map):
   Forest condition = Number of trees × 3 = 60
3. Determine the number of young trees:
   Number of young trees = 60 × 0,15 =
   60 × 15 ÷ 100 = 60 × 3 ÷ 20 = 3 × 3 = 9

Answer: 9 young trees will appear on the island in new round.

2. How to absorb CO_2?

   Time: 20 min

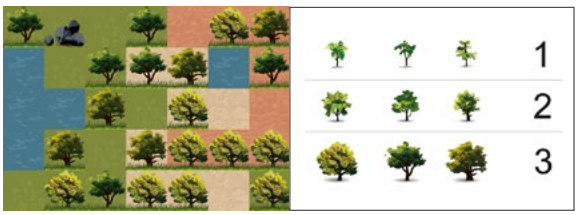
   Focus: sustainability

   Requirements: basic knowledge of arithmetic with fractions, ability to construct and solve simple equations.

   Type of interaction: individual, pair work or group work

   Materials needed: images: small map and forest points table (optionally: laptop computer, projector, screen), instructions for students, pens and paper

   Display or give each student or group of students a set of visual materials and instructions:



*Young, still growing trees absorb CO_2 from the atmosphere. Assuming that **1** forest point stores **0,03** CO_2 units, calculate how many CO2 units will be absorbed in new round.*

Set a time limit (e.g. 10 minutes) for students to come up with the correct answer. Provide feedback and explain any difficulties:

Rozwiązanie:

1. Remembering that **9 young trees** will appear in the next round and **1 young tree** is worth **1 forest point**, count the number of new forest points:

   ***Number of forest points* = 9 × 1 = 9**

2. Calculate how many CO_2 units will be absorbed in the next round:
   CO_2 (young trees) = Number of forest points × 0,03 = 9 × 0,03 = 9 × 3 ÷ 100 = 27 ÷ 100 = 0,27

Answer: in the next round, young trees will absorb 0,27 CO_2 units.

3. <u>Can we balance CO_2 emission?</u>

Time: 20 min

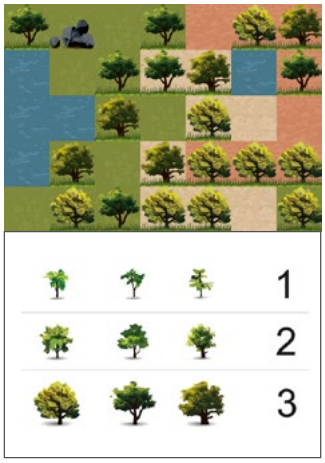
Focus: sustainability

Requirements: basic knowledge of arithmetic with fractions, ability to construct and solve simple equations

Type of interaction: individual, pair work or group work

Materials needed: images: small map and forest points table (optionally: laptop computer, projector, screen), instructions for students, pens and paper

Display or give each student or group of students a set of visual materials and instructions:



*While burning, one coal unit emits **0,99** CO_2 units to the atmosphere. If **1** forest point stores **0,03** CO_2 units, how many young trees should appear in the next round to balance this emission? And how many big trees are needed to store this amount of CO_2?*

Set a time limit (e.g. 10 minutes) for students to come up with the correct answer. Provide feedback and explain any difficulties:

Solution:

1. Equate CO_2 emission from coal burning to amount of CO_2 absorbed with young trees:

   CO_2 (coal) = CO_2 (trees)

2. Expand the right side of the equation using the formula from *Exercise 2*:

   CO_2 (coal) = Number of forest points × 0,03

3. Calculate the number of required forest points:

   Number of forest pts = CO_2 (coal) ÷ 0,03 = 0,99 ÷ 0,03 = 33

4. Determine the number of young trees containing such number of forest points:

   Number of young trees = Number of forest pts ÷ 1 = 33 ÷ 1 = 33

5. Determine the number of big trees containing such number of forest points:

   Number of big trees = Number of forest pts ÷ 3 = 33 ÷ 3 = 11

Answer: 33 young trees or 11 big trees.

Conclusion: there are only 10 fields on the map (including those with coal) where young trees can appear, while 33 are required. Coal usage causes so high CO_2 emission that the whole map isn't enough to balance the burning of even 1 coal unit.

4. <u>What causes disasters?</u>

Time: 20 min

Focus: sustainability

Requirements: basic understanding of functional dependency

Type of interaction: individual, pair work or group work

Materials needed: image of CO_2 emission and disasters, optionally: laptop computer, projector, screen

Display the big picture of the **CO_2 emission and disasters graph:**

In reference to *Exercise 3* (provided you were solving it with your students), explain that also in the real life we are not able to balance the current CO_2 atmospheric emission simply by planting trees. Leave the game's world for a second, and explain your students the CO_2 emission and disasters graph.

5. Can CO_2 concentration be stabilized?

Time: 20 min

Focus: sustainability

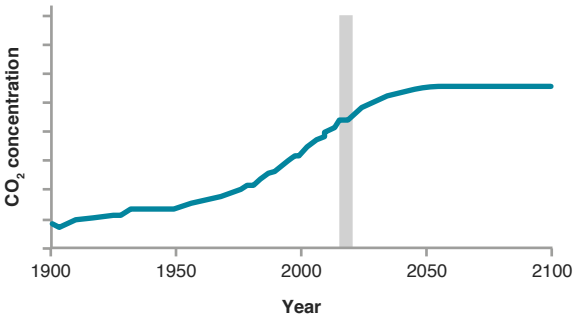
Requirements: basic understanding of functional dependency and graphs of functions

Type of interaction: individual, pair work or group work
Materials needed: images: CO_2 dynamics graphs (see: *Printables*), blackboard and chalk (or flipchart and markers), paper and pens / pencils / crayons, optionally: laptop computer, projector, screen

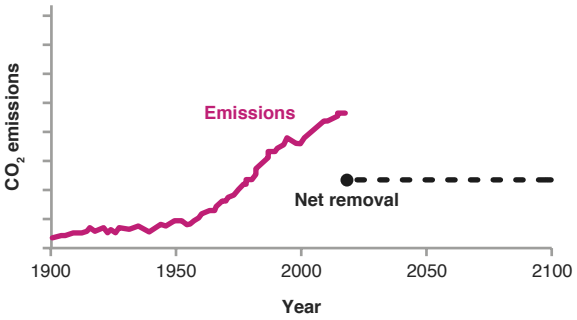
Draw or display two CO_2 dynamics graphs and explain to the students:

This exercise proposed by John D. Sterman helps to understand the relation between CO_2 emissions and CO_2 concentration and to realize how difficult it is to stabilize the latter.

The first graph represents changes of CO_2 concentration in the atmosphere: the real dynamics for the period before 2018 and the desired one for the future.



The second graph contains two curves. The first one represents CO_2 emissions. The second one shows how many CO_2 is removed from the atmosphere by natural processes. Net removal is assumed to be stable for the sake of simplicity though it actually isn't because of the deforestation and other anthropogenic factors.



Now give them the task:

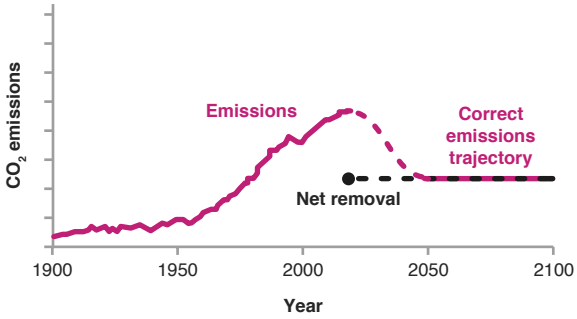
Estimate likely future CO_2 emissions to match the scenario on the first graph (stable CO_2 concentration).

You can draw the graphs on the blackboard or the flipchart and ask students to draw their responses on the same graph using chalks or markers of different colors. Printing images for each student / group of student is also an option.

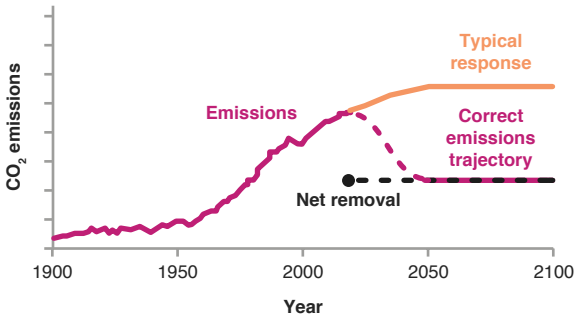
Set a time limit (e.g. 10 minutes) for them to come up with their answers. Give feedback and explain any disputable issues:

Solution:

The correct solution is:



The typical response is:



People usually think that in order to stabilize CO_2 concentration it is enough to stabilize the emissions. But in reality, stable emissions (if they are higher than the net removal level) cause stable (linear) increase of CO_2 concentration. In order to prevent it from rising, we have to reduce emissions at least to the net removal level. By analogy, to make the water in the bath (the concentration of CO_2 in the atmosphere) stop at a given level, we have to manipulate the tap so that we balance the flow rate of water entering the bathtub (the emission rate) and the the flow rate of water leaving the bathtub (the rate at which greenhouse gases are absorbed). As the diagram shows, to stabilize CO_2 concentration humanity has to reduce the emissions to the level of 1970s.

This exercise demonstrates that even the stabilization of the CO_2 concentration in the atmosphere is a very big challenge. Decreasing this concentration is a much harder task.

References:

Sterman, J.D. *Risk Communication on Climate: Mental Models and Mass Balance*. „Science" 2008, 322.5901: 532-533.

6. How rich can you become playing *New Shores*?

Time: 20 min

Focus: sustainability

Requirements: basic knowledge of arithmetics, (optionally) ability to construct and solve simple equations

Type of interaction: individual, pair work or group work

Materials needed: image of a big map (see: *Printables*), optionally: laptop computer, projector, screen, pens and paper

Display or give each student a picture of a big map (see: *Printables*)

Take a look at the big map of the island fully covered with forest. To make calculations possible, the coal deposits were revealed. For the sake of simplicity, assume that coal can be extracted without cutting a tree on a given field.

The income from actions remains the same as in New Shores game:

- *coal extracting:* ***45*** *denars*
- *cutting trees:* ***2***, ***4*** *or* ***6*** *denars, depending on tree maturity (****2*** *denars per 1 forest point)*
- *collecting berries:* ***0,2***, ***0,4*** *or* ***0,6*** *denars, depending on tree maturity (****0,2*** *denar per 1 berry point)*

Assume that you play only one round but the number of your action points in unlimited.

Your aim is to earn exactly ***572*** *denars. How can you do it? You can suggest several possible solutions.*

Set a time limit (e.g. 10 minutes) for students to come up with the solutions. Provide feedback and explain any difficulties:

Parameters of the island:

- ***80 fields***
- ***40 coal deposits → 1800 denars***
- ***45 big trees → 27 denars from collecting berries + 270 denars from cutting***
- ***25 middle trees → 10 denars + 100 denars***
- ***5 small trees → 1 denar + 10 denars***
- ***forest condition = 45 × 3 + 25 × 2 + 5 × 1 = 190***

Solution: this task has many solutions. They can be discovered by testing different options or using the following equation:

$$BP \times Profit_{BP} + FP \times Profit_{FP} + CU \times Profit_{CU} = TI$$

or

$$BP \times 0{,}2 + FP \times 2 + CU \times 45 = 572$$

where:

- ***BP — number of collected berry points***
- ***$Profit_{BP}$ — profit from one berry point***
- ***FP— number of collected forest points***
- ***$Profit_{FP}$ — profit from one forest point***
- ***CU — number of extracted coal units***
- ***$Profit_{CU}$ — profit from one coal unit***
- ***TI — total income***

This equation contains 3 independent variables. Determining the desired values for two of them (for example, assuming that we would collect all berries (earning 38 denars) and extract 5 coal units (earning 225 denars), we would come up with the third one.

Possible combinations:

- Max. coal extracting:

  12 coal units → 540 denars
  + 32 denars from collecting berries

  Pros: untouched forest

  Cons: huge irreversible CO_2 emissions from coal burning

- Max. forest usage:

  4 coal units → 180 denars
  + 38 denars from collecting berries
  + 354 denars → 177 forest points
  → 45 big + 21 middle trees

  Pros: low coal usage → low number of irreversible emissions; max. berries usage

  Cons: almost total deforestation (only 190 – 177 = 13 forest points left). Forest regeneration (without seeding) will take a very long time

- Other solutions:

  8 coal units → 360 denars
  + 38 denars from collecting berries
  + 174 denars → 87 forest points → 29 big trees

  (the larger half of the forest stays → high regeneration rate)

  6 coal units → 270 denars + 302 denars
  → 151 forest points → 45 big + 8 middle trees

  (without collecting berries)

and so on.

As a moderator, try to gather as much solutions as possible (using additional questions if required) and share them with other students (e. g. writing on the blackboard).

After that ask students which solution, according to their opinion, is the best. A leading question: what does "the best" mean?

7. Does the *New Shores* island have its limits?

Time: 20 min

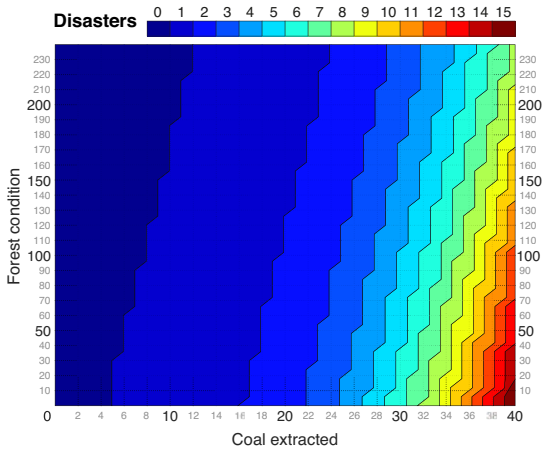
Focus: sustainability

Requirements: basic knowledge of arithmetics, (optionally) ability to construct and solve simple equations and basic understanding of graphical representation of data and previous experience with contour maps (e.g. from geography lessons)

Type of interaction: individual, pair work or group work

Materials needed: images: big map and disasters contour plot (optionally: laptop computer, projector, screen), pens and paper

Display or give each student or group of students a set of visual materials and instructions:



Take a look at the color plot with the coordinate axes. This type of plot is called contour plot. Probably, the most known contour plots are geographic maps with altitudes above sea level.

***Disasters contour plot** helps to determine the number of disasters on the island, based on the current forest condition and the amount of coal extracted. Higher values on the X- axis (horizontal axis) render into a worse ecological situation. Higher values on the Y-axis (vertical axis) mean better forest condition and thus a better ecological situation.*

Usage instruction:

1. *Calculate the amount of extracted coal (X).*
2. *Calculate the current forest condition — sum of all the forest points from all the trees (Y).*
3. *On the contour plot, find the (X, Y) point corresponding to these values.*
4. *Notice the color of the region where the point is found and read the number of disasters from the scale above.*

Tasks:

1. *Read the number of disasters corresponding to your solution for Exercise 6 (if you did it)*
2. *How much coal can you use without causing any disasters?*
3. *Decide what number of disasters is acceptable to you:*
   - *read from the contour plot what conditions must be met to reach this number,*
   - *calculate the highest possible income with established number of disasters.*
4. *Assume that you have already extracted **38** units of coal. Can you go down to **5** disasters? (To what extent can you affect the island's situation?)*

Set a time limit (e.g. 20 minutes) for students to come up with the solutions. Provide feedback and explain any difficulties:

If the (X, Y) point is located on the border of the regions, assume the higher value as a number of disasters (e. g. X = 5, Y = 0 → Num. of disasters = 1).

Answers:

1. Remembering that initial forest condition is 190:
   - ***Max. coal extracting: X = 12, Y = 190 → N = 1***
   - ***Max. forest usage: X = 4, Y = 190 – 177 = 13 → N = 0***
   - ***Other solution 1: X = 8, Y = 190 - 87 = 103 → N = 0***
   - ***Other solution 2: X = 6, Y = 190 - 151 = 39 → N = 0***
2. The answer is **4** coal units.
3. Assume that **4** disasters are acceptable. The conditions are:

   26 CE (coal extracted) and 0 FC (forest condition)
   or 27 CE and 10 FC
   or 28 CE and 39 FC
   and so on.

   The highest possible income is **1613**, when CE = 27, FC = 10 and income from berries is 38:

   $$27 \times 45 + (190 - 10) \times 2 + 38 = 1613$$

4. No, **6** is the smallest number of disasters after extracting of 38 coal units. If there is no more coal extraction, the number of disasters can vary from **6** to **13**, depending on forest condition.

Extra activities (requiring no previous exposure to the game)

8. Sprouts growing observation

   Time: at least a week project

   Preparation: 20-25 min

   Focus: sustainability; proactive attitude

   Competencies trained: scientific and entrepreneurial skills, social responsibility for environment

   Type of interaction: pair work

   Materials needed: transparent plastic cups, potting soil, been seeds (2 per cup), spray bottle with water, marker, labels, notebooks and pens (for writing observations), optionally: smartphone with camera

   Description: Growing a bean plant is a simple science experiment that can be accomplished with a very little preparation. During this activity students´ social responsibility for environment is developed: they will understand that planting a seed and then letting it grow requires time. (If you played the *New Shores* game, you can discuss that how much rounds it takes for a plant to grow in the game and how much it takes in reality.)

   Divide your class into pairs. Plant the beans at school together with your students but ask them to take their cups home for weekends: let pairs decide who fosters the little plant at the given weekend (taking on the responsibility for keeping the journal these days as well).

   Seed the beans together with kids:

   1. Prepare necessary materials (cups, soil, seeds and water). Remember to use transparent cups - otherwise observation will be difficult!
   2. Let each pair fill a plastic cup most of the way with potting soil and plant 2–3 beans. Cover the seeds gently with soil.
   3. Show children how to moisten the soil, using the water spray bottle. Ask, Why do you think we're putting water on the seeds?
   4. Help children write their names on tape and label their cups.
   5. Tell children to open their notebooks (monitoring journals) and write the first entry (you may help them with the first one). Tell them to water the seed at approximately the same every day and write down their observations.

   You may also plant beans without soil (the germination process will be more visible):

   1. Have children fold a paper towel to fit in a plastic cup.
   2. Encourage them to wet the paper and place 3–4 beans on the towel.
   3. Help children label their cups.

   If you want to introduce some variants, you may also cover some of the cups to check how the plants will grow in the dark.

   If you have a smartphone with camera, you may want to take a photo of the cups every day to show the kids the process!

   The first sign that a seed is sprouting is when the seed coat or case breaks open and the root (or hypocotyls) pushes out. All seeds do not germinate at the same time.

   Provide some questions to pairs:

   - How long will it take for a bean seed to germinate?
   - Do all seeds take the same amount of time to germinate?
   - Do seeds need light to germinate?

   After at least a week (or two) sit down to collect kids' observation points. You may display the photos you took and encourage children to talk about their experience.

   The following questions may be asked:

   - What if I used seeds that are not beans?
   - Would the germination time be different if I did this at a different time of year?
   - What do plants need to germinate?
   - How did you feel taking the plant home?

   Call to action: Ask children to read through their observation notes and draw the growing cycle step by step. Don't forget to share the results of your experiment (photos, pictures) with us on the e-learning platform!

9. Tragedy of the commons game

   Time: 60-100 minutes

   Focus: democracy / pro-active attitude

   Competencies trained: social and civic competences

   Type of interaction: group

   Materials needed: paper sheets of various color (each group will have a color to separate them and each team should have two paper sheets in their color, one saying "1", the other "2", colored score tables (a small one for each group, in order for all players to see it during the game - see: *Printables*), or a flipchart with the score table on it, result table (only the educator/facilitator allowed to see and handle this, the content will be shared with the class only at the end of the game).

   Description: The "Tragedy of the Commons" is a group game intended to demonstrate the possible challenges arising from the use and management of common access resources.

   Explain your students the term "tragedy of the commons (see the link)"

   Arrange the class into groups (ideally not more than 6 groups, with 3-5 members each). Groups should be separated as possible, in order not to overhear each others' discussion.

Tell your students that each group represents a family who uses a common pasture to let graze their cows. Hand each "family" a set of game materials (in different colors for every family):

1. **two identical cards** (in size, shape and color) where one says "1", the other "2",
2. the **Score table** to know how much milk can be gained each round regarding the total number of cows out grazin on the pasture.
3. The **Result table** is only for you. On this you (the educator / facilitator) will follow the gain of milk for each family. This can be seen only by you during the game. You share / make visible the result table at the end of the game.

Before the game starts, give each family some time (e.g. 5 minutes) to elect a leader, who will represent their family on the community meetings. Since the families live far from each other, community meetings are held only every 3rd day (after the 3rd, 6th and 9th round). Community meetings allow the family leaders to gather and share their concerns and ideas regarding the use of the common pasture (how many cows should be out, why, etc...). The length of the community meetings should be set prior (for example 3 minutes). Communication between the different families only allowed during the community meetings.

Task:

Each day (round) every family has to decide whether they bring out one or two cows to the common pasture. Their decision influences their daily milk gain, which varies on the scale of 0-8 liters per day (depending on how many cows were out that day total on the commons - see the **score table** in the *Printables*).

The game should take 10 rounds. Before each round give 1-2 minutes for each family to decide whether they will bring out 1 or 2 cows the following day. After the time limits passes, collect the cards with their decisions.

Give the families feedback only regarding their daily milk gain, they are not allowed to know (from the official source, the facilitator) how much milk did the other families gain.

Gameflow:

1. Introduce the game's rules, than arrange the room to fit as best as possible, than arrange the game-tools for each family place and then form the groups.
2. First round of two minute family discussion begins. Collect the papers regarding one or two cows will be out. Than you as facilitator use the "Result table" to calculate each family's scores and give them feedback (remember they can only know their own gains not the others!).
3. Then, a new round for discussion begins.
4. After round three it's time for community meeting.

Your way of introducing and explaining the game can have big impacts on how your students/players approach the game. As the aim of the game is to let the participants experience the dynamics of rivalry VS cooperation, it is best not to give away too much with the instructions.You can say: "The aim of the game is to maximize milk income." This way you don't say that they should maximize their own families income, neither that of the community. Still, in most cases participants understand this as maximizing their own gain - even though if they decided to cooperate, thy might have gain more as a whole. The point of the game is to let them realize this and try to come up with the solution on their own. If they ask for clarification, you should only repeat the original instruction.

After the last round you calculate the gains and now you can share, make the results public. The discussion about the game is at least as important as the game itself. You can ask questions regarding many aspects/ details, for example:

- How did you decide who will be family leader?
- Did you feel your voice is heard during the family discussions (after each round)?
- Did the families come up with clear strategies before each community meeting?
- Did the leaders feel comfortable in their positions?
- Was there trust in the game?
- Are you satisfied with the results?

Please note that it also makes sense to do the discussion round prior you show the final result table when the groups (families) will be able to compare their gains. You can also have two discussion rounds, one before showing the gains and one after (possibly with different focus). These arrangements all make a difference on how the players (students) will remember their experiences about the happenings during and after the game.

If you play the game for the first time: You should make sure there is enough time to deal with possible strong emotions, as quiet possibly trust will be breached. Also, conflicts should be interpreted as useful resources with which you and your group have to work with, utilize it. Therefore you have to be prepared to 'handle' situations and interpret them as gains from which everyone can learn. Remember to "take out" your players from the roles, say explicitly - after the discussion is finished - that everyone now leave his/her game character and slide back to reality to his/her real identity.

Also, the **"tragedy of the commons" has an ecological aspect** - the overuse of a given 'resource'. This aspect can be introduced after the game in the debriefing session. You can discuss it with your students, asking them how they think this dynamics appear in the real world. You can even show pictures of environmental degradation and explain how the environment "suffers" from overuse,

how short and long term interests are sometimes collide or the ethical questions of using common resources.

Call to action: Ask the students to think about further examples of using common resources. Let them be free and creative, but if someone is really lost, you can help him/her by giving some ideas:

- clean drinking water
- rain forests
- fish stocks
- land (overpopulation, littering)
- air (pollution)
- internet (spam, trolling)

Ask them to research their chtosen topic, and write a 1-2 page essay to show how their chosen topic/resource is being used, if it is overused or not, what are the ethical questions regarding the use of that resource, how it affects humans in general.

Links

Democracy through ages

Website:

www.democracy-building.info/definition-democracy.html

Free photos

unsplash.com
www.pexels.com
freephotos.cc

17 Sustainable Development Goals

English sites:

www.globalgoals.org/faq
www.globalgoals.org/resources
www.youneedtoknow.ch

Polish sites:

www.un.org.pl
www.un.org.pl/download
ungc.org.pl/sdg/sustainable-develompent-goals

Shared decisions

Psychology experiment shows people can be nudged into cooperation (short video):

www.nature.com/news/shared-decisions-benefit-next-generations-1.15441

Tragedy of the commons

Definition (English):

en.wikipedia.org/wiki/Tragedy_of_the_commons

Definition (Polish):

pl.wikipedia.org/wiki/Tragedia_wsp%C3%B3lnego_pastwiska

Short video (English):

ed.ted.com/lessons/what-is-the-tragedy-of-the-commons-nicholas-amendolare

Footprint calculators

English:

www.footprintcalculator.org

Polish:

waznamisjazdrowaemisja.pl/kalkulator-sladu-weglowego

Water usage calculators

English sites:

www.watercalculator.org
waterfootprint.org/en/resources/interactive-tools/personal-water-footprint-calculator
www.fao.org/land-water/databases-and-software/eto-calculator/en

Activities for training social, civic and entrepreneurial skills

3. Let's capture this: photo walk

Choose the project that suits you best:

1. ***Faces***

   Capture dramatic moments and emotions of people encountered on the way; may it be joy, surprise or sadness. Such emotional portraits are definitely not easy to work on and demand your sensitivity and consideration.

2. ***Food Wasting***

   In today's world of foodie-Instagram, Internet is full of photos presenting fresh, colorful and appetizing food. But what happens behind the scenes? What about the food we waste or throw away? You can rarely find any photos displaying this sad habit of letting good food decay. Try to capture food waste - next to the residential areas, supermarkets, or fast food restaurants.

3. ***Panoramas***

   Panoramic photography enables a much wider viewing angle than normal. This is why panoramas are perfect to present landscapes. We usually associate landscapes with idyllic views, such as sunsets, crystal lakes or beautiful mountain ranges. How about neglected streets, littered parks or polluted riverbanks? Spend the walk taking panoramic photos of both beautiful and destroyed sites.

4. ***Single Theme***

   Pick an object and try to get a collection of snapshots representing it. For example, try to shoot only circular objects everywhere you go. Or pick a color, for instance blue, and try to go all day long photographing only blue things. The aim of this assignment is to learn to see the ordinary object in a different way.

5. ***Urban Exploration***

   Urban exploration photography is the art of finding abandoned places, houses, locations; explore them and shoot in a unique way. Try to pay attention to such places during the walk and capture their not-so-obvious beauty.

6. ***Micro Beauty***

   In micro photography the subject you are photographing is small and you want to make it look big. Thus you end up with a "macro" view of a "micro" subject., Micro photography allows us thus to pay attention to things and actions that we usually overlook. Spend the walk shooting flowers, budlets, insects, specs or other "micro elements" that we usually pay no attention to.

7. New codex

Instructions

You are a small tribe in the Amazon rainforest, unknown to the civilized world. You only know about the four neighbouring tribes' existence, but you are not in contact with them. Traditionally you used to be fighting with your neighbours, but for as long as the oldest wiseman of the tribe can remember, there hasn't been any wars anymore. Because of this change, the tribe realized that the old laws they have followed don't work for them anymore, as they were all focusing on how to defend themselves. Most of the men were warriors, some were hunters, while women stayed at home. You decided to have a tribe-meeting to set up a new codex of rules that will suit the majority of the tribe in these new times of peace. Right now the tribe meeting has started and you have to decide on the tribe's new codex. Look for laws that will be fundamental to your society.

Role cards:

You want the tribe to stick together no matter what. You want to make sure that everybody is happy with the new codex.

You want to keep the traditions of old times: sacrifices to the gods, initiation ceremonies, respecting the old ones and the warriors of the tribe. You also prefer to attack the neighbours, to show them who is the boss.

You don't see the point in having warriors anymore, as there are no wars. You would prefer all man to be hunters, going on month-long hunting trips, while women collect berries and plants.

Instead of the traditional hunting, you want to start growing plants and breed animals. It would mean a less dangerous and a more stable lifestyle. You want peace with the neighbours.

You think it would be a good idea for progress to go visit the neighbours and see how they are living. You don't care much about the old traditions, you want to learn new ways. You would like to start co-operating with the neighbours, maybe start trading.

Decide collectively

- *Should you stay in the village or start moving around as a tribe?*
- *Should you continue hunting or start breeding animals and growing plants?*
- *Should you keep having warriors or not?*
- *Should you initiate contact/ co-operation with the neighbors?*
- *Should you continue making sacrifice to the gods or not?*
- *Should you appoint a group leader or everybody shoul have the same power?*

Upon deciding on these issues, prepare the new codex of the tribe!

9. Privilege walk

Role cards (Some of the roles may be too controversial for your group.
Make sure you adjust them according to your needs):

You are an unemployed young single mother.	*You are the daughter of the mayor of your city.*
You are the daughter of the local bank manager. You study economics at university.	*You are a blind young man who has been unemployed for 3 years.*
You are a young man who can only move in a wheelchair.	*You are the 19-year-old son of a farmer in a remote village in the mountains.*
You are a 21-year-old Roma (Gypsy) girl who never finished primary school.	*You are a 30 year old homosexual.*
You are an 18 years old man serving your compulsory military service.	*You are an 18 year belonging to a religious minority.*
You are a young blind woman depending on personal assistance for your daily life.	*You are 25 years old serving a 3 years term in prison.*
You are a 24-year-old refugee from Syria.	*You are a young woman just released from jail.*
You are a young illegal immigrant who has to support his/her family in your home country.	*You are a homeless young man with a small family.*
You are the president of the youth branch of the political party that is in power.	*You are a human rights activist opposing the ruling party in your country.*
You are the son of a Chinese immigrant who runs a successful business.	*You are the oldest child in your family and have to take care about your two younger sisters and 2 younger brothers.*
You are the daughter of the American ambassador to the country where you are now living.	*You the owner of a successful company in a growing market.*
You are the girlfriend of a young artist who is in great debt.	*You are a student in university. Your family collected the money for you to be the first one in the family with an academic degree.*
You are a 22-year-old lesbian.	*You are a young man belonging to an ethnic minority in the country you live in.*
You are a homeless young man, 27 years old.	*You are a migrant and just got a job as a teacher in a primary school.*
You are a young unemployed man who has no higher education.	*You are a teenage girl. You love sweets and you are a bit overweight.*

List of statements:

- You have never encountered any serious financial difficulty.
- You have decent housing with a telephone line and television.
- You feel your language, religion and culture are respected in the society where you live.
- You feel that your opinion on social and political issues matters, and your views are listened to.
- Other people consult you about different issues.
- You are not afraid of being stopped by the police.
- You know where to turn for advice and help if you need it.
- You have never felt discriminated against because of your origin.
- You have adequate social and medical protection for your needs.
- You can go away on holiday once a year.
- You can invite friends for dinner at home.
- You have an interesting life and you are positive about your future.
- You feel you can study and follow the profession of your choice.
- You are not afraid of being harassed or attacked in the streets, or in the media.
- You can vote in national and local elections.
- You can celebrate the most important religious festivals with your relatives and close friends.
- You can participate in an international seminar abroad.
- You can go to the cinema or the theatre at least once a week.
- You are not afraid for the future of your children.
- You can buy new clothes at least once every three months.
- You can fall in love with the person of your choice.
- You feel that your competence is appreciated and respected in the society where you live.
- You can use and benefit from the Internet.

11. Reverse role play

Role cards

You would like to be a very influential person. This is why, your aim on this island is to collect as many action points as possible each round.

You are a risk-taker and you would like to cease every opportunity to build the most private buildings, and by the end of the game be as rich as possible.

You don't like to trust people, thus every now and then you are suspicious about people's motives. In all rounds you are very vocal about this, and try to find out the motives of each player, monitoring them whenever possible.

As an altruistic person, the common good is very important for you, thus you try to convince everybody to work together and to build not only private buildings but as many public buildings as possible.

As an eco-friendly person, it is very important for you not to deforest or excavate all the islands treasure, and try to convince everybody to treat the island in an eco-friendly way.

As a helpful person, you are always on the lookout for poor people, and try to convince richer people to donate money to these, so that there is a certain level of well-being for everyone on the island.

12. Sinking ship role play

Task description

You were on a ship sailing from London to New York. The ship started to sink in the middle of ocean, just like the Titanic. You and 12 other people were lucky. You escaped and are now on a lifeboat. The ship sank quickly, so nobody had time to prepare. Many people in the lifeboat do not have warm clothes and there is not much to eat or drink. The water temperature is about 2 degrees Celsius, the winds are strong, the waves are high and the visibility is poor due to fog. Everybody is cold, hungry and afraid. The lifeboat has no motor, so you and the others have to row. Luckily, the ship's captain was able to send an emergency message. Help is coming, but that might take one or two days.

Problem

Your lifeboat is overloaded. It weighs too much. Slowly, it is sinking. In order to keep everybody safe, it is necessary to throw 60 kilograms of stuff out of the lifeboat. You and the other people have to decide quickly which items to throw away. You cannot remove any people. These are the items from which you must choose:

1. *5 raincoats with hoods* ***– 2 kg each (10 kg),***
2. *30 cans of tuna* ***– 1 kg each (30 kg),***
3. *a 10-liter bottle of water* ***– 10 kg,***
4. *a battery operated signal light* ***– 8 kg,***
5. *3 diving suits – each 5 kg* ***– 5 kg each (15 kg),***
6. *2 buckets for bailing water* ***– 3 kg each (6 kg),***
7. *4 wool blankets* ***– 3 kg each (12 kg),***
8. *a large S.O.S. flag* ***– 3 kg,***
9. *a first aid kit* ***– 10 kg,***
10. *8 oars* ***– 5 kg each (40 kg),***

total - 144 kg

13. Welcome to Earth - The alien's guide to humanity

Dear Group,

You have been selected to do a task which requires great responsibility, as it affects the foundations of our human world! It has come to our attention that stranger creatures, so-called aliens are arriving to Earth, which will take the form of humans and try to mingle among us.

The aliens (as far as we understood their messages) are full of good intention, they are very intelligent, and they are also quite good at adapting. They do speak all human languages, they mimic our movements perfectly and they consume their food the same way we do. But at the same time, there is one thing that trouble them: they do not understand human interactions, especially when talking about bigger groups of people (10-20-30 people being together).

Therefore the aliens asked us for help - and for the sake of both our parties, we would like to help them - supporting their integration and at the same time present the universally famous humanly hospitality.

This is the task we are asking you to perform now. Please create a sort of "10 Commandments" that helps the integration of the aliens. Collect 10 advises/warnings/information, which summarize our human, social habits, the use of which we are so successful in social situations. It might look difficult to boil down the complexity of humanity to 10 rules, but even though our alien friends are very intelligent, their memory capacity is unfortunately limited - so they need a short, but essential guide.

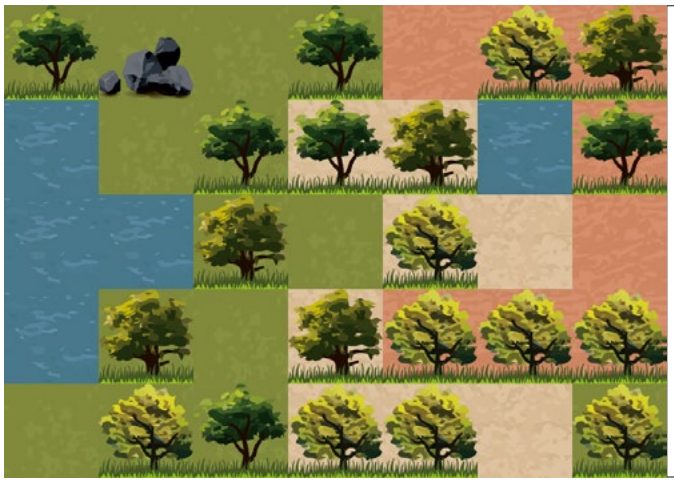
We - and certainly the aliens - are grateful for your work!

Good luck!
NASA

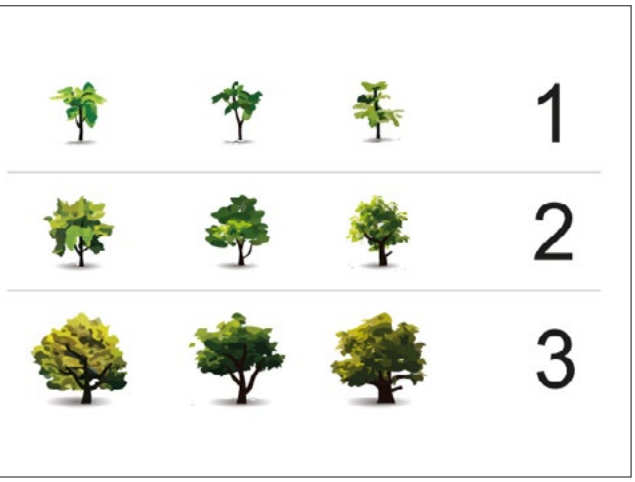
Activities for training mathematical and scientific skills

Visual material to Activity 1-3:

Small map



Forest points table



1. How does forest regenerate?

*The forest in the New Shores game, just like in the real world, can self-regenerate. The regeneration rate depends on the forest condition. Each tree in the game is worth a certain amount of forest points (see **Forest points table**). The forest condition is just the sum of all the forest points from all the trees.*

The number of young trees appearing in the next round due to the forest's regeneration is represented by the following equation:

Number of young trees = Forest condition × Regeneration factor

*Assuming that the regeneration factor is **0,15**, determine how many young trees will appear on the map in the next round.*

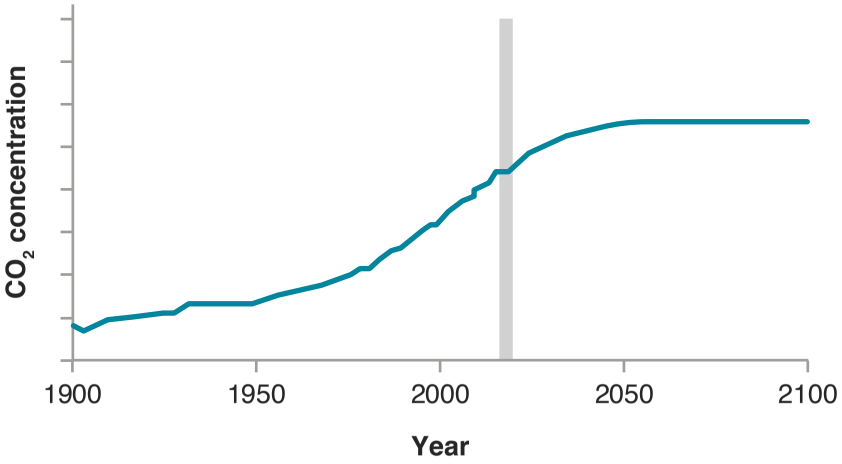
2. How to absorb CO_2?

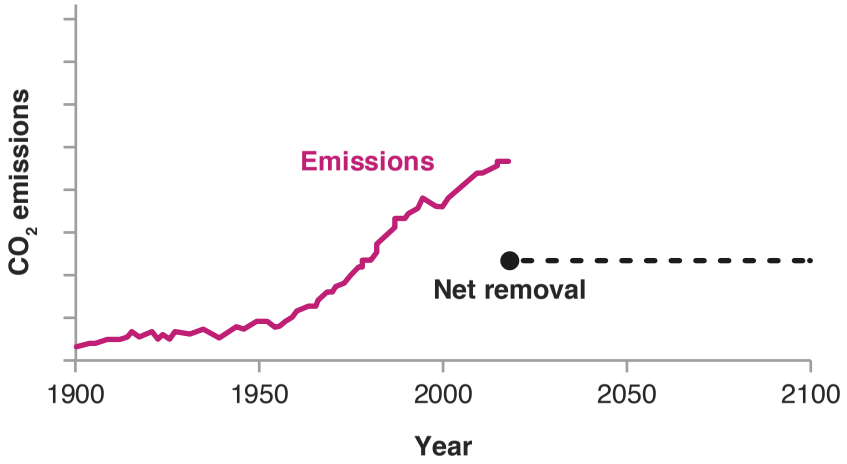
*Young, still growing trees absorb CO_2 from the atmosphere. Assuming that 1 forest point stores **0,03** CO_2 units, calculate how many CO_2 units will be absorbed in new round.*

3. Can we balance CO_2 emission?

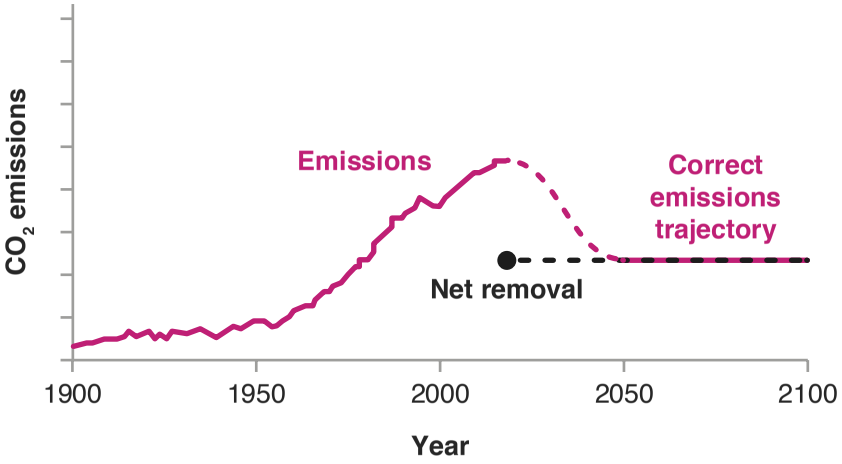
*While burning, one coal unit emits **0,99** CO_2 units to the atmosphere. If **1** forest point stores **0,03** CO_2 units, how many young trees should appear in the next round to balance this emission? And how many big trees are needed to store this amount of CO_2?*

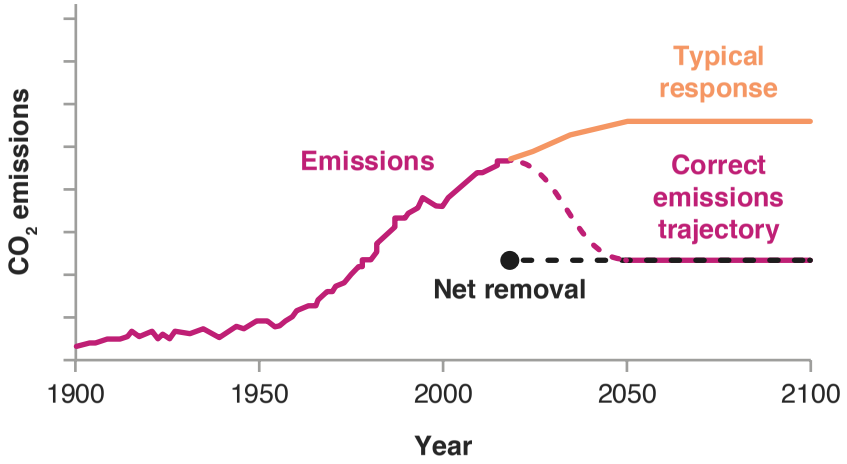
Visual material to Activity 4: CO_2 emission and disasters graph





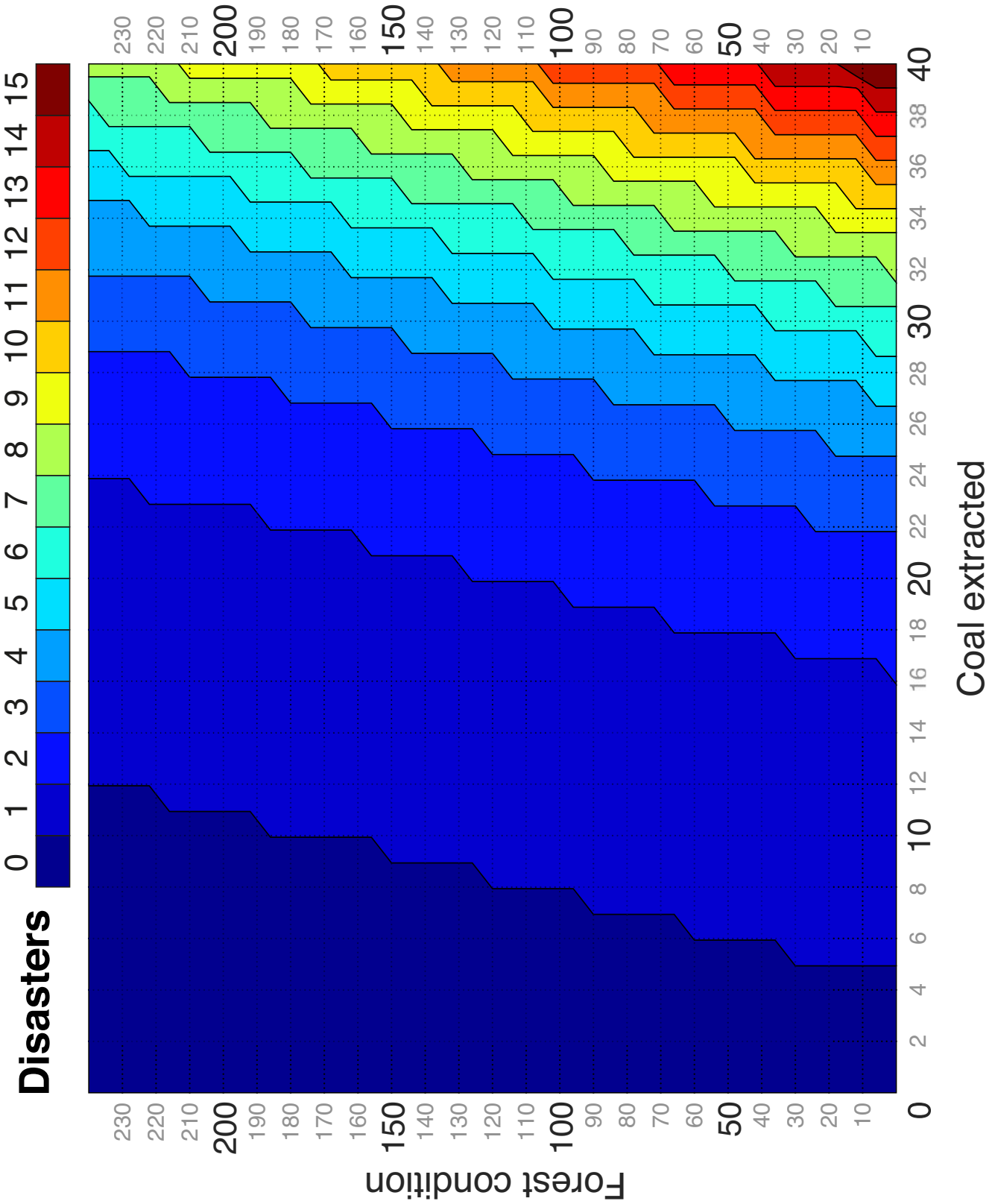
Correct answers: to be displayed while summarizing the activity





Visual material to Activity 6-7: Big map

Visual material to Activity 6-7: Disaster contour map



6. How rich can you become playing *New Shores?*

*Take a look at the **big map** of the island fully covered with forest. To make calculations possible, the coal deposits were revealed. For the sake of simplicity, assume that coal can be extracted without cutting a tree on a given field.*

The income from actions remain the same as in New Shores game:

- *coal extracting: **45** denars*
- *cutting trees: **2**, **4** or **6** denars, depending on tree maturity (2 denars per 1 forest point)*
- *collecting berries: **0,2**, **0,4** or **0,6** denars, depending on tree maturity (0,2 denar per 1 berry point)*

*Assume that you play only one round but the number of your action points in unlimited. Your aim is to earn exactly **572** denars. How can you do it? You can suggest several possible solutions.*

7. Does the *New Shores* island have its limits?

Take a look at the color plot with the coordinate axes. This type of plot is called contour plot. Probably, the most known contour plots are geographic maps with altitudes above sea level.

***Disasters contour plot** helps to determine the number of disasters on the island, based on the current forest condition and the amount of coal extracted. Higher values on the X-axis (horizontal axis) render into a worse ecological situation. Higher values on the Y-axis (vertical axis) mean better forest condition and thus a better ecological situation.*

Usage instruction:

1. *Calculate the amount of extracted coal (X).*
2. *Calculate the current forest condition — sum of all the forest points from all the trees (Y).*
3. *On the contour plot, find the (X, Y) point corresponding to these values.*
4. *Notice the color of the region where the point is found and read the number of disasters from the scale above.*

Tasks:

1. *Read the number of disasters corresponding to your solution for Exercise 6 (if you did it)*
2. *How much coal can you use without causing any disasters?*
3. *Decide what number of disasters is acceptable to you:*
   - *read from the contour plot what conditions must be met to reach this number,*
   - *calculate the highest possible income with established number of disasters.*
4. *Assume that you have already extracted **38** coal units. Can you go as low as **5** disasters? (To what extent can you change the situation on the island?)*

9. Tragedy of the commons game

families with one cow	*families with two cows*	**family 1**		**family 2**		**family 3**		**family 4**		**family 5**		**family 6**	
		cows	*milk*	*cows*	*milk*	*cows*	*milk*	*cows*	*milk*	*cows*	*milk*	*cows*	*milk*
60		16	l	16	l1		6l	16	l1		6l	16	l
51		14	l	14	l1		4l	14	l1		4l	28	l
42		13	l	13	l1		3l	13	l	27	,5l	27	,5l
33		12	l	12	l1		2l	27	l	27	l	27	l
24		1	1,5l	11	,5l	24	l	24	l	24	l	24	l
15		1	0,5l	21	,5l	21	,5l	21	,5l	21	,5l	21	,5l
06		20	l	20	l	20	l	20	l	20	l	20	l

Score table for a 6 familes scenario

families with one cow	*families with two cows*	**family 1**		**family 2**		**family 3**		**family 4**	
		cows	*milk*	*cows*	*milk*	*cows*	*milk*	*cows*	*milk*
40		14	l	14	l1		4l	1	4l
31		13	l	13	l1		3l	25	l
22		12	l	12	l	25	l	25	l
13		11	l	22	l	22	l	22	l
04		20	l	20	l	20	l	20	l

Score table for a 4 families scenario

Result table template

round	**family 1**	**family 2**	**family 3**	**family 4**	**family 5**	**family 6**
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						